SX-100/200 SUPERSWITCH
Generic 205 - Volume I

◈ MITEL ®

SX-100™/SX-200™
SUPERSWITCH™
VOLUME I (GENERIC 205) DOCUMENT LIST

SECTION	TITLE	LOCATOR
MITL9105/9110-98-000	Documentation Index	
MITL9105-98-100	General Description (SX-100)	
MITL9110-98-100	General Description (SX-200)	
MITL9105/9110-98-105	Features and Services Description	
MITL9105-98-150	Physical Description and Ordering Information (SX-100)	
MITL9110-98-150	Physical Description and Ordering Information (SX-200)	
MITL9105/9110-98-180	Engineering Information	
MITL9105/9110-98-212	Multi Digit Toll Control	
MITL9105/9110-98-220	Speed Call	
MITL9105/9110-98-300	Attendant Console Description · Commercial	
MITL9105/9110-98-305	Attendant Console Description · Hotel/Motel	
MITL9105/9110-98-310	Programming and Maintenance Console Description	
MITL9105/9110-98-450	Traffic Measurement	
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MITL9105/9110-98-500	General Maintenance Information	

SX-100*/SX-200*

SUPERSWITCH*

ELECTRONIC PRIVATE AUTOMATIC BRANCH EXCHANGES

DOCUMENTATION INDEX

1. GENERAL

1.01 This section lists Mitel Standard Practices which have been issued pertaining to the SX-100 and SX-200 Private Automatic Branch Exchanges.

2. DOCUMENTATION INDEX

2.01 The complete set of Practices are contained in two volumes as listed in Tables 2-1 and 2-2. Volume I basically covers the description and operation of the PABX's; while Volume II is concerned with the installation and maintenance aspects of the systems.

2.02 Sections commencing with MITL9105- and MITL9110- contain information specific to the SX-100 and SX-200 PABX respectively, while those commmencing with MITL9105/9110- embrace both types of PABX.

TABLE 2-1
DOCUMENTATION INDEX - VOLUME I

MITL9105/9110-98-000	Documentation Index
MITL9105-98-100	General Description
MITL9110-98-100	General Description
MITL9105/9110-98-105	Feature and Services Description
MITL9105-98-150	Physical Description and Ordering Information
MITL9110-98-150	Physical Description and Ordering Information
MITL9105/9110-98-180	Engineering Information
MITL9105/9110-98-212	Multi Digit Toll Control
MITL9105/9110-98-220	Speed Call
MITL9105/9110-98-300	Attendant Console Description-Commercial
MITL9105/9110-98-305	Attendant Console Description-Hotel/Motel
MITL9105/9110-98-310	Programming and Maintenance Console Description
MITL9105/9110-98-450	Traffic Measurement
MITL9105/9110-98-451	Station Message Detail Recording
MITL9105/9110-98-500	General Maintenance Information

TABLE 2-2
DOCUMENTATION INDEX - VOLUME II

MITL9105/9110-98-000	Documentation Index
MITL9105/9110-98-200	Shipping Receiving and Installation
MITL9105/9110-98-205	Installation Forms
MITL9105/9110-98-210	System Programming
MITL9105/9110-98-215	Installation Test Procedures
MITL9105/9110-98-320	Extension Test Procedures
MITL9105/9110-98-350	Troubleshooting

SX-100*
SUPERSWITCH*
ELECTRONIC PRIVATE AUTOMATIC BRANCH EXCHANGE
GENERAL DESCRIPTION

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TABLE 1-1
Practice Index

VOLUME I	
SECTION NO.	**TITLE**
MITL9105/9110-98-000	Documentation Index
MITL9105-98-100	General Description
MITL9110-98-100	General Description
MITL9105/9110-98-105	Feature and Services Description
MITL9105-98-150	Physical Description and Ordering Information
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VOLUME II	
SECTION NO.	**TITLE**
MITL9105/9110-98-000	Documentation Index
MITL9105/9110-98-200	Shipping Receiving and Installation
MITL9105/9110-98-205	Installation Forms
MITL9105/9110-98-210	System Programming
MITL9105/9110-98-215	Installation Test Procedures
MITL9105/9110-98-320	Extension Test Procedures
MITL9105/9110-98-350	Troubleshooting

1. GENERAL

Introduction

1.01 This section contains a brief description of the SX-100. The section also details the physical and electrical characteristics of the system together with the installation and maintenance considerations. For complete details, refer to the required practice as listed in Table 1-1.

Reason for Reissue

1.02 This section has been reissued to update the general description of the SX-100 to Generic 205.

2. GENERAL DESCRIPTION

2.01 The SX-100 is an advanced Electronic Private Automatic Branch Exchange (PABX) employing digitally controlled solid-state space-

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division switching and stored program control. The SX-100 has a capacity of 160 ports. One hundred and twelve of the ports are available for assignments to lines, trunks and additional receivers. The remaining 48 ports are reserved for common control functions. Fig. 2-1 shows the maximum line and trunk configuration. The SX-100 is electrically compatible with most existing extension, key telephone, Private Branch Exchange (PBX) and Central Office (CO) equipment and provides—

- service to a maximum of four individual customers
- the use of a flexible numbering plan
- the simultaneous use of DTMF and rotary dial stations
- optional use of attendant consoles—2 maximum
- the sharing of attendant consoles between customers
- extensive selection of standard and optional features
- freedom from scheduled maintenance
- automatic diagnostics
- six power fail transfer trunks
- free standing, wall or rack mounting cabinet
- optional reserve power supply

2.02 The SX-100 consists of a single cabinet (containing the switching circuitry and the system power supplies) and a cordless desk type attendant console equipped with pushbutton dial pad and control keys. Connections between the equipment cabinet, the consoles, and the distribution frame are made using connectorized 25 pair cables.

2.03 Noiseless operation, exceptionally small size, and environmental tolerance allow a wide choice of locations for the equipment cabinet.

Maintenance

2.04 The modular design and functional packaging of the SX-100 system permits rapid location and replacement of defective equipment. Circuit malfunctions are detected by diagnostic routines automatically initiated by the CPU. These diagnostic routines which are detailed in
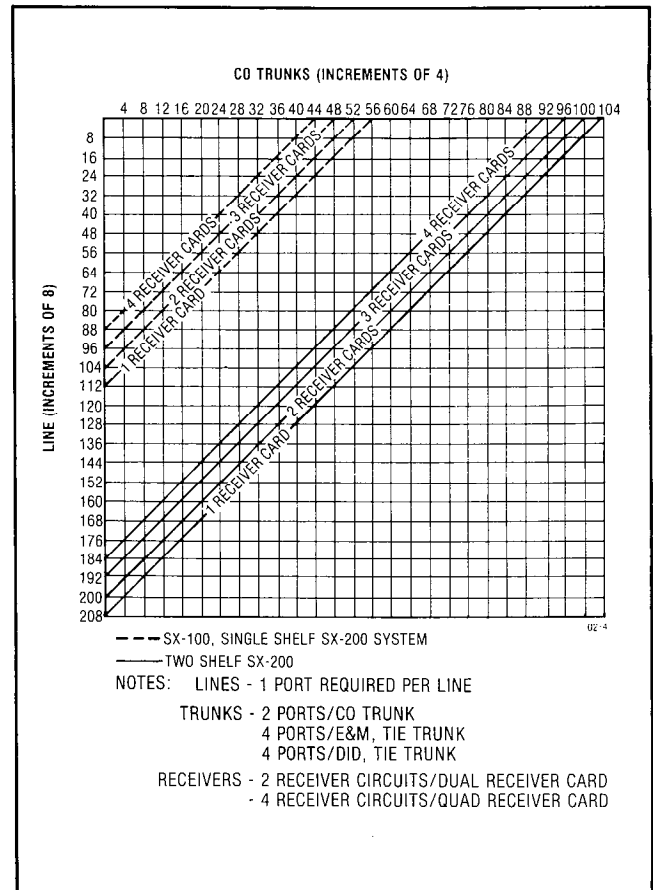

Fig. 2-1   Maximum Line and Trunk Configuration

MITL9105/9110-98-500 - MITL9105/9110-98-350 and the use of MITEL Action Procedures (MAP) locate the defective circuit card or assembly, and indicate to the service personnel the required field-replaceable unit. Diagnostic routines and maintenance procedures do not interfere with users not affected by the malfunction. Because the system employs only electronic circuits, preventative maintenance is not required.

2.05 System expansion is achieved by the addition of plug-in line and trunk printed circuit cards. Lines are added in increments of eight, CO trunks in increments of four, and tie trunks in increments of two.

Physical Description

2.06 The SX-100 equipment cabinet (See Fig. 2-2) is of metal construction and has the following dimensions: Height 16.62in. (422mm), width 25in. (635mm), and depth 18.5in. (470mm). The weight of a fully equipped PABX is approximately
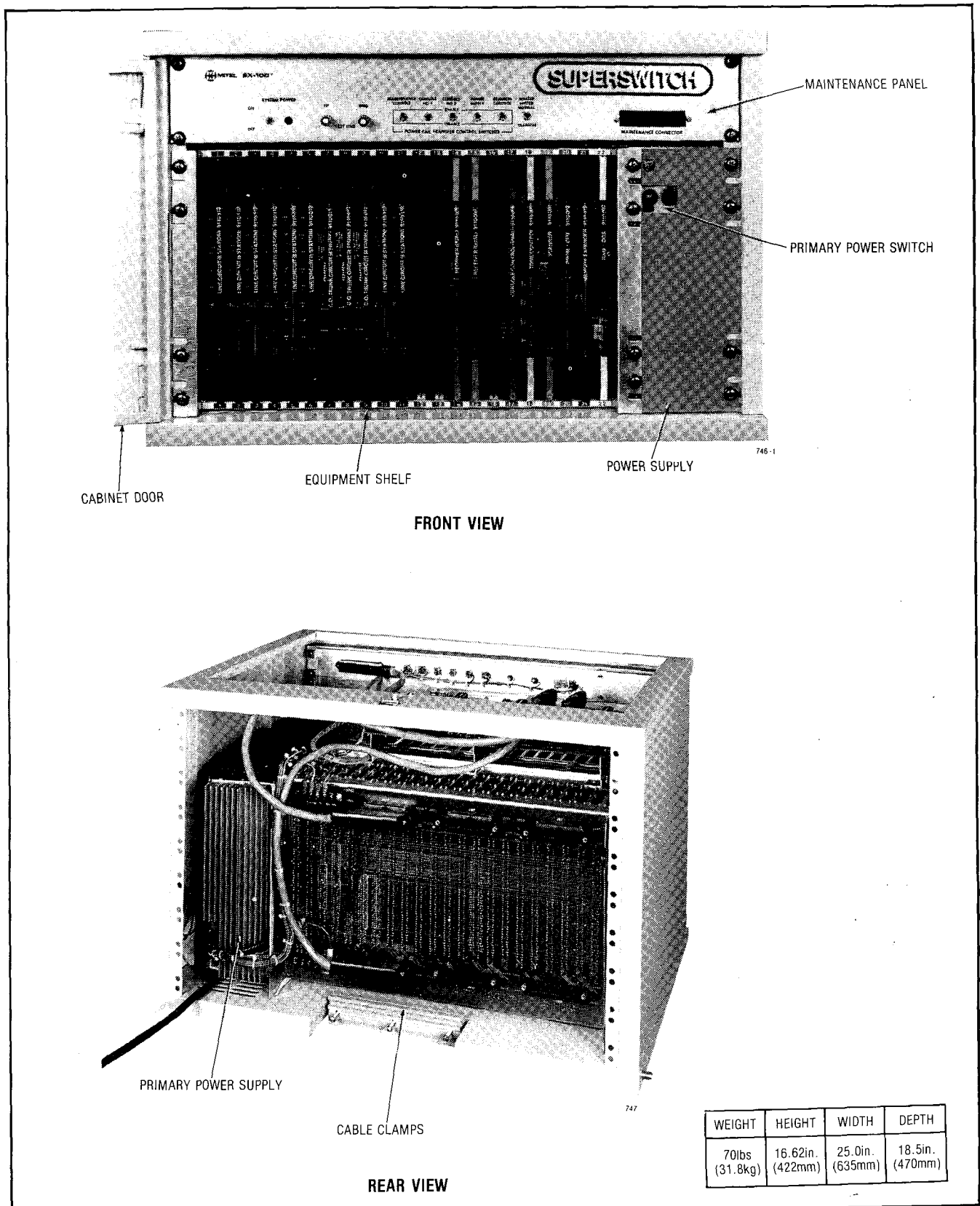
FRONT VIEW

REAR VIEW

WEIGHT	HEIGHT	WIDTH	DEPTH
70lbs (31.8kg)	16.62in. (422mm)	25.0in. (635mm)	18.5in. (470mm)

Fig. 2-2   Equipment Cabinet

70lbs (31.8kg). For a full description, see MITL9105/9110-98-150.

2.07 All connections from the cross-connecting terminals to the SX-100 equipment cabinet are made using connectorized cables. Connections between the cross-connecting terminals, the attendant console and external equipment are made in accordance with accepted practice.

2.08 A reserve power supply consisting of a fully enclosed steel casement of batteries and charger is available as an option. These batteries provide a minimum of two hours reserve power.

SX-100 Equipment Cabinet

2.09 The door on the front of the cabinet provides access to the system maintenance panel and the printed circuit cards. The removable rear panel provides access to the system power supply, and the line and trunk connections. Cable entry to the equipment cabinet is provided through a cable duct in the rear of the cabinet.

2.10 The equipment cabinet holds the maintenance panel, an equipment shelf, and the primary power supply.

Maintenance Panel

2.11 The maintenance panel, mounted at the top of the cabinet, provides access to the system from the maintenance console through a 50 pin connector. To the left of the maintenance plug is the master power fail transfer switch and five power fail transfer control switches. In addition, a test line is provided which allows service personnel to access individual lines and trunks.

Equipment Shelf

2.12 Mounted directly below the maintenance panel is the equipment shelf. This shelf contains the system control logic plus a number

of trunk, line, and receiver cards. All connections between shelves and external equipment are made by connectorized cables from the rear of the shelf. The system primary power supply, located to the right of the equipment shelf, converts the commercial input power to the required system voltage levels.

2.13 The equipment shelf holds up to 22 printed circuit cards which plug into the shelf backplane. On the rear of the backplane are a number of Amphenol plugs providing interconnections between the shelves and external equipment. In addition to the plugs are a number of screw down terminals allowing shelf connection to the primary power supply unit. The equipment shelf (Fig. 2-3) measures 10.75in. (273mm) high, 19in. (480mm) wide, 16.375in. (415mm) deep, and weighs approximately 27lbs (12.2kg) fully equipped.

Printed Circuit Cards

2.14 All circuit cards (Fig. 2-4) within the SX-100 are identical in construction and consist of a fiberglass board with printed wiring patterns on both of its faces. Riveted to the front of each board is a transparent faceplate which allows the LEDs mounted on the front of the boards to be easily seen. The two color-coded card extractors located at the top and bottom of the faceplate identify the card position within a shelf and ensure that the card is seated correctly in the backplane connector.

Primary Power Supply

2.15 The system primary power supply (Fig. 2-5), mounted to the right of the equipment shelf (total weight 15lbs (35Kg)) provides all system power from a 115Vac, 48Hz to 64Hz commercial supply.

Reserve Power Supply

2.16 The Reserve Power Supply is designed to maintain complete system operation for a minimum of two hours in the event of a commercial power failure. The batteries and the charger are enclosed in a metal casement that forms a pedestal for the SX-100 equipment cabinet weighing a total of 125lbs (56.7kg).
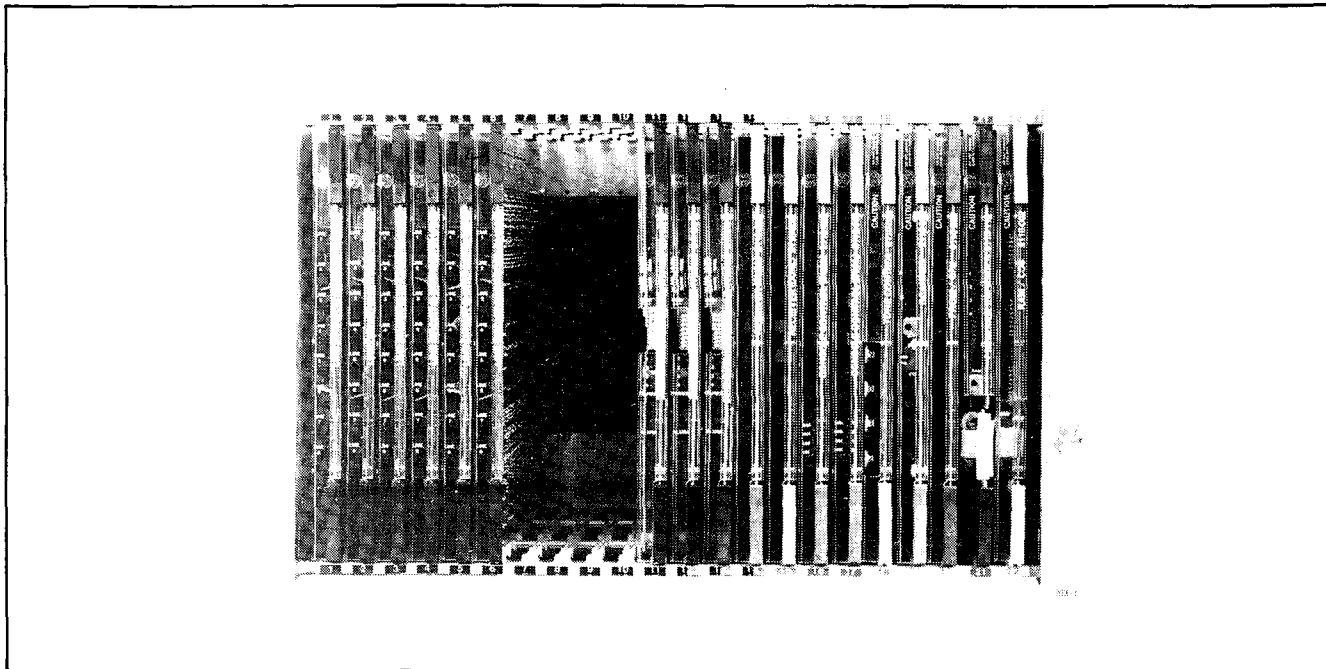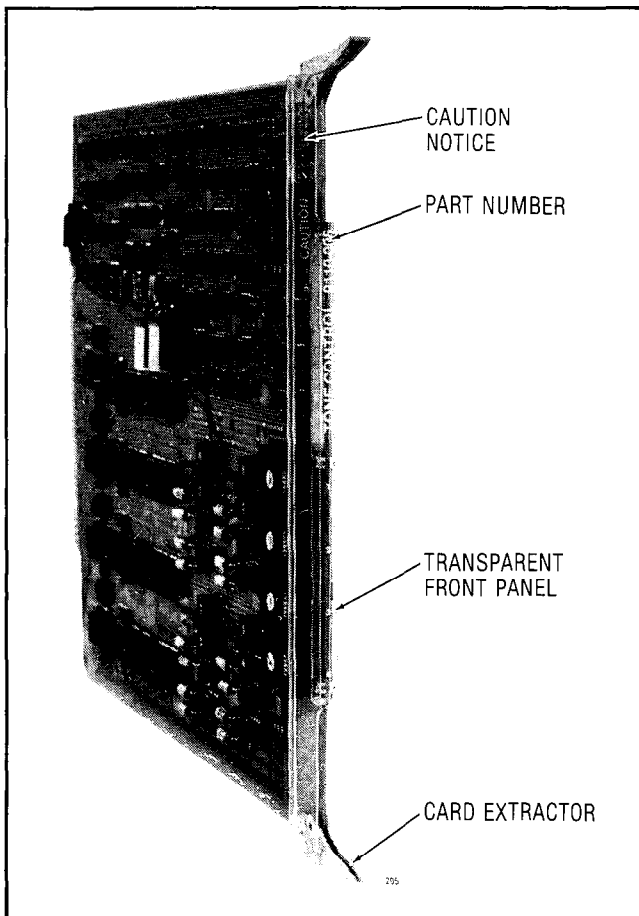
Fig. 2-3 Equipment Shelf

CAUTION
NOTICE

PART NUMBER

TRANSPARENT
FRONT PANEL

CARD EXTRACTOR

Fig. 2-4 Typical Printed Circuit Card

Attendant Console

2.17 The SX-100 attendant console (Fig. 2-6) is enclosed in a housing with a black plastic faceplate. Located on either side of the console are a pair of headset/handset jacks allowing simultaneous operation and supervision. The console keyboard holds three rows of ten nonlocking keys for the selection of features and completion of calls. On the right of the keyboard is a 12-key pushbutton dial pad. The console display, mounted above the keyboard, displays the active states of calls in progress. In addition to the call status display is a busy lamp field, a trunk group status field, a call waiting indicator, a digital clock, and three alarm indicators. The weight of the attendant console is approximately 13lbs (5.9kg) and its dimensions are: 13.75in. (350mm) wide, 6.8in. (176mm) high, 9.25in. (236mm) deep.

A complete description of the attendant consoles is given in sections MITL9105/9110-98-300 Attendant Console Description and MITL9105/9110-98-305 Attendant Console Hotel/Motel Description.

Maintenance Console

2.18 The construction of the maintenance console is identical to that of the attendant

INTERCONNECT BOARD

PRIMARY
POWER SUPPLY

EQUIPMENT SHELF
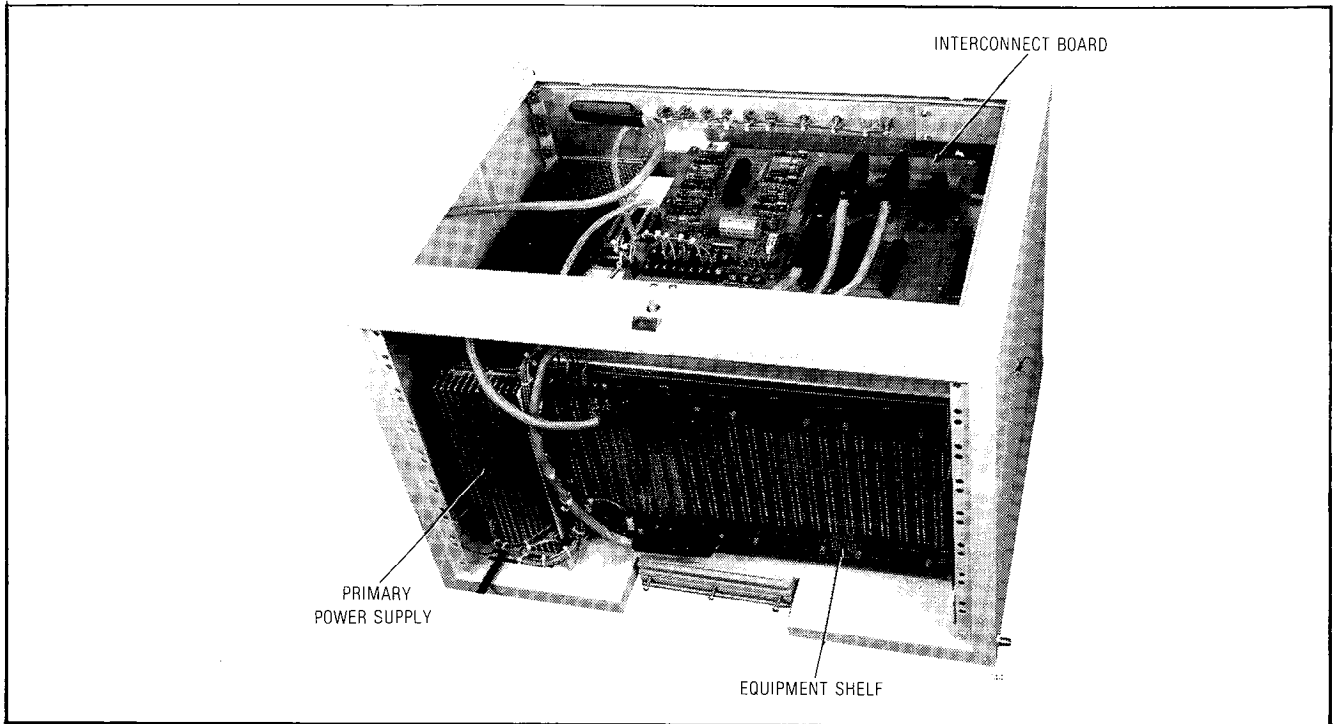
Fig. 2-5   Primary Power Supply
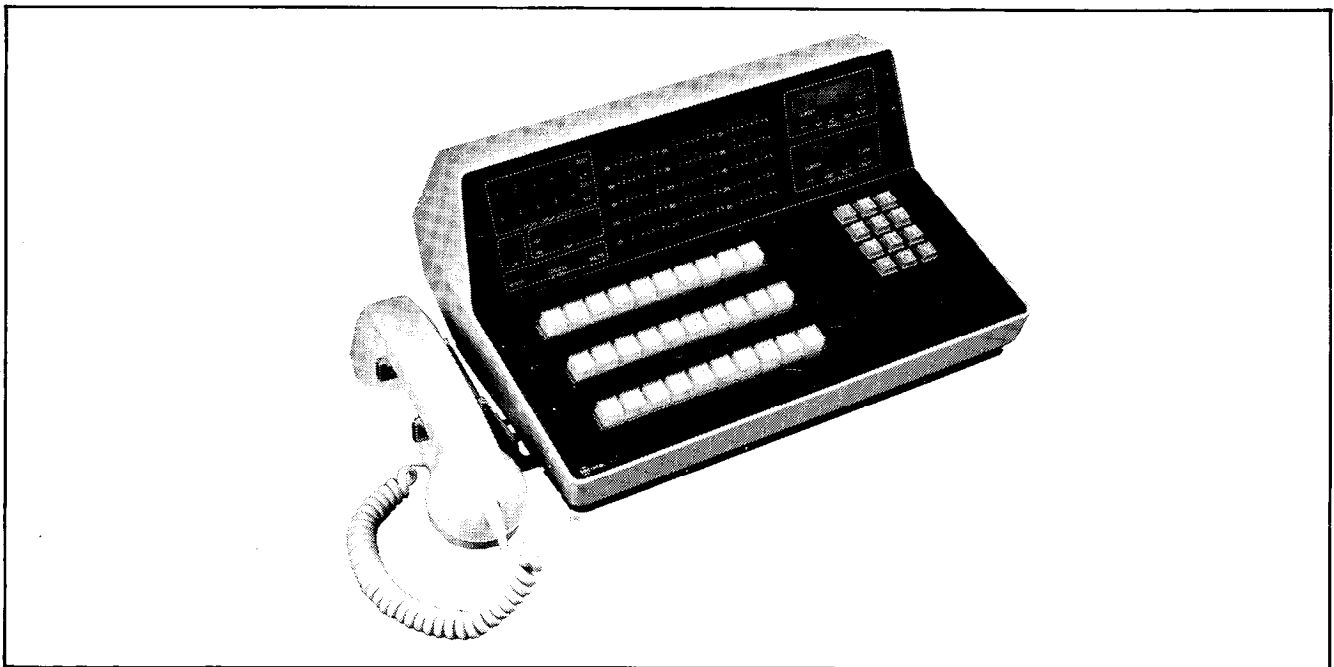
Fig. 2-6   Attendant Console

console, the only difference is in the functions of the call and feature selection keys. A complete description of the maintenance console is given in section MITL9105/9110-98-310 Maintenance Console Description.

Features

2.19   Features are provided with the SX-100 system in the form of Feature packages (Generics). Table 2-1 lists the contents of these Generics. For a detailed description refer to Section MITL9105/9110-98-105.

TABLE 2-1
SYSTEM FEATURES AND SERVICES

Feature	202	203	204	205
Account Codes				•
Alphanumeric Display for Attendant Position	•	•	•	•
Attendant Camp-On	•	•	•	•
Attendant CCSA Access		•	•	•
Attendant Console (Maximum 2)	•	•	•	•
Attendant Control of Trunk Group Access	•	•	•	•
Attendant Controlled Conference		•	•	•
Attendant Flash Over Trunks	•	•	•	•
Attendant Lockout	•	•	•	•
Attendant Position (2 Max.)	•	•	•	•
Attendant Transfer - All Calls	•	•	•	•
Automatic Callback Busy/Don't Answer (Station to Station Calls)	•	•	•	•
Automatic Callback - Busy (Station to Trunk)	•	•	•	•
Automatic Night Service Switching	•	•	•	•
Automatic Queuing to Attendant Position	•	•	•	•
Broker's Call	•	•	•	•
Busy Lamp Field	•	•	•	•
Busy Verification of Station Lines	•	•	•	•
Call Forwarding - All Calls	•	•	•	•
Call Forwarding - Busy And Don't Answer	•	•	•	•
Call Forwarding - Busy Line (DID)		•	•	•
Call Forwarding - Don't Answer (DID)		•	•	•
Call Hold		•	•	•
Call Pick-Up	•	•	•	•
Call Waiting Service				
Attendant Call Waiting	•	•	•	•
Terminating Call Waiting	•	•	•	•
Distinctive Tone Signals	•	•	•	•
Calling Number Display to Attendant	•	•	•	•
Calls Waiting Indication at Attendant Position	•	•	•	•
CCSA Access		•	•	•
Class of Service Display to Attendant	•	•	•	•
Code Calling Access	•	•	•	•
Code Restriction			•	•
Conference Calling	•	•	•	•
Contact Monitor†	•	•	•	•
Controlled Outward Restriction		•	•	•
Controlled Station-To-Station Restriction		•	•	•
Controlled Termination Restriction		•	•	•
Controlled Total Restriction		•	•	•
Data Restriction	•	•	•	•
Date Display on Console(s)			•	•
Diagnostics - Automatic	•	•	•	•
Dial Access to Attendant	•	•	•	•
Digital Clock on Attendant Position	•	•	•	•
Direct Department Calling (DDC)	•	•	•	•
Direct Inward Dialing (DID)		•	•	•
Direct Outward Dialing (DOD)	•	•	•	•
Direct Termination of Miscellaneous Circuits On Attendant Position (Paging)†	•	•	•	•
Direct Trunk Group Selection (DTGS)	•	•	•	•
Directed Call Pick-Up	•	•	•	•
Hold-For-Pick-Up Option	•	•	•	•
Distinctive Ringing	•	•	•	•
DTMF And/Or DCKP On Attendant Position	•	•	•	•
DTMF Calling	•	•	•	•
DTMF To Dial Pulse Conversion	•	•	•	•
Dump and Load of Customer Data			•	•
Executive Override	•	•	•	•
Flash for Attendant	•	•	•	•
Flexible Numbering of Stations	•	•	•	•
Foreign Exchange (FX) Access	•	•	•	•
Fully Restricted Station	•	•	•	•
Identified Trunk Group			•	•
Immediate Audible Ring on Attendant Handled Calls	•	•	•	•
Immediate Ring	•	•	•	•
Incoming Call Identification (ICI)	•	•	•	•
Indication of Camp-On	•	•	•	•
Intercept Treatment				
Attendant Intercept	•	•	•	•
Intercept Tone	•	•	•	•
Interposition Calling	•	•	•	•
Interposition Transfer	•	•	•	•
Inward Restriction		•	•	•
Line Lockout With Warning	•	•	•	•
Listed Directory Number (LDN) Service	•	•	•	•
Loudspeaker Paging†				
Direct Access by Attendant	•	•	•	•
Dial Access	•	•	•	•
Multizone	•	•	•	•
Priority Paging	•	•	•	•
Main/Satellite Service		•	•	•
Manual Originating Line Service	•	•	•	•
Manual Terminating Line Service		•	•	•
Meet Me Conference	•	•	•	•
Message Waiting (Audible)		•	•	•
Message Waiting (Lamp)		•	•	•
Miscellaneous Trunk Restriction	•	•	•	•
Multiple Listed Directory Numbers (LDN)	•	•	•	•
Multiple Access Codes for a single trunk group (10 max.)			•	•
Music On Hold†	•	•	•	•
Music on Attendant Position Hold†	•	•	•	•
Night Console Position	•	•	•	•
Night Service				
Fixed	•	•	•	•
Flexible	•	•	•	•
Night Station Service - Fixed Service	•	•	•	•
Night Station Service - Full Service	•	•	•	•
Origination Restriction	•	•	•	•
Outgoing Trunk Call Back	•	•	•	•
Outgoing Trunk Camp-On	•	•	•	•
Outgoing Trunk Queueing	•	•	•	•
Outward Restriction	•	•	•	•
Power Failure Transfer - Station	•	•	•	•
Priority Queue	•	•	•	•
Privacy and Lockout	•	•	•	•
Radio Paging Access†	•	•	•	•
Recall Dial Tone	•	•	•	•
Recorded Telephone Dictation Access†	•	•	•	•
Remote Access to PBX Services	•	•	•	•
Remote Administration and Maintenance (hardware option)	•	•	•	•
Rering From Toll (on Toll Terminal)	•	•	•	•
Reserve Power (hardware option)	•	•	•	•
Room Audit			•	
Room Status		•	•	•
Rotary Dial Calling	•	•	•	•
Route Advance	•	•	•	•
Saved Number Redial				•
Serial Call	•	•	•	•
Sharing (4 Tenant)		•	•	•
Shared Attendant Service		•	•	•
Single Digit Dialing (Non-conflicting)	•	•	•	•

† Requires external customer provided equipment

TABLE 2-1 (CONT'D)
SYSTEM FEATURES AND SERVICES

	202	203	204	205
Single Digit Dialing (Conflicting)		•	•	•
Speed Call				
System - wide				•
Personal				•
Splitting				
One-Way Manual Splitting	•	•	•	•
Two-Way Manual Splitting	•	•	•	•
One-Way Automatic Splitting	•	•	•	•
Two-Way Automatic Splitting	•	•	•	•
Station Hunting				
Terminal Hunting	•	•	•	•
Circular Hunting	•	•	•	•
Secretarial Hunting	•	•	•	•
Station Message Detail Recording				•
Station Message Register Service		•	•	•
Electronic Storage and Display		•	•	•
Internal Charging		•	•	•
Station Override Security	•	•	•	•
Station-to-Station Calling	•	•	•	•
Straightforward Outward Completion	•	•	•	•
Switched Loop Operation	•	•	•	•
Tandem Tie Trunk Switching		•	•	•
Termination Restriction	•	•	•	•
Threeway Conference Transfer	•	•	•	•
Through Dialing	•	•	•	•

	202	203	204	205
Tie Trunk Access	•	•	•	•
Timed Reminders	•	•	•	•
Toll Restriction				
Battery Reversal	•	•	•	•
0/1 Access	•	•	•	•
Multi Digit			•	•
Toll Terminal Access	•	•	•	•
Total "Do Not Disturb" Display		•	•	•
Total "Message Waiting" Display		•	•	•
Total "Room Status" Display		•	•	•
Traffic Data Collection†				•
Traffic Display to Customer				•
Transfer into Busy		•	•	•
Trunk Answer From Any Station	•	•	•	•
Trunk Group Busy (TGB) Indicators on Attendant Position	•	•	•	•
Trunk Status Field	•	•	•	•
Trunk-To-Trunk Connections	•	•	•	•
Trunk Verification by Customer (TVC)	•	•	•	•
Trunk Verification by Station (TVS)	•	•	•	•
Uniform Call Distribution (UCD)	•	•	•	•
Wake-Up Service				•
WATS Access	•	•	•	•
Wideband Data Switching	•	•	•	•
Wide Frequency Tolerant Power Plant	•	•	•	•

† Requires external customer provided equipment

1309 -4

Feature Provisioning

2.20 All station features provided by the SX-100 may be grouped into different classes of service, each class of service (a maximum of 16) may contain any mixture of features. Feature installation consists of entering into the system memory the number of the station to which the features are to be assigned, followed by the required class of service code. All data entries into the system may be made from the attendant, or maintenance consoles. To prevent the loss of customer data in the event of a complete system power failure, the memory holding the data associated with each line or trunk is equipped with its own reserve power supply. This power supply is sufficient to maintain the memory intact for a period of 4 weeks.

Electrical Characteristics

2.21 The electrical characteristics of the SX-100 are listed in Table 2-2.

2.22 The SX-100 is designed to operate from a 48Vdc source. This can be provided by the customer from a suitable source of 48Vdc.

2.23 In the event of a power failure with no reserve power available, the SX-100 can be arranged to automatically connect up to six Central Office trunks to pre-selected extensions.

3. SYSTEM OPERATION

3.01 The SX-100 is a solid-state PABX employing space division switching and microprocessor control of call processing. A block diagram of the PABX is shown in Fig. 3-1.

TABLE 2-2
SX-100 ELECTRICAL CHARACTERISTICS

Station Loop Limit	1200 ohms including set
Maximum Number of Ringers per Line	7
Ringing	90V, 20Hz - immediate ringing (option of 17Hz or 25Hz)
Standard	1s on, 3s off
Special	0.5s on, 0.5s off, 0.5s on, 2.5s off
Ring Trip	During silent or ringing period
Dial Tone	350/440Hz, continuous
Transfer Dial Tone	350/440Hz, 3 bursts of 100ms, then continuous
Busy Tone	480/620Hz, interrupted at 60ipm
Special Busy Tone	350/440Hz interrupted at 60ipm
Standard Ringback Tone	440/480Hz, 1s on, 3s off
Special Ringback Tone	440/480Hz, 0.5s on, 0.5s off, 0.5s on, 2.5s off
Callback	6 rings of standard ringing
Reorder Tone	480/620Hz, interrupted at 120ipm
Conference Tone	440Hz, 1 burst of 1s
Camp-On Tone	440Hz, one burst of 200ms for station camp-on
	440Hz, two bursts 100ms on, 50ms off, 100ms on for trunk camp-on
Override Tone	440Hz, one burst of 800ms followed by a 200ms burst every 6s
Crosstalk Attenuation	75dB minimum
Insertion Loss,	
Station-to-Station	5dB ± 0.5dB at 1004Hz
Station-to-Trunk	0.5dB ± 0.3dB at 1004Hz
Trunk-to-Trunk	0.5dB ± 0.3dB at 1004Hz
Longitudinal Balance	54dB minimum, 200-3000Hz
Return Loss	14dB minimum
Idle Circuit Noise	16dBrnC maximum
Impulse Noise	No counts over 46dBrnC
Envelope Delay Difference	200μs maximum
System Impedance	600 ohms nominal for lines
	600 or 900 ohms nominal for trunks
Traffic Capacity	7.5ccs/line minimum at 100 lines at P = 0.01
Primary Power	100-125V, 47-63Hz, 4A maximum
Central Office Trunk Loop Limit	1600 ohms
Maximum Distance of Console from Equipment	1000ft. (300m) of 26AWG cable
Operating Environment	0°C to 40°C, 10% to 90% Relative Humidity

3.02 The SX-100 has a capacity of 112 ports which may be assigned to receivers, lines, and trunks. The ports are scanned sequentially for detection of signals every 3.2 milliseconds.

3.03 Call origination is detected during scanning, an interrupt signal to the microprocessor is generated, and a speech path and receiver are assigned to the originating station. After dialing, the receiver is released and the called party is connected to the same speech path as the originator. There are 31 speech paths available in the SX-100, and each of the 112 ports has access to all 31 speech paths.
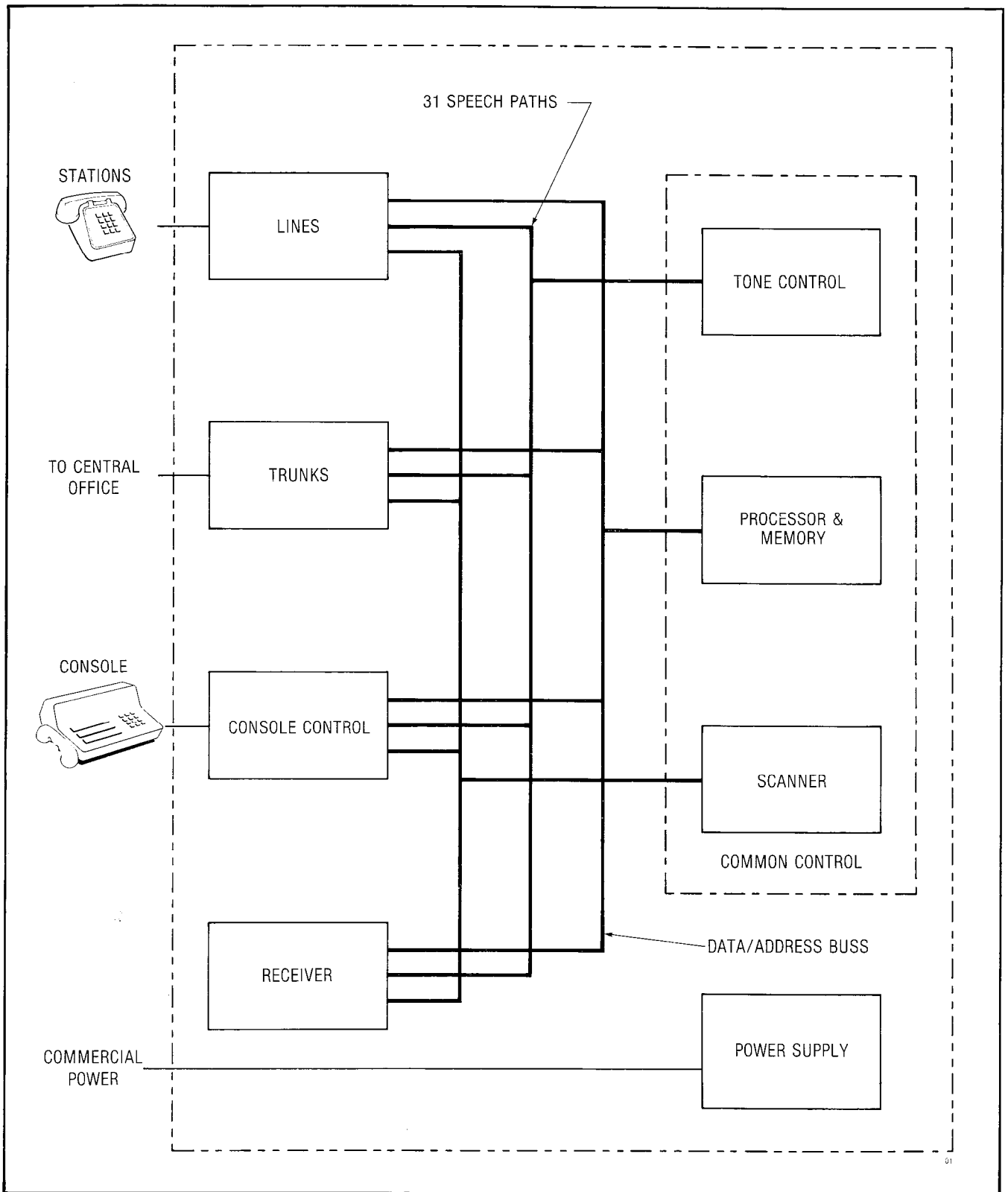
Fig. 3-1   SX-100 Block Diagram

The diagram contains the following labels:

- 31 SPEECH PATHS
- STATIONS
- LINES
- TONE CONTROL
- TO CENTRAL OFFICE
- TRUNKS
- PROCESSOR & MEMORY
- CONSOLE
- CONSOLE CONTROL
- SCANNER
- COMMON CONTROL
- DATA/ADDRESS BUSS
- RECEIVER
- COMMERCIAL POWER
- POWER SUPPLY

4. SYSTEM CONFIGURATION

General

4.01 Fig. 4-1 illustrates the SX-100 cabinet layout.

Equipment Shelf

4.02 The equipment shelf contains the five common control cards plus the required number of line, trunk, console control, and receiver cards. The common control cards are color coded and held in card positions 18 through 22. The console control cards occupy positions 16 and 17, and the first receiver card position 15. These card positions are fixed for all systems. Card positions 1 through 14 may be equipped with line, trunk or receiver cards as shown in Fig. 4-2.

FRONT VIEW

REAR VIEW
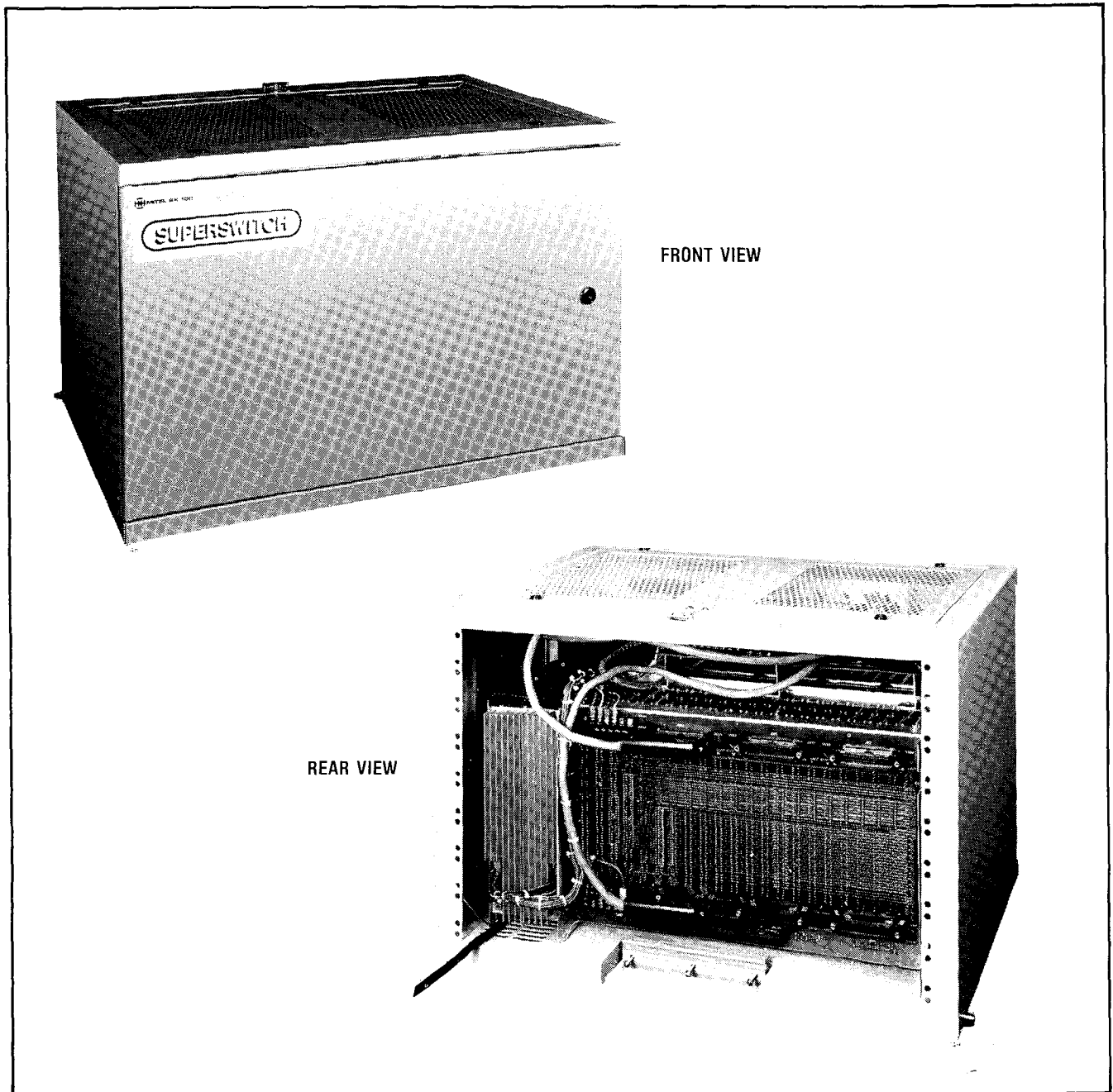
Fig. 4-1 Cabinet Layout
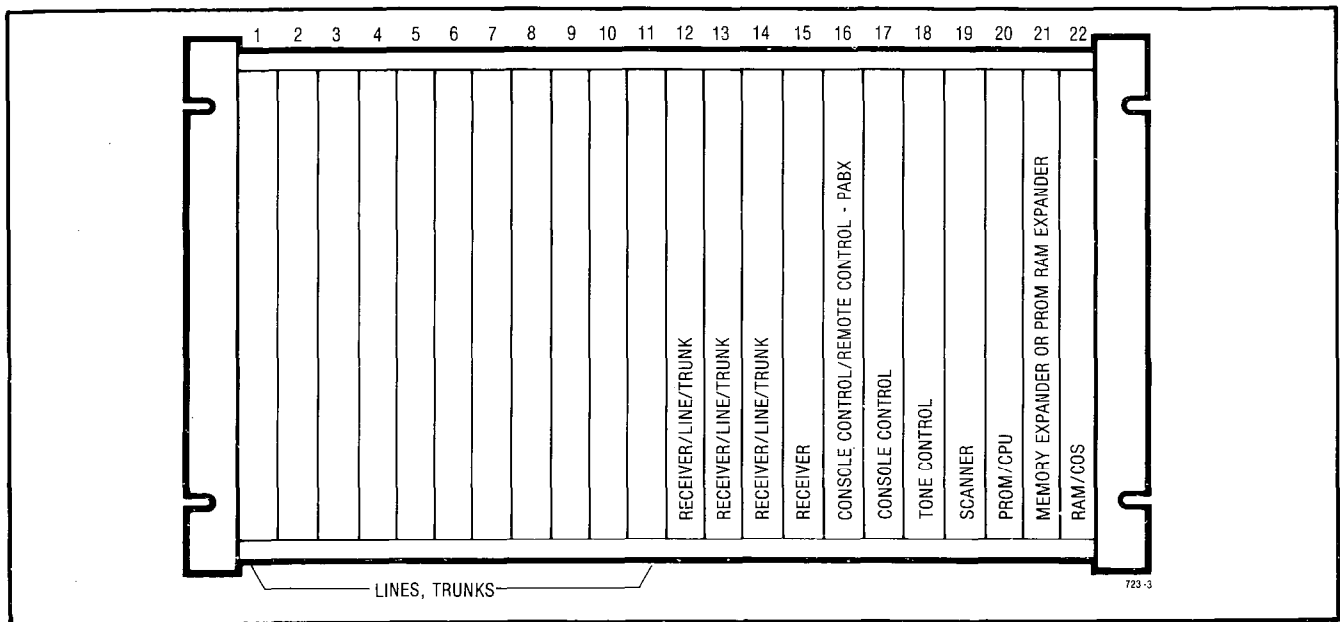
Fig. 4-2 Shelf Card Position

- **Line Card** Provides 8 line circuits which serve as interfaces between the station equipment and SX-100 switching circuitry.

- **Trunk Card** Provide either interfacing between the Central Office and the SX-100 switching circuitry for 4 trunks or between other PABX's and the SX-100 for 2 tie trunks.

- **Receiver Card** The Dual Receiver or Quad Receiver Cards respectively contain two or four sets of rotary dial and DTMF receivers, which are used to detect dialed digits, and transfer them to a temporary store for call processing.

- **Console Control Card** This printed circuit card provides the interface between the common control and two consoles. The first console control card (in position 17) is assigned to Attendant Console 1 and the Maintenance Console. The second console control card (in position 16) is assigned to Attendant Console 2.

- **Remote Control - PABX** This card allows the PABX to be accessed from a remote maintenance centre for the purpose of conducting administrative, maintenance and test routines on the PABX. The card is not normally supplied with the PABX and forms part of the RMAT System (consult Section MITL9105/9110-98-101 Remote Maintenance Administration and Test System).

- **Tone Control Card** All call progress tones, along with DTMF and rotary dial pulse generators, voice paging circuitry and speech path testing functions are supplied by this card.

- **Scanner Card** Sequentially scans all ports to detect signals that require processor action. This card also contains the night bell relays, the paging control relays, 2 digit display and the master reset button.

- **PROM/CPU Card** Contains part of the operating software in the form of a PROM card module. This card contains the microprocessor and associated circuitry.

- **Memory Expander** card provides additional memory space for the operating programs.

- **PROM/RAM Expander Card** is identical to the memory expander card with the exception of additional CMOS-RAM memory for customer data (Speed Call, Automatic Wakeup, Toll Control).

- **RAM/COS** provides CMOS-RAM memory for customer data and a scratch pad RAM. The CMOS memory is protected from power failure by a card mounted battery pack.

Primary Power Supply

4.03 The SX-100 power supply generates 48Vdc from a 115Vac power main input, and uses the 48Vdc to derive the system operating voltages of +8V, −5V, −10V, −48V and 90Vac ringing voltage.

4.04 The power failure transfer relays allow for the connection of up to 6 Central Office trunks to selected PABX stations in the event of a major system failure or a power failure.

Reserve Power Supply

4.05 The reserve power supply is designed to maintain complete system operation for a minimum of two hours in the event of a primary power failure. The reserve power supply is housed in a completely enclosed unit and forms a base unit on which the standard SX-100 cabinet can be mounted. A cable harness is supplied to interconnect the two units. In the case of wall mounted version of the SX-100 the reserve power supply may be installed adjacent to the SX-100.

Attendant Console

4.06 The layout of the SX-100/200 attendant console is shown in Fig. 4-3. The three rows of buttons on the console faceplate are used to select and handle calls. Each button has a light emitting diode (LED) associated with it to indicate the operational status of the button.

4.07 The console display area provides the attendant with specific information concerning the call which is being handled as well as general information such as the time of day, and the busy/idle status of PABX stations and trunk groups.

4.08 A brief description of the display, and the functions of each pushbutton is given below.

Console Display

4.09 Housed on the upper face of the console are the following displays:

- **TRUNK GROUP STATUS** One LED per trunk group is used to signal the busy status of the group (BUSY). Another LED per trunk group is used to indicate that the attendant has changed the trunk group from dial access to attendant access (ATT). These indications are provided for up to 10 trunk groups.
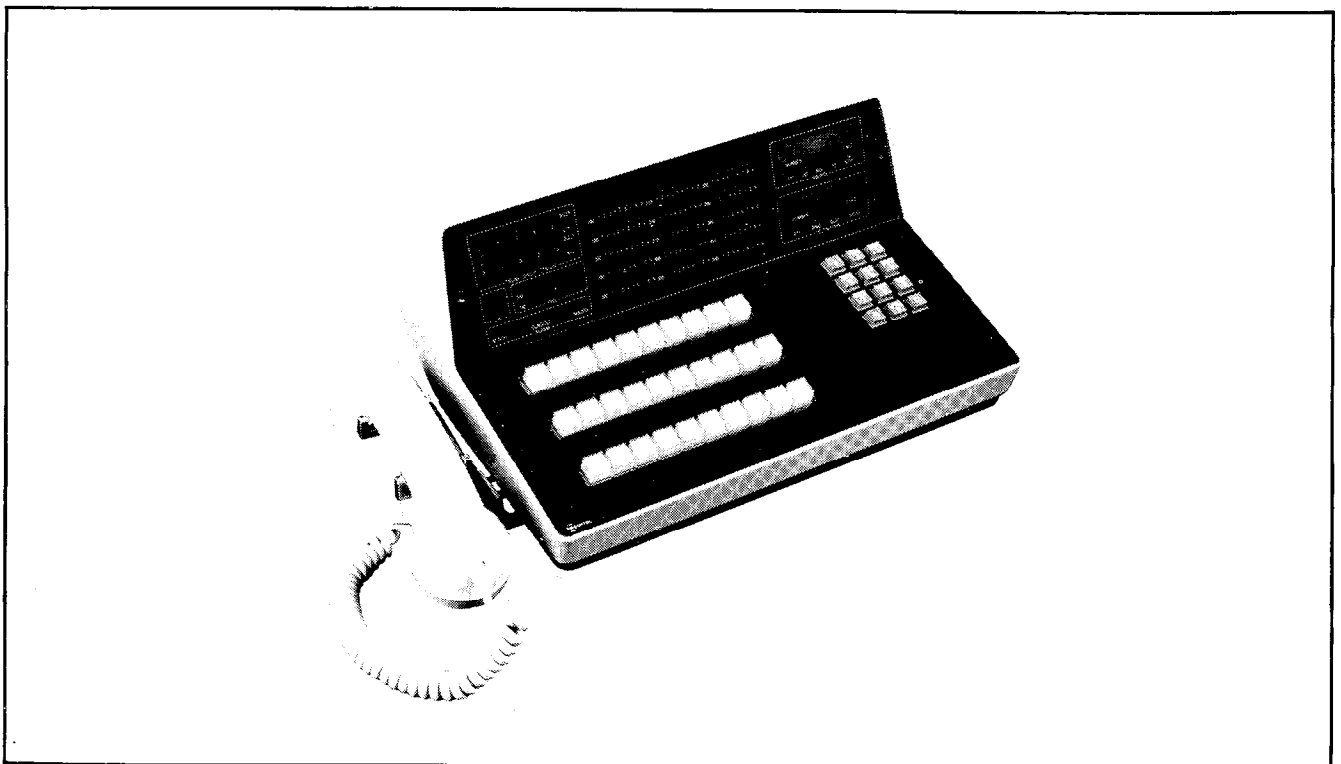

Fig. 4-3   Attendant Console

- **CALL WAITING (CW)** Indicates how many calls to the console are waiting to be answered.

- **TIME** A 12 hour or 24 hour digital clock is provided as a standard item. This display may optionally show the date.

- **ALARM** This area contains three LEDs labelled MAJOR, CONSOLE, and MINOR. A MAJOR alarm indicates a serious system malfunction and that failure transfer circuits have operated. A CONSOLE alarm indicates a console malfunction, and a MINOR alarm indicates that a non-essential circuit malfunction has been detected by the system.

- **BUSY LAMP FIELD** The centre of the display area contains the busy lamp field which provides a LED for each of 150 stations or trunks. When a station or trunk is busy, the associated LED is illuminated.

- **SOURCE** This area provides specific information about any party who calls the attendant.
  NUMBER Displays the calling number.
  CLASS Displays the calling party class-of-service.
  ATT. Indicates that the attendant is talking to the calling party.
  INT. Identifies the call as an intercept call.
  RCL Identifies the call as a recall.
  DID Identifies the call as a Direct Inward Dial call to the attendant.
  MAN Identifies the call as a Manual Line Service call.

- **DESTINATION** The destination area supplies specific information about the party called by the attendant.
  NUMBER Displays the number of the called party.
  CLASS Displays the class-of-service of the called party.
  ATT Indicates that the attendant is talking to the called party.
  RING Indicates that the called party is ringing.
  BUSY Indicates that the called party is busy.
  ERROR Indicates to the attendant that an invalid number has been dialed.

Console Faceplate

4.10 The console faceplate holds the following buttons:

- **LAMP TEST** This button, when pressed, causes all the console LEDs and seven-segment displays to turn on. In this way faulty LEDs or displays can be readily detected.

- **ALARM RESET** This button is pressed to reset the audible alarm signal in the event of an alarm and also displays an alarm identification code in the Source and Destination display areas.

- **BELL OFF** The console bell is disabled when this button is pressed. The LED associated with the button indicates the bell off condition. The bell can be reactivated by pressing the button again.

- **IDENT.** In the event of a faulty connection through the console, operation of this button will display the circuits used in the connection. The circuits used are displayed for as long as the button is held down. When the console is idle pressing the ident key identifies the software generic and revision level installed in the PABX and the console identification.

- **NIGHT 1** This button is used to switch the PABX into and out of night service 1. The associated LED when lit indicates that the PABX is in night service 1.

- **NIGHT 2** This button is used to switch the PABX into and out of night service 2. The associated LED when lit, indicates that night service 2 has been selected. Night service 1 and night service 2 are mutually exclusive.

- **ROOM RESTR** The ROOM RESTR button is used to prevent unauthorized outgoing calls from guest rooms when they are vacant.

- **MSGE WAIT** This feature is enabled by the attendant calling a room and pressing the MSGE WAIT button. This causes the room telephone to receive a burst of 3 rings every 20 minutes.

• **CALLBACK** This button allows the attendant to access the automatic callback feature.

• **CANCEL** The cancel button is used to cancel a misdialed or busy call.

• **HOLD 1-4** The attendant can place a current call on hold by pressing one of the hold buttons. The associated LED will light to indicate that the hold circuit is busy.

• **CALL BLOCK** Rooms may be restricted from calling other rooms for specific time periods.

• **FLASH** This button is pressed to flash the telephone company operator on long distance calls.

• **SERIAL CALL** This button is pressed to enable incoming Central Office calls to recall to the console when the called station hangs up.

• **GUEST ROOM** When this button is pressed and the room number dialed certain information will be displayed.

   (1) The room number and the "Message Register" status appears in the SOURCE display.

   (2) "Room Status" indicated by a digit (followed by "." if the maid is in the room) in the DESTINATION display.

   (3) The "Do Not Disturb" status (indicated by Do Not Disturb lamp)

   (4) The "Message Waiting" status (indicated by MSGE WAIT lamp)

   (5) The "Controlled Outgoing Restriction" status (indicated by ROOM RESTR lamp)

   (6) Automatic Wakeup

• **CONF.** The conference button is used to set up an attendant conference. The associated LED flashes to indicate a recall from the conference, and remains in a

steady on condition to indicate that the conference circuit is in use.

• **PAGE** Pressing the page button gives the attendant access to the paging equipment for as long as the button is held down. The associated LED indicates that the paging circuit is in use.

• **OVERRIDE** This button allows the attendant to override an existing conversation.

• **REL** The release button is used to release the attendant from connections made through the console.

• **RECALL** The LED associated with the RECALL button flashes to indicate a recall to the attendant. The recall may be answered by pressing the RECALL or ANSWER button. After answering, both the RECALL and ANSWER LED's remain in a steady on condition.

• **DO NOT DISTURB** This feature enables a guest at his request not to receive incoming calls.

• **DIAL 0** This button flashes to indicate a dial "0" call which may be answered by pressing the DIAL 0 or ANSWER buttons. After answering, both the ANSWER and DIAL 0 LED's remain in a steady on condition.

• **LDN 1-4** The LED's associated with these four buttons flash to indicate up to four different types of incoming trunk calls (e.g. FX, CO, WATS, TIE). These may be answered by pressing the appropriate LDN button or the ANSWER button. After answering, both the LDN and ANSWER LED's remain in a steady on condition.

• **SOURCE** This button is pressed to split the attendant to the source side of a call. The LED indicates the split condition to the source.

• **BOTH** This button is pressed to connect the attendant to both the source and destination parties. The associated LED lights to indicate the three-way connection.

- **DEST** The destination button is pressed to connect the attendant to the destination side of a call. The associated LED is activated whenever the attendant is split to the destination.

- **ANSWER** This is a common answer button for calls appearing on the RECALL, DIAL 0, and LDN 1-4 buttons. The ANSWER LED flashes when any incoming call appears on the console, and remains in a steady on condition when the call is answered.

- **ROOM STATUS** The function of this button is to monitor the status of each room. Pressing this button and dialing one of five possible single-digit codes indicates, on the BUSY LAMP FIELD display, which rooms correspond to a particular status condition.

4.11 In addition to the buttons and LEDs described above, the console has a 12 digit key pad which is used for dialing all calls, an emergency transfer switch (mounted on the base of the console) which switches the PABX into failure transfer mode, and a volume control (mounted on the right side of the console) to vary the bell volume.

4.12 All console buttons are non-locking.

5. INSTALLATION & MAINTENANCE CONSIDERATIONS

Installation

5.01 Installation of the SX-100 is simplified by the use of connector-ended cables and plug-in printed circuit cards. The SX-100 is shipped with all printed circuit cards in place, and with a complete set of installation and maintenance documentation.

5.02 Expansion of the SX-100 is achieved by the addition of printed circuit cards and appropriate programming. Instructions covering all aspects of expansion are included in the installation and maintenance documentation.

Maintenance

5.03 Maintenance of the SX-100 is enhanced by the automatic diagnostics which, in most cases, can pinpoint faults to a printed circuit card. The repair person can also use a test line to select paths through the PABX in order to isolate faults. A system malfunction may be corrected by the replacement of a printed circuit card. Should a fault develop on a shelf backplane, the shelf assembly itself is easily replaced.

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SX-200*
SUPERSWITCH*
ELECTRONIC PRIVATE AUTOMATIC BRANCH EXCHANGE
GENERAL DESCRIPTION

CONTENTS | PAGE

1. GENERAL

Introduction

1.01 This section contains a brief description of the SX-200. This section also details the physical and electrical characteristics of the system together with the installation and maintenance considerations. For complete details, refer to the required practice as listed in Table 1-1.

Reason For Reissue

1.02 This section has been reissued to update the general description of the SX-200 for Generic 205.

2.01 The SX-200 is an advanced Electronic Private Automatic Branch Exchange (PABX) employing digitally controlled solid-state space-

TABLE 1-1
Practice Index

VOLUME I	
SECTION NO.	**TITLE**
MITL9105/9110-98-000	Documentation Index
MITL9105-98-100	General Description
MITL9110-98-100	General Description
MITL9105/9110-98-105	Feature and Services Description
MITL9105-98-150	Physical Description and Ordering Information
MITL9110-98-150	Physical Description and Ordering Information
MITL9105/9110-98-180	Engineering Information
MITL9105/9110-98-212	Multi Digit Toll Control
MITL9105/9110-98-220	Speed Call
MITL9105/9110-98-300	Attendant Console Description-Commercial
MITL9105/9110-98-305	Attendant Console Description-Hotel/Motel
MITL9105/9110-98-310	Programming and Maintenance Console Description
MITL9105/9110-98-450	Traffic Measurement
MITL9105/9110-98-451	Station Message Detail Recording
MITL9105/9110-98-500	General Maintenance Information

VOLUME II	
SECTION NO.	**TITLE**
MITL9105/9110-98-000	Documentation Index
MITL9105/9110-98-200	Shipping Receiving and Installation
MITL9105/9110-98-205	Installation Forms
MITL9105/9110-98-210	System Programming
MITL9105/9110-98-215	Installation Test Procedures
MITL9105/9110-98-320	Extension Test Procedures
MITL9105/9110-98-350	Troubleshooting

CO TRUNKS (INCREMENTS OF 4)

- - - SX-100, SINGLE SHELF SX-200 SYSTEM
—— TWO SHELF SX-200

NOTES: LINES - 1 PORT REQUIRED PER LINE

TRUNKS - 2 PORTS/CO TRUNK
4 PORTS/E&M, TIE TRUNK
4 PORTS/DID, TIE TRUNK

RECEIVERS - 2 RECEIVER CIRCUITS/DUAL RECEIVER CARD
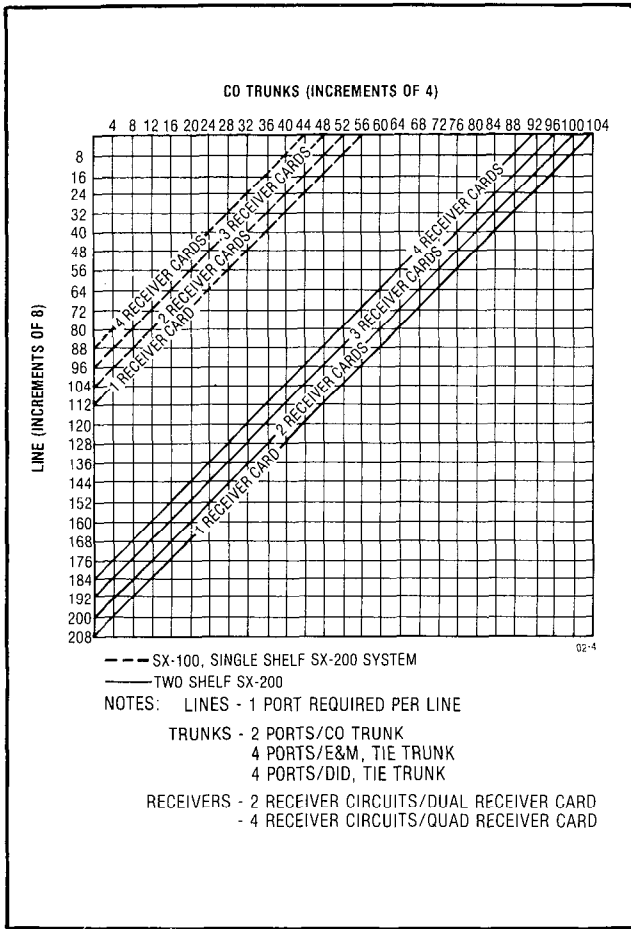- 4 RECEIVER CIRCUITS/QUAD RECEIVER CARD

Fig. 2-1   Maximum Line and Trunk Configuration

division switching and stored program control. The SX-200 has a capacity of 256 ports. Two hundred and eight of the ports are available for assignments to lines, trunks and additional receivers. The remaining 48 ports are reserved for common control functions. Figure 2-1 shows the maximum line and trunk configuration. The SX-200 is electrically compatible with most existing extension, key telephone, Private Branch Exchange (PBX) and Central Office (CO) equipment and provides:

- service to a maximum of four individual customers

- the use of a flexible numbering plan

- the simultaneous use of DTMF and rotary dial stations

- optional use of attendant consoles - 2 maximum

- the sharing of attendant consoles between customers

- extensive selection of standard and optional features

- freedom from scheduled maintenance

- automatic diagnostics

- twelve power fail transfer circuits

- optional reserve power supply

2.02   The SX-200 consists of a single cabinet (containing the switching circuitry and the system power supplies) and a cordless desk type attendant console equipped with pushbutton dial pad and control keys. Connections between the equipment cabinet, the consoles, and the distribution frame are made using connectorized 25 pair cables.

2.03   Noiseless operation, exceptionally small size, and environmental tolerance allow a wide choice of locations for the equipment cabinet.

Maintenance

2.04   The modular design and functional packaging of the SX-200 system permits rapid location and replacement of defective equipment. Circuit malfunctions are detected by diagnostic routines automatically initiated by the CPU. These diagnostic routines, which are detailed in MITL9105/9110-98-500 and MITL9105/9110-98-350, and the use of Mitel Action Procedures (MAP) locate the defective circuit card or assembly, and indicate to the service personnel the required field-replaceable unit. Diagnostic routines and maintenance procedures do not interfere with users not affected by the malfunction. Because the system employs only electronic circuits, preventative maintenance is not required.

2.05   System expansion is achieved by the addition of plug-in line and trunk printed circuit cards. Lines are added in increments of eight. CO trunks in increments of four, and tie trunks in increments of two.

Physical Description

2.06 The SX-200 equipment cabinet (See Fig. 2-2) is of metal construction and has the following dimensions: Height 38in. (960mm), width 23.5in. (600mm), and depth 27.5in. (700mm). The weight of a fully equipped PABX is approximately 290lbs. (131.7kg).

2.07 All connections from the cross-connecting terminals to the SX-200 equipment cabinet are made using connectorized cables. Connections between the cross-connecting terminals and external equipment are made in accordance with accepted practice.

2.08 A reserve power supply and battery charging system are available as an option. The reserve power supply is designed to maintain system operation for a minimum of two hours in the event of a primary power failure.

SX-200 Equipment Cabinet

2.09 The door on the front of the cabinet provides access to the system maintenance panel, printed circuit cards and reserve battery supply shelf. The hinged rear panels hold the system power supply, and provide access to the line and trunk connections, and the reserve power controls. Cable entry to the equipment cabinet is provided through cable ducts on either side of the cabinet.

2.10 The equipment cabinet holds the maintenance panel, a maximum of two equipment shelves, the optional reserve battery supply, and the primary power supply. The maintenance panel, mounted at the top of the cabinet, provides access to the system from the maintenance console through a 50 pin connector. Mounted directly below the maintenance panel is equipment shelf 2. This shelf holds line and trunk cards only. Below equipment shelf 2 is equipment shelf 1. This shelf contains the common control plus a number of trunk, line, and receiver cards. The optional reserve power supply is located at the bottom of the cabinet. All connections between shelves and external equipment are made by connectorized cables from the rear of each shelf. The system primary power supply, held on the lower hinged back panel of the cabinet, converts the commercial AC power 115V or 230V to the required system voltage levels.

Maintenance Panel

2.11 The equipment cabinet holds the maintenance panel, an equipment shelf, and the primary power supply. The maintenance panel, mounted at the top of the cabinet, provides access to the system from the maintenance console through a 50 pin connector. To the left of the maintenance plug is the master power fail transfer switch and five power fail transfer control switches. In addition, a test line is provided which allows service personnel to access individual lines and trunks.

Equipment Shelves

2.12 Each equipment shelf holds up to 22 printed circuit cards which plug into the shelf back plane. On the rear of the back plane are a number of Amphenol plugs providing interconnections between the shelves and external equipment. In addition to the plugs are a number of screw down terminals allowing shelf connection to the primary power supply unit. The equipment shelves (Fig. 2-3) measure 10.75in. (273mm) high, 19in. (480mm) wide, 16.375in. (415mm) deep, and weigh approximately 27lbs. (12.2kg) fully equipped.

Printed Circuit Cards

2.13 All circuit cards (Fig. 2-4) within the SX-200 are identical in construction and consist of a fiberglass board with printed wiring patterns on both of its faces. Riveted to the front of each board is a transparent faceplate which allows the LEDs mounted on the front of the boards to be easily seen. The two color-coded card extractors located at the top and bottom of the faceplate identify the card position within a shelf and ensure that the card is seated correctly in the back plane connector.

Primary Power Supply

2.14 The system primary power supply (Fig. 2-5), mounted directly on the cabinet back panel, (total weight 70lb., 32kg) provides all system power from 115Vac or 230Vac, 48Hz to 64Hz commercial power supply.

Reserve Power Supply

2.15 The reserve power supply is designed to maintain complete system operation for a minimum of two hours in the event of a primary
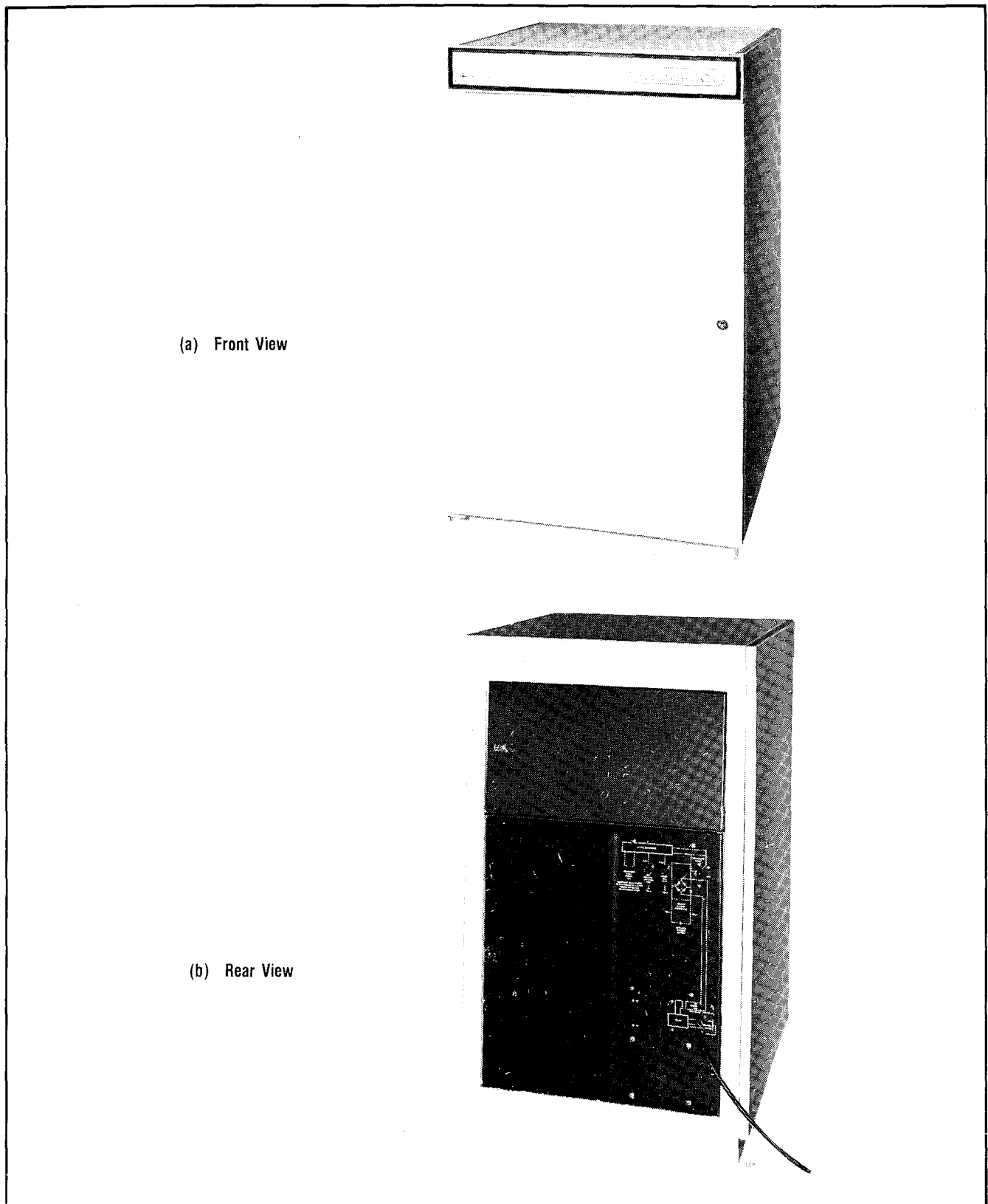
(a) Front View

(b) Rear View

Fig. 2-2   Equipment Cabinet

Fig. 2-3 Equipment Shelf

CAUTION
NOTICE

PART NUMBER

TRANSPARENT
FRONT PANEL

CARD EXTRACTOR
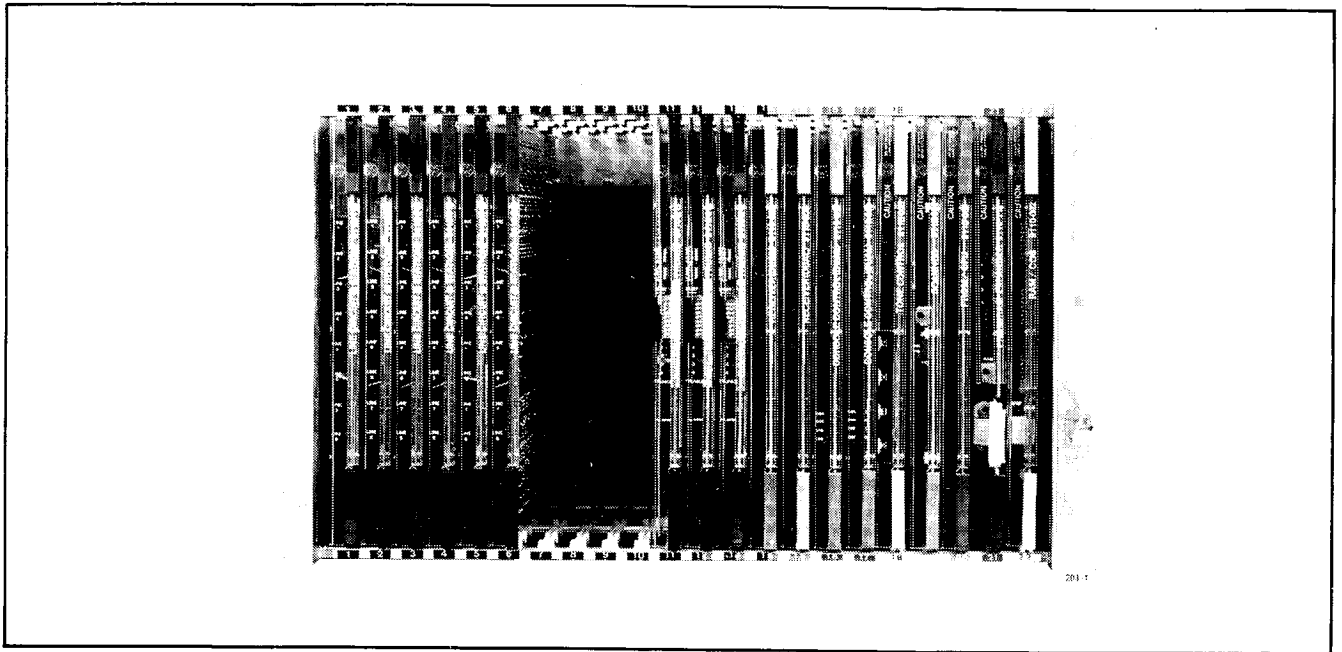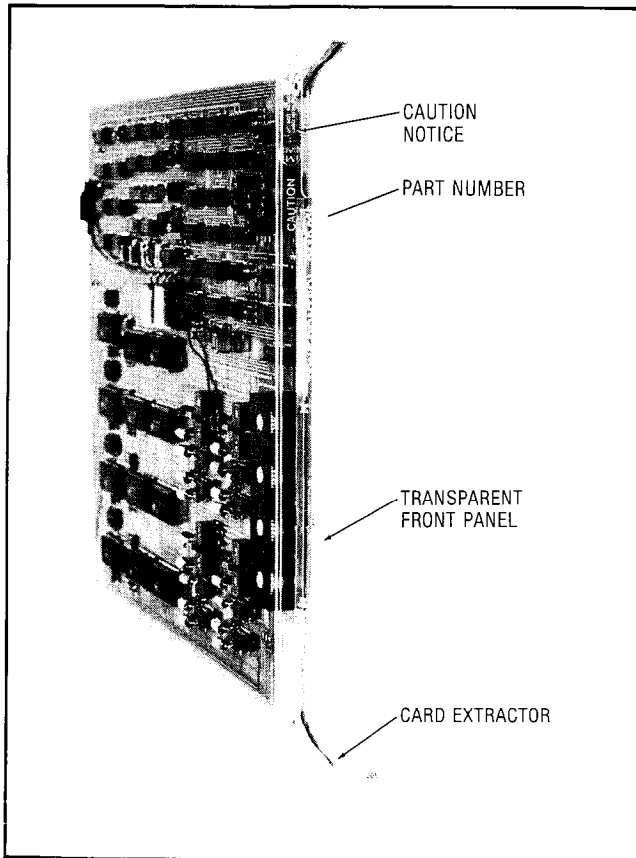
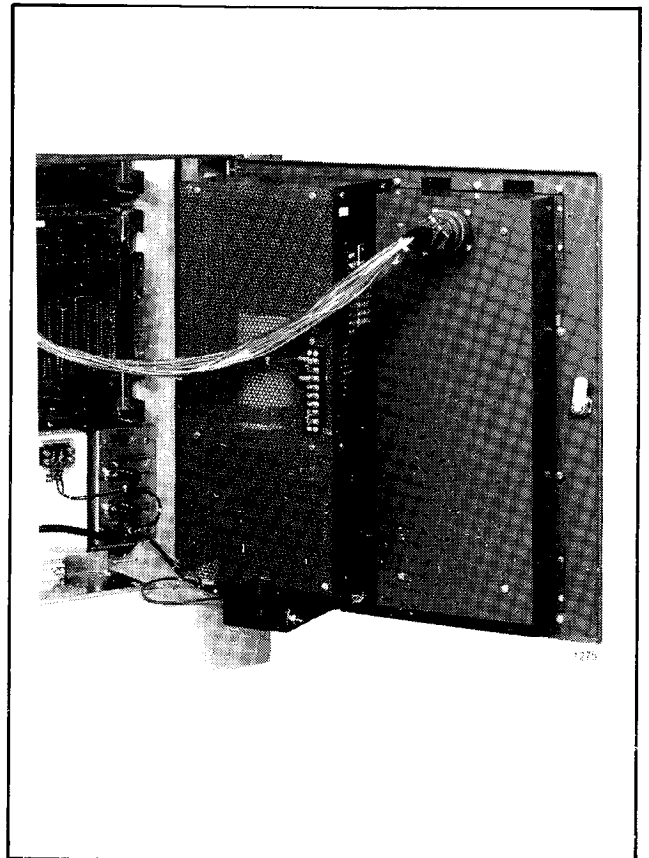Fig. 2-4 Typical Printed Circuit Card

Fig. 2-5 Primary Power Supply

power failure. The batteries are housed in a completely enclosed shelf measuring 7in. (180mm) high, 19in. (480mm) wide, 14.5in. (370mm) deep and weighing approximately 125lb. (56.7kg).

Attendant Console

2.16 The SX-200 attendant console (Fig. 2-6) is enclosed in a housing with a black plastic faceplate. Located on either side of the console are a pair of headset/handset jacks allowing simultaneous operation and supervision. The console keyboard holds three rows of ten nonlocking keys for the selection of features and completion of calls. On the right of the keyboard is a 12-key pushbutton dial pad. The console display, mounted above the keyboard, displays the active states of calls in progress. In addition to the call status display is a busy lamp field, a trunk group status field, a call waiting indicator, a digital clock, and three alarm indicators. The weight of the attendant console is approximately 13lbs. (5.9kg) and its dimensions are: 13.75in. (350mm) wide, 6.8in. (176mm) high, 9.25in. (236mm) deep.

A complete description of the console is given in Sections MITL9105/9110-98-300 Attendant Console Description and MITL9105/9110-98-305 Attendant Console Hotel/Motel Description.

Programming and Maintenance Console

2.17 The construction of the maintenance console is identical to that of the attendant console, the only difference is in the functions of the call and feature selection keys. A complete description of the maintenance console is given in Section MITL9105/9110-98-310 Maintenance Console Description.

Features

2.18 Features are provided with SX-200 system in the form of Feature packages (Generics), Table 2-1 lists the contents of these Generics. For a detailed description refer to Section MITL9105/9110-98-105.

Feature Provisioning

2.19 All station features provided by the SX-200 may be grouped into different classes of service, each class of service (a maximum of 16) may contain any mixture of features. Feature installation consists of entering into the system memory the number of the station to which the features are to be assigned, followed by the required class of service code. All data entries into
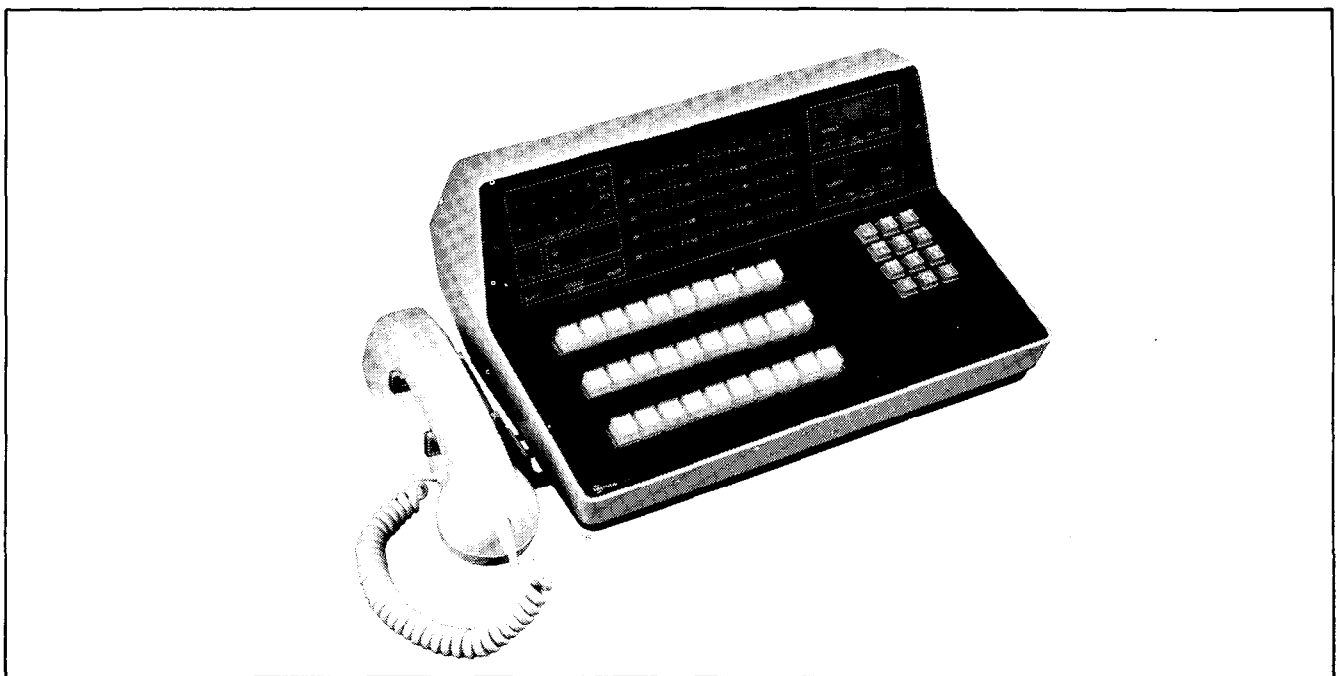

Fig. 2-6   Attendant Console

TABLE 2-1
SYSTEM FEATURES

Feature	202	203	204	205
Account Codes				•
Alphanumeric Display for Attendant Position	•	•	•	•
Attendant Camp-On	•	•	•	•
Attendant CCSA Access			•	•
Attendant Console (Maximum 2)	•	•	•	•
Attendant Control of Trunk Group Access	•	•	•	•
Attendant Controlled Conference			•	•
Attendant Flash Over Trunks	•	•	•	•
Attendant Lockout	•	•	•	•
Attendant Position (2 Max.)	•	•	•	•
Attendant Transfer - All Calls	•	•	•	•
Automatic Callback Busy/Don't Answer (Station to Station Calls)	•	•	•	•
Automatic Callback - Busy (Station to Trunk)	•	•	•	•
Automatic Night Service Switching	•	•	•	•
Automatic Queuing to Attendant Position	•	•	•	•
Broker's Call	•	•	•	•
Busy Lamp Field	•	•	•	•
Busy Verification of Station Lines	•	•	•	•
Call Forwarding - All Calls	•	•	•	•
Call Forwarding - Busy And Don't Answer	•	•	•	•
Call Forwarding - Busy Line (DID)			•	•
Call Forwarding - Don't Answer (DID)			•	•
Call Hold			•	•
Call Pick-Up	•	•	•	•
Call Waiting Service				
Attendant Call Waiting	•	•	•	•
Terminating Call Waiting	•	•	•	•
Distinctive Tone Signals	•	•	•	•
Calling Number Display to Attendant	•	•	•	•
Calls Waiting Indication at Attendant Position	•	•	•	•
CCSA Access			•	•
Class of Service Display to Attendant	•	•	•	•
Code Calling Access	•	•	•	•
Code Restriction			•	•
Conference Calling	•	•	•	•
Contact Monitor†	•	•	•	•
Controlled Outward Restriction			•	•
Controlled Station-To-Station Restriction			•	•
Controlled Termination Restriction			•	•
Controlled Total Restriction			•	•
Data Restriction	•	•	•	•
Date Display on Console(s)			•	•
Diagnostics - Automatic	•	•	•	•
Dial Access to Attendant	•	•	•	•
Digital Clock on Attendant Position	•	•	•	•
Direct Department Calling (DDC)	•	•	•	•
Direct Inward Dialing (DID)			•	•
Direct Outward Dialing (DOD)	•	•	•	•
Direct Termination of Miscellaneous Circuits On Attendant Position (Paging)†	•	•	•	•
Direct Trunk Group Selection (DTGS)	•	•	•	•
Directed Call Pick-Up	•	•	•	•
Hold-For-Pick-Up Option	•	•	•	•
Distinctive Ringing	•	•	•	•
DTMF And/Or DCKP On Attendant Position	•	•	•	•
DTMF Calling	•	•	•	•
DTMF To Dial Pulse Conversion	•	•	•	•
Dump and Load of Customer Data			•	•
Executive Override	•	•	•	•
Flash for Attendant	•	•	•	•
Flexible Numbering of Stations	•	•	•	•
Foreign Exchange (FX) Access	•	•	•	•

Feature	202	203	204	205
Fully Restricted Station	•	•	•	•
Identified Trunk Group			•	•
Immediate Audible Ring on Attendant Handled Calls	•	•	•	•
Immediate Ring	•	•	•	•
Incoming Call Identification (ICI)	•	•	•	•
Indication of Camp-On	•	•	•	•
Intercept Treatment				
Attendant Intercept	•	•	•	•
Intercept Tone	•	•	•	•
Interposition Calling	•	•	•	•
Interposition Transfer	•	•	•	•
Inward Restriction			•	•
Line Lockout With Warning	•	•	•	•
Listed Directory Number (LDN) Service	•	•	•	•
Loudspeaker Paging†				
Direct Access by Attendant	•	•	•	•
Dial Access	•	•	•	•
Multizone	•	•	•	•
Priority Paging	•	•	•	•
Main/Satellite Service			•	•
Manual Originating Line Service	•	•	•	•
Manual Terminating Line Service			•	•
Meet Me Conference	•	•	•	•
Message Waiting (Audible)			•	•
Message Waiting (Lamp)			•	•
Miscellaneous Trunk Restriction	•	•	•	•
Multiple Listed Directory Numbers (LDN)	•	•	•	•
Multiple Access Codes for a single trunk group (10 max.)			•	•
Music On Hold†	•	•	•	•
Music on Attendant Position Hold†	•	•	•	•
Night Console Position	•	•	•	•
Night Service				
Fixed	•	•	•	•
Flexible	•	•	•	•
Night Station Service - Fixed Service	•	•	•	•
Night Station Service - Full Service	•	•	•	•
Origination Restriction	•	•	•	•
Outgoing Trunk Call Back	•	•	•	•
Outgoing Trunk Camp-On	•	•	•	•
Outgoing Trunk Queueing	•	•	•	•
Outward Restriction	•	•	•	•
Power Failure Transfer - Station	•	•	•	•
Priority Queue	•	•	•	•
Privacy and Lockout	•	•	•	•
Radio Paging Access†	•	•	•	•
Recall Dial Tone	•	•	•	•
Recorded Telephone Dictation Access†	•	•	•	•
Remote Access to PBX Services	•	•	•	•
Remote Administration and Maintenance (hardware option)	•	•	•	•
Rering From Toll (on Toll Terminal)	•	•	•	•
Reserve Power (hardware option)	•	•	•	•
Room Audit			•	
Room Status		•	•	•
Rotary Dial Calling	•	•	•	•
Route Advance	•	•	•	•
Saved Number Redial				•
Serial Call	•	•	•	•
Sharing (4 Tenant)			•	•
Shared Attendant Service			•	•
Single Digit Dialing (Non-conflicting)	•	•	•	•

† Requires external customer provided equipment

TABLE 2-1 (CONT'D)
SYSTEM FEATURES

	202	203	204	205
Single Digit Dialing (Conflicting)		•	•	•
Speed Call				
System - wide				•
Personal				•
Splitting				
One-Way Manual Splitting	•	•	•	•
Two-Way Manual Splitting	•	•	•	•
One-Way Automatic Splitting	•	•	•	•
Two-Way Automatic Splitting	•	•	•	•
Station Hunting				
Terminal Hunting	•	•	•	•
Circular Hunting	•	•	•	•
Secretarial Hunting	•	•	•	•
Station Message Detail Recording				•
Station Message Register Service		•	•	•
Electronic Storage and Display		•	•	•
Internal Charging		•	•	•
Station Override Security	•	•	•	•
Station-to-Station Calling	•	•	•	•
Straightforward Outward Completion	•	•	•	•
Switched Loop Operation	•	•	•	•
Tandem Tie Trunk Switching		•	•	•
Termination Restriction	•	•	•	•
Threeway Conference Transfer	•	•	•	•
Through Dialing	•	•	•	•

	202	203	204	205
Tie Trunk Access	•	•	•	•
Timed Reminders	•	•	•	•
Toll Restriction				
Battery Reversal	•	•	•	•
0/1 Access	•	•	•	•
Multi Digit			•	•
Toll Terminal Access	•	•	•	•
Total "Do Not Disturb" Display		•	•	•
Total "Message Waiting" Display		•	•	•
Total "Room Status" Display		•	•	•
Traffic Data Collection†				•
Traffic Display to Customer				•
Transfer into Busy		•	•	•
Trunk Answer From Any Station	•	•	•	•
Trunk Group Busy (TGB) Indicators on Attendant Position	•	•	•	•
Trunk Status Field	•	•	•	•
Trunk-To-Trunk Connections	•	•	•	•
Trunk Verification by Customer (TVC)	•	•	•	•
Trunk Verification by Station (TVS)	•	•	•	•
Uniform Call Distribution (UCD)	•	•	•	•
Wake-Up Service				•
WATS Access	•	•	•	•
Wideband Data Switching	•	•	•	•
Wide Frequency Tolerant Power Plant	•	•	•	•

† Requires external customer provided equipment

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the system may be made from the attendant, or maintenance consoles. To prevent the loss of customer data in the event of a power failure, the memory holding the data associated with each line or trunk is equipped with its own reserve power supply. This power supply is sufficient to maintain the memory intact for a period of 4 weeks.

Electrical Characteristics

2.20 The electrical characteristics of the SX-200 are listed in Table 2-2.

2.21 The SX-200 is designed to operate from a 48Vdc source. A 48V power supply operating from a 115Vac or 230Vac power main is standard equipment. The SX-200 may be optionally equipped with a charger and battery arrangement which provides a minimum of 2 hours reserve power in the event of commercial power failure.

2.22 In the event of a power failure with no reserve power available, the SX-200 can be arranged to automatically connect up to twelve Central Office trunks to pre-selected extensions.

3. SYSTEM OPERATION

3.01 The SX-200 is a solid-state PABX employing space division switching and microprocessor control of call processing. A block diagram of the PABX is shown in Fig. 3-1.

3.02 The SX-200 has a capacity of 256 ports. The ports are scanned sequentially for detection of signals, each port being scanned for 12.5 microseconds. All ports are therefore scanned every 3.2 milliseconds.

3.03 Call origination is detected during scanning, an interrupt signal to the microprocessor is generated, and a speech path and receiver are assigned to the originating station. After dialing, the receiver is released and the called party is connected to the same speech path as the originator. There are 31 speech paths available in the SX-200, and each of the 256 ports has access to all 31 speech paths.

TABLE 2-2
SX-200 ELECTRICAL CHARACTERISTICS

Station Loop Limit	1200 ohms including set
Maximum Number of Ringers per Line	7
Ringing	90V, 20Hz - immediate ringing (option of 17Hz or 25Hz)
Standard	1s on, 3s off
Special	0.5s on, 0.5s off, 0.5s on, 2.5s off
Ring Trip	During silent or ringing period
Dial Tone	350/440Hz, continuous
Transfer Dial Tone	350/440Hz, 3 bursts of 100ms, then continuous
Busy Tone	480/620Hz, interrupted at 60ipm
Special Busy Tone	350/440Hz interrupted at 60ipm
Standard Ringback Tone	440/480Hz, 1s on, 3s off
Special Ringback Tone	440/480Hz, 0.5s on, 0.5s off, 0.5s on, 2.5s off
Callback	6 rings of standard ringing
Reorder Tone	480/620Hz, interrupted at 120ipm
Conference Tone	440Hz, 1 burst of 1s
Camp-On Tone	440Hz, one burst of 200ms for station camp-on
	440Hz. two bursts 100ms on, 50ms off, 100ms on for trunk camp-on
Override Tone	440Hz, one burst of 800ms followed by a 200ms burst every 6s
Crosstalk Attenuation	75dB minimum
Insertion Loss, Station-to-Station	5dB ± 0.5dB at 1004Hz
Station-to-Trunk	0.5dB ± 0.3dB at 1004Hz
Trunk-to-Trunk	0.5dB ± 0.3dB at 1004Hz
Longitudinal Balance	54dB minimum, 200-3000Hz
Return Loss	14dB minimum
Idle Circuit Noise	16dBrnC maximum
Impulse Noise	No counts over 46dBrnC
Envelope Delay Difference	200µs maximum
System Impedance	600 ohms nominal for lines
	600 or 900 ohms nominal for trunks
Traffic Capacity	7.5ccs/line minimum at 100 lines at P = 0.01
Primary Power	100-125V, 47-63Hz, 4A maximum
Central Office Trunk Loop Limit	1600 ohms
Maximum Distance of Console from Equipment	1000ft. (300m) of 26AWG cable
Operating Environment	0°C to 40°C, 10% to 90% Relative Humidity

4. SYSTEM CONFIGURATION

General

4.01 Fig. 4-1 illustrates the SX-200 cabinet layout.

Equipment Shelf 1

4.02 Equipment Shelf 1 contains the five common control cards plus the required number of line, trunk, console control and receiver cards. The common control cards are color coded and held in card positions 18 through 22. The console control cards occupy positions 16 and 17, and the first receiver card position 15. These card positions are fixed for all systems. Card positions 1 through 14 may be equipped with line, trunk or receiver cards as shown in Fig. 4-2.

- **Line Card** Provides 8 line circuits which serve as interfaces between the station equipment and SX-200 switching circuitry.

- **Trunk Card** Provides either interfacing between the Central Office and the SX-200 switching circuitry for 4 CO trunks, or between other PABX's and the SX-200 for 2 tie trunks.
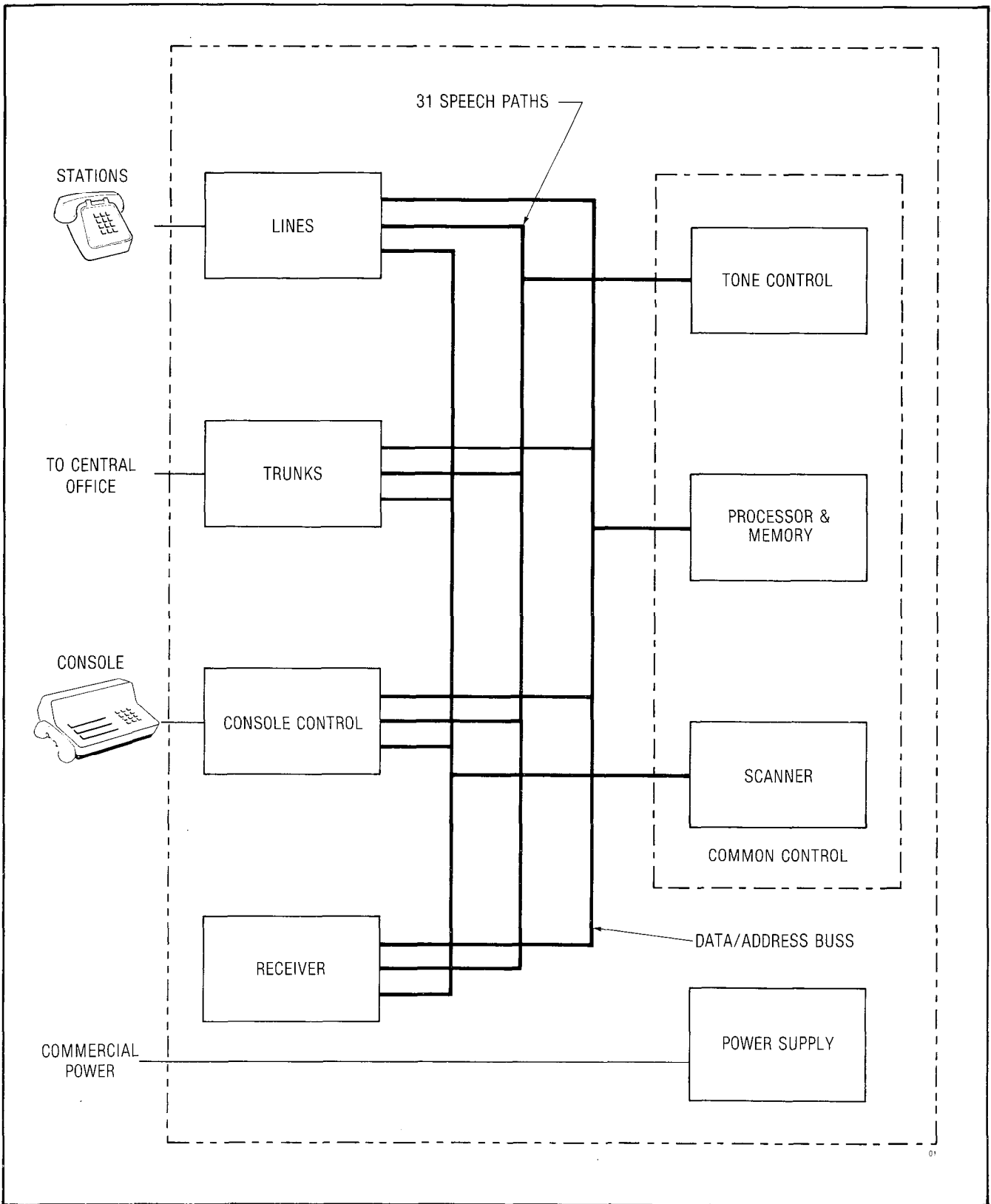
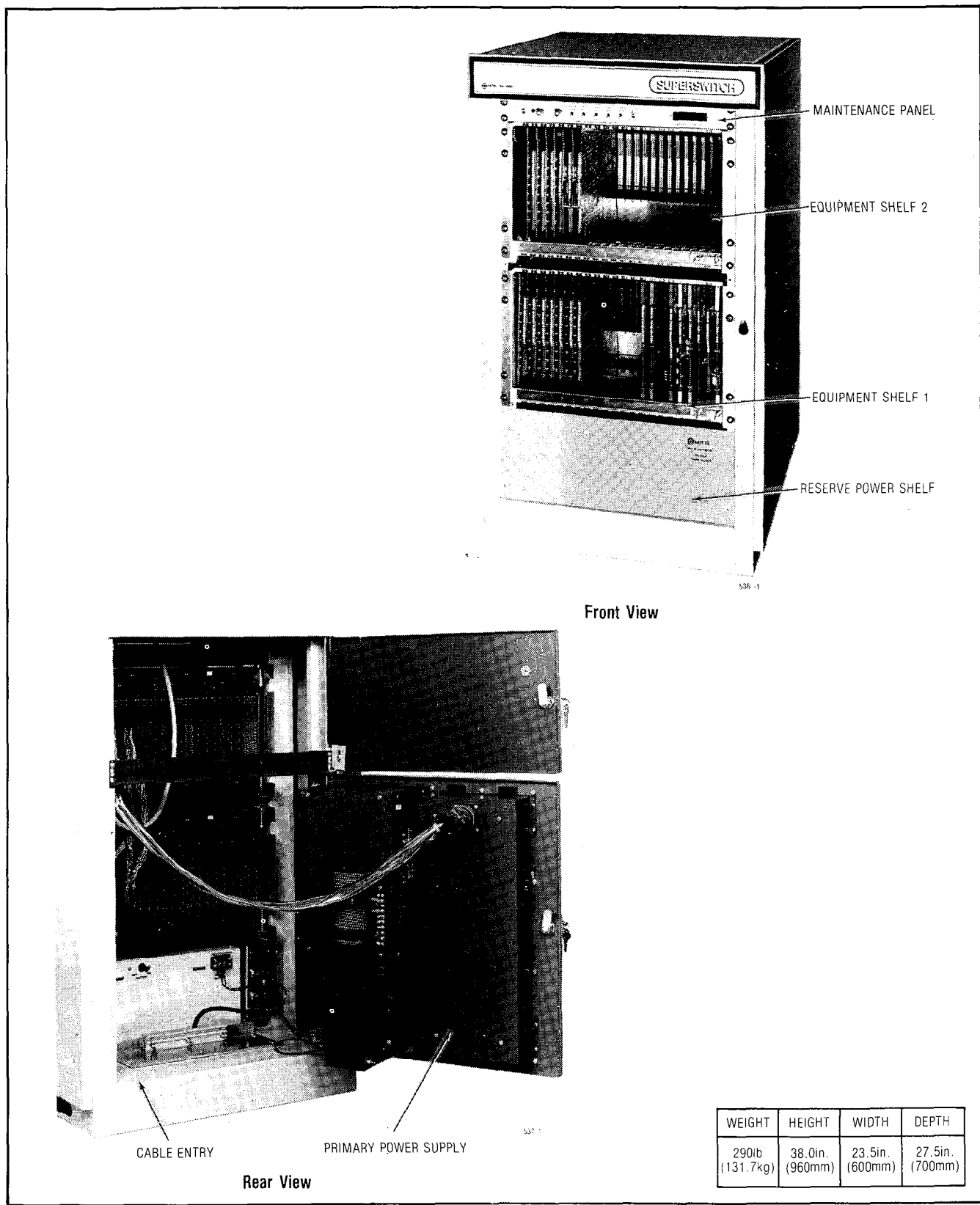Fig. 3-1   SX-200 Block Diagram

MAINTENANCE PANEL

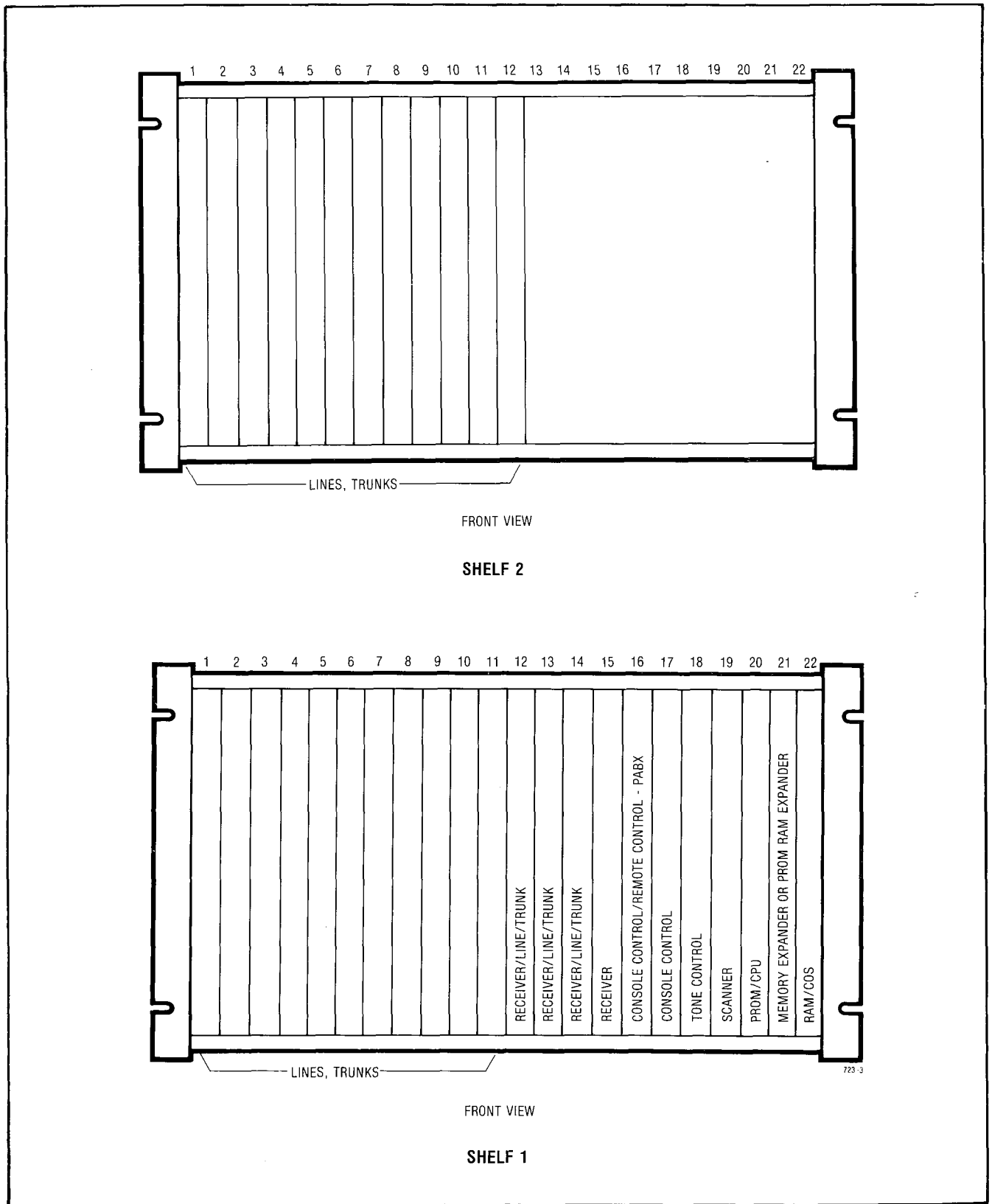EQUIPMENT SHELF 2

EQUIPMENT SHELF 1

RESERVE POWER SHELF

Front View

CABLE ENTRY

PRIMARY POWER SUPPLY

Rear View

WEIGHT	HEIGHT	WIDTH	DEPTH
290lb (131.7kg)	38.0in. (960mm)	23.5in. (600mm)	27.5in. (700mm)

Fig. 4-1   SX-200 Cabinet Layout

Fig. 4-2   Shelf Card Positions

- **Receiver Card** The Dual Receiver or Quad Receiver Cards respectively contain 2 or 4 sets of rotary dial and DTMF receivers, which are used to detect dialed digits and transfer them to a temporary store for call processing.

- **Console Control Card** This card provides the interface between the common control and two consoles. The first console control card (in position 17) is assigned to Attendant Console 1 and the Maintenance Console. The second console control card (in position 16) is assigned to Attendant Console 2.

- **Remote Control - PABX Card** This card allows the PABX to be accessed from a remote maintenance centre for the purpose of conducting administrative, maintenance and test routines on the PABX. The card is not normally supplied with the PABX and forms part of the RMAT System (consult Section MITL9105/9110-98-101 Remote Maintenance, Administration and Test System).

- **Tone Control Card** All call progress tones are supplied by this card. In addition this card contains the DTMF and DP pulse generators, voice paging circuitry and diagnostic testing functions.

- **Scanner Card** Sequentially scans all 256 ports to detect signals that require processor action. This card also contains the night bell, paging control relays, 2 digit display and the master reset button.

- **PROM/CPU Card** Contains part of the operating software in the form of a PROM card module. This card contains the microprocessor and associated circuitry.

- **Memory Expander Card** This provides additional memory space for the operating programs.

- **PROM/RAM Expander Card** Is identical to the memory expander card with the exception of additional CMOS-RAM memory for customer data (Speed Call, Automatic Wakeup, Toll Control).

- **RAM/COS Card** Provides CMOS-RAM memory for customer data and a scratch pad RAM memory. The CMOS memory is protected from power failure by a card mounted battery pack.

Equipment Shelf 2

4.03 To expand the system to its maximum capability, a second equipment shelf must be employed. Equipment shelf 2 is identical in construction to shelf 1 and provides an additional 12 card positions, which may be used to house line or trunk cards.

Primary Power Supply

4.04 The SX-200 primary power supply generates 48Vdc from a 115Vac or 230Vac power main input, and uses the 48Vdc to derive the system operating voltages of $+8V$, $-5V$, $-10V$, $-48V$ and 90Vac ringing voltage.

4.05 The power failure transfer relays allow for the connection of up to 12 Central Office trunks to selected PABX stations in the event of a major system failure or a power failure.

Attendant Console

4.06 The layout of the SX-100/SX-200 attendant console is shown in Fig. 4-3. The three rows of buttons on the console faceplate are used to select and handle calls. Each button has a light emitting diode (LED) associated with it to indicate the operational status of the button.

4.07 The console display area provides the attendant with specific information concerning the call which is being handled, as well as general information such as the time of day, and the busy/idle status of PABX stations and trunk groups.

4.08 A brief description of the display, and the functions of each pushbutton is given below.

Console Display

4.09 Housed on the upper face of the console are the following displays:

- **TRUNK GROUP STATUS** One LED per trunk group is used to signal the busy status of the group (BUSY). Another LED per trunk group is used to indicate that the attendant has changed the trunk group from dial access to attendant access (ATT). These indications are provided for up to 10 trunk groups.
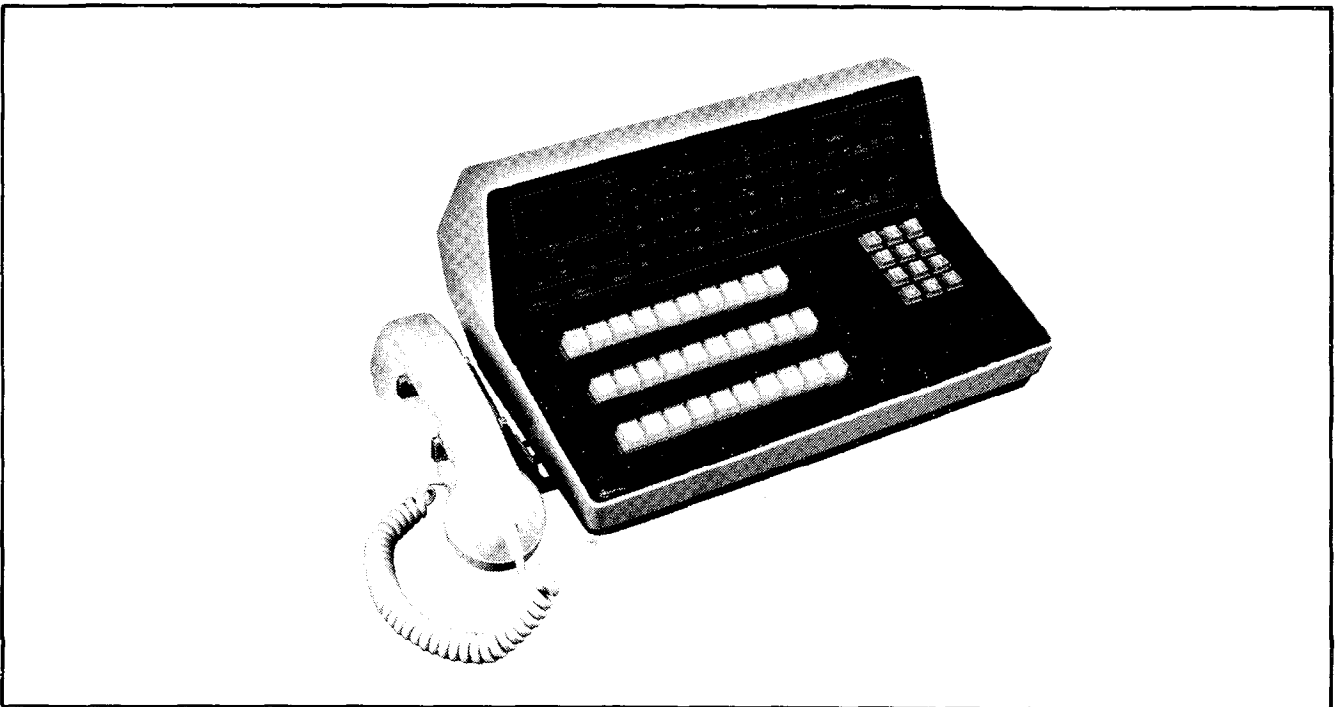
Fig. 4-3   Attendant Console

- **CALL WAITING (CW)** Indicates how many calls to the console are waiting to be answered.

- **TIME** A 12 hour or 24 hour digital clock is provided as a standard item. This display may optionally show the date.

- **ALARM** This area contains three LEDs labelled MAJOR, CONSOLE, and MINOR. A MAJOR alarm indicates a serious system malfunction and that failure transfer circuits have operated. A CONSOLE alarm indicates a console malfunction, and a MINOR alarm indicates that a non-essential circuit malfunction has been detected by the system.

- **BUSY LAMP FIELD** The centre of the display area contains the busy lamp field which provides a LED for each of 150 stations or trunks. When a station or trunk is busy, the associated LED is illuminated.

- **SOURCE** This area provides specific information on any party who calls the attendant.

NUMBER Displays the calling number.
CLASS Displays the calling party class-of-service.
ATT. Indicates that the attendant is talking to the calling party.
INT. Identifies the call as an intercept call.
RCL Identifies the call as a recall.
DID Identifies the call as a Direct Inward Dial call to the attendant.
MAN Identifies the call as a Manual Line Service call.

- **DESTINATION** The destination area supplies specific information about the party called by the attendant.

NUMBER Displays the number of the called party.

CLASS Displays the class-of-service of the called party.

ATT Indicates that the attendant is talking to the called party.

RING Indicates that the called party is ringing.

BUSY Indicates that the called party is busy.

ERROR Indicates to the attendant that an invalid number has been dialed.

Console Faceplate

4.10 The console faceplate holds the following buttons.

- **LAMP TEST** This button, when pressed, causes all the console LEDs and seven-segment displays to turn on. In this way faulty LEDs or displays can be readily detected.

- **ALARM RESET** This button is pressed to reset the audible alarm signal in the event of an alarm and also displays an alarm identification code in the Source and Destination display areas.

- **BELL OFF** The console bell is disabled when this button is pressed. The LED associated with the button indicates the bell off condition. The bell can be reactivated by pressing the button again.

- **IDENT.** In the event of a faulty connection through the console, operation of this button will display the circuits used in the connection. The circuits used are displayed for as long as the button is held down. When the console is idle pressing the ident key identifies the software installed in the PABX and the console identification.

- **NIGHT 1** This button is used to switch the PABX into and out of night service 1. The associated LED when lit indicates that the PABX is in night service 1.

- **NIGHT 2** This button is used to switch the PABX into and out of night service 2. The associated LED when lit, indicates that night service 2 has been selected. Night service 1 and night service 2 are mutually exclusive.

- **ROOM RESTR** The ROOM RESTR button is used to prevent unauthorized outgoing calls from guest rooms when they are vacant.

- **ROOM STATUS** The function of this button is to monitor the status of each room. Pressing this button and dialing one of five possible single-digit codes indicates, on the BUSY LAMP FIELD display, which rooms correspond to a particular status condition.

- **MSGE WAIT** This feature is enabled by the attendant calling a room and pressing the MSGE WAIT button. This causes the room telephone to receive a burst of 3 rings every 20 minutes or flash a special lamp.

- **DO NOT DISTURB** This feature enables a guest at his request not to receive incoming calls.

- **CALLBACK** This button allows the attendant to access the automatic callback feature. If a callback call has been answered the associated LED is on.

- **CANCEL** The cancel button is used to cancel a misdialed or busy call.

- **HOLD 1-4** The attendant can place a current call on hold by pressing one of the hold buttons. The associated LED will light to indicate that the hold circuit is busy.

- **CALL BLOCK** Certain rooms and all vacant rooms may be restricted from calling other rooms for specific time periods.

- **FLASH** This button is pressed to flash the telephone company operator on long distance calls.

- **SERIAL CALL** This button is pressed to enable incoming Central Office calls to recall to the console when the called station hangs up. If a call has been answered the associated LED is on.

- **GUEST ROOM** When this button is pressed and the room number dialed certain information will be displayed.

  (1) The room number and the "Message Register" status in the SOURCE display.

(2) The "Room Status" indicated by a digit (followed by "." if the maid is in the room) and a set Wake-Up in the Destination display.

(3) The "Do Not Disturb" status (indicated by DO NOT DISTURB lamp)

(4) The "Message Waiting" status (indicated by MSGE WAIT lamp)

(5) The "Controlled Outgoing Restriction" status (indicated by ROOM RESTR lamp)

- **CONF.** The conference button is used to set up an attendant conference. The associated LED flashes to indicate a recall from the conference, and remains in a steady on condition to indicate that the conference circuit is in use.

- **PAGE** Pressing the page button gives the attendant access to the paging equipment for as long as the button is held down. The associated LED indicates that the paging equipment is busy.

- **OVERRIDE** This button allows the attendant to override an existing conversation.

- **REL** This release button is used to release the attendant from connections made through the console.

- **RECALL** The LED associated with the RECALL button flashes to indicate a recall to the attendant. The recall may be answered by pressing the RECALL or ANSWER button. After answering, both the RECALL and ANSWER LEDs remain in a steady on condition.

- **DIAL 0** This button flashes to indicate a dial "0" call which may be answered by pressing the DIAL 0 or ANSWER buttons. After answering, both ANSWER and DIAL 0 LEDs remain in a steady on condition.

- **LDN 1-4** The LEDs associated with these four buttons flash to indicate up to four different types of incoming trunk calls (eg. FX, CO, WATS, TIE). These may be answered by pressing the appropriate LDN button or the ANSWER button. After answering, both the LDN and ANSWER LEDs remain in a steady on condition.

- **SOURCE** This button is pressed to split the attendant to the source side of a call. The LED indicates the split condition to the source.

- **BOTH** This button is pressed to connect the attendant to both the source and destination parties. The associated LED lights to indicate the three-way connection.

- **DEST** The destination button is pressed to connect the attendant to the destination side of a call. The associated LED is activated whenever the attendant is split to the destination.

- **ANSWER** This is a common answer button for calls appearing on the RECALL, DIAL 0 and LDN 1-4 buttons. The ANSWER LED flashes when any incoming call appears on the console, and remains in a steady on condition when the call is answered.

4.14 In addition to the buttons and LEDs described above, the console has a 12 digit key pad which is used for dialing all calls, an emergency transfer switch (mounted on the base of the console) which switches the PABX into failure transfer mode, and a volume control (mounted on the right side of the console) to vary the bell volume.

4.15 All console buttons are non-locking.

5. INSTALLATION & MAINTENANCE CONSIDERATIONS

Installation

5.01 Installation of the SX-200 is simplified by the use of connector-ended cables and plug-in printed circuit cards. The SX-200 is shipped with a complete set of installation and maintenance documentation.

5.02 Expansion of the SX-200 is achieved by the addition of printed circuit cards and appropriate programming. Instructions covering all aspects of expansion are included in the installation and maintenance documentation.

Maintenance

5.03 Maintenance of the SX-200 is enhanced by the automatic diagnostics which, in most cases, can pinpoint faults to a printed circuit card. The repair person can also use a test line to select paths through the PABX in order to isolate faults. A system malfunction may be corrected by the replacement of a printed circuit card. Should a fault develop on a shelf backplane, the shelf assembly itself is easily replaced.

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SX-100*/SX-200*

SUPERSWITCH*

FEATURES AND SERVICES DESCRIPTION

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1. GENERAL

Introduction

1.01 This section contains a description of the features and services provided by the SX-100 and SX-200 PABX's. The selection of features and services are subject to minimal constraints, allowing each system to be configured to meet the individual requirements of the customer.

Reason For Reissue

1.02 This section has been reissued to update the manual to include all generic 205 information for the SX-100 and SX-200 PABX's.

1.03 Detailed instructions for the programming and testing of each feature and service are given in the following sections:

- MITL9105/9110-98-205   Installation Forms
- MITL9105/9110-98-210 System Programming

2. FEATURES AND SERVICES DESCRIPTION

Introduction

2.01 This part contains a description of each feature and service provided by the SX-100 or SX-200. Each description contains four parts:

- Description - a detailed description of the feature or service.
- Conditions - a list of any special conditions which should be taken into account when selecting the feature or service.
- Programming - the parameters which must be programmed to allow selection and operation of the feature or service.
- Operation - a brief description of the feature operation. In a number of attendant feature operations the * symbol is shown. This is the attendant function access code (Feature Number 18) and can be programmed as any symbol or number that may be dialed from the console dial pad. Description of maintenance feature operation assumes the access code 555 (feature number) is used. SX-100/SX-200 Console Operating Instructions (9110-037). SX-100/SX-200 Extension Features Operation (9110-03).

2.02 This section lists all feature descriptions in alphabetical order. The names of the features used refer directly to the text of the SX-100/SX-200 documentation as closely as possible, to allow direct reference from any part of the documentation.

2.03 Tables 2-2 to 2-8 break all features listed in the Table of Contents into sections as shown in Table 2-1.

TABLE 2-1
TABLE CONTENTS

Table Number	Table Title
2-2	Features and Services
2-3	System Features
2-4	Attendant Features
2-5	Extension Features
2-6	Maintenance Features
2-7	Hardware Features
2-8	Trunk Features
2-9	System Option Conflicts
2-10	Terminology Cross Reference

2.04 The terminology of this practice is oriented to the terminology of all SX-100/SX-200 documentation. Some terminology (for system options, features, etc.) is peculiar to the SX-100/SX-200 and does not directly refer to standard industry terms for the features listed in Table 2-9. Table 2-10 provides a cross-reference from the terms used in Table 2-8 to the terms used throughout this practice.

2.05 The SX-100/SX-200 PABX's are provided with various degrees of sophistictation in their software abilities. Note individual system Generic when referring to this documentation. Features which are supplied only by specific Generics carry a note eg. Generic 203/up. For an overview of the Generic abilities see Fig. 2-1 and reference Table 2-2.

Generic 202

Basic
Software

↓

Generic 203

Hotel/Motel Features
DID
Tenanting

↓

Generic 204/205 General

Multi Digit Toll Control
Data Dump/Load
Identified Trunk Groups
Identified Trunk Groups
RS232 Port
Multiple Trunk Group Access

↓

Generic 204/205 Specific

↓   ↓
Generic 204   Generic 205

Wake-Up   Speed Call
Traffic Measurement   SMDR
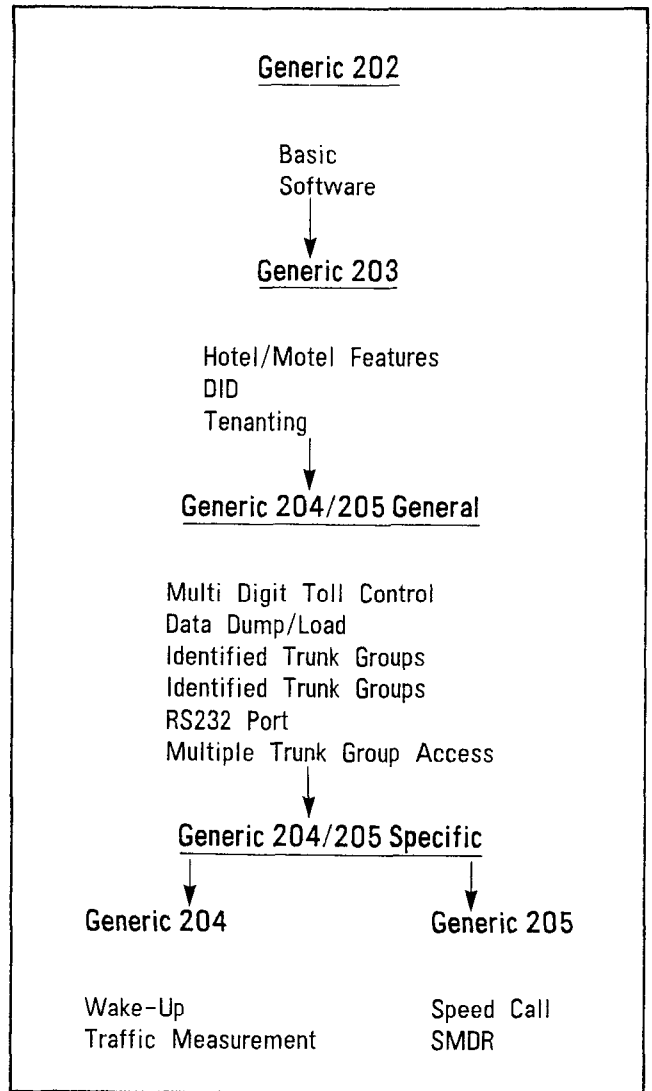
Fig. 2-1 Generic Overview

TABLE 2-2
FEATURES AND SERVICES

	202	203	204	205
Account Codes				•
Alphanumeric Display for Attendant Position	•	•	•	•
Attendant Camp-On		•	•	•
Attendant CCSA Access			•	•
Attendant Console (Maximum 2)	•	•	•	•
Attendant Control of Trunk Group Access	•	•	•	•
Attendant Controlled Conference			•	•
Attendant Flash Over Trunks	•	•	•	•
Attendant Lockout	•	•	•	•
Attendant Position (2 Max.)	•	•	•	•
Attendant Transfer - All Calls	•	•	•	•
Automatic Callback Busy/Don't Answer (Station to Station Calls)	•	•	•	•
Automatic Callback - Busy (Station to Trunk)	•	•	•	•
Automatic Night Service Switching	•	•	•	•
Automatic Queuing to Attendant Position	•	•	•	•
Broker's Call		•	•	•
Busy Lamp Field	•	•	•	•
Busy Verification of Station Lines		•	•	•
Call Forwarding - All Calls	•	•	•	•
Call Forwarding - Busy And Don't Answer	•	•	•	•
Call Forwarding - Busy Line (DID)		•	•	•
Call Forwarding - Don't Answer (DID)		•	•	•
Call Hold		•	•	•
Call Pick-Up	•	•	•	•
Call Waiting Service				
Attendant Call Waiting	•	•	•	•
Terminating Call Waiting	•	•	•	•
Distinctive Tone Signals	•	•	•	•
Calling Number Display to Attendant	•	•	•	•
Calls Waiting Indication at Attendant Position	•	•	•	•
CCSA Access		•	•	•
Class of Service Display to Attendant	•	•	•	•
Code Calling Access	•	•	•	•
Code Restriction			•	•
Conference Calling	•	•	•	•
Contact Monitor†	•	•	•	•
Controlled Outward Restriction		•	•	•
Controlled Station-To-Station Restriction		•	•	•
Controlled Termination Restriction		•	•	•
Controlled Total Restriction		•	•	•
Data Restriction	•	•	•	•
Date Display on Console(s)			•	•
Diagnostics - Automatic	•	•	•	•
Dial Access to Attendant	•	•	•	•
Digital Clock on Attendant Position	•	•	•	•
Direct Department Calling (DDC)	•	•	•	•
Direct Inward Dialing (DID)		•	•	•
Direct Outward Dialing (DOD)	•	•	•	•
Direct Termination of Miscellaneous Circuits On Attendant Position (Paging)†	•	•	•	•
Direct Trunk Group Selection (DTGS)	•	•	•	•
Directed Call Pick-Up	•	•	•	•
Hold-For-Pick-Up Option	•	•	•	•
Distinctive Ringing	•	•	•	•
DTMF And/Or DCKP On Attendant Position	•	•	•	•
DTMF Calling	•	•	•	•
DTMF To Dial Pulse Conversion	•	•	•	•
Dump and Load of Customer Data			•	•
Executive Override	•	•	•	•
Flash for Attendant	•	•	•	•
Flexible Numbering of Stations	•	•	•	•
Foreign Exchange (FX) Access	•	•	•	•

	202	203	204	205
Fully Restricted Station	•	•	•	•
Identified Trunk Group			•	•
Immediate Audible Ring on Attendant Handled Calls	•	•	•	•
Immediate Ring	•	•	•	•
Incoming Call Identification (ICI)	•	•	•	•
Indication of Camp-On	•	•	•	•
Intercept Treatment				
Attendant Intercept	•	•	•	•
Intercept Tone	•	•	•	•
Interposition Calling	•	•	•	•
Interposition Transfer	•	•	•	•
Inward Restriction			•	•
Line Lockout With Warning	•	•	•	•
Listed Directory Number (LDN) Service	•	•	•	•
Loudspeaker Paging†				
Direct Access by Attendant	•	•	•	•
Dial Access	•	•	•	•
Multizone	•	•	•	•
Priority Paging	•	•	•	•
Main/Satellite Service			•	•
Manual Originating Line Service	•	•	•	•
Manual Terminating Line Service		•	•	•
Meet Me Conference	•	•	•	•
Message Waiting (Audible)			•	•
Message Waiting (Lamp)			•	•
Miscellaneous Trunk Restriction	•	•	•	•
Multiple Listed Directory Numbers (LDN)	•	•	•	•
Multiple Access Codes for a single trunk group (10 max.)			•	•
Music On Hold†	•	•	•	•
Music on Attendant Position Hold†	•	•	•	•
Night Console Position	•	•	•	•
Night Service				
Fixed	•	•	•	•
Flexible	•	•	•	•
Night Station Service - Fixed Service	•	•	•	•
Night Station Service - Full Service	•	•	•	•
Origination Restriction	•	•	•	•
Outgoing Trunk Call Back	•	•	•	•
Outgoing Trunk Camp-On	•	•	•	•
Outgoing Trunk Queueing	•	•	•	•
Outward Restriction	•	•	•	•
Power Failure Transfer - Station	•	•	•	•
Priority Queue	•	•	•	•
Privacy and Lockout	•	•	•	•
Radio Paging Access†	•	•	•	•
Recall Dial Tone	•	•	•	•
Recorded Telephone Dictation Access†	•	•	•	•
Remote Access to PBX Services	•	•	•	•
Remote Administration and Maintenance (hardware option)	•	•	•	•
Re-ring From Toll (on Toll Terminal)	•	•	•	•
Reserve Power (hardware option)	•	•	•	•
Room Audit			•	
Room Status			•	•
Rotary Dial Calling	•	•	•	•
Route Advance	•	•	•	•
Saved Number Redial				•
Serial Call	•	•	•	•
Sharing (4 Tenant)			•	•
Shared Attendant Service			•	•
Single Digit Dialing (Non-conflicting)	•	•	•	•

† Requires external customer provided equipment

TABLE 2-2 (CONT'D)
SYSTEM FEATURES AND SERVICES

	202	203	204	205		202	203	204	205
Single Digit Dialing (Conflicting)		•	•	•	Tie Trunk Access	•	•	•	•
Speed Call					Timed Reminders	•	•	•	•
System - wide				•	Toll Restriction				
Personal				•	Battery Reversal	•	•	•	•
Splitting					0/1 Access	•	•	•	•
One-Way Manual Splitting	•	•	•	•	Multi Digit			•	•
Two-Way Manual Splitting	•	•	•	•	Toll Terminal Access	•	•	•	•
One-Way Automatic Splitting	•	•	•	•	Total "Do Not Disturb" Display		•	•	•
Two-Way Automatic Splitting	•	•	•	•	Total "Message Waiting" Display		•	•	•
Station Hunting					Total "Room Status" Display		•	•	•
Terminal Hunting	•	•	•	•	Traffic Data Collection†			•	
Circular Hunting	•	•	•	•	Traffic Display to Customer			•	
Secretarial Hunting	•	•	•	•	Transfer into Busy		•	•	•
Station Message Detail Recording				•	Trunk Answer From Any Station	•	•	•	•
Station Message Register Service		•	•	•	Trunk Group Busy (TGB) Indicators on	•	•	•	•
Electronic Storage and Display		•	•	•	Attendant Position				
Internal Charging		•	•	•	Trunk Status Field	•	•	•	•
Station Override Security	•	•	•	•	Trunk-To-Trunk Connections	•	•	•	•
Station-to-Station Calling	•	•	•	•	Trunk Verification by Customer (TVC)	•	•	•	•
Straightforward Outward Completion	•	•	•	•	Trunk Verification by Station (TVS)	•	•	•	•
Switched Loop Operation	•	•	•	•	Uniform Call Distribution (UCD)	•	•	•	•
Tandem Tie Trunk Switching		•	•	•	Wake-Up Service			•	
Termination Restriction	•	•	•	•	WATS Access	•	•	•	•
Threeway Conference Transfer	•	•	•	•	Wideband Data Switching	•	•	•	•
Through Dialing	•	•	•	•	Wide Frequency Tolerant Power Plant	•	•	•	•

† Requires external customer provided equipment

1309-5

TABLE 2-3
SYSTEM FEATURES

- Alarm Indication
- Call Forwarding – Busy (System – DID, CCSA, Dial In Tie Trunks)
- Call Forwarding – Don't Answer (System – DID, CCSA, Dial In Tie Trunks)
- CCSA
- Class of Services (16)
- Common Alerting Devices (Nightbells, Console less operation)
- Contact Monitor
- DID/Dial-In/CCSA Vacant/Illegal Access Intercept to Attendant
- DID to Non CO Trunk via Attendant Inhibit
- Discriminating Ringing
- DTMF Signal Rings
- DTMF to Rotary Dial Conversion
- End of Dial Signal on Outgoing Trunks
- First Digit Toll Deny
- Fixed Night Service
- Flexible Night Service
- Flexible Numbering Plan
- Immediate Ring
- Inhibit Automatic Supervision
- Illegal Access Intercept to Attendant
- Limited Wait for Dial Tone
- Lockout Alarm
- Maid in Room
- Meet-Me Conference
- Message Register Audit
- Message Register Print
- Message Waiting
- Message Waiting Print
- Minor Alarm Contact
- Mixed Station Dialing

- Multi Console Operation
- Multiple Trunk Groups with Overflow
- Multiple Trunk Group Access Codes
- Night Service Automatic Switching
- Paging Access
- Room Status
- Room Status Audit
- Single Digit Dialing
- SMDR
- Speed Call
- Station Transfer Security
- Switchhook Flash Timer
- System Identifier
- System Options
- Tenant Service
- Through Dialing
- Traffic Measurement
- Trunk Answer from any Station (TAFAS) available during the day
- Trunk Answer from any Station (TAFAS) (Night Service)
- Trunk Recall Partial Inhibit
- Vacant Number Intercept to the Attendant
- Variable Timers

TABLE 2-4
ATTENDANT OPTIONS

- Alarm Indication
- Attendant Bell Off
- Attendant Busy Override
- Attendant Called Number Display
- Attendant Call Forward Setup and Cancel
- Attendant Callback Cancel
- Attendant Calling Number Display
- Attendant Calls Waiting Display
- Attendant Camp-On with Indication
- Attendant CCSA Access
- Attendant Class of Service Display
- Attendant CO Trunk - CO Trunk Connect Enable
- Attendant CO Trunk - Non CO Trunk Connect Enable
- Attendant Console Emergency Transfer
- Attendant Console Flash
- Attendant Controlled Conference
- Attendant DISA Code Setup
- Attendant Functions
- Attendant Hold Circuits
- Attendant Individual Trunk Access
- Attendant Jacks

- Attendant Lamp Test
- Attendant Lock Out
- Attendant Non CO Trunk - Non CO Trunk Connect Enable
- Attendant Secrecy
- Attendant Serial Call
- Attendant Station Busy Out
- Attendant Timed Recall
- Attendant Transfer All Calls
- Attendant Trunk Busy Out
- Both Button Enable
- Both Mode Standard
- Busy Lamp Field
- Busy Trunk Release
- Busy Verification
- Callback Button
- Call Blocking
- Call Selection
- Console Date Display
- Control of Trunk Group Access
- Controlled Outgoing Restriction Setup
- Controlled Station Restriction (Do Not Disturb)
- Digital Clock 12 or 24 Hours
- Direct Trunk Access
- Guest Room Button
- Individual Trunk Access
- Listed Directory Numbers
- Message Waiting Display
- New Call Tone
- Page Button
- Trunk-to-Trunk Connections - Attendant

TABLE 2-5
EXTENSION OPTIONS

- Automatic Callback - Busy
- Automatic Callback - Don't Answer
- Automatic Station Release
- Automatic Wake-Up (Alarm Call)
- Broker's Call
- Call Forwarding - Busy (Extensions)
- Call Forwarding - Don't Answer (Extensions)
- Call Forwarding - Follow Me
- Call Forwarding System Inhibit
- Call Hold
- Call Park
- Call Retrieve
- Camp-On
- Can Flash if on an Incoming Trunk

- Can Flash if Talking to an Extension
- Cannot Dial a Trunk After Flashing if Holding or in Conference with a Trunk
- Cannot Dial a Trunk After Flashing
- Controlled Station Restriction (Do Not Disturb)
- CO Trunk via Attendant Inhibit
- Data Security
- Dial Access to Attendant
- Dial Call Pick-Up
- Directed Call Pick-Up
- Direct Outward Dialing
- Discriminating Dial Tones
- Do Not Disturb - see Controlled Station Restriction
- Do Not Overflow (Trunks)
- DTMF Dialing
- Executive Busy Override (Extension)
- Extension Trunk to Non CO Trunk Connect
- Feature Access
- Flash for Attendant
- Flash Disable
- Hold Pick-Up
- Hunting
- Inward Restriction
- Manual Line
- Message Registration
- Multiple Extensions
- Never a Consultee
- Never a Forwardee
- No Dial Tone
- Non - CO Trunk via Attendant Inhibit
- Originate Only
- Outgoing Trunk Callback
- Outgoing Trunk Camp-On
- Paging (Extensions)
- Pick-Up Groups
- Receive Only
- Room Status - Update
- Station Conference
- Station Override Security
- Station Transfer Consultation Hold Add/On
- Toll Restriction
- Transfer Dial Tone
- Trunk Answer From Any Station (TAFAS) (Night Service)

TABLE 2-6
MAINTENANCE FEATURES

- Customer Data Dump/Load
- Diagnostics
- Maintenance Function
- Programming and Maintenance Security
- Receiver - Busy Out
- Receiver - Direct Selection
- Remote System Reset Protection Override
- Reset the System
- Speech Path - Busy Out
- Speech Path - Direct Selection
- Test Line

TABLE 2-7
HARDWARE OPTIONS

- E&M Trunks
- Ground Start Trunks
- Loop Start Trunks
- Printer and Recording Devices
- RMAT
- Reserve Power Supply
- 220V Operation

TABLE 2-8
TRUNK FEATURES

- Answer Supervision Detection
- DID - Loop Dial Tie Trunks
- Dial In Tie Trunks
- Dictation Trunks
- DID/Dial In/CCSA
- Direct In Lines
- Direct Inward Dial (DID) Trunks
- Direct Inward System Access (DISA)
- Failure Transfer
- Ignore Reversal
- Outgoing Audio Inhibit Until Answer Supervision
- Toll Reversal
- Tie Trunks
- Trunk Groups - Two Types
- VNL - Trunks
- Wait for Dial Tone

TABLE 2-9
SYSTEM OPTION CONFLICTS

System Option	113	114	121	190	203	205	208
105						X	
106						X	
132	X	X					
134	X	X					
156	X	X					
172	X	X	X				
173	X	X	X				
190	X	X					
205	X						
210				X			
191					X		
193					X		
194					X		
195					X		
204					X		
205							X

TABLE 2-10
TERMINOLOGY CROSS REFERENCE

Alphanumeric Display for Attendant Position – Console Date Display, Alarm Indication, Busy Lamp Field

Attendant Console (maximum 2) – Multi Console Operations, Tenant Service

Attendant Control of Trunk Group Access – Attendant Individual Trunk Access, Attendant Trunk Busy Out, Busy Trunk Release, CO Trunk Via Attendant Inhibit, Do Not Overflow Trunks, Identified Trunk Groups, Call Blocking, Multiple Trunk Access Codes, Trunk Busy Out Enable, Trunk Groups, Trunk Groups Two Types, Control of Trunk Group Access

Attendant Flash Over Trunks – Attendant Console Flash

Attendant Lockout – Attendant Lock Out, Call Blocking, Attendant Trunk Busy Out, Attendant Station Busy Out, Lockout Alarm Enable

Attendant Position (2 Maximum) – Multi Console Operation Tenant Operation

Attendant Transfer All Calls – Attendant Transfer All

Calls, Night Service Automatic Switching

Automatic Callback Busy/Don't Answer (Station to Station Calls) – Automatic Callback Busy, Automatic Callback Don't Answer, Outgoing Trunk Call Back

Automatic Queuing to Attendant Position – Call Selection

Call Forwarding – All Calls – Call Forwarding – Busy (Extensions), Call Forwarding – Busy (System – DID, CCSA, Dial In Tie Trunks), Call Forwarding – Don't Answer (Extensions), Call Forwarding – Don't Answer (System – DID, CCSA, Dial In Tie Trunks), Call Forwarding – Follow Me

Call Forwarding Busy and Don't Answer – Call Forwarding – Busy (Extensions), Call Forwarding – Busy (System – DID, CCSA, Dial In Tie Trunks), Call Forwarding – Don't Answer (Extensions), Call Forwarding – Don't Answer (System – DID, CCSA, Dial In Tie Trunks)

Call Forwarding – Busy Line (DID) – Call Forwarding – Busy (System – DID, CCSA, Dial In Tie Trunks)

Call Forwarding – Don't Answer (DID) – Call Forwarding – Don't Answer (System – DID, CCSA, Dial In Tie Trunks)

Call Hold – Attendant Hold Circuits, Call Hold, Hold Pick-Up, Trunk Recall Partial Inhibit

Call Pick-Up – Directed Call Pick-Up, Hold Pick-Up, Call Park

Call Waiting Service – Attendant Calls Waiting Indicator, Attendant Camp-On With Indication, Attendant Timed Recall, Call Retrieve, New Call Tone Enable, Transfer Dial Tone

Calling Number Display to the Attendant – Attendant Calling Number Display

Calls Waiting Indication at Attendant Position – Attendant Calls Waiting Indicator

Class of Service Display to Attendant – Attendant Class of Service Display

Code Calling Access

Conference Calling – Attendant Controlled Conference, Meet-Me Conference

Controlled Station-To-Station Restriction – Call Blocking

Data Restriction - Data Security

Date Display on Console(s) - Attendant Date Display

Diagnostics Automatic - Diagnostics

Direct Department Calling (DDC) - Dial In Tie Trunks, Manual Line

Direct Inward Dialing - DID/Dial In/CCSA, DID - LOOP Dial Tie Trunks, DID to Non CO Trunk via Attendant Inhibit, Dial Trunks, Direct Inward System Access

Direct Termination of Miscellaneous Circuits on Attendant Position (Paging) - Page Button Enable, RMAT

Direct Trunk Group Selection (DTGS) - Direct Trunk Access

Directed Call Pick-Up - Directed Call Pick-Up, Hold Pick-Up

Distinctive Ringing - Discriminating Ringing

DTMF and/or DCXP on Attendant Position - Dial Pulse Signalling, DTMF to Rotary Dial Conversion to Pulse Conversion, DTMF Signalling

Dump Load of Customer Data - Customer Data Dump Load, Data Security

Fully Restricted Station - Originate Only, Receive Only

Immediate Audible Ring on Attendant Handled Calls - Immediate Ring

Incoming Call Identification (ICI) - Attendant Calling Number Display, Attendant Class of Service Display

Identification of Camp-On - Attendant Camp-On with Indication, Camp-On

Intercept Treatment - First Digit Toll Deny, Illegal Access Intercept to the Attendant

Interposition Calling - Tenanting, Multi Console Operation

Line Lockout With Warning - Lockout Alarm Enable

Loudspeaker Paging - Page Button Enable, Paging (Extension)

Main/Satellite Service - Tenanting, Multi Console Operation

Manual Originating Line Service - Manual Line

Manual Terminating Line Service - Originate Only

Meet Me Conference - Meet Me Conference, Attendant Controlled Conference

Miscellaneous Trunk Restriction - Class of Service, Trunk Groups, Trunk Group - Two Types

Multiple Listed Directory Numbers - Listed Directory Numbers

Multiple Access Codes for a single trunk group - Multiple Trunk Access Codes

Night Station Service - Fixed Service - Trunk Answer From Any Station (TAFAS) Available During the Day, Trunk Answer From Any Station (TAFAS) Night Service

Night Station Service - Full Service

Origination Restriction - Originate Only

Outgoing Trunk Callback - Automatic Callback Busy, Automatic Callback Don't Answer

Outgoing Trunk - Camp-On

Outward Restriction - Illegal Access Intercept to Attendant, Receive Only

Power Failure Transfer-Station - Failure Transfer

Priority Queue - Call Selection

Privacy and Lockout - Secrecy

Recall Dial Tone - Transfer Dial Tone

Remote Access to PBX Services - Direct Inward System Access (DISA)

Remote Administration and Maintenance - RMAT

Reserve Power (hardware option) - Reserve Power, Contact Alarm

Rotary Dial Calling - DTMF to Rotary Dial Conversion to Pulse Conversion

Route Advance - Class of Service, Multiple Trunk Groups with Overflow

Serial Call – Attendent Serial Call

Sharing (4 Tenant) – Multi Console Operation, Tenanting

Shared Attendant Service – Tenanting, Multi Console Operation

Splitting – Both Button Enable, Both Mode Standard

Station Hunting – Hunting

Station Message Detail Recording – SMDR SECTION MITL9105/9110-98-451

Station Override Security – Data Security

Straightforward Outward Completion – Direct Outward Dialing

Switched Loop Operation – Attendant Calls Waiting Indicator, Loop Start Trunks

Tandem Tie Trunk Switching – Tie Trunks

Termination Restriction – Manual Line, Illegal Access Intercept to Attendant

Threeway Conference Transfer – Meet Me Conference, Attendant Controlled Conference

Through Dialing – Direct Outward Dialing

Timed Reminders – Extensions, Serial Call

To Restriction – Multi Digit Toll Control, Toll Restriction

Traffic Data Collection – Traffic Measurement

Traffic Display to Customer – Traffic Measurement

Transfer into Busy – Camp–On

Trunk Group Busy (TGB) Indicators on Attendant Position – Trunk Groups, Busy Lamp Field

Trunk–to–Trunk Connections – Trunk–to–Trunk Connections Extensions

Trunk Verification by Customer (TVC) – Individual Trunk Access

Trunk Verification by Station – Individual Trunk Access

Uniform Call Distribution (UCD) – Hunting

Wake–Up Service – Automatic Wake–Up Alarm Call

WATS Access – Multiple Trunk Access Codes

Alarm Indication

Description

Each attendant console is equipped with three alarm lamps; MINOR, MAJOR and CONSOLE. The minor alarm lamp, when lit, indicates that the system has detected a malfunction which has not seriously degraded the customer's service. A major alarm indicator is caused by the system detecting a failure which affects the complete system operation and indicates that a failure transfer has taken place. The console alarm is raised when a malfunction affecting the console operation is detected. If the PABX is equipped with an optional reserve power supply, there are provisions for a "battery on" indicator. This indicator may be wired to provide a Contact Monitor alarm to alert the attendant that the system is on battery (i.e. AC power failure). See SECTION MITL9105/9110-98-200. See SECTION MITL9105/9110-98-500 General Maintenance Information.

Conditions

- None

Programming

- None

Operation

Major Alarm:

- MAJOR alarm lamp lit, Power Fail Transfer automatically takes place, an error code may be displayed (see Table 4-3 SECTION MITL9105/9110-98-500).

Minor Alarm:

- MINOR alarm lamp flashes, tone ringer sounds. Press and hold down console ALARM RESET button - MINOR alarm lamp lights solidly, tone ringer sound stops, SOURCE and DESTINATION displays show information describing the cause of the alarm condition.

Attendant Bell Off

Description

Selection of this option activates the attendant console BELL OFF button. Pressing the button turns off the console tone ringer; incoming calls are identified by flashing LEDs only. Pressing the BELL OFF button again enables the console bell.

Conditions

- None

Programming

- Select System Option 122 (Bell Off Enable).

Operation

To disable the console tone ringer:

- Press the BELL OFF button – BELL OFF lamp is lit.

To enable the console tone ringer:

- Press the BELL OFF button – BELL OFF lamp is dark.

Attendant Busy
Override

Description

This option allows the attendant who encounters a busy connection, to override the connection and enter the call. Before the attendant enters the connection, all parties in the call hear an 800ms burst of warning tone, after which the attendant is connected to the call and the warning tone continues for a further 200ms. A single 200ms burst of warning tone is repeated every six seconds for the duration of the override. If the call cannot be overriden, reorder tone is returned.

Conditions

- If a call includes an extension with Option Number 41 (Data Security) in its COS, no party in the call can be overridden.
- Override can only be performed on an established (talking) call.
- Override cannot be performed on an attempted trunk group access.
- A call cannot be overriden by two parties simultaneously.

Programming

- Select System Option 120 (Attendant Busy Override).

Operation

Having reached a busy number or individual trunk:

- Press and hold down the console OVERRIDE button.
  - All parties in the connection hear the warning tone, you are connected to the call.
- Release the OVERRIDE button.
  - You are released from the call.

**Attendant Call
Forward Setup and
Cancel
Generic 203**

Description

This feature allows the attendant to set up, review and cancel call forwarding for any extension. (The extension for which the attendant sets up forwarding need not have any of the call forwarding features in its COS). The attendant may also set up call forwarding from the extension to the attendant.

Conditions

- The extension to which the calls are forwarded must not have Option Number 38 (Never a Forwardee) in its COS.
- The attendant can only set up a forwarding type for which a feature access code has previously been assigned (features 3, 4 and 5).
- It is not possible to set up or cancel call forwarding for an extension whose number begins with #.
- If in multi-tenant mode, Cancel All Call Forwarding only cancels forwarding for the current tenant.

Programming

- None

Operation

To set up Call Forwarding:

- Dial * 11 followed by the number of the forwarding extension.
- Dial the call forwarding type –
  1 = Call Forwarding – Busy
  2 = Call Forwarding – Don't Answer
  3 = Call Forwarding – Follow Me
- Dial the number of the extension to which the calls are to be forwarded, or the access code of the attendant (Feature Number 1) if the call is to be forwarded to the attendant.
- Press the RELEASE button.

To review Call Forwarding for an extension:

- Dial * 11 followed by the number of the extension.
  - The console SOURCE display shows the extension number dialed, followed by the call forwarding type. The DESTINATION display shows the extension number to which the calls are to be forwarded.
- Press the RELEASE button.

To cancel Call Forwarding for a single extension:

- Dial * 11 followed by the extension number.
- Dial #
- Press the RELEASE button.

To cancel Call Forwarding for all extensions:

- Dial * 11 #
- Dial #
- Press the RELEASE button.

ADD # TO DELETE ALL CALL FORWARDING

**Attendant Callback
Cancel**

Description

The attendant may cancel all system callbacks from the console.

Conditions

- None

Programming

- Assign an access code to Feature number 18 (Attendant Function)

Operation

- Dial *4
- Dial #
- Press the RELEASE button.
  - All callbacks are cancelled.

Attendant Called
Number Display

Description

If the attendant dials an extension or trunk access code, that number will appear in the first three segments of the DESTINATION display. The Class of Service of the extension or trunk will appear in the last segment of the DESTINATION display. The ATT LED in the DESTINATION and SOURCE displays will light. If the extension or trunk is busy the BUSY LED will light. If the extension or trunk is available the RING LED will light. If an invalid number is dialed, the error lamp will be lit in the DESTINATION display.

Conditions

- None

Programming

- Complete all system programming as per SECTION MITL9105/9110-98-205.

Operation

- None

**Attendant Calling
Number Display**

Description

A trunk or extension that calls to the attendant will have its number displayed. This will appear in the first three segment of the SOURCE display when the ANSWER button is pressed. The Class of Service will be displayed in the last segment of the SOURCE display.

Conditions

- None

Programming

- Complete all programming as per SECTION MITL9105/9110-98-205.

Operation

- None

Attendant Calls
Waiting Indicator

Description

The attendant may have calls that are directed to the console (outside trunks and PABX extensions) queued. The total number of calls in the queue will be displayed in the CW (Call Waiting) display. The console tone ringer will ring and one of the call LEDs may flash (Dial 0, LDN 1, 2, 3 or 4) with the ANSWER LED.

Conditions

- None

Programming

- None

Operation

- None

**Attendant Camp-On
with Indication**

Description

This feature allows the attendant to connect calls to busy extensions or trunks for automatic completion when the busy party becomes free.

When a call is Camped-On to an extension, the called extension, and only that extension, will hear a burst of Camp-On tone indicating the existence of a Camped-On call. If the Camped-On call is a trunk, two bursts of Camp-On tone are given. If the Camped-On call is an extension, a single burst of tone is given.

Calls that are not completed within the Camp-On timeout will recall to the console.

If Music on Hold is provided, the Camped-On party will hear music until the called party answers or the call recalls to the console.

Conditions

- If System Option 118 (Attendant Camp-On) is not selected, an attempt to Camp-On a call to a busy number will result in the call being released when the console RELEASE button is pressed.
- Extensions with COS Option Number 41 (Data Security) selected may have a call Camped-On, but the extension will not receive the Camp-On tone.
- If the called party is on Hold when the Camp-On is initiated, and Music On Hold is provided, the music is removed while the Camp-On tone is applied.

Programming

- Select System Option 118 (Attendant Camp-On).
- If System Option 139 (Attendant Timed Recall – Camp-On-20S) is selected the recall time is 20 seconds.
- If System Option 140 (Attendant Timed Recall– Camp-On-40S) is selected the recall time is 40 seconds.
- If neither System Option 139 nor 140 is selected, the recall time is 30 seconds.

Operation

To Camp-On a call to a busy number:

- The number you have called is busy.
- Press the RELEASE button – this automatically Camps-On the calling party to the busy number.

**Attendant CCSA
Access**

Description

The attendant may access the common controlled switching arrangement trunks. These trunks are similar to DID trunks in all respects except that they are considered to be Non-CO and may be used as bothway trunks. For further information see Direct Trunk Access and CCSA Generic 203/204.

Attendant Class of
Service Display

Description

The attendant may display the Class of Service of any extension or trunk in the system. The Class of Service will appear in the last two segments of the SOURCE or DESTINATION displays over the title of CLASS. For further information see Class of Service.

Conditions

- None

Programming

- Complete all programming as per SECTION MITL9105/9110-98-105.

Operation

- None

Attendant CO Trunk -
CO Trunk Connect
Enable

Description

Selection of this option allows the attendant to connect a CO trunk call to another CO trunk, then release the call from the console. See End of Dial Signal for Outgoing Trunks.

Conditions

- In Generic 203 and above, two or more trunks may be connected in an Attendant Controlled Conference.
- At least one of the trunks in the connection must provide release supervision or the trunk connection will not automatically release from the system when the call is completed.

Programming

- Select System Option 129 (Attendant CO Trunk - CO Trunk Connect Enable).
- System Option 129 may be selected in conjunction with System Options 130 (Attendant CO Trunk - Non CO Trunk Connect Enable) and 131 (Attendant Non Co Trunk - Non CO Trunk Connect Enable).

Operation

After answering an incoming trunk call, or establishing an outgoing trunk call:

- Dial the trunk group access code of the required outgoing CO trunk.
- Dial the required CO number.
- Wait for the called party to answer.
- Press the RELEASE button - the two trunks are connected together.

Attendant Console
Emergency Transfer

Description

If the PABX goes completely out of service and the MAJOR ALARM LED is not on, the EMERGENCY TRANSFER switch may be activated. It is located on the base of the console and may be used to manually set the PABX into the emergency transfer position.

Conditions

- Operation of the switch will disconnect all existing calls. It may connect up to: six trunks for an SX-100 or twelve trunks for an SX-200, to extensions for direct out lines.

When the transfer switch is returned to normal calls on the transfer trunks will not be dropped. The trunk will be released after the extension goes on hook.

Programming

- No programming is required but hard wiring details are discussed in SECTION MITL9105/9110-98-200.

Operation

To operate the emergency transfer:

- Push the switch to the Transfer position.

To restored normal operation:

- Push the switch to the Normal position.

Attendant Console
Flash

Description

The attendant may flash for the long distance operator by pressing the FLASH button.

Conditions

- The attendant must be on a long distance trunk that the long distance operator has assisted on.

Programming

- None

Operation

- After answering an attendant recall, the extension wants to be reconnected to the long distance operator.
- Press the FLASH button several times.
    - Wait for long distance operator to answer and advise theoperator of the operator of the situation.
- Press the RELEASE button.

Description

This feature allows the attendant to set up a conference with up to six conferees plus the attendant. The conferees may be any combination of extensions and trunks. To set up a conference the attendant must have a completed Source and/or a Destination call. If only one party is in the conference it will hear music, if provided. Each the attendant enters the conference, all parties in the conference hear a warning tone. The attendant may reenter the conference or be recalled to the conference, by an extension switchhook flash, at any time.

Conditions

- Parties may be added to the conference by the attendant only.
- If Tenant Service Separate Consoles is selected two Attendant Controlled Conferences may be in progress simultaneously.
- If a single tenant or multi tenant with shared consoles is selected, only one conference may be active at a time.
- If two or more trunks are to be connected to the conference, the required trunk to trunk parameters must be selected.
- The conference must not contain trunks for which automatic release supervision is not provided.
- If the conference contains only a single party for more than one minute, the party recalls to the attendant as a RECALL, and the conference is terminated.

Programming

- Select System Option 119 (Attendant Controlled Conference).
- Select the required Trunk to Trunk Connect System Options – System Option Numbers 129 (Attendant CO Trunk – CO Trunk Connect Enable), 130 (Attendant CO Trunk – Non CO Trunk Connect Enable), and 131 (Attendant Non CO Trunk – Non CO Trunk Connect Enable).

Operation

After establishing a Source, Destination or both:

- Press the CONF button – the CONF lamp lights, the SOURCE display clears, the DESTINATION display shows C (plus tenant number if tenanting with shared consoles).
- Press the RELEASE button.
- Dial the number of the next party – when the party answers.
- Press the CONF button – you and the called party are connected to the conference.
- Press the RELEASE button – the called party remains in the conference, the console is released and becomes idle.
- Dial the number of the next party. When the party answers, repeat the above two steps.

Attendant Date
Display

Description

The attendant may set, modify or display the date from the console. This date will appear on all SMDR, Traffic Measurements and Data dumps.

Description

- The date and the time may not be displayed simultaneously.
- Some Traffic Measurements may be lost with a date change.
- This option is only available in Generic 204/up.

Programming

- Assign an access code to Feature Number 18 (Attendant Function).

Operation

To display the date:

- Press the IDENT button.
  - The date appears in the time display.

To change or set the date:

- Dial *15 (where * is the Attendant Function).
- Dial 3 or 4 digit date (one or two digit month, two digit day).
- Press the RELEASE button.

**Attendant DISA Code
Setup Enable**

Description

This option allows the attendant to change the Direct Inward System Access (DISA) security code that a caller must dial to access the system.

Conditions

- The DISA code cannot conflict with the numbering plan.
- The DISA code is limited to a maximum of 4 digits.
- The DISA code cannot be displayed.
- An attendant may change a DISA code, irrespective to what tenant the DISA code is applied to.
- An attendant cannot delete the DISA code, it may only be deleted via Programming.
- Only one DISA code may be assigned irrespective of the number of tenants.

Programming

- Select System Option 135 (Attendant DISA Code Setup Enable).
- Assign an access code to Feature Number 21 (Direct Inward System Access).

Operation

- Dial * 7
- Dial the new 1, 2, 3 or 4 digit DISA code.
- If a new code is not entered the existing code will remain in effect.
- Press the RELEASE button - the new DISA code is in effect.

Attendant Function

Description

By assigning a code to the Attendant Function the attendant may access all Attendant Function codes. For further information see table 6-3 of SECTION MITL9105/9110-98-500.

Conditions

- None

Programming

- Assign a code to Feature Number 18 (Attendant Function).

Operation

- See table 6-3 of SECTION MITL9105/9110-98-500.

**Attendant Hold
Circuits**

Description

The attendant may put an extension or trunk on hold at any one of four HOLD positions. The system may be programmed for a call hold recall of a variable time (see Variable Timers).

Conditions

- None

Programming

- For a Call Hold recall of 20 seconds select System Option 143 (Attendant Timed Recall – Hold – 20 seconds).
- For a Call Hold recall of 40 seconds select System Option 144 (Attendant Timed Recall – Hold – 40 seconds).

Operation

To put a call on hold at the console:

- Press the answer button when call rings console.
- Press any HOLD button (1-4) call is put on hold.

To retreive a call on hold at the console:

- If the call has been recalled by a call hold timeout, the HOLD button LED will flash. By fered to the SOURCE or the DESTINATION if there is a SOURCE already.
- If the call is to be recalled before a timeout the attendant may press the HOLD button where the call is being held. By pressing the HOLD button the call will be transfered to the SOURCE or the DESTINATION if there is a SOURCE already.

**Attendant Individual
Trunk Access**

Description

The attendant may access an individual trunk to; busy or debusy it, dial out on it or make a night service assignment.

Conditions

- None

Programming

- Assign an access code to Feature Number 18 (Attendant Function).

Operation

To busy out an individual trunk:

- Dial *9
- Dial individual trunk access number (equipment number).
- Dial *
- Press the RELEASE button.

To debusy an individual trunk:

- Dial *9
- Dial individual trunk access number (equipment number).
- Dial #
- Press the RELEASE button.

To access an individual trunk:

- Dial *2
- Dial individual trunk access number (equipment number).
- Dial *
- Press the RELEASE button.

To make a flexible night service assignment:

- Dial *3
- Dial individual trunk access number (equipment number).
- Press the NIGHT 1 or NIGHT 2 button.
- Dial the extension number that will answer the trunk.
- Press the RELEASE button.

Attendant Jacks

Description

Each attendant console is equipped with two sets of attendant jacks. Either set of jacks may be used by the attendant. The other set provides a monitoring, supervisory or training position. Most commonly used handsets or headsets may be used with the attendant console. Removal of both handsets and headsets from the console(s) causes the console(s) to become inoperative. In systems with Generic 203/up if the handsets are removed from both console one and console two, the system will switch to Night Service 1. The presence or absence of a maintenance console does not affect the switching to Night Service.

Conditions

- None

Programming

- None

Operation

- None

Attendant Lamp Test

Description

The attendant may test all the console LEDs, seven segment displays and tone ringer on the console by pressing the LAMP TEST button.

Conditions

- If the LAMP TEST button is pressed and the BELL OFF button has been enabled the console tone ringer will still be rung.

Programming

- None

Operation

- Press the LAMP TEST button and hold down.
  - Either all the seven segment displays all the LEDs will be lit. Pressing the LAMP TEST button again will toggle between the two displays.

Attendant Lock Out

Description

The attendant may be alerted that an extension has gone off hook and timed out (not dialed within a by the console tone ringing and the minor alarm LED flashing. Upon pressing the ALARM RESET button the SOURCE display shows E099 and the equipment number. The DESTINATION display shows the extension number and LD for locked out. For Automatic Station release.

Conditions

- None

Programming

- Select System Option 112 (Lockout Alarm Enable).

Operation

- Console tone ringer rings and minor alarm LED flashes.
- Attendant presses the ALARM RESET button - SOURCE and DESTINATION displays display information.
- Once the problem has been corrected the attendant may cancel the error by dialing ✳ 8 # (where * is the Attendant Function) and press the RELEASE button.

**Attendant Non CO
Trunk - Non CO Trunk
Connect Enable**

Description

This option allows the attendant to connect a Non CO Trunk call to another Non **CO** Trunk, then release the call from the console. See End of Dial Signal for Outgoing Trunks.

Conditions

- In Generic 203/up, two or more trunks may be connected together in an Attendant Controlled Conference.
- At least one of the trunks must provide release supervision or the trunk connection will not automatically release from the system when the call is completed.

Programming

- Select System Option 131 (Attendant Non CO Trunk Non CO Trunk Connect Enable).
- System Option 131 may be selected in conjunction with System Options 129 (Attendant CO Trunk - CO Trunk Connect Enable) and 730 (Attendant CO Trunk - Non CO Trunk Connect Enable).

Operation

After answering an incoming Non CO Trunk call, or establishing an outgoing trunk call:

- Dial the access code of the required Non CO Trunk.
- Dial the required number.
- Wait for the called party to answer.
- Press the RELEASE button - the two trunks are connected together.

Attendant Secrecy

Description

The attendant may "split" between calls (see Both Button Enable, Brokers Call, Both Mode Standard) and talk to each call without the other overhearing.

Conditions

- **None**

Programming

- **None**

Operation

- The attendant may press the SOURCE or DESTINATION button and **coverse** with either call privately.
- To talk to both the SOURCE and DESTINATION the extension may press the BOTH button.

Attendant Serial Call

Description

This feature allows the attendant to have incoming trunk calls automatically returned to the console when the original call is finished.

Conditions

- Attendant Serial Call is available on all trunk calls.
- This feature amd System Option 172 (Guest Room Button Enable Generic 203/up) are mutually exclusive.

Programming

- Select System Option 121 (Attendant Serial Call).

Operation

To establish a Serial Call:

- Answer an incoming LDN call.
- Press the SERIAL CALL button.
- Dial the required extension number.
- Press the RELEASE button.

To answer a Serial Recall:

- ANSWER and RECALL lamps flash.
- Press the ANSWER button – ANSWER, RECALL, SOURCE and SERIAL CALL lamps are lit. The attendant is connected to the recalling trunk.

To cancel a Serial Recall:

- ANSWER and RECALL lamps flash.
- Press the ANSWER key – ANSWER, RECALL, SOURCE and SERIAL CALL lamps lit.
- Press the SERIAL CALL button, SERIAL LED goes out. If the call is subsequently connected to another station, it will not recall.

Attendant Station
Busy -Out
Generic 203/204

Description

This feature allows the attendant to busy-out any extension (the extension cannot originate or receive any calls), and to remove the busy-out condition. If the attendant dials the number of a busied out extension, the console will display the extension number and "oo" in the Destination display, the ERROR lamp is lit, the busy lamp field shows the extension is busy, and reorder out extension will receive reorder tone. The attendant may display all extensions that have been busied-out on the console busy lamp field (see Locked Out Display).

Conditions

- If the extension is idle when the attendant dials the busy-out code, the extension will be busied-out immediately.
- If the extension is busy when the attendant dials the busy-out code, the extension is busied-out as soon as the extension becomes idle extension has "Call Forwarding - Busy" or "Call Forwarding-Follow Me" set up, the forwarding will occur.
- If an extension has Call Forwarding in effect, and the extension forwarded to has been busied out, the calling extension receives reorder tone.
- If the extension is a member of a hunt group, all calls to the hunt group will bypass the busied-out extension.

Programming

- Select System Option 179 (Attendant Station Busy-Out Enable).

Operation

To Busy-Out an extension

- Dial *12
- Dial the extension number, and *.
- Press the RELEASE button - the station is Busied-Out.

To remove the Busy-Out condition on an extension:

- Dial *12, the extension number, and #
- Press the RELEASE button - the Busy-Out condition is removed.

**Attendant Time
Display**

Description

Each attendant console is equipped with a digital clock that continuously displays the time-of-day in hours and minutes. The time may be displayed in 12 or 24 hour mode. The clock display is driven by pulses derived from the CPU master clock. The fact that the clock is on is thus a direct indiction that the CPU is running. The time displayed by the clock is used by Automatic Wake Up, Message Waiting and Traffic Measurement.

Conditions

- Feature Nuinber 18 (Attendant Function) must be assigned an access code. For the purpose of the following description, this is assumed to be *.
- After a power failure, the clock will flash (Generic 204/up) until the time has been set.

Programming

- If 12 hour time display is required, no clock options are required.
- If 24 hour time display is required, select System Option 154 (24 Hour Clock Display).

Operation

To Set Time-Of-Day:

- Press the * button.
- Dial 5
- Dial the required hours.
- Dial two digit minutes.
- If time is p.m. (12 hour clock) press the * button.
- Press the RELEASE button - the time is set and the clock continues to run.

**Attendant Timed
Recall**

Description

This feature automatically alerts the attendant when a call extended through the
console or a call held at the console has not been answered within the preselected
time. Selectable recall times are:

- Attendant Timed Recall - Camp-On 20s, 30s or 40s.
- Attendant Timed Recall - Don't Answer 20s, 30s or 40s.
- Attendant Timed Recall - Hold 20s, 30s, or 40s.

Conditions

- Recalls to the console are inoperative during night service, unless the call has
  been handled by the console.

Programming

- For a Camp-On timeout of 20s select System Option 139. Select System Option
  140 for a timeout of 40s. Neither option is selected for a timeout of 30s
  (default   timeout).
- For a Don't Answer timeout of 20s select System Option 141. Select System
  Option 142 for a 40s. No entry is selected for a timeout of 30s (default
  timeout).
- For a Hold timeout of 20s select System Option 143. Select System Option 144
  for a timeout of 40s. If neither option is selected the timeout is 30s (default
  timeout).

Operation

- None

**Attendant Trunk Busy
out**

Description

The attendant may "busy out" trunk from the console, for maintenance or any other purposes.

Conditions

- Any extension or console dialing a busied out.

Programming

- Assign an access code to Feature Number 18.

Operation

To busy out a trunk:

. Dial *9 + the trunk equipment number + *
- Press the RELEASE button.
  - LED for trunk on the busy lamp field (if assigned) lights.

To debusy a trunk:

- Dial *9 + the trunk equipment number + #
· Press the RELEASE button.
  - LED for trunk on the busy lamp field (if assigned) goes out.

**Automatic
Callback -Busy
(Extensions)**

Description

Automatic Callback-Busy allows an extension user, upon encountering a busy extension number (or trunk access code, see Outgoing Trunk Callback), to have the call completed when the extension becomes idle. After the feature has been activated, the system continuously monitors the originating extension, and the called number. When both become idle, the system rings the originating extension, and when that extension goes off-hook, the called extension is rung. If more than one callback request is active on any number, the requests are queued and serviced on a first-in, first-out basis. All callbacks may be cancelled from the attendant console.

Conditions

- An individual callback cannot be cancelled by the station or the attendant.
- A callback will always ring the originating extension, call forwarding has no effect.
- Automatic Callback may be activated on extension numbers, hunt group access codes and trunk group access codes.
- Up to 32 callback requests may be active within the system at any time.
- If the two parties involved in a callback hold a conversation (not a conference) before the callback is honoured, the callback will be cancelled automatically.
- Any callback outstanding for more than 8 hours is cancelled automatically.
- Duplicate callback requests are ignored (the original callback request is cancelled).
- The callback access code must be dialed within 10 seconds of receiving busy tone.
- If a callback is not answered by the originating extension within 6 rings, it is automatically   cancelled.
- If the called party becomes busy before the originating party answers a callback, the originating party will hear busy tone and may dial the callback code again.
- All callback requests are lost after recovery from a power failure.

Programming

- The originating extension's COS must include . Assign a single digit Access Code to Feature Number 23 (Callback - Busy). This code may conflict with the system numbering plan.
- If callback to busy trunk groups is required, select System Option 106 (Outgoing Trunk Callback).

Operation

To set up an Automatic Callback-Busy:

- Dial the required extension number or access code - busy tone is heard.
- Dial the Automatic Callback Busy code - dial tone is returned and the dialing extension is available for normal use.

To answer an Automatic Callback-Busy:

- The extension rings.
- Lift the handset - ringing tone is returned, the called number rings.

To cancel all Automatic Callback requests from the attendant console:

- Dial * 4 # ("tenant number" * 4 # if Tenant Service).
- Press the RELEASE button - all callback requests are cancelled.

Automatic Callback -
Don't Answer

Description

This feature allows an extension user, upon encountering an extension which does not answer, to have the call completed after the called extension has gone off and on hook. After the feature has been activated the system continuously monitors the originating extension and the required number. After the called extension goes off hook the callback will be handled in the same way as an Automatic Callback-Busy. If more than one callback request is active on any extension, the requests are queued and serviced on a first-in, first-out basis. All callbacks may be cancelled from the attendant console.

Conditions

- An individual Callback can not be cancelled by the station or the attendant.
- A callback will always ring the originating extension, call forwarding has no effect.
- Automatic Callback may be activated on extension numbers, hunt group access codes and Trunk Group access codes.
- Up to 32 callback requests may be active within the system at any time.
- If the two parties involved in a callback hold a conversation (not a conference) before the callback is honoured, the callback will be cancelled automatically. Duplicate callback requests are ignored (the original callback request is cancelled).
- If a callback is not answered by the originating extension within 6 rings, it is automatically cancelled.
- If the called party becomes busy before the originating party answers a callback, the originating party will hear busy tone and may dial the callback-busy code.
- All callback requests are lost after recovery from a power failure.
- The callback access code must be dialed within 10 seconds of receiving busy tone.

Programming

- Originating extension's COS must include Option Number 33 (Automatic Callback).
- Assign an Access Code to Feature Number 2 (Callback - Don't Answer). This code may not conflict with the system numbering plan.

Operation

To set up an Automatic Callback-Don't Answer:

- Dial the required extension number - the extension does not answer.
- Flash the switchhook - Dial tone is returned.
- Dial the Callback Don't Answer access code, and the extension number - Dial tone is returned.
- Replace the handset - the extension is available for normal use.

To answer an Automatic Callback-Don't Answer:

- The extension rings.
- Lift the handset ~ ringing tone is returned, the called number rings.

To cancel all Automatic Callback requests from the attendant console:

- Dial * 4 # (tenant number * 4 # if Tenant Service).
- Press the RELEASE button = all callback requests are cancelled.

Automatic Station Release

Description

This system feature automatically releases and locks out an extension if it does not dial a digit within the dial timeout period, or exceeds the interdigit timeout period, or does not hang-up within one minute of finishing a call. If the extension has a trunk call on Hold when it becomes locked out, the held trunk call will be returned to the console as a recall. If the attendant dials the number of an extension that is locked out, the console DESTINATION display will display the extension's class of service as LO. The System may be programmed to raise a Minor Alarm when a lockout condition is detected.

- If at the end of a call an extension does not go on-hook within one minute, the extension is locked out. The extension will also be locked out if ringing tone is returned for more than five minutes or if busy tone is returned for more than 30s and the extension has not camped on to the busy number. An extension will also be locked out if a vacant or illegal number is reached and reorder is supplied for more than 30 seconds.
- Dial Timeout: If an extension does not dial a digit within 15 seconds after going off-hook, dial tone is replaced with reorder tone. If the extension remains off-hook for an additional 30 seconds, reorder tone is removed and the extension is locked out.
- Interdigit Timeout: If after dialing the initial digit of a call, a user fails to dial further digits within the interdigit timeout period (extension to extension call timeout is 15 seconds, extension to trunk call timeout is 10 seconds), reorder tone is applied to the extension. If the extension remains off-hook for an additional 30 seconds, reorder tone is removed and the extension is locked out.

Conditions

- If System Option 112 (Lockout Alarm Enable) is selected, any extension which is locked out will cause a minor alarm.

Programming

- If a Minor Alarm is to be raised when lockout is detected, Select System Option 112 (Lockout Alarm Enable).

Programming

- Press the ALARM RESET key. The console SOURCE displays E099 and the equipment number of the locked out extension. The DESTINATION displays the number of the extension and the letters Lo to indicate that it is Locked Out.

Automatic Wake -Up
(Alarm Call)
Generic 204

Description

This feature allows either the attendant or an extension user to set up a Wake-Up **alarm** call that will ring the extension at a prearranged time. After answering a wake-up alarm call, the extension user receives either a special tone (100ms On, 400ms off of miscellaneous tone) or music. If the call is not answered within six rings, or if the extension is busy, the call will repeat two more times at five minute intervals.

Conditions

In the event of a power failure:

- A Wake-Up call will be delayed if there are ten Wake-Up calls in the ringing state or if there are only four free speech paths. The remaining Wake-Up call(s) will be initiated as soon as conditions allow.
- An extension with "00 Not Disturb" will be over- ridden and rung at the requested time.
- System Option 113 (Tenant Service) and System Option 190 (Automatic Wake-up) are mutually exclusive.
- System Option 203 (Traffic Measurement Polling) and System Option 191 (Automatic Wake-Up Print) are mutually exclusive.
- A PROM/RAM Expander Card is required.

Programming

- Initialize Extended RAM (see SECTION MITL9105/9110-98-210).
- Select a configuration 1 or 4.
- Select System Option 190 (Automatic Wake-Up Enable) if the Wake-Up call is to be set from the console.
- For a printed copy of all Wake-Up requests and attempts select System Option 191 (Automatic Wake-Up Print).
- A Wake-Up/Alarm call may be answered using Dial or Directed Call Pick-Up. Once answered the Wake-Up/Alarm call is cancelled. For music when the Wake-Up call is answered, select System Option 192 (Automatic Wake-Up MOH).
- For an extension to set Automatic Wake-Up, select Class of Service Option Number 82 (Alarm Call Setup Enable).
- For an extension to set Automatic Wake-Up, assign an access code to Feature Number 30 (Alarm Call Setup Access Code).

Operation

To set or modify a Wake-Up call from the console:

- Press the GUEST ROOM button - the GUEST ROOM lamp lights.
- Dial the extension number - the Destination display shows the Wake-Up time.
- Dial *, the Wake-Up time, then # (or * if p.m. and a 12 hour clock-is used) - the DESTINATION display shows the Wake-Up time.
- Press the RELEASE button, or the GUEST ROOM button to return to the source

party.

To cancel a Wake-Up call from the console:

- Press the GUEST ROOM button — the GUEST ROOM lamp lights.
- Dial the extension number — the DESTINATION display shows the Wake-Up time.
- Dial *# — DESTINATION display clears.
- Press the RELEASE button, or the GUEST ROOM button to return to the source party.

To set or modify a Wake-Up call from an extension:

- Dial the access code and desired Wake-Up time as a four digit number using the 24 hour clock — dial tone is returned.

To cancel a Wake-Up call from an extension:

- Dial the access code, followed by 9999 — dial tone is returned.

Both Button Enable

Description

Selecting this option enables the attendant con? sole BOTH button. In normal console operation (automatic split mode), the console is either connected to the source or destination party of a call. Pressing the BOTH button allows the attendant to speak to both the calling and called parties at the same time. See also Both Mode Standard.

Conditions

- In the Both mode of operation, the Do Not Disturb and Message Waiting indications are (Generic 203/up) thoseof the DESTINATION party.

Programming

- Select System Option 128 (Both Button Enable).

Operation

With the console operating in the automatic split mode:

- Press the BOTH button - the SOURCE display shows the number of the source party, the DESTINATION display shows the number of the destination party, the attendant is connected to both parties.

Both Mode Standard

Description

When selected, this option causes the attendant to be normally connected to both the SOURCE and DESTINATION parties on all calls through the console. Manual splitting may still be achieved using the console SOURCE and DEST buttons. If this option is not selected, the attendant will be connected to the SOURCE party on answering the call, and the DESTINATION party as soon as the destination number is dialed (Automatic Split Mode). See also Both Button Enable.

Conditions

- When this option is in effect, the console dis? plays reflect the status of the destination party for Do Not Disturb and Message Waiting (Generic 203/up).

Programming

- Select System Option 125 (Both Mode Standard).

Operation

- **None**

Broker's Call

Description

The Broker's Call allows an extension user, while engaged in a call, to hold the first call and originate a new call. Once the new call has been established, the originating extension may alternate between the calls, and carry on a PRIVATE conversation with either party. If the extension originating the Broker's Call hangs up with a party on hold, the extension will be rung back by the held party.

Conditions

- An extension with the Broker's Call feature may access the Call Park, Call Hold, Call Hold and Retreive, and Paging features after flashing on a call.
- The originating extension and only one of the other parties may be in the talking connection at any time.
- COS Option Number 48 (Broker's Call) and Option Number 49 (Station Conference) are mutually exclusive.
- System Options 110 (Cannot Dial a Trunk after Flashing) and 111 (Cannot Dial a Trunk After Flashing if Holding or in Conference with a Trunk) do not apply to an extension with Broker's Call.

Programming

- The COS of the extension originating the Broker's Call must contain Option Number 48 (Broker's Call).
- One or more of the System Options 107 (Can Flash if on an Incoming Trunk), 108 (Can Flash if on an Outgoing Trunk) and 109 (Can Flash if Talking to an Extension) must be selected in conjunction with Broker's Call.

Operation

- After establishing a call, flash the switchhook.
  - Transfer dial tone is returned.
- Dial the number of the second party - when the second party answers, two-way private conversation.
- To alternate between calls, flash the switchhook.
  - Private conversation with the other party.

Busy Lamp Field

Description

Each attendant console is equipped with a Busy Lamp Field which displays the busy/idle state of any 150 selected trunks or extensions. The Busy Lamp Field can also display the status of assigned extensions. See Do Not Disturb, Message Waiting Display, Busy Verification, Room Status, Automatic Station Release, and Maid in Room.

Conditions

- Multiple assignment of a Busy Lamp is not permitted.

Programming

- Enter the Busy Lamp number to be associated with the extension or trunk when programming the item.
- Attach the required designation strip to console.

Operation

- None

Busy Trunk Release

Description

This feature allows the attendant or repair person to release a trunk that has been busied out from the console.

Conditions

. None

Programming

- Assign an access code to Feature Number 18 (Attendant Function).

Operation

- Dial ✶ 9
- Dial the Individual Trunk access code (trunk equipment number).
- Dial #
- Press the RELEASE button - the trunk is idle.

Busy Verification

Description

This feature allows the attendant to view the busy/idle status of lines and trunks using the Busy Lamp Field. The Busy Lamp Field is a standard feature. The attendant may further investigate apparent busy conditions by using the Busy Override feature.

Conditions

- For an extension to be displayed it must have a lamp assigned to it.
- Only one extension or trunk per lamp can be assigned.

Programming

- Assign the trunk or extension to the required busy lamp position during programming.

Operation

- None

Call **Blocking**
Generic 2031204

Description

This feature allows the attendant to restrict extensions with 'Hotel/Motel Station to Station Restriction Applies' in their COS, from making calls to other extensions with the same option, by activating Call Blocking Calls to the attendant or to extensions without the option selected may be made normally. During Day Service calls made between restricted extensions are intercepted to the attendant or reorder tone, during Night Service interception is to reorder tone only.

Conditions

- An extension with COS Option Number 63 (Hotel/ Motel Station to Station Restricting Applies) set may call an extension without Option Number 63 while Call Blocking is in effect.
- An extension without Option Number 63 set may call an extension with Option Number 63 set while Call Blocking is in effect,
- System Option 113 (Tenant Service) and System Option 134 (Controlled Station to Station Restriction Setup Enable) are mutually exclusive.

Programming

- Select System Option 134 (Controlled Station to Station Restriction Set Up Enable).
- Select System Option 116 (Illegal Access Intercept to the Attendant) may be selected. If this option is not selected blocked calls will intercept to reorder tone.
- The COS of the extension to be blocked must include Option Number 63 (Hotel/Motel Station to Station Restriction Applies).

Operation

To setup Call Blocking:

- Press the CALL BLOCK button – the CALL BLOCK lamp lights, all calls are blocked between extensions with Option Number 63 in their COS.

To remove Call Blocking:

- Press the CALL BLOCK button – the CALL BLOCK lamp goes out, Call Blocking is removed.

Callback Button

Description

Selection of this feature allows the attendant to set up a Don't Answer or Busy Callback by pressing the CALLBACK button.

Conditions

- Automatic Callback may be activated on extension numbers, hunt group access codes and trunk group access codes.
- Up to 32 callback requests may be active within the system at any time.
- If the two parties involved in a callback hold a conversation (not a conference) before the callback is honoured, the callback will be cancelled automatically unless it was set by the attendant.
- Any callback outstanding for more than 8 hours is cancelled automatically.
- Duplicate callback requests are ignored (the original callback request is cancelled).
- The CALLBACK button must be depressed while receiving ringback or busy tone.
- If the called party becomes busy before the attendant answers a callback, the attendant will hear busy tone and may press the CALLBACK button again. The attendant may cancel all callback requests by dialing * 4 # (or dialing the "tenant number" and * 4 # if Tenant Service).
- All callback requests are lost after recovery from a power failure.

Programming

- Select System Option 126 (Callback Button Enable).

Operation

On reaching a busy or unanswered number:

- Press the CALLBACK button.
- Press the RELEASE button - the console displays clear, the console will be called when the number becomes free.

To answer a CALLBACK RECALL:

- Press the ANSWER button - ANSWER lamp lights, the Callback lamp lights.
- Listen for ringing tone - the RECALL lamp goes out, the DESTINATION display shows the number and class of Service of the extension and the console is connected to the ringing extension.

Call Forwarding -
Busy (Extensions)

Description

This feature allows a user to have all calls which are directed to his extension, forwarded to the attendant or to a selected extension number within the PABX, WHEN THE EXTENSION IS BUSY. While the feature is active and the extension is idle, calls may be made and received normally.

Conditions

- Callbacks will always ring the originating extension, call forwarding has no effect.
- Call forwarding has no effect on calls directed to an extension via hunting.
- Only one type of Call Forwarding may be active on each extension at any time. If an extension has one type of Call Forwarding code active and the user enters a new Call Forwarding code, the first type of forwarding is cancelled.
- Calls may not be forwarded to trunks or numbers external to the PABX.
- Calls may not be forwarded to extensions with a COS that includes Option Number 38 (Never a Forwardee).
- The attendant cannot forward calls that. are directed to the console.
- Calls may be forwarded a maximum of two steps, once at the dialing stage (Call Forwarding- Follow Me or Call Forwarding - Busy), and once after ringing (Call Forwarding - Don't Answer).
- Calls will not be forwarded to the attendant during Night Service.
- If an invalid number is selected as a forwarding number, reorder tone is returned.
- Call forwarding does not apply if the calling extension (or attendant) is the party to which the call would be forwarded.
- Calls cannot be forwarded to a hunt group.
- All call forwarding requests are lost after recovery from a power failure.
- Extension call forwarding takes precedence over system call forwarding, i.e. extension call forwarding is tested initially and system call forwarding are then forwarded to number.

Programming

- Assign an access code to Feature Number 3 (Call Forwarding - Busy). This code cannot conflict with the system numbering plan.
- The COS of the forwarding extensions must contain Option Number 34 (Call Forwarding - Busy).

Operation

To select Call Forwarding - Busy:

- Lift the handset - dial tone returned.
- Dial the Call Forwarding - Busy access code.
- Dial the number to which calls are to be forwarded - dial tone returned.
- The extension is available for normal use.

To cancel Call Forwarding-Busy:

- Lift the handset - dial tone returned.
- Dial the Call Forwarding - Busy access code - no tone returned.
- Replace the handset.

To cancel all Forwarding Requests from the console:

- Dial * 1 # (dial the "tenant number" * 1 #, if Tenant Service) and then press the RELEASE button.

To cancel a Forwarding Request for an extension from the console:

- Dial * 11 nnn # (where nnn is the extension number) and then press the RELEASE button.

Call **Forwarding -
Busy (System -** DID.
**CCSA, Dial In Tie
Trunks)**

Description

This feature allows a customer to specify that all DID, CCSA and Dial-In tie trunk calls directed to a busy extension will be forwarded to the attendant. The forwarded calls will appear at the attendant console as recalls.

Conditions

- Call Forwarding - Busy System is not active during night service.
- Extension call forwarding takes precedence over system call forwarding, ie. extension call forwarding is tested initially, and system call forwarding acts upon the forwarded-to number if required.
- Calls to extensions with Option Number 81 (Call Forwarding System Inhibit) in their COS will not be forwarded but will continue to ring at the extension.

Programming

- Select System Option 149 (Call Forwarding - Busy, System). If this option is not selected, Dial-In calls to busy extensions will receive busy tone.

Operation

- None

**Call Forwarding -
Don't Answer
(Extensions)**

Description

This feature allows an extension user to have all calls directed to the extension that are not answered within a selected time to be forwarded to the attendant or to another extension number specified. The forwarded calls will appear at the attendant's console as recalls.

Conditions

- Extension call forwarding takes precedence over system call forwarding, i.e. extension call forwarding is tested initially and system call forwarding tests then forwarded to number.
- Callbacks will always ring the originating extension - call forwarding has no effect.
- Only one type of Call Forwarding may be active on an extension at any time. If an extension has one type of Call Forwarding active and the user enters a new Call Forwarding code, the first type of forwarding is canceled.
- Calls may not be forwarded to trunks or numbers external to the PABX.
- Calls may not be forwarded to extensions with a COS that includes Option Number 38 (Never a Forwardee).
- Calls may be forwarded a maximum of two steps, once at the dialing stage (Call Forwarding - Follow Me or Call Forwarding - Busy), and once after ringing (Call Forwarding - Don't Answer).
- Call Forwarding does not apply if the calling extension (or attendant) is the party to which the call would be forwarded.
- Call will not be forwarded to the attendant during night service.
- If an invalid number is selected as a forwarding number, reorder tone is returned.
- Calls cannot be forwarded to a hunt group.
- All call forwarding requests are lost after recovery from a power failure.
- The attendant cannot forward calls that are directed to the console.
- Calls will not be forwarded to the console during Night Service.

Programming

- Assign an access code to Feature Number 4 (Call Forwarding - Don't Answer).
- The forwarding extension must have COS Option Number 35 (Call Forwarding - Don't Answer).
- If calls are to be forwarded after 20s, select System Option 147.
- If calls are to be forwarded after 40s, select System Option 148.
- If neither System Option 147 or 148 is selected, calls are forwarded after 30s (default timeout).

Operation

To Select Call Forwarding - Don't Answer:

- Lift the handset - dial tone is returned.
- Dial the Call Forwarding - Don't Answer access code.
- Dial the attendant access code, or the number of the extension to which the

calls are to be forwarded - dial tone is returned.

- The extension is now available for the origination and reception of calls.

To cancel Call Forwarding - Don't Answer:

- Lift the handset - dial tone is returned.
- Dial the Call Forwarding - Don't Answer access code - no tone is returned.
- Replace the handset - call forwarding is cancelled.

Note: To Cancel All Call Forwarding requests from the console:

- Dialing * 1 # (or * 11 #) ("tenant number" * 1 # if Tenant Service) and then press the RELEASE button.

**Call Forwarding -
Don't Answer (System
- DID, CCSA, Dial In
Tie Trunks)**

Description

This feature allows a customer to specify that all DID, CCSA or Dial In Tie Trunk calls directed to an extension or hunt group, that are not answered within the selected time, will be forwarded to the attendant. The forwarded calls appear on the attendant console as recalls.

Conditions

- Calls will not be forwarded during Night Service.
- Calls to extensions with Option Number 81 (Call Forwarding System Inhibit) in their CDS will not be forwarded but will continue to ring at the extension.
- See Call Forwarding Busy (System - DID, CCSA, Dial In Tie Trunks).
- Extension call forwarding takes precedence over system call forwarding, i.e. extension call forwarding is tested initially, and system call forwarding acts upon the forwarded to number, if required.

Programming

- Select System Option 150 (Call Forwarding - Don't Answer, System).
- Calls will be forwarded after 20s if System Option 147 is selected.
- Calls will be forwarded after 40 seconds if System Option 148 is selected.
- If neither Option 147 nor Option 148 is selected, calls will be forwarded after 30s (default timeout).

Operation

- None

Call Forwarding -
Follow **Me**

Description

This feature allows an extension user to have all calls which are directed to the extension, to be forwarded to the attendant or a selected extension within the PABX. The number to which the calls are forwarded is the only originating party that may call the forwarding extension. While Call Forwarding - Follow Me is active, the forwarding extension may originate calls in the normal manner. Extension call forwarding takes precedence over system call forwarding, i.e. extension call forwarding is tested initially and system call forwarding test is then forwarded to a number

Conditions

- Callbacks will always ring the originating extension - call forwarding has no effect.
- Call Forwarding has no effect on calls directed to the extension via hunting.
- Only one type of Call Forwarding may be active on an extension at any time. If an extension has one type of Call Forwarding active and the user enters a new Call Forwarding Code, the first type of forwarding is cancelled.
- Calls may not be forwarded to trunks or numbers external to the PABX.
- Calls may not be forwarded to extensions with a COS that includes COS Option Number 38 (Never a **Forwardee).**
- Calls may be forwarded a maximum of two steps, once at the dialing stage (Call Forwarding - Follow Me or Call Forwarding - Busy), and once after ringing (Call Forwarding - Don't Answer).
- Call Forwarding does not apply if the calling extension (or attendant) is the party to which the call would be forwarded.
- Calls will not be forwarded to the attendant during night service.
- If an invalid number is selected as a forwarding number, reorder tone is returned.
- Calls cannot be forwarded to a hunt group.
- All call forwarding requests are lost after recovery from a power failure.
- The attendant cannot forward calls that are directed to the console.
- Calls will not be forwarded to the console during Night Service.

Programming

- Assign an access code to Feature Number 5 (Call Forwarding - Follow Me).
- The COS of the forwarding extension must include Option Number 36 (Call Forwarding - Follow Me).

Operation

To select Call Forwarding - Follow Me:

- Lift the handset - dial tone is returned.
- Dial the Call Forwarding - Follow Me access code.
- Dial the number to which the calls are to be forwarded (extension number or the attendant) - dial tone is returned.
- Replace the handset - the extension is available for call originations.

To cancel Call Forwarding - Follow Me:

- Lift the handset - dial tone is returned.
- Dial the Call Forwarding - Follow Me access code.
  - No tone is returned.
- Replace the handset - all forwarding is cancelled.

To cancel all Call Forwarding requests from the console:

- Dial * 1 # (tenant number * 1 # if Tenant Service) and then press the RELEASE button.

To cancel a Call Forwarding request for an extension from the console:

- Dial * 11 nnn # (where nnn is the extension number), then press the RELEASE button.

Call Forwarding
System inhibit
Generic 203/204

Description

This feature allows System Call Forwarding to be inhibited on an extension basis. If a DID, CCSA or Dial-In Tie Trunk call is directed to an extension with this feature active, the calling party will continue to hear ringing (extension idle) or busy tone (extension busy); the call will not be forwarded to the attendant.

Conditions

- None

Programming

- Select System Option 149 (Call Forwarding Busy - System).
- Select System Option 150 (Call Forwarding Don't Answer - System).
- To inhibit the call forwarding, the COS of the extension must include Option Number 81 (Call Forwarding System Inhibit).

Operation

- None

Call **Hold**
Generic 203/204

Description

Call Hold allows an extension user engaged in an active call, to place the call on hold, then to replace the extension handset or use the extension for other calls. All features normally active on the extension may be selected while the call is held. The held call may be retrieved locally or remotely (from a different extension) by dialing the required Call Hold Retreive code. A held call may be retrieved as part of consultation hold or conferencing. The extension may interchange the held call with an active call or conference the two calls. If the held call is not retrieved within the selected recall time, the holding extension is automatically recalled.

Conditions

- Conference calls may not be held.
- If the user has a trunk on "Consultation Hold", and the held party is a trunk, System Option 110 (Cannot Dial a Trunk After Flashing) and System Option 111 (Cannot Dial a Trunk After Flashing if Holding or in Conference with a Trunk) apply to the holding extension.

Programming

- Assign access codes to feature numbers 25 (Call Hold), 26 (Local - Retrieve) and 27 (Remote Retrieve).
- The COS of the holding extension must include Option Number 79 (Call Hold).
- Select System Option 151 for a recall time of two minutes or System Option 152 for a recall time of four minutes. If neither of these options is selected, the recall time will be three minutes.

Operation

To place a Call on Hold:

- Flash the switchhook   transfer dial tone.
- Dial the Call Hold code - dial tone is returned, the original call is held and hears music, if provided. The holding extension may make or receive calls or access features in the normal manner.

To retrieve the call locally (at the holding extension):

- Dial the Local Retrieve code - you are connected to the held call.
- The call is returned to the holding extension.

To Retrieve the call remotely (at a remote extension):

- Dial the Remote Retrieve code.
- Dial the number of the holding extension - the call is connected to the remote extension.

Call Park

Description

This feature allows an extension user to park an active call and replace the extension handset. The call may be retrieved at the extension at which the call was parked, or at any remote extension within the system. The parked party hears music while the call is parked, or nothing if Music On Hold is not employed.

If a parked call is not retrieved within the selected recall time (2, 3 or 4 minutes), the parking extension is rung. If the parked call was a trunk call and the extension does not answer the recall within the selected recall timeout period (20, 30 or 40 seconds), the parked call will be routed to the attendant console and will appear as a RECALL. If the parked call was an internal call, the parking extension will continue to ring until it is answered or until the parked extension goes on-hook.

Conditions

- A parking extension cannot originate or answer calls while the call is parked but may access the paging equipment after dialing the CALL PARK code.
- The attendant cannot park calls.
- The selected Don't Answer recall timeout applies to Call Park recall timeout.
- During Night Service a parked trunk call is not routed to the attendant but continues to ring at the parking extension.
- System Option 183 (Trunk Recall Partial Inhibit) and Call Park are mutually exclusive.

Programming

- Assign an access code to Feature Number 6 (Call Park).
- The COS of the extension must include Option Number 37 (Call Park).
- If remote pickup of, the parked call is required, the extension's COS must contain Option Number 39 (Directed Call Pickup).
- If System Option 151 is selected, the Call Park recall time is 2 minutes.
- If System Option 152 is selected, the Call Park.
- If neither Option 151 nor Option 152 is selected, the recall time is 3 minutes (default time).

Operation

To Park a call:

- Flash the switchhook - dial tone returned.
- Dial the assigned Call Park access code - dial tone returned. Replace the handset, or access the paging equipment and make an announcement, then replace handset.

To retrieve the Parked call at the Parking extension:

- Lift the handset - you are connected to the call,

To retrieve the Parked call from a different extension:

- Lift the handset, dial the Call Park (or Directed Call Pickup) code, dial the extension number at which the call was parked - you are connected to the call.

Call **Retrieve**
(Extensions)

Description

Calls may be parked or held (see Call Park and Call Hold) and retrieved either locally or remotely by an extension. For further information see Call Hold or Call Park.

Call Selection

Description

This feature allows the attendant to answer calls either in the order in which they arrive at the console, or by selecting a specific call type. As calls arrive at the console they are queued and the LED associated with the call flashes. The attendant may answer the first call in the console queue by pressing the ANSWER button, or may select a call of a specific type by pressing the button associated with the flashing LED. The LEDs associated with the calls remaining in the attendant queue continue to flash. Six incoming call indicators are provided, identifying the following call types:

- DIAL 0 – calls from extensions.
- RECALL   recalls.
- LDN I-4 – These buttons may be assigned to incoming trunks in order to arrange the trunks in up to 4 different groups as required. Additional button labels are provided to identify these 4 buttons as TIE, WATS, FX or LDN type calls.

Conditions

- Assignment of trunks to LDN buttons is arbitrary. All trunks may be on one button, or they may be distributed across all four buttons as required. DID or CCSA trunks that dial the operator code (Alternate Attendant Access Code) will appear on LDN 4.

Programming

- Each Non Dial In trunk which appears on the console is assigned an LDN number. This number identifies on which button incoming calls will appear (LDN I-4).

Operation

To answer the first call in the attendant queue:

- Press the ANSWER button – the tone ringer stops, the LED associated with the call type lights steadily, the SOURCE display shows the number of the calling trunk or extension, and the attendant is connected to the calling party.

To answer a specific call type:

- Press the button associated with the desired call type – the tone ringer stops, the LED below the button lights steadily, the SOURCE display shows the number of the originating party, and the attendant is connected to the calling party.

Camp-On

Description

When an extension user who is equipped with the Camp-On feature reaches a busy extension, hunt group or trunk group and remains off-hook for ten seconds, it will be Camped-On to the busy equipment. At this time, a special busy tone is received (350/440Hz interrupted at 60 ipm) and the called equipment receives a Camp-On tone (a single burst of 440Hz tone for 200ms or a double burst if a trunk) if it is not dialing or listening to a tone. When the busy equipment hangs up, the calling extension receives ring-back tone and the (formerly busy) equipment is rung. The attendant or an extension may also transfer a call into busy (camp the call onto a busy extension).

Conditions

- Camp-On tone is not applied to trunks or stations using paging equipment.
- Extensions cannot Camp-On to paging equipment.
- Extensions with COS Option Number 41 (Data Security) may be Camped-On to, but do not receive Camp-On tone.
- If the called extension is on Hold and Music on Hold is provided, the music is removed while the Camp-On tone is applied.
- An extension on Hold will receive a Camp-On tone.

Programming

- The COS of the extension must include Option Number 51 (Camp-On) in its COS.
- To Camp-On to a trunk group, COS Option Number 51 and System Option 105 (Outgoing Trunk Camp-On) must also be selected.

Operation

Camp-On

- Dial the number - busy tone is returned.
- After ten seconds of special busy tone, the called extension receives Camp-On tone.
- The busy extension goes on-hook - the calling extension hears ringing tone, the called extension is rung.
  or
- The called trunk becomes idle   the calling extension is connected to the trunk.

Transfer Into Busy

- Place the call on Hold - dial tone returned.
- Dial the extension to transfer the call to hang up - the extension on hold remains on hold until the called extension hangs up. The extension on hold receives ring-back tone and the called extension is rung when it goes on hook.

The attendant may perform the same operation but is not required to put the caller on hold (see Console Operators manual).

Can Flash if on an
Incoming Trunk

Description

When selected, this option allows extension users to flash the switchhook while connected to an incoming trunk. This enables the trunk call to be Transferred, Held, Parked or added to a conference.

Conditions

- This option will be disabled if the extension has Option Number 46 (Flash Disable) in its COS.
- If the COS of an extension contains Option Number 62 (Flash for Attendant), flashing the switchhook results in the call being presented to the attendant. See Flash for Attendant.

Programming

- Select System Option 107 (Can Flash if on an Incoming Trunk).

Operation

- None

Can **Flash if on an
Outgoing Trunk**

Description

When selected, this option allows extension users to flash the switchhook while
connected to an outgoing trunk. This enables the trunk call to be Transferred, Held,
Parked or added to a conference.

Conditions

- This option will be disabled if the extension has Option Number 46 (Flash
  Disable) in its COS.
- If the COS of an extension contains Option Number 62 (Flash for Attendant),
  flashing the switchhook results in the call being presented to the attendant. See
  Flash for Attendant.

Programming

- Select System Option 108 (Can Flash if on an Outgoing Trunk).

Operation

- None

**Can Flash if Talking
to an Extension**

Description

This option allows an extension user to flash the switchhook while talking to an extension. This enables the extension to Hold, Park, Transfer or Conference the internal call.

Conditions

- This option will be disabled if the extension has Option Number 46 (Flash Disable) in its CDS.
- If the COS of an extension contains Option Number 62 (Flash for Attendant), flashing the switchhook results in the call being presented to the attendant. See Flash for Attendant.

Programming

- Select System Option 109 (Can Flash if Talking To an Extension).

Operation

- None

**Cannot Dial a Trunk
After Flashing'**

Description

This option inhibits an extension from accessing a trunk after flashing the switchhook.

Conditions

- If the user has a trunk on "Consultation Hold", the "Cannot Dial a Trunk After Flashing" and "Cannot Dial a Trunk if Holding or in a Trunk" options apply.
- This option does not apply to extensions with option number 48 (Broker's Call) in their conference with COS.

Programming

- Select System Option 110 (Cannot Dial a Trunk After Flashing).

Operation

- None

**Cannot Dial a Trunk
After Flashing if
Holding or in
Conference with a
Trunk**

Description

This system option prevents extensions from holding a trunk call by flashing the switchhook, then dialing a second trunk.

Conditions

- This option does not apply to extensions with Option Number 48 (Broker's Call) in their COS.

Programming

- Select System Option 111 (Cannot Dial a Trunk After Flashing if Holding or in Conference with a Trunk).

Operation

- None

CCSA
Generic 203/204

Description

The system can accomodate Common Control Switching Arrangement trunks. These trunks are similar to DID trunks in all respects except that they are considered to be Non-CO trunks and may be used as bothway trunks.

Conditions

- If the CCSA trunk sends less digits than expected the trunk will receive reorder tone after the interdigit timeout (15 sec).
- Extra digits sent are ignored.
- CCSA trunks may access extensions, hunt groups or the attendant.
- An extension with Option 43 (Inward Restriction DID) or Outgoing Only or CCSA in its COS cannot receive a call directly from a DID trunk.
- CCSA trunks may only dial numbers that are exactly the correct length (incoming length minus the number of digits absorbed).
- An Incoming CCSA Trunk may not access a Trunk Group.

Programming

- When programming the trunk the entry made after pressing the I/C (Incoming Digits) button may consist of two or three digits.
  First Digit – specifies the number of incoming digits (l-9).
  Second Digit – the number of leading digits to be absorbed (O-8).
  Third Digit, if required – the actual digit to be prefixed to the incoming number after absorption (O-9). The maximum number of digits permitted after absorption and adding the prefix digit is 4 (3 if tenant service is used)
- Trunk Type must be specified as 'type' 6.
- If calls to vacant or illegal numbers are to be routed to the attendnant System Option 117 (DID, CCSA, or Dial-In Vacant/Illegal Access to the Attendant) must be selected. If this option is will receive reorder tone.
- If calls to busy numbers are to be routed to the attendant System Option 149 (Call Forward Busy – System) must be selected.
- If calls to an extension that are not answered within the selected timeout period are to be forwarded to the attendant System Option 150 (Call Forward – Don't Answer – System) must be selected.
- If DID, CCSA trunks are not to be connected to Non-CO trunks via the attendant, System Option 171 (DID to Non-CO Trunks via Attendant Inhibit) must be selected.
- Assign an access code to feature number.20 (Alternate Attendant Access). This provides an access number to the attendant for DID, CCSA calls.

Operation

- None

Class of **Service**
(COS)

Description

The system allows up to 16 independant COS to be defined. Each COS specifies the features and options that may be accessed by an extension, dial-in trunk or DISA trunk assigned that COS.

Conditions

- · 16 independent COS are available.
- One COS may be assigned per extension.
- Several COS options are mutually exclusive. These are listed in Table 2-3 at the beginning of this manual.

Programming

- Assign the desired Features to each COS.
- Assign the required access codes to Features.
- Assign a COS to each extension, dial in trunk and DISA trunk.

Operation

- None

Common Alerting
Devices (Nightbells)

Description

This feature allows incoming calls directed to the attendant console to appear also at one of three common alerting devices. The call may be answered either from the attendant console, or from a station with TAFAS Access in its COS. The system provides a contact closure which is used to operate the alerting device. See TAFAS.

Conditions

- None

Programming

- Assign 1, 2 or 3 (for common alerting devices 1,2 or 3 respectively) to Day, Night 1 and Night 2 when programming each Non Dial-In Trunk that is to appear on a common alerting device.
- Assign Option Number 54 (TAFAS Access) to the COS of any extension which is to answer calls appearing on common alerting devices.
- In console-less operation it is desireable to have a minor alarm ring night bell three (Generic 204/up). Select System Option 212 (Night Bell 3 with Minor Alarm Enable).

Operation

- In console-less operation the night bell may be turned off by dialing 555 + 1 from the console or test, or pressing the ALARM RESET button on the console.

Console-less
Operation

Description

The system may be operated without the use of an attendant console. Under these conditions all features associated with the console will be unavailable.

Conditions

- All features originated by or directed to the console are not available.
- The system will operate in NIGHT 1 mode.

Programming

- All incoming trunks must have a Night 1 assignment to a night bell, extension or hunt group.

Operation

- None

Contact Monitor

Description

This feature allows a station line to be used for monitoring an alarm contact. The contact to be monitored is connected across Tip and Ring of a line. When the contact closes, the call is presented to the attendant as a DIAL 0 call. On answering the call, the SOURCE display on the console shows the extension number assigned to the contact and a COS of AL. An extension may be programmed as a Contact Monitor. If the PABX is equipped with an optional reserve power supply, there are provisions for an "on battery indicator". This indicator may activate a Contact Monitor to alert the attendant that the system is on battery power (AC power failure). See MITL9105/9110-98-200.

Conditions

- COS Option Number 58 (Contact monitor), and Option Number 44 (Receive Only) are mutually exclusive.

Programming

- The COS assigned to the line (alarm contact) must include Option Number 58 (Contact Monitor)
- The contact signal is non latching, i.e. if the contact opens, the DIAL 0 call will disappear from the attendant console.

Operation

- None

Control of Trunk
Group Access

Description

Each attendant console provides a Trunk Group Status display. This display continuously shows the Busy and Attendant Access status of the first ten trunk groups. The attendant may restrict a trunk group to Attendant Access only, or return it to Dial Access. An extension which dials a trunk in a trunk group that has been made Attendant Access will be intercepted to the attendant (Illegal Access Intercept to the Attendant) or reorder tone will be returned.

Conditions

- None

Programming

- If calls are to be intercepted to the attendant during day service, select System Option 116 (Illegal Access intercept to Attendant).

Operation

To make a trunk group attendant access:

- Oial * 6
- Dial the number of required trunk group (l-12).
- Press the * button.
- Press the RELEASE button — the trunk group may only be accessed by the attendant.

To make a trunk group dial access:

- Dial * 6
- Dial the number of required trunk group (l-12).
- Press the # button.
- Press the RELEASE button — the trunk group is now Dial Access and may be accessed by extensions.

**Controlled Outgoing
Restriction Setup
Generic 203**

Description

If this feature is selected, the attendant may restrict an extension from making any outgoing trunk calls. The attendant may also remove the restriction. While the restriction is in force, any outgoing trunk call from the extension is intercepted to the attendant (Illegal Access Intercept to the Attendant) or reorder tone. If this option, and System Options 172 (Guest Room Button Enable) and 173 (Room Status Button and Display Enable) are selected, outgoing restriction is automatically set when the room status is set to "1", Room Vacant and Ready to be Sold or "3" Room Vacant but not ready.

Conditions

- Night Service 2 is not available.
- Tenant Service and Controlled Outgoing Restriction are mutually exclusive.
- Room Status Button and Controlled Outgoing Restriction are mutually exclusive.
- Controlled Outgoing Restriction and Tenant Service are mutually exclusive.

Programming

- Select System Option 132 (Controlled Outgoing Restriction Setup Enable).
- Select System Option 172 (Guest Room Button Enable) if Controlled Outgoing Restriction is to be setup with out ringing the extensions.
- If the restriction is to be set automatically when the Room Status is set to 1 or 3, select System Option 173 (Room Status Button and Display Enable).
- If calls are to be intercepted to the attendant select System Option Number 116 (Illegal Access Intercept to Attendant).

Operation

To set Outgoing Restriction:

- Press the GUEST ROOM button.
- Dial the required extension number.
- Press the ROOM RESTR button - the ROOM RESTR lamp lights, controlled outgoing restriction is now in effect on the extension.

To remove Outgoing Restriction:

- Press the GUEST ROOM button.
- Dial the required extension number - the ROOM RESTR lamp lights.
- Press the ROOM RESTR button - the ROOM RESTR lamp goes out, outgoing restriction is removed from the extension.
- Room restriction may also be turned on or off while the attendant is talking to a room by pressing the ROOM RESTR button.

For automatic restriction operation refer to the ROOM STATUS feature description.

**Controlled Station
Restriction (Do Not
Disturb)**

Description

The Do Not Disturb feature allows a user to have all incoming calls to the extension, routed to the attendant or reorder tone. The feature may be activated by the extension user or by the attendant. If the attendant calls an extension with Do Not Disturb active, the console DO NOT DSTB lamp flashes and the ERROR lamp lights in the DE-STINATION display. The attendant may override the feature by pressing the DO NOT DSTB button. All other calls directed to the extension receive reorder tone or are intercepted to the attendant. Other features (e.g. Hunting, Call Forwarding) work as if the extension were busy. Call origination from an extension with this feature active is not affected in any way.

Conditions

- A busy lamp must be assigned to a trunk or extension in order for it to be included in the displayed total count of Do Not Disturbs.
- System Option 133 (Controlled Station Restriction Setup) must be enabled, otherwise the DO NOT DSTB button will be inoperative.
- If Do Not Disturb is to be toggled in the Room Mode System Option 172 (Guest Room Button Enable) must be selected.
- If the attendant dials an extension with DO NOT DISTURB in effect, and has a source, the console must be in Both or Destination mode to override DO NOT DISTURB.

Programming

- Select System Option 133 (Controlled Station Restriction Setup Enable).
- Select System Option 172 (Guest Room Button Enable) if Do Not Disturb is to be set without ringing the extension.
- Select System Option 174 (Do Not Disturb intercept to Attendant), if the calls are to be intercepted to the attendant. If this option is not selected, calls to a Do Not Disturb extension will receive reorder tone.
- If the Do Not Disturb status of the extensions are to be displayed, Select System Option 175 (Do Not Disturb and Message Waiting Display Enable).
- If the extension is to be able to set up and cancel Do Not Disturb, its COS must contain Option Number 78.
- If COS Option Number 78 (Room Do not Disturb set up enables) is enabled, an access code must be assigned to Feature Number 24 (Do Not Disturb Setup and Cancel).

Operation

To set Do Not Disturb from the extension:

- Dial the Do Not Disturb access code followed by the digit 1 - dial tone is heard.
- Replace the extension handset - all calls to the extension will be intercepted.

To remove Do Not Disturb from the extension:

- Dial the Do Not Disturb access code followed by the digit 2 – dial tone is returned.
- Replace the extension handset – calls may be received by the extension in the normal manner.

To setup Do Not Disturb when calling the extension from the console:

- Dial the required extension number – ringing tone or busy tone is returned.
- Press the DO NOT DSTB button – the DO NOT DSTB LED lights.
- Press the RELEASE button – all calls to the extension are intercepted.

To override Do Not Disturb when calling the extension from the console:

- Dial the required extension number – the ERROR lamp lights and the Do Not Disturb lamp flashes.
- Press the DO NOT DSTB button – extension rings or busy tone is returned if the extension is in use. The DO NOT DSTB LED lights.
- At this point, attendant call handling proceeds as normal.

To setup Do Not Disturb without calling the extension:

- Press the GUEST ROOM button.
- Dial the required extension number.
- Press the DO NOT DSTB button – the DO NOT OSTB LED lights, all calls to the extension are intercepted.

To remove Do Not Disturb without calling the extension:

- Press the GUEST ROOM button.
- Dial the required extension number.
- Press the DO NOT OSTB button, the DO NOT OSTB LED is extinguished – calls may be received by the extension in the normal manner.

To display the total number of DO NOT DISTURBs set:

- Press the GUEST ROOM button.
- Press the DO NOT DSTB button – the busy lamp field changes to show only those extensions with Do Not Disturb set, the SOURCE display shows the total number of the Do Not Disturbs set.

CO Trunk Via
Attendant inhibit

Description

This feature denies an extension the ability to be connected to a CO trunk through the attendant. This restriction applies to both incoming and outgoing calls.

Conditions

- None

Programming

- The COS of the extension must contain Option Number 60 (CO Trunk via Attendant Inhibit).

Operation

- None

**Customer Data
Dump/Load**

Description

This feature allows the contents of the non volatile RAM (the customer data) to be Dumped on a storage device. Any RS232 compatible, recording device, may be used. This data may be used to reprogram a system or program an alternate system (with the same customer data).

Conditions

The data recorder must have the following characteristics:

- RS232 Interface.
- Printing ASCII character set (no control characters are used).
- Odd parity.
- A line consists of 80 characters followed by a carriage return line feed and an optional 6 null characters.
- The baud rate selected on the Scanner card must match the baud rate of the recording device.

Dump:

- If the RS232 is in use when a Dump is requested, the request will be ignored and busy tone returned.
- The Dump function can be performed in 16 minutes at 110 baud, 6 minutes at 306 baud or 2 minutes at 1200 baud.

Load:

- During a Data Load the system operates in the Power Fail Transfer mode.
- The load function takes 16 minutes at 110 baud or 6 minutes at 300 baud.
- If the first data block is not in the correct format or if a checksum error is detected the load is terminated.

Programming

- If the system is to be remotely reset, select System Option 197 (Remote System Reset Protection Override).

Operation

Dump:

- If a tape is used, ensure that it is of sufficient length and ready to start at the beginning of the tape.
- Dial 555 + 7. If the printer port is reserved for another function (i.e. Traffic Measurement Polling or Call Detail Recording) busy tone will be returned.
- Disconnect the device currently connected after setting the device to suspended.
- Connect the recording device to the RS232 port. Set the device to record and start it.
- Dial *14#
    - the storage device starts recording the RAM data.

- LED number four on the extended memory card will be lit for the duration of the dump.
- At the end of the dump.
- LED four no longer lit.
- No further print out.

To stop the Data ouptut:

To stop from the console:

- Dial *14*, printer stops or
- to abort the dump dial *1400.

To stop from the test line:

- Dial 555 + 8 + * or 1, printer stops or
- to abord the dump dial 555 + 8 + 00.

To Load the system:

- If a tape is used ensure that it is of sufficient length and ready to start at the beginning of the tape.
- Dial 555 + 7 if the printer port is reserved for another function (i.e. Traffic Measurement Polling or Call Detail Recording).
- Disconnect the device currently connected after setting the device to suspended.
- Connect the recording device to the RS232 port.
- Set the thumbwheel switches on the scanner card to 5623 (LOAD).
- Press the reset button on the Extended Memory Card - all calls in progress are lost. The system will be in Power Fail Transfer. The LEDs on the Scanner card show AA.
- Select the READ function on the recording device. The Scanner card will show 01 to 99 then (1) 00 to 1 (30) during the load. At the end of a successful load the system resets and initializes.
- Disconnect the storage device and reconnect the desired recording device.
- Dial *14# from the console or dial 555 + 8 + # (or 2) from the test line.

Data Security

Description

Any call which includes an extension with a COS containing Data Security cannot be overriden or receive Camp-On Tone. The extension may be Camped-On to but is secure against any form of audio intrusion.

Conditions

- None

Programming

- Include in the COS of the extension Option Number 41 (Data Security).

Operation

- None

Diagnostics

Description

The system continuously runs diagnostic checks on the system operation and if a malfunction is detected raises an alarm. Refer to MITL9105/91 10- 98-500 General Maintenance Information for a full description of diagnostics.

Conditions

- None

Programming

- None

Operation

- None

Dial Access to the Attendant

Description

An extension may access the attendant by dialing a code (Feature number one). This code will generally be the numeral zero.

Conditions

- The attendant access code may not conflict with any other access code.

Programming

- Assign an access code to Feature number one (Attendant Access).

Operation

- Dial Attendant access code.
  - Ringback tone returned.
  - Attendant console rung.

Dial **Call Pickup**

Description

This feature allows an extension to be assigned to a Pick-Up group and to answer any call to that group, by dialing the Dial Call Pick-Up code.

Conditions

- Dial Call Pickup cannot be originated by an extension with a call on hold. If Dial Call Pickup is attempted, the originating extension receives reorder tone and must flash to return to the held call.
- A maximum of 50 Pickup groups are permitted per system.
- An extension with Message Registration cannot be made a member of a Pickup Group.

Programming

- An access code must be assigned to Feature Number 7 (Dial Call Pickup). This code cannot conflict with the system numbering plan.
- Assign the extension to the required Pickup Group.

Operation

- Lift the handset - dial tone returned.
- Dial the Call Pickup code - the call is connected.

Dial Pulse Signalling

Description

The PABX may accept or generate dial pulses. The systems Central Processor Unit (CPU) reads dialed digits (decoded by the Receiver card) and validates and or causes the necessary operation. The CPU may also cause the trunk card accessed by an extension to outpulse in dial pulses.

Conditions

- None

Programming

- See Trunk Group programming SECTION MITL9105/9110-98-205.

Operation

- None

DID/Dial-In/CCSA
Vacant/Illegal Access
Intercept to Attendant

Description

Selection of this System Option causes all DID, CCSA or Dial-in tie trunk calls to vacant or unauthorized levels or numbers to be routed to the attendant. If this option is not selected, these calls receive reorder tone.

Conditions

- None

Programming

- Select System Option 117 (DID/Dial-In/CCSA Vacant/Illegal Access Intercept to Attendant).

Operation

- None

Direct-In Lines

Description

This feature allows incoming trunks to be assigned to a specific extension or hunt group. Incoming calls from the trunk ring the extension (or hunt group) directly. The calls do not appear at the attendant console. If the assigned extension is busy when a call arrives, the call will be camped-on. If all extensions of a Hunt Group are busy the call will be queued. In no case will the call be answered, therefore the caller will hear ringback tone from the CO. Camp-On tone will be heard by an extension which is Camped-On to. If a Hunt Group is Camped-On to, no tone is heard. All Call Forwarding features may be activated on incoming trunk calls to extensions.

Conditions

- Camp-On recall and Don't Answer recall to the attendant are not active on Direct-In Line calls.
- During night service incoming calls will be directed to the night assignment of the trunk.
- If a direct in line call is handled by the attendant as the result of a transfer, it will then recall to the attendant in day or night service.

Programming

- Specify the DAY, NIGHT 1 or NIGHT 2 assignments of the trunk as the equipment number of the extension or the hunt group number to which the trunk is to be assigned.
- The trunk type must be Type 1 (Standard Bothway CO Trunk), or 5 (Non Dial-In Tie Trunks).

Operation

- None

**Direct Inward Dial
(DID) Trunks
Generic 203/204**

Description

This feature allows DID Trunks to be used in the system. The length of the incoming number, the number of digits to be absorbed, and a prefix digit, if required, may also be specified.

Conditions

- If the DID trunk sends less digits than expected the trunk will receive reorder tone from the PABX after the interdigit timeout (15 sec).
- DID trunks may access extensions, hunt groups or the attendant.
- An extension with Option Number 43 (Inward Restriction DID) in its COS cannot receive a call directly from a DID trunk.
- DID trunks can be used outgoing only if special Network equipment is provided (see CCSA).
- DID trunks are rotary dial only, never DTMF . Incoming trunk calls to the attendant always appear on LDN 4.

Programming

- When programming the trunk the entry made after pressing the I/C (Incoming Digits) button may consist of two or three digits.
  First Digit - specifies the number of incoming digits (1-9).
  Second Digit - specifies the number of leading digits to be absorbed (0-8).
  Third Digit, if required - the actual digit to be prefixed to the incoming number after absorption (0-9). The maximum number of digits permitted after absorption and after adding the prefix digit is 4 (3 if tenant service is used).
- The trunk type must be specified as 3.
- If calls to vacant or illegal numbers are to be routed to the attendnant System Option 117 (DID or Dial-In Vacant/illegal Access to the Attendant) must be selected. If this option is not selected, calls to vacant or illegal numbers will receive reorder tone.
- If calls to busy numbers are to be routed to the attendant, System Option 149 (Call Forwarding Busy - System) must be selected.
- If calls to an extension that are not answered within the selected timeout period are to be forwarded to the attendant System Option 150 (Call Forwarding - Don't Answer - System) must be selected.
- If DID trunks are not to be connected to Non-CO trunks via the attendant, System Option 171 (DID to Non-CO Trunks via Attendant Inhibit) must be selected.
- Assign an access code to feature number 20 (Alternate Attendant Access Code). This provides an access number to the attendant for DID calls.

Operation

- None

**Direct Inward System
Access (DISA)**

Description

This feature allows an external caller access to the PABX by selecting a special trunk and dialing a security code. After the code is dialed the System returns dial tone to the caller, who may then access any features in the DISA trunk's COS except for those which require a switchhook flash.

Conditions

- The outside caller must use a DTMF telephone.
- The security code may be 1, 2, 3 or 4 digits in length.
- The same security code applies to all DISA calls.
- If a caller dials an invalid code the call is dropped after three digits have been dialed. Reorder tone is not returned to the caller.
- A DISA trunk may be used as a standard CO trunk.
- Access to the allowed features is controlled by the COS assigned to the trunk.
- Switchhook flash is not possible on a DISA trunk.

Programming

- Program trunk(s) as type 2 (DISA).
- Assign a DISA security access code to Feature (Direct Inward System Access).
- If the attendant is allowed to change the DISA access code, select System Option 135 (Attendant DISA Code Setup Enable).
- Assign a COS to the trunk.

Operation

To Access the System:

- Dial the required directory number from a DTMF telephone.
- The System returns two bursts of ringback tone followed by dial tone.
- Dial the DISA security code - PABX dial tone returned.
- Dial the required feature access code or extension.

Direct Outward Dialing

Description

The Direct Outward Dialing feature allows an extension user to make external calls without the assistance of the attendant.

Conditions

- Access restrictions to the trunks are controlled by the Class of Service Option Numbers 65 through 76 (Trunk Group Access).
- Some Direct Outward Dialing may be restricted by Multi Digit Toll Control see SECTION MITL9105/9110-98-212.

Programming

- Program the required Class of Service to include the required trunk group access.
- Assign the Class of Service to the required extension.
- Program the Trunk.
- Program the Trunk Group.
- Assign an access code to the trunk group.

Operation

- Lift the handset, dial the access code - CO dial tone is returned.
- Dial the required external number.

Direct Trunk Access

Description

The console or test line may directly access a trunk for maintenance or operational procedures.

Conditions

- None

Programming

- Assign an access code to Feature number 19 (Maintenance Function).

Operation (where 555 is the Maintenance Function code).

· From the console dial 555 + 2 + the equipment number or dial ✳ 2 + equipment number + ✳.
· From the test line dial 555 + 2 + the equipment number.

Directed Call Pick-Up

Description

Directed Call Pick-Up allows an extension user to answer any ringing telephone within the PABX. If more than one party attempts to pick-up the call, the call will be completed to the first party, other parties will receive busy tone.

Conditions

- Directed Call Pick-Up cannot be originated by an extension after flashing. If Directed Call Pick-Up is attempted, the originating extension receives reorder tone and must flash to return to the held call.

Programming

- The COS of the extension must include Option Number 39 (Directed Call Pick-Up).
- An access code must be assigned to Feature Number 8 (Directed Call Pick-Up).

Operation

- Lift the handset - dial tone is returned.
- Dial the Directed Call Pick-Up code followed the number of the ringing extension - the call is completed.

**Discriminating Dial
Tone**

Description

An extension having Do Not Disturb or a Call Forward Follow Me in effect, it will hear a distinct dial tone (350/440 Hz, 400/ms on, 100 ms off for 6 cycles continuous tone) when going off-hook.

Conditions

- None

Programming

. Select System Option 228 (Discriminating Dial Tone).

Operation

If any extension goes off-hook while having Do Not Disturb or Call Forwarding Follow Me in effect discriminating dial tone will be returned.

Discriminating Ringing

Description

Selection of this option allows a user to distinguish between internal calls and incoming trunk or attendant calls by the assignment of different ringing patterns. Internal calls have a ringing pattern of 1s on and 3s off. Trunk or attendant calls have a ringing pattern of 0.5s on, 0.5s off, 0.5s on and 2s off.

Conditions

- None

Programming

- Select System Option 100 (Discriminating Ringing).

Operation

- None

Do Not Disturb
Display
Generic 203/204

Description

This feature allows the attendant to display all extensions that have Do Not Disturb set. When the attendant presses and holds the DO NOT DSTB button (while the console is idle), the busy lamp field goes dark, leaving only the lamps lit for the rooms that have Do Not Disturb active. In addition the SOURCE display shows the total number of extensions with a Busy Lamp assigned and Do Not Disturb set.

Conditions

- The console must be idle. If the console has an extension as its Source or Destination party or of the attendant is using the GUEST ROOM button, the Do Not Disturb status for that extension will be changed.
- For an extension to be included in the total displayed in the SOURCE display, the extension must have a busy lamp assigned to it.

Programming

- Select System Option 133 (Controlled Station Restriction Setup).
- Select System Option 175 (Do Not Disturb and Message Waiting Display Enable).

Operation

- Press the DO NOT DSTB button - the busy lamp field changes to display only the extensions that have DO NOT DSTB active, the SOURCE display shows the total number of extensions that have Do Not Disturb set.
- Release the DO NOT DISTURB button - the busy lamp field returns to normal.

Do Not **Overflow**
(Trunks)

Description

If an extension has Do Not Overflow in its COS and dials a busy trunk group, busy tone is returned by the system and trunk group overflow is denied. See Trunk Groups.

Conditions

- None

Programming

- Assign Option Number 52 (Do Not Overflow) to the extension's COS.
- Assign COS to required extensions.

Operation

- None

**DTMF to Rotary Dial
Conversion (Tone to
Pulse Conversion)**

Description

This feature automatically converts DTMF tones from DTMF equipment to rotary dial outpulsing on outing trunks which have been programmed as rotary dial trunks.

Conditions

- The DTMF digits also appear on the trunk, as early line split is not provided, unless in the case of E&M or loop tie trunks, the trunk group type contains a 4 as the first digit. In this case, no audio will be transmitted to the trunk, however, answer supervision MUST be returned in order to restore outgoing audio.

Programming

- The third digit of the four digit Trunk Group Type must be a 1 or a 2.

Operation

- None

Enable Non CO Trunk-
Trunk Connect by
Extension
Generic 204

Description

This feature enables an extension to connect a non-CO trunk to a CO or non-CO trunk, then go on hook and leave the two trunks connected.

Conditions

- One trunk must be a non CO trunk.
- If the COS of an extension contains Option Number 62 (Flash for an Attendant) a switchhook flash will present the call to the attendant.
- Option 46 (Flash Disable) and System Option 198 (Enable Non CO Trunk - Trunk Connect by Extension) are mutually exclusive.

Programming

- Select System Option 198 (Extension Trunk to non-CO Trunk Connect).
- Select System Option 107 (Can Flash if on an Incoming Trunk).
- Select System Option 108 (Can Flash if on an Outgoing Trunk).

Operation

- Conversation between trunk and extension.
- The extension flashes switchhook - dial tone returned.
- The extension dials trunk - the trunk answers.
- The extension hangs up. The trunk and non-CO Trunk are connected.

**End of Dial Signal or
Outgoing Trunks**

Description

This option, if selected, allows the attendant or extension to access a trunk, dial the required directory number. Then complete the call to an internal extension without delay, by pressing the # button to stop digits being passed to the trunk. Digits dialed after the # will be interpreted by the PABX as a new number i.e. an extension.

Conditions

- When this option is not included, digits dialed by the attendant will be passed to the trunk until one of the following occurs; answer supervision is received, a ten second inter-digit pause in dialing occurs, or the attendant puts the trunk on hold. This option is only available to DTMF extensions.

Programming

- Select System Option 153 (End of Dial Signal for Outgoing Trunks).

Operation

From the console:

- Dial the required trunk group access code.
- Dial the required external directory number - ringing tone is returned.
- Press the # button.
- Dial the required extension number or trunk.
- Press the RELEASE button - the called extension is connected to the outside directory number.

From an extension:

- Dial the required trunk group access code.
- Dial the required external directory number.
- Dial #

**Executive Busy
Override (Extensions)**

Description

This feature allows a user who encounters a busy extension to dial a code and enter the conversation. Eight hundred milliseconds before override voice contact is established, both parties in the original conversation receive a warning tone (440Hz). The tone continues for 200ms after override is established. A 200ms burst of the 440Hz tone is repeated every 6s for the duration of the override. If the overridden extension flashes the switchhook or goes on-hook the overriding extension is dropped and receives reorder tone.

Conditions

- . The overriding extension cannot manipulate the original connection in any way.
- A call in which any extension has a COS that includes Option Number 42 (Station Override Security) or Option Number 41 (Data Security) cannot be overriden.
- Any extension speaking to the attendant dialing, or receiving supervisory tone cannot be overriden.
- An extension on hold cannot be overriden.
- An extension with a parked or held call can not be overriden.

Programming

- The overriding extension must contain Option Number 40 (Executive Busy Override) in its COS.
- Assign a single digit access code to Feature Number 22 (Executive Busy Override).

Operation

- Dial the extension number - special busy tone.
- Dial the Executive Busy Override access code- after the warning tone you are connected to the call. Special busy tone will be returned if override is attempted.

Fai lure Transfer

Description

In the event of a common control or power failure which would cause a major loss of call processing, preselected CO trunks are automatically switched to designated extensions. Failure transfer may be selected automatically under control of the system, or manually by setting the console or maintenance panel transfer switches to TRANSFER. When normal system operation is restored, calls on transfer circuits remain in effect until the calls are terminated, then the circuits are returned to normal operation. The POWER FAIL TRANSFER (PFT) control switches on the Maintenance Panel may be used to locate and isolate the source of Transfer condition. See SECTION MITL9105/9110-98-500 General Maintenance Information.

Conditions

- A maximum of 6 transfer circuits are provided by the SX-100.
- A maximum of 12 transfer circuits are provided by the SX-200.
- If a transfer takes place, calls on the transferred trunks and extensions are dropped.
- When the system is returned to normal existing PFT trunk calls will not be dropped.

Programming

- None

Operation

Manual Transfer:

- Set the console transfer switch to the TRANSFER position. The corresponding Maintenance Panel POWER FAIL TRANSFER CONTROL SWITCH must be set to ENABLE.

Feature Access

Description

An attendant, extension or trunk may access certain features by dialing an **access** code. The ability of an extension or trunk to access features is limited by their class.

Conditions

- None

Programming

- See SECTION MITL9105/9110-98-205.

Operation

- None

First Digit Toll Deny

Description

If this option is selected, Toll Denial applies only to the first, rather than the first two digits. A call is denied if the first digit dialed after accessing a trunk is 0, 1, # or *.

Conditions

- None

Programming

- Select System Option 155 (First Digit Toll Deny).

Operation

- None

Fixed Night Service

Description

This feature allows calls normally directed to the attendant console to be routed to preselected extensions, hunt groups or common alerting devices when the system is in night service. After selection of night service all calls directed to the attendant are routed to the selected night assignment. Calls held in the attendant queue when night service is selected, remain at the console and may be answered in the normal manner. The system provides two independant night service assignments, NIGHT 1 and NIGHT 2. The calls are directed to the assignment selected.

Conditions

- The assignment of trunks may not be changed from the attendant console. See Flexible Night Service.

Programming

- Assign incoming trunks to the required extensions, hunt groups or common alerting devices when programming the trunks.

Operation

- Press the NIGHT 1 button on the attendant console to select Night Service 1 assignments.
- Press the NIGHT 2 button on the attendant console to select Night Service 2 assignments.

Flash Disable

Description

This feature inhibits a switchhook flash from an extension. All features using the switchhook in the selection of the feature are therefore inhibited.

Conditions

- Class of Service Option 46 (Flash Disable) and Class of Service Option 62 (Flash for Attendant) are mutually exclusive.

Programming

- The COS of the extension must contain Option Number 46 K-lash Disable).

Operation

· None

Flash For Attendant

Description

An extension with this option specified in its COS will automatically ring the attendant console if the switchhook is flashed while in an established call. The call will appear at the console as a Dial 0 call.

Conditions

- The extension cannot access any other feature requiring a switchhook flash, e.g. "Broker's Call" or "Transfer/Add-On/Conference".

Programming

- The COS of the extension must include Option Number 62 (Flash For Attendant).

Operation

- While on an established call; flash the switchhook – the extension rings the attendant console, the other extension will be placed on hold.

Flexible Night Service

Description

This option allows the attendant to change the night service assignment of trunks associated with extensions or hunt groups. The system allows full flexibility of trunk assignment, all trunks may be assigned to one extension, each trunk may be assigned to a different extension, or a hunt group.

Conditions

- · Night service assignment may be assigned to trunks only.
- • Trunks must already be programmed for assignment to an extension, or hunt group during night service.
- · Trunks programmed for assignment to night bells cannot be changed by the attendant.

Programming

- • Specify System Option 102 (Flexible Night Service).

Operation

For Flexible Night Service Assignment:

- • Dial * 3
- • Dial the individual trunk access code (equipment number).
- • Press the NIGHT 1 or NIGHT 2 button. The existing extension or a hunt group assignment is displayed.
- • Dial the extension number or a hunt group master number to which the trunk is to be assigned.
- • Press the RELEASE button.

**Flexible Numbering
Plan**

Description

The numbering plan used within the system is completely flexible. The user may select any combination of 1, 2, 3 and 4 digit numbers. The only constraint in the selection of a numbering among access codes and extension numbers.

Conditions

- First digit conflict between the access codes assigned to Executive Busy Override and the Callback-Busy features, and other numbers within the numbering plan, are permitted.
- * and # are valid digits within the system numbering plan.
- If Tenant Service is selected a maximum of three digits may be assigned for any number.

Programming

- Assign the required extension numbers and access codes.

Operation

- None

Guest Room Button
Generic 2031204

Description

The console GUEST ROOM button, when enabled, allows the attendant to display the current status of a room. The status display shows:

- SOURCE display shows the extension number of the room and the number·of local call units made from the room.
- DESTINATION display shows the current room status code, (l-4).
  1 - Room vacant and ready to be sold
  2 - Room occupied and clean
  3 - Room vacant but not ready to be sold
  4 - Room occupied but needs cleaning
  A period displayed after the room status code indicates that the maid is currently in the room.
- If the 00 NOT DSTB LED lights, the room has Do Not Disturb set.
- If the MSGE WAIT LED lights, the room has a message waiting.
- If the ROOM RESTR LED is lit or if the room status code is 1 or 3, Controlled Outgoing Restriction is enabled and the ROOM STATUS button enabled, Controlled Outgoing Restrictions are in effect for that extension.
- See "Do Not Disturb", "Maid In Room", "Message Registration", "Message Waiting", "Message Waiting Lamp", "Room Status", "Automatic Wakeup (Alarm Call)" and Controlled Outgoing Restrictions descriptions.
- If Automatic Wakeup is in effect the time of the wakeup will appear in the Destination Display.

Conditions

- System Option 172 (Guest Room Button Enable) and System Option 113 (Tenant Service) are mutually exclusive.
- System Option 172 (Guest Room Button Enable) and System Option 121 (Attendant Serial Call) are mutually exclusive.

Programming

- Select System Option 172 (Guest Room Button Enable) must be selected.
- If the Room Status is to be displayed, Select System Option 173 (Room Status Display and Room Status Button Enable) must be selected.
- If Message Registration is to be displayed and or printout, select System Option 156 (Message Registration).
- If the Room Status of an extension is to be displayed and changed, its COS must contain Option Number 80 (Room Status Applies).
- If the extension is to display Message Waiting, its COS must contain Option Number 77 (Message Waiting Applies).
- If the local CO call units are to be accumulated for the extension, the COS of the extension must contain Option Number 64 (Message Registration Applies).

Operation

- Press the GUEST ROOM button.

- Dial the required extension number - the console displays the status of the room (see Description).
- Press the RELEASE button - the console is idle.

Hold Pick Up

Description

The Hold Pick Up feature allows an extension user to pick up a call held at the attendant console on one of the console HOLD keys. If a single console is employed, four HOLD buttons (HOLD buttons 1 through 4) are provided. A second console provides four additional HOLD positions (HOLD buttons 5 through 8).

Conditions

- In Generic 202 an extension cannot dial Hold Pick-Up after flashing.
- Hold 4 and Call Block (Generic 204/up) are mutually exclusive.

Programming

- The COS of the extension must include Option Number 55 (Hold Pickup).
- Assign an Access code to Feature Number 12 (Hold Pickup Access).

Operation

After being informed that a call is being held on a specified HOLD button:

- Lift the extension handset – dial tone is returned.
- Dial the Hold Pick Up access code followed by the number of the HOLD button specified – the call is removed from the console and connected to the extension. All features normally associated with the extension may be accessed normally.

Hunting

Description

Master number hunting allows a user to dial an access code (the master hunt number of the hunt group), and have the call completed to the first idle extension in that hunt group. Any extension within a hunt group may be accessed directly by dialing the extension number; hunting will not take place if the extension is busy. Three types of hunting are provided by the system; Circular, Terminal and Secretarial hunting.

Circular Hunting starts at the extension after the last extension in the hunt group to which a call was completed (the extension rung), and hunts over all extensions in the hunt group in the sequence programmed. Hunting stops at the first idle extension found. If all extensions are busy the calling extension hears busy tone, and may Camp-On to the Hunt Group. A Dial-in trunk receives ringback, while a transferred trunk will receive Music On Hold if provided.

Terminal Hunting starts at the first extension in the hunt group and terminates at the first idle extension found. Hunting takes place in the order in which the extensions were programmed into the hunt group.

Secretarial Hunting is the same as terminal hunting, except that the terminating extension (the secreterial positions) are the same for more than one hunt group.

Conditions

- All extensions must be programmed before programming the hunt group.
- The hunt group access code must be unique and must not conflict with the system numbering plan trunks may be directed to a hunt group.
- A maximum of 12 independant hunt groups may be defined.
- If an extension appears in more than one hunt group, (secretarial hunting) the numbers following the extension must be identical and in the same sequence in each hunt group that the extension appears in.
- Extensions can not be in more than one circular hunt group.
- An extension with COS Option 64 (Message Register, Generic 203 and above) cannot be put into a hunt group.
- An extension with Do Not Disturb set, or one which is Busied-Out, will be passed in the hunt.

Programming

- Program all extensions.
- Program the hunt group. If Circular Hunting is required, the last equipment number entered must be identical to the first entry.
- See SECTION MITL9105/9110-98-205.

Operation

- None

Identif ied Trunk
Groups
Generic 204

Description

When an identified trunk group is accessed, the trunk group access code is repeated as the first digit (or digits) dialed into the trunk. For example, the trunk access code is 2, and the digits 35 are dialed, the trunk will be seized when the digit 2 is dialed. The 2 will be repeated to the trunk, followed by the digits 3 and 5. The equipment (usually a PBX) at the other end of the trunk will see the digits 235.

The purpose of the repeating digits is to allow a common numbering plan between two or more PBX's. In the above example, an extension numbered 235 could be accessed from the PBX in which it was programmed, or from another PBX with an identified trunk group which is seized by dialing the digit 2.

Trunk group one can have more than one access code; a maximum of ten different codes are allowed. If programmed as an identified Trunk Group each code will be repeated and may be part of an extension number or feature. Alternatively, the leading digit or digits may in turn seize other trunk groups allowing tandeming between two or more switches.

Conditions

- This feature applies to outgoing, non-CO rotary trunks only.
- A Camp-On on Callback cannot be made to an Identified Trunk Group.
- System Options 113 (Tenant Service) and 205 (Identified Trunk Group Enable) are mutually exclusive.
- System Options 114 (Tenant Service ▪ Separate Consoles) and 205 (Identified Trunk Groups) are mutually exclusive.
- This feature applies to calls from extensions, dial-in trunks or the attendant.
- System Option 205 (Identified Trunk Group Enable) requires that the last two digits in the four digit trunk group type be '13' in order to define the trunk group as non-CO trunk group with identification and to perform tone to pulse conversion if tone extensions are to be used without waiting for dial tone.

Programming

- Select System Option 205 (Identified Trunk Group Enable).
- Program required Trunk Groups.
- If multiple Trunk Group Access is required, assign a maximum of ten access codes to Feature Numbers 33-42 for access to Trunk Group 1 only.

Operation

- Dial the appropriate number ▬ ringing tone is returned from the tandem office.

**Illegal Access
Intercept Attendant**

Description

Calls to non-programmed or restricted access codes or extension numbers will be routed to the attendant. Calls routed to the console in this way appear as DIAL 0 calls, with the INT indicator lit in the SOURCE display, defining the calls as intercept calls. See also Vacant Number Intercept to Attendant, and DID/Dial-In/CCSA Vacant Number Intercept to Attendant.

Conditions

- During night service (NIGHT 1 or NIGHT 2) all intercept calls receive reorder tone, regardless of the options selected.

Programming

- To cause all calls to restricted numbers or non-programmed access codes, other than DID or Dial-In tie trunk calls, to be routed to the Attendant, select System Option 116 (Illegal Access Intercept to Attendant). If this option is not selected, such calls will receive reorder tone.

Operation

- None

Immediate Ring

Description

Ringing is applied to a called free extension number within 100ms of the last digit in the number being dialed.

Conditions

- None

Programming

- None

Operation

- None

Individual Trunk Access

Description

This feature allows the attendant to access individual trunks within a trunk group.

Conditions

- **None**

Programming

- **Assign an access code to Feature Number 18 (Attendant Function).**

Operation

- **Dial * 2**
- **Dial the individual trunk access code (equipment number of the trunk).**
- **Dial * ▬ CO dial tone is returned if the trunk is free. PABX busy** tone is **returned if the trunk is busy.**

**Limited Wait For Dial
Tone**

Description

This option, when set, causes the "Wait for Dial Tone" feature on outgoing trunks to wait only 5 seconds and then enable outgoing audio even if no dial tone is received.

Conditions

- None

Programming

- Select System Option 136 (Limited Wait for Dial Tone).

Operation

- None

**Listed Directory
Numbers (LDN)**

Description

The attendant console will identify Listed Directory Numbers (LDN's) at the console. Each Listed Directory Number may be assigned to a separate LDN button (1-4), allowing the attendant to answer the incoming call with the correct response.

Conditions

- Only CO or Non Dial-In Trunks may be assigned to LDN appearances.
- DID/CCSA trunks appear on LON 4 when accessing the attendant.

Programming

- Assign the trunk to the required LDN button number when programming the trunk.

Operation

- None

Lockout Alarm

Description

This system option causes a minor alarm to come up at the attendant's console when an extension is locked out.

Conditions

- Dial tone timeout is 15 seconds with an additional 30 seconds of reorder tone before a lockout is applied to the extension.
- Interdigit timeout is 15 seconds for lines, 10 seconds for trunks with an additional 30 seconds of fast busy tone before a lockout is applied to an extension.

Programming

- Select System Option 112 (Lockout Alarm Enable).

Operation

- None

Maid In Room
Generic 203/204

Description

This feature allows the maid to change the status indicate on the attendant console which room the maid is in (see Room Status).

Conditions

- A lamp must be assigned to the extension. in order to display its status in the busy lamp field.

Programming

- Select System Option 173 (Room Status Button Enable).
- The COS of the extension must contain Option Number 80 (Room Status Applies).
- An access code must be assigned to Feature Number 28 (Room Status Update Maid in Room).

Operation

At the extension in the room:

- Dial the Maid In Room access code.
- Dial:
  1 - change room status display to show the maid in the room.
  2 - clear maid in room indication and leave room status code unchanged.
  3 - clear maid in room indication and change room status from "needs cleaning" to clean.
  - Dial tone is returned.

Manual Line

Description

An extension with this option specified in its COS is routed directly to the attendant console when going off-hook. The extension can receive calls, but all call originations must be made with the assistance of the attendant.

Conditions

- The extension does not receive dial tone, but will receive ringback tone.
- Manual line service cannot be used with consoleless operation.

Programming

- Option Number 57 (Manual Line) must be specified in the COS of the extension.

Operation

- None

Meet -Me Conference

Description

The Meet-Me Conference feature allows up to seven extensions to dial the Meet-Me Conference access code at a specified time, and to be connected into a conference. As each conferee joins the conference, a single 200ms burst of a 440Hz tone is superimposed on the conference. When a conference is full (seven conferees), parties trying to enter the conference receive busy tone.

Conditions

- A maximum of seven conferees may be in a conference.
- Only one Meet-Me Conference may be active at any time.
. Switchhook flash cannot be used by an extension in a Meet-Me Conference - the extension will be dropped from the conference upon flashing the switch-hook.
- The attendant cannot dial into a Meet-Me Conference.
- Extensions and DISA trunks may only access a Meet-Me conference.

Programming

- All extensions accessing the feature must have Option Number 50 (Meet-Me Conference) specified in their COS.
. Assign an access code to Feature Number 9' (Meet- Me Conference). This access code must not conflict with the system numbering plan.

Operation

- Dial the Meet-Me Conference access code - if you are the first person in the conference, you will hear music, if provided, or nothing if Music On Hold is not provided. As each conferee joins the conference a warning tone is heard and the new conferee is added to the conference.
- To leave the conference - replace the handset. The last party in the conference hears music if Music On Hold is provided.

Message Registration
Generic 203/204

Description

This feature allows the system to accumulate the number of completed local call units made from an extension. The number of call units counted for each call is dependant on the call unit modifiers selected. The accumulated call unit counts are held in the system message registers. These register is protected against power failure, so that the call count is not lost in the event of a power outage.

Conditions

- Extensions with Message Registration cannot be members of Pick-Up or Hunt Groups.
- System Option 113 (Tenant Service) and System Option 156 (Message Registration Enable) are mutually exclusive.
- The maximum count, before the multiplier, is 999. After this the counter returns to 000.

Programming

- The COS of the extension for which a call unit count is to be accumulated must contain Option Number 64 (Message Registration Applies).
- Select System Option 156 (Message Registration Enable).
- If all supervision signals except pseudo answer supervision are to be counted, select System Option 157 (Message Registration: Count Additional Supervisions). If this option is not selected only the first supervision received is counted.
- If the CO trunk does not supply answer supervision, pseudo answer supervision will be generated after 20 seconds if System Option 158 selected, or after 40 seconds if System Option 159 (Message Registration: Timer = 40 seconds) is selected. If neither of these options are selected pseudo answer supervision is generated after 30 seconds.
- If any one of System Options 163 through 170 are programmed, the selected surcharge is added to the first answer supervision signal received. If none of these options are selected, no surcharge is made.
- If any one of System Options 160 through 162 are selected, the contents of the message register is multiplied by the selected multiplier (2, 3, or 4) when the content of the message register is displayed.
- Select System Option 172 (Guest Room Button Enable).
- The first digit of the TYPE code for the trunk groups used must be programmed as Type 2 if answer supervision is not generated by the CO (Answer Supervision) or Type 4 (Outgoing Audio Inhibit Until Answer Supervision) if answer supervision is provided. The second digit of the trunk group type must be specified as 2 (Message Register). If the trunk group is not programmed for answer supervision, pseudo answer supervision will be automatically generated.

Operation

- Press the GUEST ROOM button.
- Dial the extension number of the room - the SOURCE display shows the number dialed, the DESTINATION display shows ROOM STATUS if System Option 173 (Room Status Button Enable) is selected and the number of call units made

from that extension.
- To clear the message register, press the # button and the ROOM STATUS button.
- Press the RELEASE button.

Description

This feature allows the attendant to request a printed list of all extensions that have made local calls, and the total number of cat! units made from each extension. The printout format includes date, time, extension number and the message register value for each extension.

Conditions

- The printer must meet the requirements of E1A RS232 with a data speed of 110 or 300 baud and a minimum of 80 characters per line.
- The request will be ignored if the printer queue is full.
- System Option 203 (Traffic Measurement Polling) and System Option 193 (Room Audit Enable) are mutually exclusive.
- The second digit of the trunk group type must be 1 or 2.

Programming

- Select System Option 193 (Room Audit Enable).
- Select System Option 208 (Room Audit Clear Message Register) if the message register are to be cleared after its contents have been printed.

Operation

- Dial *16
- Press the RELEASE button - the display clears and the report is printed (listing is in equipment number sequence).

Message Waiting
Generic 203/204

Description

This feature allows the attendant to inform a guest that there is a message waiting. The message waiting indication may take the form of a continuously flashing lamp on the extension, or the extension may be rung every 20 minutes with a distinctive ringing pattern (3 cycles of 3.5ips ringing). If the extension is busy, or has Do Not Disturb active, when Message Waiting is activated, the message waiting indication is initiated as soon as the extension becomes idle. If the message waiting indication is given by a lamp, the lamp flashes (at 60 IPM). If the message waiting indication is given by ringing the extension, the first ring starts ten seconds after the extension becomes idle. The extension will ring every twenty minutes after an off-on hook condition or until the message waiting is cancelied. When the guest returns and calls the attendant, the MSGE WAIT lamp lights to indicate that there is a message waiting for that extension.

Conditions

- Message Waiting - Bell and Message Waiting - Lamp are mutually exclusive.
- See Message Waiting Print.
- The MSGE WAIT lamp will not light if the BOTH MODE button is pressed.

Programming

- Select System Option 138 (Message Waiting - Bell) or 137 (Message Waiting - Lamp).
- Select System Option 172 (Guest Room Button Enable), if Message Waiting is to be turned on and off without calling the room.
- Select System Option 175 (Do Not Disturb and Message Waiting Display Enable), if the special message waiting display is to be used.
- The COS of extensions to which message waiting is to be applied must include COS Option 77 (Message Waiting Applies).

Operation

To set up with the GUEST ROOM button:

- Press the GUEST ROOM button.
- Dial the extension number.
- Press the MSGE WAIT button.
- Press the RELEASE button.

To set up without the GUEST ROOM button:

- Dial the extension number.
- Press the MSGE WAIT button.
- Press RELEASE.

To cancel:

- Repeat the above steps accordingly. When the MSGE WAIT button is pressed it will be cancelled.

Message Waiting
Display
Generic 2031204

Description

This feature allows the attendant to display all extensions that have a Message Waiting. When the ant presses and holds the MSGE WAIT button, the busy lamp field goes dark, leaving only the lamps lit for the rooms that have a Message Waiting. In addition the SOURCE display shows the total number of extensions with a Message Waiting.

Conditions

- The console must be idle. If the console has an extension as its Source or Destination party or is using the GUEST ROOM button, the Message Waiting status for that extension will be changed.
· For an extension to be included in the total display of the Busy Field Lamps and the total amount in the SOURCE display, it must have a lamp assigned a Message Waiting.

Programming

- Select System Option 175 (Do Not Disturb and Message Waiting Display Enable).

Operation

To Display the Total Number of Extensions with Message Waiting Set:

- Press the MSGE WAIT button - the busy lamp field changes to display only the extensions that have a Message Waiting active, the SOURCE display show the total number of extensions with a Message Waiting.
· Release the MSGE WAIT button - the busy lamp field and SOURCE display return to normal.

Message Waiting Print
Generic 204

Description

The message waiting status of a room can be printed whenever the attendant changes the status of the room.

Conditions

- See Message Waiting.
- If the printer is occupied the status does not change and a warning beep is returned.

Programming

- Select System Option 195 (Message Register and Message Waiting Change Print Enable).
- See Message Waiting.

Operation

If Message Waiting is setup or removed it will be recorded as: extension number, date, time and one of the two following:

MESSAGE WAITING ON

MESSAGE WAITING OFF

Mixed Station Dialing

Description

This feature allows the simultaneous use of rotary and DTMF telephones. All features provided to telephones.

Conditions

- None

Programming

.   None

Operation

- None

Multi Console
Operation

Description

In systems employing two attendant consoles the following features apply:

- All calls appear on both consoles.
- Either attendant may answer any call.
- Attendant 1 may hold calls on HOLD buttons 1, 2, 3 and 4.
- Attendant 2 may hold four additional calls on HOLD buttons 5, 6, 7 and 8.
- Either attendant may select night service for the system.

Conditions

- Calls can be transfered from one console to the other by holding the call on one console, then dialing the appropriate Hold Pick-Up code from the other console.

Programming

- None

Operation

- All operations are identical for both attendant consoles.

**Multi Digit Toll
Control**

Description

Multi Digit Toll Control provides a method of controlling the sequence of digits which an extension may dial into a trunk. Toll Control is applied on an extension basis, that is, the control applied to digits can vary depending on which extension has accessed the trunk. Should no toll restrictions on an extension be required, the extension may be Toll Allowed, i.e., dialing is unrestricted. For further information see SECTION MITL9105/9110-98-212.

Multiple   Extensions

Description

A maximum of seven extensions with bells may be connected (hardwired) together.

Conditions

- If more than one extension is off hook a drop in audio level will occur.

Programming

- None

Operation

- None

**Multiple Trunk Groups
With Overflow**

Description

The system permits up to twelve independant trunk groups to be defined. Each trunk group may be specified to overflow to another trunk group when s in the called group are busy. Extensions may be prevented from using the overflow group on an individual extension basis. See COS Option Number 52 (Do Not Overflow), Trunk Groups and Trunk Groups, two types.

Conditions

- A trunk may be a member of only one trunk group.
- All trunks within a trunk group must be of the same type.
- If an overflow group is specified, the trunks in the overflow group should be of the same type as the originating group.

Programming

- Program the overflow option of the trunk group as the number of the group to which extensions are to overflow.
- Assigned the originating trunk group option (65-76) to the extension's COS. It is not necessary to put the overflow trunk group into the COS.
- Assign Option Number 52 (Do Not Overflow), if required, to the COS of the extension.

Operation

- None

Music on Hold

Description

A music source may be connected to the System via the cross connect field for use with Camp-On and Hold features. If music is not provided calls that are held or Camped-On will hear nothing.

Conditions

- The music source should be between 50 and 500mVRMS.
- input to the system is 600 Ohms AC transformer coupled. A DC voltage should not be applied to this input.

Programming

- See SECTION MITL9105/9110-98-200 for wiring details.

Operation

- None

Never A Consultee

Description

This Class of Service feature denies an extension the ability to be dialed from extensions that have a call on hold or are part of a conference call.

Conditions

- None

Programming

- The COS must contain Option Number 47 (Never A Consultee).

Operation

- None

Never a **Forwardee**

Description

Inclusion of this feature in an extension's Class of Service prevents an extension from having any calls forwarded to it by an extension. If an extension attempts to forward a call to an extension with this option in its COS, he will receive reorder tone or intercept to the attendant. Calls directed to the extension by hunting are not affected by the selection of this feature.

Conditions

- None

Programming

- The COS of the extension must include Option Number 38 (Never a Forwardee).
- Select System Option 116 (Illegal Access Inter? **cept** to the Attendant) if forwarded calls are to be intercepted by the attendant.

Operation

- None

New Call **Tone**

Description

If this option is selected, the first call placed in the attendant call waiting queue when the console is not free signals the attendant with a single burst of tone. Subsequent calls do not alert the attendant when they are added to the queue. Their presence is shown by the CW (call waiting) indicator. If the option is not selected, incoming calls do not signal the attendant until the console is free.

Conditions

- None

Programming

- Select System Option 124 (New Call Tone Enable).

Operation

- None

Night Service
Automatic Switching

Description

This feature automatically switches the system into night service if an incoming call or recall to the attendant console is not answered within the selected Night Service Timeout period.

Conditions

- A new call causing the system to switch to Night Service remains at the attendant console.
- If the trunk was programmed to a night bell in NIGHT SERVICE, then it will appear on the bell. If it was programmed to an extension it will not be rerouted to the extension.
- A recall will remain on the attendant console, but will not appear on a night bell.
- The console must not be active during the Night Service Timeout period. If the attendant presses any console button, the timeout is cancelled.
- All calls in progress when Night Service is selected are not affected.
- Depressing the Night key to terminate the night mode also terminates further Night Service Automatic Switching timing on a unanswered incoming trunk call.

Programming

- Select System Option 103 (Night Service Automatic Switching).
- If System Option 145 is selected the timeout period is 20 seconds.
- If System Option 146 is selected the timeout period is 40 seconds.
- If neither System Option 145 nor 146 is selected the timeout period is 30 seconds.

Operation

- None

No Dial Tone

Description

Assignment of this feature to a dial-in tie trunk suppresses dial tone on an incoming trunk call. If this feature is assigned to an extension, the extension will not receive dial tone when going off-hook.

Conditions

- None

Programming

- The COS assigned to a tie trunk or an extension must contain Option Number 61 (No Dial Tone).

Operation

- None

**Non CO Trunk via
Attendant Inhibit**

Description

This option denies an extension the ability to access a Non-CO Trunk through the attendant.

Conditions

- None

Programming

- The COS of the extension must contain Option Number 59 (NON CO Trunk via Attendant Inhibit).

Operation

- None

Originate Only

Description

An extension with this COS option may originate calls but cannot receive any calls dialed to its number unless they are forwarded. If calls are dialed to the extension, the calls are intercepted and routed to the attendant or to reorder tone.

Conditions

- An extension with this COS option may receive calls via Call Forwarding (unless Never a Forwardee is selected in its COS).
- An Originate Only extension may receive calls via a master hunt group number.

Programming

- The extension's COS must include Option Number 44 (Originate Only).

Operation

- None

**Outgoing Trunk
Callback**

Description

Outgoing Trunk Callback allows the attendant or an extension user who receives a busy signal after dialing a trunk group access code, to have the call completed when a trunk in the called trunk group becomes free. After the feature has been called trunk group and the originating party. When a trunk becomes free, the system seizes the required trunk and rings the originating party. See Automatic Callback.

Conditions

- A callback will always ring the originating extension, call forwarding has no effect.
- Up to 32 callback requests may be active within the system at any time.
- If the trunk group is accessed before the callback is honoured, the callback will be cancelled automatically.
- Duplicate callback requests are ignored (the original callback request is cancelled).
- The Callback-Busy access code must be dialed within 10 seconds of receiving busy tone.
- If a callback is not answered by the originating extension within 6 rings, it is automatically cancelled.
- If the called trunk group becomes busy before the originating party answers the callback, the originating party will hear busy tone and may dial the callback code again.
- The attendant may cancel all callback requests by dialing ∗ 4 # and pressing the RELEASE button. If the system has Tenant Service, the Tenant Number ∗ 4 # and pressing the RELEASE button must be dialed to cancel all callbacks for that tenant.
- All callback requests are lost after recovery from a power failure.
- Attempting to set up a callback on an Identified trunk group will result in reorder tone being returned.

Programming

- Select System Option 106 (Outgoing Trunk Callback).
- Select COS Option Number 33 (Automatic Callback).
- Assign an access code to Feature Number 23 (Callback – Busy).

Operation

- Dial the trunk group access code – special busy tone is returned.
- Dial the Callback-Busy code – dial tone is returned or the attendant presses the CALLBACK button, then the RELEASE button.
- Replace handset.

To answer a Trunk Callback at the attendant console:

- The ANSWER and the RECALL lamps flash.
- Press the ANSWER button – the ANSWER, CALLBACK and Destination lamps light, CO dial tone is returned.
- Dial the required number.

To Answer a Trunk Callback at an extension:

- The extension rings.
- Lift the handset – CO dial tone is returned.
- Dial the required number.

**Outgoing Trunk
Camp-On**

Description

When an extension user who is equipped with the Camp-On feature reaches a busy trunk group, he receives a special busy tone (350/440 interrupted at 60ipm). If the originating extension remains off-hook for ten seconds the special busy tone changes to regular busy tone. When one of the trunks in the group becomes free, the caller is connected to the trunk and receives Central Office dial tone.

Conditions

• The attendant or extensions cannot Camp-On to Identified Trunk Groups.

Programming

• The COS of the extension must include Option Number 51 (Camp-On).
• Select System Option 105 (Outgoing Trunk Camp- On).

Operation

• Dial the trunk group access code - special busy tone is returned.
• After ten seconds - standard busy tone is returned.
• When a trunk becomes free, Central Office dial tone is returned.

Page Button

Description

Selection of this option enables the PAGE button on the attendant console to be used. When the PAGE button is pressed, the console handset is connected directly to both zones of the paging equipment, overriding any extension announcement in progress, The attendant may access either of the individual paging circuits by dialing the required paging access codes (see Paging Access).

Conditions

- Access to two paging zones is provided.
- When shared consoles are in use, the second console will receive busy tone when pressing the button, if the PAGE button is in use by the first console.
- Audio output level is approx. 100mV RMS.
- Output is 600 ohms, transformer coupled. No DC voltage should be applied to this output.
- Amplifier and loudspeaker equipment are customer provided, and are external to the system equipment.
- A dry relay contact is provided for amplifier control purposes for each zone (see MITL9105/9110-98-200).

Programming

- Select System Option 123 (Page Button Enable).
- If individual access to paging circuits is required, access codes must be assigned to Feature Numbers 10 and 11 (Pagers 1 and 2).

Operation

- Press and hold down the console PAGE button - the console handset is immediately connected to both paging zones, overriding any extension announcement in progress.
- When the paging equipment is in use by the console or an extension, the PAGE LEO on the console is lit indicating to the attendant that an announcement is being made.

**Paging Access
(Extensions)**

Description

An extension equipped with this feature is permitted access to the system paging equipment by dialing the required access code. Access may be restricted to zone 1 only, zone 2 only, or zones 1 and 2 depending upon the access code dialed. If an extension trys to access busy paging equipment, busy tone is returned.

Conditions

- A maximum of two paging circuits are provided.
- Camp-On or Automatic Callback-Busy may not be activated on busy paging equipment.
- Any extension paging announcement may be overridden by the attendant.
- Paging amplifiers and loudspeakers are customer provided equipment.
- A dry relay control is provided for amplifier control purposes for each zone (see MITL9105/9110-98-200).
- If the attendant overrides an extension, the extension will receive busy tone.

Programming

- Option Number 53 (Paging Access) must be included in the COS of the extension.
- Assign an access code to the paging access required.
  Pager 1 - Feature Number 10
  Pager 2 - Feature Number 11
  Pagers 1 and 2 - Feature Number 13

Operation

- Dial the required paging access code - after the short pulse of tone is heard, you are connected to the paging system and may make the required announcement.

Pick-Up Groups

Description

An extension may be programmed into a Pick-Up Group permitting it to pick-up a call within that group. See Dial Call Pick-Up.

**Printer and Recording
Devices Generic 204**

Description

The system may output data to a printer or recording device. This allows the hotel attendant to print information such as the number of local call units charged to a hotel room. An installer may write customer data to a storage device like cassette tape for backup. See Automatic WAKE-UP (Alarm Call), Message Register Print, Room Audit and Traffic Measurement, Customer Data Dump & Load.

Conditions

- The printer must meet EIA RS232 requirements.
- The printer must have a line length of 80 characters.
- The printer must be capable of either 110 or 300 baud, no parity, full duplex.
- For Modem Operation a RS232 adapter is required (MITL9110-052).

Programming

- If 'purge or ignore output' is to be used, select System Option 196 (Ignore Print Enable).
- If additional time is required for the carriage return on the printer incorporated, select System Option 207 (Printer Carriage Return Delay).
- Select System Option 210 (Attendant Printer Control Enable). Operation From the console:

To suspend the output (for example, to change paper).

- Dial * 14 *
- Press the RELEASE button.

To re-enable the output.

- Dial * 14 #
- Press the RELEASE button.

To purge and ignore the output (if the printer is out of service).

- Dial * 1400
- Press the RELEASE button.

**Programming and
Maintenance Security
Generic 204**

Description

This feature allows a maintenance console to program a system without changing the switches on the Tone Control card. To safeguard against misuse a one to four digit security code may be used to enter Programming. To be secure, a maintenance code other than 555 is also recommended.

Conditions

- The Security Code cannot conflict with the numbering plan.
- The RAM memory cannot be zeroed unless all switches are set to 7776. This must be set at the system site.

Programming

- Set switches on the tone control card to any number other than 777X (where X is the console number).
- Assign a one to four digit access code to Feature Number 29 (Security Code). Operation To Enter the Programming mode:

- Dial the security code ▪ the programming mode is entered.

To Exit from standard Programming mode:

. Press the LAMP TEST button.

To Exit from Extended programming mode:

- Press the NEXT button.
- Press the LAMP TEST button.

Receive Only

Description

An extension with this COS option may receive calls but cannot originate calls. The extension may, however, originate calls and select features specified in its COS after having received a call, and placing the call on hold by flashing. If System Option 116 (Illegal Access Intercept to the Attendant) is selected, when the extension goes off hook to dial it will be forwarded to the attendant.

Conditions

- If used in conjunction with the Flash Disable feature, ALL types of call origination are blocked.
. See Never a Forwardee and Callback features.
- Receive Only and CDS Option Number 58 (Contact Monitor) are mutually exclusive.

Programming

- The extension's COS must include Option Number 45 (Receive Only).

Operation

None

Receiver - Busy Out

Description

This feature allows a particular receiver circuit to be busied out or debusied for maintenance purposes (i.e. pinpointing faulty receiver circuitry). The receiver circuit may be busied out from the test line or from any console (Generic 203/up).

Conditions

- None

Programming

- An access code must be assigned to Feature Number 19 (Maintenance Function).

Operation (where 555 is the Maintenance Function Code).

To busy out a receiver circuit:

- Dial 5553.
- Dial equipment number of the receiver circuit.

To De-Busy a receiver circuit:

- Dial 5554.
- Dial the equipment number of the receiver circuit.

For information of equipment numbering of receiver circuits see SECTION MITL9105/9110-98-500.

**Receiver Direct
Selection**

Description

For maintenance purposes a specific receiver may be selected and tested from the test line.

Conditions

- The receiver must be idle.

Programming

- Assign an access code to Feature Number 19 (Maintenance Function).

Programming

At the Tone Control Card:

- Set the top two thumbwheel switches to the desired receiver circuit number. Set the two bottom switches to the desired speech path. If the bottom two switches are set to 99 any free speech path will be selected.

At the test line:

- When the test line goes off-hook it will seize the selected receiver and speech path.

See Receiver-Busy Out and SECTION MITL9105/9110-98-500.

**Remote Maintenance
Administration and
Test System (RMATS)**

Description

The RMAT System allows personnel at maintenance centres to remotely access an
SX-100 or SX-200 PABX. This access allows the maintenance centre to obtain data
information relating to maintenance aspects, or to cause programming changes. The
system provides a means of remotely identifying PABX alarm conditions. It also
allows programming changes to be done, without the necessity of visiting the user's
premises. For further information see SECTION MITL9105/9110-98-101 and
9105/9110-98-301.

**Remote System Reset
- Protection Override
Generic 204/up**

Description

This system option allows the PABX to be reset from the test line or console without setting the thumbwheel switches on the Tone Control card to 777n. See also Reset the system.

Conditions

- None

Programming

- Select System Option 197 (Remote System Reset - Protection Override).
- An access code (i.e. 555) must be assigned to Feature Number 19 (Maintenance Function).

Operation (where 555 is the Maintenance Function Access code).

- The console or test line dials 555 + 6 - system resets.

Reserve Power Supply

Description

The SX-IOO/SX-200 PABXs may be optionable equipped with a Reserve Power Supply. The supply is capable of sustaining normal operation in the event of a commercial power failure for a minimum of 2 hours. The SX-200 reserve power supply (MITL9110-014) is mounted in the bottom of the equipment cabinet. The SX-100 reserve power supply (MITL9105-014) is mounted in a separate pedestal designed to support the SX-100. For further information as to the installation of the Reserve Power Supply see SECTION MITL9105/9110-98-200.

Conditions

- None

Programming

- None

Operation

- None

Reset the System
Generic 203/up

Description

This feature allows the console or test line to reset the system. See also Remote System Reset - Protection Override.

Conditions

- The thumbwheel switches on the Tone Control card must be set to 777n where n = 0 to 9. This is not necessary if System Option 197 (Remote System Reset - Protection Override) has been selected.

Programming

- Assign an access code (i.e. 555) to Feature number 19 (Maintenance Function).

Operation (where 555 is the Maintenance Function)

From the console or test line:

- Dial 555 + 6 - System reset.

Note: All Traffic Measurement (for the hour), SMOR (in buffers), Call backs, Call Forwarding, Time, and date will be lost.

Room Status Audit

Description

This feature allows the attendant to request a printout that will show the room status of all rooms. The format of this printout is:

First Line:

_ _ _ _ _ mm/dd_hh:mmp_ _ _ ROOM- - _ STATUS

Subsequent Lines:

rrrr-_sn_ _ _ _ (repeated up to six times on each line)

Where:

rrrr is the extension number (room number)

s is the room status

n is printed as * if the room is not ready. It will be blank-if the room is ready.

Conditions

See Printer and Recording Devices, Room Status Update (Maid in Room) and Maid in Room SECTION MITL9105/9110-98-105.

System Option 203 (Traffic Measurement Polling) and System Option 194 (Room Status Audit Enable) are mutually exclusive.

Programming

- Option Number 80 (Room Status Applies) must be included in COS of all extensions to be monitored.
- Select System Option 173 (Room Status Button Enable & Display Enable).
- An access code must be assigned to Feature Number 28 (Room Status Update (Maid in Room)).
- System Option 172 (Guest Room Button Enable) must be enabled.
- Select System Option 194 (Room Status Audit Enable). Operation
- Dial *18.
- Press the RELEASE button - Printer starts.

**Room Status Update
(Maid in Room)
Generic 203/204**

Description

This feature allows the Hotel/Motel attendant to monitor, display and change the status of a room. The functions which may be monitored are -

- Room Condition - Vacant and Clean (Status code 1), Occupied and Clean (Status code 2), Vacant and needs Cleaning (Status code 3), Occupied and needs Cleaning (Status code 4).
- Location of the maids (displayed as a period (.) after the room Status code).

Conditions

Tenant Service and Room Status:

- Trunk group access will be restricted if the status 1 and 3 if System option 132 (Controlled Outgoing Restriction Set-Up) has been selected.
- A Busy Lamp must be assigned to an extension for Room Status to be displayed.

The following features are mutually exclusive:

- Tenant Service and Room Status.
- Tenant Service and Guest Room Button Enable.
- Room Status Display and Room Restrict.
- Night 2 facility and Room Status Display.
- Guest Room Button Enable and Attendant Serial Call.
- Room Status and Attendant Serial Call.

Programming

- System Option 132 (Controlled Outgoing Restriction) may be selected.
- System Option 172 (Guest Room Button Enable) must be enabled.
- System Option 173 (Room Status Button Enable & Display Enable) must be enabled.
- The COS of the extension must include COS Option 80 (Room Status Applies).
- An access code must be assigned to feature number 28 (Room Status Update) for updating of the room status by the extensions. Operation To display the status of an individual room:

- Press the GUEST ROOM button.
- Dial the required extension number - console displays the complete room status. See the GUEST ROOM Button.

To display all rooms with the same status:

- Press the ROOM STATUS button.
- Press and hold down selected room status code digit.
  - 0 - Busy Lamp Field shows all rooms that the Maids are in.
  - 1 - Busy Lamp Field shows all vacant and clean rooms.
  - 2 - Busy Lamp Field shows all occupied and clean rooms.
  - 3 - Busy Lamp Field shows all vacant rooms that need cleaning.

4 - Busy Lamp Field shows all occupied rooms that need cleaning.
The source display shows the number of rooms of the requested status.

- Press the RELEASE button.

To change the status of a room:

- Press the GUEST ROOM button.
- Dial the required extension number (not required if talking to the room) - the console displays the status of the room.
- Dial the new Room Status code.
- Destination display changes to show the new status code.
- Press the RELEASE button.

To change aLL rooms with status 2 (Occupied and Clean) to status 4 (Occupied and Needs Cleaning):

- Dial *10*
- Press the RELEASE button.

To change aLL rooms with status 4 (Occupied and Needs Cleaning) to status 2 (Occupied and Clean)

- Dial *10#
- Press the RELEASE button,

See also the Maid In Room feature description.

Single Digit Dialing
Generic 203/204

Description

This feature, allows selected features hunt groups, trunk groups or extensions to be accessed by dialing a single digit number even though it conflicts with the system numbering plan. When programming the system the access code or extension number is entered as N#, where N is any single digit number. The # character is assigned an interdigit timeout period. If an extension dials a digit and does not dial a second digit within the timeout period, the system assumes that the # character was dialed and completes the call. The # character may be dialed from an extension in place of waiting for the timeout period.

Conditions

- To access a single digit service from the attendant console, N# must be dialed.
- Features requiring an extension number to be dialed after dialing the feature access code may not be accessed by single digit dialing.

Programming

- Assign access code or extension number as N#, where N is any single digit number.
- System Option 176 (Single Oigit Dialing) must be selected.
- For an interdigit time of 3 seconds select System Option 177 (Single Digit Dialing Timeoue 3 seconds), if the interdigit timeout period is to be 5 seconds, select System Option 178 (Single Digit Dialing Timeout 5 seconds). If neither of these options are selected the interdigit timeout is 4 seconds.

Operation

From an extension:

- Dial the required single digit, wait the timeout period or dial # - the call is completed.

From the attendant console:

- Dial N#, where N is the single digit number - the call is completed.

**Speech Path ▪ Busy
out**

Description

This feature allows a particular speech path circuit to be busied out, or be put in service again.

Conditions

- None

Programming

- An access code must be assigned to Feature Number 19 (Maintenance Function).

Operation (Where 555 is the Maintenance Function Access code).

From the console or test line:

To busy out a speech path:

- Dial 555 + 33 + the speech path number (01-31).
  - Speech path busied out.

To de-busy a speech path:

- Dial 555 + 4 + speech path number (01-31).
  - Speech path de-busied.

**Speech Path - Direct
Selection**

Description

The status of a speech path and or a receiver may be displayed on the scanner card. This may be done from the test line and using the Tone Control card switches to select a receiver and speech path. For further information see part E paragraph 5.05 of the SECTION MITL9105/9110-98-500.

Speed Call

Description

Generic 205 This feature allows extensions to program and use directory numbers in a speed call application. The attendant may program numbers or may view programmed numbers. Individual extensions may also be assigned personal tables which the extension programs. Number redial (10, 16, 24 digits) is also available on an extension basis. Speed Call capability is assigned on a Class of Service basis. For further information see SECTION MITL9105/9110-98-220.

Station Conference

Description

This feature allows an extension user to set up a conference with up to six conferees (plus the originating extension), without the assistance of the attendant. The conferees may be any combination of extensions and trunks. To originate a conference an extension user first establishes a two party call, then adds-on the remaining conferees. Any extension in the conference with an appropriate COS may add additional parties to the conference to a maximum of seven. If the originator encounters a busy or unanswered extension number, he may flash the switchhook to return to the conference. If after flashing out of the conference, the extension hangs up, the extension will automatically be recalled to the conference. If a CO trunk is to be added to the conference and the number dialed is incorrect or unanswered, the calling party must hang up to release the connection. The extension will automatically be recalled to the conference.

Conditions

- COS Option Number 49 (Station Conference) and COS Option Number 48 (Broker's Call) are mutually exclusive.
- If a conference contains only trunks (i.e. all stations in the conference hang up), the conference is terminated and the trunk connections are dropped. In Generic 204 it is possible to leave two trunks in the conference alone but one must be a non CO trunk.
- A call may not be held or transfered by an extension in a conference.
- A maximum of 30 conferences may be active at one time.
- Only one party may flash out of the conference at a time.

Programming

- The originating extension must have Option Number 49 (Station Conference) in its COS.
- System Options 107 (Can Flash if on an Incoming Trunk), 108 (Can Flash if on an Outgoing Trunk), 109 (Can Flash if Talking to an Extension), 110 (Cannot Dial a Trunk after Flashing) and 111 (Cannot Dial a Trunk After Flashing if Holding or in Conference with a Trunk) may be used to modify the conference capability of extensions.

Operation

To establish a conference:

- Establish a two party call.
- Flash the switchhook - transfer dial tone is returned.
- Dial the number of the next conferee - ringing tone is returned. When the conferee answers, flash the switchhook three party conference exists.
- Any extension in the conference may add additional conferees to the conference by repeating the above two steps.

**Station Message
Detail Recording
(SMDR)
Generic 205**

Description

Station Message Detail Recording (SMDR)allows data to be collected for each outgoing and, optionally, incoming trunk call. This data may be output to a printer or recording device (see Printer and Recording Devices). This data includes:

* Records of outgoing and incoming calls.
* Records of up to 26 digits dialed on the trunk.
* Account codes of up to 12 digits.
* Optional meter pulses.
* Outgoing trunk number.
* Optional system ID.
* Long calls identifications.
* Time to answer for incoming calls.
* Identifies other extensions in a transfer.
* Identifies conferences and transfers.
* Records answer supervisions.

For further information see SECTION MITL9105/9110-98-451.

**Station Override
Security**

Description

This option provides an extension with security against Executive Busy Override. See Executive Busy Override.

Conditions

- None

Programming

- The COS of the extension must contain Option Number 42 (Station Override Security).

Operation

- None

Station Transfer
Consultation
Hold/Add-On

Description

This feature allows an extension user on an established call to hold the call, add a third party to the call, or transfer the original call to a third party. By programming selected options the feature may be restricted on the basis of the type of the second party in the call.

Conditions

- This feature is mutually exclusive with COS Option Number 48 (Broker's Call) and COS Option Number 62 (Flash for Attendant) and COS Option Number 46 (Flash Disable).
- The number of the third party in the call must not be the Dial Call Pickup or Directed Call Pickup access codes. All other types of call may be made after holding the second party (subject to system and extension options).
- . Calls may not be transfered to the paging circuit.
- . Flashing the switchhook while talking to the attendant will result in release of the call.
- · In Generic 202 the number of the third party in the call cannot be the Hold Pickup code.

Programming

- To allow an extension to hold, add-on, or transfer a call in which the second party is an extension, select System Option 109 (Can Flash if Talking to an Extension).
- To allow an extension to hold, add-on, or transfer a call in which the second party is an outgoing trunk, select System Option 108 (Can Flash if on an Outgoing Trunk).
- . To allow an extension to hold, add-on, or transfer a call in which the second party is an incoming trunk, select System Option 107 (Can Flash if on an Incoming Trunk).
- To prevent an extension from attempting to hold a trunk call, then originating a second trunk call, select System Option 111 (Cannot Dial a Trunk after Flashing if Holding or in Conference with a Trunk).
- . To prevent an extension from holding an exten? sion call, then originating a trunk call, select System Option 110 (Cannot Dial a Trunk after Flashing).
- If a combination of the above is selected, calls may be held, added or transfered as specified by the combination selected.
- If System Option 101 (Transfer Dial Tone) is selected, transfer dial tone is returned.

Operation

On an established call:

- Flash the switchhook - dial tone is returned the caller is held and will hear music if provided.
- · Dial the number of the required extension - ringing tone or busy tone is returned.

- After the called party answers - private conversation with third party.
- Flash the switchhook - a 3 party call is established.
- Replace the handset - the held call is transferred to the called extension.
- After the called extension replaces the handset - the call is released.

Station Transfer
Security

Description

This feature is designed to prevent "lost" calls, i.e. mishandled calls. If a trunk call is transfered to a ringing extension, and the extension does not answer within the timeout period, this feature will route the call to the attendant during day service, or to the extension that originally answered the call during night service. Also, if an extension, during transfer, hangs up before completing dialing, the call which was held by flashing automatically calls the extension back.

Conditions

- Timed Recall applies only to trunk calls.

Programming

- If the recall timeout is **20sec,** select System Option 141 (Attendant Timed Recall - Don't Answer **20sec).**
- If the recall timeout is **30sec,** no System Option is selected.
- If the timeout is **40sec,** select System Option 142 (Attendant Timed Recall - Don't Answer **40sec).**

Operation

- None

**Switchhook Flash
Timer**

Description

This feature defines the maximum duration of a switchhook flash. An on-hook condition of longer will be considered by the software as a valid on-hook (disconnect). An on-hook condition of less than 190ms is filtered by the line circuit hardware, and is not detected by the software. The maximum duration of a valid flash condition may be selected to be between the limits of; 700 ms, 900 ms, 1100 ms, or 1500 ms.

Conditions

- None

Programming

In Generic 202.05/up:

- Select System Option 114 for a maximum flash time of 700 ms. If this option is not selected a switchhook flash time of 1500 ms is in effect.

In Generic 203/up:

- Select System Option 180 for a maximum flash time of 700 ms.
- Select System Option 181 for a maximum flash time of 900 ms.
- Select System Option 182 for a maximum flash time of 1100 ms.
- If one of these options is not selected a maximum flash time of 1500 ms is in effect.
- If Generic 203/up software is installed in a programmed system which had Generic 202 System Option 114 was set as a switchhook flash time of 700ms, the System Option 180 will automatically be set. In the 203 sofware, Option Number 114 is defined as Tenant Service - Separate Consoles.

Operation

- None

System identifier
Generic 204

Description

This feature allows a unique identifier to be assigned to the system. This code identifies the system when central polling equipment is used for traffic data collection. It also appears on the customer data dump.

Conditions

- None

Programming

- Select System Option 211 (System IO Enable).

Operation

To Enter a New System Identifier:

- Dial *17 — the system identifier is displayed in the console SOURCE display — if an identifier is not assigned the display shows 000.
- Dial the new system identifier (nxx where n is any digit l-9 and x is any digit D-9).
- Press the RELEASE button — the display clears.

To Display the System Identifier:

- . Dial *17 — the console SOURCE display shows the current system identifier.
- Press the RELEASE button — the display clears.

Test Line

Description

The test line, equipment number 001, is hard wired to the test terminals on the maintenance panel. This line, in addition to normal extension facilities, has access to special features used for maintenance and testing. These exclusive features allow the service personnel to:

- Directly access an extension (in Generic 203/up).
- Directly access a trunk.
- Set and clear busy-out condition of speech paths and receivers.
- Clear all busy-out conditions except trunks.
- Clear all errors.
- Select a specific speech path and receiver for use, and display their status.
- Initialize the hardware status of circuit cards.
- Reset the System.
- Reserve the printer for dump (in Generic 204/up).
- Suspend the printout (in Generic 204/up).
- Enable the printout (in Generic 204/up).
- Ignore the printout (in Generic 204/up).

Conditions

- Card position 1 must contain a Line Card.

Programming

- Assign an unrestricted COS to equipment number 001.

Operation

- The operation of the Test Line is detailed in SECTION MITL9105/9110-98-500 General Maintenance Information.

Tenant Service
Generic 203/up

Description

This feature allows up to four individual tenants (customers) to share the system. Each tenant may have the same numbering plan or an independant numbering plan. If tenant service is selected the attendant consoles may be assigned as:

Shared Consoles - any console may answer or originate any call to any tenant, or

Separate Consoles - attendant console 1 may answer or originate calls to tenant 1 only. Attendant console 2 may answer or originate calls to tenant 2 only. Tenants 3 and 4 have no console and are permanently in "Night Service 1" mode.

Conditions

Tenant Service General

- Inter-tenant calls cannot be made within the PABX.
- Each tenant may have the same or independent numbering plans.
- All feature access codes are common to all tenants.
- All extension numbers and access codes are limited to a maximum of three digits.
- Each extension trunk and trunk group is assigned a tenant number.
- A maximum of 12 trunk groups and 12 hunt groups may be assigned per PBX. Any trunk group or hunt group may be assigned to any tenant, but tenants cannot share groups.
- A maximum of 16 COS may be defined per PBX, any tenant may be assigned any COS.
- A maximum of one Meet-Me Conference per tenant.
- The same time and date display is shown on all consoles. Any console may change the display.
- TAFAS is not restricted to tenants, but one tenant cannot answer calls to another tenants trunks. It is recommended that tenants do not share common Night Bells.
- All alarm calls appear on both consoles.
- Any attendant may answer an alarm call.
- Tenant Service is mutually exclusive with the following features -
  Call Blocking button and the Do not Disturb button
  Controlled Station to Station Restriction Setup
  GUEST ROOM Button Enable
  Message Registration Enable
  Controlled Outgoing Restriction Setup

Tenant Service - Shared Consoles

- The attendant cannot make inter-tenant connections within the PABX.
- The Night Service selected by the attendant affects all tenants.
- PAGE button access of the paging system, accesses both paging zones.
- All calls to the attendant show the originating tenant number as the first digit of the SOURCE or DESTINATION display.
- All calls originated from the console must contain the required Tenant Number as the first digit dialed.

Tenant Service - Separate Consoles

- Console 1 is assigned to Tenant 1, this attendant may make and receive cals for Tenant 1 only.
- Console 2 is assigned to Tenant 2, this attendant may make or receive calls for Tenant 2 only.
- Tenants 3 and 4 do not have access to attendant consoles and operate permanently in Night 1 service.
- Each attendant may set up an Attendant Control Conference.
- The Tenant 1 console has access to Page Zone 1.
- The Tenant 2 console has access to Page Zone 2.
- The Tenant 1 console has access to HOLD buttons 1, 2, 3 and 4.
- The Tenant 2 console has access to HOLD buttons 5, 6, 7 and 8.
- No attendant related features or services are available to Tenants 3 and 4. Any extension attempting to access any of these features will receive reorder tone.
- If intercept to the attendant is specified, Tenant 1 will intercept to console 1, Tenant 2 to console 2, and Tenants 3 and 4 to reorder tone.

Programming

- TENANT SERVICE MUST be selected when the programming configuration is initiated. This automatically sets System Option Number 113 (Tenant Service).
- If separate consoles are to be used, System Option Number 114 (Tenant Service - Separate Consoles) must be selected.
- Before programming Extensions, Trunks, Hunt Groups or Trunk Groups, the tenant number must number remains unchanged until a new tenant number is selected.

Operation

Shared Console Operation

To Originate a Call from an Idle Console:

- Dial the desired tenant number - the tenant number followed by " ", is displayed in the DESTINATION display.
- Dial the required feature access code, trunk access code or extension number - the number dialed is displayed after the tenant number.
- Proceed normally. Refer to Console Operation Manual for details.

Note: Common attendant functions (Setting the Digital Clock, Answering An Alarm Signal, etc.) may be selected from the console using any console.

Separate Console Operation

- Console Operation does not differ from single tenant console operation. Refer to Console Operations Manual for details.

Through Dialing

Description

This feature allows the attendant to select an outgoing trunk and connect the extension to the trunk. The call may be completed by the

Conditions

● If toll denial is to be bypassed, the attendant must access the trunk for the extension.

Programming

This feature may be restricted by including either of the following options in the station's COS:

● COS Option Number 59 (Non-CO trunks via Attendant Inhibit).
● COS Option Number 60 (CO trunks via Attendant Inhibit).

Operation

● The extension user lifts handset, and dials the Attendant Access code ("0").
. The attendant answers the call, dials the trunk roup access code, then presses the RELEASE button. The extension may now dial on the trunk.

Description

Tie trunks may be arranged to terminate on the console, at night bells, at extensions, in hunt groups, or they may be Dial-In Tie Trunks. Tandem operation may also be arranged. Tie trunks are arranged in groups in the same way as CO trunks. Extensions have access to tie trunk groups through the extension options selected in their Class of Service. Dial-In Tie Trunks are assigned a Class Service in the same manner as extensions, and thus may be given access to selected PABX features.

Conditions

- Dial-In tie trunks may not access Paging, Hold Pick-Up, Directed Call Pick-Up, and Call Park.

Programming

- Set individual trunk and option switches as required. See SECTION MITL9105/91108-98-200 and 9105/9110-98-205.
- Program trunk information.
- Program trunk group information.
- Program required extension COS options for access to tie trunk groups.
- If access to tie trunks via the attendant is to be restricted, then COS Option Number 59 (Non CO Trunks via Attendant Inhibit) must be included in the COS of the restricted extensions.
- If tie trunks are to be connected to CO trunks via the attendant, then System Option 130 Enable) must be selected.
- If tie trunks are to be connected to other tie trunks via the attendant, then System Option 131 Attendant Non CO Trunk - Non CO Trunk Connect Enable) must be selected.
- If System Option 149 (Call Forwarding - Busy, System) is selected, calls to busy extensions are forwarded to the attendant.
- If System Option 150 (Call Forwarding - Don't Answer, System) is selected, calls to unanswered extensions are forwarded to the attendant.

Operation

- None

Timed Automatic
Answer Supervision

Description

This option allows answer supervision to be given to an incoming dial-in tie trunk accessing a CO trunk. Answer supervision may be supplied by the CO or the PBX after a timeout of 10 seconds.

Conditions

- If System Option 206 (inhibit Automatic Supervision) is enabled only supervision from the CO will be given from the CO trunk,

Programming

- None

Operation

- None

Toll Restriction

Description

Toll restriction denies an extension or Dial-in Tie Trunk the ability to make toll calls. Toll denial may be specified to be active on the first, or first and second digits dialed. Toll calls are defined as those calls which have a 0, 1, * or #, as the first or second digit after the trunk access code has been dialed, or as calls which receive toll supervision. Denial may be specified o be active on the first and second digits dialed (see SECTION MITL9105/9110-98-212).

Conditions

- To implement toll restriction it is recommended that Wait for Dial Tone be specified in the Trunk Group Type.
- Toll denial must be programmed both on extensions and on trunk groups in order to be effective. This allows toll denial on a trunk group

Programming

- Program toll deny for trunk groups which will be restricted.
- If Toll Denial is to be implemented on detection of Toll Reversal, the first digit of the Trunk Group Type must be entered as 3.
- Program toll deny for dial-in tie trunks which will be restricted.
- Program toll deny for extensions which are to be restricted.
- If toll denial is to be active only on the first digit dialed, select System Option 155 (First Digit Toll Deny).

Operation

- None

Tol l Reversal

Description

Trunk Groups may be programmed to indicate that a reversal on a trunk represents a toll call detection by the Central Office. The first digit of the Trunk Group must be programmed as a type 3 (see the Trunk Group programming form SECTION MITL9105/9110-98-205).

Conditions

- None

Programming

- The First digit of Trunk Group Type must be 3 see SECTION MITL9105/9110-98-205.

Operation

- None

Traffic   Measurement
Generic 204

Description

Traffic measurements can be made using Generic 204 PABX, and the results presented at a RS232 format port for subsequent printout on a suitable output device (e.g. printer or magnetic tape unit). The types of measurements made include the following:

- Trunk Group peg usages.
- Incoming trunk peg counts and usages.
- Console traffic data counts.
- System elements usage data.

information is accumulated during a 1 hour block, and are then available for printout. The start time and number of consecutive data blocks during each day is specified from the attendant's console. The manner in which the data is to be output is selected by System Options. The system provides the following two mutually exclusive features programmable by the selection of the appropriate system option:

- Polling by external devices.
- Automatic   data   printout.

For a full description of traffic measurement refer to SECTION MITL9105/9110-98-450.

Transfer Dial Tone

Description

Selection of this option returns transfer dial tone in place of regular dial tone. This occurs when extension flashes the switchhook to put an established call on Hold in order to Park, Consult or Transfer the call. Regular dial tone is 350/440Hz continuous tone, Transfer dial tone is 350/440Hz, three bursts of 100ms on, 100ms off, followed by continous tone.

Conditions

- None

Programming

- Select System Option 101 (Transfer Dial Tone).

Operation

- None

**Trunk Answer From
Any Station (TAFAS)
Available During the
Day**

Description

TAFAS Available During the Day allows incoming trunk calls to ring common alerting device(s) when the system is in day set-vice. Any extension user, with the appropriate COS, may answer the call by dialing the required access code. The answering extension may exercise any feature associated with incoming calls that are normally available at the extension. See TAFAS available during night service.

Conditions

- Extensions cannot flash, then dial a TAFAS code.

If a call is picked up (in day service) by TAFAS, then is transferred to an extension which does not answer, it will recall to the original station, not to the console.

Programming

- Select System Option 104 (TAFAS Available During the Day).
- See TAFAS Night.

Operation

- See TAFAS (Night Service).

**Trunk Answer From
Any Station (TAFAS)
(Night Service)**

Description

TAFAS allows incoming calls, normally directed to the attendant, to appear also at a common alerting device when the system is in night service, (or when TAFAS day service has been specified, see TAFAS Available During the Day). TAFAS enables any extension user with the correct COS to answer incoming calls appearing at the common alerting devices. TAFAS 1, 2 and 3 access codes are used to answer calls ringing at common alerting devices 1, 2 and 3. The TAFAS ALL access code allows the user to answer any call appearing at any alerting device. The answering extension may exercise any feature associated with the incoming call that is normally available at that extension.

Conditions

- A maximum of three individual TAFAS groups are available.
- Calls to common alerting devices will ring the console on their assigned LDN if the console handset or headset is not removed.

Programming

- The COS of answering extensions must include Option Number 54, (TAFAS Access).
- Access codes must be assigned to the required TAFAS features.
  Feature Number 14 - answer all TAFAS Groups
  Feature Number 15 - answer TAFAS Group 1
  Feature Number 16 - answer TAFAS Group 2
  Feature Number 17 - answer TAFAS Group 3
- Trunk group NIGHT assignment must include assignment to Bell 1, 2, or 3.

Operation

- An incoming CO trunk call, causes the common alerting device and the console (if handset is plugged in) bell to ring.
- At extension, lift handset - dial tone is returned.
- Dial the TAFAS code - converse with the incoming trunk.

**Trunk Busy-Out
Enable**

Description

Selection of this option allows the attendant to make a trunk busy to prevent access to the trunk, and to remove the busy condition as required. If this option is not selected the attendant may still access individual trunks, but is unable to force them into a busy condition.

Conditions

- None

Programming

- Select System Option 127 (Trunk Busy-Out Enable).

Operation

To Busy-Out a trunk:

- Dial ✳ 9 followed by the individual trunk access code (trunk equipment number).
- Dial *
- Press the RELEASE button - the trunk is made busy.

To make a Trunk Non-Busy:

- Dial ✳ 9 followed by the individual trunk access code.
- Dial #
- Press the RELEASE button - the trunk is made non-busy.

Note: A trunk may also be busied out by the trunk busy out switches on the Trunk Circuit card (see MITL9105/9110-98-500 and MITL9105/9110-98-200).

Trunk Groups

Description

This feature controls extension access to selected Trunk Groups. An extension has access to all trunk groups specified in its COS by dialing the assigned access code. See Trunk Groups - Two Types

Conditions

- A maximum of 12 individual trunk groups are available.
- A trunk may only be a member of one trunk group.
- All trunks within a trunk group must be of the same type.
- An overflow trunk group should contain trunks of the same type as the overflowing trunk group.
- Trunks must be programmed before trunk groups.

Programming

- Assign required trunk group types, access codes, toll denial and overflow information for each trunk group (See SECTION MITL9105/9110-98-210).
- The COS of the extension must contain the option numbers of the trunk groups (Option Numbers 65-76) to which access is allowed (See SECTION MITL9105/9110-98-210).
- If the extension is not permitted to overflow from one trunk group to another, the COS of the extension must contain Option Number 52 (Do Not Overflow).

Operation

- None

**Trunk Groups - Two
Types
Generic 203**

Description

This feature allows trunk group hunting to be setup as; terminating or circular. If the trunk group is programmed as a terminating group, trunks are always selected in a predetermined order. If the trunk group is programmed as a circular group, trunks are selected in a distributed manner, the next free trunk being the new first choice.

Conditions

- **None**

Programming

- See Trunk Groups for programming information.

Terminating

- **All members of the trunk group are unique and are entered in the hunting sequence required.**

Circular

- **When programming a circular trunk group the last entry in the trunk group must be identical to the first entry.**

Operation

- **None**

Trunk Recall Partial
Inhibit

Description

By selecting this option all switchhook flashes that occur while an extension is on a trunk will be partially inhibited. This will avoid the system mistaking a hang-up for a switchhook flash and ringing the extension back (i.e. phantom ringback).

Conditions

- System Option 183 (Trunk Recall Partial Inhibit) is mutually exclusive with Call Park.

Programming

- Select System Option 183 (Trunk Recall Partial Inhibit)

Operation

- None

Trunk -to-Trunk
Connections
(Attendant)

Description

This feature allows the attendant to connect any two trunks together, then release them from the console. The trunks involved may be CO and/or Non-CO trunks depending on the system options selected.

Conditions

- All trunks involved must provide release supervision in order to assure trunk release. Lack of release supervision will result in trunks being "hung up".

Programming

- If the attendant is to be able to connect CO trunks to CO trunks, select System Option 129.
- If the attendant is to be able to connect CO trunks to Non CO trunks, select System Option 130.
- If the attendant is to be able to connect Non CO trunks to Non CO trunks, select System Option 131.
- Any combination of the above System Options may be selected, providing complete flexibility.

Operation

- Answer the incoming trunk call.
- Dial the access code for the outgoing trunk group required.
- Oial the required number.
- When the called party answers, announce the call.
- Press the RELEASE button.

Trunk -to -Trunk
Connections •
Extensions

Description

This feature allows an extension user who has an established trunk call to hold the call and dial a second trunk. The user may then converse privately with the third party, transfer between parties or form a three party conference. This feature may be inhibited on an extension or on a system basis.

Conditions

• At least one extension in the conference must remain in the connection.

Programming

• Seiect System Options 107 (Can Flash on an Incoming Trunk) and 108 (Can Flash on an Outgoing Trunk).
• COS of extension must include the required trunk group Option Numbers (65 through 76).

Operation

• Establish a two party trunk call.
• Flash the switchhook • the first party is put on hold, dial tone is returned.
• Dial the required trunk group access code and directory number • two way conversation with the third party.
• Flash the switchhook to connect the held trunk to the existing call and form a three party conference (if COS option 49 is assigned) or to alternatively talk to each party (if COS Option Number 48 is assigned).

**Vacant Number
Intercept to the
Attendant**

Description

Selection of this option causes all calls other than DID, CCSA or Dial-In Tie Trunk calls to vacant numbers or levels to be routed to the attendant for completion. If this option is not selected these calls receive reorder tone.

Conditions

- During Night Service, reorder tone is provided to extensions dialing vacant numbers or levels.

Programming

- Select System Option 115 (Vacant Number Intercept to the Attendant).

Operation

- None

Variable Timers

Description

Some timeout periods switchhook flash times (switchhook flash recognition) and recall may be programmed.

Conditions

· If no System Option is selected all timeouts default to standard timing.

Programming

For a Message Registration Timer of 20 seconds select System Option 158.

For a Message Registration Timer of 40 seconds select System Option 159.

For a Park or Hold Recall of 2 minutes select System Option 151.

For a Park or Hold Recall of 4 minutes select System Option 152.

For an Attendant Timed Recall Camp-On of 20 seconds select System Option 139.

For an Attendant Timed Recall Camp-On of 40 seconds select System Option 140.

For an Attendant Timed Recall Don't Answer of 20 seconds select System Option 141.

For an Attendant Timed Recall Don't Answer of 40 seconds select System Option 142.

For an Attendant Timed Recall Hold of 20 seconds select System Option 145.

For an Attendant Timed Recall Hold of 40 seconds select System Option 146.

For a Night Service Timeout of 20 seconds select System Option 147.

For a Night Service Timeout of 40 seconds select System Option 148.

For a Call Forwarding-Don't Answer Timeout of 20 seconds select System Option 149.

For a Call Forwarding-Don't Answer Timeout of 40 seconds select System Option 150.

For a Single Digit Dialing Timeout of 3 seconds select System Option 177.

For a Single Digit Dialing Timeout of 5 seconds select System Option 178.

For a Switchhook Flash Timer of .7 seconds select System Option 180.

For a Switchhook Flash Timer of .9 seconds select System Option 181.

For a Switchhook Flash Timer of 11 seconds select System Option 182.

Operation

• None

220Vac Operation

Description

Both the SX-IOO/SX-200 PABXs can operate from a 220Vac commercial power source. The SX-200 requires a mechanical strapping done by an authorized MITEL service representative. The SX- 100 incorporates an optional 220Vac adapter (MITL9110-047). For further information see SECTION MITL9 105-98- 150.

Conditions

- None

Programming

- None

Operation

- None

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Issue 4, June 1980

SX-1oo*
SUPERSWITCH*
ELECTRONIC PRIVATE AUTOMATIC BRANCH EXCHANGE
PHYSICAL DESCRIPTION AND ORDERING INFORMATION

CONTENTS   PAGE

1. GENERAL

Introduction

1.01 This section contains a brief description of the SX-100 Electronic Private Automatic Branch Exchange (PABX), the features and ser-

vices provided, and the equipment ordering information.

Reason for Reissue

1.02 This section has been reissued to incorporate Generic 205 information.

2. GENERAL DESCRIPTION

System Description

2.01 The SX-100 Electronic PABX is an electronic switching system with a capacity of 160 ports. One hundred and twelve of these ports are available for assignment to lines, trunks and additional receivers. The remainder are reserved for control and special functions. The system is electrically compatible with most existing station, key telephone, Private Branch Exchange (PBX) and Central Office (CO) equipment and provides:

- the use of a flexible numbering plan

- the simultaneous use of DTMF and rotary dial stations

- optional use of attendant consoles-2 maximum

- extensive selection of standard and optional features

- freedom from scheduled maintenance

- automatic diagnostics

- six power fail transfer circuits

- optional reserve power supply

2.02 The SX-100 consists of a single cabinet (containing the switching equipment and

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the system power supplies) and a cordless desk type attendant console equipped with pushbutton dial pad and control keys. The equipment cabinet may be either free standing or wall mounted.

2.03 All connections from the cross-connecting frame to the SX-100 equipment are made using 25 pair connectorized cables. Connections between the cross-connecting frame, the attendant console and external equipment are made in accordance with accepted practice.

2.04 A reserve power supply is available as an option. It is designed to maintain system operation for a minimum of two hours in the event of a commercial power failure.

2.05 Figure 2-1 shows a diagrammatic representation of the SX-100 system configuration.

SX-100 Free Standing or Wall Mounting Equipment Cabinet

2.08 The SX-100 equipment cabinet (Fig. 2-2) is of welded steel construction and measures

16.62in. (422mm) high, 25in. (635mm) wide, and 18.5in. (470mm) deep. A fully equipped cabinet weighs approximately 70lbs (31.8kg). The door on the front of the cabinet provides access to the system maintenance panel, printed circuit cards and primary power supply controls. Access to the line and trunk connectors and the power supply cable harness is provided by removing the rear panel. Cable entry to the equipment cabinet is provided through cable duct at the rear of the cabinet.

Rack Mounting Equipment Shelf

2.07 The SX-100 may be mounted in a standard 23in. (584.2mm) equipment rack with an allowance of 16.62in. (422.1mm) for height and 18.5in. (470mm) for depth. The SX-100 is supported by two mounting brackets extending equally out the front and back of the rack. After cable installation the system is covered by a metal cover for protection.
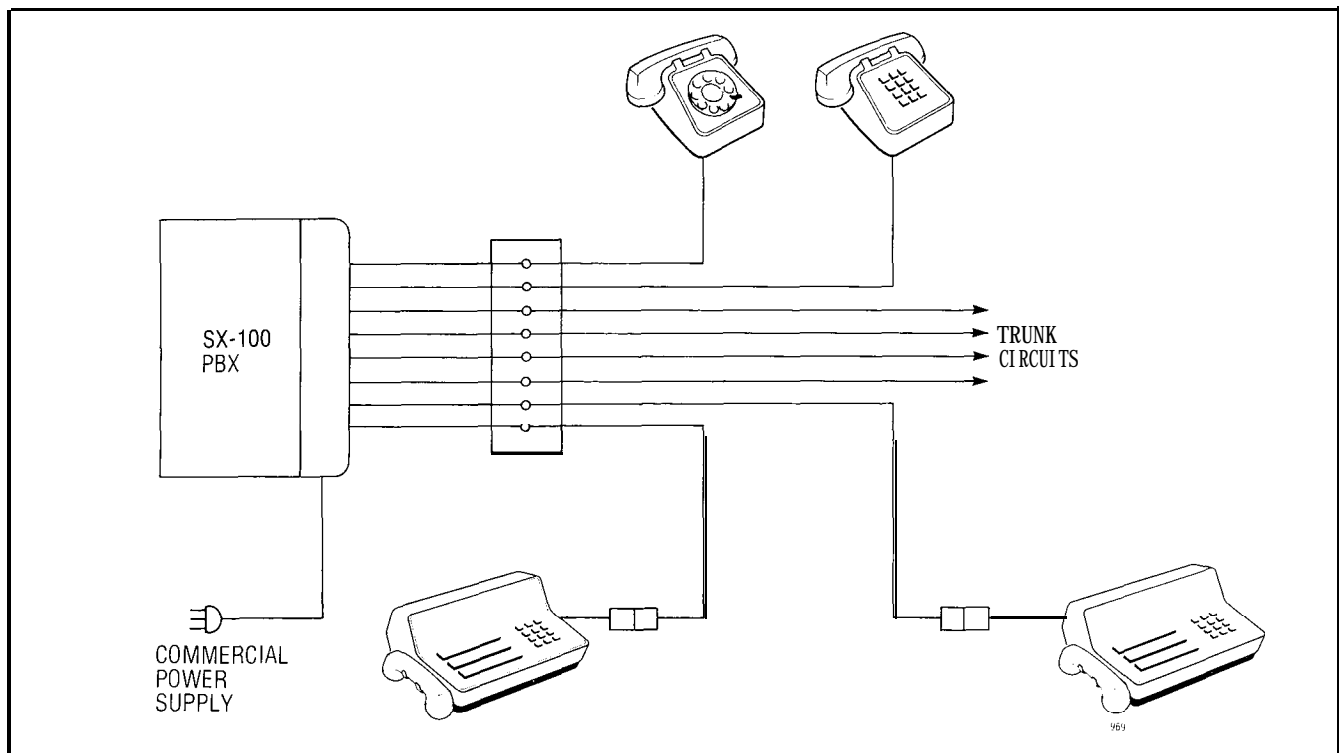
Fig. 2-1   SX-100 System Configuration
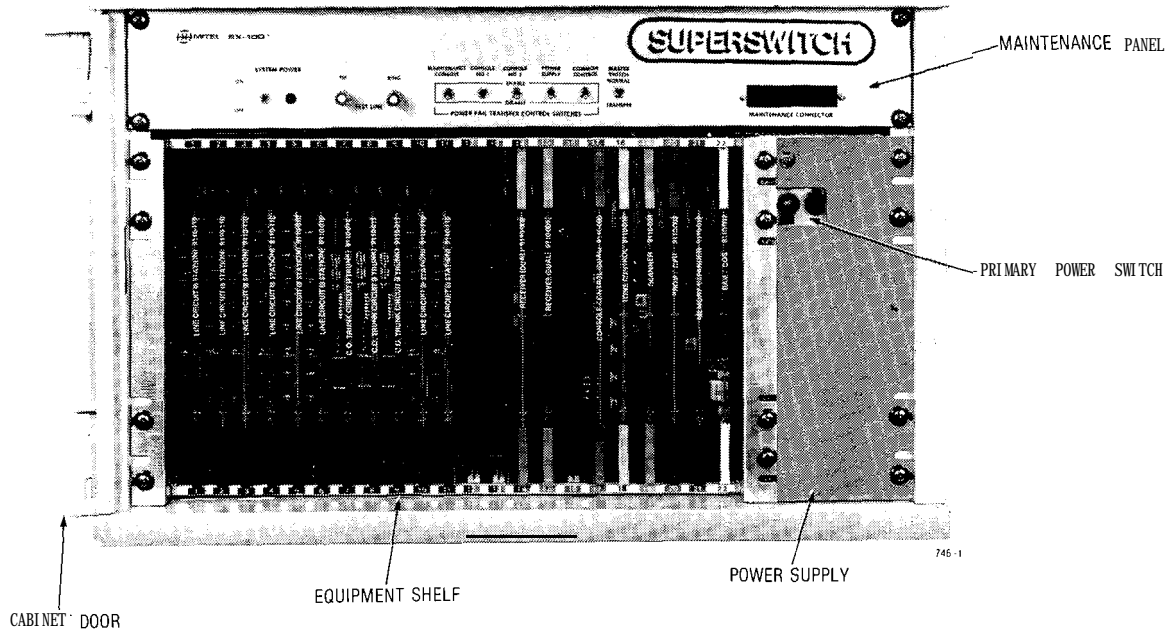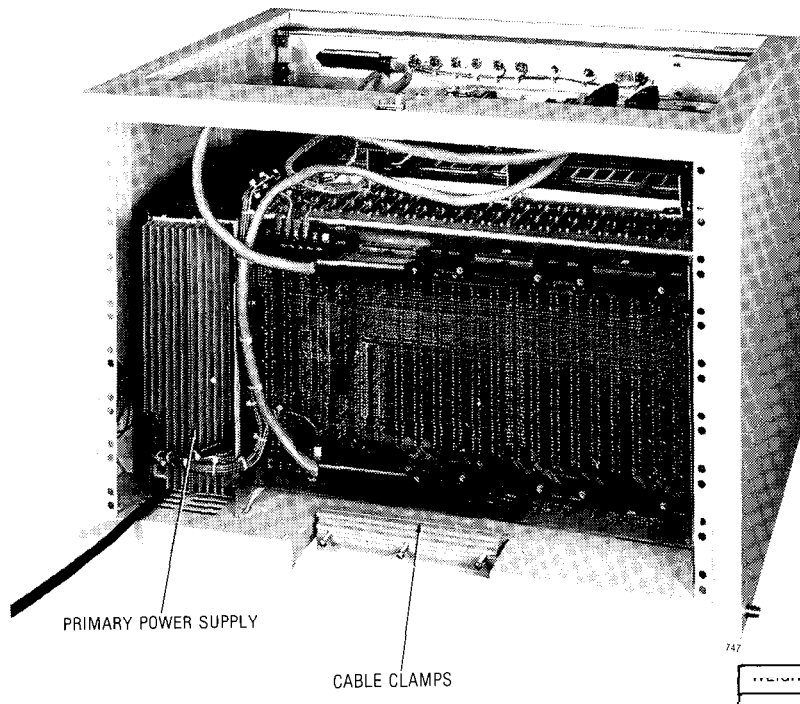
FRONT VIEW

CABINET DOOR

EQUIPMENT SHELF

POWER SUPPLY

MAINTENANCE PANEL

PRIMARY POWER SWITCH

PRIMARY POWER SUPPLY

CABLE CLAMPS

REAR VIEW

HEIGHT	HEIGHT	WIDTH	DEPTH
70lbs (31.8kg)	16.62in. (422mm)	25.0in. (635mm)	18.5in. (470mm)

Fig. 2-2 Equipment Cabinet
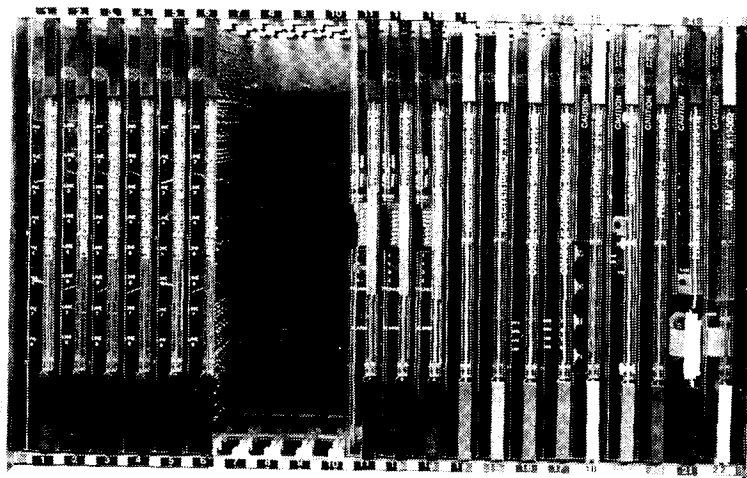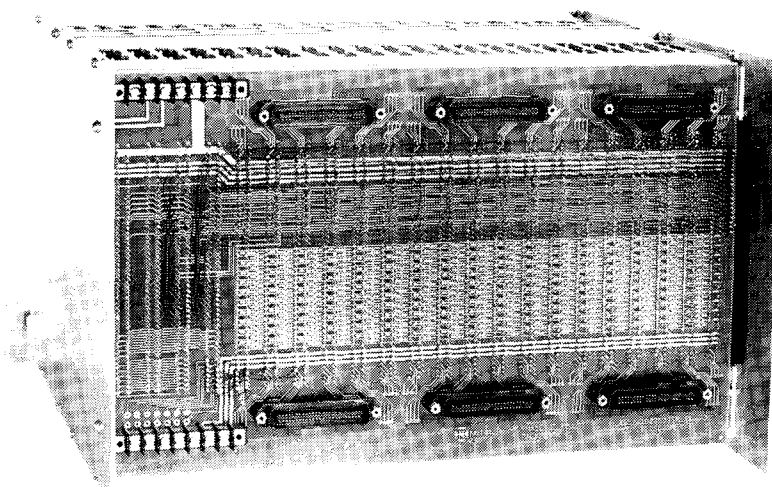
Fig. 2-3 Equipment Shelf
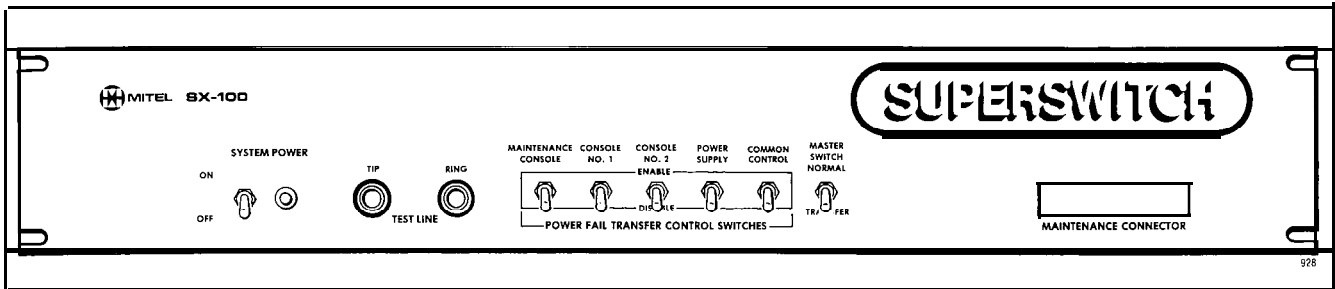
Fig. 2-4 Maintenance Panel

Maintenance Panel

2.08 The maintenance panel (Fig. 2-4) measures 3.50in. (88.9mm) high, 23in. (584.2mm) wide, and 2.0in. (50.8mm) deep with a total weight of 1.5lbs (.682kg). The maintenance connector on the right of the panel permits the service personnel to perform maintenance tasks and enter new, or modify existing customer data using the maintenance console. The test line terminals on the panel allow the use of a standard hand test-set (butt-in) to establish calls through the system using preselected circuits. The power switch controls the application of power to the equipment shelves.

Equipment Shelf

2.09 The equipment shelf (Fig. 2-3) holds up to 22 printed circuit cards which plug into the shelf back plane. On the rear of the back plane are a number of connectors providing interconnections between the shelf and external equipment. In addition to these connectors are a number of screw down terminals allowing shelf connection to the primary power supply unit. The equipment shelf measures 10.75in. (273mm) high, 19in. (480mm) wide, 16.375in. (415mm) deep and weighs approximately 27lbs (12.2kg) fully equipped.

Printed Circuit Cards

2.10 All circuit cards (see Fig. 2-5) within the SX-100 are identical in construction and consist of a fiberglass board with printed wiring patterns on both of its faces. Rivetted to the front of each board is a transparent faceplate which allows the LEDs mounted on the front of the boards to be easily seen. The two color-coded

card extractors located at the top and bottom of the faceplate, identify the card position (see Table 2-1) within a shelf and ensure that the card is seated correctly in the backplane connector. Those cards which should not be removed from the equipment shelves with power on carry a CAUTION notice to that effect.
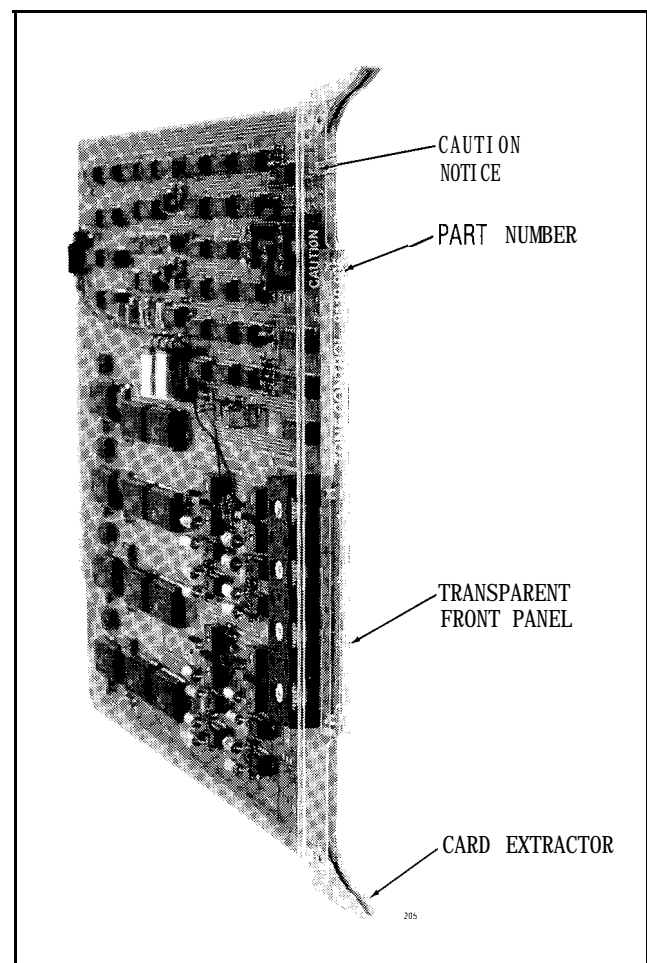
Fig. 2-5 Typical Printed Circuit Card

Primary Power Supply

2.11 The system primary power supply (Fig. 2-6), is to the right of the equipment shelf and provides all system power from a 115Vac 60Hz commercial supply. The power switches, located on the power supply face plate, allows all power to be removed from the system.

Reserve Power Supply

2.12 The batteries and the charger are housed in a metal encasement that forms a pedestal for the SX-100 cabinet weighing approximately 125lbs. (56.7kg).

Attendant Console

2.13 The SX-1001200 attendant console (see Fig. 2-7) is enclosed in a housing with a black faceplate. Located on either side of the console are a pair of headset/handset jacks allowing simultaneous operation and supervision. The console keyboard holds three rows of ten nonlocking keys for the selection of features and completion of calls. On the right of the keyboard is a 12-key pushbutton dial pad. The console display, mounted above the keyboard, displays the active states of calls in progress. In addition to the call status display is a busy lamp field, a trunk group status field, a call waiting indicator, a digital

clock, and three alarm indicators. The weight of the attendant console is approximately 13lbs (5.9kg) and its dimensions are 13.75in. (350mm) wide, 6.8in. (176mm) high and 9.25in. (236mm) deep. A complete description of the attendant console is contained in Section MITL9105/9110-98-300 and the description of the Hotel/Motel console is given in Section M ITL9105/911 o-98-305.

Maintenance Console

2.14 The construction of the maintenance console is identical to that of the attendant console; the only difference is in the functions of the call and feature selection keys. A complete description of the maintenance console is given in Section MITL9105/9110-98-310 Maintenance Console Description.

Features

2.15 Features are provided in the SX-100 in the form of Feature packages (Generics). Table 2-2 lists the contents of these Generics.

Feature Provisioning

2.18 All station features provided by the SX-100 may be grouped into different classes of service. Each class of service (a maximum of 16)

TABLE 2-1
CIRCUIT CARD COLOR CODE AND CARD POSITION

Circuit Card Name	Color Code	Card Position Shelf 1
RAM/COS	White	22
MEMORY EXPANDER	Brown	21
PROM/RAM EXPANDER	Brown	21
PROM/CPU	Red	20
SCANNER	Orange	19
TONE CONTROL	Yellow	18
CONSOLE CONTROL (DUAL)	Green	17,16
REMOTE CONTROL- PABX (RCP)	Green	16 see note 1
RECEIVER (DUAL OR QUAD)	Blue	15 see note 2
LINE CIRCUIT (8 STATION)	Black	1 through 14
TRUNK CIRCUIT (4 TRUNK)	Black	1 through 14
TRUNK CIRCUIT (2 TRUNK)	Black	1 through 14

NOTES: 1. The Remote Control PABX card is supplied only when required for use with RMAT Systems (Section MITL9105/9110-98-101). It occupies the slot normally used for the second console control card.

2. If additional receiver cards are used, they must be placed in the following card positions on shelf 1 — second receiver position 14, third receiver position 13, and fourth receiver position 12.
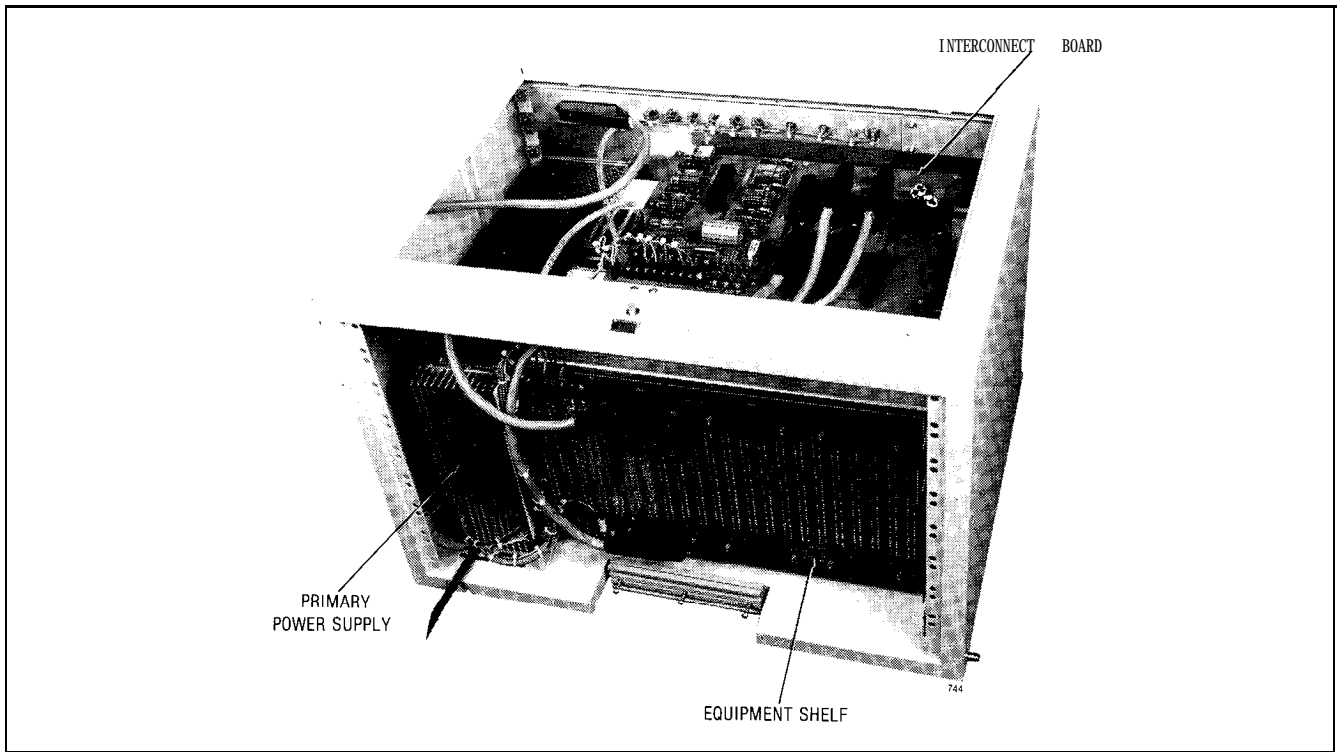
Fig. 2-8   Primary Power Supply

Fig. 2-7 Attendant Console

TABLE 2-2
SYSTEM FEATURES

Feature	202	203	204	205
Account Codes				▲
Alphanumeric Display for Attendant Position	•	•	•	•
Attendant Camp-On	.	.	.	.
Attendant CCSA Access		.	.	.
Attendant Console (Maximum 2)	.	.	.	.
Attendant Control of Trunk Group Access	•	•	•	•
Attendant Controlled Conference		.	.	.
Attendant Flash Over Trunks		.	.	.
Attendant Lockout		.	.	.
Attendant Position (2 Max.)	•	•	•	•
Attendant Transfer. All Calls	.	.	.	.
Automatic Callback Busy/Don't Answer (Station to Station Calls)		.	.	.
Automatic Callback - Busy (Station to Trunk)	•	•	•	•
Automatic Night Service Switching	.	.	.	.
Automatic Queuing to Attendant Position	•	•	•	•
Broker's Call	⌀	⌀	⌀	⌀
Busy Lamp Field				
Busy Verification of Station Lines	•	•	•	•
Call Forwarding - All Calls	.	.	.	.
Call Forwarding - Busy And Don't Answer	•	•	•	.
Call Forwarding - Busy Line (DID)		.	.	.
Call Forwarding - Don't Answer (DID)		.	.	.
Call Hold		.	.	
Call Pick-Up		.	.	.
Call Waiting Service				
Attendant Call Waiting	.	.	.	.
Terminating Call Waiting	.	.	.	.
Distinctive Tone Signals	.	.	.	.
Calling Number Display to Attendant	.	.	.	.
Calls Waiting Indication at Attendant Position	•	•	•	•
CCSA Access				
Class of Service Display to Attendant	.	.	.	.
Code Calling Access	.	.	.	.
Code Restriction		.	.	.
Conference Calling	.	.	.	.
Contact Monitor†	.	.	.	.
Controlled Outward Restriction		.	.	.
Controlled Station-To-Station Restriction			•	.
Controlled Termination Restriction		.	.	.
Controlled Total Restriction		.	.	.
Data Restriction	.	.	.	.
Date Display on Console(s)	.	.	.	.
Diagnostics - Automatic	.	.	.	.
Dial Access to Attendant	.	.	.	.
Digital Clock on Attendant Position	.	.	.	.
Direct Department Calling (DDC)	.	.	.	.
Direct Inward Dialing (DID)	.	.	.	.
Direct Outward Dialing (DOD)	.	.	.	.
Direct Termination of Miscellaneous Circuits On Attendant Position (Paging)†	.	.	.	
Direct Trunk Group Selection (DTGS)	.	.	.	.
Directed Call Pick-Up	.	•	.	.
Hold-For-Pick-Up Option	.	.	.	.
Distinctive Ringing	.	.	.	.
DTMF And/Or DCKP On Attendant Position	•	•	•	•
DTMF Calling	.	•	•	•
DTMF To Dial Pulse Conversion	.	.	.	.
Dump and Load of Customer Data		.	.	.
Executive Override	.	.	.	.
Flash for Attendant	.	.	.	.
Flexible Numbering of Stations	.	•	•	•
Foreign Exchange (FX) Access	.	.	.	.

Feature	202	203	204	205
Fully Restricted Station	.	.	.	.
Identified Trunk Group			.	.
Immediate Audible Ring on Attendant Handled Calls	.	.	.	.
Immediate Ring		.	.	.
Incoming Call Identification (ICI)	.	.	.	.
Indication of Camp-On	.	.	.	.
Intercept Treatment				
Attendant Intercept	.	.	.	.
Intercept Tone	.	.	.	.
Interposition Calling	.	.	.	.
Interposition Transfer	.	.	.	.
Inward Restriction		.	.	.
Line Lockout With Warning	.	.	.	.
Listed Directory Number (LDN) Service	•	•	•	•
Loudspeaker Paging†				
Direct Access by Attendant	.	.	.	.
Dial Access	.	.	.	.
Multizone	.	.	.	.
Priority Paging	.	.	.	.
Main/Satellite Service		.	.	.
Manual Originating Line Service	.	.	.	.
Manual Terminating Line Service	.	.	.	.
Meet Me Conference	.	.	.	.
Message Waiting (Audible)	.	.	.	.
Message Waiting (Lamp)		.	.	.
Miscellaneous Trunk Restriction	.	.	.	.
Multiple Listed Directory Numbers (LDN)	•	•	•	•
Multiple Access Codes on a single trunk group (10 max.)			•	•
Music On Hold†	.	.	.	.
Music on Attendant Position Hold†	•	•	•	•
Night Console Position	.	.	.	.
Night Service				
Fixed	.	.	.	.
Flexible	.	.	.	.
Night Station Service Fixed Service	•	•	•	•
Night Station Service - Full Service	•	•	•	•
Origination Restriction	.	.	.	.
Outgoing Trunk Call Back	.	.	.	.
Outgoing Trunk Camp-On	.	.	.	.
Outgoing Trunk Queueing	.	.	.	.
Outward Restriction	•			
Power Failure Transfer - Station	.	.	.	.
Priority Queue	.	.	.	.
Privacy and Lockout	.	.	.	.
Radio Paging Access†	.	.	.	.
Recall Dial Tone	.	.	.	.
Recorded Telephone Dictation Access†	•	•	•	•
Remote Access to PBX Services	.	.	.	.
Remote Administration and Maintenance (hardware option)	.		.	.
Re-ring From Toll (on Toll Terminal)	•	•	•	•
Reserve Power (hardware option)	.	.	•	.
Room Audit				
Room Status		.	⌀	⌀
Rotary Dial Calling	•	•	•	•
Route Advance	•	•	•	•
Saved Number Redial				.
Serial Call	.	•	.	.
Sharing (4 Tenant)	•	.	.	⌀
Shared Attendant Service	•	⌀	⌀	
Single Digit Dialing (Non-conflicting)	•	•	.	.

† Requires external customer provided equipment

TABLE 2-2
SYSTEM FEATURES (CONT'D)

Feature	202	203	204	205
~~Single-Digit-Dialing~~ (Conflicting)		.	.	.
Speed Call				
System wide				.
Personal				.
Splitting				
One-Way Manual Splitting	•	.	.	.
Two-Way Manual Splitting	.	.	.	.
One-Way Automatic Splitting	.	.	.	.
Two-Way Automatic Splitting	.	.	.	.
Station Hunting				
Terminal Hunting		.	.	.
Circular Hunting		.	.	.
Secretarial Hunting		.	.	.
Station Message Detail Recording				.
Station Message Register Service		.	.	.
Electronic Storage and Display		.	.	.
Internal Charging		.	.	.
Station Override Security		.	.	.
Station-to-Station Calling		.	.	.
Straightforward Outward Completion		.	.	.
Switched Loop Operation		.	.	.
Tandem Tie Trunk Switching			.	.
Termination Restriction	.	.	.	.
Threeway Conference Transfer	.	.	.	.
Through Dialing	.	.	.	.

Feature	202	203	204	205
Tie Trunk Access	•	•	•	•
Timed Reminders				
Toll Restriction				
Battery Reversal	•	•	•	•
011 Access	•	•	•	•
Multi Digit			•	•
Toll Terminal Access	.	.	.	.
Total "Do Not Disturb" Display		.	.	.
Total "Message Waiting" Display		.	.	.
Total "Room Status" Display		.	.	.
Traffic Data Collection†				.
Traffic Display to Customer				.
Transfer into Busy			.	.
Trunk Answer From Any Station	.	.	.	.
Trunk Group Busy (TGB) Indicators on Attendant Position	.	.	.	.
Trunk Status Field	.	.	.	.
Trunk-To-Trunk Connections	.	.	.	.
Trunk Verification by Customer (TVC)	•	•	•	•
Trunk Verification by Station (TVS)	.	.	.	.
Uniform Call Distribution (UCD)	.	.	.	.
Wake-Up Service				.
WATS Access	.	.	.	.
Wideband Data Switching	.	.	.	.
Wide Frequency Tolerant Power Plant	•	•	•	•

† Requires external customer provided equipment

may contain any mixture of features. Feature installation consists of entering into the system memory the number of the station to which the features are to be assigned, followed by the required class-of-service code. All data entries into the system may be made from the attendant or maintenance console. To prevent the loss of customer data in the event of a complete system power failure, the memory holding the data associated with each line or trunk is equipped with its own reserve power supply. This power supply is sufficient to maintain the memory system intact for a period of four weeks.

3. DETAILED DESCRIPTION

General

3.01 Each SX-100 Electronic PABX is completely factory tested prior to packaging and shipment.

3.02 On arrival at the customer's premises, installation consists of unpacking the SX-100, making the required connections between external equipment and the system, and supplying commercial power. System capacity may be increased at any time by the addition of plug-in printed circuit boards.

Basic System

3.03 The basic system consists of the equipment cabinet; maintenance panel; power supply and attendant console. All necessary control circuitry for system and feature operation is included in the basic system.

Attendant Console

3.04 The SX-100 may be operated with or without an attendant console. Consoles may be dedicated to a single customer or shared between customers. If an additional attendant console is required, the console package plus the required console control card should be requested. For single console operation the console control card is located in card position 17. If two consoles are employed, the second control' card is placed in card position 16.
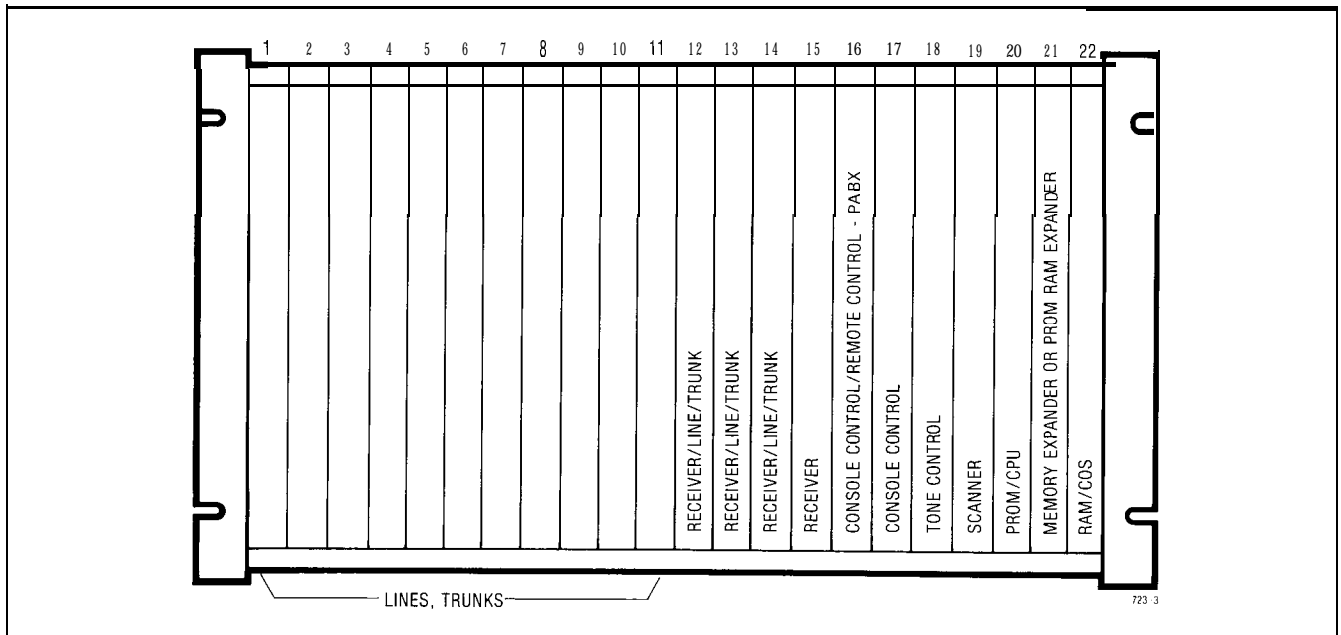
Fig. 3-1 Equipment Shelf

Equipment Shelf

3.05   The equipment shelf contains the five common control cards plus the required number of line, console, trunk, and receiver cards. The common control cards are color coded and held in card positions 18 through 21. These card positions are fixed for all systems. Card positions 1 through 17 may be equipped with line, console, trunk or receiver cards as shown in Figure 3-l.

Equipment Cards

3.06 The number of line, trunk, and receiver cards must be specified to fulfill the individual requirements of each customer. Each line card contains eight independant line circuits. Each trunk card contains two or four trunk circuits depending on the trunk type. The receiver card may contain 2 receiver circuits (dual type) or 4 receiver circuits (quad type). See Fig. 3-2 which shows the maximum configurations of cards.

Reserve Power

3.07   The optionally available reserve power supply consists of a completely enclosed housing, which contains the batteries and the charging circuitry. The housing forms a pedestal for the SX-100 cabinet.

Electrical Characteristics

3.08 The SX-100 is designed to operate from a 48Vdc supply which is derived from either the commercial ac supply or a reserve battery supply. Table 3-I details the electrical characteristics of the system.
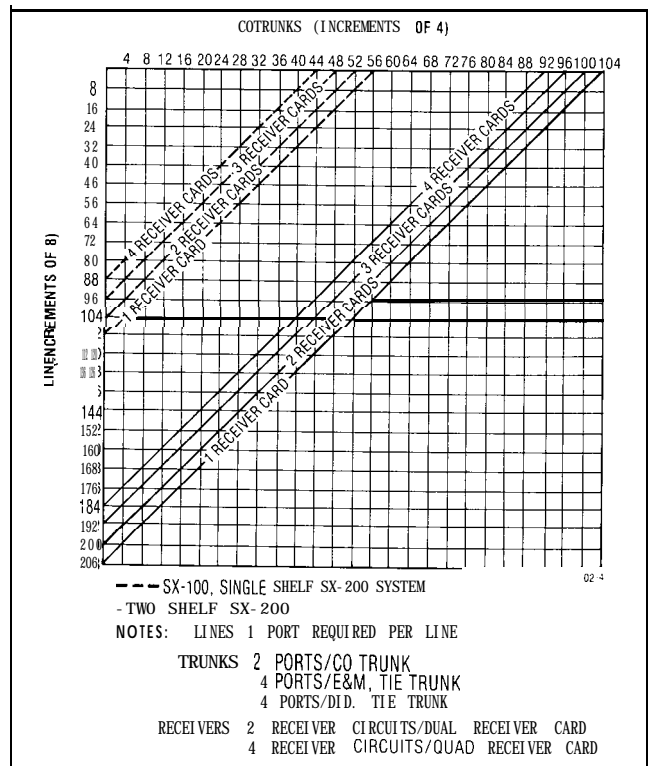
Fig. 3-2 Line/Trunk Configuration

TABLE 3-1
SX-100 ELECTRICAL CHARACTERISTICS

Station Loop Limit	1200 ohms including set
Maximum Number of	
Ringers per Line	7
Ringing	90V, 20Hz · immediate ringing (option of 17Hz or 25H
Standard	1s on, 3s off
Special	0.5s on, 0.5s off, 0.5s on, 2.5s off
Ring Trip	During silent or ringing period
Dial Tone	350/440Hz, continuous
Transfer Dial Tone	350/440Hz, 3 bursts of 100ms, then continuous
Busy Tone	480/620Hz, interrupted at 60ipm
Special Busy Tone	350/440Hz interrupted at 60ipm
Standard Ringback Tone	440/480Hz, 1s on, 3s off
Special Ringback Tone	440/480Hz, 0.5s on, 0.5s off, 0.5s on, 2.5s off
Callback	6 rings of standard ringing
Reorder Tone	480/620Hz, interrupted at 120ipm
Conference Tone	440Hz, 1 burst of 1s
Camp-On Tone	440Hz, one burst of 200ms for station camp-on
	440Hz, two bursts 100ms on, 50ms off, 100ms on
	for trunk camp-on
Override Tone	440Hz, one burst of 800ms followed by a 200ms
	burst every 6s
Crosstalk Attenuation	75dB minimum
Insertion Loss,	
Station-to-Station	5dB ± 0.5dB at 1004Hz
Station-to-Trunk	0.5dB ± 0.3dB at 1004Hz
Trunk-to-Trunk	0.5dB ± 0.3dB at 1004Hz
Tie Trunk to Station on Non-VNL Trunk	2.5dB ± 0.3dB at 1004Hz
Longitudinal Balance	54dB minimum, 200-3000Hz
Return Loss	14dB minimum
Idle Circuit Noise	16dBrnC maximum
Impulse Noise	No counts over 46dBrnC
Envelope Delay Difference	200μs maximum
System Impedance	600 ohms nominal for lines
	600 or 900 ohms nominal for trunks
Traffic Capacity	7.5ccs/line minimum at 100 lines at P = 0.01
Primary Power	100-125V, 47-63Hz, 4A maximum
Central Office	
Trunk Loop Limit	1600 ohms
Maximum Distance of	
Console from Equipment	1000ft. (300m) of 26AWG cable
Operating Environment	0°C to 40°C, 10% to 90% Relative Humidity

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4. ORDERING INFORMATION

General

4.01 The following information is provided for ease of ordering the SX-100 equipment. Table 4-1 lists all basic systems and re-quirements. Table 4-2 is a form which may be used to determine what items are required to meet the customers needs. Table 4-3 lists available software packages. Table 4-4 shows detailed system configurations which may be ordered. Table 4-5 is a description of the content of the software packages. Table 4-6 covers all additional equipment which may be ordered according to customer requirements, while Table 4-7 covers all replaceable parts in sequential order. Table 4-8 shows the main documentation packages. Their relationship to one another is shown in Table 4-10. Table 4-9 lists Mitel Action Procedures (MAPs) which may be issued in connection with work to be done as indicated by the MAP title. Table 4-l 1 is the RMAT Documentation package.

Systems

4.02 Basic Systems A number of different basic systems are available to accomodate different requirements. The basic systems differ in various items shown in Table 4-l.

4.03 Line Cards

$$\text{number of line cards} = \frac{\text{number of extensions}}{8}$$

4.04 CO · Trunk Cards

$$\text{number of CO · trunk cards} = \frac{\text{number of CO · trunks} + \text{number of misc. CO type trunks}}{4}$$

4.05 E&M Trunk Cards

$$\text{number of E\&M trunk cards} = \frac{\text{number of E\&M type trunks}}{2}$$

4.08 DID/TIE Trunk Cards

$$\text{number of DID/TIE trunks cards} = \frac{\text{number of loop DID/TIE trunks}}{2}$$

4.07 Receiver Cards Order one additional receiver (dual or quad) card if the system has more than forty extensions. For a detailed calculation of the number of receiver cards re-quired refer to Section MITL9105/9110-98-180.

4.08 **Console** Order a console if there is a re-quirement for a second console (maintenance, administrative for Hotel/Motel re-quirements).

4.09 Console Control Card Order one console control card 91 10-006 if a second console is used as an attendant console.

4.10 Miscellaneous Backplane translators (2 per shelf), RS232 adapter (1 per system).

Software

4.11 Software is available in different Generic programs and may be ordered as part of a basic system (see Table 4-l) or separately (see Table 4-3). The software consists of PROM/CPU card and Memory Expander or PROM/RAM Ex-pander card. To order a set of specific software these cards have to be ordered, specifying the software, they should carry. This can be done by either ordering the individual cards or by using the order numbers of Table 4-3.

Parts

4.12 Spare parts and documentation- may be ordered individually according to Table 4-7.

TABLE 4-1
BASIC SYSTEMS

Basic Systems	PROM/CPU	Memory Exp. PROM/RAM Exp.	Software	Console, Console Control	Receiver
9106-I 00-000	no	no	no	yes	1 quad
9106-I 00-202	yes	Mem. Exp.	202	yes	1 quad
9106-I 00-203	yes	Mem. Exp.	203	yes	1 quad
9106-I 00-204	yes	Mem. Exp.	204	yes	1 quad
9106-200-000	no	no	no	yes	1 dual
9106-200-202	yes	Mem. Exp.	202	yes	1 dual
9106-200-203	yes	Mem. Exp.	203	yes	1 dual
9106-200-204	yes	Mem. Exp.	204	yes	1 dual
9106-300-204	yes	PROM/RAM Exp.	204	yes	1 quad
9106-300-205	yes	PROM/RAM Exp.	205	yes	1 quad
9106-400-204	yes	PROM/RAM Exp.	204	yes	1 dual
9106-400-205	yes	PROM/RAM Exp.	205	yes	1 dual
9106-900-290	yes	no	290	yes	no

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NOTES: 1. For a detailed content of each basic system see Table 4-4.
2. A PROM/RAM Expander is required to use the following features of Generic 204.
   - Multi Digit Toll Control
   - Automatic Wakeup

TABLE 4-2
SYSTEM ORDER FORM

Item No.	Quantity	Description
9106-........-000		SX-100 Basic System
9110-018-.......		Software Generic ....
9110-110		Line Circuit
9110-011		CO - Trunk Circuit
9110-013		E&M Trunk Circuit
9110-031		DID/TIE Trunk Circuit
9110-009		Receiver (Dual)
9110-006		Console Control
9110-007-A		Console
9110-046		Backplane Translator
9110-052		RS232 Adapter
9110-017		Remote Control - PABX (RCP)
9110-014		SX-100 Reserve Power Supply

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TABLE 4-3
SOFTWARE PACKAGES

Order #	Description
9110-018-202	Generic 202
911 O-01 8-203	Generic 203
911 O-01 8-204	Generic 204
911 O-l 18-204	Generic 204 Extended
911 O-l18-205	Generic 205
911 O-21 8-290	Generic 290 (RMAT)

TABLE 4-4
SX-100 EQUIPMENT

Description	Order No.	Comments
SX-100 PABX Basic System consisting of one each:-	9106-l 00-XXX	XXX . . . . defines software 202, 203, or 204
Equipment Cabinet	9105-001	Includes Power Distribution Cable 9105-027
Primary Power Supply	9105008	
Power Fail Transfer/ Cable Interconnect Card	9105-023	
Maintenance Panel	9105-025	
Equipment Shelf	9110-112	
RAM/COS Card	911 O-002	includes RAM Battery Pack 9110-020
Memory Expander Card	911 O-01 9-XXX-YY	Note 1
PROM/CPU Card	911 0-003-XXX-YY	Note 1
Scanner Card	911 O-004	
Tone Control Card	911 O-005	
Console Control Card	911 O-006	
Receiver (Quad) Card	91 10-016	
Console	911 O-007	Includes Console Operating Inst. 91 10-037
System Documentation	911 O-032	

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NOTE 1: If ordered as single item XXX-YY defines software generic and revision level. (e.g. 9110-019-202-01); if only "XXX" is specified but not "YY" the latest revision level will be supplied.

TABLE 4-4
SX-100 EQUIPMENT

Description	Order No.	Comments
SX-100 PABX Basic System consisting of one each:-	9 106-l 00-000	Excluding Software
Equipment Cabinet	9105-001	Includes Power Distribution Cable 9105027.
Primary Power Supply	9105008	
Power Fail Transfer/ Cable Interconnect Card	9105023	
Maintenance Panel	9105-025	
Equipment Shelf	9110-l 12	
RAM/COS Card	911 O-002	Includes RAM Battery Pack 9110-020
Scanner Card	911 O-004	
Tone Control Card	911 O-005	
Console Control Card	911 O-006	
Receiver (Quad) Card	9110-016	
Console	911 O-007	Includes Console Operating Inst. 91 10-037

TABLE 4-4
SX-100 EQUIPMENT

Description	Order No.	Comments
SX-100 PABX Basic System consisting of one each:-	9106-200-XXX	XXX . . . . defines software 202, 203, or 204
Equipment Cabinet	9105-001	Includes Power Distribution Cable 9105027
Primary Power Supply	9105008	
Power Fail Transfer/ Cable Interconnect Card	9105023	
Maintenance Panel	9105-025	
Equipment Shelf	9110-112	
RAM/COS Card	911 O-002	Includes RAM Battery Pack 91 10-020
Memory Expander Card	9110-019-XXX-YY	Note 1
PROM/CPU Card	911 0-003-XXX-YY	Note 1
Scanner Card	911 O-004	
Tone Control Card	911 O-005	
Console Control Card	911 O-006	
Receiver (Dual) Card	911 O-009	
Console	911 O-007	Includes Console Operating Inst. 9110-037
System Documentation	9110-032 (E or F)	

NOTE 1: If ordered as single items XXX-YY defines software generic and revision level. (e.g. 9110-019-202-01); If only "XXX" is specified but not "YY" the latest revision level will be supplied.

TABLE 4-4
SX-100 EQUIPMENT

Description	Order No.	Comments
SX-100 PABX Basic System consisting of one each:-	9106-200-000	Excluding Software
Equipment Cabinet	9105-001	Includes Power Distribution Cable 9105027
Primary Power Supply	9105008	
Power Fail Transfer/ Cable Interconnect Card	9105023	
Maintenance Panel	9105-025	
Equipment Shelf	9110-l 12	
RAM/COS Card	911 O-002	Includes RAM Battery Pack 91 10-020
Scanner Card	911 O-004	
Tone Control Card	911 O-005	
Console Control Card	911 O-006	
Receiver (Dual) Card	911 O-009	
Console	911 O-007	Includes Console Operating Inst. 91 10-037

TABLE 4-4
SX-100 EQUIPMENT

Description	Order No.	Comments
SX-100 PABX Basic System consisting of one each:-	9106-300-XXX	XXX . . . . defines software 204 or 205
Equipment Cabinet	9105-001	Includes Power Distribution Cable 9105027
Primary Power Supply	910.5008	
Power Fai I Transfer/ Cable Interconnect Card	9105-023	
Maintenance Panel	9105-025	
Equipment Shelf	9110-112	
RAM/COS Card	911 O-002	Includes RAM Battery Pack 91 10-020
PROM/RAM Expander Card	9110-119-XXX-YY	(Note 1), Includes RAM Battery Pack 9110-020
PROM/CPU Card	911 0-003-XXX-YY	Note 1
Scanner Card	911 O-004	
Tone Control Card	911 O-005	
Console Control Card	911 O-006	
Receiver (Quad) Card	911 O-01 6	
Console	911 O-007	Includes Console Operating Inst. 9110-037
System Documentation	911 O-032	

NOTE 1:   If ordered as single items XXX-YY defines software generic and revision level. (e.g. 9110-019-202-01); If only "XXX" is specified but not "YY" the latest revision level will be supplied.

TABLE 4-4
SX-100 EQUIPMENT

Description	Order No.	Comments
SX-100 PABX Basic System consisting of one each:-	9106-400-XXX	XXX . . defines software 204 or 205
Equipment Cabinet	9105-001	Includes Power Distribution Cable 9105027
Primary Power Supply	9105008	
Power Fail Transfer/ Cable Interconnect Card	9105-023	
Maintenance Panel	9105-025	
Equipment Shelf	9110-112	
RAM/COS Card	911 O-002	Includes RAM Battery Pack 9110-020
PROM/RAM Expander Card	9110-I 19-XXX-YY	(Note 1), Includes RAM Battery Pack 91 10-020
PROM/CPU Card	911 0-003-XXX-YY	Note 1
Scanner Card	911 O-004	
Tone Control Card	911 O-005	
Console Control Card	911 O-006	
Receiver (Dual) Card	911 O-009	
Console	911 O-007	Includes Console Operating Inst. 9110-037
System Documentation	911 O-032	

NOTE 1: If ordered as single items XXX-YY defines software generic and revision level. (e.g. 9110-019-202-01); If only "XXX" is specified but not "YY" the latest revision level will be supplied.

TABLE 4-4
SX-100 EQUIPMENT

Description	Order No.	Comments
SX-100 RMAT System consisting of:-	9106-900-290	
Equipment Cabinet	9105-001	Includes Power Distribution Cable 9105027
Primary Power Supply	9105008	
Power Fail Transfer/ Cable Interconnect Card	9105023	
Maintenance Panel	9105-025	
Equipment Shelf	9110-112	
RAM/COS Card	911 O-002	Includes RAM Battery Pack 91 10-020
PROM/CPU Card	911 0-003-290-YY	(Note 1)
Scanner Card	911 O-004	
Console Control Card	911 O-006	
Remote Control - Central Card	9110-117	
CO - Trunk Card	9110-011	
Console	911 O-007	Includes Console Operating Inst. 91 10-037
RMAT Documentation	911 O-058	
System Documentation	911 O-032	

NOTE 1: If ordered as single items 290-YY defines software generic and revision level. (e.g. 9110-003-290-01); If only "290" is specified but not "YY" the latest revision level will be supplied.

TABLE 4-5
SOFTWARE PACKAGES

Description	Order Number
Software Generic 202 consisting of: 1 PROM/CPU 1 Memory Expander 1 System Documentation	91 1O-018-202 91 1o-003-202 91 1O-019-202 91 1O-032
Software Generic 203 consisting of: 1 PROM/CPU 1 Memory Expander 1 System Documentation	911 O-018-203 911 o-003-203 911 O-01 9-203 911 O-032
Software Generic 204 consisting of: 1 PROM/CPU 1 Memory Expander 1 System Documentation 1 Console Operating Instructions	911O-O18-204 911 o-003-204 911 O-019-204 911 O-032 911 O-037
Software Generic 204 Extended consisting of: 1 PROM/CPU 1 PROM/RAM Expander 1 System Documentation 1 Console Operating Instructions	911 O-I18-204 911 o-003-204 911 o-1 19-204 911 O-032 911 O-037
Software Generic 205 consisting of: 1 PROM/CPU 1 PROM/RAM Expander 1 System Documentation 1 Console Operating Instructions	911 O-I18-205 911 o-003-205 911 o-1 19-205 911 O-032 911 O-037
Software Generic 290 consisting of: 1 PROM/CPU 1 Remote Control · Central 1 System Documentation 1 RMAT Documentation 1 Console Operating Instructions	911O-218-290 911 O-003-290 9110-117 911 O-032 911 O-058 911 O-037

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TABLE 4-6
ADDITIONAL EQUIPMENT TO BE ORDERED ACCORDING TO CUSTOMER REQUIREMENTS

Description	Order No.	Comments
Line Circuits (8 Station) Card	9110-110	Provides 8 line circuits with Message Waiting capability
Trunk Circuit (4 Trunks) Card	9110-011	Provides four loop or ground start CO trunks
E&M Trunk Circuit (2 Trunks) Card	9110-013	Provides two E and M trunk circuits
DID/TIE Trunk Circuit (2 Trunks) Card	9110-031	Provides two DID/TIE trunk circuits
Receiver (Dual) Card	911 O-009	Provides two receiver circuits
Receiver (Quad) Card	91 10-016	Provides four receiver circuits
Console	911 O-007	Maintenance or attendant console. Max. 2 attendant consoles/system
Console Control (Dual) Card	911 O-006	Order one if two attendant consoles in system
Backplane Translator Board	911 O-046	Allows connections to be made to three complete card positions through a single plug. Two required per equipment shelf.
RS232 Adapter	911 O-052	Is required to connect a modem to the RS232 data port.
SX-100 Wall Mount Unit	9105038	Converts cabinet version to wall mount version.
SX-100 220V Adapter	9105047	Required for operation from 220Vac.
SX-100 Reserve Power Supply	9105014	Forms a base unit for the cabinet.
Remote Control · PABX	9110-017	Provides facility of being accessed by RMAT System when used in PABX.

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TABLE 4-7
REPLACEABLE PARTS

ORDER NUMBER	DESCRIPTION
9105-001	SX-100 Cabinet
911 O-002	RAM/COS
91 10-003-202-YY	PROM/CPU, Generic 202
91 10-003-203-YY	PROM/CPU, Generic 203
9110-003-204-Y Y	PROM/CPU, Generic 204
91 10-003-205-YY	PROM/CPU, Generic 205
911 0-003-290-YY	PROM/CPU, Generic 290
911 O-004	Scanner
911 O-005	Tone Control - American Tones
911 O-006	Console Control
911 O-007	Console
9105-008	SX-100 Power Supply
911 O-009	Receiver (Dual)
9110-110	Line Circuit - Message Waiting Lamps
911 0-01 1	CO - Trunk Circuit
9110-111	SE - CO - Trunk Circuit
9110-211	CO - Trunk Circuit
911 o-31 1	SE - CO - Trunk Circuit
9110-012	Equipment Shelf, includes Shelf Interconnection Cable
9110-112	Equipment Shelf, excludes Shelf Interconnection Cable
9110-013	E&M Trunk Circuit
9105-014	SX-100 Reserve Power Supply
9110-114	Battery Charger
9110-016	Receiver (Quad)
9110-017	Remote Control - PABX
9110-117	Remote Control - Central
911 O-01 8-202	Software Package 202
911 O-01 8-203	Software Package 203
911 O-01 8-204	Software Package 204
911 O-l 18-204	Software Package 204 Extended
911 O-1 18-205	Software Package 205
9110-218-290	Software Package 290 (RMAT)
911 O-01 9-202-YY	Memory Expander, Generic 202
9110-019-203-YY	Memory Expander, Generic 203
911 O-01 9-204-YY	Memory Expander, Generic 204
911 o-1 19-204-YY	PROM/RAM Expander, Generic 204
9110-I 19-205-YY	PROM/RAM Expander, Generic 205
9 11 O-020	RAM Battery Pack
9105023	SX-100 Power Fail Transfer/Cable Interconnect Card
9105-025	SX-100 Maintenance Panel
9105-027	SX-100 Power Distribution Cable
911 O-030	Extension Feature Operation Guide - Plastic
9110-031	DID/TIE Trunk Circuit
9110-032 (E or F)	System Documentation
9 11 O-033	Console Operating Instruction - List Finder
91 10-034 (E or F)	Extension Feature Operation - Paper
9110-037 (E or F)	Console Operating Instructions
911 O-038	SX-100 Wall Mount Unit

TABLE 4-7 REPLACEMENT PARTS

ORDER NUMBER	DESCRIPTION
911 O-046	Backplane translator board
911 O-048	Console Handset
911 O-049	Ringing Generator - 20Hz
9110-149	Ringing Generator - 17Hz
911 o-249	Ringing Generator - 25Hz
911 O-052	RS232 Adapter

Notes: 1. YY defines revision level   E indicates English   F indicates French   1805

TABLE 4-8 MAIN DOCUMENTATION PACKAGES

Description	Order Number	Comments
Complete Documentation	91 IO-035 (E or F)	See Table 4-10 for breakout of documentation packages.
System Documentation	91 10-032 (E or F)	
Console Documentation	911 O-037	
List Finder	911 O-033	Supplied on special order only.
Extension Feature Operations Guide	9110-030 (E or F)	Plastic
Mitel Action Procedures (MAPs)	See Table 4-9	
Extension Feature Operation	91 10-034 (E or F)	Paper
RMAT Documentation	911 O-058	See Table 4-I 1

Note: E indicates English, F indicates French   1796

TABLE 4-9 MAP DOCUMENTATION

P/N	MAP No.	Title
911 O-098-200-501	MAP200-501	Set CO Trunk Switches
911 O-098-200-502	MA P200-502	Set E&M Trunk Switches
911 O-098-200-503	MAP200-503	Set DID Trunk Switches
911 O-098-200-504	MAP200-504	Set Scanner Card Switch
911 O-098-200-602	MA P200-602	Install New Cards
911 O-098-200-605	MA P200-605	Backplane Translator Board Installation
911 O-098-200-606	MAP200-606	Installation of RCP Card
911 O-098-200-607	M AP200-607	Reserve Power Supply Installation (SX-100)
911 O-098-350-401	MAP350-401	Replace Major Cards
911 o-098-350-402	MAP350-402	Replace Equipment Shelf
911 o-098-350-403	MAP350-403	Replace Power Supply
911 o-098-350-404	MA P350-404	Replace Reserve Power Supply (SX-100)
911 o-098-350-405	MAP350-405	Replace Maintenance Panel (SX-100)
911 o-098-350-406	MA P350-406	Replace 220Vac Adapter
911 o-098-350-51 0	MAP350-510	Replace Shelf Cards

These MAPs are issued for the particular purposes as indicated in the titles.

TABLE 4-10
DOCUMENTATION PACKAGE DETAILS

911 O-035	Complete System Documentation
911 O-032	System Documentation
911 O-037	Console Documentation
911 O-034	Extension Feature Operation

911 O-032   **System Documentation**

911 O-098-001	Volume 1
(Note 1)	
911 o-098-002	Volume 2
911 O-054	5 Repair Tags
911 O-057	Warranty Card
911 O-056	5 Maid-In-Room Card
911 O-059	Personal Speed Call Directory

911 O-037   **Console Documentation**

9110-037-001	Console Book
9110-037-002	Console Key Tabs (Comm/Hotel)
9110-037-003	Console Key Tabs (Maintenance'
9110-037-005	Console Programming Overlay
9110-037-006	Console Attendant Overlay
9110-037-008	Sheet Definitions
9110-037-009	Sheet Alarm Descriptions
9110-037-010	Sheet Faulty Circuits and Alarm:
9110-037-011	2 Sheet Black Number Field
9110-037-012	4 Sheet Speed Call Records
911 O-054	Repair Tag

911 o-098-01 1   **System Documentation**
(Note 1)   ▪ **Volume I**

911 o-098-099	Binder
911 O-098-000	Documentation Index
9105-098-I 00	SX-100 General Description
9110-098-I 00	SX-200 General Description
9110-098-I 05	Feature and Services Description
9105-098-I 50	SX-100 Order Information
9110-098-I 50	SX-200 Order Information
9110-098-I 80	Engineering Information
911 o-098-21 2	Multi Digit Toll Control
911 o-098-220	Speed Call
911 o-098-300	Console Description Commercial
911 o-098-305	Console Description H/M
911 o-098-31 0	Console Description Maintenance
911 o-098-450	Traffic Measurement
911 o-098-451	Station Message Detail Recording
911 O-098-500	General Maintenance
911 O-095	Volume I Spine Insert
9 11 O-094	Superswitch Binder Insert

911 o-098-002   **System Documentatior**
                 ▪ **Volume II**

911 o-098-099	Binder
911 O-098-000	Documentation Index
911 o-098-200	Installation Information
911 o-098-205	Installation Forms
911 o-098-21 0	Programming Practice
911 o-098-21 5	Installation Test Procedures
911 o-098-320	Extension Test Procedures
911 o-098-350	Troubleshooting
911 O-096	Volume II Spine Insert
911 O-094	Superswitch Binder Insert

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NOTES: 1. Volume I System Documentation is normally supplied as a "Perfect Bound" Volume (9110-098-001), but may also be supplied in loose-leaf binder form (9110-098-011) when required.

TABLE 4-11
RMAT DOCUMENTATION

P/N	Title
911 O-058	RMAT Documentation consisting of:
9110-098-I 01	RMAT General Description
911 o-098-301	RMAT Operation Practice
911 O-037-004	Console Key Tabs (RMAT)
911 O-037-007	Console RMAT Overlav

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sx-200 *
SUPERSWITCH*
ELECTRONIC PRIVATE AUTOMATIC BRANCH EXCHANGE
PHYSICAL DESCRIPTION AND ORDERING INFORMATION

1. GENERAL

Introduction

1.01 This section contains a brief description of the SX-200 electronic Private Automatic Branch Exchange (PABX), the features and services provided, and the equipment ordering information.

Reason for Reissue

1.02 This section has been reissued to include Generic 205 information.

2. GENERAL DESCRIPTION

System Description

2.01 The SX-200 Electronic PABX is an electronic switching system with a capacity of 256 ports. Two hundred and eight of these ports are available for assignment to lines, trunks and additional receivers (Fig. 2-l). The remainder are reserved for control functions. The system is electrically compatible with most existing station, key telephone, Private Branch Exchange (PBX) and Central Office (CO) equipment and provides:

- the use of a flexible numbering plan

- the simultaneous use of DTMF and rotary dial stations

· optional use of attendant consoles-2 maximum

· extensive selection of standard and optional features

- freedom from scheduled maintenance

· automatic diagnostics

- twelve power fail transfer circuits

- optional reserve power supply

2.02 The SX-200 consists of a single cabinet (containing the switching equipment and the system power supplies) and a desk type attendant console equipped with pushbutton dial pad and control keys.

2.03 All connections from the cross-connecting frame to the SX-200 equipment cabinet are made using 25 pair connectorized cables. Connections between the cross-connecting frame, the attendant console and external equipment are made in accordance with accepted practice.

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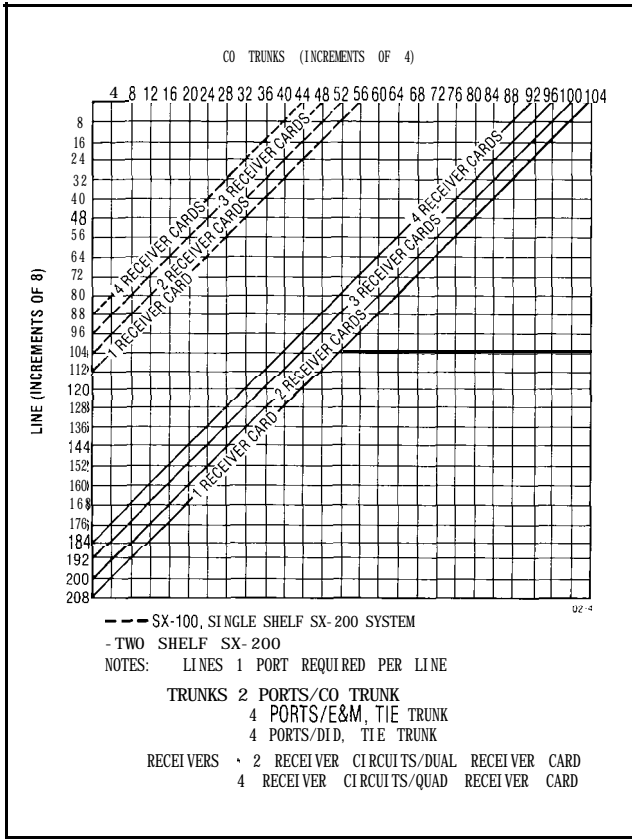
Fig. 2-1 Line/Trunk Configuration

2.04 A reserve power supply and battery charg-
ing system are available as an option. The
reserve power supply is designed to maintain
system operation for a minimum of two hours in
the event of a primary power failure.

2.05 Figure 2-2 shows a diagrammatic represen-
tation of the SX-200 system configuration.

SX-200 Equipment Cabinet

2.08 The SX-200 equipment cabinet (Fig. 2-3) is
of welded steel construction and measures
38in. (960mm) high, 23.5in. (600mm) wide, and
27.5in. (700mm) deep. A fully equipped cabinet
weighs approximately 290lbs (131.7kg). The door
on the front of the cabinet provides access to the
system maintenance panel, printed circuit cards
and reserve battery supply shelf. The hinged rear
panels hold the system power supply and provide
access to the line and trunk connectors and the
reserve power controls. Cable entry to the equip-
ment cabinet is provided through cable ducts on
either side of the cabinet.

2.07 The equipment cabinet holds the
maintenance panel, a maximum of two
equipment shelves (see Fig. 2-4), the optional

Fig. 2-2 SX-200 System Configuration

WEIGHT	HEIGHT	WIDTH	DEPTH
290lb (131.7kg)	38.0in. (960mm)	23.5in. (600mm)	27.5in. (700mm)
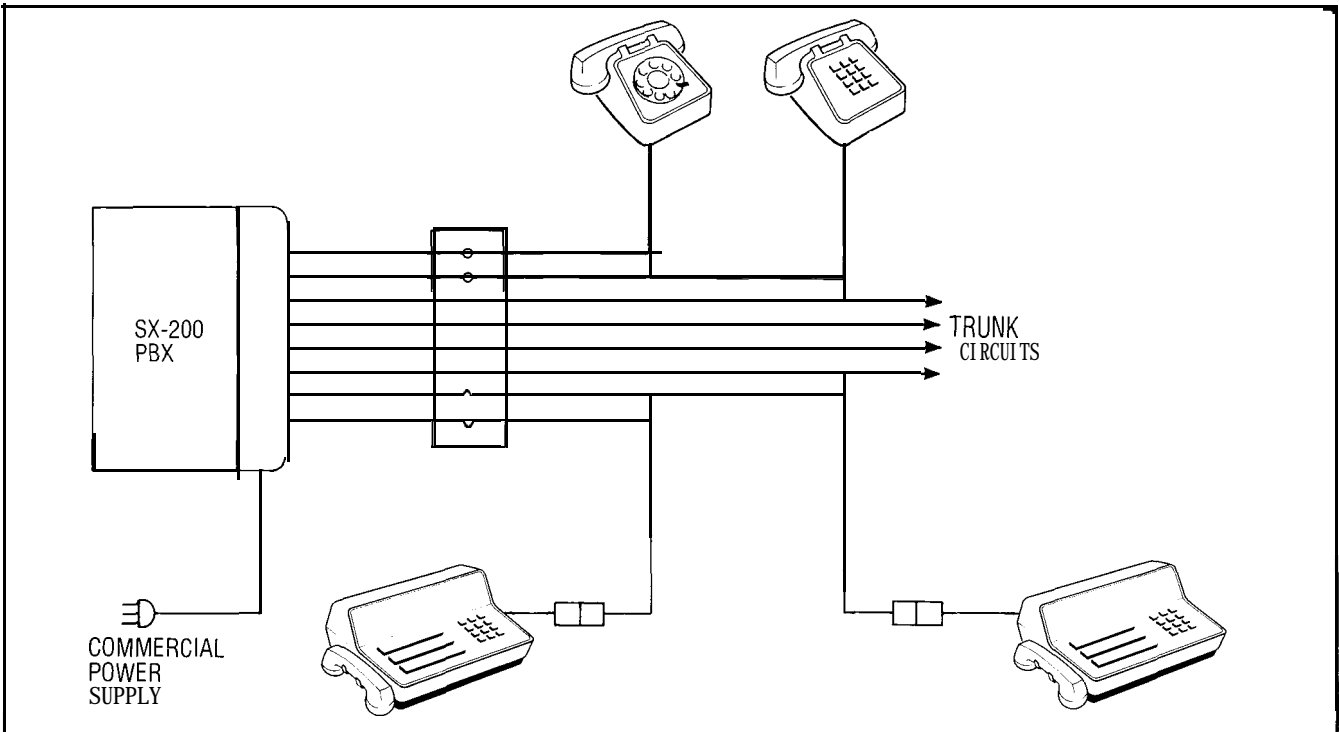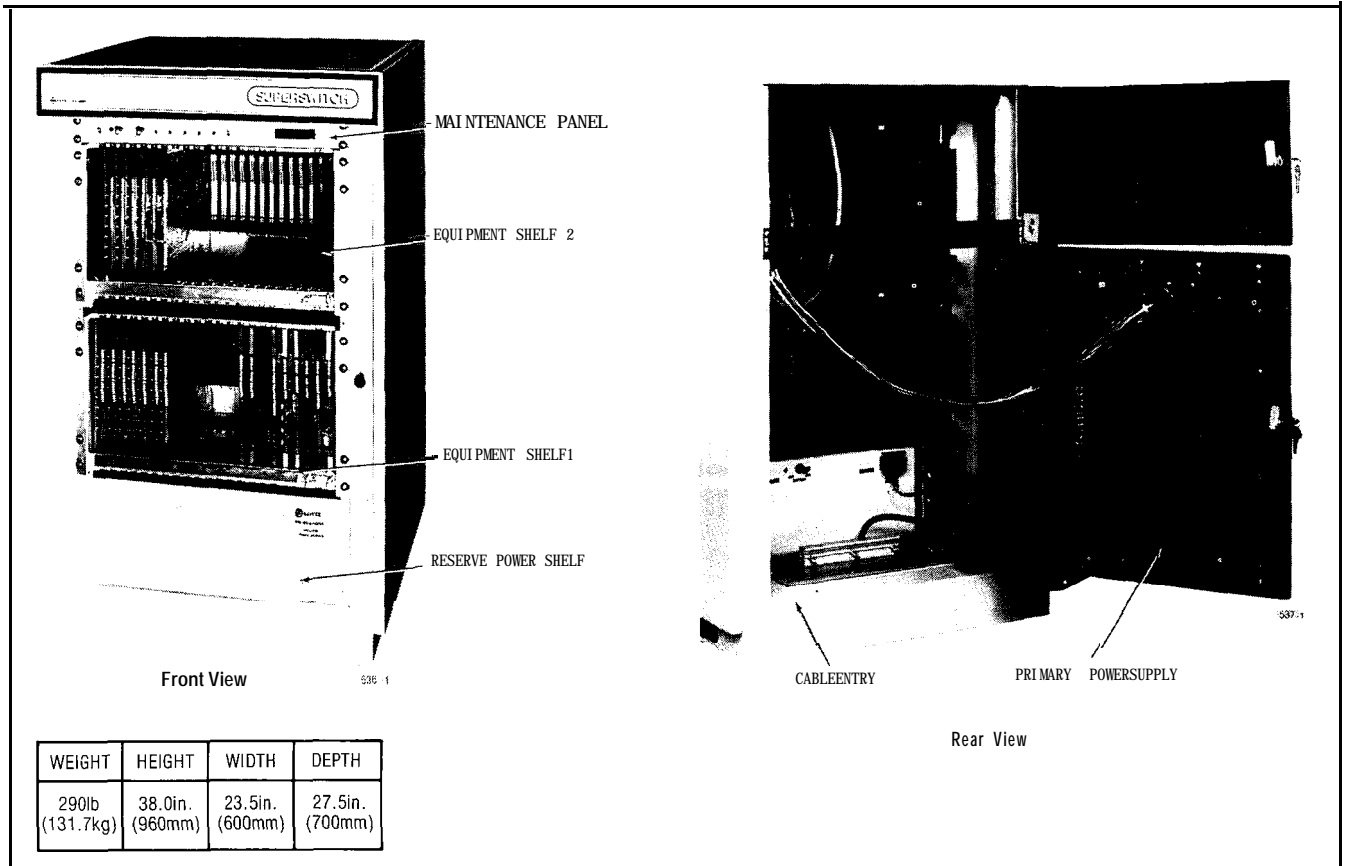
Fig. 2-3 Equipment Cabinet

reserve battery supply and the primary power supply. The maintenance panel, mounted at the top of the cabinet, provides access to the system from the maintenance console through a 50 pin connector. To the left of the maintenance connector is a master power fail transfer switch and five power fail transfer control switches. A system power switch, with indicator is provided on the panel. In addition, a test line is provided which allows service personnel to access individual lines and trunks. Mounted in the middle of the equipment cabinet is equipment shelf 1. This shelf holds all system control logic plus a number of trunk, line, and receiver cards. Above equipment shelf 1 is equipment shelf 2 which contains additional trunk and line cards. The optional reserve power supply is contained in a completely enclosed shelf located below shelf 1. All connections between shelves and external equipment are made by plug-ended cables from the rear of each shelf. The system primary power supply, held on the hinged back panel of the cabinet, converts the commercial input power to the required system voltage levels.

Maintenance Panel

2.08 The maintenance panel (Fig. 2-5) measures 2in. (51mm) high, 19in. (480mm) wide, and 2in. (51mm) deep with a total weight of 2.1lbs (0.9kg). The maintenance connector on the right of the panel permits the service personnel to perform maintenance tasks and enter new, or modify existing customer data using the maintenance console. The test line terminals on the panel allow the use of a standard hand test-set (butt-in) to establish calls through the system using preselected circuits. The power switch controls the application of power to the equipment shelves.

Equipment Shelves

2.09 Each equipment shelf (Fig. 2-4) holds up to 22 printed circuit cards which plug into the
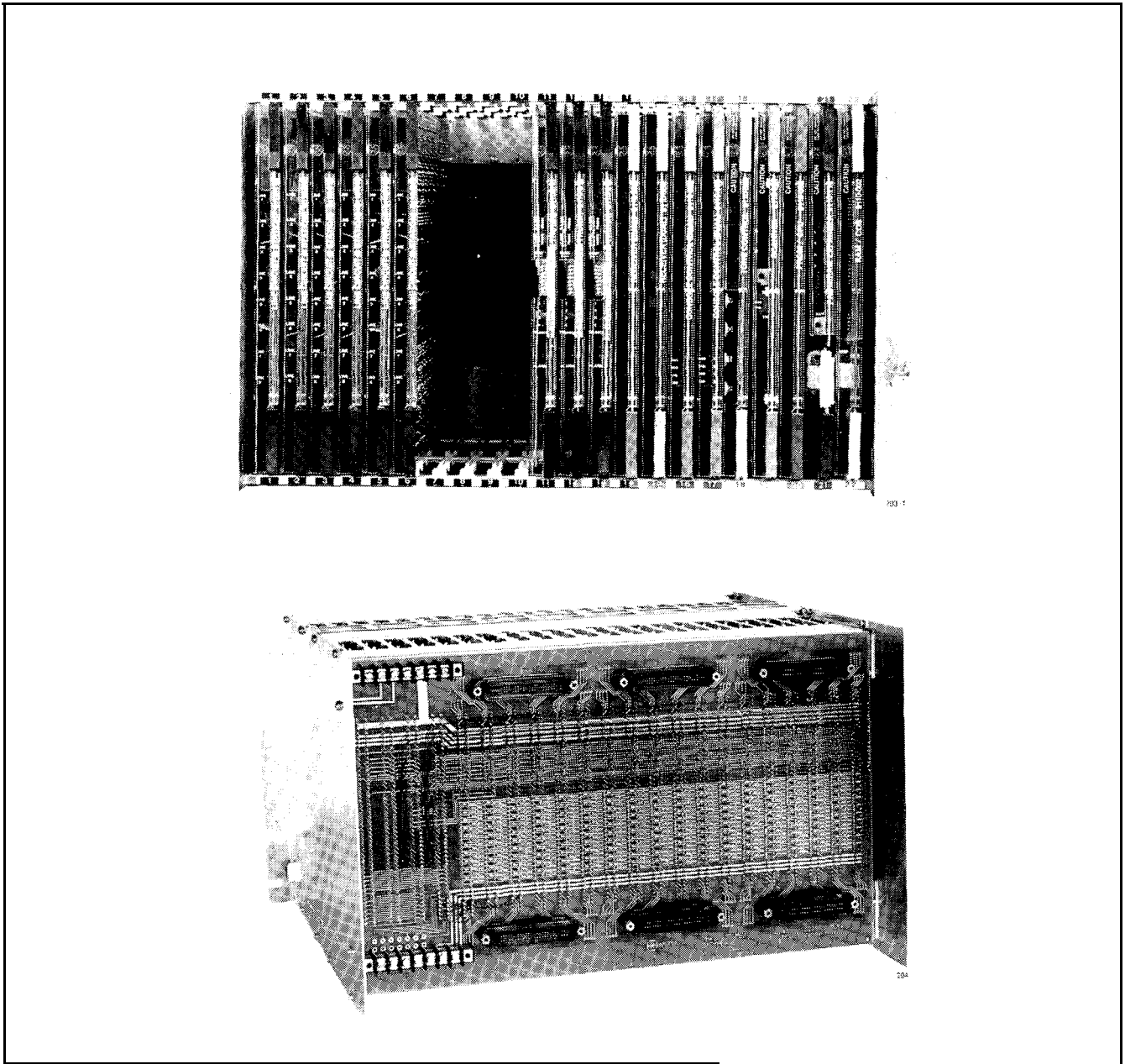
Fig. 2-4 Equipment Shelf

shelf back plane. On the rear of the back plane are a number of connectors providing interconnections between the shelves and external equipment. In addition to these connectors are a number of screw down terminals allowing shelf connection to the primary power supply unit. The equipment shelves measure 10.75in. (273mm) high, 19in. (480mm) wide, 16.375in. (415mm) deep and weigh approximately 27lbs (12.2kg) fully equipped.

Printed Circuit Cards

2.10 All circuit cards (see Fig. 2-6) within the SX-200 are identical in construction and consist of a fiberglass board with printed wiring patterns on both of its faces. Rivetted to the front of each board is a transparent faceplate which allows the LEDs mounted on the front of the boards to be easily seen. The two color-coded card extractors located at the top and bottom of
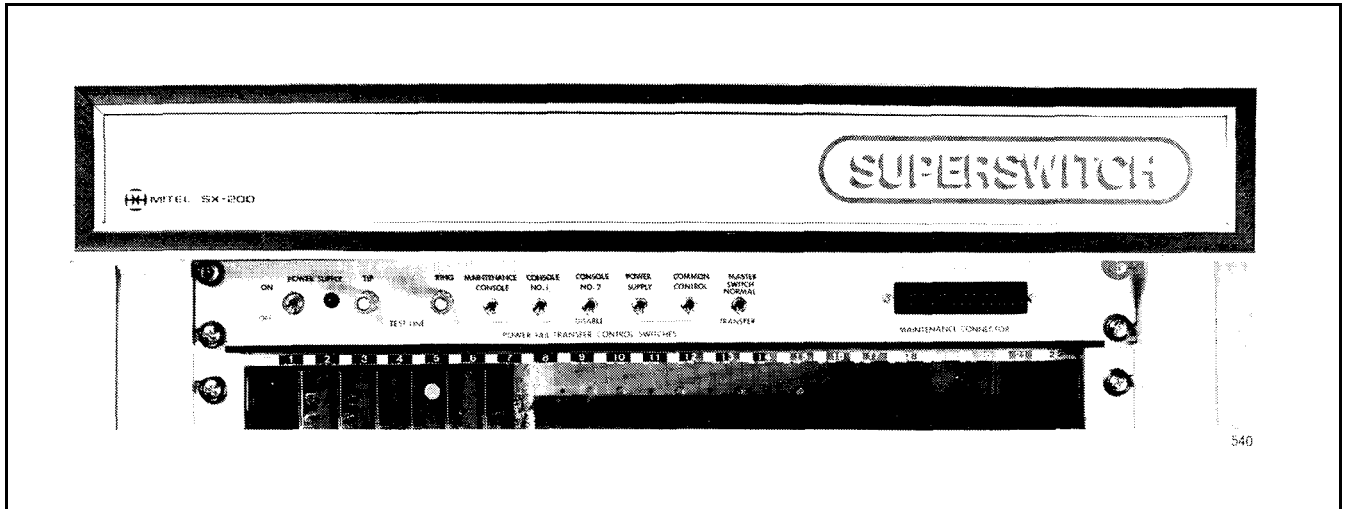
Fig. 2-5 Maintenance Panel
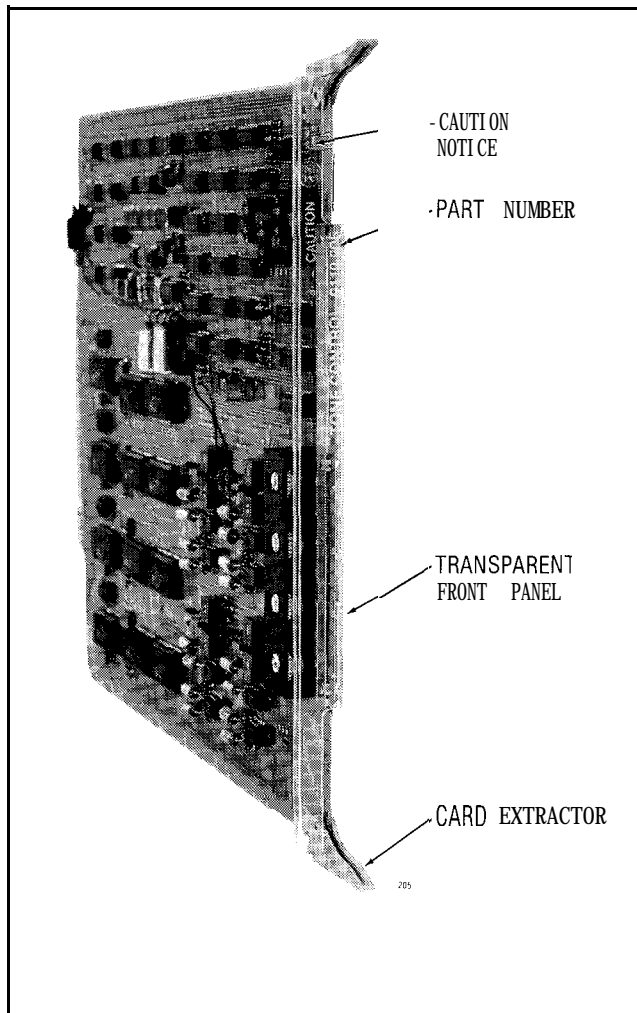
Fig. 2-6 Typical Printed Circuit Card

the faceplate, identify the card position (see Table 2-1) within a shelf and ensure that the card is seated correctly in the backplane connector. Those cards which should not be removed from the equipment shelves with power on carry a CAUTION notice to that effect.

Primary Power Supply

2.11   The system primary power supply (Fig. 2-7), mounted directly on the cabinet back panel, (total weight 70lbs, 32kg) provides all system power from either a 115Vac or a 230Vac, 47Hz to 63Hz commercial supply. The power switch mounted on the outside face of the power supply permits all power to be removed from the system before the equipment cabinet is opened.

Reserve Power Supply

2.12   The reserve power supply consists of a battery charging unit and 8 Globe GEL GC6200 batteries providing 48.3 volts at 20°C. This supply will maintain complete system operation for a minimum of two hours in the event of a primary power failure. The temperature-compensated charging system maintains the correct battery voltage level. The reserve power supply is housed in a completely enclosed shelf measuring 7in. (180mm) high, 19in. (480mm) wide, 14.5in. (370mm) deep and weighing approximately 125lbs (56.7kg).

TABLE 2-1
CIRCUIT CARD COLOR CODE AND CARD POSITION

Circuit Card Name	Color Code	Card Position	
		Shelf 1	Shelf 2
RAM/COS	White	22	—
MEMORY EXPANDER	Brown	21	—
PROM/RAM EXPANDER	Brown	21	—
PROM/CPU	Red	20	—
SCANNER	Orange	19	—
TONE CONTROL	Yellow	18	—
CONSOLE CONTROL (DUAL)	Green	17,16	—
REMOTE CONTROL-PABX (RCP)	Green	16 see note 1	—
RECEIVER (DUAL OR QUAD)	Blue	15 see note 2	—
LINE CIRCUIT (8 STATION)	Black	1 through 14	l - 1 2
TRUNK CIRCUIT (4 TRUNK)	Black	1 through 14	l - 1 2
TRUNK CIRCUIT (2 TRUNK)	Black	1 through 14	l - 1 2

NOTES: 1. The Remote Control PABX card is supplied only when required for use with RMAT Systems (Section MITL9105/9110-98-101). It occupies the slot normally used for the second console control card.

2. If additional receiver cards are used, they must be placed in the following card positions on shelf 1 — second receiver position 14, third receiver position 13, and fourth receiver position 12.
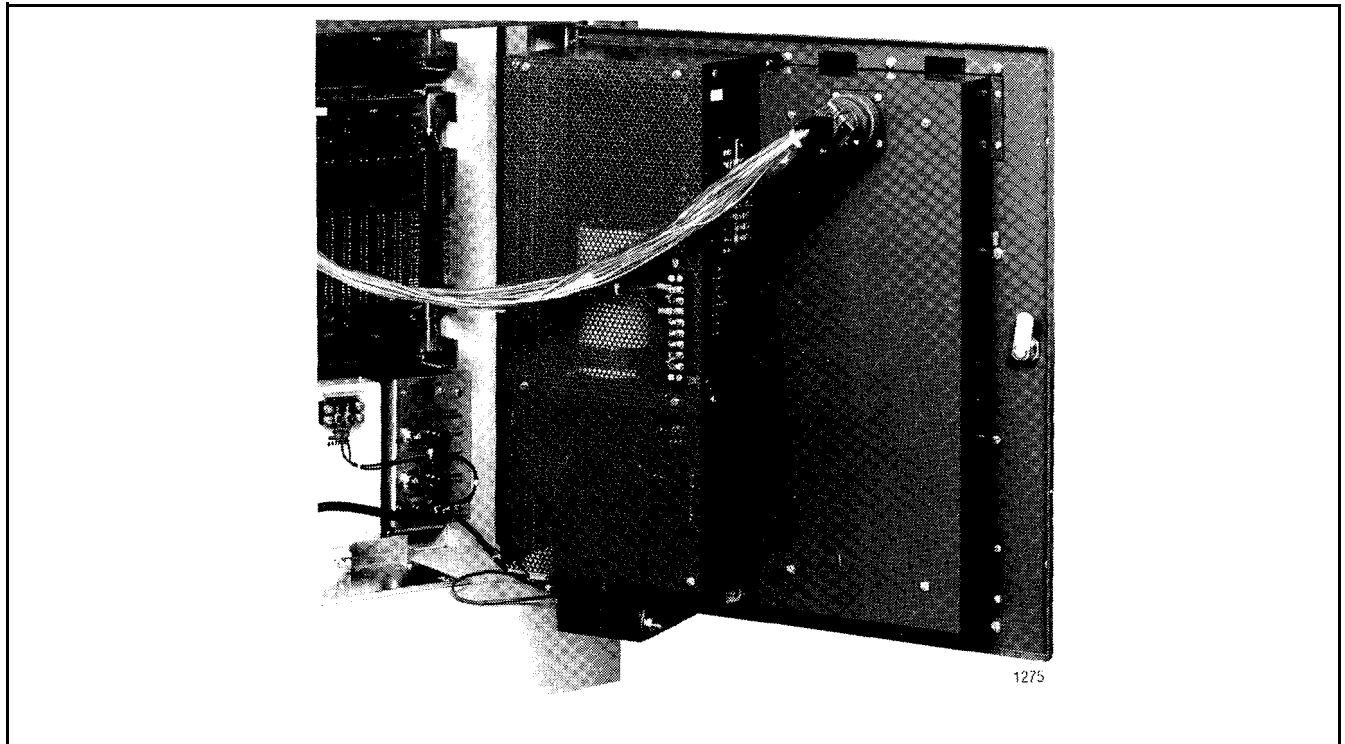
Fig. 2-7 Primary Power Supply

Attendant Console

2.13 The SX-200 attendant console (see Fig. 2-8) is enclosed in a housing with a black faceplate. Located on either side of the console are a pair of headset/handset jacks allowing simultaneous operation and supervision. The console keyboard holds three rows of ten nonlocking keys for the selection of features and completion
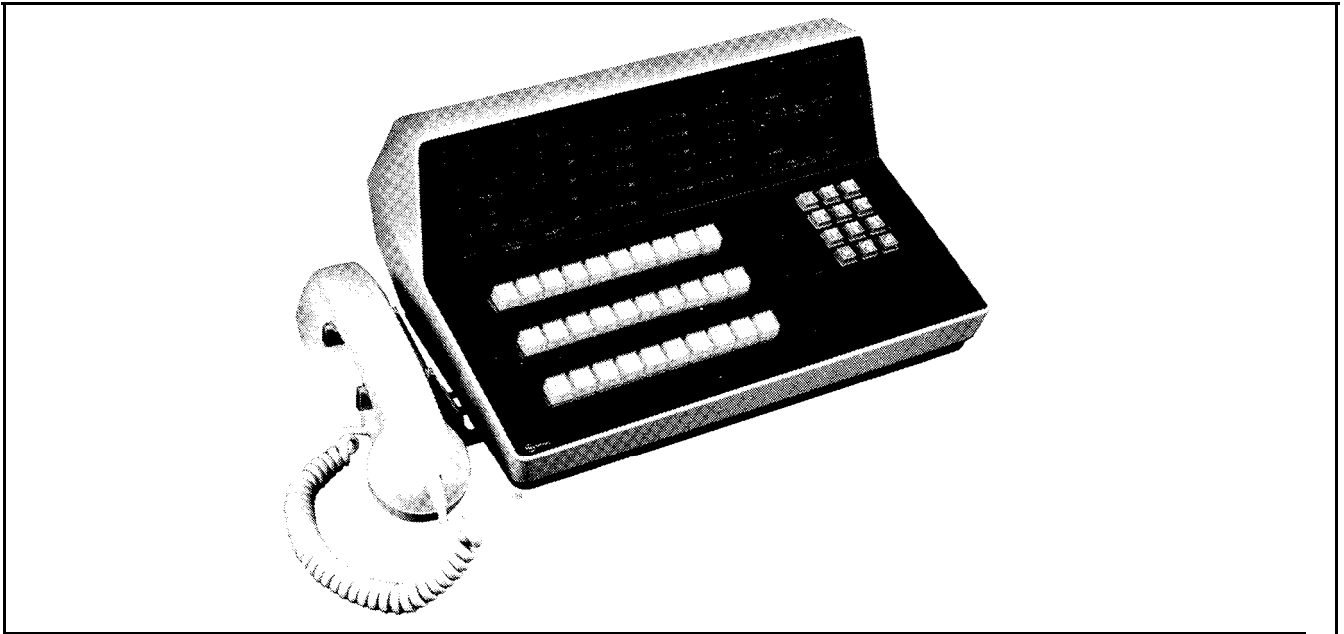
Fig. 2-8 Attendant Console

of calls. On the right of the keyboard is a 12-key pushbutton dial pad. The console display, mounted above the keyboard, displays the active states of calls in progress. In addition to the call status display is a busy lamp field, a trunk group status field, a call waiting indicator, a digital clock, and three alarm indicators. The weight of the attendant console is approximately 13lbs (5.9kg) and its dimensions are 13.75in. (350mm) wide, 6.8in. (176mm) high and 9.25in. (236mm) deep. A complete description of the attendant console is contained in Section MITL9105/9110-98-300 and the description of the Hotel/Motel console is given in Section M ITL9105/911 o-98-305.

Maintenance Console

2.14 The construction of the maintenance console is identical to that of the attendant console; the only difference is in the functions of the call and feature selection keys. A complete description of the maintenance console is given in Section MITL9105/9110-98-310 Maintenance Console Description.

Features

2.15 Features are provided in the SX-200 in the form of feature packages (Generics). Table 2-2 lists the contents of these Generics.

Feature Provisioning

2.16 All station features provided by the SX-200 may be grouped into different classes of service. Each class of service (a maximum of 16) may contain any mixture of features. Feature installation consists of entering into the system memory the number of the station to which the features are to be assigned, followed by the required class-of-service code. All data entries into the system may be made from the attendant or maintenance console. To prevent the loss of customer data in the event of a complete system power failure, the memory holding the data associated with each line or trunk is equipped with its own reserve power supply. This power supply is sufficient to maintain the memory system intact for a period of four weeks.

3. DETAILED DESCRIPTION

General

3.01 Each SX-200 Electronic PABX is completely factory tested prior to packaging and shipment.

TABLE 2-2
SYSTEM FEATURES

Feature	202	203	204	205
Account Codes				.
Alphanumeric Display for Attendant Position	•	•	•	●
Attendant Camp-On	.	.	.	.
Attendant CCSA Access	.	.	.	.
Attendant Console (Maximum 2)	.	.	.	.
Attendant Control of Trunk Group Access	•	•	•	•
Attendant Controlled Conference	.	.	.	.
Attendant Flash Over Trunks	.	.	.	.
Attendant Lockout	.	.	.	.
Attendant Position (2 Max.)	.	.	.	.
Attendant Transfer - All Calls	.	.	.	.
Automatic Callback Busy/Don't Answer (Station to Station Calls)	▲	.	▲	•
Automatic Callback - Busy (Station to Trunk)	•	•	•	•
Automatic Night Service Switching	.	.	.	.
Automatic Queuing to Attendant Position	•	•	•	•
Broker's Call	.	.	.	.
Busy Lamp Field	.	.	.	.
Busy Verification of Station Lines	.	.	.	.
Call Forwarding - All Calls	.	.	.	.
Call Forwarding - Busy And Don't Answer	•	•	•	•
Call Forwarding - Busy Line (DID)	.	.	.	.
Call Forwarding - Don't Answer (DID)	.	.	.	.
Call Hold	.	.	.	.
Call Pick-Up	.	.	.	.
Call Waiting Service				
Attendant Call Waiting	.	.	.	.
Terminating Call Waiting	.	.	.	.
Distinctive Tone Signals	.	.	.	.
Calling Number Display to Attendant	.	.	.	.
Calls Waiting Indication at Attendant Position	•	•	•	•
CCSA Access	.	.	.	.
Class of Service Display to Attendant	.	.	.	.
Code Calling Access	.	.	.	.
Code Restriction			.	.
Conference Calling	.	.	.	.
Contact Monitor†	.	.	.	.
Controlled Outward Restriction			.	.
Controlled Station-To-Station Restriction			.	.
Controlled Termination Restriction			.	.
Controlled Total Restriction			.	.
Data Restriction	.	.	.	.
Date Display on Console(s)			.	.
Diagnostics - Automatic	•	•	•	•
Dial Access to Attendant	•	•	•	•
Digital Clock on Attendant Position	•	•	•	•
Direct Department Calling (DDC)	•	•	•	•
Direct Inward Dialing (DID)		•	•	•
Direct Outward Dialing (DOD)	•	•	•	•
Direct Termination of Miscellaneous Circuits On Attendant Position (Paging)†	•	•	•	•
Direct Trunk Group Selection (DTGS)	•	•	•	•
Directed Call Pick-Up	•	•	•	•
Hold-For-Pick-Up Option	•	•	•	•
Distinctive Ringing	•	•	•	•
DTMF And/Or DCKP On Attendant Position	•	•	•	•
DTMF Calling	•	•	•	•
DTMF To Dial Pulse Conversion	.	.	.	.
Dump and Load of Customer Data			.	.
Executive Override	.	.	.	.
Flash for Attendant	.	.	.	.
Flexible Numbering of Stations	.	.	.	.
Foreign Exchange (FX) Access	.	.	.	.

Feature	202	203	204	205
Fully Restricted Station	.	.	.	.
Identified Trunk Group			.	.
Immediate Audible Ring on Attendant Handled Calls	.	.	.	.
Immediate Ring	.	.	.	.
Incoming Call Identification (ICI)	.	.	.	.
Indication of Camp-On	.	.	.	.
Intercept Treatment				
Attendant Intercept	.	•	.	.
Intercept Tone	.	.	.	.
Interposition Calling	.	.	.	.
Interposition Transfer	•	•	•	•
Inward Restriction	.	.	.	.
Line Lockout With Warning	.	.	.	.
Listed Directory Number (LDN) Service	•	•	•	•
Loudspeaker Paging†				
Direct Access by Attendant	.	.	.	.
Dial Access	.	.	.	.
Multizone	.	.	.	.
Priority Paging	.	.	.	.
Main/Satellite Service	.	.	.	.
Manual Originating Line Service	.	.	.	.
Manual Terminating Line Service	.	.	.	.
Meet Me Conference	.	.	.	.
Message Waiting (Audible)			.	.
Message Waiting (Lamp)			.	.
Miscellaneous Trunk Restriction	.	.	.	.
Multiple Listed Directory Numbers (LDN)	•	•	•	•
Multiple Access Codes for a single trunk group (10 max.)			•	•
Music On Hold†	.	.	.	.
Music on Attendant Position Hold†	•	•	•	•
Night Console Position	.	.	.	.
Night Service				
Fixed	.	.	.	.
Flexible	.	.	.	.
Night Station Service. Fixed Service	•		•	•
Night Station Service - Full Service	•	•	•	•
Origination Restriction	.	.	.	.
Outgoing Trunk Call Back	.	.	.	.
Outgoing Trunk Camp-On	.	.	.	.
Outgoing Trunk Queueing	.	.	.	.
Outward Restriction	.	.	.	.
Power Failure Transfer - Station	.	.	.	.
Priority Queue	.	.	.	.
Privacy and Lockout	.	.	.	.
Radio Paging Access†	.	.	.	.
Recall Dial Tone	.	.	.	.
Recorded Telephone Dictation Access†	•	•	•	•
Remote Access to PBX Services	•	⌐	⌐	⌐
Remote Administration and Maintenance (hardware option)	.	.	.	.
Re-ring From Toll (on Toll Terminal)	•	•	•	•
Reserve Power (hardware option)	.	.	.	.
Room Audit				.
Room Status			.	.
Rotary Dial Calling	.	.	.	.
Route Advance	.	.	.	.
Saved Number Redial				•
Serial Call	.	.	.	.
Sharing (4 Tenant)			•	
Shared Attendant Service			.	.
Single Digit Dialing (Non-conflicting)	•	•	•	•

† Requires external customer provided equipment

TABLE 2-2
SYSTEM FEATURES

	202	203	204	205		202	203	204	205
Single Digit Dialing (Conflicting)		.	.	.	Tie Trunk Access	.	.	.	.
Speed Call					Timed Reminders	.	.	.	.
System - wide				.	Toll Restriction				
Personal				.	Battery Reversal	.	.	.	.
Splitting					011 Access	.	.	.	.
One-Way Manual Splitting	.	.	.	.	Multi Digit			.	.
Two-Way Manual Splitting	.	.	.	.	Toll Terminal Access	.	.	.	.
One-Way Automatic Splitting	.	.	.	.	Total "Do Not Disturb" Display		.	.	.
Two-Way Automatic Splitting	.	.	.	.	Total "Message Waiting" Display		.	.	.
Station Hunting					Total "Room Status" Display		.	.	.
Terminal Hunting	.	.	.	.	Traffic Data Collection			.	.
Circular Hunting	.	.	.	.	Traffic Display to Customer			.	.
Secretarial Hunting	•	•	•	•	Transfer into Busy		.	.	.
Station Message Detail Recording				.	Trunk Answer From Any Station	.	.	.	.
Station Message Register Service		•	•	•	Trunk Group Bus) / (TGB) Indicators on	.	.	.	.
Electronic Storage and Display		•	•	•	Attendant Position				
Internal Charging		•	•	•	Trunk Status Field	.	.	.	.
Station Override Security	.	.	.	.	Trunk-To-Trunk Connections	.	.	.	.
Station-to-Station Calling	.	.	.	.	Trunk Verification by Customer (TVC)	•	•	•	•
Straightforward Outward Completion	.	.	.	.	Trunk Verification by Station (TVS)	•	•	•	•
Switched Loop Operation	.	.	.	.	Uniform Call Distribution (UCD)	•	•	•	•
Tandem Tie Trunk Switching		.	.	.	Wake-Up Service				•
Termination Restriction	.	.	.	.	WATS Access	•	•	•	•
Threeway Conference Transfer	.	.	.	.	Wideband Data Switching	•	•	•	•
Through Dialing	.	.	.	.	Wide Frequency Tolerant Power Plant	•	•	•	•

† Requires external customer provided equipment

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3.02 On arrival at the customer's premises, installation consists of unpacking the SX-200, making the required connections between external equipment and the system, and supplying commercial power. System capacity may be increased at any time by the addition of plug-in printed circuit boards.

Basic System

3.03 The basic system consists of the equipment cabinet, the maintenance panel, primary power supply, one console and equipment shelf 1. All necessary control circuitry for system and feature operation is included in the basic system.

Attendant Console

3.04 The SX-200 may be operated with or without an attendant console. Consoles may be dedicated to a single customer or shared between customers. If an additional attendant console is required, the console plus the console control card and the console interface card should be requested. For single console operation the console control card is located in position 17 on equipment shelf 1. If two consoles are employed, the second console control card is placed in position 16 on equipment shelf 1.

Equipment Shelf 1

3.05 Equipment Shelf 1 contains the five common control cards plugs the required number of line, console, trunk and receiver cards. The common control cards are color coded and held in card positions 18 through 22. These card positions are fixed for all systems. Card positions 1 through 17 may be equipped with line, console, trunk or receiver cards as shown in Fig. 3-1.

Equipment Cards

3.08 The number of line, trunk, and receiver cards must be specified to fulfill the individual requirements of each customer. Each line card contains eight independant line circuits. Trunk cards contain two or four trunk circuits depending on the trunk type. The receiver card may contain 2 receiver circuits (dual type) or 4 receiver circuits (quad type). Normally, four receiver cards will handle all traffic requirements for any system configuration.

FRONT VIEW
SHELF 2

FRONT VIEW
SHELF 1

Fig. 3-1 Equipment Shelves

Equipment Shelf 2

3.07 To expand the system to its maximum
capability a second equipment shelf must
be employed. Equipment shelf 2 (Fig. 3-1) is iden-
tical in construction to shelf 1 and provides an ad-
ditional 12 card positions, which may be used to
house line or trunk cards. Card positions 13
through 22 on shelf 2 are not used.

Reserve Power

3.08 The reserve power supply available with the
basic SX-200 system consists of a battery

pack shelf and associated charging system. If
reserve power is required, the reserve power shelf
must be specified.

Electrical Characteristics

3.09 The SX-200 is designed to operate from a
48Vdc supply which is derived from either
the commercial ac supply or a reserve battery sup-
ply. Table 3-I details the electrical characteristics
of the system.

TABLE 3-1
SX-200 ELECTRICAL CHARACTERISTICS

Station Loop Limit	1200 ohms including set
Maximum Number of Ringers Per Line	7
Ringing	90V, 20Hz · immediate ringing(optionof 17Hz or 25Hz
Standard	1s on, 3s off
Special	0.5s on, 0.5s off, 0.5s on, 2.5s off
Ring Trip	During silent or ringing period
Dial Tone	350/440Hz, continuous
Transfer Dial Tone	350/440Hz, 3 bursts of 100ms, then continuous
Busy Tone	480/620Hz, interrupted at 60ipm
Special Busy Tone	350/440Hz interrupted at 6Oipm
Standard Ringback Tone	440/480Hz, 1s on, 3s off
Special Ringback Tone	440/480Hz, 0.5s on, 0.5s off, 0.5s on, 2.5s off
Callback	6 rings of standard ringing
Reorder Tone	480/620Hz, interrupted at 120ipm
Conference Tone	440Hz, 1 burst of 1s
Camp-On Tone	440Hz, one burst of 200ms for station camp-on
	440Hz, two bursts 100ms on, 50ms off, 100ms on
	for trunk camp-on
Override Tone	440Hz, one burst of 800ms followed by a 200ms
	burst every 6s
Crosstalk Attenuation	75dB minimum
Insertion Loss, Station-to-Station	5dB ± 0.5dB at 1004Hz
Station-to-Trunk	0.5dB ± 0.3dB at 1004Hz
Trunk-to-Trunk	0.5dB ± 0.3dB at 1004Hz
Longitudinal Balance	54dB minimum, 200-3000Hz
Return Loss	14dB minimum
Idle Circuit Noise	16dBrnC maximum
Impulse Noise	No counts over 46dBrnC
Envelope Delay Difference.	200μs maximum
System Impedance	600 ohms nominal for lines
	600 or 900 ohms nominal for trunks
Traffic Capacity	7.5ccs/line minimum at 100 lines at P ≃ 0.01
Primary Power	100-125V, 47-63Hz, 4A maximum
Central Office Trunk Loop Limit	1600 ohms
Maximum Distance of Console from Equipment	1000ft. (300m) of 26AWG cable
Operating Environment	0°C to 40°C, 10% to 90% Relative Humidity

TABLE 4-1
BASIC SYSTEMS

Basic Systems	PROM/CPU	Memory Exp. PROM/RAM Exp.		Software	Console Console Control Console Interface	Receiver	Shelves
911 o-1 00-000	no	no		no	yes	1 quad	1
9110-100-202	yes	Mem. Exp.		202	yes	1 quad	1
911 O-I 00-203	yes	Mem.	Exp.	203	yes	1 quad	1
911 O-I 00-204	yes	Mem.	Exp.	204	yes	1 quad	1
9110-200-000	no	no		no	yes	2 dual	1
911 O-200-202	yes	Mem.	Exp.	202	yes	2 dual	1
911 o-200-203	yes	Mem.	Exp.	203	yes	2 dual	1
911 o-200-204	yes	Mem.	Exp.	204	yes	2 dual	1
911 o-300-204	yes	PROM/RAM Exp.		204	yes	1 quad	1
911 o-300-205	yes	PROM/RAM Exp.		205	yes	1 quad	1
911 o-400-204	yes	PROM/RAM Exp.		204	yes	2 dual	1
911 o-400-205	yes	PROM/RAM Exp.		205	yes	2 dual	1
9110-500-000	no	no		no	yes	1 quad	2
911 O-600-000	no	no		no	yes	2 dual	2
911 O-900-290	yes	no		290	yes	—	1

For a detailed content of each basic system see Table 4-4.   **1798 -I**

A PROM/RAM Expander is required to use the following features of Generic 204
- Multi Digit Toll Control (Generic 204/205)
- Automatic Wakeup (Generic 204)

TABLE 4-2
SYSTEM ORDER FORM

Item #	Quantity	Description
911 o-........-000		SX-200 Basic System
911 O-018-XXX		Software Generic
9110-110		Line Circuit
91 10-011 or -211		CO · Trunk Circuit
9110-013		E&M Trunk Circuit
911 O-031		DID/TIE Trunk Circuit
911 O-009		Receiver (Dual)
9110-016		Receiver (Quad)
9110-017		Remote Control - PABX (RCP)
9110-006		Console Control
9110-007-A		Console
9110-045		Console Interface
9110-012		Equipment Shelf
9110-014		Reserve Power Supply
9110-046		Backplane Translator
9110-052		RS232 Adapter

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4. ORDERING INFORMATION

General

4.01 The following information is provided for ease of ordering SX-200 equipment. Table 4-1 lists all basic systems and requirements. Table 4-2 is a form which may be used to determine what items are required to meet the customers needs. Table 4-3 lists available information on the software packages. Tables 4-4 show the detailed system configurations which may be ordered. Table 4-5 is a description of the content of the software packages. Table 4-6 covers all additional equipment which may be ordered according to customer requirements, while Table 4-7 covers all replaceable parts in sequential order. Table 4-8 shows the main documentation packages. Their relationship to one another is shown in Table 4-10. Table 4-9 lists Mitel Action Procedures (MAPs) which may be issued in connection with work to be done as indicated by the MAP title. Table 4-11 is the RMAT documentation package.

Systems

4.02 Basic Systems A number of different basic systems are available to accomodate different requirements. The basic systems differ in various items shown in Table 4-1.

4.03 Line Cards The number of line cards
$$= \frac{\text{number of extensions}}{8}$$

4.04 **CO · Trunk Cards** The number of CO · trunk cards
$$= \text{number of CO · trunks} + \frac{\text{number of misc. CO type trunks}}{4}$$

4.05 **E&M Trunk Cards** The number of E&M Trunk cards
$$= \frac{\text{number of E&M trunks}}{2}$$

4.06 **DID/TIE Trunk Cards** The number of DID/TIE trunk cards
$$= \frac{\text{number of loop DID/TIE trunks}}{2}$$

4.07 **Receiver cards** Order two additional dual receiver cards or one additional quad receiver card if a second shelf is used. For a detailed calculation of the number of receivers required, refer to Section MITL9105/9110-98-180.

4.06 Remote Control · PABX Card One RCP card is required if the PABX is to be accessed from a Remote Maintenance, Administration and Test System (RMAT) Controller.

4.09 Console, Console Control and Console Interface Card Order a console if there is the need for a second console (maintenance, administrative for Hotel/Motel requirements). Order a console control card and a console interface card if a second console is used as an attendant console.

4.10 Equipment Shelf

Add: number of line cards
number of CO trunk cards
number of E&M trunk cards
number of DID trunk cards
number of receiver cards

If total number exceeds 14 order an equipment shelf. If total number exceeds 26, the SX-200 capacity is exhausted.

4.11 Miscellaneous Reserve power supply (1 per system), Backplane translators (2 per shelf), RS232 adapter (1 per system).

Software

4.12 Software is available in different Generic programs and may be ordered as part of a basic system (see Table 4-1) or separately (see Table 4-3). The software consists of PROM/CPU card and Memory Expander or PROM/RAM Expander card. To order a set of specific software these cards have to be ordered, specifying the software they should carry. This can be done by either ordering the individual cards or by using the order numbers of Table 4-3.

TABLE 4-3
SOFTWARE PACKAGES

Order #	Description
9110-018-202	Generic 202
911 O-01 8-203	Generic 203
9110-018-204	Generic 204
9110-l 18-204	Generic 204 Extended
911 O-l 18-205	Generic 205
911 O-21 8-290	RMAT

Parts

4.13 Spare parts and documentation may be ordered as individual parts according to Table 4-7.

TABLE 4-4
SX-200 EQUIPMENT

Description	Qty.	Order No.	Comments
SX-200 PABX Basic System con-sisting of:		9110-100-000	Excludes software
Equipment Cabinet	1	911 O-001	includes Power Distribution Cable 9110-127
Primary Power Supply	1	9110-108	
Power Fail Transfer	1	911 O-023	Provides 12 failure transfer circuits
Cable Interconnect Card	1	9110-124	
Maintenance Panel	1	911 O-l 25	
Equipment Shelf	1	9110-112	Excludes Shelf Interconnect Cable
RAM/COS Card	1	9 11 O-002	Includes RAM Battery Pack 9110-020
Scanner Card	1	911 O-004	
Tone Control Card	1	911 O-005	
Console Control Card	1	911 O-006	Provides control for Console 1 and the Maintenance Console
Console	1	911 O-007	Includes 91 10-037 (Table 4-7)
Receiver (Quad) Card	1	91 IO-016	
Console Interface Card	1	911 O-045	

TABLE 4-4
SX-200 EQUIPMENT

Description	Qty.	Order No.	Comments
SX-200 PABX Basic System con-sisting of:		911 o-1 oo-xxx	xxx . . . . defines software 202, 203, or 204
Equipment Cabinet	1	911 O-001	Includes Power Distribution Cable 9110-127
Primary Power Supply	1	911 O-l 08	
Power Fail Transfer	1	911 O-023	Provides 12 failure transfer circuits
Cable Interconnect Card	1	911 O-l 24	
Maintenance Panel	1	9110-125	
Equipment Shelf	1	9110-112	Excludes Shelf Interconnect Cable
RAM/COS Card	1	911 O-002	Includes RAM Battery Pack 91 10-020
Memory Expander Card	1	91 10-019-XXX-YY	Note 1
PROM/CPU Card	1	91 10-003-XXX-YY	Note 1
Scanner Card	1	911 O-004	
Tone Control Card	1	911 O-005	
Console Control Card	1	911 O-006	Provides control for Console 1 and the Maintenance Console
Console	1	911 O-007	Includes 91 IO-037 (Table 4-7)
Receiver (Quad) Card	1	911 O-01 6	
Console Interface Card	1	911 O-045	
System Documentation	1	9110-032 (E or F)	E indicates English F indicates French

NOTE 1:   If ordered as single items XXX-YY defines software generic and revision level. (e.g. 9110-003-203-01); if only "XXX" is specified but not "YY" the latest revision level will be sup-plied.

TABLE 4-4
SX-200 EQUIPMENT

Description	Qty.	Order No.	Comments
SX-200 PABX Basic System con-sisting of:		9110-200-000	Excludes software
Equipment Cabinet	1	9110-001	Includes Power Distribution Cable 9110-127
Primary Power Supply	1	9110-108	
Power Fail Transfer	1	911 0-023	Provides 12 failure transfer circuits
Cable Interconnect Card	1	911 0-l 24	
Maintenance Panel	1	911 o-1 25	
Equipment Shelf	1	9110-112	Excludes Shelf Interconnect Cable
RAM/COS Card	1	911 0-002	Includes RAM Battery Pack 91 10-020
Scanner Card	1	911 0-004	
Tone Control Card	1	911 0-005	
Console Control Card	1	911 0-006	Provides control for Console 1 and the Maintenance Console
Console	1	911 0-007	Includes 9110-037 (Table 4-7)
Receiver (Dual) Card	2	9110-009	
Console Interface Card	1	911 0-045	

TABLE 4-4
SX-200 EQUIPMENT

Description	Qty.	Order No.	Comments
SX-200 PABX Basic System consisting of:		911 0-200-XXX	xxx . . . . defines software 202, 203, 204 or 205
Equipment Cabinet	1	911 0-001	Includes Power Distribution Cable 9110-127
Primary Power Supply	1	9110-108	
Power Fail Transfer	1	911 0-023	Provides 12 failure transfer circuits
Cable Interconnect Card	1	911 0-l 24	
Maintenance Panel	1	9110-125	
Equipment Shelf	1	9110-112	Excludes Shelf Interconnect Cable
RAM/COS Card	1	911 0-002	Includes RAM Battery Pack 9110-020
Memory Expander Card	1	91 10-019-XXX-YY	Note 1
PROM/CPU Card	1	91 10-003-XXX-YY	Note 1
Scanner Card	1	911 0-004	
Tone Control Card	1	911 0-005	
Console Control Card	1	911 0-006	Provides control for Console 1 and the Maintenance Console
Console	1	911 0-007	Includes 91 10-037 (Table 4-7)
Receiver (Dual) Card	2	9110-009	
Console Interface Card	1	911 0-045	
System Documentation	1	9110-032 (E or F)	E indicates English F indicates French

NOTE 1: If ordered as single items XXX-YY defines software generic and revision level. (e.g.
9110-003-203-01); if only "XXX" is specified but not "YY" the latest revision level will be supplied.

TABLE 4-4
SX-200 EQUIPMENT

Description	Qty.	Order No.	Comments
SX-200 PABX Basic System consisting of:		911 0-300-XXX	xxx .defines .software 204 r 205
Equipment Cabinet	1	911 O-001	Includes Power Distribution Cable 9110-127"
Primary Power Supply	1	9110-108	
Power Fail Transfer	1	911 O-023	Provides 12 failure transfer circuits
Cable Interconnect Card	1	911 O-l 24	
Maintenance Panel	1	911 o-1 25	
Equipment Shelf	1	9110-112	Excludes Shelf Interconnect Cable
RAM/COS Card	1	911 O-002	Includes RAM Battery Pack 9110-020
PROM/RAM Expander Card	1	9110-119-XXX-YY	Note 1; includes RAM Battery Pack 911 O-020
PROM/CPU Card	1	91 10-003-XXX-YY	Note 1
Scanner Card	1	911 O-004	
Tone Control Card	1	911 O-005	
Console Control Card	1	911 O-006	Provides control for Console 1 and the Maintenance Console
Console	1	911 O-007	Includes 91 10-037 (Table 4-7)
Receiver (Quad) Card	1	9110-016	
Console Interface Card	1	911 O-045	
System Documentation	1	9110-032 (E or F)	E indicates English F indicates French

NOTE 1: If ordered as single items XXX-YY defines software generic and revision level. (e.g. 9110-003-202-01); if only "XXX" is specified but not "YY" the latest revision level will be supplied.

TABLE 4-4
SX-200 EQUIPMENT

Description	Qty.	Order No.	Comments
SX-200 PABX Basic System consisting of:-		911 0-400-XXX	xxx . . . . defines software 204 or 205
Equipment Cabinet	1	9110-001	Includes Power Distribution Cable 9110-12
Primary Power Supply	1	911 O-l 08	
Power Fail Transfer	1	911 O-023	Provides 12 failure transfer circuits
Cable Interconnect Card	1	911 O-l 24	
Maintenance Panel	1	911 o-1 25	For use with Power Supply 9110-108
Equipment Shelf	1	9110-112	Excludes Shelf Interconnect Cable
RAM/COS Card	1	911 O-002	Includes RAM Battery Pack 9110-020
PROM/RAM Expander Card	1	9110-119-XXX-YY	Note 1; includes RAM Battery Pack 911 O-020
PROM/CPU Card	1	91 10-003-XXX-YY	Note 1
Scanner Card	1	911 O-004	
Tone Control Card	1	911 O-005	
Console Control Card	1	911 O-006	Provides control for Console 1 and the Maintenance Console
Console	1	911 O-007	
Receiver (Dual) Card	2	9110-009	
Console Interface Card	1	911 O-045	
System Documentation	1	9110-032 (E or F)	E indicates English F indicates French

NOTE 1: If ordered as single items XXX-YY defines software generic and revision level. (e.g. 9110-021-202-01); if only "XXX" is specified but not "YY" the latest revision level will be supplied.

TABLE 4-4
SX-200 EQUIPMENT

Description	Qty.	Order No.	Comments
SX-200 PABX Basic System consisting of:—		9110-500-000	Excluding Software
Equipment Cabinet	1	-001	Includes Power Distribution Cable 9110-127
Primary Power Supply	1	-108	
Console Interface Card	1	-045	
Power Fail Transfer	1	-023	
Cable Interconnect Card	1	-124	
Maintenance Panel	1	-125	
Equipment Shelf	2	-112	
Shelf Interconnect Cables	1	-026	
RAM/COS	1	-002	Includes RAM Battery Pack 9110620
Scanner	1	-004	
Tone Control	1	-005	
Console Control	1	-006	
Receiver (Quad)	1	-016	
Console	1	-007	

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TABLE 4-4
SX-200 EQUIPMENT

Description	Qty.	Order No.	Comments
SX-200 PABX Basic System con-sisting of:-		9110-600-000	Excluding software
Equipment Cabinet	1	911 O-001	Includes Power Distribution Cable 9110-12?
Primary Power Supply	1	9110-108	
Console Interface Card	1	911 O-045	
Power Fail Transfer	1	911 O-023	
Cable Interconnect Card	1	911 O-l 24	
Maintenance Panel	1	9110-125	
Equipment Shelf	2	9110-112	
Shelf Interconnect Cables	1	911 O-026	
RAM/COS	1	911 O-002	Includes RAM Battery Pack 9110-020
Scanner	1	911 O-004	
Tone Control	1	911 O-005	
Console Control	1	911 O-006	
Receiver (Dual)	2	9 11 O-009	
Console	1	911 O-007	

TABLE 4-4
SX-200 EQUIPMENT

Description	Qty.	Order No.	Comments
SX-200 RMAT System consisting of:-		911 O-900-290	
Equipment Cabinet	1	9110-001	Includes Power Distribution Cable 9110-127
Primary Power Supply	1	9110-108	
Console Interface Card	1	911 O-045	
Power Fail Transfer	1	911 O-023	
Cable Interconnect Card	1	9110-124	
Maintenance Panel	1	911 o-1 25	
Equipment Shelf	1	9110-112	
RAM/COS Card	1	911 O-002	Includes RAM Battery Pack 9110-020
PROM/CPU Card	1	9110-003-290-YY	Note 1
Scanner Card	1	911 O-004	
Console Control Card	1	911 O-006	
CO - Trunk Card	1	9110-011	
Remote Control - Central Card	1	9110-117	
Console	1	911 O-007	Includes Console Operating Instructions 911 O-037
System Documentation	1	911 O-032	
RMAT Documentation	1	911 O-058	

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NOTE 1: If ordered as single items 290-YY defines software generic and revision level. (e.g. 9110-003-290-01); if only "290" is specified but not "YY" the latest revision level will be supplied.

TABLE 4-5
SOFTWARE PACKAGES

Description	Order Number
Software Generic 202 consisting of: 1 PROM/CPU 1 Memory Expander 1 System Documentation	911 O-01 8-202 911 o-003-202 911 O-019-202 911 O-032
Software Generic 203 consisting of: 1 PROM/CPU 1 Memory Expander 1 System Documentation	911 O-01 8-203 911 o-003-203 911 O-019-203 911 O-032
Software Generic 204 consisting of: 1 PROM/CPU 1 Memory Expander 1 System Documentation 1 Console Operating Instructions	9110-018-204 911 o-003-204 9110-019-204 911 O-032 911 O-037
Software Generic 204 Extended consisting of: 1 PROM/CPU 1 PROM/RAM Expander 1 System Documentation 1 Console Operating Instructions	911 O-l 18-204 911 o-003-204 911 o-1 19-204 911 O-032 911 O-037
Software Generic 205 consisting of: 1 PROM/CPU 1 PROM/RAM Expander 1 System Documentation 1 Console Operating Instructions	9110-118-205 911 o-003-205 911 o-1 19-205 911 O-032 911 O-037
Software Generic 290 consisting of: 1 PROM/CPU 1 Remote Control • Central 1 System Documentation 1 RMAT Documentation 1 Console Operating Instructions	911 O-21 8-290 911 O-003-290 9110-117 911 O-032 911 O-058 911 O-037

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TABLE 4-8
ADDITIONAL EQUIPMENT TO BE ORDERED ACCORDING TO CUSTOMER REQUIREMENTS.

Description	Order No.	Comments
Line Circuits (8 Station) Card	9110-110	Provides 8 Line Circuits with Message Waiting capability
Trunk Circuit (4 Trunks) Card	9110-011	Provides 4 loop or ground start CO trunks
E&M Trunk Circuit (2 Trunks) Card	9110-013	Provides 2 E and M trunk circuits
DID/TIE Trunk Circuit (2 Trunks) Card	911 0-031	Provides 2 DID/TIE trunk circuits
Receiver (Dual) Card	9110-009	Provides 2 receiver circuits
Receiver (Quad)	9110-016	Provides 4 receiver circuits
Console	9110-007	Maintenance or attendant console. Max. 2 attendant consoles/system
Console Control Card	9110-006	Order 1 if 2 attendant consoles in system
Equipment Shelf No. 2	9110-012	Order if total number of receiver, trunk, and line cards exceeds 15. Includes Shelf Interconnect Cable 91 10-026
Reserve Power Supply	9110-014	
Backplane Translator Board	9110-046	Allows connections to be made to 3 complete card positions through a single plug. 2 required per equipment shelf.
Console Interface Card	9110-045	For Attendant Console 2
RS232 Adapter	9110-052	Is required to connect a modem to a RS232 data port
Remote Control - PABX	9110-017	Provides facility of being accessed by RMAT System when used in PABX

TABLE 4-7
REPLACEABLE PARTS

ORDER NUMBER	DESCRIPTION
911 O-001	SX-200 Cabinet
911 O-002	RAM/COS
91 10-003-202-YY	PROM/CPU, Generic 202
91 10-003-203-YY	PROM/CPU, Generic 203
91 10-003-204-YY	PROM/CPU, Generic 204
91 10-003-205-YY	PROM/CPU, Generic 205
911 0-003-290-YY	PROM/CPU, Generic 290
911 O-004	Scanner
911 O-005	Tone Control
911 O-006	Console Control
911 O-007	Console
911 O-008	SX-200 Power Supply · Superceded by 9110-108 use only for replacement
911 O-l 08	SX-200 Power Supply
9 11 0-009	Receiver (Dual)
9110-110	Line Circuit · Message Waiting Lamps
911 0-01 1	CO · Trunk Circuit
911 o-1 11	SE · CO · Trunk Circuit
9110-211	CO · Trunk Circuit, transformer-coupled
911 o-31 1	SE · CO · Trunk Circuit, transformer-coupled
9110-012	Equipment Shelf, includes Shelf Interconnection Cable
9110-112	Equipment Shelf, excludes Shelf Interconnection Cable
9110-013	E&M Trunk Circuit
9110-014	SX-200 Reserve Power Supply
9110-114	Battery Charger
9110-016	Receiver (Quad)
9110-017	Remote Control · PABX
9110-117	Remote Control · Central
911 O-01 8-202	Software Package 202
911 O-01 8-203	Software Package 203
911 O-01 8-204	Software Package 204
911 O-l 18-204	Software Package 204 Extended
911 O-l 18-205	Software Package 205
911 O-21 8-290	Software Package 290 (RMAT)
911 O-01 9-202-YY	Memory Expander, Generic 202
911 O-01 9-203-YY	Memory Expander, Generic 203
911 O-01 9-204-YY	Memory Expander, Generic 204
911 o-1 19-204-YY	PROM/RAM Expander, Generic 204
911 o-1 19-205-YY	PROM/RAM Expander, Generic 205
9 11 O-020	RAM Battery Pack
911 O-023	SX-200 Power Fail Transfer Card
911 O-024	SX-200 Cable Interconnect Card · used with Power Supply 9110-008
9110-124	SX-200 Cable Interconnect Card · used with Power Supply 91 10-108
911 O-025	SX-200 Maintenance Panel · used with Power Supply 9110-008
9110-125	SX-200 Maintenance Panel · used with Power Supply 9110-108
911 O-026	SX-200 Shelf Interconnect Cable
911 O-027	SX-200 Power Distribution Cable · used with Power Supply 9110-008
9110-127	SX-200 Power Distribution Cable · used with Power Supply 9110-108
9 11 0-030	Extension Feature Operation Guide · Plastic
9110-031	DID/TIE Trunk Circuit

TABLE 4-7
REPLACEABLE PARTS

ORDER NUMBER	DESCRIPTION
911 O-032 (E or F)	System Documentation
911 O-033	Console Operating Instruction · List Finder
9110-034 (E or F)	Extension Feature Operation · Paper
911 O-035	Complete Documentation
911 O-037 (E or F)	Console Operating instructions
911 O-044	SX-200 Heatsink · For use with Power Supply 9110-008
9110-144	SX-200 Heatsink · For use with Power Supply 9110-108
911 O-045	Console Interface Card
911 O-046	Backplane translator board
911 O-048	Console handset
911 O-049	Ringing Generator · 20Hz
9110-149	Ringing Generator · 17Hz
911 o-249	Ringing Generator · 25Hz
911 O-052	RS232 Adapter
911 O-059	Personal Speed Call Directory (25)

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E indicates English, F indicates French

TABLE 4-8
MAIN DOCUMENTATION PACKAGES

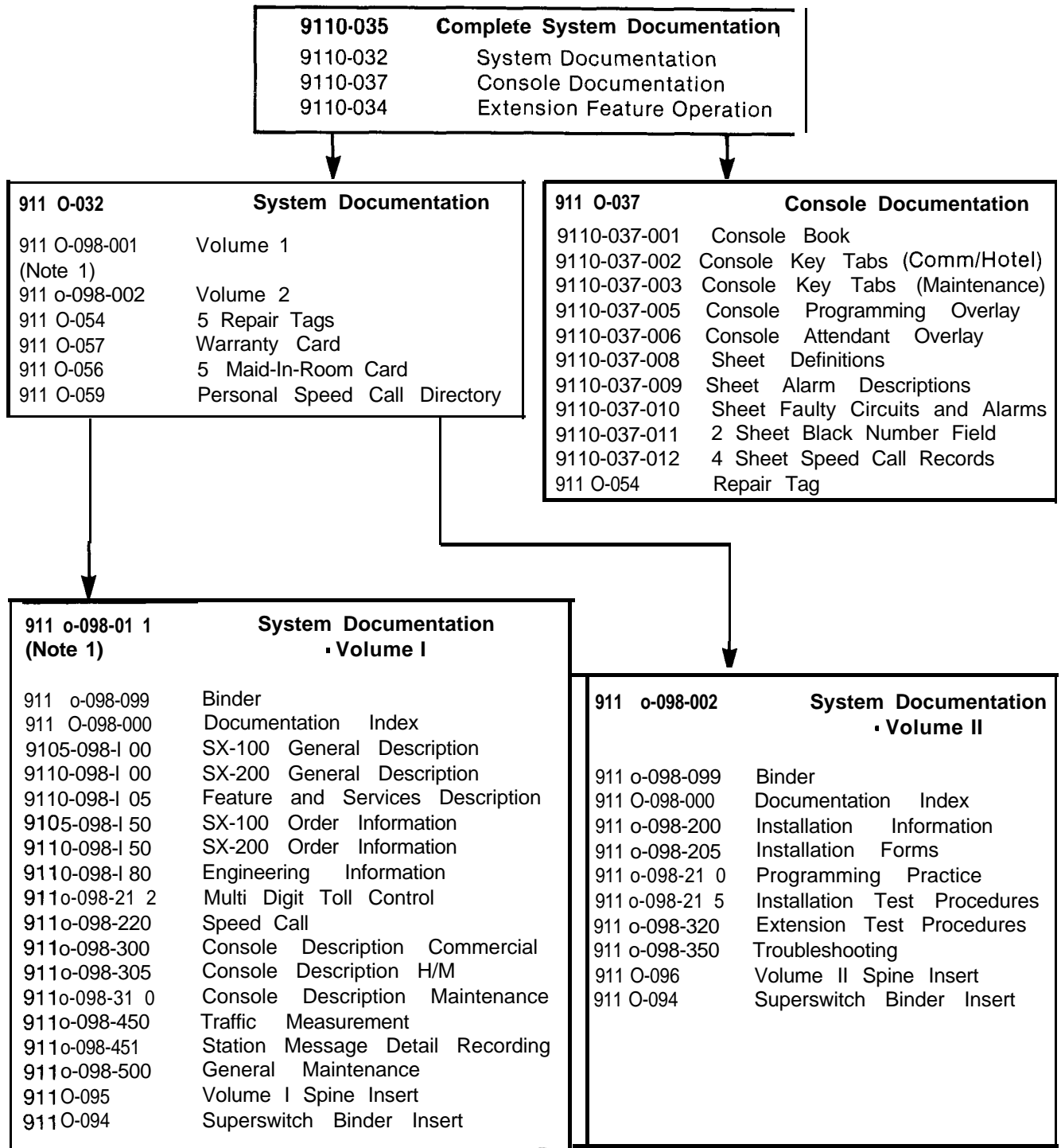| Description	Order Number	Comments
Complete Documentation	911 O-035 (E or F	See Table 4-10 for breakout of documentation packages.
System Documentation	91 10-032 (E or F	
Console Documentation	911 O-037	
List Finder	911 O-033	Supplied on special order only.
Extension Feature Operations Guide	9110-030 (E or F	Plastic
Mitel Action Procedures (MAPs)	See Table 4-9	
Extension Feature Operation	91 10-034 (E or F	Paper
RMAT Documentation	91 10-058	See Table 4-11

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Note: E indicates English, F indicates French

TABLE **4-9**
MAP DOCUMENTATION

P/N	MAP No.	Title
911 O-098-200-501	MAP200501	Set CO Trunk Switches
911 O-098-200-502	MAP200502	Set E&M Trunk Switches
911 O-098-200-503	MAP200-503	Set DID Trunk Switches
911 O-098-200-504	MAP200-504	Set Scanner Card Switches
911 O-098-200-601	MAP200-601	Shelf 2 Installation
911 O-098-200-602	M AP200-602	Install New' Cards
911 O-098-200-603	MAP200-603	Reserve Power Supply Installation
911 O-098-200-604	MA P200-604	Console Interface Board Installation
911 O-098-200-605	MAP200-605	Backplane Translator Board Installation
911 o-098-350-502	MAP350-502	Replace Interconnect Card
911 o-098-350-503	M AP350-503	Replace Power Fail Transfer Card
911 o-098-350-504	MA P350-504	Replace Console Interface Card
911 o-098-350-505	MAP350-505	Replace Shelf
911 o-098-350-506	MAP350-506	Replace Heat Sink Assembly
911 o-098-350-507	M AP350-507	Replace Power Supply Assembly
911 o-098-350-508	MAP350-508	Replace Reserve Power Supply
911 o-098-350-509	MAP350-509	Replace Translator Board
9110-098-350-510	MAP350-510	Replace Shelf Cards
911 o-098-350-51 1	MAP350-511	Replace Maintenance Panel
911 o-098-350-51 2	MAP350-512	Replace Wiring Harness

These MAPs are issued for the particular purposes as indicated in the titles.

TABLE 4-10
DOCUMENTATION PACKAGE DETAILS

9110-035	Complete System Documentation
9110-032	System Documentation
9110-037	Console Documentation
9110-034	Extension Feature Operation

911 O-032 **System Documentation**

911 O-098-001 (Note 1)	Volume 1
911 o-098-002	Volume 2
911 O-054	5 Repair Tags
911 O-057	Warranty Card
911 O-056	5 Maid-In-Room Card
911 O-059	Personal Speed Call Directory

911 O-037 **Console Documentation**

9110-037-001	Console Book
9110-037-002	Console Key Tabs (Comm/Hotel)
9110-037-003	Console Key Tabs (Maintenance)
9110-037-005	Console Programming Overlay
9110-037-006	Console Attendant Overlay
9110-037-008	Sheet Definitions
9110-037-009	Sheet Alarm Descriptions
9110-037-010	Sheet Faulty Circuits and Alarms
9110-037-011	2 Sheet Black Number Field
9110-037-012	4 Sheet Speed Call Records
911 O-054	Repair Tag

911 o-098-01 1 **System Documentation**
(Note 1) **▪ Volume I**

911 o-098-099	Binder
911 O-098-000	Documentation Index
9105-098-I 00	SX-100 General Description
9110-098-I 00	SX-200 General Description
9110-098-I 05	Feature and Services Description
9105-098-I 50	SX-100 Order Information
9110-098-I 50	SX-200 Order Information
9110-098-I 80	Engineering Information
911o-098-21 2	Multi Digit Toll Control
911o-098-220	Speed Call
911o-098-300	Console Description Commercial
911o-098-305	Console Description H/M
911o-098-31 0	Console Description Maintenance
911o-098-450	Traffic Measurement
911o-098-451	Station Message Detail Recording
911o-098-500	General Maintenance
911O-095	Volume I Spine Insert
911O-094	Superswitch Binder Insert

911 o-098-002 **System Documentation**
▪ Volume II

911 o-098-099	Binder
911 O-098-000	Documentation Index
911 o-098-200	Installation Information
911 o-098-205	Installation Forms
911 o-098-21 0	Programming Practice
911 o-098-21 5	Installation Test Procedures
911 o-098-320	Extension Test Procedures
911 o-098-350	Troubleshooting
911 O-096	Volume II Spine Insert
911 O-094	Superswitch Binder Insert

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NOTES: 1. Volume I System Documentation is normally supplied as a "Perfect Bound" Volume (9110-098-001), but may also be supplied in loose-leaf binder form (9110-098-011) when required.

TABLE 4-11
RMAT DOCUMENTATION

PIN	Title
9 11 O-058	RMAT Documentation consisting of:
9110-098-101	RMAT General Description
911 o-098-301	RMAT Operation Practice
911 O-037-004	Console Key Tabs (RMAT)
911 O-037-007	Console RMAT Overlay

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SX-IOO* AND SX-200*
SUPERSWITCH*
ELECTRONIC PRIVATE BRANCH EXCHANGE
ENGINEERING INFORMATION

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1. GENERAL

Introduction

1.01 This section provides engineering informa- tion for the SX-100 and SX-200 electronic Private Automatic Branch Exchanges (PABX's).

Reason For Reissue

1.02 This section is being reissued to include Generic 205 information.

2. SYSTEM OVERVIEW

General

2.01 The SX-100 and SX-200 are advanced elec- tronic PABX's employing digitally controll- ed solid-state, space-division switching with stored program control. The capacities of the PABX's are as follows:

- SX-100. A total capacity of 160 ports, of which 112 are available for assignment to lines, trunks and additional receivers

- SX-200. A total capacity of 256 ports, of which 208 ports are available for assign- ment to lines, trunks and additional receivers

- Each line requires 1 port, each trunk re- quires 2 ports and each additional receiver requires 4 ports (dual) or 2 ports (quad)

- The remaining ports are reserved for receivers, common control and special functions

- The maximum possible combination of trunks and lines which can be ac- comodated is dependent upon the number of receivers installed and is illustrated in Fig. 2-l.

2.02 The PABX's are electrically compatible with most existing extension key telephone, Private Branch Exchange (PBX) and Central Office (CO) equipment and provide -

- service to a maximum of four individual customers

- the use of a flexible numbering plan

- The simultaneous use of DTMF and rotary dial (RD) stations

- optional use of attendant consoles - 2 max- imum

- the sharing of attendant consoles between customers

- extensive selection of standard and op- tional features

- freedom from scheduled maintenance

- automatic diagnostics

- six power fail transfer circuits (SX-100)

- twelve power fail transfer circuits (SX-200)
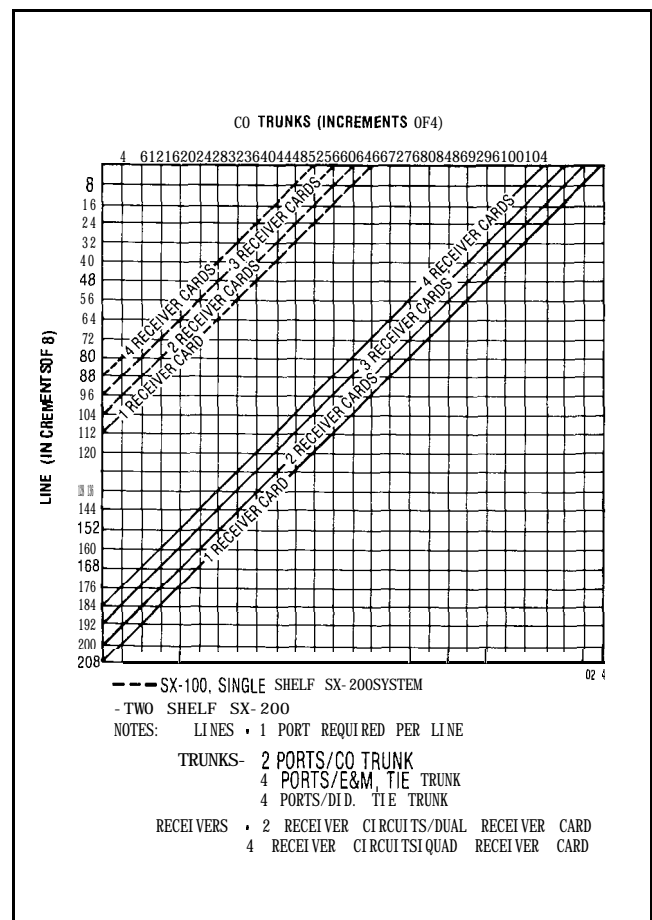
- optional reserve power supply

Fig. 2-l   Maximum Line and Trunk Configuration

2.03 The SX-100 consists of a single cabinet (containing the switching circuitry and the system power supplies) and a cordless desk-type

attendant console equipped with pushbutton dial pad and control keys. The equipment may optionally be supplied as a cabinet with a wail mounting assembly (Part 3).

2.04 The SX-200 consists of a single cabinet (containing the switching circuitry and the system power supplies) and a cordless desk-type attendant console equipped with pushbutton dial pad and control keys.

2.05 Connections between the equipments, the consoles, and the distribution frame are made using connectorized 25 pair cables.

2.06 Noiseless operation, exceptionally small size, and environmental tolerance allow a wide choice of locations for the equipment.

Maintenance

2.07 The modular design and functional packaging of the equipment systems permit rapid location and replacement of defective equipment. Circuit malfunctions are detected by diagnostic routines automatically initiated by the CPU. These diagnostic routines which are detailed in Section MITL9105/9110-98-500, and the use of MITEL Action Procedures (MAP), direct service personnel to the defective circuit card or assembly, and indicate the required field-replaceable unit. Diagnostic routines and maintenance procedures do not interfere with users not affected by the malfunction. Preventative maintenance is limited to the replacement of the RAM battery pack every 4 years.

2.08 System expansion is achieved by the addition of plug-in line and trunk printed circuit cards. Lines are added in increments of eight, CO trunks in increments of four, and tie trunks in increments of two.

3. PHYSICAL DESCRIPTION

A. SX-100 Equipment

3.01 The SX-100 equipment can be supplied in one of two versions-

·   as a complete cabinet intended for mounting on a pedestal or table or

·   as a cabinet which, with the addition of a wall-mount kit, can be mounted on a wall,

SX-100 Cabinet (Basic Version)

3.02 The SX-100 equipment cabinet (See Fig. 3-1) is of metal construction and has the following dimensions: Height 16.62in. (422mm), width 25in. (635mm), and depth 18.5in. (470mm). The weight of a fully equipped PABX is approximately 701 bs. (31.8kg).

3.03 All connections from the cross-connecting terminals to the SX-100 equipment cabinet are made using connectorized cables. Connections between the cross-connecting terminals, the attendant console and external equipment are made in accordance with accepted practice.

3.04 The door on the front of the cabinet provides access to the system maintenance panel and the printed circuit cards. The removable rear panel provides access to the system power supply, and the line and trunk connections. Cable entry to the equipment cabinet is provided through a cable duct in the rear of the cabinet.

Cabinet Components

3.05 The equipment cabinet holds the maintenance panel, an equipment shelf and the primary power supply.

Maintenance Panel

3.06 The maintenance panel, mounted at the top of the cabinet, provides access to the system from the maintenance console through a 50 pin connector. To the left of the maintenance plug is the master power fail switch and five power fail transfer control switches. In addition, a test line is provided which allows service personnel to access individual lines and trunks.

Equipment Shelf

3.07 Mounted directly below the maintenance panel is the equipment shelf. This shelf contains the system control logic plus a number of trunk, line, and receiver cards. All connections between shelves and external equipment are made by connectorized cables from the rear of the shelf. The system primary power supply, located to the right of the equipment shelf, converts the commercial input power to the required system voltage levels.

3.08 The equipment shelf holds up to 22 printed circuit cards (3.22) which plug into the shelf backplane. On the rear of the backplane are a number of multipin plugs providing interconnections between the shelves and external equipment. In addition to the plugs are a number of screw down terminals allowing shelf connection to the primary power supply unit. The equipment shelf (Fig. 3-5) measures 10.75in. (273mm) high, 19in. (480mm) wide, 16.375in. (415mm) deep, and weighs approximately 27lbs. (12.3kg) fully equipped.

CABINET DOOR   EQUIPMENT SHELF   POWER SUPPLY

FRONT VIEW

PRIMARY POWER SUPPLY

CABLE CLAMPS

REAR VIEW

WEIGHT	HEIGHT	WIDTH	DEPTH
70lbs (31.8kg)	16.62in. (422mm)	25.0in. (635mm)	18.5in. (470mm)
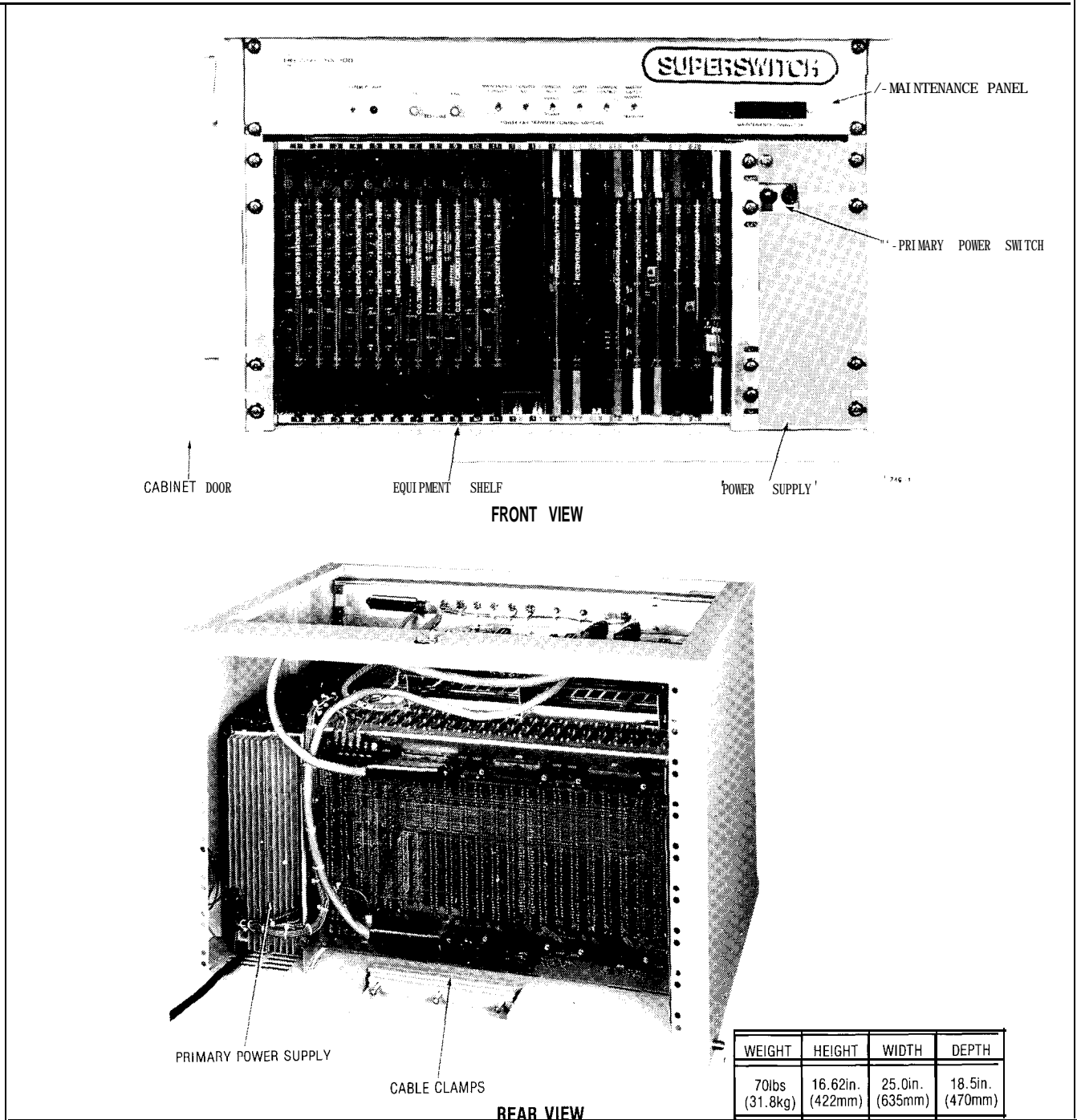
Fig. 3-1 Equipment Cabinet

Primary Power Supply

3.09 The system primary power supply mounted to the right of the equipment shelf (total weight 16lbs, 7.3kg) provides all system power from a 115Vac (optionally 230Vac), 44Hz to 64Hz commercial supply.

SX-100 Cabinet (Wall-mount Version)

3.10 The SX-100 cabinet can be mounted on a wall surface by means of a wall-mount kit. Strikes and pivot pins, which form part of the kit, are attached to the cabinet (Fig. 3-2) which allows the cabinet to be securely fastened to the wall mount assembly. This method of attachment allows the cabinet to be swung down for installation and maintenance purposes.
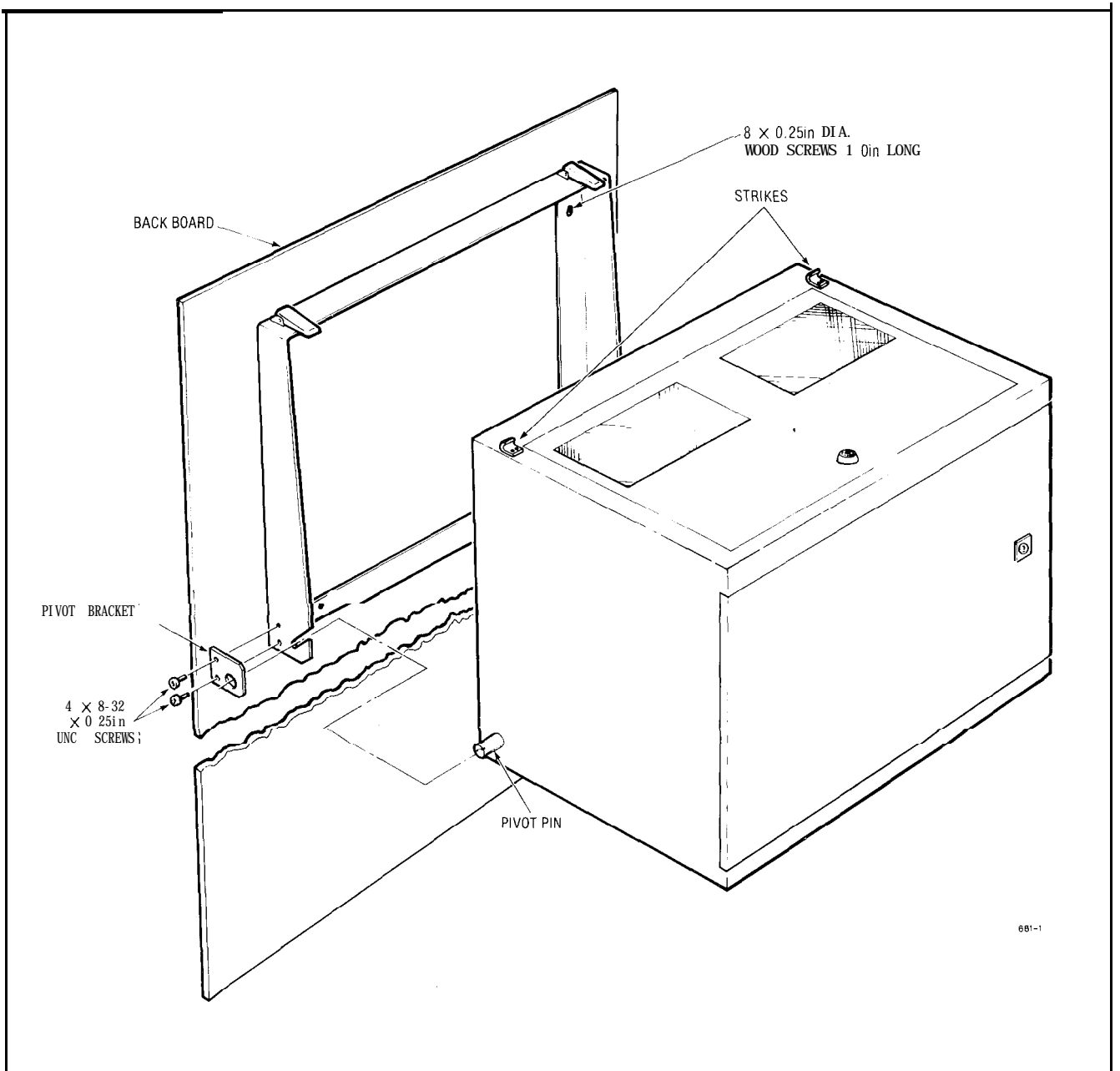
Fig. 3-2   SX-100 (Wall Mount Version)

Reserve Power

3.11 The reserve power supply is designed to maintain complete system operation for a minimum of two hours in the event of a primary power failure. The reserve power supply is housed in a completely enclosed unit and forms a base unit on which the standard SX-100 cabinet can be mounted (Fig. 3-3). A cable harness is supplied to interconnect the two units. In the case of the wall mounted version of the SX-100 the reserve power supply may be installed adjacent to the SX-100.

B. SX-200 Equipment

General

3.12 The SX-200 equipment cabinet (See Fig. 3-4) is of metal construction and has the following dimensions: Height 38in. (965mm), width 23.5in. (600mm), and depth 27.5in. (700mm). The weight of a fully equipped PABX is approximately 2901 bs. (131.7kg).

3.13 All connections from the cross-connecting terminals to the SX-200 equipment cabinet are made using connectorized cables. Connections between the cross-connecting terminals, the attendant console and external equipment are made in accordance with accepted practice.

3.14 A reserve power supply and battery charging system are available as an option. The reserve power supply is designed to maintain system operation for a minimum of two hours in the event of a primary power failure.

SX-200 Equipment Cabinet

3.15 The door on the front of the cabinet provides access to the system maintenance panel, printed circuit cards and reserve battery supply shelf. The hinged rear panels hold the system power supply, and provides access to the line and trunk connections, and the reserve power controls. Cable entry to the equipment cabinet is provided through cable ducts on either side of the cabinet.

3.18 The maintenance panel, mounted at the top of the cabinet, provides access to the system from the maintenance console through a 50 pin connector. To the left of the maintenance connector is the master power fail switch and five power fail transfer control switches. In addition, a test line is provided which allows service person-

nel to make calls and to access special maintenance functions. Mounted directly below the maintenance panel is equipment shelf 2. This shelf holds up to 12 line and/or trunk cards. Below equipment shelf 2 is equipment shelf 1. This shelf contains the system common control cards plus a number of trunk, line, and receiver cards. The optional reserve power supply is contained in a completely enclosed shelf located at the bottom of the cabinet. Connections between shelves and external equipment are made by connectorized cables from the rear of each shelf. The system primary power supply, held on the lower hinged back panel of the cabinet, convects the commercial input power to the required system voltage levels.

Maintenance Panel

3.17 The plug on the right of the maintenance panel permits the maintenance console to be used by the service personnel to perform maintenance tasks and enter new, or modify existing customer data using the maintenance console. The test line terminals on the panel, allow the use of a standard hand test-set (butt-in) to establish calls through the system using preselected circuits. The power switch on the maintenance panel controls the application of power to the equipment shelves.

Equipment Shelves

3.18 Equipment shelf 1 holds up to 22 printed circuit cards which plug into the shelf backplane. On the rear of the backplane are a number of multipin type plugs providing interconnections between the shelves and external equipment. In addition to the plugs are a number of screw down terminals, allowing shelf connection to the primary power supply unit. The equipment shelves (Fig. 3-5) measure 10.75in. (273mm) high, 19in. (480mm) wide, 16.375in. (415mm) deep, and weigh approximately 27lbs. (12.3kg) fully equipped. Equipment shelf 2 is identical in construction to equipment shelf 1 and holds up to 12 additional line or trunks cards.

Primary Power Supply

3.19 The system primary power supply (Fig. 3-6) mounted directly on the cabinet back panel, (total weight 70lb, 31.8kg) provides all system power from either a 115Vac, or a 230Vac, 44Hz · 64Hz commercial supply.
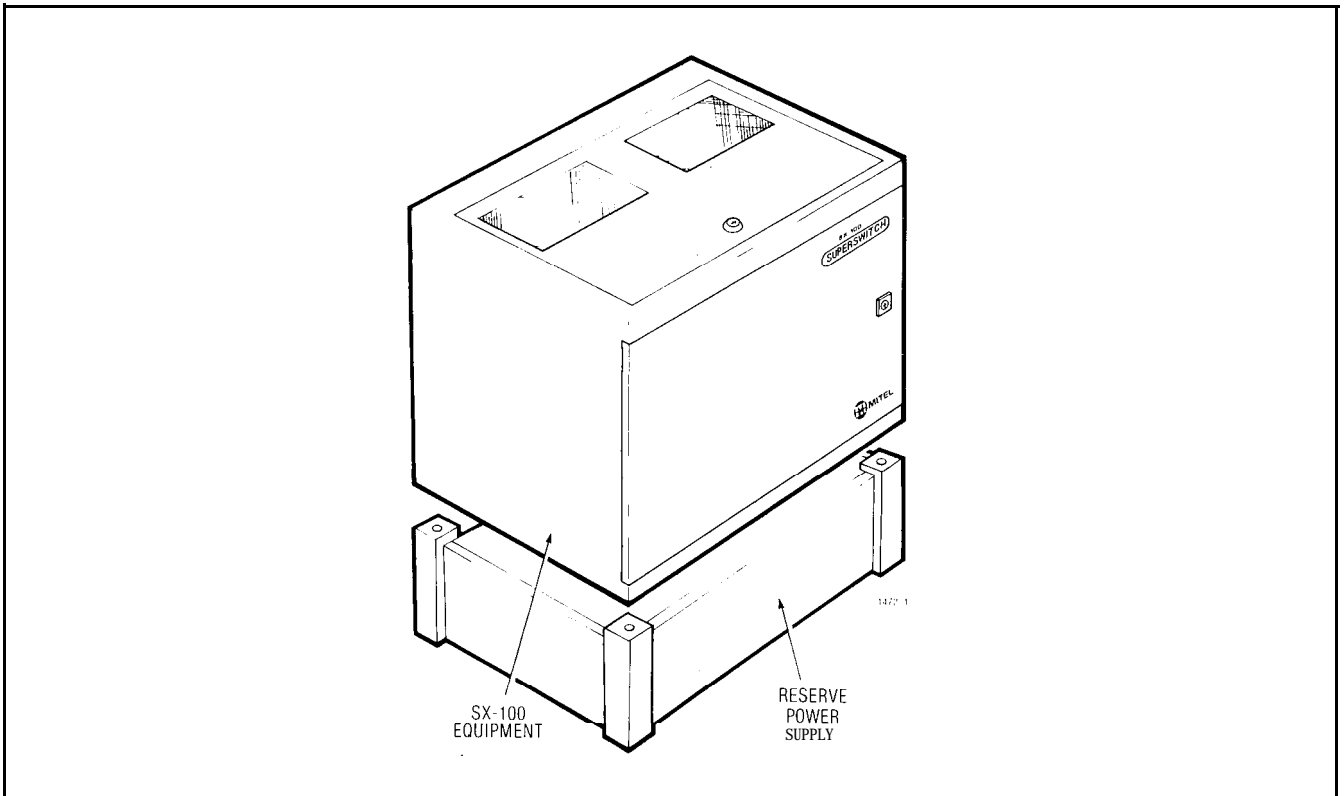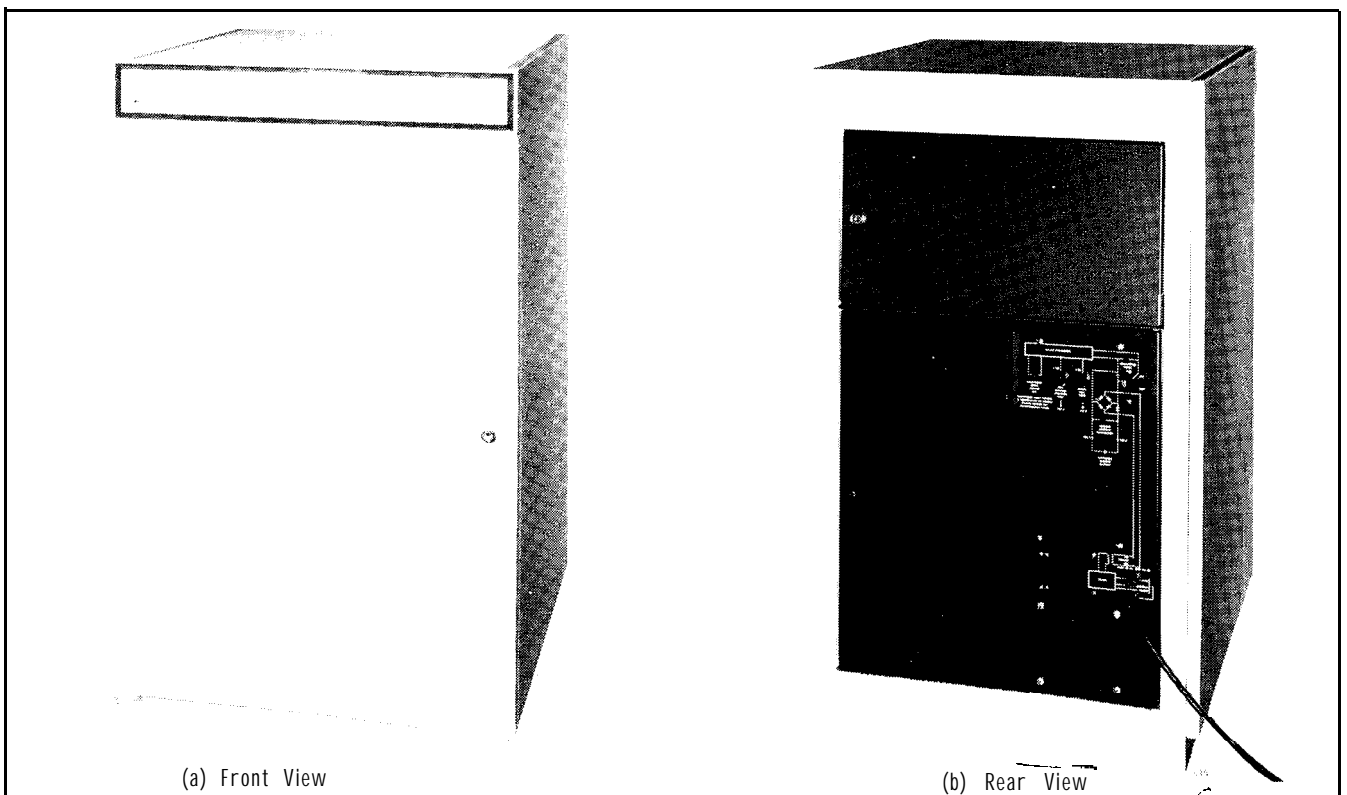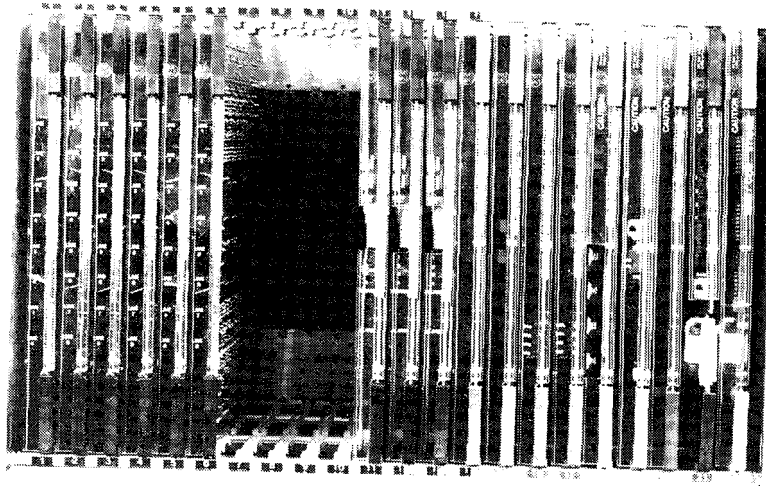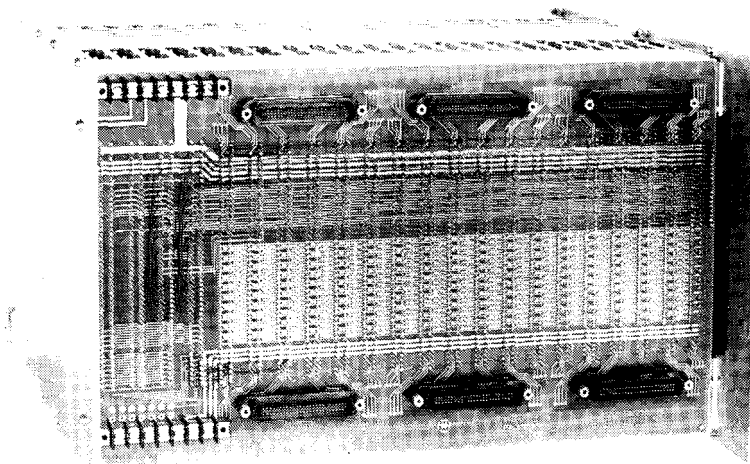
Fig. 3-3 SX-100 and Reserve Power Supply

(a) Front View   (b) Rear View

Fig. 3-4 Equipment Cabinet

Front View

Rear View

Fig. 3-5 Equipment Shelf

Reserve Power

3.20 The reserve power supply is designed to maintain complete system operation for a minimum of two hours in the event of a primary power failure. The power battery supply is housed in a completely enclosed shelf measuring 7in. (178mm) high, 19in. (483mm) wide, 15in. (381mm) deep and weighing approximately 95lbs (43kg). The charging unit measures 7in. (178mm) high, 5in. (127mm) wide, 14in. (355mm) deep, weighs 141bs (6.4kg), and mounts inside the SX-200 cabinet (Fig. 4-l).

C. **Common Components, SX-100 and sx- 200**

Printed Circuit Cards

3.21 All circuit cards (Fig. 3-7) within the PABX are identical in construction and consist of a fiberglass board with printed wiring patterns on both of its faces. Riveted to the front of each board is a transparent faceplate which allows the LEDs mounted on the front of the boards to be easily seen. The two color-coded card extractors located at the top and bottom of the faceplate identify the card position within a shelf and ensure that the card is seated correctly in the backplane connector.
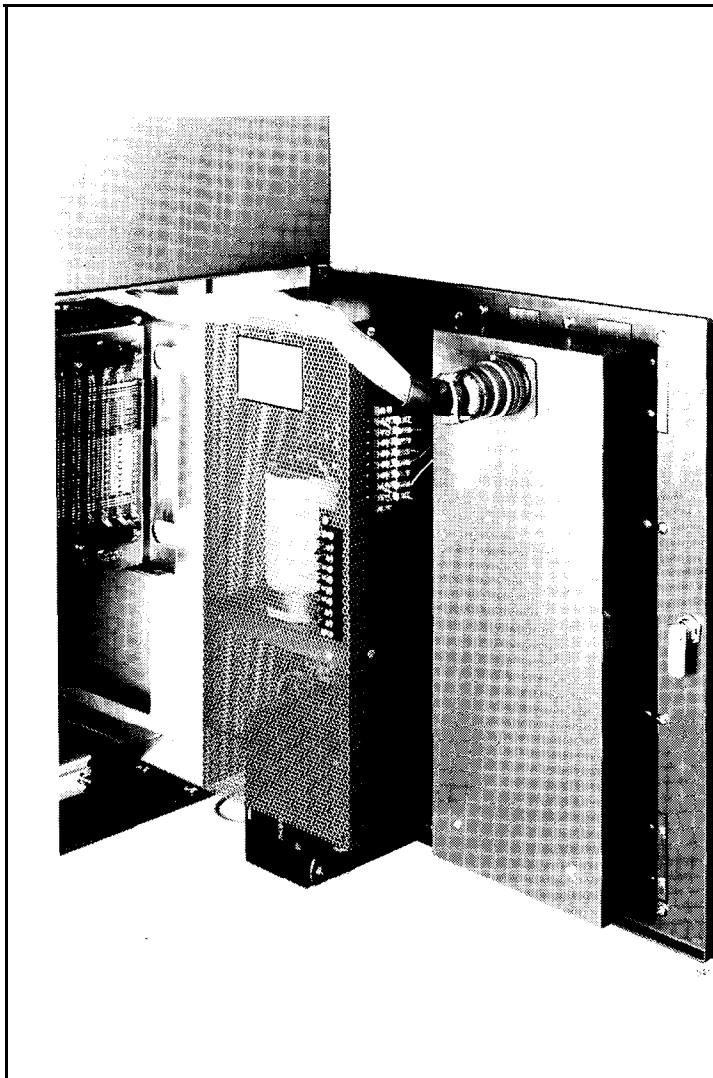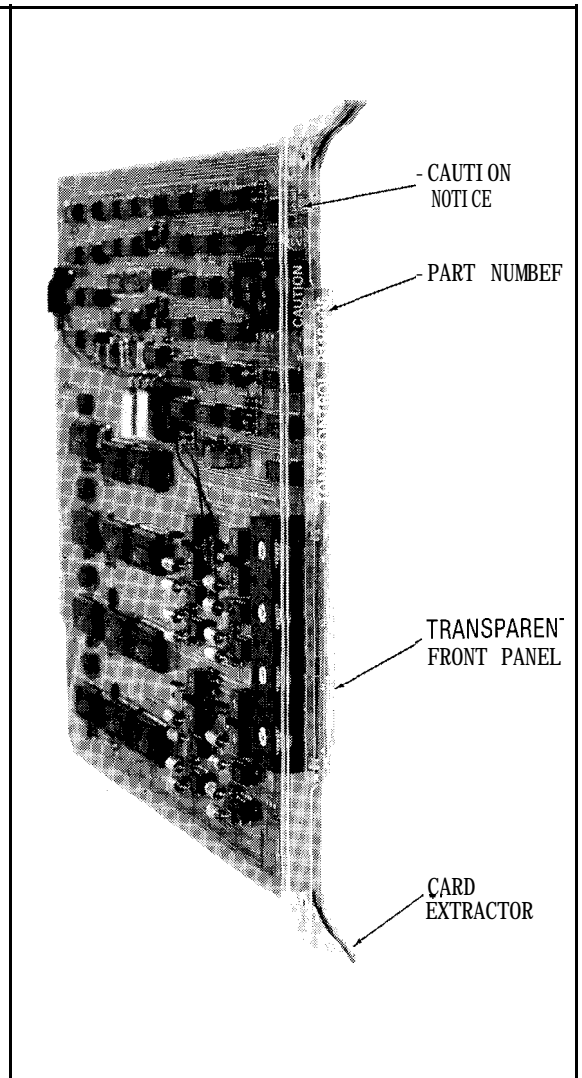

Fig. 3-6 Primary Power Supply

- CAUTION NOTICE
- PART NUMBEF
TRANSPAREN⁻ FRONT PANEL
ÇARD EXTRACTOR

Fig. 3-7 Typical Printed Circuit Card

Attendant Console

3.22 The attendant console (Fig. 3-8) is enclosed
in a housing with a black plastic faceplate.
Located on either side of the console are a pair of
headset/handset jacks allowing simultaneous
operation and supervision. The console keyboard
holds three rows of ten nonlocking keys for the
selection of features and completion of calls. On
the right of the keyboard is a 12-key pushbutton
dial pad. The console display, mounted above the
keyboard, displays the active states of calls in
progress. In addition to the call status display is a
busy lamp field, a trunk group status field, a call
waiting indicator, a digital clock, and three alarm
indicators. The weight of the attendant console is
approximately 13lbs (5.9kg) and its dimensions
are: 13.75in.(350mm) wide, 6.8in. (173mm) high,
9.25in. (235mm) deep.

A complete description of the attendant console
is given in Section MITL9105/9110-98-300 Atten-
dant Console Description and its operation in the
Console Operating Instructions handbook.

**Programming and Maintenance Console and
Hotel/Motel Console**

3.23 The physical construction of the Programm-
ing and Maintenance console and the
Hotel/Motel console are identical to that of the at-
tendant console. The only difference is in the
functions of the call and feature selection keys
which may be designated using the push-out tabs
supplied. A complete description of the
Hotel/Motel console is given in Section
MITL9105/9110-98-305 and it's operation in the
Console Operating Instructions handbook. The
description of the Programming and Maintenance
console is given in Section MITL9105/9110-98-310.

Fig. 3-8 Console

4. SYSTEM CONFIGURATION

General

4.01 Fig. 3-1 shows the SX-100 cabinet which incorporates the equipment shelf, maintenance panel and primary power supply mounted from the front of the cabinet.

4.02 Fig. 4-1 shows the SX-200 cabinet which incorporates two Equipment Shelves, the Maintenance Panel, the optional Reserve Power Supply mounted in the base of the cabinet and the Primary Power Supply mounted on the lower rear door.

4.03 These units are described in more detail below.

Equipment Shelves

4.04 The Equipment Shelves contain the PCB cards in the necessary quantities required for a particular configuration, as illustrated in Fig. 4-2. Shelf 1 must always be included as it contains all the necessary control circuitry. Shelf 2 is included on the SX-200 when the number of line cards, trunk cards and receiver cards exceeds 15.

4.05 Equipment Shelf 1 contains the five common control cards plus the required number of line, trunk, and receiver cards. The common control cards are color-coded and held in card positions 18 through 22. The console control cards occupy positions 16 and 17; the first receiver card is held in position 15. These card positions are fixed for all systems. Card positions 1 through 14 may be equipped with line, trunk or receiver cards as shown in Fig. 4-2. If there is a requirement for the PABX to be accessed from a Mitel RMAT System (see Section 9105/9110-98-101) the second Console Control card is replaced by a Remote Control · PABX card (Fig. 4-2).

4.06 Equipment Shelf 2 (SX-200) is identical in construction to Shelf I and provides for 12 additional card positions which may house line and/or trunk cards as required. Card position 13 through 22 are not used. Access to shelf 2 is made through the shelf interconnect cables plugged into the rear of each shelf.
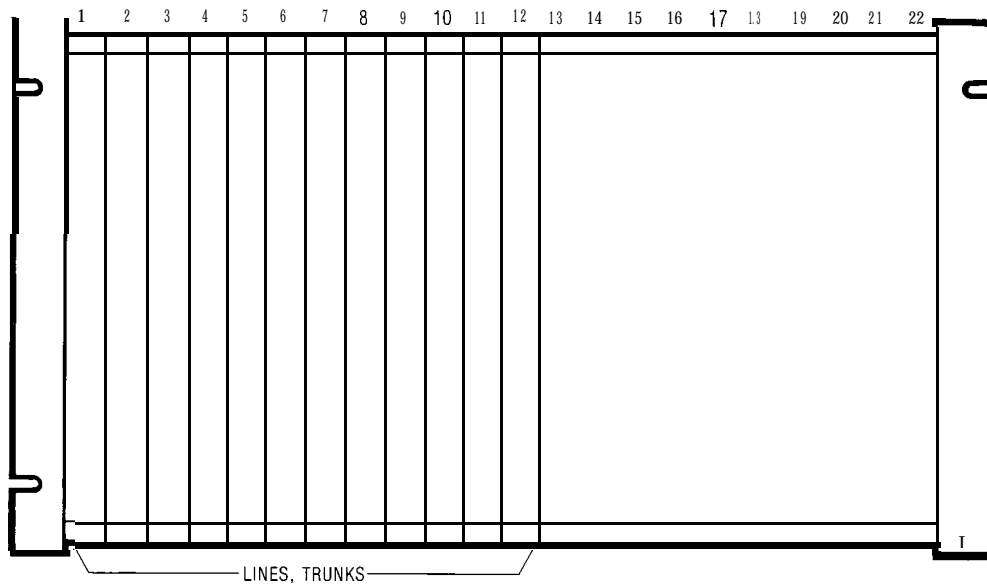
4.07 A brief description of each card type is given below:

- **Line Card.** Provides 8 line circuits which serve as interfaces between the station equipment and switching circuitry.

- **Trunk Card.** Provides interfacing either between the Central Office and the PABX switching circuitry for 4 CO trunks; or between other PABX's and the SX-lOO/SX-200 for 2 tie trunks.

- **Receiver Card.** Contains either four (Quad) or two (Dual) receivers, each of which can detect either rotary dial or DTMF digits, and transfer them to a temporary store for call processing.

- **Console Control Card.** This card provides the interface between the common control and two consoles. The first console control card (in position 17) is assigned to Attendant Console 1 and the Maintenance Console. The second console control card (in position 16) is assigned to Attendant Console 2.

- **Remote Control · PABX Card.** This card allows the PABX to be accessed from a remote maintenance centre for the purpose of conducting administrative, maintenance and test routines on the PABX. The card is not normally supplied with the PABX and forms part of the RMAT System (consult Section MITL9105/9110-98-101 Remote Maintenance, Administration and Test System).

- **Tone Control Card.** All call progress tones are supplied by this card. In addition this card contains the DTMF and DP generators, voice paging circuitry, music-on-hold circuitry and diagnostic testing functions.

- **Scanner Card.** Sequentially scans all ports to detect signals that require processor action. This card also contains the night bell and paging control relays.

- **PROM/CPU Card.** The card contains part of the system operating software in the form of a PROM card module on the CPU card. The CPU card also contains the microprocessor and associated circuitry.

- **Memory Expander Card.** This provides additional memory space for the operating programs.

- **PROM/RAM Expander Card.** Is identical to the Memory Expander Card except for additional CMOS RAM memory for customer data (e.g. Speed Call, Automatic- Wake-Up and Toll Control).

Front View

CABLE ENTRY

PRIMARY POWER SUPPLY

Rear View
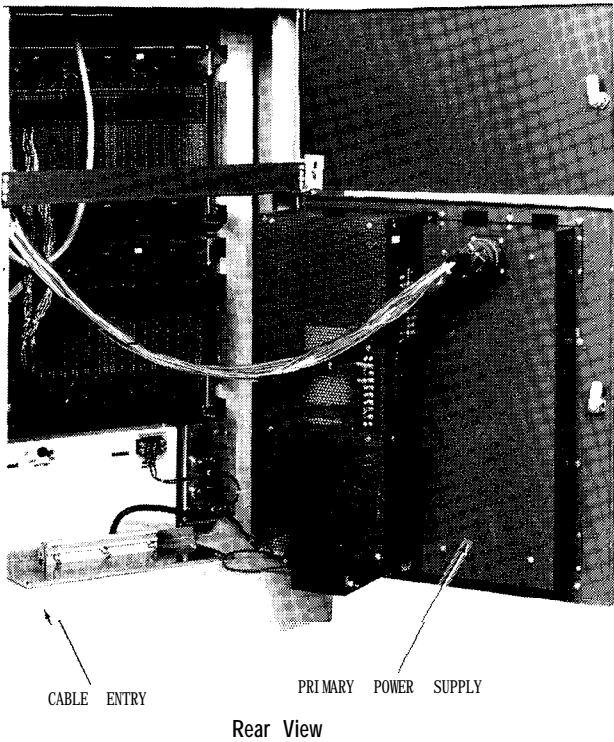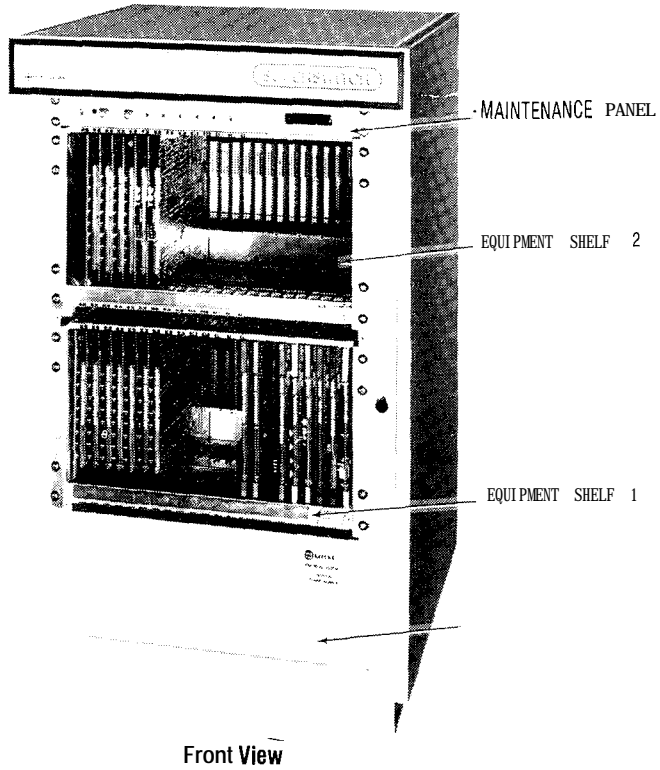
WEIGHT	HEIGHT	WIDTH	DEPTH
290lb (131.7kg)	38.0in. (960mm)	23.5in. (600mm)	27.5in. (700mm)

Fig. 4-1 Cabinet Layout

SHELF 2 (SX-200 ONLY)

FRONTVIEW

SHELF 2 (SX-200 ONLY)

Column labels Shelf 1 positions 13–22:
RECEIVER/LINE/TRUNK
RECEIVER/LINE/TRUNK
RECEIVER/LINE/TRUNK
RECEIVER
CONSOLE CONTROL/REMOTE CONTROL - PABX
CONSOLE CONTROL
TONE CONTROL
SCANNER
PROM/CPU
MEMORY EXPANDER OR PROM RAM EXPANDER
RAM/COS.

LINES, TRUNKS
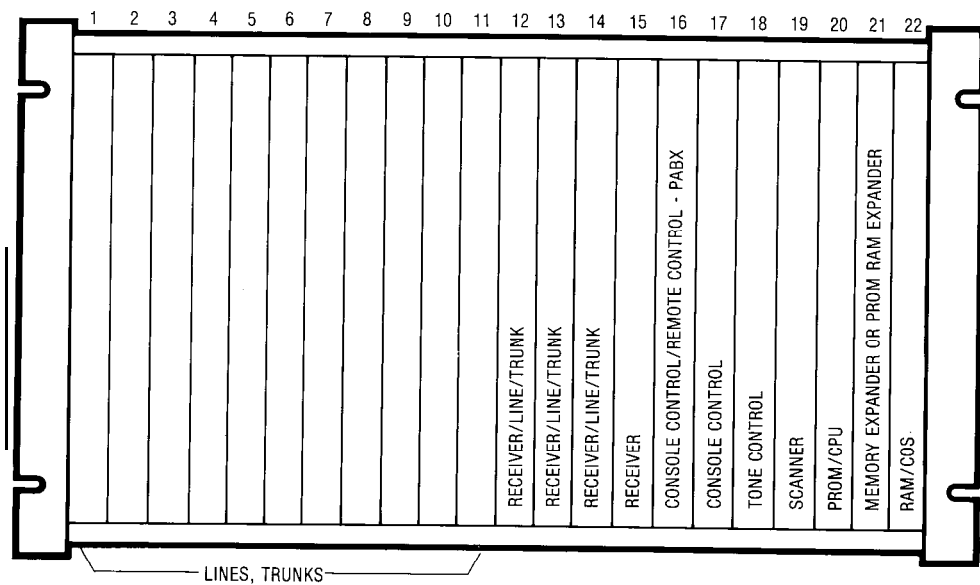
FRONTVIEW

SHELF 1

Fig. **4-2** Shelf Card Positions

RANDOM ACCESS MEMORY
THE SCRATCHPAD RAM KEEPS TRACK OF ACTIVE
INFORMATION WITHIN THE PABX
. DIALING
. RECEIVERS
. SPEECH PATHS IN USE
. PAGING
. CONFERENCES
  ETC

RAM/COS CARD

SCRATCHPAD	CMOS
SK BYTE	2K BYTE
VOLATILE	NON-VOLATILE

NI-CAD BATTERY

— SHELF-LIFE OF APPROX. 4 YRS.
MAINTAINS COS MEMORY FOR APPROX. 4
WEEKS WITH NO POWER APPLIED TO SYSTEM
(LED INDICATOR LIT WHEN BATTERIES ARE
BEING CHARGED)
- CAN BE REMOVED WHILE SYSTEM IS UNDER
POWER

PROM

THE RAM/COS MEMORY CONTAINS ALL OF THE
CUSTOMER PROGRAM INFORMATION.
• SYSTEM OPTIONS SELECTED
• FEATURES
• ACCESS CODES
• CLASSES-OF-SERVICE
• EXTENSION NUMBERS
  ETC

THE PROM/CPU AND MEMORY EXPANDER CARDS
CONTAIN PROMS WHICH PROVIDE FACTORY
PROGRAMMED MEMORY FOR PARTICULAR
GENERICS, 28K BYTES FOR THE PROM/CPU AND
CAPABILITY FOR 28K BYTES FOR THE MEMORY
EXPANDER

PROM/CPU CARD

PROM	CENTRAL PROCESSING UNIT
	6800
	MICROPROCESSOR

PROM/RAM OR
MEMORY EXPANOER CARD

| PROM | CMOS |
| | RAM |

THE SCANNER CARD CONTINUOUSLY SCANS ALL
PORTS FOR A CHANGE THAT REQUIRES THE
ACTION OF THE PROCESSOR.
• GENERATES INTERRUPT PULSE TO CPU
• LOCATION OF THE CONTROL RELAYS K1 K5
• LED WINDOWS TO AID IN DIAGNOSTICS

SCANNER CARD

CARD SELECT BUS

31 SPEECH PATHS

| LINE CARD | TRUNK CARD | Rx CARD | TONE CONTROL CARD |

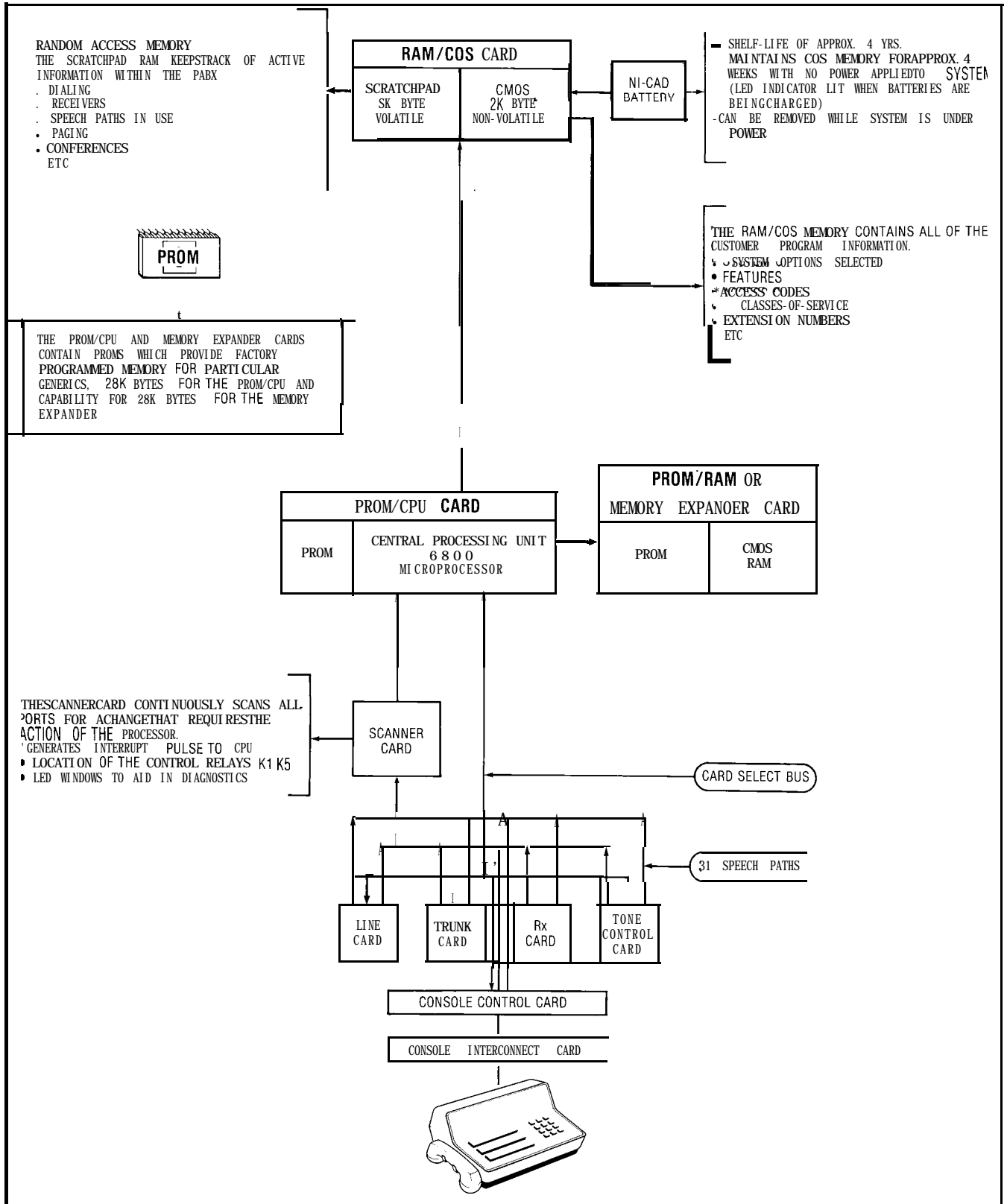CONSOLE CONTROL CARD

CONSOLE INTERCONNECT CARD

Fig. 4-3 Data Flow Interconnections

- **RAM/Class of Service Card.** Provides Random Access Memory for customer data and scratch pad applications. The customer data memory is protected from power failure by a card-mounted battery pack.

4.08 Fig. 4-3 illustrates the basic interconnections of the foregoing cards to provide the desired facilities. Reference should be made to Part 7 for circuit descriptions.

Primary Power Supplies

4.09 The SX-100 and SX-200 primary power supplies generate the system operating voltages of + 8V, – 5V, – 10V, – 48V and 90Vac ringing voltage, from a 115Vac power mains input (optionally 230Vac for the SX-200). These units are fully described in Parts 8 and 9.

4.10 Separately mounted on the top of the SX-100 equipment shelf are power fail transfer relays. In the SX-200 cabinet these are separately mounted on the left-side of the equipment cabinet (as viewed from the rear). These relays allow for the connection of up to 6 Central Office trunks to selected SX-100 PABX stations or 12 Central Office trunks to selected SX-200 PABX stations, in the event of a major system failure.

Attendant Console

4.11 The attendant console is shown in Fig. 3-8. The three rows of buttons on the console faceplate are used to select and handle calls. Each button has a light emitting diode (LED) associated with it to indicate the status of the call appearing on that button.

4.12 The console display area provides the attendant with specific information concerning the call which is being handled, as well as general information such as the time of day, and the busy/idle status of PABX stations, trunks and trunk groups.

5. FEATURES

General

5.01 The PABX's offer a number of features which are provided by various software packages, known as Generic packages. Table 5-l lists the features, and indicates in which Generic package they are provided. Generic 202 is the basic package, all others are optional. A full description of these features appears in MITL9105/9110-98-105. Certain limitations apply in the use of the System Features and these are listed in Table 5-2.

Class Of Service

5.02 The Station features can, for convenience, be grouped into sets of different classes of service (up to a maximum of 16 sets), each class of service incorporating a different combination of features. Every extension assigned a particular class of service is governed by the features and restrictions allocated to that class of service.

5.03 Section MITL9105/9110-98-210 fully describes the System programming which allows the features to be properly coordinated with the system requirements for the trunks, extension lines and attendant console. The customer's particular requirements are met by entering the appropriate data from the attendant (or maintenance) console; the Class of Service Option being one example of the data sets entered.

8. SYSTEM ENVIRONMENTAL AND INSTALLATION REQUIREMENTS

General

6.01 This part is concerned with the design parameters of the PABX's in so far as they are effected by environmental conditions. Electrical characteristics and performance are detailed in the subsequent parts of this section.

6.02 The parameters in this Part are segregated into the following sub-parts:

- Design data and compatibility as detailed in 6.03 and 6.04
- Shipping and storage data as detailed in **6.05**
- Installation requirements as detailed in 6.06 to 6.09

Design Data

6.03 The PABX systems are designed to operate within the following environmental conditions:

- **Temperature** · The systems operate satisfactorily in the range of 0" to 40" C maximum. These are ambient temperatures as measured at a point 59.1in. above the floor and 1.5in. in front of the equipment.
- **Relative Humidity Range** · The system operates when subjected to a relative humidity range of 10% to 90%, non-condensing.

TABLE 5-I SYSTEM FEATURES

Feature	202	203	204	205
Account Codes			•	
Alphanumeric Display for Attendant Position	•	•	•	●
Attendant Camp-On	•	•	•	•
Attendant CCSA Access		•	•	•
Attendant Console (Maximum 2)	•	•	•	•
Attendant Control of Trunk Group Access	•	•	•	•
Attendant Controlled Conference		•	•	•
Attendant Flash Over Trunks	•	•	•	•
Attendant Lockout	•	•	•	•
Attendant Position (2 Max.)	•	•	•	•
Attendant Transfer - All Calls	•	•	•	•
Automatic Callback Busy/Don't Answer (Station to Station Calls)	•	•	•	•
Automatic Callback - Busy (Station to Trunk)	•	•	•	•
Automatic Night Service Switching	•	•	•	•
Automatic Queuing to Attendant Position	•	•	•	•
Broker's Call	•	•	•	•
Busy Lamp Field	•	•	•	•
Busy Verification of Station Lines	•	•	•	•
Call Forwarding - All Calls	•	•	•	•
Call Forwarding - Busy And Don't Answer	•	•	•	•
Call Forwarding - Busy Line (DID)		•	•	•
Call Forwarding - Don't Answer (DID)		•	•	•
Call Hold		•	•	•
Call Pick-Up	•	•	•	•
Call Waiting Service				
Attendant Call Waiting	•	•	•	•
Terminating Call Waiting	•	•	•	•
Distinctive Tone Signals	•	•	•	•
Calling Number Display to Attendant	•	•	•	•
Calls Waiting Indication at Attendant Position	•	•	•	•
CCSA Access		•	•	•
Class of Service Display to Attendant	•	•	•	•
Code Calling Access	•	•	•	•
Code Restriction			•	•
Conference Calling	•	•	•	•
Contact Monitor†	•	•	•	•
Controlled Outward Restriction		•	•	•
Controlled Station-To-Station Restriction		•	•	•
Controlled Termination Restriction		•	•	•
Controlled Total Restriction		•	•	•
Data Restriction	•	•	•	•
Date Display on Console(s)			•	•
Diagnostics - Automatic	•	•	•	•
Dial Access to Attendant	•	•	•	•
Digital Clock on Attendant Position	•	•	•	•
Direct Department Calling (DDC)	•	•	•	•
Direct Inward Dialing (DID)		•	•	•
Direct Outward Dialing (DOD)	•	•	•	•
Direct Termination of Miscellaneous Circuits On Attendant Position (Paging)†	•	•	•	•
Direct Trunk Group Selection (DTGS)	•	•	•	•
Directed Call Pick-Up	•	•	•	•
Hold-For-Pick-Up Option	•	•	•	•
Distinctive Ringing	•	•	•	•
DTMF And/Or DCKP On Attendant Position	•	•	•	•
DTMF Calling	•	•	•	•
DTMF To Dial Pulse Conversion	•	•	•	•
Dump and Load of Customer Data			•	•
Executive Override	•	•	•	•
Flash for Attendant	•	•	•	•
Flexible Numbering of Stations	•	•	•	•
Foreign Exchange (FX) Access	•	•	•	•

† Requires external customer provided equipment

Feature	202	203	204	205
Fully Restricted Station	•		•	•
Identified Trunk Group			•	•
Immediate Audible Ring on Attendant Handled Calls	•	•	•	•
Immediate Ring	•	•	•	•
Incoming Call Identification (ICI)	•	•	•	•
Indication of Camp-On	•	•	•	•
Intercept Treatment				
Attendant Intercept	•	•	•	•
Intercept Tone	•	•	•	•
Interposition Calling	•	•	•	•
Interposition Transfer	•	•	•	•
Inward Restriction			•	•
Line Lockout With Warning	•	•	•	•
Listed Directory Number (LDN) Service	•	•	•	•
Loudspeaker Paging†				
Direct Access by Attendant	•	•	•	•
Dial Access	•	•	•	•
Multizone	•	•	•	•
Priority Paging	•	•	•	•
Main/Satellite Service			•	•
Manual Originating Line Service	•	•	•	•
Manual Terminating Line Service	•	•	•	•
Meet Me Conference	•	•	•	•
Message Waiting (Audible)			•	•
Message Waiting (Lamp)			•	•
Miscellaneous Trunk Restriction	•	•	•	•
Multiple Listed Directory Numbers (LDN)	•	•	•	•
Multiple Access Codes for a single trunk group (10 max.)				•
Music On Hold†	•	•	•	•
Music on Attendant Position Hold†	•	•	•	•
Night Console Position	•	•	•	•
Night Service				
Fixed	•	•	•	•
Flexible	•	•	•	•
Night Station Service - Fixed Service	•	•	•	•
Night Station Service - Full Service	•	•	•	•
Origination Restriction	•	•	•	•
Outgoing Trunk Call Back	•	•	•	•
Outgoing Trunk Camp-On	•	•	•	•
Outgoing Trunk Queueing	•	•	•	•
Outward Restriction	•	•	•	•
Power Failure Transfer - Station	•	•	•	•
Priority Queue	•	•	•	•
Privacy and Lockout	•	•	•	•
Radio Paging Access†	•	•	•	•
Recall Dial Tone	•	•	•	•
Recorded Telephone Dictation Access†	•	•	•	•
Remote Access to PBX Services	•	•	•	•
Remote Administration and Maintenance (hardware option)	•	•	•	•
Re-ring From Toll (on Toll Terminal)	•	•	•	•
Reserve Power (hardware option)	•	•	•	•
Room Audit				•
Room Status			•	•
Rotary Dial Calling	•	•	•	•
Route Advance	•	•	•	•
Saved Number Redial				•
Serial Call	•			•
Sharing (4 Tenant)	•			
Shared Attendant Service	•	•	•	•
Single Digit Dialing (Non-conflicting)	•	•	•	•

TABLE 5-1 (CONT'D) SYSTEM FEATURES

	202	203	204	205
Single Digit Dialing (Conflicting)		·	·	·
Speed Call				
System-wide				·
Personal				·
Splitting				
One-Way Manual Splitting	·	·	·	·
Two-Way Manual Splitting	·	·	·	·
One-Way Automatic Splitting	·	·	·	·
Two-Way Automatic Splitting	·	·	·	·
Station Hunting				
Terminal Hunting	·	·	·	·
Circular Hunting	·	·	·	·
Secretarial Hunting	·	·	·	·
Station Message Detail Recording				·
Station Message Register Service		·	·	·
Electronic Storage and Display		·	·	·
Internal Charging		·	·	·
Station Override Security		·	·	·
Station-to-Station Calling	·	·	·	·
Straightforward Outward Completion	·	·	·	·
Switched Loop Operation		·	·	·
Tandem Tie Trunk Switching			·	·
Termination Restriction	·	·	·	·
Threeway Conference Transfer	·	·	·	·
Through Dialing	·	·	·	·

	202	203	204	205
Tie Trunk Access	·	·	·	·
Timed Reminders		·	·	·
Toll Restriction				
Battery Reversal	·	·	·	·
011 Access	·	·	·	·
Multi Digit			·	·
Toll Terminal Access	·	·	·	·
Total "Do Not Disturb" Display		·	·	·
Total "Message Waiting" Display		·	·	·
Total "Room Status" Display			·	·
Traffic Data Collection†				·
Traffic Display to Customer				·
Transfer into Busy		·	·	·
Trunk Answer From Any Station	·	·	·	·
Trunk Group Busy (TGB) Indicators on Attendant Position	·	·	·	·
Trunk Status Field	·	·	·	·
Trunk-To-Trunk Connections	·	·	·	·
Trunk Verification by Customer (TVC)	•	•	•	•
Trunk Verification by Station (TVS)	•	•	•	•
Uniform Call Distribution (UCD)		·	·	·
Wake-Up Service				·
WATS Access	·	·	·	·
Wideband Data Switching	·	·	·	·
Wide Frequency Tolerant Power Plant	•	•	•	•

† Requires external customer provided equipment

1309-4

- **Acoustic Noise** – The systems do not radiate acoustic noise greater than 45dB SPL, "A" Weighted, measured 47.2in. (1200mm) from the center of the cabinet.

- **Vibration** – The systems operate satisfactorily when subjected to a continuous vibration of 5-200Hz with an acceleration of 0.5g.

- **Electrostatic Discharge** – The systems meet the following electrostatic discharge test:

With the common equipment grounded, a voltage of 15kV placed to various parts of the equipment such as faceplates, switches, etc, has no noticeable effect on the operation of the system. With all the exposed metal of the peripheral equipment grounded, a voltage of 15kV applied to various parts of the peripheral equipment, has no noticeable effect on the operation of the system.

Note: The high voltage DC is derived from an induction type generator with an output capacity of 250pF and a series resistance of 3.9kohms.

- **Electomagnetic Susceptibility** – The systems are able to work in an electric field of 5V/m without major degradation of service.

Compatibility

8.04 The systems are compatible with:

- Single line 2500 or 500 type telephone sets or equivalent station apparatus.

- Line cards of a 1A1/2 telephone key system.

- Standard Dial Pulse and DTMF telephone sets equipped with or without message waiting lamps.

- Step by step, crossbar and commonly used electronic central office equipment.

Shipping and Storage

8.05 The equipment is designed to withstand shipping by truck, rail, air or sea without damage, when packaged in conventional shipping containers of the manufacturer. The range of environmental conditions that the equipment is capable of withstanding is shown in Table 6-1.

Installation Requirements

8.08 The installation requirements are detailed in Section MITL9105/9110-98-200.

TABLE 5-2
SYSTEM FEATURE LIMITATIONS

/Maximum number of simultaneous calls = 31.
Maximum number of speech paths used by any call = 2.
Maximum number of simultaneous consultations = 15.
Maximum number of simultaneous add-on (3 way) calls = 30.
Maximum number of simultaneous station controlled conference calls = 30.
Maximum number of calls that can simultaneously be camped on to an extension, trunk group or hunt group = 30.
Maximum number of simultaneous callbacks that can be enabled = 32.
Maximum number of simultaneous call forwards that can be enabled = 208 (SX-200); 112 (SX-100).
Maximum number of simultaneous "dial 0" calls = 31.
Maximum number of hunting groups = 12.
Maximum number of calls that can be simultaneously connected to music on hold = 31.
Maximum number of stations in a station hunting group = 200 (SX-200); 112 (SX-100).
Maximum number of stations in a call pick up group = 200 (SX-200); 112 (SX-100).
Maximum number of dial call pick up groups = 50.
Maximum number of trunks assignable to night stations = 100 (SX-200); 52 (SX-100).
Maximum number of trunks in a trunk group = 104 (SX-200); 56 (SX-100).
Maximum number of trunk groups = 12.
Maximum number of calls that can override a given extension = 1.
Maximum number of calls that can be simultaneously parked = 31.
Maximum number of simultaneous meet-me conferences = 1.
Maximum number of simultaneous attendant controlled conferences = 1 (Two if tenanting with separate consoles)
Maximum number of calls that can be simultaneously held by one attendant = 4.
Maximum number of simultaneous incoming calls that can be separately identified by the attendant = 6. (Recall, Dial 0, LDN 1 through LDN 4)
Maximum number of LDNs that can be identified at the attendant's console = 4.
Maximum number of simultaneously ringing Wake-Ups = 10.
Maximum number of speed call tables = 25.
Maximum number of personal speed call tables = 18
PABX numbering schemes may be 1, 2, 3 or 4 digit or a combination of 1, 2, 3 and 4 digit, as long as there are no conflicts in the first digits.
Maximum number of trunk buffers for SMDR = 31.
Maximum number of speed call digits that may be stored = 56. (per table)

TABLE 6-I ENVIRONMENTAL CONDITIONS

• Temperature Range:	-50°C to +71 °C
• Relative Humidity:	Up to 100% RH at 18°C (i.e.: 15mm Hg water vapour pressure)
• Vibration:	.5G (Sinusoidal) 10 to 500Hz
• Shock:	Up to 30 inches drop depending on package
• Low rressure:	**87mm** Hg(50,000 feet)
• Temperature Shock:	-50°C to +25°C in 5 minutes

Cabling and Cross Connections

6.07 The following paragraphs detail the cabling and cross-connections required when installing the Electronic PABX.

Telephone Set and Trunk Cabling

6.08 Telephone set and trunk cabling terminates on the building cross-connect terminal in the normal manner. The cabling requirements and limits for stations and consoles are shown in Fig. 6-1 and 6-2.

Cable Terminals

6.09 Section MITL9105/9110-98-200 gives full details of the requirements for interconnection of cables between the building cross-connect terminal and the connector locations in the rear of the cabinet (Fig.6-3 and 6-4). This includes the power fail transfer connections between the cabinet and the cross-connect terminal.
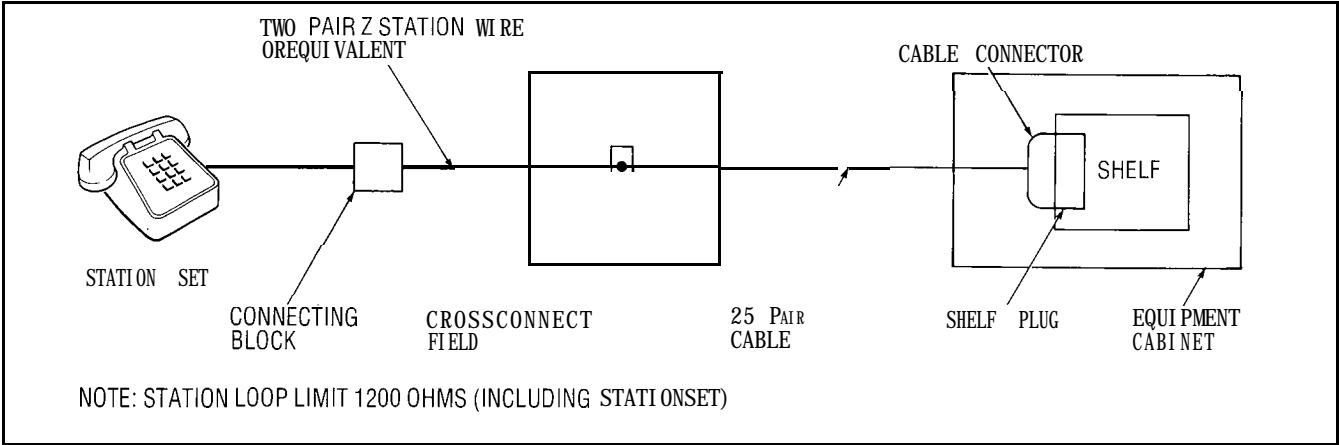
Fig. 6-I Station Cabling and Limits
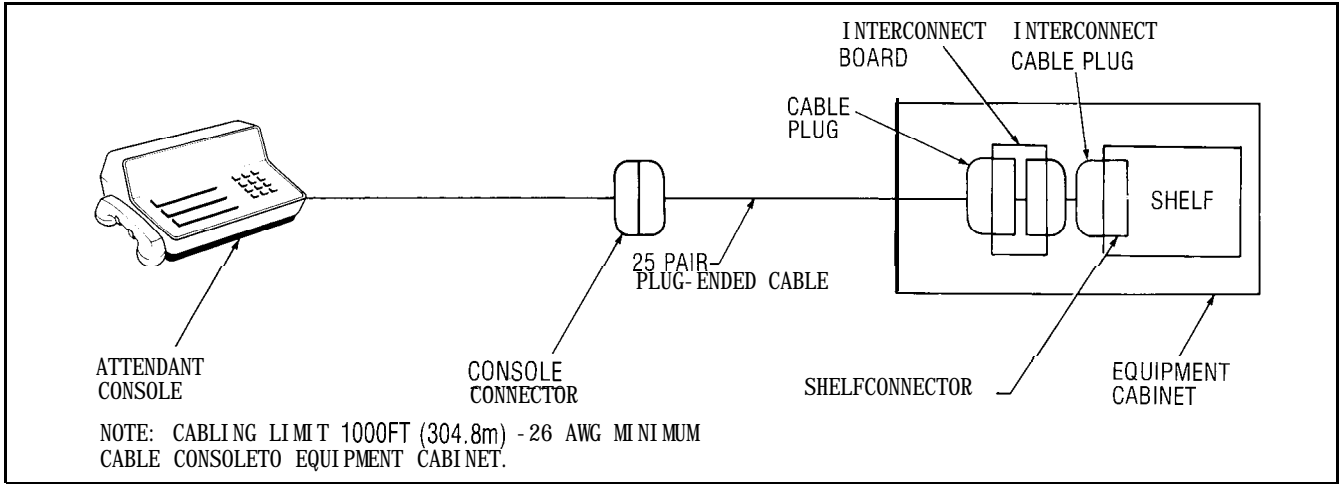
Fig. 6-2 Attendant Console Cabling and Limits
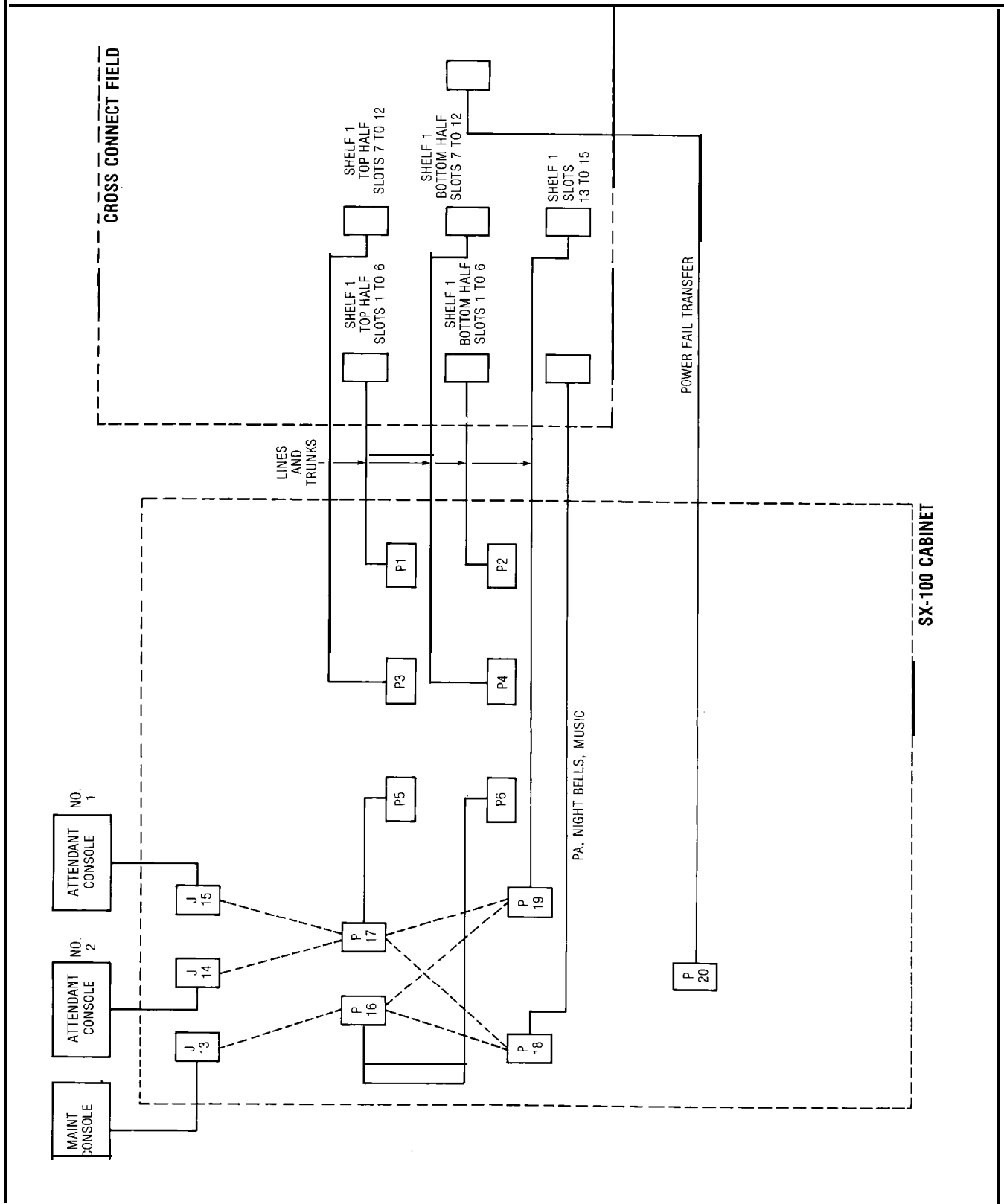
Fig. 6-3   Overall Cable Plan, SX-100

Fig. 6-4 Overall Cable Plan, SX-200

CROSS CONNECT FIELD

ATTENDANT CONSOLE NO. 2

ATTENDANT CONSOLE NO. 1

MAINT CONSOLE

CONSOLE INTERFACE

CONSOLE INTERFACE

J 13

J 14

J 15

P11

P9

P7

SHELF 2 4 - 1 SHELF 2
TOP HALF TOP HALF
SLOTS 1 TO 6 SLOTS 7 TO 12

P12

P10

P8

LINES AND TRUNKS

SHELF 2
BOTTOM HALF
SLOTS 1 TO 6

SHELF 2
BOTTOM HALF
SLOTS 7 TO 12

P 16

P 17

P5

P3

P1

SHELF 1
TOP HALF
SLOTS 1 TO 6

SHELF 1
TOP HALF
SLOTS 7 TO 12

P6

P4

P2

SHELF 1
BOTTOM HALF
SLOTS 1 TO 6

SHELF 1
BOTTOM HALF
SLOTS 7 TO 12

P 18

P 19

PA, NIGHT BELLS, MUSIC

SHELF 1
SLOTS
13 TO 15

P 20

POWER FAILTRANSFER

P 21

POWER FAILTRANSFER

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SX-200 CABINET

7. PROGRAMMING AND NUMBERING

A. General

7.01 The firmware of the SX-100 and SX-200 is written in a manner that allows maximum flexibility during installation or whenever a change is required. The features discussed in Part 5 of this Practice are built into the system and may be enabled or disabled with a simple change of parameters by the installer or repairman. This procedure is called programming and may be accomplished from either a maintenance console or an attendant console. Full details of the programming procedures are contained in Section MITL9105/9110-98-210.

B. Programs

7.02 Eight service programs, in the following order, are initially placed in the SX-200 to control the entry of subsequent data:

- Tenant Mode Definition
- System Options
- Class-of-Service Options
- Access Code Assignments
- Extensions
- Extension Hunt Groups
- Trunks
- Trunk Groups

7.03 Other additional service programs, dependant upon the type of software Generic installed in the PABX, may be implemented. These are listed below and include relevant MITEL Practice references, which should be consulted for descriptions and programming requirements.

a) Traffic Measurement (Generic 204 only). See Section MITL9105/9110-98-450

b) Multi Digit Toll Control (Generic 204 and 205 only). See Section MITL9105/9110-98-212

c) Station Message Detail Recording (Generic 205 only). See Section MITL9105/9110-98-451

d) Speed Call (Generic 205 only). See Section MITL9105/9110-98-220

7.04 The scope of the programming capability caters to all changes which may be expected during the normal operation of the PABX, i.e. no modification or wiring and component changes are necessary. The foregoing programs

are discussed in more detail in the following paragraphs.

Tenant Mode Definition

7.05 This program allows the selection of the tenant which is to be programmed, if Tenant Service is used.

System Options

7.06 System Options are those that affect the overall system including those relating to the console operation. A typical example is given below:

- **Discriminating Ringing** - A call originating external to the system results in a double ring signal, whereas an internal call results in a single ring signal. If this option is enabled it affects ALL extensions within the system.

Class of Service

7.07 Classes of Service are sets of features and/or restrictions which can be applied to a single extension or to a group of extensions. These classes are then subsequently assigned to extensions in the Extension program or to trunks in the Trunk program. Typical examples of Class of Service Options are:

- **Paging Access** - An extension which has Paging Access in its class of service can dial the appropriate code(s) and be connected to a user-supplied paging system(s).

- **Executive Busy Override** - An extension with Executive Busy Override in its class of service can 'barge-in' to a conversation by dialing a code over the busy tone.

- **Station Override Security** - It is also possible to set the Station Override Security option which will disallow another extension's override capability. As suggested by these examples, a great deal of flexibility exists within the system and groups of features can be easily set in place for the various extensions.

7.08 Paragraph 7.19 details the particular case where an extension is fully restricted, and is an example of a class of service incorporating restrictions rather than access to features.

Access Code Assignments

7.09 Access codes are allotted for desired features and programmed into the System. These codes may consist of one, two, three or

four digits, and must be unique i.e. they must not conflict with any other numbers allotted within the system. (Note the exceptions for override, callback busy). Extensions may have the capability of dialing these codes subject to whether their class of service incorporates these particular features. Typical access code examples include such features as Paging and Executive Busy Override.

Extensions

7.10 An extension is connected from the building cross-connect field, and via the cable between it and the shelf backplane, to a port within the equipment shelf. The port is identified with a particular equipment number, and by means of the Extension program is given an extension number and linked to the required class of service. It is then allowed or denied toll access, assigned an appropriate busy lamp on the attendant console and linked to a pick-up group. Changes, such as the allottment of a new extension number or additional features (including restictions), are effected by simple keying sequences from the attendant (or maintenance) console. The console must be in the programming mode.

Extension Hunt Groups

7.11 Hunt Groups are programmed with their own master access codes and the equipment number (port) of each extension that is to be part of the particular group. This master number must be unique within the system; it cannot be one of the extension numbers of the group. This method is required to ensure that the Call Forwarding and Call Back features are available even when an extension is part of a Hunt Group. Use of a master number also eliminates any conflict between hunting and forwarding.

7.12 Hunt Groups can be arranged to be of the terminal, circular or secretarial type as detailed hereunder:

- Terminal hunting results in the group being accessed successively from the first to last extensions programmed into the group, with the first non-busy extension in the sequence being rung

- Circular hunting starts at the last extension which was reached and hunts over all extensions until the first free extension is reached.

- Secretarial hunting is similar to Terminal

hunting with the additional facility that the last number in the group is common to two or more groups.

It should be noted that each extension is otherwise a normal extension and can receive calls directed to it as for other extensions.

Trunks

7.13 Trunk lines are programmed in a similar manner (for similar reasons) to Extension lines (see 7.10). They are allotted an equipment (port) number; a trunk code (which defines the type of trunk · CO, DISA, etc.); a busy lamp; and an LDN (listed directory number position on the console). In addition they may be assigned a "Day" and "Night" option which enables the trunk to ring a particular night bell and/or directly access a particular extension or hunt group. A class of service code can be provided for dial-in trunks to enable them to have access to features such as paging.

Trunk Groups

7.14 In addition to the individual trunk program (paragraph 7.13) one or more trunk lines may be programmed into groups having particular requirements. They must be given an access code and may be toll denied. Note that toll denial requires that both the extension and the trunk group must be programmed with toll denial to prevent toll calls. This allows a given extension to be denied toll access on one group of trunks but not on another. Finally, the trunk groups must each be given a four-digit type code which defines such things as answer supervision, toll reversal, message registration, and DTMF or DP signaling. One group can also be programmed to overflow into another similar group when the former group is busy.

Toll Control

7.15 The Multi Digit Toll Control program allows a customer to specify the toll calls which may be made from any extension within the PABX. The level of toll control for any extension can range from full capability (i.e. ability to dial any toll call) to being restricted to calling a single directory number. An extension can also be inhibited from making any toll call. A fall description of this program is given in Section MITL9105/911O-98-212.

Traffic Measurement

7.18 The Traffic Measurement program allows a user to output traffic data to a customer-provided terminal (printer or magnetic tape recorder), which is connected to the RS232 data port of the PABX. Alternatively the data may be transmitted to a remotely-located terminal (using a modem) over the public telephone network. Full details are contained in Section M ITL9105/911 0-98-450.

Station Message Detail Recording

7.17 The Station Message Detail Recording program allows a business to analyze its telephone costs by collecting data for each outgoing and/or incoming trunk call. The data contains details such as called and calling party numbers; data, time and duration of each trunk call; and whether PABX parties were transformed or put into conference during a trunk call. The data is output from the RS232 port, and may be recorded for subsequent processing by a service bureau. Alternatively records may be printed and the records analyzed by hand. Section MITL9105/9110-98-451 gives details of the SMDR feature.

Speed Call

7.18 The Speed Call program allows selected stations to use their own personally-programmed speed call tables; and programmed stations and the attendant to use other speed call tables which are available to them on a common-use basis. This feature is described in Section M ITL9105/911 0-98-220.

C. Extension Restrictions

7.19 The following list exemplifies the case where restriction of extension capabilities is accomplished by programming a combination of restrictive class of service options into the extension's class of service. These, and other options allow extreme flexibility in the degree of restriction assigned to a given class of service.

OPTION NUMBER	OPTION NAME
38	Never a Forwardee
43	Inward Restriction (DID)
46	Flash Disable
47	Never a Consultee
57	Manual Line
59	Non-CO Trunks via Attendant Inhibit
60	CO Trunks via Attendant Inhibit

This class of service allows a station to call the attendant by lifting the handset, and allows the station to be called by the attendant or any unrestricted extension. Functions such as consultation, and access to trunks are not available.

7.20 The extension capabilities may be made less restrictive by deleting some of the foregoing options or adding other options; and may be made even more restrictive by including, for example, Option 44 (originate only) or Option 45 (receive only).

D. Numbering Plan

7.21 The PABX allows a completely flexible, user-defined numbering plan. Extension numbers can be up to four digits in length and all combinations are acceptable provided that they do not conflict with each other or with feature access codes (e.g. if one number is 2000, neither 200 nor 20 can be used).

7.22 Since they are programmable, extension numbers need not be considered when the cabling and installation are performed. Instead, each equipment port, to which a subset has been connected, is assigned the requested access number from any console that has been placed in programming mode. Similarly, an extension number can be changed at a later date by a simple keying sequence from the console.

8. TECHNICAL DESCRIPTION

A. General

8.01 The SX-100 and SX-200 are microprocessor controlled PABX's which use distributed processing and space-division switching. The main processor which has overall control of the system is a MC6800. It is supported by 8K bytes of Random Access Memory (volatile) used as a scratch pad for current activity, such as which extensions are off-hook; and 2K bytes of RAM (non-volatile · i.e. battery protected) which contains installation-dependent information, such as access codes and extension numbers. The system also provides up to 56K bytes of Programmable Read Only Memory (PROM) containing the firmware which is programmed into it at the factory, and 2K bytes of non-volatile RAM on the PROM/RAM Expander card.

8.02 The console contains a MC6800 microprocessor with 2K of ROM which controls the displays, and monitors such· things as keystrokes. On each trunk circuit card is a MC6802 processor with up to 4K of ROM that con-

TABLE 8-1
BACKPLANE SIGNALS

A	Address • Processor address bus (parallel 16 bit, A0 to A15) used to address memory on the RAM and the memory expander circuit cards.
CS	Card Select • one CS for every trunk, line, console control, receiver, and scanner circuit card; two for the tone control circuit card.
D	Data • Processor data bus (parallel 8 bit, DO to D7) used to transmit data to/from the RAM, memory expander, and scanner circuit cards.
DI	Data In • transmit digital data from console to console control card.
DO	Data Out • transmits digital data from console control card to console.
HA	High Address • a level shifted version of AO, AI and A2.
HD	High Data • a level shifted version of the D lines (parallel 8 bit, HD0 to HD7). Sends data to and/or from all circuit cards other than those serviced directly by the D lines.
IA	Interrupt Address • used by scanner to address individual circuits on each card.
IRQ	Interrupt Request • used by scanner to cause a processor interrupt.
IZ	Interrupt Zone • one for each line, trunk. console. receiver and tone control circuit card.
J	Junctor • Speech paths (31) plus one for music on hold.
MRST	Master Reset • resets all circuitry. Originates in power-up circuitry; from the reset switch on scanner circuit card or from the "watchdog".
TR	Tip and Ring • respective conductors of an audio pair.
NOTE: The above symbols are used in conjunction with the text description and Fig. 8-2.	

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trols functions such as seizing and releasing trunks.

8.03 The PABX uses a specially-developed large scale integrated (LSI) circuit to implement a space-division switching matrix. The basis of this space division is a four-by-eight bit analog cross-point switch (MITEL MT8804) which is used throughout the system to connect any one of thirty-one speech paths to any one (or more) extension, trunk, console, receiver or tone generator circuit(s). Such connections are controlled by the microprocessor via its data and address lines. These, together with the card select, interrupt, power and other lines, run the length of the equipment shelf backplane and are available as required to each circuit card. See Table 8-1 and Fig. 8-2 for a description of the backplane signals.

B. Speech Path Accessing

8.04 Each speech path, plus the "music on hold" speech path is directly wired on each line, trunk, tone, receiver and console control circuit card to an 8804 which can, under processor control, be connected to any circuit on the card (i.e. a line circuit, a tone generator, etc). The processor sends a card select (CS) signal to access a particular card together with a combination of address lines and data lines which close the required "contact".

The concept discussed in the foregoing description is illustrated in Fig. 8-1, and shows that Line Circuit numbers 2 and 7 have been connected to one another using Speech Path number 3.

C. Operational Details

8.05 The following subparagraphs detail the sequence of circuit operations encountered within the PABX system during the progress of calls.

8.08 Fig. 8-2 and Table 8-1 should be consulted when reading the descriptive material. In addition the following abbreviations have the meanings indicated in the text:

CO • Central Office (main public exchange)

DISA • Direct Inward System Access enables incoming trunk calls (DTMF-type only) to dial PABX features or extensions directly

DP • Dial Pulse signaling

DTMF • Dual Tone Multi-Frequency signaling

GS/LS Refers to trunk circuits with a "ground-start' (GS) or "loop-start" (LS) facility
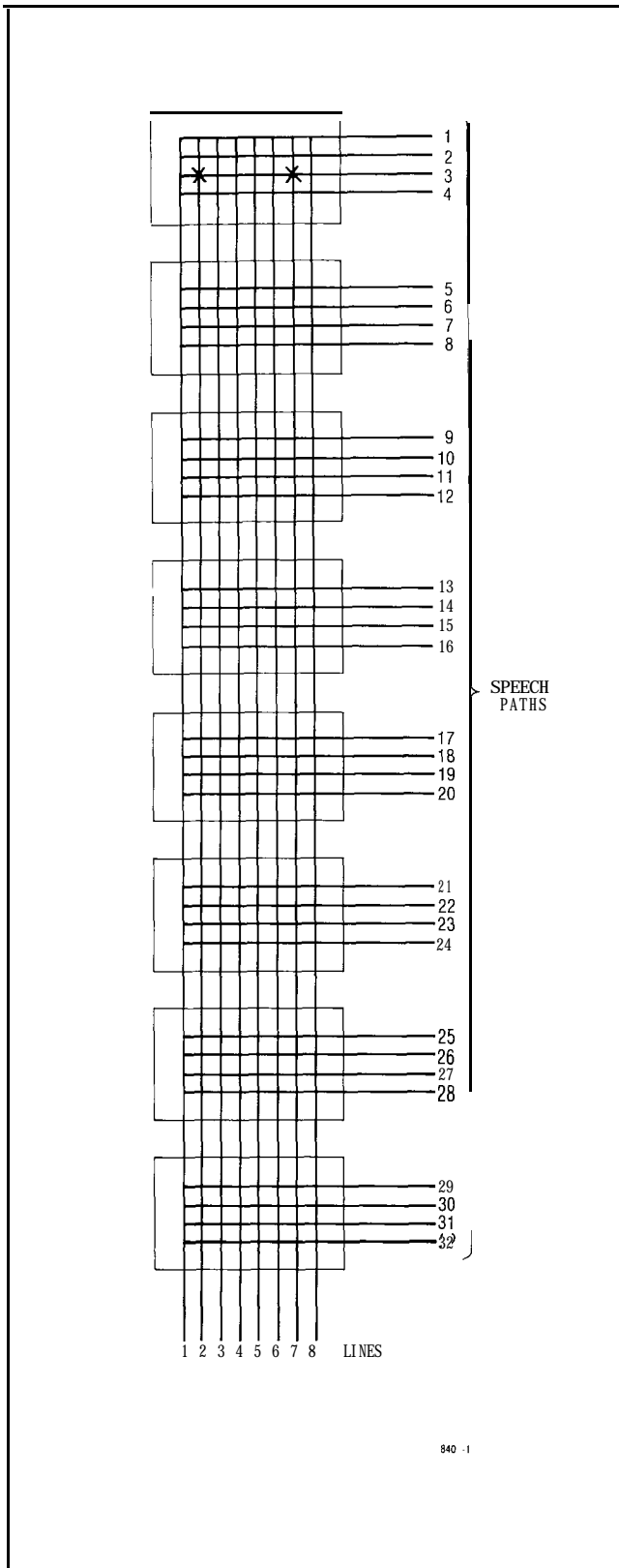
OP-AMP • operational amplifier

LED • light emitting diode

Fig. 8-1   Speech Path Access Circuit

PCB   ▪ printed circuit board

UART   ▪ Universal Asynchronous Receiver
              ▪ Transmitter

Off-Hook (Extension)

8.07   When an extension goes off-hook, drawing
          loop current, the fact is detected by an op-
amp which turns on an LED on the line circuit card
and sets a signal, OFF-HOOK X (Where X
represents one of the eight lines on the PCB),
which is fed to an analog switch together with a
similar signal for each of the other seven lines.
When the scanner addresses each of these lines
via the IA bus, the OFF-HOOK X state is presented
on the IZ line for that particular line circuit card.

8.08   The IZ line, having changed for the exten-
          sion addressed, causes the scanner to stop
scanning and to interrupt the processor via the
IRQ line. The scanner presents the line and card
addresses, and the state of the IZ, to the data bus
which the processor then reads while restarting
the scanner.

Off-Hook (Console)

8.09   The console does not have a hookswitch
          similar to that of an extension. Rather, the
OFF-HOOK signal is true whenever the console
handset is plugged in. To originate a call, it is
necessary only to depress the key of the first digit
to be dialed.

Dial Tone (Extension)

8.10   When the processor is informed of an off-
          hook condition (See 8.07 Off-Hook-
Extension), it interrogates its RAM to find a free
speech path which it checks via a diagnostic cir-
cuit on the tone control circuit card. The tested
speech path is then connected to the line circuit
that went off-hook (see 8.04 Speech Path Access-
ing).

8.11   The processor searches for an idle receiver
          (DTMF/DP), then dial tone. Using the card
select, address and data lines, the processor then
connects the selected receiver and dial tone from
the tone control card to the same speech path as
the line circuit, providing dial tone to the exten-
sion.

Dialing Internally (From Extension)

8.12   DTMF or DP signals originate at an exten-
          sion and are passed over Tip,-and Ring
through the line circuit to a speech path (see 8.04
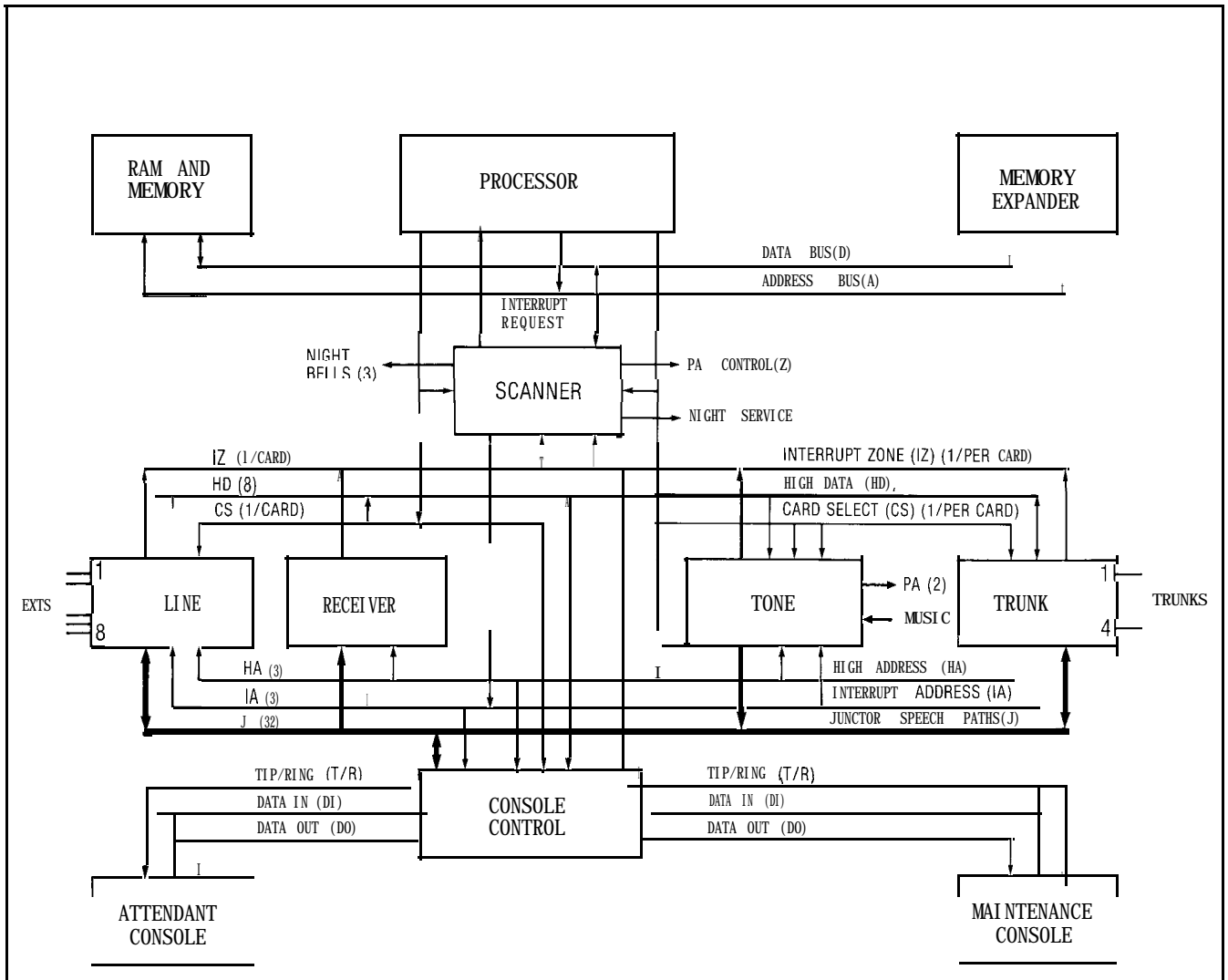
Fig. 8-2 Call Processing Block Diagram

Speech Path Accessing). Detection of the dialed digits takes place on a receiver circuit card which has been connected to the same speech path. A receiver is connected whenever an extension originates a call or whenever it does a switchhook-flash. A receiver caters to the reception of DTMF or DP signals.

8.13 When a DTMF digit is sent, filter circuits determine its value; a DP signal is decoded by a pulse counter. The receiver sets its interrupt signal and when the scanner addresses it, the interrupt is placed on the IZ line for that receiver circuit card. A change on the IZ line causes the scanner to stop and to interrupt the processor via the IRQ line. The scanner presents the receiver and card address to the data bus which the processor

then reads while restarting the scanner.

8.14 The processor reads the digit from the receiver and disconnects dial tone from the speech path after the first digit. If the processor determines that the digit is valid but does not completely define a number, it simply stores the digit in the volatile RAM memory. Should the digit be considered invalid by the processor, reorder tone, from the tone control card, is connected to the speech path. A valid extension number causes the processor to disconnect the receiver from the speech path and to reconnect a tone generator to provide ring-back tone to the originator. If a busy extension is encountered a special busy tone is connected to the speech path.

Dialing Internally (From a Console)

8.15 Unlike an extension, the console key-pad generates neither DTMF nor DP. Instead, the microprocessor inside the console notes which key was depressed and looks in the console ROM to find the corresponding eight bit code. This code is converted by a UART to a serial string of data, complete with start and stop bits and is sent as a differential signal along one of the 25 pairs of wires leading to the interconnect card and from there to the console control card.

8.16 In the equipment shelf, this signal enters the console control card as DI. It is converted by another UART into parallel data and sets a DATA READY bit which goes out onto the IZ line when the scanner addresses this console control circuit.

8.17 After the processor has received a console interrupt from the scanner, has read the dialed code from the data bus and has determined which digit has been sent, it stores the digit in the RAM (see Off-Hook-Console). If the digit is considered invalid, the processor connects re-order tone from the tone control card to the console's speech path. When the firmware's logic decides that the number is complete, it rings the extension dialed (see Ringing an Extension). It also connects a tone generator to the console's speech path to provide ring-back tone. Note that a receiver is not used for dialing from a console.

Ringing An Extension

8.18 The dialing of a valid extension number prompts the processor to select a particular line on a particular circuit card (as determined by the programming in the non-volatile RAM) and to send a data line command there to turn on ringing current to the extension. When the extension is answered, the line circuit detects an off-hook condition (see Off-Hook Extension) and disconnects ringing. The processor then connects the called extension to the speech path of the calling device (extension, console or trunk).

Hook-Flash

8.19 A hook-flash is defined for the PABX as an on-hook condition of between 200ms and 1500ms (700,900 or 1100ms may be used in some generics as system option) following an off-hook condition where a speech path has been established between an extension and a trunk or between two extensions. When an extension goes

on-hook, the scanner notifies the processor which first checks its memory to determine whether a flash is legal at that point. If not, the extension is disconnected from the speech path and a subsequent off-hook is interpreted as the beginning of a new call (see Off-Hook). However, when a flash is determined to be a legal operation, the firmware is designed to start a timer. If the extension goes back off-hook within the specified time period, it is considered to be flashing. An on-hook of less than 200ms is considered to be a noise glitch while an on-hook greater than 1500ms (700,900 or 1100ms alternatively) is considered as a call termination (hang-up).

8.20 When a flash is detected, the processor disconnects the flashing extension from its speech path, finds a free speech path which it tests, and connects the extension to it (see 8.04 Speech Path Accessing). It then provides transfer dial tone (see 8.10 Dial Tone-Extension) and connects a receiver to the speech path allowing the extension to dial (see 8.12 Dialing Internally) and converse privately with a third party, or to access features.

8.21 Meanwhile, if the extension had flashed out of a conference, the conference is unaffected. However, if the other party was not in conference, it is disconnected from its speech path and connected instead to the HOLD junctor which is a speech path with a low impedance such that it effectively "grounds" the output of any extension or trunk connected to it, thus preventing parties on the HOLD junctor from hearing each other.

Incoming Calls (GS/LS Trunks)

8.22 When the trunk circuit detects ringing voltage, or forward or reverse current, or a tip ground (ground start trunks), the trunk's microprocessor interrupts the system processor via the IZ/Scanner arrangement (see 8.09 Off-Hook-Console) and lights up the LED on the trunk card. The system then reads a status report from the trunk.

8.23 The system processor finds and tests a speech path (see 8.04 Speech Path Accessing) and notifies the programmed equipment (console or extension). When it answers, the system processor connects it and the trunk to the speech path, and sends a data line command to the trunk card. The trunk card then terminates the trunk circuit and enables the audio.

8.24 If the trunk has been programmed for DISA the system processor waits 10 seconds before answering and then connects a receiver and a dial-tone generator. This allows the trunk to appear as though it were an extension and enables it to dial internal stations and features (see 8.10 Dial Tone-Extension and 8.12 Dialing Internally From Extension).

Dialing a CO Trunk (From Extension)

8.25 When an extension has gone off-hook and is connected to dial tone and a receiver (see 8.10 Dial Tone-Extension and 8.12 Dial Internally from Extension) an access code is dialed to obtain a CO trunk. Upon determining the validity of this code the processor interrogates the trunk circuit cards to find an available trunk in the appropriate trunk group. A data line seize command is then sent to the trunk's microprocessor and the trunk circuit is connected to the extension's speech path (see Speech Path Accessing). If the trunk is "ground start" the ring lead is grounded and the trunk's processor waits for CO acknowledgement. The trunk processor connects the audio network and enables the audio and the LED on the circuit card.

8.26 There are three basic configurations of Extension/Trunk Circuit conditions which are encountered as follows:

- DP extension accessing a DP trunk

- DTMF extension accessing a DTMF trunk

- DTMF extension accessing a DP trunk

These three combinations result in a number of system connection configurations depending upon whether the trunk is a CO or TIE, and whether or not tone to pulse conversion is required:

(a) If Fig. 8-3(a) configuration is applicable the dial pulses from the extension are repeated by a relay in the trunk card and enter the trunk circuit. The call proceeds under control of these pulses.

(b) If Fig. 8-3(b) conditions are applicable then DTMF tones from the extension are routed over the speech path, through the trunk card to the main exchange, and again the call proceeds normally.

(c) When DTMF extension dialing is used to a DP exchange, Fig. 8-3(c) conditions apply. In this case the DTMF tones are translated by the receiver to digital data and forwarded to the microprocessor where it is translated into further data required by the trunk processor. The trunk processor converts this data to the proper dial pulse train required by the CO exchange. It should be noted that both the DTMF tones and DP signals will appear on the trunk circuit.

8.27 The receiver is disconnected as soon as the trunk access code has been detected if both the extension and trunk are DTMF (Fig. 8-3(b)) and if Toll-Denial is not checked. If the extension requires DTMF to DP conversion the receiver is maintained until dialing is completed. Toll-Denial requires that the receiver be maintained on the speech path until the required number of digits have been dialed. (See Section MITL9105/9110-98-212 Multi Digit Toll Control)

Dialing a Tie Trunk (From Extension)

8.28 The circuit operations described above are similar to those required for Tie-Trunk circuits; with the exceptions following. For DP extensions to DP tie-trunk circuits (Fig. 8-3(d)) the requirement exists to inhibit dial train distortion arising as a result of tandem operation through one or more tie trunks. For this reason, when the trunk processor receives the input data it causes the output to the tie-trunk to be a regenerated train of dial pulses. It should be noted also that the trunk processor isolates the speech path to prevent dial pulses from feeding back to the extension.

Dialing a Trunk (From Console)

8.29 As noted in 8.15 (Dialing Internally-From Console), the console dial pad produces digital signals which are stored by the microprocessor. After the trunk access code has

been dialed the subsequently keyed data signals are forwarded to the microprocessor, where, after decoding, they are forwarded to the trunk card and outpulsed to the trunk line. Fig. 8-3(e) illustrates this circuit. Note that a receiver card is not required for this configuration.
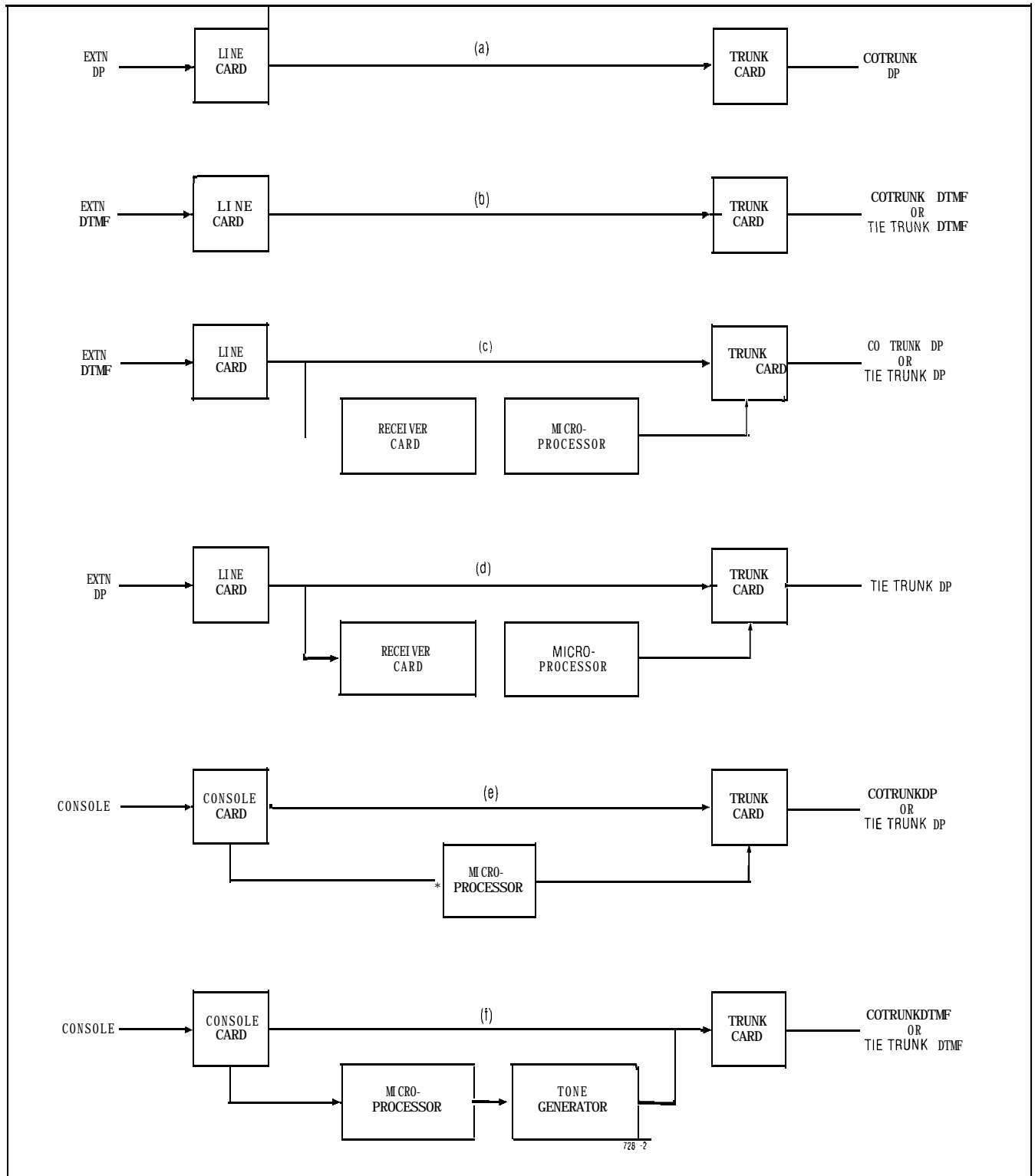

Fig. 8-3 Trunk Dialing Configurations

8.30 If the circuit is programmed as a DTMF trunk circuit a tone generator will be inserted as illustrated at Fig. 8-3(f). This results in the digital data signals being translated into DTMF tone pulses which are then placed on the speech path (not into the trunk card) and forwarded to the trunk circuit for outward transmission. The audio path is isolated back to the console when the DTMF transmission takes place.

Console Data Updating

8.31 The console indicators are refreshed and/or updated continuously every 100 milliseconds by the firmware. These indicators include the seven segment displays for the time-of-day clock, the source and destination readouts and the calls-waiting display as well as over two hundred LEDs.

8.32 The status of each of these indicators is maintained in the volatile RAM on the RAM/COS pcb. Every 100 ms, the processor addresses the RAM on the console control card and sends it sixty-four bytes of information for each of the two consoles. This data is then sent through the UART, where it is changed from parallel to serial data, and along a pair of wires to the console.

8.33 In the console, the information is once again clocked into a UART to be transformed into parallel data and stored in a RAM. At this point, the console's microprocessor takes control and sorts this input "file" into the form required to turn on/off the matrix of LEDs and the console ringer.

D. Power Supplies

8.34 The operation of the SX-100 and SX-200 PABX power supply arrangements are described in the following paragraphs.

Power Supply, SX-100

8.35 The SX-100 power supply is mounted to the right hand side of the SX-100 card file. It is a fully RFI-shielded switching power supply consisting of the following sections.

- AC/DC Converter
- DC/DC Converter
- Ringing Generator

8.38 The AC/DC converter is designed to operate with an input of 115Vac, 44-64Hz and produces a controlled output of 53 ± 2Vdc. This

53Vdc source is supplied to the DC/DC converter where it generates the following output voltages.

- + 8 volts ± 5%
- -5 volts ± 5%
- − 10 volts ± 5%

When these voltages are within tolerance a signal is sent to the AC/DC converter which turns on the 48Vdc regulator. The regulator provides split outputs of -48 volts (−48V1) and -48 volts (−48V2).

8.37 A back-up dc power source of between 42 to 56Vdc may be connected to the SX-100 power supply. This voltage is also sensed by the out-of-tolerance circuit and will activate the 48Vdc regulator. Out-of-tolerance voltages will turn off the regulator under power fail conditions.

8.38 An out-of-tolerance circuit constantly monitors all voltage levels and should a deviation occur the power fail transfer circuits are activated.

8.39 The ringing generator uses the − 48V 2 output to derive a 90Vrms 20Hz supply for use within the system for ringing and message waiting purposes. A fused output is available to provide ringing for night bells.

Power Supply, SX-200

8.40 The SX-200 power supply is housed in a metal cabinet which forms the lower rear door of the SX-200 cabinet. It is a fully RFI-filtered switching power supply comprising the following basic sections:

- AC/DC converter
- Pre-regulator
- DC/DC Converter
- Ringing Generator
- Out-of-Tolerance Detector

8.41 The AC/DC converter is designed to operate with an input of either 115V 60Hz or 230V 50Hz and to produce an output of 60-64Vdc which k supplied as an input to the DC/DC converter through a bridge rectifier.

8.42 Because the AC/DC converter has a minimum input capacitance of 0.08 Farad, a somewhat high current flow could be expected on power-up. Therefore a pre-regulator is placed ahead of the capacitors to slow down this charging process. The pre-regulator then maintains the basic DC level to between 60 and 64 volts.

8.43 The -64 volts is fed to the main DC/DC converter and to a control voltage supply. The DC/DC converter may also be fed by a 48V battery. Since the DC level from the bridge rectifier is greater than − 48 volts when AC is applied (-60V to − 64V), the battery supply may be connected permanently to allow instantaneous cut-in should the AC power fail. The control voltage supply generates a number of levels which are used to operate the main converter. The main converter produces the following dc voltages required by the SX-200:

- · + 8 volts (+ 8V1)
- · + 8 volts (+ 8V2)
- · − 5 volts
- · − 10 volts
- • 0 volts (chassis ground)
- · -48 volts (− 48V1)
- · 48 volts (− 48V2)

8.44 These levels are regulated within ± 5% except for the -48 volt which may vary by ± 10%. An out-of-tolerance circuit monitors all levels continuously, and should a deviation occur, the output of this circuit is used to activate the power-fail transfer circuitry.

8.45 The ringing generator uses one of the -48 volt outputs from the main converter to produce a 90 volt, 20Hz supply which is used within the system (ringing, message waiting) and which is also accessible for night bells, etc.

Reserve Power Supplies

8.48 The PABX's are designed to operate from a 48Vdc source. This source is provided from the power supply, contained within the SX-100 or SX-200 equipment, and which operates from a 115Vac (optionally 230Vac) commercial source. A reserve power supply can be provided to supply 48Vdc in the case of commercial power failure. The reserve power supply consists of two major assemblies as follows, which are differently packaged to meet the SX-100 (8.47) and SX-200 (8.48) requirements.

- • A battery pack of 8 Globe BEL BC6200 batteries providing 48.3Vdc at 20°C
- • A temperature compensated battery charging unit operating from the commercial main source, and which maintains the proper battery voltage

SX-100 Reserve Power Supply

8.47 The SX-100 reserve power supply consists of a single enclosed assembly. This assembly forms the base unit upon which the SX-100 cabinet may be mounted (Fig. 3-4); and is supplied complete with a cable harness to interconnect the 48Vdc supply between the two units. In the case of the wall mount version of the SX-100 the reserve power supply can be installed adjacent to the SX-100 but will require a locally fabricated cable harness to interconnect the PABX and the reserve power supply. The SX-100 reserve power supply is 25in. (635mm) wide, 18.5in. (470mm) deep, 8in. (203mm) high and weighs 104lbs (49.4kg).

SX-200 Reserve Power Supply

8.48 The SX-200 reserve power supply is intended for installation within the lower portion of the cabinet. The battery pack is contained within a shelf unit which is mounted immediately below Shelf Unit 1; and the charging unit is mounted from the rear of the cabinet. The battery supply is housed in a completely enclosed shelf measuring 7in. (178mm) high, 19in. (483mm) wide, 15in. (381mm) deep and weighing 95lbs (43kg). The charging unit measures 5in. (127mm) wide, 7in. (178mm) high, 14in. (355mm) deep and weighs 14lbs (6.4kg).

8.49 In the event of power failure with no reserve power available, or if the reserve power capability period is exceeded, the PABX's can be arranged to automatically connect a maximum of twelve Central Office trunks (six trunks for the SX-100) to preselected extensions.

8.50 In addition to the above power requirements, and to prevent loss of customer data in the event of a power failure, the memory holding these data (non-volatile) is equipped with a reserve power supply, (Ni-Cad batteries) mounted on the shelf card.

9. ELECTRICAL CHARACTERISTICS

General

9.01 This part gives details of the electrical characteristics of the power supplies, signaling and supervisory tones, and timeout information.

Power Supplies

9.02 A summary of the electrical power
characteristics is -as follows:

AC Power Supplies

Characteristic	sx-100	sx-200
Input Voltage	115Vac, -20% to +10%	115Vac or 230Vac, ➖ 20 % tc + 10%
Frequency	44Hz to 64Hz	44Hz to 64Hz
Hold-over Time	Momentary interruptions in commercial power up to 250ms duration	Momentary interruptions in commercial power up to 250ms duration
Input Current	3A maximum at 115Vac	4A maximum at 115Vac
Talk Battery Noise	Does not exceed 28dBrnc	Does not exceed 28dBrnc

Reserve Battery Supply

Voltage Range	44v to 48.3V
Holdover Time	2 hours min
Battery Life Time	3 to 5 yrs

RAM/COS Battery Pack

Holdover Time	4 wks
Battery Life Time	4 yrs

Ringing Supply

Output Voltage	90Vac + 10%
Frequency	20Hz + 1Hz
	17Hz (Option)
	25Hz (Option)

PABX Tones

9.03 A summary of the signaling and supervisory
tones provided by the PABX is shown in

Table 9-1. Part 10 provides data in regard to dial-
ing and supervisory parameters. The following
notes apply to Table 9-1.

Notes: 1. Tolerance of call progress tone
levels is ± 1.5dBm.

2. Individual tones of any compound
tone are within 1dB of each other

3. Tolerance of individual tones are
± 1% of the frequency stated.

Timeout Information

9.04 Table 9-2 lists the timeout information and
shows the various timeout delays which
can occur under specific conditions.

10. SIGNALING AND SUPERVISION

General

10.01 This part details the technical parameters
of the PABX with regard to signaling and
supervisory condition.

Dial Pulse and DTMF Tone Data

10.02 The PABX is capable of accepting and
repeating signals from telephone sets
which have the parameters shown in Table 10-I
Dial Pulse Limits, and 10-2 DTMF Tone Limits.

TABLE 9-1   PABX TONES

Dial Tone	350/440Hz, continuous, ▬ 13dBm
Transfer Dial Tone	350/440Hz, 3 bursts 100ms on · 100ms off followed by continuous tone, ▬ 13dBm
Busy Tone	480/620Hz, interrupted at 60ipm, ▬ 24dBm
Special Busy Tone	350/440Hz at 60ipm, ▬ 13dBm
Standard Ringback Tone	440/480Hz, 1s on, 3s off, ▬ 19dBm
Special Ringback Tone	440/480Hz, 0.5s on, 0.5s off, 0.5s on, 2.5s off, ▬ 19dBm
Reorder Tone	480/620Hz, interrupted at 120ipm, ▬ 24dBm
Camp-On Tone	440Hz, one burst of 200ms, ▬ 16dBm (when extension camps on) 440Hz, 100ms on, 50ms off, 100ms on, ▬ 16dBm (when trunk camps on)
Over-ride Tone	440Hz, one burst of 800ms followed by a 200ms burst every 6s, ▬ 16dBm
Attendant Error Tone	440Hz at 10ips for 400ms, ▬ 16dBm
Conferencing Tone	440Hz, one burst of 1s, ▬ 16dBm (attendant controlled conference) 440Hz, 200ms, ▬ 16dBm (meet-me controlled conference)
Miscellaneous Tone	440Hz, ▬ 16dBm
Paging Tone	440Hz, 200ms, ▬ 16dBm

TABLE 9-2 TIMEOUT INFORMATION

Attendant Timed Recall (Don't Answer)	20s, 30s, or 40s
Attendant Timed Recall (Camp-On)	20s, 30s, or 40s
Attendant Timed Recall (Hold)	20s, 30s, or 40s
Automatic Night Switching	20s, 30s, or 40s
Dial Tone Timeout	15s
Interdigit Timeout	15s lines, 10s trunks
Lockout Timeout	45s
Callback Clear Timeout	8 hours
Callback Don't Answer Reset	6 rings
Call Park Recall	2, 3, or 4 minutes
Call Hold Recall	2, 3, or 4 minutes
Call Forward · Don't Answer Timeout	20s, 30s, or 40s
Switchhook Flash	190ms to 700ms, 900ms, 1100ms or 1500ms
Ringing Timeout	5 minutes
Automatic Wake-Up Ringing	6 rings, each 1s on, 3s off
Automatic Wake-Up Attempts	3 at 5 minute intervals

TABLE 10-1 DIAL PULSE LIMITS

PARAMETER	MIN.	MAX.
Pulse Rate (pps)	8.0	12.0
Break Duration (percent)	50.0	80.0
Break Interval (ms)	41.7	100.0
Make Interval (ms)	16.7	62.5
Interdigit Time (ms)	300.0	10s (trunks); 15s (lines)

10.03 When any of the frequencies shown in
        Table 10-2 are present at the system input
any other single frequency (200-3400Hz) should be
a minimum of 40dB below the former. However,
DTMF pulses are registered, in the presence of
precise dial tone at a level of – 10dBm.

TABLE 10-2
DTMF TONE LIMITS

Low **Frequency** (Hz)	**High Frequency (Hz)**		
	1209	**1336**	**1477**
697	1	2	3
770	4	5	6
			9
852	*	8	#

Frequency deviation: ± 1.5%
Signal interval (2 frequency): 40ms (minimum)
Per frequency, minimum level: – 17dBm on lint
        circuit
Twist, maximum (at – 10dBm): +4 to -8dBm
High f relative to low f)

Supervisory Data

10.05 The PABX is capable of responding to or
        providing the following supervisory condi-
tions:

- The PABX responds to hookswitch flashes
  with a duration of between 200ms and a
  programmable max. time (0.7, 0.9, 1.1 or
  1.5s) in order to activate the
  Transfer/Consultation/Hold/Add-On
  features

- An open tip lead condition of 500ms (op-
  tional 50ms) or more duration on a CO trunk
  will release the PABX connection

- Momentary open loop conditions of up to
  350ms (optional 40ms) generated by the
  Central Office on outgoing PABX calls, will
  not release PABX calls

- PABX station hookswitch flashes of less
  than the maximum selected time will not be
  repeated towards the Central Office

- PABX station on-hook conditions will
  release a trunk connection after the
  selected maximum time.

10.06 The PABX caters to or provides the follow-
      ing line and trunk parameters:

- **Station Loop .** The station loop range, in-
  cluding the station apparatus can be up to a
  maximum of 1200ohms

- **Attendant Console Range .** The attendant
  console can be remoted from the cabinet
  up to a maximum of (300m) 1000ft with
  26AWG cable

- **CO Trunk Loop** -The PABX will operate with
  CO trunks up to a maximum of 1600ohms
  loop resistance

- **CO Trunk Seizure .** The PABX nominal
  seizure resistance is 270ohms at 30mA

	below DTMF signal
Twist	Less than 4dB

- **CO Trunk Resistance** · In the idle state the resistance towards the PABX from the trunk circuit is not less than 40kohms for ground start, and not less than 10Mohms for loop start trunks

- **Tie Trunk Resistance** · The maximum resistance towards the tie trunk are:

  2kohm for Loop

  3kohm for E&M

11. TRANSMISSION

General

11.01 This section specifies the PABX transmission characteristics.

Transmission Characteristics

11.02 The insertion loss at 1004Hz is as follows:

- Line to Line connection
  4.5 to 5.5dB average with a maximum 0.3dB variation between paths

- Line to Trunk connection
  0.0 to 0.5dB average with a maximum 0.3dB variation between paths

- Trunk to Trunk connection
  0.0 to 0.5dB average with a maximum 0.3dB variation between paths

The attenuation variation, relative to the 1004Hz insertion loss, does not exceed the limits as shown in Table 11-1.

11.03 Harmonic Distortion. With a 200 or 1004Hz signal at − 10dBm, the second or third harmonic shall not exceed a level of -55dBm.

11.04 Intermodulation Distortion. With an input signal consisting of 900Hz and 1004Hz, each at − 13dBm, the rms sum of all the intermodulation products shall not exceed − 50dBm when measured at the output.

TABLE 11-1
ATTENUATION VARIATION

Transmission Plan	Frequency or Frequency Band (Hz)	Variation in Attenuation w/r to 1004 Hz (dB)
Line to Line	200 300 to 3000 3400	-0.1 to + 0.6 -0.1 to + 0.4 -0.1 to + 0.6
Line to Trunk	200 300 to 3000 3400	-0.1 to + 0.5 -0.1 to + 0.2 -0.1 to + 0.3
Trunk to Trunk	200 300 to 3000 3400	-0.1 to + 0.5 -0.1 to + 0.3 -0.1 to + 0.3
		(+) is more los! (-) is less los!

11.05 Overload. The change in attenuation when the level of a 1004Hz signal is increased from 0 to + 10dBm shall not exceed 0.2dB.

11.06 Return Loss. The Return Loss parameters are less than:

a) Line to Trunk Structural Return Loss
   ERL 20dB
   SRL 14dB
   Measured on the trunk side (without pad) and terminated in 600 Ω + 2.15uF

b) Trunk to Trunk Return Loss (Terminal Balance)
   ERL 24dB
   SRL 14dB
   Measured with 900 Ω + 2.15uF termination

c) Trunk to Trunk Return Loss (Through Balance)
   ERL 27dB
   SRL 20dB
   Measure with respect to 900 Ω + 2.15uF terminations

d) Line to Trunk non-talking condition
   SRL 5dB
   With respect to 900 Ω + 2.15uF reference

e) Trunk to Trunk non-talking condition
   SRL 10dB
   With respect to 900 Ω + 2.15uF reference

11.07 Longitudinal Balance. All connections meet the following requirements with respect to Longitudinal Balance.

Minimum

200Hz	1000Hz	3000Hz
65dB	60dB	54dB

11.08 Crosstalk Attenuation. The crosstalk attenuation, or coupling loss, between any two transmission paths is as stated below:

Both paths are terminated in 600 or 9000hms as required at each end. The frequency band which applies is 200 to 3400Hz.

Line to Line	— 75dB minimum
Line to Trunk	— 75dB minimum
Trunk to Trunk	— 75dB minimum

The level of the disturbing signal is 0dBm.

11.09 Message Circuit Noise. The total level of all noise sources within the system does not exceed the following limits:

Line to Line	— 16dBrnC (message weighted) 35dBrn flat (3kHz weighted)
Line to Trunk	— 16dBrnC (message weighted) 35dBrn flat (3kHz weighted)
Trunk to Trunk	— 16dBrnC (message weighted) 35dBrn flat (3kHz weighted)

Impulse noise in the voice band results in zero counts at a threshold level of 46dBrnC.

11.10 System Impedences. System impedences are:

6000hms nominal for lines

9000hms nominal for trunks

11.11 Envelope Delay. The delay difference is less than 200us between 400-3200Hz.

12. TRAFFIC CONSIDERATIONS

General

12.01 This part provides background data in determining the following parameters for the PABX's under various traffic loading conditions:

- Level of traffic per line (ccs per line), and

- Quantities of receivers required.

Intercom Traffic

12.02 In determining the Intercom Traffic values and expressing these values as ccs per line figures the following assumptions are made:

- Total Traffic (T) is 763ccs

- Originating Traffic equals the terminating traffic and is equivalent to 50 percent of total traffic i.e. 387.5ccs

- The Intercom Originating Traffic (To) can be expressed as a percentage X of the originating traffic

- Total Traffic divided by the number of lines results in a traffic per line (ccslline) figure

- Intercom Traffic expressed as ccslline must have the Intercom Traffic divided by (number of lines divided by 2). This doubling of ccslline derives from the fact that 2 lines are involved for each intercom call

- The number of lines are expressed as N

12.03 The total traffic can thus be expressed as the sum of:—

Terminating Traffic	$T/2$
Originating-Traffic · Intercom Originating Traffic	$(T/2\text{-}XT/2)$
Intercom Originating Traffic	$XT/2$

This total of course is T.

TABLE 12-1
INTERCOM CCS/LINE TRAFFIC

Intercom Traffic (Percentage of Originating Traffic)	CCS/LINE 40 LINES	CCS/LINE 80 LINES	CCS/LINE 120 LINES	CCS/LINE 160 LINES
0	19	9.5	6.3	4.7
10	20	10	6.6	5
20	20.9	10.5	7	5.2
30	21.9	10.9	7.3	5.5
40	22.9	11.5	7.6	5.7
50	23.8	11.9	7.9	5.9

12.04 The ccs/line is dependant on the proportion of Intercom Originating Traffic XT/2 and the number of lines (N). Table 12-1 shows various intercom traffic levels expressed as percentages of originating traffic for different values of installed lines. Taking an example of 30 percent with 80 installed lines and applying these values the ccs/line is obtained as follows:

$$ccs/line = \frac{T}{2N} + \frac{(T-XT)}{2N} + \frac{2XT}{2N}$$

$$= 4.768 + 3.338 + 2.861$$

$$ccs/line = 10.967$$

Receiver Provisioning

12.05 The number of receivers required to be installed in the PABX is dependent on various factors, such as the number of lines and trunks installed and the amount of traffic flow estimated for the system.

12.06 In order to arrive at the quantity required for a particular installation the following assumptions are made:

- Required grade of service:
  ABSBH: 98.5% of all receiver requests are serviced within 3 seconds

- Traffic: 6ccs/line ABSBH
  50% originating
  120sec average holding time

- Average holding time for a DP receiver
  =1.5sec/digit

- Average holding time for a TT receiver
  = 0.8sec/digit

- All receivers except one are used only for originating calls. One receiver is alloted for all other uses such as diagnostics

- Call originations are Poisson, holding times are exponential, queue discipline is random.

- All lines originating intercom calls are DP.

- All lines originating trunk calls are DTMF and require tone to pulse conversion.

- All originating trunk calls involve 1 digit to get an outgoing trunk, a 1 second wait, then 7 digits. The receiver is seized on origination and is held until 10 seconds after the last digit is punched.

- All stations have 4 digit numbers.

- A receiver can interpret either DP or DTMF.

- Receivers are provisioned in groups of 2 (Note 3).

- There is no delay in connecting an idle receiver to an originating line.

12.07 With the foregoing assumptions, and under the following conditions, the required quantities of receivers are as shown in Table 12-2.

- Cases of 40, 80, 120 and 160 line PABXs

- Degrees of intercom traffic expressed as 0, 10, 20, 30, 40 and 50 percent of originating traffic.

Notes: 1. Intercom call receiver holding time
  $= 4 \times 1.5 = 6.0sec$

2. Trunk call receiver holding time =
  $0.8 + 1.0 + 7(0.8) + 10 = 17.4sec$

3. A Receiver (Dual) Card contains two receiver circuits. A Receiver (Quad) Card contains four receiver circuits.

TABLE 12-2
RECEIVER QUANTITIES

PBX SIZE	%INTERCOM TRAFFIC	# OF RECEIVERS REQUIRED
40	0	4
	1 0	4
	2 0	4
	3 0	4
	4 0	4
	5 0	4
80	0	6
	1 0	6
	20	6
	30	6
	40	4
	50	4
120	0	6
	1 0	6
(SX-200 only)	20	6
	30	6
	40	6
	50	6
160	0	8
	1 0	8
(SX-200 only)	2 0	6
	30	6
	40	6
	50	6

12.08 Tables 12-3 to 12-6 inclusive show quan-
tities of receivers required under particular
traffic conditions, for differing quantities of in-
stalled lines and trunks and proportions of inter-
com traffic. The information in these Tables have
been derived from the traffic calculation formulas
shown in Appendix 1.

TABLE 12-3
GENERAL BUSINESS HEAVY TRAFFIC

LINE SIZE	CCS LINE	TOTAL CCS	INTRA CCS	2 WAY TRUNKS	RECEIVER
30	6.9	207	35	11	4
34	6.7	227	42	12	4
38	6.5	247	48	12	4
42	6.4	268	55	13	4
46	6.3	288	62	13	4
50	6.2	309	69	14	4
54	6.1	329	76	14	4
58	6.0	350	83	15	4
62	6.0	370	90	15	4
66	5.9	390	97	16	6
70	5.9	411	105	16	6
74	5.8	431	112	17	6
78	5.8	452	120	17	6
82	5.8	472	128	18	6
86	5.7	493	135	18	6
90	5.7	513	143	19	6
94	5.7	534	151	19	6
98	5.7	554	159	20	6
100	5.6	564	163	20	6
120	5.6	666	196	23	6
140	5.5	769	228	25	6

TABLE 12-4
GENERAL BUSINESS LIGHT TRAFFIC

LINE SIZE	CCS LINE	TOTAL CCS	INTRA CCS	2 WAY TRUNKS	RECEIVER
30	1.8	54	5	5	2
34	1.8	61	5	6	2
38	1.8	67	6	6	2
42	1.7	73	6	6	2
46	1.7	78	7	6	4
50	1.7	84	8	7	4
54	1.7	90	8	7	4
58	1.6	96	9	7	4
62	1.6	101	9	7	4
66	1.6	107	10	8	4
70	1.6	112	11	8	4
74	1.6	117	11	8	4
78	1.6	123	12	8	4
82	1.6	128	12	9	4
86	1.5	133	13	9	4
90	1.5	138	14	9	4
94	1.5	143	14	9	4
98	1.5	148	15	9	A

TABLE 12-4 (CONT'D)
GENERAL BUSINESS LIGHT TRAFFIC

LINE SIZE	c c s LINE	TOTAL c c s	INTRA c c s	2 WAY TRUNKS	RECEIVER
100	1.5	151	15	9	4
120	1.5	176	18	10	4
140	1.4	200	21	11	4
160	1.4	223	24	12	4

TABLE 12-5
HOTEL/MOTEL HEAVY TRAFFIC

LINE SIZE	c c s LINE	TOTAL c c s	INTRA c c s	2 WAY TRUNKS	RECEIVER
30	4.5	134	53	7	4
34	4.1	140	53	7	4
38	3.8	145	54	7	4
42	3.6	151	54	8	4
46	3.4	156	55	8	4
50	3.2	161	55	8	4
54	3.1	167	56	8	4
58	3.0	172	56	9	4
62	2.9	177	57	9	4
66	2.8	183	57	9	4
70	2.7	188	58	9	4
74	2.6	193	58	9	4
78	2.5	199	59	10	4
82	2.5	204	59	10	4
86	2.4	209	60	10	4
90	2.4	215	60	10	4
94	2.3	220	61	11	A.
98	2.3	226	61	11	4
100	2.3	228	62	11	4
120	2.1	255	64	12	4
160	1.4	302	68	14	4

TABLE 12-6
HOTEL/MOTEL LIGHT TRAFFIC

LINE SIZE	c c s LINE	TOTAL c c s	INTRA c c s	2 WAY TRUNKS	RECEIVER
30	.5	15	2	3	2
34	.5	17	2	3	2
38	.5	19	1	3	1
42	.5	21	2	3	2
46	.5	23	2	4	2
50	.5	26	3	4	2
54	.5	28	3	4	2
58	.5	30	3	4	2
62	.5	32	3	4	2
66	.5	34	3	4	2
70	.5	36	4	4	2
74	.5	38	4	4	2
78	.5	40	4	4	2
82	.5	42	4	5	2
86	.5	44	4	5	2
90	.5	46	5	5	2
94	.5	48	5	5	2
98	.5	50	5	5	2
100	.5	51	5	5	2
120	.5	61	6	6	2
140	.5	71	7	6	2
160	.5	a2	a	7	2
180	.5	92	9	7	2

APPENDIX 1
TRAFFIC CALCULATIONS

GENERAL

Al.01 The Tables shown in 12.07 which reflect quantities of receivers required for the PABX, (under the conditions stated) are derived in part from the following equations:

$$RT = \frac{1}{36}\left[\left(\frac{6}{120}\right)\left(\text{Intercom T}\right) + \left(\frac{17.4}{120}\right)\left(\frac{\text{Trunk T}}{2}\right)\right]$$

RT = Receiver Traffic (Erlangs)
Intercom T = Intercom Traffic
Trunk T = Trunk Traffic

$$\frac{6}{120} \quad \frac{\text{Receiver Holding Time (internal)}}{\text{Average Call Duration}}$$

$$\frac{17.4}{120} = \frac{\text{Receiver Holding Time (trunk)}}{\text{Average Call Duration}}$$

Select number of receivers (C)

Calculate "α" $= \dfrac{RT}{C}$

Using P = 0.015

Use $\dfrac{T}{H} = \dfrac{3}{(6)\dfrac{\text{Internal T}}{T} + (17.4)\dfrac{\text{Trunk T}}{T}} =$

$\underline{\text{(max. delay)}}$
(weighting)

$\dfrac{T}{H}$ = Delay in multiples of average holding time

Using $\dfrac{T}{H} =$ "α", and C weighting, using the delay curves, verify that the estimated number of receivers will carry the required traffic

SX-100* AND SX-200*
SUPERSWITCH*
ELECTRONIC PRIVATE AUTOMATIC BRANCH EXCHANGE
MULTI DIGIT TOLL CONTROL

I. GENERAL

Introduction

1.01 This section contains a description and explanation of Multi Digit Toll Control utilized by the SX-IOO/SX-200. It also contains the necessary programming forms and MAPs (MITEL ACTION PROCEDURES) required to program an SX-100 or SX-200 for Multi Digit Toll Control.

Reason for Reissue

1.02 This practice is reissued to incorporate Generic 205 information.

1.03 This practice consists of nine parts the first being a brief introduction and outline of the practice.

- Part two is a brief general description of Multi Digit Toll Control

- Part three covers Multi Digit Toll Control in four areas; Control Plans, Extension CORs, Trunk Group Identification, and Absorb Plans

- Multi Digit Toll Control is described in detail in part four with the use of diagrams and an example

- Part five is a brief explanation of the North American Numbering Plan and its applicability with Multi Digit Toll Control

- Part six is a Programming Sequence Overview covering the actual programming of a system

- Part seven is a Functional description of all button designations for the Extended Programming mode

- Part eight lists the error codes that may appear while programming the system in the Extended Programming mode

• Part nine is an example of a completed set of Toll Control forms interspaced with a functional series of diagrams

2. GENERAL DESCRIPTION

2.01 Multi Digit Toll Control provides a method of controlling the sequence of digits which an extension may dial into a trunk. Toll Control is applied on an extension basis, that is, the control applied to digits can vary depending on which extension has accessed the trunk. Should no toll restrictions on an extension be required, the extension may be Toll Allowed, i.e., dialing is unrestricted.

2.02 Toll Control is implemented by programming the following information:

• Control Plans

• Extension Definition

• Trunk Group Definition

Control Plans

2.03 A Control Plan defines explicitly the sequence of digits which will be allowed or denied. This plan may deny or allow all digits dialed into a trunk. More often, however, the plan will consist of the dialing sequence which is allowed. Note again that the digit sequences may be either allow (only digits in the list can be dialed) or deny (all digits except those in the list can be dialed).

2.04 Up to 15 Control Plans may be defined. The size of these plans depends on the usage of the extended non volatile RAM. A slightly restricted form of Toll Control is available when using Automatic Wake-Up (Alarm Call). Although the following sections of this practice only mention restrictions placed on access to a toll network, it is also feasable to restrict on access to non toll numbers (ie. local calls on WATS lines).

Extension Definition

2.05 Each extension is assigned a Class of Restriction (COR). The COR (1, 2 or 3) links the extension to one of three Control Plans which can be assigned to each Trunk Group. The Control Plan defines the sequences of digits which can be dialed into the trunk by the extension. The extension's COR selects a Trunk Group COR which in turn selects a Control Plan assigned to that COR in that Trunk Group.

2.06 Extension's COR can also be defined as ALLOWED. This will result in no dialing restriction being applied to the extension.

Trunk Group Definition

2.07 Each trunk group can be assigned up to three Control Plans, associated with COR 1, COR 2 and COR 3. The plan that is applied to a call through the group is determined by the COR of the extension which accesses the group. Thus an extension with COR 1 will be linked to the Control Plan assigned to COR 1 in the Trunk group, an extension with COR 2 would be linked to the Control Plan assigned to COR 2 in the Trunk group, and an extension with COR 3 would be linked to the Control Plan assigned to COR 3 in the Trunk group.

2.08 The Trunk Group programming also defines Absorb Plans, which cope with Central Offices that absorb some digits, either once or repeatedly. Also, "Deny on Toll Reversal" may be enabled in each Control Plan.

2.09 A COR in the Trunk group need not be assigned a Control Plan. In this case, no restriction will be applied to an extension when an assigned Control Plan would otherwise have been in effect. Also, the same Control Plan may be assigned to more than one COR within a trunk group, and in more than one trunk group.

Digits Dialed

2.10 A maximum of 26 digits can be controlled for a single dialing sequence by an extension. It is possible to dial more than 26 digits, but only the first 26 would be monitored for Toll Control purposes. The attendant can dial a maximum of 26 digits into a trunk. Digits beyond this number will not be output to the trunk by the PABX. No Toll Control is ever applied to the console.

2.11 An extension dialing an illegal number will receive reorder tone or may be-directed to the attendant after the last digit dialed.

3. ELEMENTS OF MULTI DIGIT TOLL CONTROL

3.01 The following section is a general description of the elements of Multi Digit Toll Control. The description is broken down into four parts;

- Control Plans

- Extension CORs

- Trunk Group Definition

- Absorb Plans

Control Plans

3.02 Each Trunk Group may be assigned three different Control Plans, each one linked to one of the Trunk Groups CORs. When an extension accesses a Trunk Group the COR of the extension is matched to the Trunk Group COR and the assigned Control Plan is accessed. This allows different extensions to access different Control Plans when placing calls through the same Trunk Group (Fig. 3-l). It should be noted that a path of complete allowal exists in each Trunk Group. This occurs for access by fully toll allowed extensions or if a Trunk Group has no Control Plan assigned.

Extension CORs

3.03 Each extension may be defined as Toll Allowed or as having one of three COR's. Toll Allowed indicates that no denial checking

will be done for an extension. A COR assignment will indicate that denial checking will occur for trunk calls made from an extension. This checking will be according to the Control Plan linked to the extension's COR number within the Trunk Group. The linking of an extension's COR (in a Trunk Group) with a Control Plan is shown in Fig. 3-2 using the following information:

Extension W may access Control Plan 1 through Trunk Group A
Extension X may access Control Plan 1 through Trunk Group B
Extension Y may access Control Plan 1 through Trunk Group B and Plan 2 through Trunk Group C
Extension Z may access Control Plan 3 through Trunk Group C and Control Plan 4 through Trunk Group D

Trunk Group Definition

3.04 Trunk Group access is primarily controlled by an extension's Class of Service. By restricting access to certain Trunk Groups an extension is inhibited from making some calls on a general basis. The four paths that may be used after an extension has accessed a trunk, are: COR 1, COR 2, COR 3 and Toll allowed. Each COR may be linked to a specific Control Plan which will define the actual digits that may or may not be allowed. The Control Plan can also specify Denial on Toll Reversal.
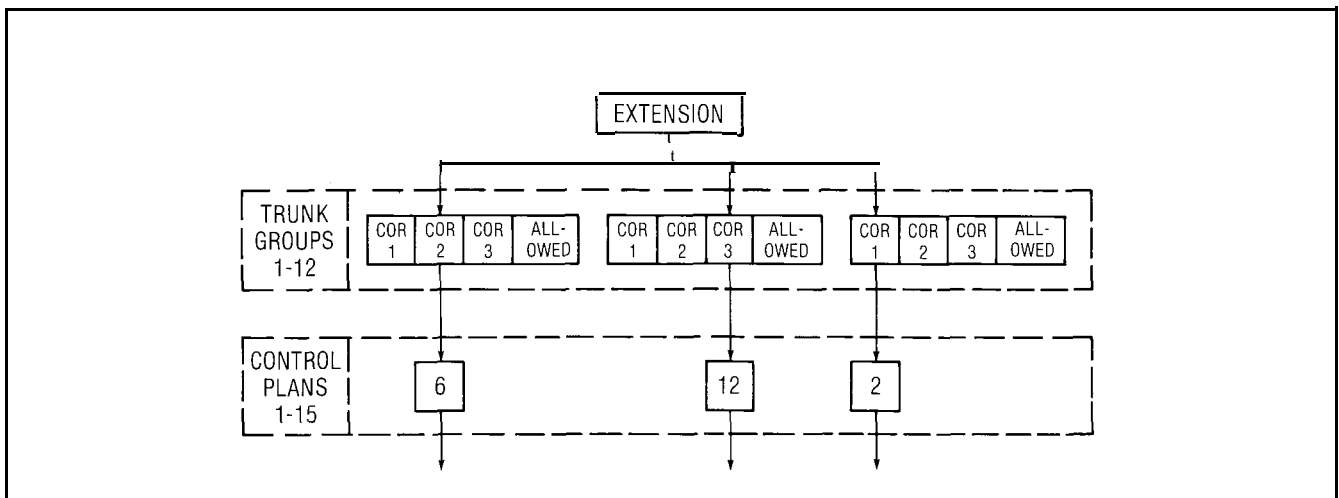
Fig. 3-1 Trunk Group Control Plans
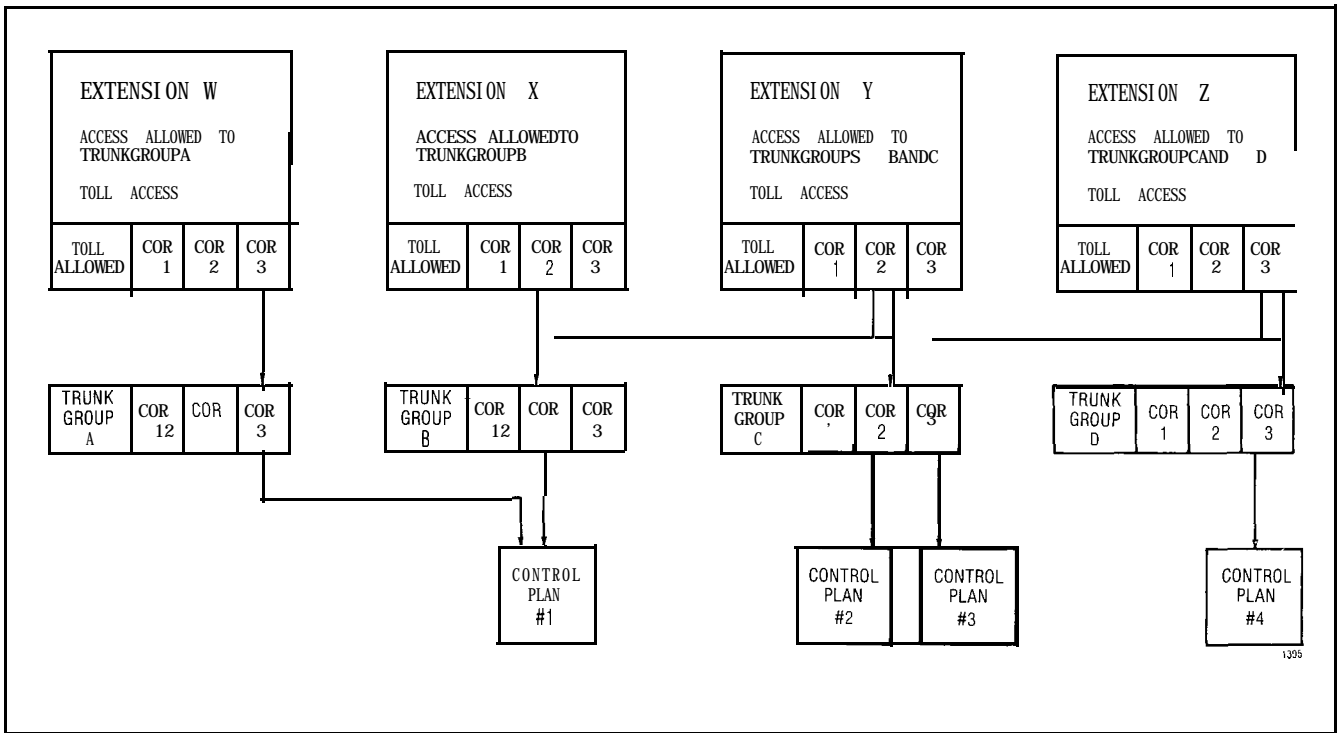
Fig. 3-2 Basic Block Diagram

3.05 Each defined Control Plan can be enabled to cause an unconditional denial of a call if a toll reversal is sensed. The first digit of the Trunk Group "type" in Standard Programming must be programmed as '3'. This programming will indicate that a battery reversal on any trunk within the group signifies detection of a toll call by the central office.

Absorb Plans

3.06 In some localities, certain leading digits are ignored by the Central Office equipment. Through Absorb Plans absorbing digits may be simulated in two manners; Absorb Repeat, Absorb Unlock. An Absorb Repeat digit is continuously ignored until a non absorb digit or a non-unlock digit is dialed. An Absorb Unlock digit is ignored only on its first occurrence. Up to two Absorb Plans may be defined per system. Either one or none of the two Absorb Plans may be assigned to any trunk group or may be assigned to more than one trunk group (Fig. 4-1 (a))

4. DETAILED DESCRIPTION

General

4.01 Multi Digit Toll Control allows toll restrictions to be placed on all outgoing trunk calls on an individual extension basis. In other words, the parameters specifying toll restriction details are assigned directly to each Trunk Group used in the system. If desired, the same parameters can be assigned to more than one Trunk Group allowing identical Toll control on different Trunk Groups. To achieve different restrictions on the same Trunk Group, different extensions may be assigned different classes of control.

4.02 The basic architecture of the Multi Digit Toll Control is illustrated in Fig. 4-1 (a) and Fig. 4-1 (b). This architecture outlined in these Figs. is discussed in the remainder of this section, and it does not include the toll allowed case.

Fig. 4-1 (a) Toll Control Architecture Diagram

NOTE: EXCEPTION TABLE CHAIN FOR BASIC CONDITION 1 IS NOT SHOWN FOR SIMPLICITY.

Fig. 4-1 (b)   Toll Control Architecture Diagram · continued

4.03 Each extension may be defined as Toll allowed or as having one of three CORs (Class of Restriction). Toll allowed indicates that no denial checking will be done for an extension, no matter which Trunk Group is accessed. A COR assignment will indicate that denial checking will occur for trunk calls made from an extension according to the Control Plan linked to the extensions COR number within the Trunk Group accessed. If no Control Plan is linked to this COR of the Trunk Group, the extension will be completely allowed. It may be seen when an extension makes an outside call, the COR of the extension determines the Trunk Group Control Plan to be used.

4.04 The Trunk Group definition includes; the assignment of Absorb Plans to the Trunk Group and the association of the required Control Plans to the Trunk Group's CORs.

Absorb Plan

4.05 If the PABX is connected to a CO which absorbs specific digits, it will be necessary to define an Absorb Plan. The purpose of an Absorb Plan is to cause the PABX to ignore dialed digits exactly as the CO absorbs them. The system can accomodate up to two independent Absorb Plans. Each plan specifies the "Absorb Repeat" digits and the "Absorb Unlock" digits. Either or none of the Absorb Plans may be selected for use by a trunk group. Note that the application of an Absorb Plan to a Trunk Group will never cause the PABX to prevent dialed digits from going to the CO. The "absorbed" digits are simply ignored by the PABX in terms of toll control checking. In this case the PABX will check the same digits which the CO (and toll network) acts upon. Two different types of digit absorbs are provided:

- **Absorb Repeat Digits** The Absorb Plan may absorb up to four individual digits. When the first digit dialed on the trunk is an absorb repeat digit, it is passed without further analysis by the PABX. Further digits matching any of the absorb repeat digits programmed will also be ignored. When a non-listed digit is received the effects of the absorb plan are terminated, and the non-listed digit and all subsequent digits are subject to toll control.

- **Absorb Unlock Digits** The Absorb Plan may contain up to four individual digits. When the first digit dialed (or the digit after

any absorb repeats) is one of the absorb unlock digits programmed, it is passed without further analysis by the PABX. At this point the absorb plan is unconditionally terminated, and all subsequent digits (not including the unlocking digit) are analyzed. Before that all digits are ignored.

Control Plan Assignment

4.06 Each Trunk Group may be assigned three different Control Plans, one linked to each of the Trunk Group's CORs. When an extension accesses a Trunk Group the COR of the extension is matched to the Trunk Group COR and the assigned Control Plan is accessed. This allows different extensions to access different Control Plans when placing calls through the same Trunk Group.

Control Plan Definition

4.07 Each system can accomodate up to 15 individual Control Plans. A Control Plan defines the actual digits that will or will not be allowed. The Control Plan also specifies whether or not 'Denial on Toll Reversal' is active on calls.

Basic Conditions

4.08 Five 'Basic Conditions' must be defined for each Control Plan. These basic conditions specify Allow or Deny rules according to the first digits dialed (after any absorbs).

Basic Condition 1 (Allow/Deny First Digit 0)

4.09 Basic Condition 1 specifies whether or not calls with '0' as the first digit dialed, after any absorbs, are to be allowed.

Basic Condition 2 (Allow/Deny 1-XNX)*
Basic Condition 3 (Allow/Deny 1-X0/1X)*

- *Note:*   "N" is defined as any digit 2-9
          "X" is defined as any digit 1-9, 0

4.10 Which of these two Basic Conditions is in effect is determined by the digits dialed after any digit absorbs. Basic Condition 2 is in effect if a CO code (XNX code) is dialed after the toll prefix. Basic Condition 3 is selected if an area code (X0/1X) is dialed after the toll prefix.

4.11 These Basic Conditions may reference an Exception Table if required. This table lists any exceptions to the Basic Conditions selected. If the Basic Condition is specified as Allow, all codes will be allowed except those listed in the Table referenced. Similarly if the Basic Condition is defined as Deny, the table will list those codes which will be allowed.

Basic Condition 4 (Allow/Deny XNX)
Basic Condition 5 (Allow/Deny X0/1X)

4.12 Basic Condition 4 or 5 is in effect if an Area Code (X0/1X) or a CO Code (XNX) is dialed without the toll prefix (1) and after any digit absorbs. Basic Condition 4 is selected for CO calls and Basic Condition 5 for Area Code calls. These Basic Conditions may also reference an Exception Table which lists any exceptions to the basic Allow/Deny condition.

Restriction Tables

4.13 Each of these Restriction Tables consist of a listing of the codes that are exceptions to the Basic Condition from which they are referenced. The tables may be 800-entry, 20-range, or 4-entry tables. The number of tables of each size available for assignment is dependant on the system memory allocation (Fig. 4-2). A table may be referenced only once within the system (Fig. 4-3). Any of these tables can be represented an expansion or exception table of any level.

4.14 Eight Hundred Entry Tables An 800 entry table (Tables Numbers l-9) may consist of any or all of the three digit codes in the range 200 through 999.

TABLE TYPE	TABLE NUMBERS AVAILABLE		
	CONFIGURATION 1 & 2	CONFIGURATION 3	CONFIGURATION 4
800 ENTRY	1-7	1-4	1-9
20 RANGE	21-29	21-27	21-33
4 ENTRY	51-67	51-62	51-73

1408

Fig. 4-2 Configurations
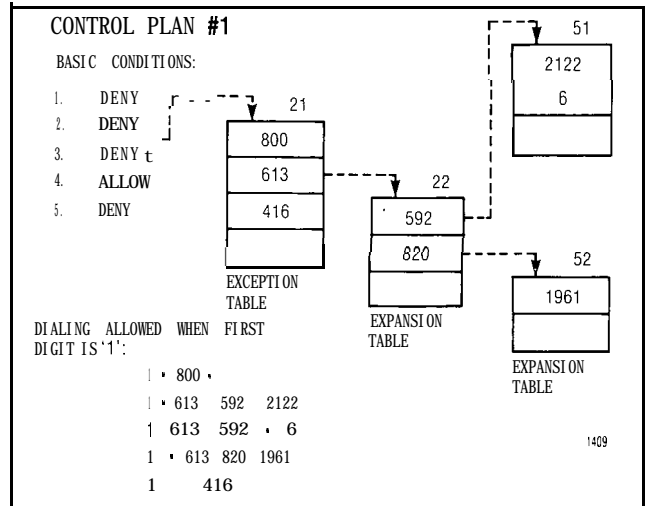
Fig. 4-3 Application of Tables in a Control Plan

4.15 Twenty Range Tables Each range in this type of table (Table Numbers 21 through 33) consists of ten three digit numbers. A Range is defined as any group of entries with the first two digits the same (311, 312, 316 is considered one range, 312, 325 is considered two ranges). A maximum of 20 'ranges' may be contained in this type of table.

4.16 Four Entry Tables These tables (Table Numbers 51 through 73 maximum) may hold up to four entries. Each entry may be one, two, three or four digits in length. If only a one, two or three digit entry is made, the restriction (Allow/Deny) will apply to all numbers beginning with the entry.

4.17 The 4-entry table type can accomodate entries of 1 to 4 digits. Also, any digits can be stored in an entry. For example, a 4-entry table could hold the following entries:

1. 2122

2. 23

3. 114

4. 0909

Note that this table type is the only type whose entries need not be a fixed number of digits. This enables many 'special case' toll restriction situations to be accomodated.

Table Usage and Expansion (refer to Fig. 4-3)

4.18 The tables define the exceptions to the basic allow/deny conditions of the Control Plans. It is the method of the application of the exception tables which gives the Toll Control feature its flexibility. This section will explain the possibilities of using the exception tables. The actual programming of the tables will be discussed in the programming sections.

4.19 When it is determined that exceptions are required for a basic condition, a table is assigned to store the exceptions. ANY unassigned table, regardless of the type, may be assigned. Figure 4-3 shows a typical exception sequence for Control Plan 1. Here a 20-range table (Table 21) has been assigned as an Exception Table to basic conditions 2 and 3. This indicates that all 3-digit codes dialed after a '1' will be denied unless the code appears in Table 21. As shown, several area codes have been entered.

4.20 Any entry in a Table can be 'expanded' with another table. The table used to expand the entry can be of any type, so long as the table is not yet assigned. An expansion has been applied to the 613 entry in the Exception Table by assigning Table 22. This indicates that 613 will only be allowed if followed by an entry in Table 22. Since the 416 entry in the Exception Table has no expansion, any digits dialed after 416 will be allowed.

4.21 When a table is assigned to a basic condition (or pair of basic conditions) it is called an 'Exception Table'. When a table is assigned to an entry in any other table, it is termed an 'Expansion Table'. Tables can be used to expand entries in other tables to any level. Each table can only be assigned to one place, either a basic condition (or pair of conditions) or an entry in another table.

4.22 The number of tables available for use in the Control Plans is determined by the "configuration" selected for the non-volatile RAM on the PROM/RAM Expander card. Figure 4-2 gives the Restriction Table numbers available with the two feature sizes (feature size is determined by configuration number). These table numbers are used to make all references to the tables during programming. The following points summarize Restriction Table capabilities and limitations:

- Any table (regardless of type) may be assigned to a Basic Condition (or pair of Conditions) in a Control Plan

- Any table (regardless of type) may be assigned to any entry in any table

- A table may only be assigned to one place at a time, whether to a Basic Condition (or pair) or another table entry

5. NUMBERING PLAN (NORTH AMERICAN)

5.01 Almost every subscriber in the North American telephone system may access any other subscriber by dialing a maximum of ten or eleven digits. These digits consist of an optional toll prefix number (usually 1) three digit area code, a three digit Central Office code and a four digit subscriber number (Fig. 5-l).

5.02 In the area code the first digit may be any number except one or zero. The second digit must be one or zero. The last digit may be any number zero through nine.

5.03 In the CO code the first digit may be any number two through nine. The second digit must not be either digit zero or one and the last digit may be any digit zero through nine. It should be noted that there are assigned service codes such as 911 and 411 that may conflict.

5.04 The subscriber number may be any series of digits from 0000 to 9999. Once again there are assigned numbers such as 1212 and 1000 that are generally reserved for special services.

5.05 In some smaller locales a Central Office may utilize the first series of digits dialed to unlock the office. That is the digits will be absorbed by the office i.e. 687-6577 where the 68 will be absorbed and it is only required to dial the 7-6577. Thus 68 would be entered into an Absorb Repeat plan. There is also the situation where these digits may be automatically outpulsed in a tandem situation making the dialing of those digits necessary.
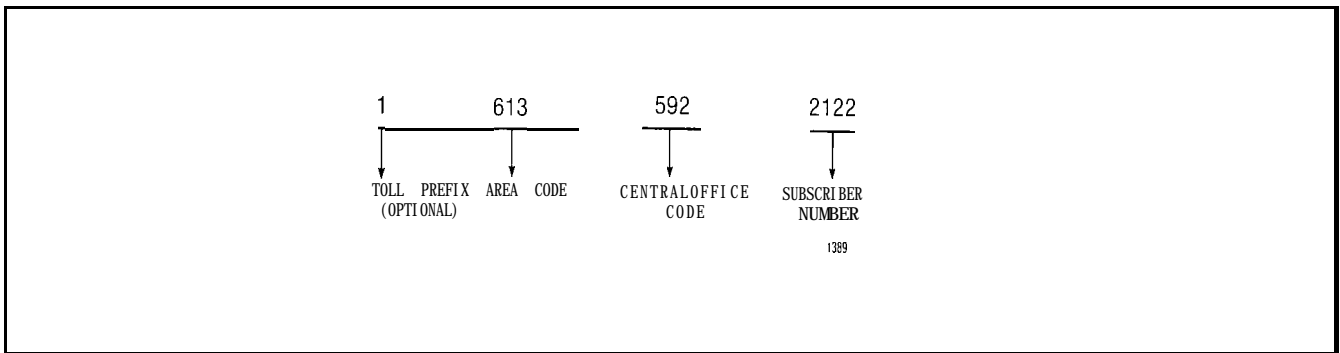
Fig. 5-1   North American Numbering Plan

5.06   Utilizing this information and taking into account that other numbering plans exist other than the North American Numbering Plan, a difficulty in toll restriction may be observed. The problem compounds itself within a PABX since some extensions must be restricted. and others toll allowed when accessing different or even the same trunks. The remainder of this section will discuss (with specific reference to the North American Numbering Plan) various methods of toll control that may be utilized.

5.07   The first consideration to toll restrict an extension in a PABX would be to limit the ability to access outgoing trunks. This is done when an extension is assigned a Class of Service (COS) (MITL9105/9110-98-205) with a specific Trunk Group access programmed into it. This does not restrict an extension's ability to make toll calls, but rather restricts the ability to access outgoing trunks. The problem in most PABX's lies in a system's ability to restrict an extension after it has accessed a trunk. (Fig. 5-2)

5.08   In the SX-lOO/SX-200 system there are provisions for denial on dialing the digits one and zero. That is, if the first digit dialed is a one or a zero the toll denied extension will be routed to
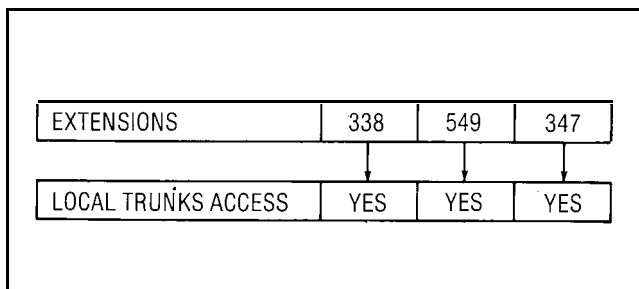
Fig. 5-2 O/I, Toll Restriction

the attendant or will receive re-order tone. (Fig. 5-3)
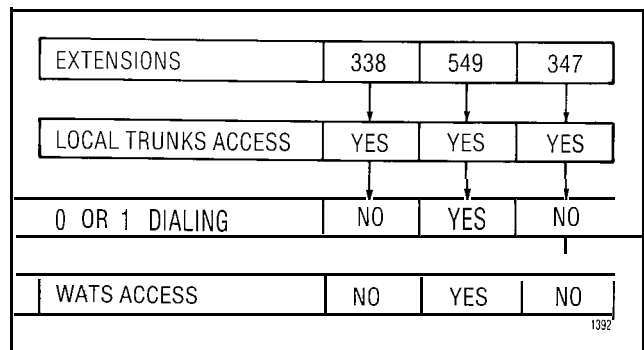
Fig. 5-3 O/I, WATS, Toll Restriction

5.09   In the examples shown in Figs. 5-3 and 5-2 extension 549 is the only extension which will be permitted to dial a long distance code or access a WATS line. Extension's 338 and 347 will be restricted to local calls only unless the attendant makes a long distance call and connects the extension to that trunk. Obviously the efficiency of such a system is dubious at the best of times. A toll control based upon the digits or sequence of digits would be preferable to the two outlined situations of 5.07 and 5.08.

5.10   The following example should be used in conjunction with the examples in the installation forms in the latter part of this practice. This section will outline a possible implementation of the Multi Digit Toll Control feature in an area where the toll prefix is one. The pertinent system configuration information for the example is:

• There are three trunk groups, trunk group one and trunk group two

• Trunk group three consists of tie trunks to another PABX

5.11 It will be assumed, for Toll Control purposes, there are three classes of users served by the PABX

• User A Upper Management

• User B Sales and Marketing

• User C All other users

5.12 The following restrictions are desired for each user group with each trunk group:

• Trunk Groups 1 and 2 (local CO)
  User A: Complete allowal
  User B: Allow all calls in home area code (local and toll)
      Allow all calls to area codes 408,209, 707
      Deny all toll calls to other area codes
      Allow toll calls to 613-592-2122
      Deny operator access

  User C: Allow local calls only (primary calling area)
      Deny operator access

• Trunk Group 3 (tie)
  User A: Complete allowal
  User B: Complete allowal
  User C: Deny Trunk access on other PABX (deny '9')
      Allow everything else

First, it can be seen that no digit absorbs will be required. Therefore, no Absorb Plans need be defined or assigned to any Trunk Groups. This is shown in Figure 5-4.

5.13 The Extension programming must be performed to define the paths to be taken within the Trunk Groups. Group A users will have complete allowal in all Trunk Groups, so their Extensions need only be programmed with 'TOLL DENY · DELETE'. Group B users are only com-

pletely allowed when accessing one Trunk Group (#3), so the same thing cannot be done with this group of users. Here, we will program their Extensions with 'TOLL DENY 1', meaning Class of Restriction 1 will be taken in the Trunk Groups they are accessing. Similarly, group C users' Extensions can be programmed with 'TOLL DENY 2', which will define the path taken when group C users access a Trunk Group.

5.14 At this point, the major paths taken in any trunk-dialing instance have been defined. The Control Plans needed must now be assigned and programmed. A different Control Plan is needed for each different allow/deny requirement of the Levels of Restriction. Figure 5-4 shows a possible Control Plan assignment. Note that even though Class of Restriction 3 is not actively used, it must be assigned a Control Plan number. In this case it has been assigned the same Control Plan as Level of Restriction.

5.15 The only remaining task is to define the Control Plans. Figure 5-5 shows the set-up for Control Plan 1. Figure 5-6 shows Control Plan 2, Figure 5-7 shows the last Control Plan needed. In all three figures (5-4 to 5-7) the type of any digit tables used can be found by noting the table number and referring to Table 4-2.

5.16 As can be seen, any Control Plan could become quite complicated, thereby allowing a restriction capability closely tailored to a particular installation's requirements. Generally, the maximum feature capability is limited by the number of tables available. Careful planning is necessary before programming the feature to eliminate duplication of Control Plans (and therefore digit tables) and ensure efficient usage of the digit tables.

6. PROGRAMMING SEQUENCE

6.01 This section discusses the actual method for Multi Digit Toll Control Programming. It should be used in conjunction with; Section 7 Functional Description, the Programming Tables and the MAPs.
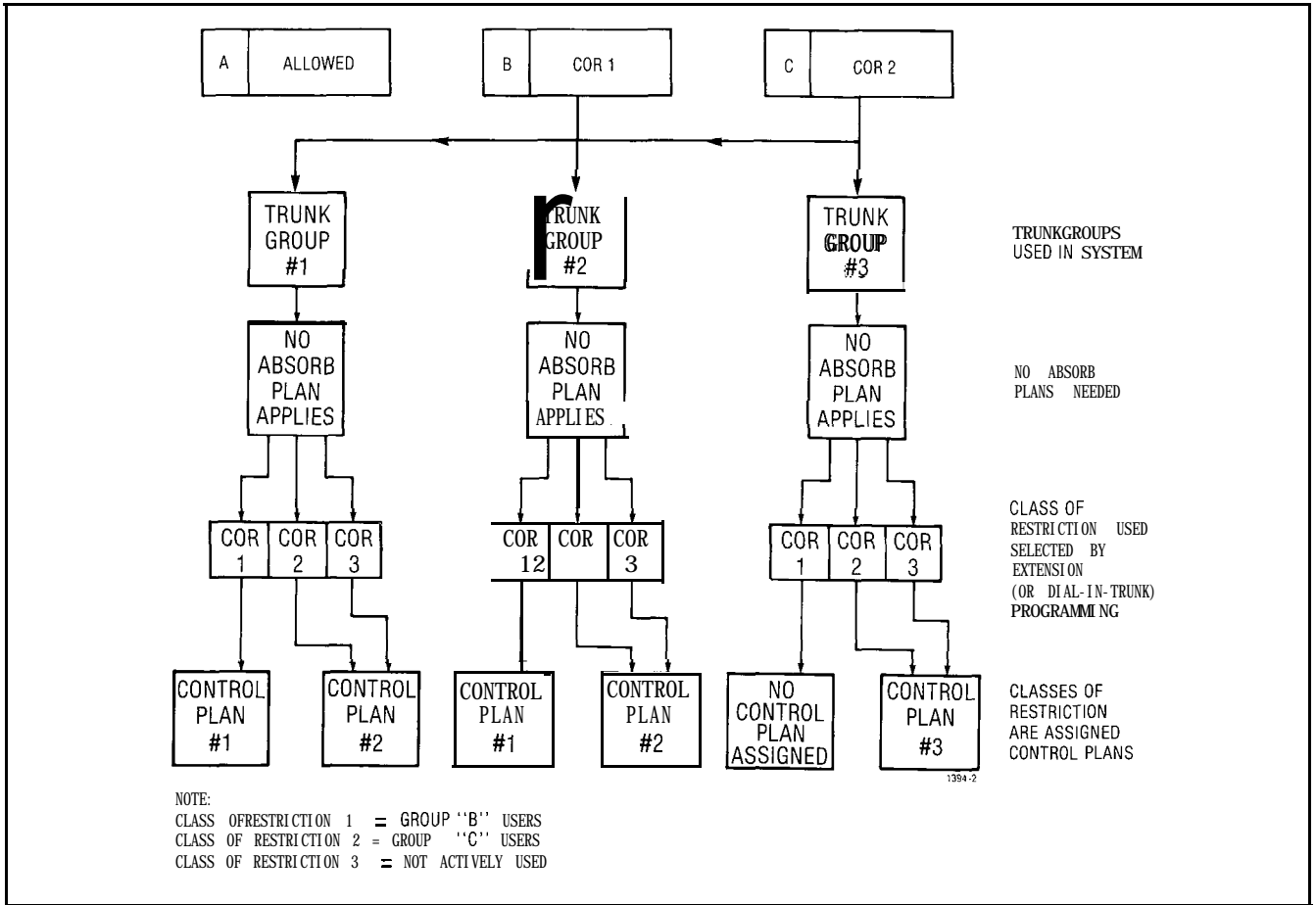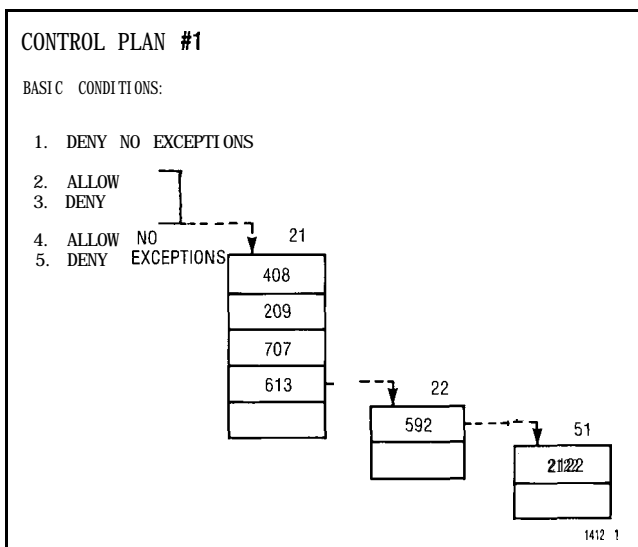
Fig. 5-4 Diagram of Basic Toll Control Paths

CONTROL PLAN #1

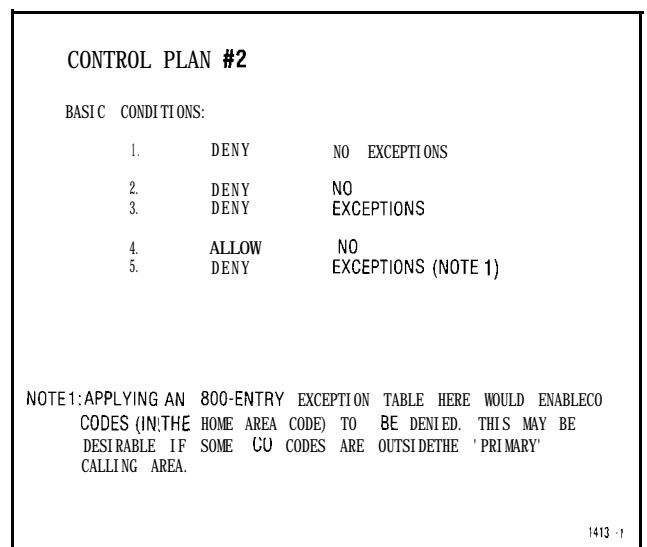**BASIC CONDITIONS:**

1. **DENY NO EXCEPTIONS**

2. **ALLOW**
3. **DENY**

4. **ALLOW** NO
5. **DENY** EXCEPTIONS

21
408
209
707
613

22
592

51
2122

Fig. 5-5 Control Plan 1 of Example

CONTROL PLAN #2

BASIC CONDITIONS:

1.	DENY	NO EXCEPTIONS
2.	DENY	NO
3.	DENY	EXCEPTIONS
4.	ALLOW	NO
5.	DENY	EXCEPTIONS (NOTE 1)

NOTE 1: APPLYING AN 800-ENTRY EXCEPTION TABLE HERE WOULD ENABLE CO CODES (IN THE HOME AREA CODE) TO BE DENIED. THIS MAY BE DESIRABLE IF SOME CO CODES ARE OUTSIDE THE 'PRIMARY' CALLING AREA.

Fig. 5-6 Control Plan 2 of Example

CONTROL PLAN #3

BASIC CONDITIONS:

1.   **ALLOW**   **NO   EXCEPTIONS**

2.   **ALLOW**   **NO**
3.   **ALLOW**   **EXCEPTIONS**

4.   **ALLOW**
5.   **ALLOW**

52

9

1411-1

Fig. 5-7   Control Plan 3 of Example

6.02   There are 11 basic steps in a complete pro-
gramming of Multi Digit Toll Control. These
are;

- Complete all forms MITL9105/9110-98-212

- Enter Standard Programming Mode

- Initialize the non Volatile RAM (if
necessary)

- Program Extensions and Dial-In Trunks for
COR

- Enter Extended Programming Mode

- Select Configuration

- Program Absorb Plans

- Program Trunk Groups

- Program Control Plans

- Program Restriction Tables

- Terminate Programming

6.03   All forms in MITL9105/9110-98-205 should
be completed before attempting to program
the system for Multi Digit Toll Control. All Stan-
dard Programming MITL9105/9110-98-205 and
MITL9105/9110-98-210 should be completed
before attempting to program the system for Multi
Digit Toll Control. MITL9105/9110-98-210 should
be consulted when programming extensin COR.

6.04   The system is put in Standard Programming
Mode following the procedure outlined in
MITL9105/9110-98-210. It should be noted that the
Standard System Programming must include
System Option 199 (Toll Control Enable). If this op-
tion is not selected the system will default to a 0/1
type of Toll Control.

6.05   If Multi Digit Toll Control is to be programm-
ed for the first time or to be totally
reprogrammed the system's RAM must be in-
itialized. An important point: if the RAM is initializ-
ed all RAM data will be destroyed. Initialization
may be accomplished as per MITL9105/9110-
98-210

6.06   All extensions must be assigned a Class of
Restriction or be completely toll allowed.
This is done by the following sequence; select
Standard Programming console overlay, press
EQPT NUMBER button, dial the extension
number, press the TOLL DENY button; dial one,
two or three (for COR 1, 2 or 3), or press the
DELETE button (for toll allowed). At the end of all

each entry for the extensions or Dial-In Trunks, the ENTER button must be pressed. If System Option 199 (Multi Digit Toll Control Enable) is not selected or the additional Non Volatile RAM is not installed an EO error will result, if 1, 2 or 3 is dialed as a COR.

6.07 The system must be in the Standard Programming mode to be placed in the Extended Programming mode. To enter Extended programming press the LAMP TEST button followed by pressing the NEXT button. At this time the LAMP TEST LED will start flashing and will continue to flash while the system is in Extended Programming.

6.08 In Generic 2041205 systems there are four configurations of Multi Digit Toll Control available:

1. Automatic Wakeup and Toll Control Standard (Configuration 1)

2. Toll Control Standard and Speed Call Standard (Configuration 2)

3. Toll Control Basic and Speed Call Extended (Configuration 3)

4. Toll Control Extended (Configuration 4)

6.09 One of these four configurations must be selected after the system has been placed in the Extended Programming mode. Example: if Automatic Wakeup and Toll Control Standard is currently configured the Source display will show a one for configuration one. If Toll Control alone was selected the configuration will be shown as four. Configurations 1 and 4 are exclusive to Generic 204. Configurations 2 and 3 are exclusive to Generic 205.

6.10 There is a possibility of two Absorb Plans within the system. There may not be a requirement for Absorb Plans and this section of the Programming sequence overview may be ignored if such is the case. Some important points to recall about absorb plans are listed below:

- Each Trunk Group may be assigned one of two Absorb Plans

- The same Absorb Plan may be assigned to more than one Trunk Group

- Up to 4 'digit absorb repeat' digits are allowed in each plan

- Up to 4 'digit absorb unlock' digits are allowed in each plan

- It is not possible to specify a two (or more) digit sequence. Each of four digits is referenced independently

6.11 Trunk Group programming is primarily dependant on the COR of an extension that accesses that Trunk Group. The toll control process will follow the path specified by the extension's COR. The extension COR will select a COR path within the Trunk Group that will have a Control Plan assigned to it (Fig. 3-2). One of fifteen Control Plans may be assigned to a COR and the same Control Plan may be assigned to more than one Class of Restriction. Each defined Control Plan can be enabled to cause an unconditional denial of a call if a toll reversal is sensed. Note that the first digit of the trunk group 'type' must be programmed as '3' to indicate that a reversal on the trunk represents toll call detection by the Central Office.

6.12 The Control Plan contains the basic allow/deny information. This includes information for denying if a 'Toll Reversal' is sensed, and five 'Basic Conditions' of allow/deny. The Control Plan also designates any required table(s) of exceptions to the five basic conditions.

6.13 The basic allow/deny conditions fall into three groups and only one of these groups will be involved in any single dialing instance. The three groups and the basic allow/deny conditions listed as (1 through 5) are as follows:

(a) First digit (after absorbs) is a 0

    1. Allow/Deny 1st digit 0

(b) First digit (after absorbs) is a 1

    2. Allow/Deny   1-XNX
    3. Allow/Deny   1-x 011 x

c) First digit (after absorbs) is a 2-9

    4. Allow/Deny   XNX
    5. Al low/Deny   x O/l x

Tables

8.14 Initializing a Table If a table which was previously in use is required for different entries, it may be cleared of all entries and expansions via initialization. The suggested programming form shows the procedure.

6.15 Examining and Adding/Deleting Table Entries Tables may be manipulated on an entry basis. Inspecting the programming procedure form for table manipulation will reveal there are four basic entry operations once the table number has been entered and DISPLAY ENTRY has been keyed:

1. Display next entry in table.

2. Search for specific entry.

3. Add a specific entry to the table, including an optional table number of an expansion to the entry.

4. Delete the entry currently being displayed from the table.

6.16 During table manipulation, a display of dashes in the entry digits indicates the end of the table has been reached. This can happen when:

A. Initially accessing a table for modification. The first entry in the table is normally displayed, but if the table is empty dashes will be displayed, which indicates the end of the table was reached before an entry was found.

B. The next entry in the table is desired for inspection. If the entry displayed is the last entry in the table, dashes will be displayed when attempting to examine the next entry in the table.

C. Searching for a specific entry. If the entry does not exist in the table, dashes indicate the end of the table was reached and the entry was not found.

6.17 When adding entries in a 4-entry table, care must be taken not to attempt entry of a code already existing in the table, or an entry which would cause an ambiguous entry to exist. For example, the two entries 46 and 461 cannot exist simultaneously in a 4-entry table. For 800-entry and 20-range tables, adding an existing entry has no effect and ambiguous entries cannot exist because all entries must be three digits in length for these table types.

6.18 Extended Programming may be terminated by pressing the LAMP TEST button followed by the NEXT button. At this time the LAMP TEST LED will stop flashing and Standard Programming will be entered. To exit from programming mode see MAP210-010 of MITL9105/9110-98-212.

7. FUNCTIONAL DESCRIPTION

7.01 The Extended Programming console faceplate layout is shown in Fig. 7-l. The faceplate differs from other programming faceplates, in that certain keys bear different designations required for Multi Digit Toll Control. For a brief description of each key and its function see the appropriate following description.

• **Config** Pressing this key allows the extended non-volatile RAM to be initialized.

• **Toll Control** Pressing this key initiates the selection of different programming modes of Multi Digit Toll Control.

• **Deny Toll** Rev Pressing this key will enable or disable denying on a Toll Reversal within the Control Plan.

• **Absorb Plan** Pressing this key allows the definition or display of an absorb plan. If the system is in Toll Control Trunk Group Programming this key may define an Absorb Plan to be used for the selected trunk group.

EXTENDED PROGRAMMING OVERLAY
(LAMP TEST LED FLASHING)

Console Programming Overlay
PN 9110-028 Issue 3

| LAMP TEST | TENANT | CONFIG | TOLL CONTROL | SPEED CALL | | CANCEL |

| DENY TOLL REV | TRUNK GROUP | ABSORB PLAN | CONTROL PLAN | TABLE | EQPT NUMBER | ACCESS NUMBER | NUMBER REDIAL | ADD | ENTER |

| COR NUMBER | BASIC COND | DISPLAY ENTRY | ABSORB REPEAT | ABSORB UNLOCK | | CONFIRM | DELETE | NEXT |
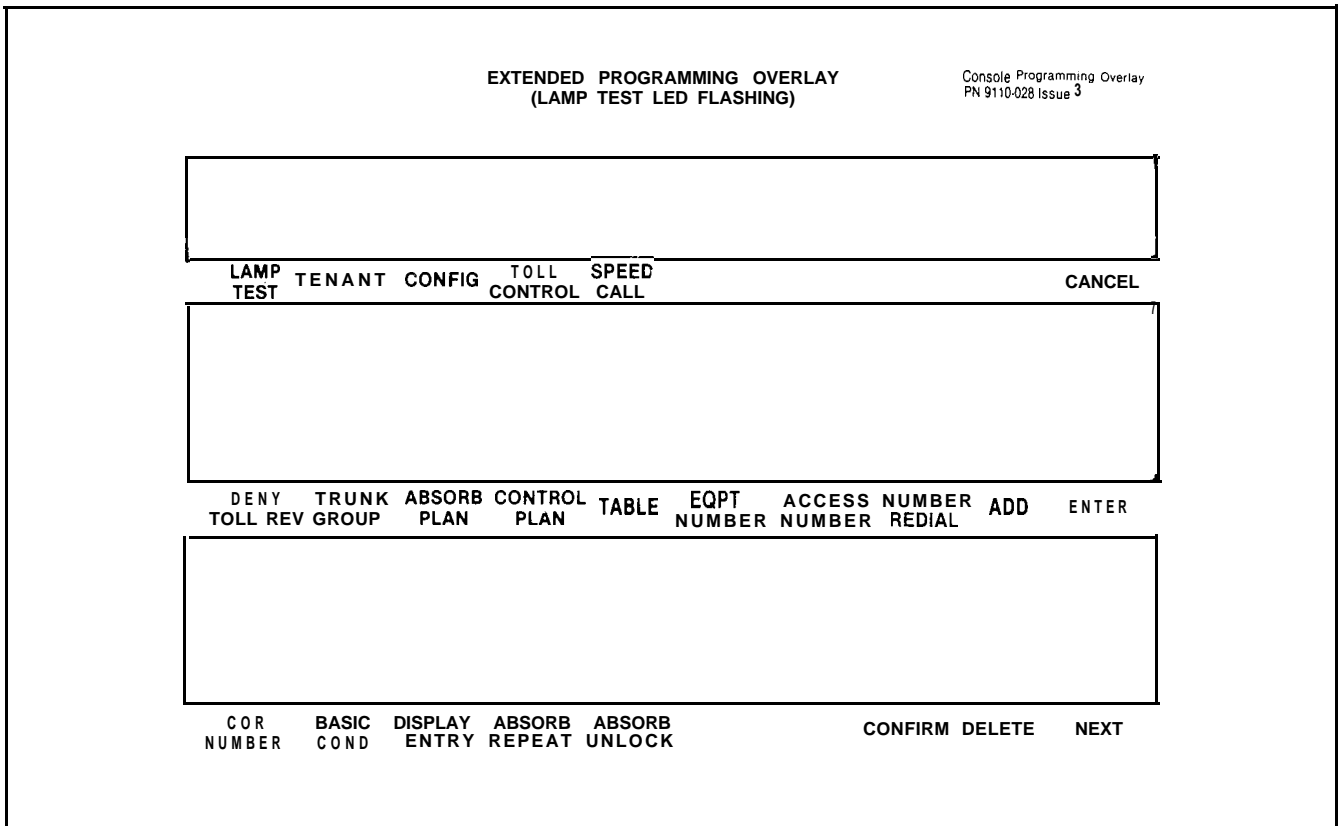
Fig. 7-1 Extended Programming Console Overlay

- **Control Plan** If this key is pressed any one of the 15 Control Plans in the Toll Control may be examined or defined. If the system is in Toll Control Trunk Group Programming the Control Plan key may be used to assign a Control Plan to each COR of the selected trunk group.

- **Trunk Group** Pressing this key allows the selection of a specific Trunk Group for programming of specific Toll Control parameters.

- **Absorb Unlock** This key allows the Absorb Unlock digits of an Absorb Plan to be defined.

- **Delete** Pressing the DELETE key removes the data entered from the active program. If an extension or trunk is to have toll access, pressing the DELETE key after the TOLL DENY key removes the extension or trunk from the "toll-denied" list, allowing the equipment to have toll access.

- **Next** Entries in a program may be reviewed by selecting the desired program and pressing the NEXT button. Each time the NEXT button is pressed, the next entry in the program selected is displayed.

- **Cancel** Pressing the CANCEL button after making a data entry, will remove all new data from temporary storage, and allows the correct information to be entered.

- **Confirm** This key is used in a number of circumstances to confirm a requested action, usually an action which destroys existing programmed information.

- **Lamp Test** The LED associated with the LAMP TEST key is lit when the console is in the programming mode. It will flash while the system is in the extended programming mode. Pressing the LAMP TEST key, while the switches on the scanner card are set for programming (or dialing the maintenance

security code Generic 204 only) changes the operational mode of the console; if the console is in the call processing mode it enters the programming mode.

- **Add** This key is used to enable denial on a toll reversal in the Control Plans. It is also used to add entries to a restriction table.

- **Enter** Pressing this button transfers the entered data from the system temporary storage to permanent non-volatile memory.

- **Table** This key may be used to examine or modify a restriction table. The Table key may also be used to define exception tables to Basic Conditions or expansions to Table entries.

- **COR Number** This key when pressed allows the selection of a Class of Restriction within Toll Control Trunk Group Programming for a specific trunk group.

* **Basic Condition** This key when pressed allows the selection of a Basic Condition number within Toll Control Trunk Group Programming.

- **Display Entry** This key allows the last numerical parameter entered by the programmer to be displayed (and processed by the machine).

- **Absorb Repeat** This key allows the Absorb Repeat digits of an Absorb Plan to be defined.

8. ERROR CODES

8.01 This section lists the error and confirm codes that may be displayed on the console DESTINATION Display during extended programming of the system.

PROGRAMMING ERRORS

Error	Applies to:	Meaning
E0	Ail modes	Invalid key pressed. Consult MAP for correct procedure. System Option 199 may not be enabled.
EI	Absorb Plan mode Trunk Group mode Control Plan mode	Number is not within the range of the parameter being defined. Re-enter parameter key defined.
E 2	All modes	An attempt was made to leave the current mode after some parameters were changed but before ENTER or CANCEL was pressed. ENTER may be used to write the new programming information back to the non-volatile RAM or use CANCEL to ignore all programming changes made since the last time ENTER was pressed.
E 3	Control Plan mode Table mode	The table number entered is not valid for the current configuration. Re-enter a number which exists for the configuration of the extended non-volatile customer RAM.

PROGRAMMING ERRORS **(CONT'D)**

Error	Applies to:	Meaning
E4	**Table** mode	The table entry code is invalid for the table programmed. This occurs in the following situation: 1. A code of more than 3 digits in length for an 800-entry or 20-range table. 2. A code not in the range of 200-999 for an 800-entry table. 3. A code which already exists or a code which would be ambiguous in conjunction with the existing table entries, for a 4-entry table.
E5	Table mode	The table is full and cannot hold the entry.
E7	Configuration mode	Configuration is not allowed because the Tone Control card switches are not 7776 or the system is not idle.
E9	Configuration mode	A hardware failure was detected while clearing the extended customer non-volatile RAM.

CONFIRM CODES

Error	Applies to:	Meaning
c5	Control Plan mode Table mode	An attempt was made to assign a table which is currently assigned elsewhere. Pressing the confirm key will de-assign the table from wherever it was previously assigned to assign it to the specified place.
C6	Table mode	A request has been made to delete all entries in a table. If CONFIRM is pressed all entries will be de-assigned. The old data in the non-volatile RAM will not be destroyed until the ENTER key is pressed, and the table itself can be reprogrammed as desired before the ENTER key is used.

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9. MULTI-DIGIT TOLL CONTROL ASSIGNMENT EXAMPLES

General

9.01 This section contains two examples of Multi Digit Toll Control. Each example lists the conditions to be fulfilled and shows how to complete the required programming forms.

9.02 These examples also contain a series of figures that represent the pictorial breakdown of the information. These Figs. should be compared to the programming forms for complete information pretaining to the examples.

9.03 Example 1: Allow Extension A to ALL local NNX codes and to the three N(O/I)X codes · 212, 714 and 303. Deny access to the CO operator and the complete toll network. (Fig. 9-1, 9-2)
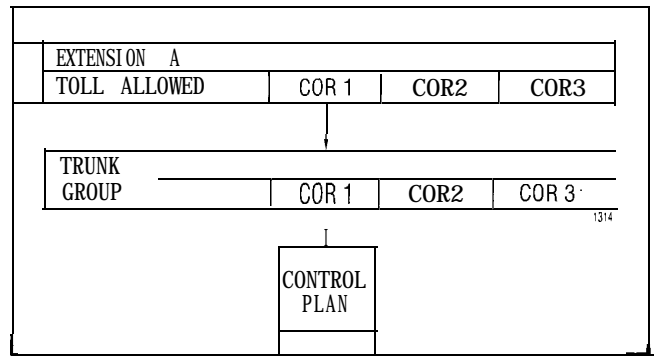
Fig. 9-1 Control Plan Assignment

Fig. 9-2 Control Plan 1

CONTROL PLAN	DIAL 1-15	DENY TOLL REV	ADD OR DELETE	BASIC COND DIAL 1-5 (NOTE 1)	ADD OR DELETE (NOTE 1)	DIAL 1-9 (BOO ENTRY) 21-33 (20 RANGE) 51-73 (4 ENTRY) OR DELETE c l
				1	DELETE	
				2	DELETE	
1		DELETE		3	DELETE	
				4	ADD	*51*
				5	DELETE	
				1		
				2		
				3		
				4		
				5		
				I		
				2		
				3		
				4		ENTER
				5		

NOTE 1

ADD - ALLOW ALL CODES EXCEPT THOSE LISTED IN THE TABLE SPECIFIED

DELETE DENY ALL CODES EXCEPT THOSE LISTED IN THE TABLE SPECIFIED

TO REVIEW CONTROL PLAN ASSIGNMENTS

| CONTROL PLAN | DIAL 1-15 | DISPLAY ENTRY | | NEXT |

TO REVIEW THE BASIC CONDITIONS OF A CONTROL PLAN

| CONTROL PLAN | DIAL 1-15 | BASIC COND | DIAL 1 | DISPLAY ENTRY | NEXT | NEXT |

DISPLAY BASIC CONDITION I   DISPLAY BASIC CONDITION 2   DISPLAY BASIC CONDITION 3

EXCEPTIONTABLE.

FROM BASIC CONDITION- **3**
OR TABLE NUMBER **51**   CONTROLPLAN!

TOLL CONTROL

THISTABLE LISTS ALL THE CODESTHAT ARE ALLOWED ☑

THIS TABLE LISTS ALL THE CODES THAT ARE DENIED ☐

TABLE	DIAL 1-73	DISPLAY ENTRY	.PRESS	ADD	BEFORE DIALING EACH ENTRY	IF AN EXCEPTION TABLE IS TO BE APPLIEDTO THIS ENTRY	
						TABLE — DIAL 1-9 (800 ENTRY) 21-33 (20 RANGE) 51-73 (4 ENTRY)	
TABLE NUMBER	**51**			**212**			
				714			
				303			
							ENTER

TO SEARCH FOR A SPECIFIC ENTRY

DISPLAY ENTRY   DIAL ENTRY   DISPLAY ENTRY

IF THE ENTRY DOES NOT EXIST DASHES ARE SHOWN IN THE ENTRY DISPLAY.

TO DELETE THE ENTRY BEING DISPLAYED

DELETE   ENTER

NOTE: ANY OPERATION MAY BE PERFORMED IN ANY ORDER.

TO DISPLAYTHE NEXT ENTRY IN THE TABLE AFTER AN ENTRY HAS BEEN SELECTED

NEXT
c l

TO DELETE ALL ENTRIES FROMA TABLE

TABLE   DIAL 1-73   DELETE   CONFIRM   ENTER

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9.04 Example 2: This example will parallel the example outlined in sections 5.10 to 5.16. The Control Plan assignment is again shown in Fig. 9-3. Figs. 9-4, 9-5 and 9-6 show the Control Plans required, with the completed installation forms following. The required information is:

    1. Local CO trunks are split up into two groups, Trunk Groups 1 and 2.

    2. Trunk Group #3 consists of tie trunks into another PABX.

It will be assumed that, for Toll Control purposes, there are three classes of users served by the PABX:

    User Group A. Upper Management

    User Group B. Sales and Marketing

    User Group C. All other users.

We will also assume the following allowal/denial conditions are desired for each user group with each Trunk Group:

1. Trunk Groups 1 and 2 (local CO)

User Group A: Complete allowal

User Group B: Allow all calls in home area code (local and toll)
Allow all toll calls to area codes 408, 209, 707
Deny all toll calls to other area codes
Allow toll calls to 613-592-2122
Deny operator access

User Group C: Allow local calls only (primary calling area)
Deny operator access

2. Trunk Group 3 (tie)

User Group A: Complete allowal

User Group B: Complete allowal

User Group C: Deny Trunk access on other PABX (deny '9')
Allow everything else

Assign Control Plans as shown in Fig. 9-3.
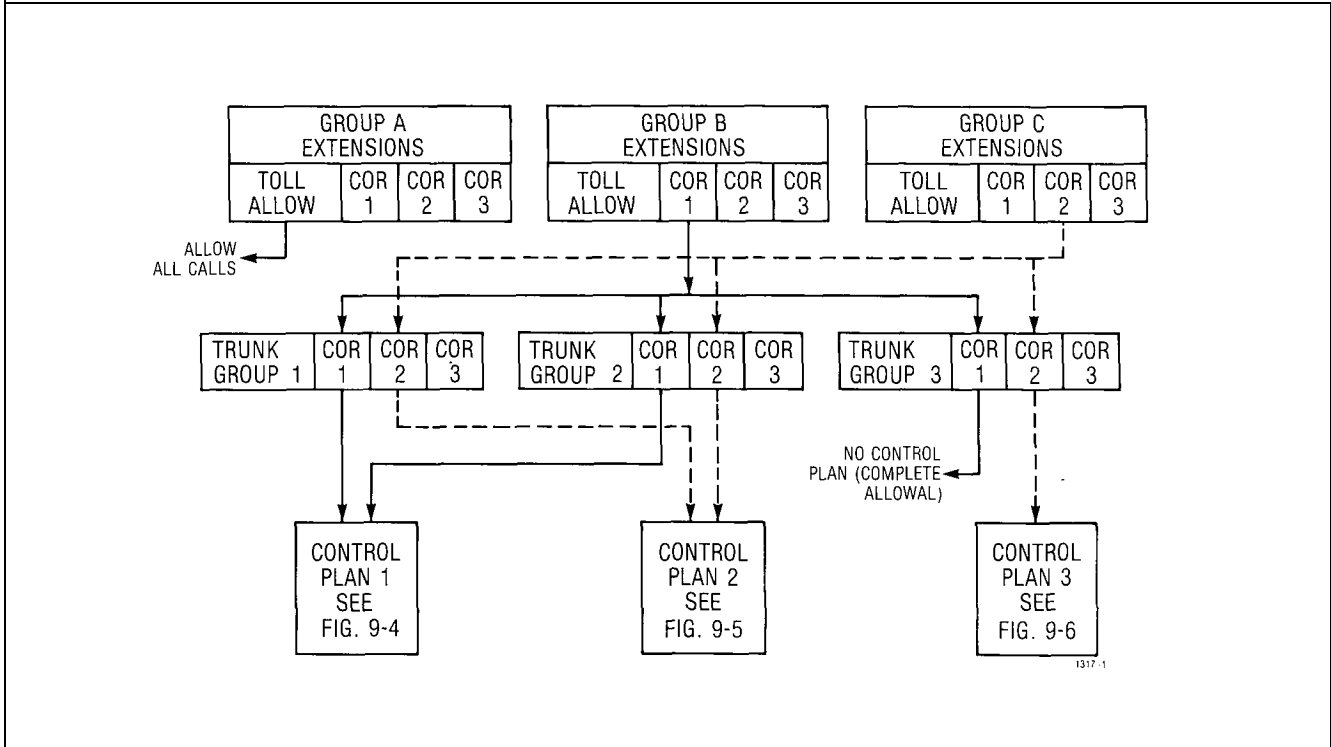
Fig. 9-3 Control Plan Assignment
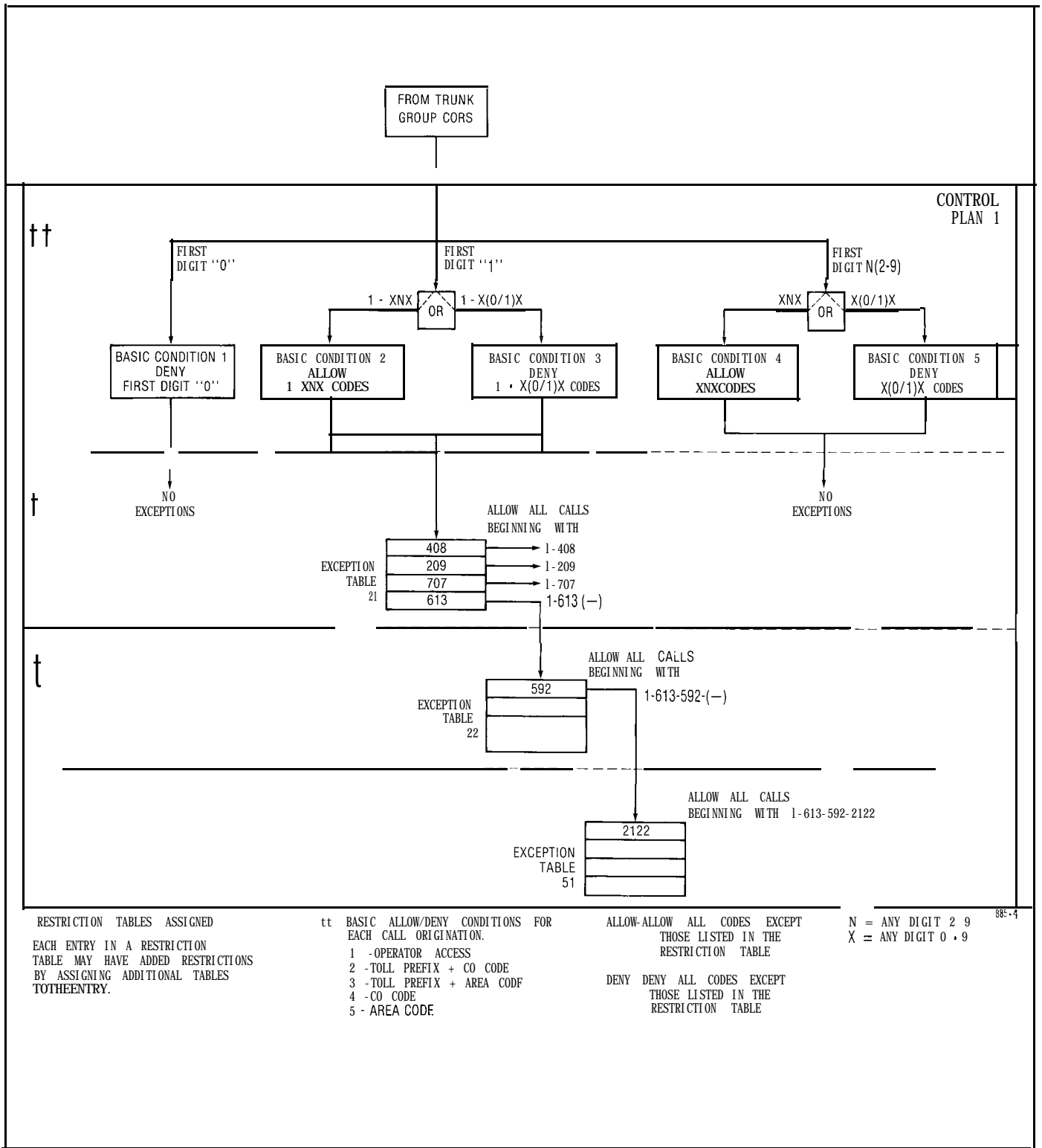
Fig. 9-4 Control Plan 1
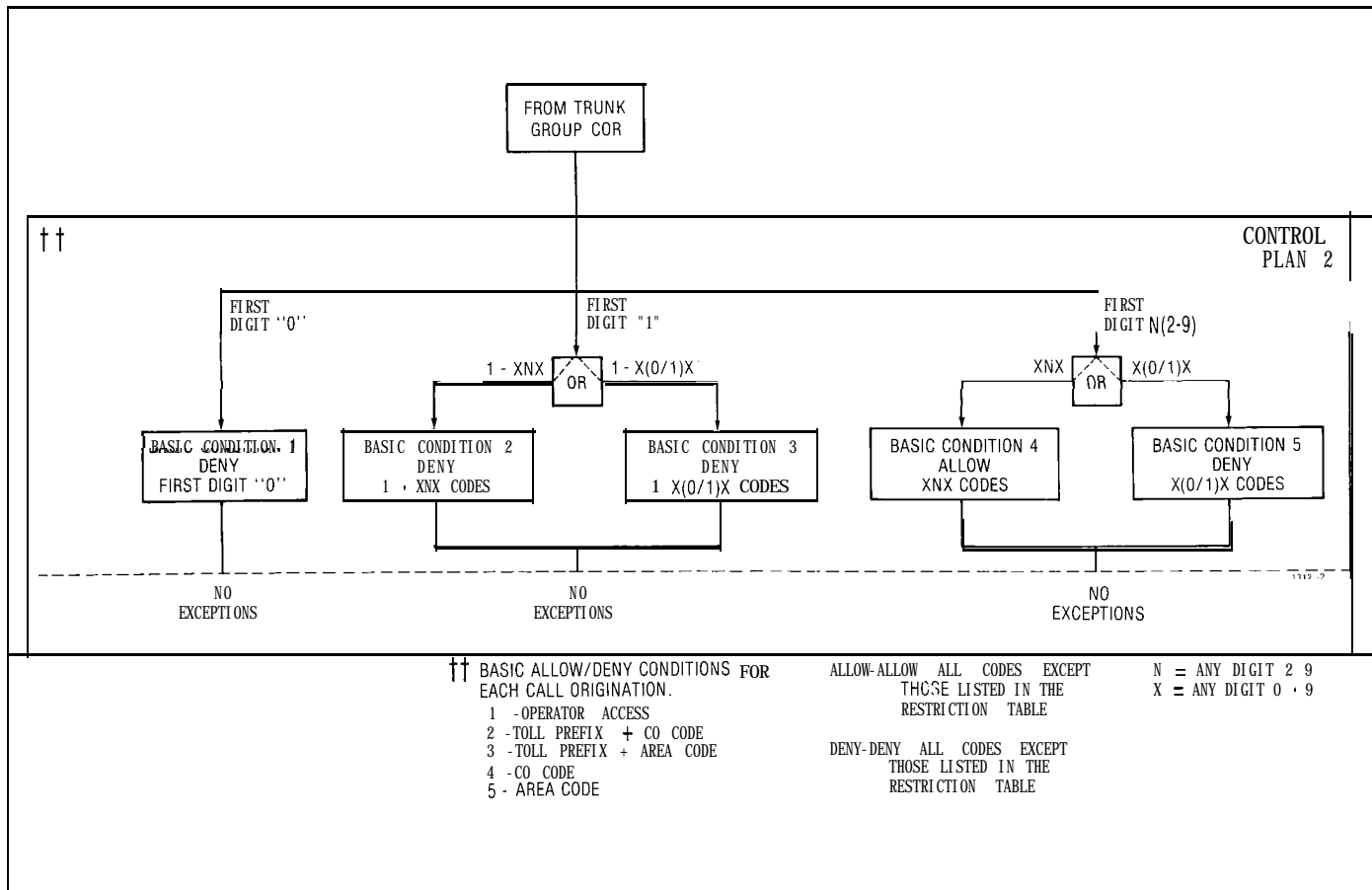
Fig. 9-5 Control Plan 2
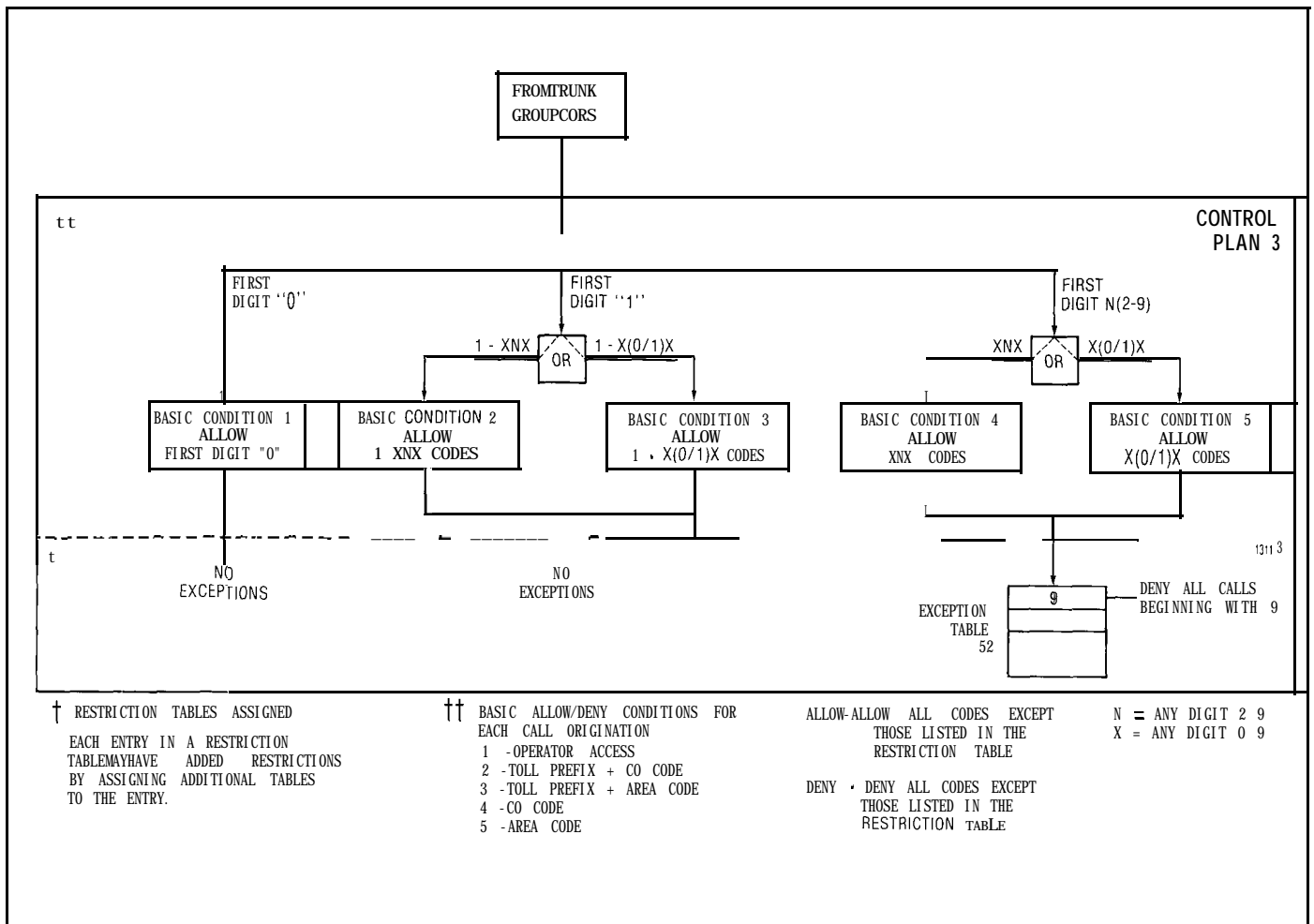
Fig. 9-6 Control Plan 3

EXTENSIONS

APPLIES TO GENERIC 203 AND ABOVE

IF TENANT SERVICE IS IN USE
ALL ENTRIES MADE ARE ASSIGNED TO THE TENANT NUMBER DIALED

| TENANT | DIAL 1-4 | ENTER |

TO ENTER EXTENSION PROGRAMMING PRESS [EXTN]

TENANT NUMBER	EQPT NUMBER DIAL 1-112 OR 161-256 (SEE NOTE 1	EXTN NUMBER / DIAL CODE OR SEE NOTES 2, 3, OR 4	COS NUMBER / DIAL 1-16	(TOLL DENY) ADD / OR DIAL COR CODE 1, 2, OR 3 OR / TOLL DENY / (TOLL ALLOW) DELETE / NOTE 5	BUSY LAMP NUMBER / DIAL 1-150 OR DELETE c 1	PICKUP GROUP / DIAL 1-50 OR DELETE	ENTER
NAME							
	002	202	3	1	002	3	ENTER
	003	203	3	1	003	3	✓
	004	204	4	2	004	1	✓
	005	205	5	3	005	5	✓
	006	206	3	1	006	1	✓

NOTES:

1. EQUIPMENT NUMBERS 161-256 APPLIES TO SX-200 ONLY

2. TO ASSIGN NON CONFLICTING SINGLE DIGIT DIRECTORY NUMBER ENTER N#, WHEN N IS THE SINGLE DIGIT.

3. TO REMOVE EXTENSION PROGRAMMING

| EXTN | EQPT NUMBER | DIAL EQUIPMENT NUMBER | EXTN NUMBER | DELETE |

(EXTENSION MUST BE REMOVED FROM ANY HUNT GROUP BEFORE REMOVING THE EXTENSION PROGRAMMING)

4. TO SEE THE NEXT EQPT NUMBER ASSIGNED AS AN EXTENSION:

| EQPT NUMBER | NEXT |

5. COR I-3 APPLIES ONLY, IF TOLL CONTROL (GENERIC 204/UP) IS USED

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DJAL-IN TRUNKS

APPLIES TO GENERIC 203 AND ABOVE

IF TENANT SERVICE IS IN USE
ALL ENTRIES MADE ARE ASSIGNED TO THE TENANT NUMBER DIALED

| TENANT | DIAL 1-4 | ENTER |

TO ENTER TRUNK PROGRAMMING PRESS TRUNK
c 1

TENANT NUMBER	LDN NUMBER	EQPT NUMBER DIAL 2-112 OR 162-256 (SEE NOTE 1 AND 2)	SEE NOTE 3 TYPE	DIAL 2, 4, 21, OR 41 OR DELETE c 1	COS NUMBER DIAL 1-16	(TOLL DENY) ADD / TOLL DENY OR DIAL COR CODE 1, 2, OR 3 OR (TOLL ALLOW) DELETE NOTE 6	BUSY LAMP NUMBER DIAL 1-150 OR DELETE	ENTER
		0 5 8	2		15	1	DELETE	ENTER
		O62	2		15	1	DELETE	✓

NOTES:
EQUIPMENT NUMBERS 162-256 APPLIES TO SX-200 ONLY

EVEN EQUIPMENT NUMBERS ONLY MAY BE ASSIGNED TO TRUNKS

. TYPE 2 = DIRECT INWARD SYSTEM ACCESS VNL
TYPE 4 = DIAL IN TIE TRUNK (NON CO) VNL
TYPE 21 = DIRECT INWARD SYSTEM ACCESS NONVNL
TYPE 41 = DIAL IN TIE TRUNK (NON CO) NON VNL

4. TO REMOVE A TRUNK ASSIGNMENT:
NOTE TRUNK MUST FIRST BE REMOVED FROM TRUNK GROUP

| EQPT NUMBER | TYPE | DELETE |

GENERIC 202-02 TYPE CODE DISPLAY DEFAULTS
TO 1 WHEN TRUNK IS DELETED

5. TO SEE THE NEXT EQPT NUMBER ASSIGNED AS A TRUNK

| EQPT NUMBER | NEXT | . . .

6. COR 1-3 APPLIES ONLY, IF TOLL CONTROL (GENERIC 204/UP) IS USED

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ABSORB PLAN

| TOLL CONTROL |

Not Applicable This Case.

ABSORB PLAN DIAL 1 OR 2	DIAL REPEAT DIGITS (MAX 4) OR	ABSORB REPEAT	DIAL UNLOCK DIGITS (MAX 4) OR	ABSORB UNLOCK
c	DELETE		DELETE	

ABSORB PLAN NUMBER 1
ABSORB PLAN NUMBER 2

| ENTER |

GENERIC 205/UP

TO VIEW THE ABSORB PLANS:

ABSORB PLAN	NEXT	NEXT
	PLAN NUMBER 1 DISPLAYED	PLAN NUMBER 2 DISPLAYED

CLASS OF RESTRICTION
(TRUNKGROUP)

TOLL CONTROL

TRUNK GROUP DIAL 1-12	ABSORB PLAN DIAL 1-2 OR DELETE	COR NUMBER DIAL 1-3	CONTROL PLAN DIAL 1-15 OR DELETE	
1	DELETE	1	1	
		2	2	
		3	DELETE	
2	DELETE	1	1	
		2	2	
		3	DELETE	
3	DELETE	1	DELETE	
		2	3	
		3	DELETE	
		1		
		2		
		3		
		1		
		2		
		3		

ENTER

TO REVIEW CLASS OF RESTRICTION OF A TRUNK GROUP

TRUNK GROUP | DIAL 1-12 | COR | DIAL 1 | DISPLAY ENTRY | NEXT | NEXT

COR 1 — COR 2 — COR3
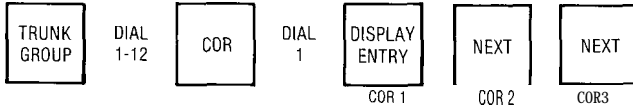
TO SEE NEXT TRUNK GROUP CLASS OF RESTRICTION

TRUNK GROUP | DIAL 1-12 | DISPLAY ENTRY | NEXT

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CONTROL PLAN c 1	DIAL 1-15	DENY TOLL REV	ADD OR DELETE	BASIC COND DIAL 1-5 (NOTE 1)	ADD OR DELETE (NOTE 1)	TABLE	DIAL 1-9 (800 ENTRY) 21-33 (20 RANGE) 51-73 (4 ENTRY) OR DELETE	
1		DELETE		1	DENY			
				2	ALLOW		21	
				3	DENY			
				4	ALLOW			
				5	DENY			
2		DELETE		1	DENY			
				2	DENY			
				3	DENY			
				4	ALLOW			
				5	DENY			
3		DELETE		1	ALLOW			
				2	ALLOW			
				3	ALLOW			
				4	ALLOW			ENTER
				5	ALLOW	52		

NOTE 1

ADD — ALLOW ALL CODES EXCEPT THOSE LISTED IN THE TABLE SPECIFIED

DELETE — DENY ALL CODES EXCEPT THOSE LISTED IN THE TABLE SPECIFIED

TO REVIEW CONTROL PLAN ASSIGNMENTS

| CONTROL PLAN | DIAL 1-15 | DISPLAY ENTRY | | NEXT |

TO REVIEW THE BASIC CONDITIONS OF A CONTROL PLAN

| CONTROL PLAN | DIAL 1-15 | BASIC COND | DIAL 1 | DISPLAY ENTRY | NEXT | NEXT |

DISPLAY BASIC CONDITION 1   DISPLAY BASIC CONDITION 2   DISPLAY BASIC CONDITION 3

EXCEPTION TABLE

FROM BASIC CONDITION _____

OR TABLE **N U M B E R &**   CONTROL PLAN **/**

TOLL CONTROL

THIS TABLE LISTS ALL THE CODES THAT ARE ALLOWED ☒

THIS TABLE LISTS ALL THE CODES THAT ARE DENIED ☐

TABLE DIAL 1-73 DISPLAY ENTRY	PRESS ADD BEFORE DIALING EACH ENTRY r l	FAN EXCEPTION TABLE IS TO BE APPLIED TO THIS ENTRY TABLE DIAL 1-9 (800 ENTRY) 21-33 (20 RANGE) 51-73 (4 ENTRY)	
TABLE NUMBER 21	408		
	209		
	707		
	613	22	
		ENTER	

TO SEARCH FOR A SPECIFIC ENTRY

DISPLAY ENTRY   DIAL   \ ENTRY _____

IF THE ENTRY DOES NOT EXIST DASHES ARE SHOWN IN THE ENTRY DISPLAY.

TO DISPLAY THE NEXT ENTRY IN THE TABLE AFTER AN ENTRY HAS BEEN SELECTED

NEXT

TO DELETE THE ENTRY BEING DISPLAYED

DELETE   ENTER

NOTE: ANY OPERATION MAY BE PERFORMED IN ANY ORDER

TO DELETE ALL ENTRIES FROM A TABLE

TABLE   DIAL 1-73   DELETE   CONFIRM   ENTER

⊕ MITEL

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FROM BASIC CONDITION _____
OR TABLE NUMBER _22_   **CONTROLPLAN/**

TOLL CONTROL

THIS TABLE **LISTS ALLTHECODESTHAT ARE ALLOWED** ☒
THIS TABLE LISTS ALL THE **CODESTHATARE DENIED** ☐

TABLE	DIAL 1-73	DISPLAY ENTRY	PRESS	ADD	BEFORE DIALING EACH ENTRY	IF AN EXCEPTION TABLE IS TO BE APPLIED TO THIS ENTRY

TABLE with DIAL 1-9 **(800 ENTRY)** 21-33 **(20 RANGE)** 51-73 (4 ENTRY)

TABLE NUMBER	22	592	51	

ENTER

TO SEARCH FOR A SPECIFIC **ENTRY**

DISPLAY ENTRY   DIAL ENTRY _____

IF THE **ENTRY DOES NOT EXIST DASHES** ARE SHOWN IN THE ENTRY DISPLAY.

TO DISPLAY THE **NEXT ENTRY IN** THE TABLE
AFTER AN ENTRY HAS BEEN SELECTED

NEXT

TO DELETETHE ENTRY BEING DISPLAYED

DELETE   ENTER

NOTE: ANYOPERATION MAY BE PERFORMED IN ANYORDER.

TO DELETE ALL ENTRIES FROM A TABLE

TABLE   DIAL 1-73   DELETE   CONFIRM   ENTER

⊕ MITEL

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EXCEPTION TABLE

FROM BASIC CONDITION
OR TABLE NUMBER __51__   CONTROL PLAN ___1___

| TOLL CONTROL |

THIS TABLE LISTS ALL THE CODES THAT ARE ALLOWED ☐
THIS TABLE LISTS ALL THE CODES THAT ARE DENIED ☐

TABLE	DIAL 1-73	DISPLAY ENTRY	PRESS	ADD	BEFORE DIALING EACH ENTRY	IF AN **EXCEPTION TABLE IS TO BE APPLIED TO THIS ENTRY**

| TABLE | DIAL 1-9 (800 ENTRY) 21-33 (20 RANGE) 51-73 (4 ENTRY) |

| TABLE NUMBER | *51* | *2122* | |

ENTER

TO SEARCH FOR A SPECIFIC ENTRY

| DISPLAY ENTRY | DIAL ENTRY | DISPLAY ENTRY | IF THE **ENTRY DOES NOT EXIST DASHES** ARE SHOWN IN THE **ENTRY DISPLAY** |

TO DELETE THE ENTRY BEING DISPLAYED

| DELETE | ENTER | NOTE: ANY OPERATION MAY BE PERFORMED IN ANY ORDER.

TO DISPLAY THE NEXT ENTRY IN THE TABLE
AFTER AN ENTRY HAS BEEN SELECTED

| NEXT |

TO DELETE ALL ENTRIES FROM A TABLE

| TABLE | DIAL 1-73 | DELETE | CONFIRM | ENTER |

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EXCEPTIONTABLE

FROM BASIC CONDITION

OR TABLE NUMBER **52**   **CONTROL PLAN 3**

TOLL CONTROL

THIS TABLE LISTS ALL THE COOESTHATAREALLOVEO ☐

THIS TABLE LISTS ALL THE CODESTHAT ARE DENIED ☐

TABLE DIAL 1-73 DISPLAY ENTRY	PRESS ADD BEFORE DIALING EACH ENTRY	IF AN EXCEPTION TABLE IS TO BE APPLIEDTO THIS ENTRY TABLE DIAL 1-9 (800 ENTRY) 21-33 (20 RANGE) 51-73 (4 ENTRY)

TABLE NUMBER **52**	**9**		
			ENTER

TO SEARCH FOR A SPECIFIC ENTRY

DISPLAY ENTRY DIAL ENTRY DISPLAY ENTRY   IF THE ENTRY DOES NOT EXIST DASHES THE ENTRY DISPLAY

TO DISPLAY THE NEXT ENTRY IN THE TABLE AFTER AN ENTRY HAS BEEN SELECTED

NEXT

TO DELETETHE ENTRY BEING DISPLAYED

DELETE ENTER

NOTE: ANYOPERATION MAY BE PERFORMED IN ANYORDER.

TO DELETE ALL ENTRIES FROM A TABLE

TABLE DIAL 1-73 DELETE CONFIRM ENTER

MITEL

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10. MULTI DIGIT TOLL CONTROL INSTALLA-TION FORMS

General

10.01 The installation forms for system programming are contained in Section MITL9105/9110-98-205. Programming of the system should be performed as detailed in Section MITL9105/9110-98-210.

10.02 Configuration numbers available are:

1 · Automatic Wake-Up and Toll Control, Standard (Generic 204)

2 · Toll Control Standard and Speed Call Standard (Generic 205)

3 · Toll Control Basic and Speed Call Extended (Generic 205)

4 · Toll Control Extended (Generic 204)

10.03 After initialization the Extended RAM will be set as:

- Both Absorb Plans empty and unassigned

- No Control Plans are assigned to any Trunk Groups for any level of restriction

- All Basic Conditions set to allow

- No exceptions to Basic Conditions set

- All Restriction Tables are unassigned and empty

10.04 Configuration and Initialization occur together. A new configuration number cannot be entered without initializing the PROM/RAM Expander card.

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SX- 100*AND SX-200"

SUPERSWITCH"

ELECTRONIC PRIVATE AUTOMATIC BRANCH EXCHANGE

SPEED CALL

1. GENERAL

1.01 Speed Call is a feature of the SX-100 /SX-200 PABX when fitted with Generic 205 software. This feature allows the use of common-use speed call tables by the PABX attendant and by selected stations, and of personal tables by selected stations. General descriptions of the SX-100 and SX-200 PABX Systems are contained in Sections MITL9 105-98- 100 and MITL9 1 1 0-98- 100 respectively. These also contain a listing of applicable documents for these PABX Systems. Reference to some of these documents are made in this Section.

1.02 The remaining Parts of this section are concerned with the following areas:

. Part 2 ▪ Description, including architecture of the Speed Call feature to illustrate the facilities and parameters of the feature

• Part 3 ▪ Programming requirements to implement the Speed Call feature. This is supported by MAP's which are contained in Appendix 2

• Part 4 ▪ Definition of the speed call numbers within the tables by the station user and the attendant

• Part 5 ▪ The display of speed call numbers at the attendant console

• Part 6 ▪ Using speed call numbers

2. SYSTEM DESCRIPTION

General

2.01 The basic elements of the Speed Call feature are speed call tables, which are used to store speed call numbers which have been defined (entered) by the attendant as common-use speed call numbers; or defined (entered) by

TABLE 2-1
EXTENDED PROGRAMMING CONFIGURATIONS

Configuration Number	Configuration	Tables Available	
		Speed Call	Toll Control
1	Automatic Wakeup and Toll Control Standard	N/A	33
2	Toll Control Standard and Speed Call Standard	12	33
3	Toll Control Basic and Speed Call Extended	25	23
4	Toll Control Extended	N/A	45

selected station users for their personal use. A speed call number consists of the outgoing trunk group access number, and the proper number of digits required to obtain the desired party. The speed call number is called up and applied to the trunk circuit, by the user dialing a speed call feature access code, followed by the speed call entry access number assigned for that speed call number.

2.02 The foregoing overview is discussed in detail in the following paragraphs. In addition a simplified typical system is discussed in 2.17 to which reference may be made while reading the following paragraphs.

Speed Call Tables

2.03 There is only one type of speed call table and it has the following characteristics:

. It has the capacity of containing a maximum of 56 digits

• The table can contain a maximum of 5 separate speed call numbers, each of any number of digits, provided that the total number of digits does not exceed 56.

2.04 The tables may be programmed for use as:

(a) Common-use tables, whereby the attendant and selected stations may make use of the tables on a Class of Service basis to dial calls external to the PABX.

(b) Personal tables, which are dedicated for a selected station's use.

Note: The assignment of these tables is done at the time of programming.

Table Configuration Capacity

2.05 The number of speed call tables which are available for use by a system is dependant upon the type of configuration which is programmed by the installer. The PABX (with Generic 205 software) makes use of the PROM/RAM Expander which contains the necessary non-volatile RAM memory for both Speed Call and Multi-Digit Toll Control features. Table 2-1 shows how the memory may be configured to meet various user requirements for Speed Call and Toll Control Table capacities. The particular Configuration required is programmed as shown in Section MITL9105/9110-98-210 Appendix 2.

Table Assignments

2.06 Tables are assigned during programming (Part 3), for use as common-use or personal tables. Those assigned for common-use may be accessed by the attendant, or by stations with the necessary Class of Service Options (2.20). A personal table may only be accessed by the station which has been assigned the table during programming. These table assignments are further discussed in the following paragraphs.

Common-Use Tables

2.07 Any station may access the speed call numbers in the common-use tables under the following conditions:

. **The station's Class of Service (COS) has the COS option (Table 2-3) which allows access to a particular common-use table.**

● **If the station user has a personal table speed call entry access number which is the same as that for a common-use table, only the personal table will be accessed.**

2.08 Speed call numbers for common-use tables are entered by the attendant. These numbers may also be displayed or changed by the attendant on the console, except for those numbers which have been assigned the attribute "confidential". Numbers may be set as confidential, at the time the number is entered. Once set the number cannot be changed, or re-entered unless System Option 217 has been set, and cannot be displayed unless System Option 2 18 has been set.

Personal Tables

2.09 In contrast to common-use tables, a personal table is one which can only be used 'by the one station to which it has been assigned during programming. A station may have more than one table (up to a maximum of 18) assigned to it. The following are other characteristics of assigned personal tables:

(a) **The station user enters the numbers, which are required to be stored in the station's table(s) (Part 4).**

(b) **Personal table numbers cannot be displayed, and can be deleted or changed only by the station user.**

(c) **The assignment of a table for personal table use precludes the use of that table as a common-use table, or as a personal table for any other station.**

Accessing Speed Call Numbers

2.10 Every speed call number (common-use or personal) is accessed by an access code consisting of two parts, which are the speed call feature access code and the speed call entry access number.

2.11 Feature 32 when enabled allows a 1 to 4 digit number to be assigned and programmed as the feature access code. The speed call entry access numbers are pre-defined as two-digit numbers, within the range of 10-99. Therefore the number of required digits to access a speed call number may be a minimum of three. The characteristics of the speed call entry access numbers for common-use tables are discussed in 2.12 and those for personal tables are discussed in 2.14.

Common-Use Speed Call Access

2.12 Speed call entry access numbers for common-use tables are non-programmable and each entry access number accesses a particular number entry in a particular table as shown in Table 2-2. The first speed call entry access number accesses the first speed call number in a table, the second speed call access number accesses the second speed call number in the same table, and so on. If a table has less than 5 speed call numbers the unused access numbers will be ineffective.

2.13 For Configuration 2 (Table 2-1) only 12 common-use tables are available, so that speed call entry access numbers 70 to 99 (Table 2-2) are ineffective for common-use tables, as tables 13 to 18 do not exist. For Configuration 3 there are 25 tables available. Table 2-2 indicates speed call access numbers for all common use tables. Tables 19 through 25 are available for personal user assignments (Configuration 3 only). It should be noted that any of the first 18 tables may be programmed as a personal table if required, in which case it will not be available as a common-use table. Common-use *tables are made available to groups of stations by setting Class of Service options (see Fig. 2-1).

TABLE 2-2
SPEED CALL ACCESS NUMBERS
COMMON USE TABLES

Table Number	Speed Call Entry Access Number Range	Table Number	Speed Call Entry Access Number Range
1	10-14	10	55-59
2	15-19	11	60-64
3	20-24	12	65-69
4	25-29	13	70-74
5	30-34	14	75-79
6	35-39	15	80-84
7			
8	40-44 45-49	17 16	90-94
9	50-54	18	94-99

Personal Speed Call Access

2.14 The groups of speed call entry access numbers are the same for personal table users as those for common-use tables. Distinctions between the use of these two groups of speed call entry access numbers are listed below:

(a) Speed call entry access numbers for personal tables are selected and are programmed when the table is assigned to an extension (MAP2 1 O-242).

(b) Speed call entry access numbers are not pre-defined on a one-to-one basis with a table as is the case for common-use tables (Table 2-2). See the typical example in Fig. 2-1 which shows that Access Number range 10-14 is fixed for Table 1, but the same range is programmed for Table 1 1 when it is a Personal Table.

2.15 Other points with regard to personal table speed call entry access numbers are as follows:

(a) Two or more personal tables assigned to one station cannot have the same group of access numbers.

(b) More than one station may have the same group of speed call entry access numbers, because each personal table is unique to that station.

(c) A speed call entry access number range programmed for a personal table precludes the user from accessing a common-use table bearing the same number range even if the COS options would allow it.

Saved Number Redial

2.16 A saved number redial facility can exist only for a personal table user. This attribute can only be added when programming, and can only be used with a DTMF telephone. It is always held by the last access number of the personal table. Only one number may be stored for redial even though more than one table may be assigned to the extension. When the attribute is programmed the number digits available for the "saved" number are the digits remaining, after the entries for the other telephone numbers in the table. Note that the "saved" number includes 1 or' more digits for trunk group access. For further details refer to 4.10 and 6.06.

Note: The saved number redial facility cannot be used when tenant service is employed.

System Example

2.17 In order to illustrate the description of the Speed Call feature an example-is given in Fig. 2-1. This example should not be considered typical, in that certain aspects have been emphasized to illustrate all possible combinations

TABLE 2-3
SPEED CALL TABLE COS OPTIONS

COS Ootion	Tables
85	1 and 2
86	3 and 4
87	5 and 6
88	7 and 8
89	9 and 10
90	11 and 12
91	13 and 14
92	15 and 16
93	17 and 18

which may occur under different circumstances. These aspects are discussed with respect to the following areas:

. Table assignments
• Speed Call Entry Access Numbers
. COS Options
• Classes of Service

2.18 The tables, as shown in Fig. 2- 1, are assigned as a mix of common-use and personal tables. When Configuration 2 is programmed only 12 tables are available, while Configuration 3 provides 25 tables. Note that tables 19 through 25 may be used only as personal tables. Tables are assigned in pairs by means of COS options (Table 2-3), when used as common-use tables, but are separately assignable when used as personal tables. For example tables 18, 24 and 25 are shown as assigned to Extension 403.

2.19 The assignment of speed call entry access numbers shown in Fig. 2-I emphasizes the following points:

(a) Some tables may not require the maximum range of speed call entry access numbers (e.g. that for Table 4 shows only 3 access numbers; 25, 26 and 27). This may be due to the need to store numbers of excessive length, or the need simply to store no more than three numbers in this table.

(b) The last number of an access **range for a** personal table can be used for saved number redial (2.16) (e.g. access number 74 for table 24).

(c) Tables 12 and 18, have the same access numbers,which is permissible for personal table use (2.15 (b)).

(d) Tables 3 and 7, have some duplicate access numbers. The system precludes the station assigned to table 7 (personal use) from accessing these duplicate numbers in table 3, (common use) even though the COS options allow it (2.15 (c)).

2.20 The COS option, when programmed in a particular Class of Service, allows access of its associated tables to the common-users which have been programmed for that Class of Service. Table 2-3 is a list of the COS options which control access to common-use tables, and show which COS options allow access to which common-use tables. However if a particular table has been programmed as a personal table it cannot be used as a common-use table (2.09 (c)). All or any combination of speed call COS options can be assigned to any COS.

2.21 It should be noted that a station with a personal table may also have access to a common-use table, provided that the station user is also a member of that Class of Service which can access the common-use table. However, if the user has a personal table which has an access number which is identical to that for a common-use table entry, then when that access number is dialed the user will access the personal table, not the common-use table, although the user has the COS option for that table programmed in the Class of Service.

2.22 Programming the Classes of Service determine which groups of stations may access particular groups of common-use tables. For example in Fig. 2- 1 the members of Class of Service Number 1 may only access tables 1 and 2. These Classes of Service, can then determine the particular needs of groups of stations within a PABX system, and configured accordingly. Table 2-4 illustrates the various parameters discussed above, as they apply to Fig. 2- 1.

TABLE 2-4
SPEED CALL OPERATING CHARACTERISTICS

See Fig. 2- 1 for which the following characteristics apply.

Extension Number	Speed Call Table Number	Speed Call Entry Access Number	Characteristics
201	1 and 2	10-14; 15-19	Extension 20 1 is a member of Class of Service 1 with speed call access to Tables 1 and 2.
232	3 to 6	20-24; 25-27 30-34; 35	Extension 232 is a member of Class of Service 3 with speed call access to Tables 3 through 6. Not all of the table access codes are used.
393	3 to 6,7	20-22; 23,24; 25-27; 30-34; 35	Extension 393 has same COS access to tables 3 to 6 as Extension 232 except as noted herewith. Table 7 is added as a personal table, with access numbers 20-22. Extension 393 will not be able to access the speed call numbers held in Table 3 with the same numbers; but can access those in Table 3 with access numbers 23 and 24 (see 2.14(a) and 2.15(c)).
210	3 to 6, 11	20-24; 25-27; 30-34; 35; 10-14	Extension 2 10 has the same speed call access as Extension 232 but with the additional access to personal Table 11. Note that Tables 1 and 11 have similar access numbers but the extension cannot access Table 1 because it is not a member of Class of Service 1.
211	12	65-69	Extension 2 11 has access only to personal Table 12. Tables 12 and 18 have the same access number range, but because they are programmed for different extensions no conflict arises (see 2.15(b))
403	18, 24 25	10- 14; 65-69 70-73	Extension 403 has access only to personal Tables 18, 24 and 25. The last access number for Table 24 is programmed as a Saved Number Redial number (see 2.161.

Fig. 2-1 Speed Call System Allocations
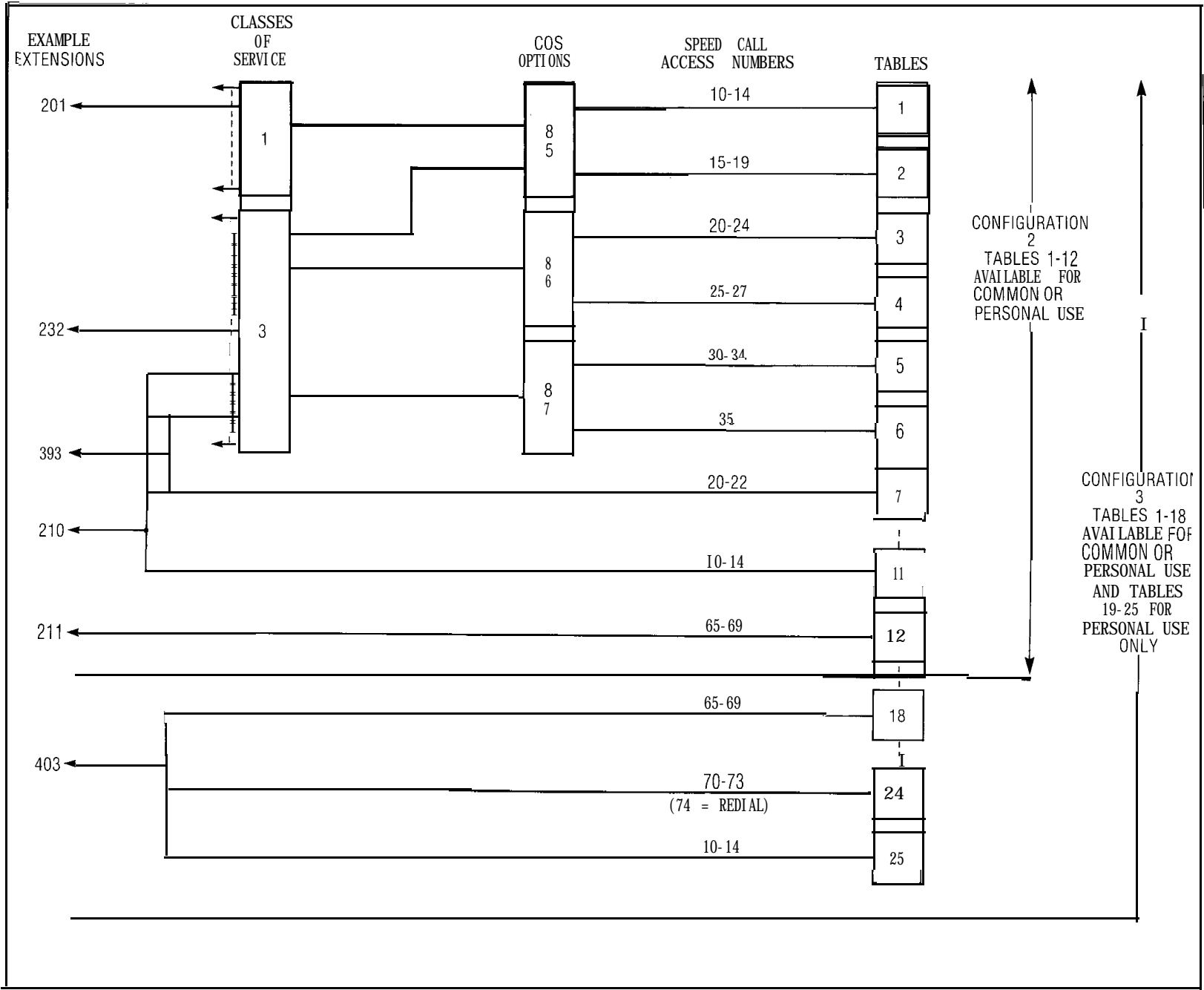
3. PROGRAMMING

General

3.01 Programming the SX-1 OO/SX-200 PABX for the Speed Call feature consists of the following steps.

(a) Comptete the installation Forms (included in Section MITL9 105/9 1 1 o-98-205) with respect to Speed Call. Examples showing typical entries are shown in Figs. 3- 1 and 3-2.

(b) Determine the requirements of the Multi Digit Toll Control feature and the Speed Call feature to arrive at the necessary Configuration (Table 2- 1).

(c) Ensure that the PABX is fitted with Generic 205 Software, and that the System includes a PROM/RAM Expander.

(d) In the programming mode enter the System Options, Speed Call Feature Access Code and COS Options required for Speed Call (see Section MITL9 105/9 1 1 O-98-2 10).

(e) Place the PABX in the Extended Programming Mode, initialize the extended RAM and choose the proper Configuration (see (b)). This may only be performed when the system is idle.

(f) Perform the required programming to enable the Speed Call feature. This procedure is amplified in 3.09-3.12. This step is only necessary if personal speed call tables have to be assigned.

(g) When all programming is completed the console is returned to the normal operational state. The defining of speed call numbers is done in this state as detailed in Part 4.

Installation Forms

3.02 The following Speed Call Installation Forms are supplied with Section MITL9 105/9 1 1 o-98-205 Installation Forms:

. Form SC- 1 Speed Call Table Allocations
• Form SC-2 Personal Table Programming Form

3.03 Form SC-1 is used to list a speed call table as a common-use table or as a personal table; and includes data concerning the equipment number and COS assignments, and whether the saved number redial facility is enabled for any of the tables. This information is tabulated and then used in conjunction with Form SC-2 to perform table programming. The information is also used to provide the attendant, and a personal table user with basic data (required to define the speed call numbers). An example of Form SC- 1, based on Configuration 3 in Fig. 2- 1, is shown in Fig. 3- 1.

3.04 The personal table information compiled on Form SC- 1 is entered on Form SC-2. This form is used to program the required data as detailed in later paragraphs. Upon completion of programming the speed call entry access number and whether the saved number redial is enabled is entered on the Speed Call Number Record Card (3.13). Example entries, again based on Fig. 2- 1, are shown in Fig. 3-2.

Standard Programming

3.05 The data entered on Forms SC-1 and SC-2 are used to program the Speed Call Feature as described in the following paragraphs.

3.06 The Speed Call options and features are entered at the same time as those for other options and features needed for the PABX user's requirements and in the following sequence:

. System Options
• Feature Access Code
• COS Options

3.07 A feature access code has to be assigned for Speed Call. This feature number is 32, and it must be programmed in the Standard Programming Mode, in the same manner as other

MITEL SPEED CALL TABLE ALLOCATIONS FORM SC-I

TABLE NUMBER	ENTRY ACCESS NUMBERS COMMON-USE	PERSONAL	EQPT NUMBER	REDIAL	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	10-14				✓															
2	15-19				✓															
3	20-24						✓													
4	25-29						✓													
5	30-34						✓													
6	35-39						✓													
7	~~40-44~~	20-22	048																	
8	45-49																			
9	50-54																			
10	55-59																			
11	~~60-64~~	10-14	025																	
12	~~65-69~~	65-69	037																	
13	70-74																			
14	75-79																			
15	80-84																			
16	85-89																			
17	90-94																			
18	~~95-99~~	65-89	165																	
19																				
20																				
21																				
22																				
23																				
24		70-73	165	✓																
25		10-14	165																	

EXAMPLE ONLY

NOTES: 1. STRIKE THROUGH NUMBERS IN COMMON-USE COLUMN, IF TABLE IS TO BE A PERSONAL TABLE; THEN ENTER NEW ENTRY ACCESS NUMBERS IN PERSONAL COLUMN.
2. CHECK (✓) IN REMAINING COLUMNS AS REQUIRED IN RESPECT TO EACH TABLE.

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Fig. 3-1   Sample Entries, Form SC-1

Fig. 3-2 Sample Entries, Form SC-2

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PERSONAL TABLE PROGRAMMING FORM SC-2
(SYSTEM MUST BE IN EXTENDED PROGRAMMING)

PRESS [SPEED CALL]

GENERIC 205

TABLE DIAL TABLE NO.	EQPT NUMBER DIAL EQUIPMENT NO. (1-112; 161-256) OR DELETE	ACCESS NUMBER (NOTE 2 & 10) DIAL ACCESS NO	NUMBER REDIAL (NOTE 3) ADD OR DELETE
1			
2			
3			
4			
5			
7	048	20	
a			
9			
10			
11		10	
12		65	
13			
14			
15			
16			
17			
18	165	65	
19			
20			
21			
22			
23			
24	165	70	✓
25	165	10	

EXAMPLE ONLY

SEE NOTE 5 TO ENTER DATA

NOTES

1 Use the entries made on Form SC-I for the Personal tables by transcribing these in turn to their respective columns against the same Table numbers on Form SC-2. Common-use tables have blank entries

2. Only the first Access Number for each Personal table is required to be entered The remaining access numbers are automatically allocated fcr that table.

3. The Saved Number Redial operation is initially omitted if not required For subsequent programming see Notes 8 and 9.

4. Personal table data is programmed in Extended Programming Mode See Section MITL9105/9110-98-210 Appendix 2 for full details.

5. The ENTER button may be pressed at any time to enter data, or pressed when all data is entered

6. Removing a Personal table removes all its contents, Access Numbers and Redial value (if any)

7 To remove a Personal table.

[SPEED CALL] [TABLE] [DIAL TABLE NUMBER] [EQPT NUMBER] [DELETE] [ENTER]

8. To add a Redial attribute:

[SPEED CALL] [TABLE] [DIAL TABLE NUMBER] [NUMBER REDIAL] [ADD] [ENTER]

9. To remove a Redial attribute

[SPEED CALL] [TABLE] [DIAL TABLE NUMBER] [NUMBER REDIAL] [DELETE] [ENTER]

10. To change a Speed Call Access Number:

[SPEED CALL] [TABLE] [DIAL TABLE NUMBER] [ACCESS NUMBER] [DIAL NEW ACCESS NUMBER] [ENTER]

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(a) Basic Programming

(b) Extended Programming

Fig. 3-3   Programming Console Overlay Designations

feature access codes. To minimize the number of digits to be dialed for speed call the access code should be preferably a single digit code. A conflicting single digit entry access code of the form N# must not be assigned. It is used to access the following functions:

- Outdialing speed call numbers from the stations, or from the attendant consoles (Part 6)
- Definition or deletion of speed call numbers (Part 4) from stations or from the attendant consoles

3.08 The COS options govern the station access to the numbers in the common-use tables. Each COS option allows access to a pair of tables. See Fig. 2-1 for an example of this application. If any of the tables 1 through 18 have been assigned as a personal table then only the assignee may have access to it, irrespective of a COS option set up.

Extended Programming

3.09 The personal tables are programmed in the Extended Programming Mode. This includes assignment of tables (and Saved Number Redial enabled if required). MAP2 1 O-22 1, Section MITL9 105/9 1 1 O-98-2 10 details this procedure, and Fig. 3-3 shows the Extended Programming Overlay which is used for this procedure.

3.10 Tables are automatically allotted as common-use tables when the System is initialized and thus do not require programming. When a table is programmed as a personal table (3.1 1) it negates the use of that table as a common-use table. Subsequent deletion of a personal table restores the table as a common-use table (see MAP2 1 O-243).

3.11 While in the Extended Programming Mode the personal tables are programmed, by using the information which had been previously recorded on SC-2. Fig. 3-2 is an example of entries made in Form SC-2 and shows the programming procedure. In addition MAP2 1 O-242 details these procedures, and includes typical display examples.

3.12 When all extended programming is completed the PABX is returned to its normal operational state (see Section

MITL9 105/9 1 1 O-98-2 10, MAP2 1 O-244), in order that the actual speed call numbers may be entered in the enabled tables as detailed in Part 4.

Speed Call Number Record Cards

3.13 The Speed Call Number Record Form SC-3 is intended to be a record of common-use speed call numbers for the user. Initial basic data is entered on the form by the installer and then handed to the user for completion. When completed the user compiles lists of the speed call numbers together with their Entry Access numbers, according to the Class of Service and distributes them to the relevant stations of concern. Form SC-3 is maintained by the user as a master record which may be subsequently updated when changes occur.

3.14 Each Speed Call Number Record card is inscribed by the installer with regard to the following particulars:

- the COS numbers to indicate the group of stations (Class of Service) which will access the common-use table
- the speed call feature access code
- writing the word "PERSONAL" in the Speed Call Number column against a table which has been assigned for personal use.

3.15 The particulars are obtained from Form SC-I after all programming has been completed, and the PABX is returned to its normal operating state. When so inscribed the SC-3 forms are given to the user for the numbers to be defined (Part 4) and distributed as indicated in 3.13. An example of Form SC-3 completed for Table 6 (Fig. 2-1) is shown in Fig. 3-4.

Personal Speed Call Directory

3.16 The personal table user is provided with a Personal Speed Call Directory which will have that user's basic data entered by-the installer. The basic data, which is to be entered in the Speed Call Directory after programming, is as follows:

SPEED CALL NUMBER RECORDS FORM SC-3 (SHEET 2 OF 4)

SPEED CALL FEATURE CODE 60

MITEL

EXAMPLE ONLY

SPEED CALL NUMBER

SPECIAL SEQUENCES CAN BE ENTERED AT ANY POINT IN THE TELEPHONE NUMBER LISTING:

* 1 OCCUPIES 1 DIGIT SPACE AND CAUSES A 5 SEC. PAUSE IN USE
* 2 OCCUPIES 1 DIGIT SPACE AND CAUSES WAIT FOR DIAL TONE (SYSTEM OPTION 136 APPLIES)
* 3QQ OCCUPIES 2 DIGIT SPACE AND ENABLES MANUALLY DIALED DIGITS TO BE ENTERED.
QQ REPRESENTS THE NUMBER OF DIGITS TO BE DIALED IN RANGE 01 TO 16.

TABLE	COS	ENTRY ACCESS NUMBER	SPEED CALL NUMBER	DIGITS USED	DIGITS UNUSED	CALLED PARTY
4		25				
5		30				
6	(3)	35	9 1*303 551 2122	11	45	AREA INFORMATION
		36	8 36*13 15 337 0303	14	31	ROME OFFICE
		37	8 36*13 05 428 3434	14	17	DEERFIELD OFFICE
		38	8 36*14 04 793 6800	14	3	GEORGIA OFFICE
7		40	PERSONAL			
8		45				

Fig. 3-4 Sample Entries, Form SC-3

Listing your speed call numbers

Essential data for your use is entered at the right by the installer.

Use only the ranaes of checked Entry Access numbers.
On the followina tables write in the first of your Entry Access numbers followed by your first telephone number. The number must have the trunk group access digit(s) entered first. Use the "T" column to keep a tally of digits entered. Use a fresh line to enter the next Entry Access number and its associated telephone number.

Note the information at the foot of each table.

Extension Number:

Feature Access Code:

Entry Access Numbers

10-14	35-39	60-64	85-89
15-19	40-44	65-69	90-94
20-24	45-49	70-74	95-99
25-29	50-54	75-79	
30-34	55-59	80-84	

EXAMPLE ONLY

Fig. 3-5 Sample Entries, Personal Speed Call Directory

- **the speed call feature access code**
- the extension number
- **whether a number redial (and its Entry Access number) is enabled**
- **the Entry Access numbers assigned to the user.**

3.17   An example of this type of entry, based on Fig. 2-1, is shown in Fig. 3-5.

4. DEFINITION OF SPEED CALL NUMBERS

General

4.01 Speed Call numbers are defined (entered into the tables) by the user. The user is either the attendant, for numbers to be defined in the common-use tables, or the station user for numbers to be defined within the personal table(s).

4.02 The personal table user cannot define the last number in his allotted table if it has been enabled for the Saved Number Redial facility (2.16). Note that a personal user may have more than one personal table, but only one table of a set can have the Saved Number Redial facility.

4.03 The installer writes the necessary information on the Speed Call Number Record cards (3.13) or in the Personal Speed Call Directory (3.16), which are given to the user. The customer uses this information in conjunction with the speed call number — defining procedure as described below, and the instructions contained on these documents.

Defining Personal Numbers

4.04 The dialing sequence for a station to define a personal speed call number is shown in Table 4-1. During Step 4 special key sequences may be entered as required. These key sequences may be entered to provide the following facilities:

. **Key Sequence "*I". This code causes a 5 second pause to occur when the number is used. This may be required when a trunk is first seized. This code may be entered at any point and more than once. The system**

inserts a pause without this entry after the trunk group access code, if the speed-dialed number is used by the attendant.

- **Key Sequence "*2". This code causes the number not to be outpulsed until dial tone is obtained. This code may be entered at any point and more than once. The system waits for dial tone after the trunk group access code without this sequence, if the speed-dialed number is used by an extension. A "*2" sequence after the trunk group access code would be ineffective. System Option 136 (limited wait for dial tone) is** applicable to this entry.
- **Sequence "*3QQ".** When entered at any point within the number, it enables user-dialed digits to be inserted. See 4.05 for details of this facility. Only one "*3QQ" entry can be made per speed call number.

4.05 The key sequence "*3QQ" may be inserted at a required point within the speed call number (step 4, Table 4-1), to enable the station to manually dial digits at this point when the number is being used. The "QQ" portion of the key signifies the number of digits which are to be manually dialed, and has a range of 0 1 to 16. This number must include the leading 0 when being entered. Only one set of manually-dialed digits is allowed for each speed call number.

4.06 The special key sequences occupy digits within the table as follows:

- **Key Sequence "*1" occupies 1 table digit**
- **Key Sequence "*2" occupies 1 table digit**
- **Key Sequence "*3QQ" occupies 2 table digits**

4.07 The special key sequences require a DTMF telephone for their entry, but once entered a DTMF or rotary-dial telephone may be used to employ the sequences. See Fig. 3-4 which illustrates special key sequences and note the digits count for these sequences.

Defining   Common-Use   Numbers

4.08 The dialing sequence at the console keypad to define a common-use speed call num- ber is similar to that for the station (4.04) and is shown in Table 4-2.

TABLE 4-1
DEFINING PERSONAL TABLE NUMBERS

step	Action	Remarks
1	Lift handset	Listen for dial tone
2	Dial Speed Call Access Code	Reorder tone is returned if System Option 2 16 Speed Call Enable is not set
3	Dial 0	A short tone burst is heard indicating that the system is ready to accept the speed call number.
4	Dial Speed Call Entry Access Number	Reorder tone is returned if the entry access number does not exist for the assigned table
6	Dial Speed Call Number	1. First digit(s) entered must be that for the Trunk Group access. 2. If a digit is input which would cause an overflow of the table, reorder tone is returned when it is entered. Going on-hook clears the number being entered. 3. Special key sequences may be entered. See 4.04
6	Go on-hook	Terminates definition of number. If no number was dialed (Step 5) then any entry which may have been held is cleared.

4.09 The special key sequences (4.04) for personal table users are also effective for common-use numbers. In addition when a common-use table number is to have a confidential attribute, the sequence *4 is entered (Step 4, Table 4-2) at any point within or at the end of the speed call number. This inhibits the display of that number by the attendant unless System Option 2 18 has been enabled.

Saved Number Redial

4.10 The saved number redial procedure is applicable only to personal table users (stations), and only if the number redial attribute has been programmed (2.16), for the last speed call entry access number of the table. Only DTMF telephones can "save" a number dialed on a trunk.

4.11 To store a number for subsequent use the station user dials "*" within 10 sec after the last digit dialed on the trunk circuit.

4.12 This procedure causes the following sequence to take place:

(a) Deletion of a previous "saved' number if it had been stored in the table.

(b) The dialed number including the trunk group access code is stored as the last number of the speed call table.

(c) A short burst of dial tone is returned to the user, and the user goes on-hook, or continues with the call.

Note: If the number dialed exceeds the remaining allowable digit capacity of the table (total 56 digits) no dial tone is heard and no trunk digits are stored.

4.13 Dial tone may not be returned after the foregoing procedure because a pause of longer duration than the interdigit timeout (10

TABLE 4-2
DEFINING COMMON-USE TABLE NUMBERS

Step	Action	Remarks
1	Dial Speed Call Access Code	Reorder tone is returned if System Option 2 16 is not set.
2	Dial 0	
3	Dial Speed Call Entry Access Number	1. Reorder tone is returned if System Option 2 17 is not set, or 2. The number was previously programmed as confidentialand System Options 217 and 2 18 are not set, or 3. The Access number given referencesa table which has been assigned as personal.
4	Dial Speed Call Number	1. First digit(s) entered must be that for the Trunk Access Group. If not entered it will cause an aborted call when used. 2. If a digit is entered which would cause an overflow of the table, reorder tone is returned when it is entered. Pressing the CANCEL key clears the number being entered. 3. Include the sequence *4 if the number is to be confidential.See 4.09
5	Press Console RELEASE key	Terminatesdef inition of number

sec.) before **the * digit, causes the * digit to be ignored. The call will progress as usual and the number is not stored in the table.**

4.14 To use the number stored as a number redial in the table, the user follows the procedures outlined in 6.06.

4.15 To delete a saved number follow the same procedures as for the personal speed call numbers **(Table 4– 1).**

5. DISPLAY OF SPEED CALL NUMBERS

5.01 The attendant may display any speed call number on the console, provided that access is allowed to that number. The attendant is not allowed to display:

. **Personal Table numbers**

• **Confidential numbers, if System Option 218 is not set**

5.02 The procedure for displaying a number is as follows:

. **Dial Speed Call Access Code**
• **Dial #**
• **Dial Speed Call Entry Access Number**
• **Dial # (or any other key pad digit)**

5.03 The speed call access number appears in the console SOURCE display, with the first eight digits of the speed call number appearing in the DESTINATION display. Keying of the # or any other keypad digit causes the DESTINATION display to scroll left by one digit, and the ninth digit of the number to appear in the rightmost position. Repeated operation of any keypad digit

causes the display to successively scroll left, until the last digit of the number appears in the rightmost position of the DESTINATION display. Scrolling will not continue beyond this point.

5.04 The display procedure shown in Fig. 5-I applies to a table which has a speed call access number 70, and a speed call number defined as 9*3035551212. The Speed Call access code has been programmed as 78 in the example. The console RELEASE key is pressed to clear the display.

5.05 If the attendant can display confidential speed call numbers (i.e. System Option 2 18 is enabled), then when such a number is displayed the last two digits in the SOURCE display will be " 4". Fig. 5-1 illustrates this attribute.

6. SPEED CALL USAGE

General

6.01 The stations use the same procedure as the attendant to call numbers. This procedure is:

● Dial Speed Call Access Code
● Dial Speed Call Entry Access Number
● Dial manual digits, if required (4.05). The system starts dialing whenever the required number of digits is entered. Digits in excess of the required number are ignored. If the number of digits dialed are less than that specified a "#" terminating digit must be used.

6.02 The above entry results in one of the following actions:

. Dialing of the speed call number (6.05 and Table 6-1)
· Busy tone is returned if a free trunk cannot be obtained
· Reorder tone is returned because of one of the reasons stated in 6.04.

6.03 If neither busy nor reorder tone is heard by the caller the call procedes in the usual manner. If the caller hears busy tone, the handset should be replaced and the call attempted at a later time,

6.04 Reorder tone is heard by the caller after dialing the speed call access number, if one of the following conditions exist:

(a) The station does not have the required Class of Service for the dialed number to access the common-use table.

(b) The number dialed is not valid for a personal table assigned to the station, and if considered as a common-use table access number the number is already assigned to another station's personal table.

(c) The common-use table is not available in the current configuration.

(d) The Speed Call feature is not enabled.

(e) The call is denied by Toll Control parameters in the case of the personal table user, (or intercepted to the attendant if System Option 1 16 is enabled).

(f) The first digit(s) of the entry accessed is not a valid trunk group access code.

6.05 The sequence of events which take place when a speed call number is used is shown in Table 6-1, and assumes that the proper access numbers have been used.

Saved Number Redial

6.06 The number redial procedure is applicable only to personal table users (stations), and only if the number redial attribute has been programmed and if the extension is a DTMF telephone set. The number to be used was entered as outlined in 4.10. The procedure to use the number is as follows:

(a) Lift handset and listen for dial tone.

(b) Dial Speed Call Feature access code.

(c) Dial Entry Access number (of the Number Redial entry),

TABLE 6-I
SPEED CALL NUMBER OUTPULSING

Step	Event	Remarks
1	Caller dials Speed Call Access Code, followed by Speed Call Entry Access Number, and manually — dialed digits (if required)	Manually-dialed digits are inserted immediately after dialing the Speed Call Entry Access Number. When outpulsed (Step 4) they are automatically inserted in the correct place within the speed call number.
2	The first digit(s) of the number locate the trunk group	If all trunks are busy, including any in an authorized overflow group, then busy tone is returned to the caller. No camp-on or callback facility applies to this application.
3	A free trunk is seized (Note 1)	An automatic "Wait for Dial Tone" condition occurs. This occurs regardless of whether a "*2" (see 4.041 had been included in the speed call number or not. If System Option 136 (limited wait for dial tone) had been enabled, then the number will be outpulsed after the timeout period.
4	Speed Call number digits are outpulsed on the trunk (Note 1)	Outpulsed digits are subject to the trunk group programming (e.g. rotary dial or DTMF digits may be programmed). When DTMF to RD conversion is used the * digit cannot be used as a manually-dialed digit. During outpulsing the caller is split from the outgoing call.
5	An audio connection is completed between calling party and trunk circuit	When called party answers, the call proceeds in the normal manner.

Note 1:   When the attendant is outpulsing an entry, all *2 special sequences are treated as *1.

OPERATION

THE FOLLOWING SEQUENCE
IS DIALED:

1. DIAL 78
2. DIAL #
3. DIAL 70
4. DIAL # (OR ANY OTHER
   KEY PAD DIGIT)

RESULTS

THE CONSOLE SOURCE AND DESTINATION
DISPLAYS SHOW THE DIALED DIGITS
AT RIGHT.

CONFIDENTIAL
ATTRIBUTE

DISPLAYED DIGITS

ENTRY
ACCESS
NUMBER

DEFINED SPEED
CALL NUMBER

OPERATION

5. DIAL # (OR ANY OTHER
   KEY PAD DIGIT)

RESULTS

DESTINATION DISPLAY SCROLLS LEFT
AND REVEALS NEXT DIGIT OF
NUMBER.

OPERATION

6. REPEATED KEY PAD DIGIT OPERATION

RESULTS

DESTINATION DISPLAY SCROLLS LEFT
FOR EACH KEY PAD DIGIT OPERATION
BY ONE DIGIT, UNTIL COMPLETE NUMBER
HAS BEEN REVEALED.

NOTE: WHEN LAST DIGIT IS DISPLAYED THE DISPLAY WILL NO
        LONGER SCROLL IRRESPECTIVE OF THE NUMBER OF KEY
        PAD DIGIT OPERATIONS.

Fig. 5-1   Speed Call Number Display Example

Toll Restriction/Toll Control

6.07 If it is required to delete a saved number for any reason perform the following procedure:

   (a) **Lift handset and listen for dial tone.**

   (b) **Dial Speed Call Feature access code.**

   (c) **Dial "0"**

   (d) **Dial the Saved Number Entry Access number.**

6.08 If the PABX was programmed to include Toll Control or Toll Restriction features it should be noted that numbers entered in personal tables are subject to toll restriction or control, but those for common-use tables do not have this restriction or control.

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SX-100*AN D SX-200"
SUPERSWITCH"
ELECTRONIC PRIVATE AUTOMATIC BRANCH EXCHANGE
ATTENDANT CONSOLE DESCRIPTION

1. GENERAL

1.01 This section describes the attendant functions of the SX-100/SX-200 Attendant Console and contains a brief description of each button and display. For a full description of all features provided by the SX-100 and the SX-200 PABX's refer to Section MITL9105/9110-98-105.

1.02 Reason for Issue. This section has been issued to incorporate the description of the attendant console when used with the SX-100 and the SX-200 PABX.

2. INTRODUCTION

General

2.01 The attendant console (Fig. 2-1) is designed specifically for use with the SX-100 and SX-200 PABX's. The console provides the attendant with a number of unique features which increase the speed of operation and ease of call processing.

2.02 The following physical features are provided by the attendant console.

- Ivory Base, Black Faceplate

- 12 Button Dial Pad

- 30 Operating Keys and LEDs

- 10 Trunk Group Busy indicators

- 3 Alarm Indicators

- Calling and Called Number displays

- Busy Lamp Field

- Digital Clock

- Digital Date

- Call Waiting Display

Release Loop Operation

2.03 Release loop operation is used by both the SX-100 and SX-200 systems. This method of operation allows the attendant to camp-on, or connect a call to a trunk or extension, and release from the call before the called number answers. If the released call is not answered within the selected recall time period, it is returned to the console as a recall.

A Alarm Indicators
B Call Waiting Indicator
C Digital Clock
D Trunk Group Busy Indicators
E Busy Lamp Field
F Calling Number Display
G Called Number Display
H Dial Pad
J Operating Keys and LED's

Fig. 2-1 Attendant Console

Multi-Tenant   Service

2.04   A maximum of two attendant consoles may
be used with either the SX-100 or the SX-200
PABX. In multi-tenant service the consoles may
be assigned as shared consoles (any attendant
may answer or originate any call to any tenant) or
assigned to individual tenants (attendant console
1 is assigned to tenant 1 and attendant console 2
is assigned to tenant 2 (tenants 3 and 4 will be per-
manently in Night Service 1). If multi-tenants are
assigned to a console, the attendant must dial the
number of the tenant when originating any call for
that tenant. This allows all tenants to use the
same numbering plan if desired.

3. PHYSICAL   DESCRIPTION

General

3.01   The major components of the attendant
console are interconnected by a connec-

torized cable harness, allowing easy replacement
of a defective item. The following paragraphs
describe each of the major components as shown
in Fig. 3-1.

Console   Housing

3.02 The console housing consists of a formed
aluminum base holding the cable harness,
Power Fail Transfer (PFT) switch, console connec-
tor, and handset/headset jacks. The PFT switch
and the console connector are located on the
base of the console. Located at either end of the
console housing is a handset/headset jack. These
jacks allow the use of a standard G-3 type handset
or a lightweight headset. The overall dimensions
of the console housing are 13.75in. (349mm) wide,
9.25in. (234mm) deep, and 6.8in. (172mm) high.
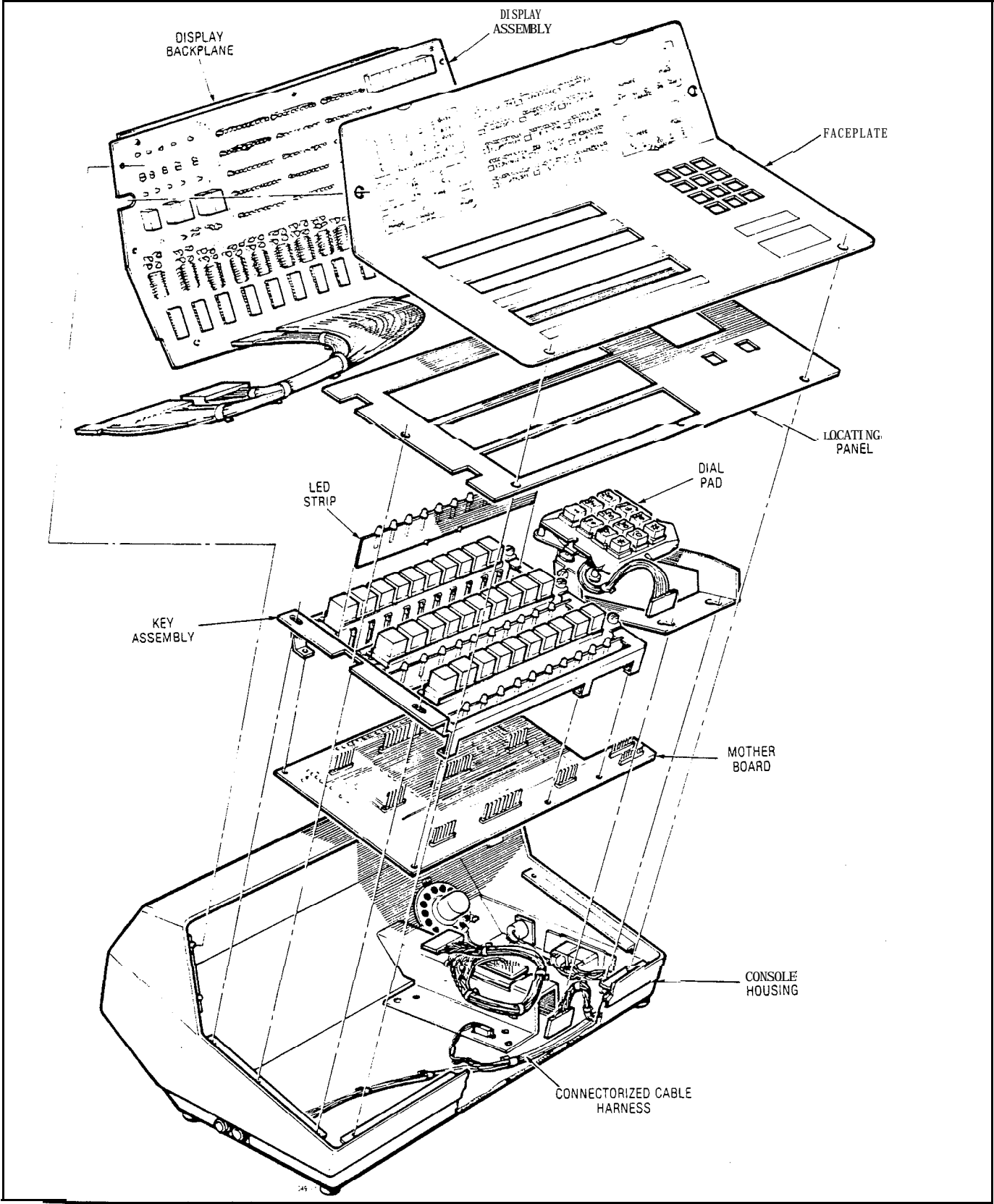
Fig. 3-1   Attendant Console Major Components

Dial Pad

3.03 The console dial is a conventional 12 button key pad minus the tone generators. The pad is connected to the console key assembly mother board by a connector-ended cable.

'Key Assembly

3.04 The key assembly consists of the console mother board, three key strips and three LED strips. Each key strip holds ten non-locking keys and plugs into the mother board, the strip being secured to the mother board by four screws. The ten LEDs associated with each key strip are mounted on a single printed circuit board, which plugs into the key strip to form a single assembly. The complete key assembly is attached to the console by the' cable harness.

Display Assembly

3.05 The display assembly is made up of two boards, the main display board and the display backplane. The display backplane holds the display control circuits and plugs into the main display board. This display board holds the LEDs for the TRUNK GROUP STATUS, CALL WAITING, ALARM and BUSY LAMP FIELD also the SOURCE, DESTINATION, and CLOCK displays. The complete assembly is mounted at the top of the the console housing and is connected to the other assemblies through the main cable harness.

Locating Panel

3.06 This panel ensures that the key strips and the dial pad are located correctly within the console housing; it also provides a firm base for the console faceplate.

Faceplate

3.07 The faceplate completes the console housing and provides all required LED and indicator annotations.

4. FUNCTIONAL DESCRIPTION

General

4.01 The attendant console faceplate layout is shown in Fig. 4-1. The following description

details the function of each button, indicator and display.

Buttons and Indicators

4.02 Each functional key on the attendant console has associated with it a Light Emitting Diode (LED). The state of the LED indicates the condition of the associated call—

Flashing LED-a call of that type is being presented to the console and may be answered by pressing the associated key.
Lit LED-the call of that type is connected to the handset or the option is active.

4.03 LAMP TEST: This button allows the attendant to test all indicators, LEDs and displays on the console. Pressing the key causes all LEDs on the console to light and the console ringer to sound. If the key is then released and pressed again, all the LEDs go out, the ringer stops and all console displays show 8. This operation therefore allows the attendant to verify that no faulty LED or display exists.

4.04 ALARM RESET: If an Alarm condition is detected by the system, the console ALARM LED lights (see ALARM indicators description) and the tone ringer sounds. Pressing the ALARM RESET button cuts off the tone ringer and causes the error code associated with the alarm condition to be displayed in the SOURCE and DESTINATION displays.

The ALARM RESET button, if pressed when an alarm condition does not exist causes all busied out trunks and lines, and all locked out lines to be displayed on the Busy Lamp Field.

4.05 BELL OFF: This button, when pressed, disables the console tone ringer and lights the BELL OFF LED. With the console ringer disabled, incoming calls to the attendant console are indicated by a flashing LED only, no audible signal is given. If the BELL OFF button is pressed when its associated LED is lit, the tone ringer will be reactivated and the LED is extinguished.

4.06 **IDENT:** Pressing the IDENT key when the console is idle causes the console to display the firmware generic numbeiand its revision level in the SOURCE display, and the internal
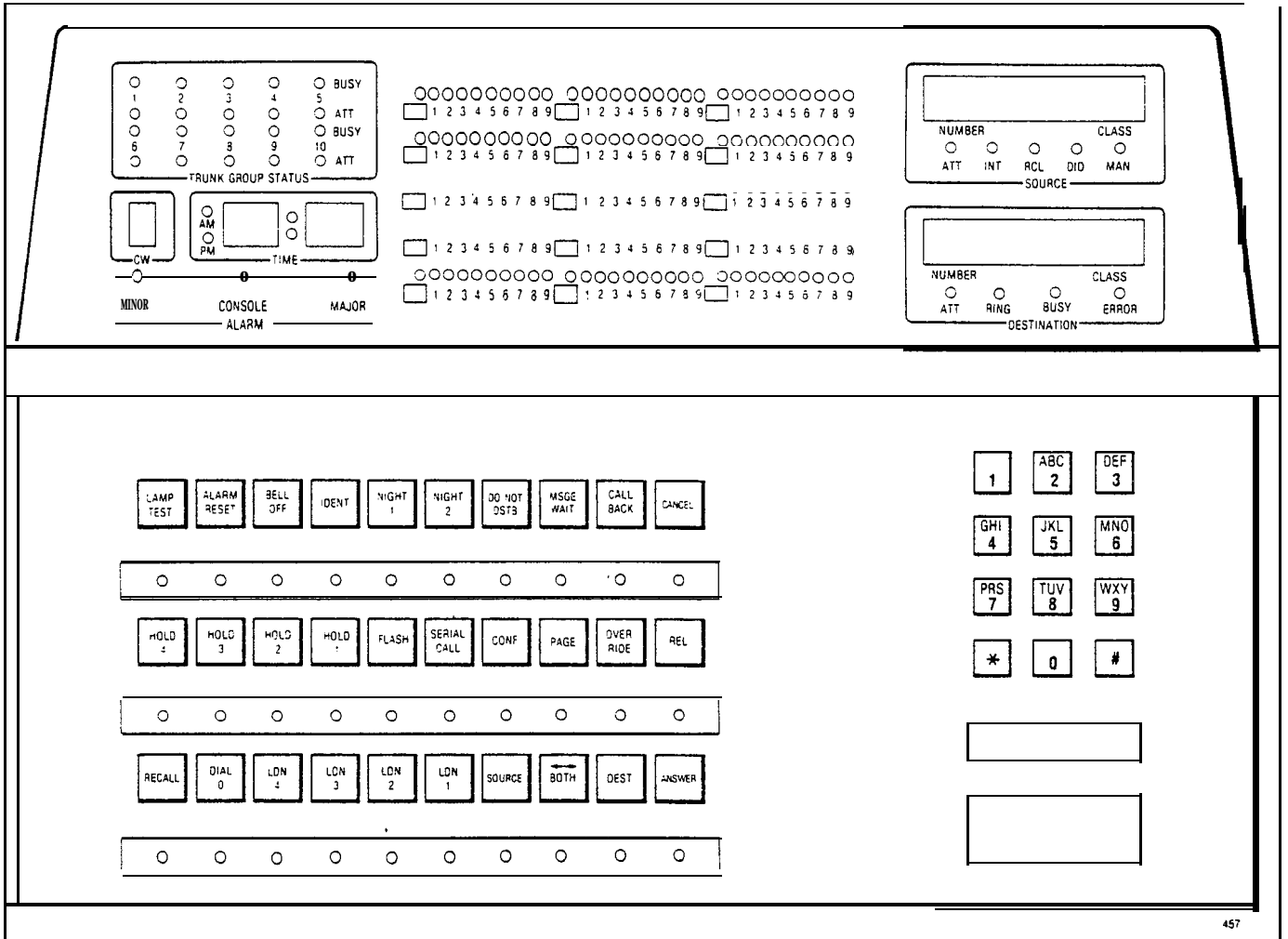
Fig. 4-1 Attendant Console Faceplate
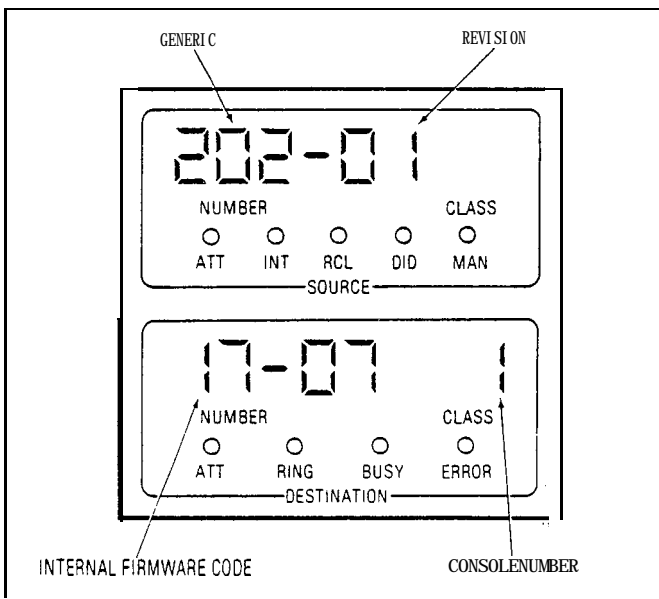
Fig. 4-2 Typical identification Display

firmware code and the console number in the DESTINATION display (Fig. 4-2).

o = Maintenance/Programming console
1 = Attendant console 1
2 = Attendant console 2

If the IDENT key is pressed while the console is connected to either a source or destination party the system will display the equipment number and speech path in use (Fig. 4-3).

4.07 **NIGHT** 1, **NIGHT** 2: These buttons are used to switch the system into and out of Night Service. When a night service button is pressed, the LED associated with the night service selected lights, and the system switches the selected incoming trunks to the required TAFAS equipment or extension lines. Pressing the NIGHT 112 button(s) returns the system to normal service. NIGHT 1 and 2 cannot be active at the same time.

Page 5
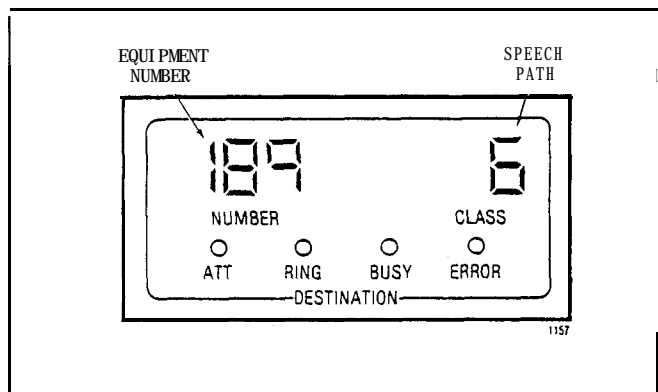
Fig. 4-3 Typical Display

4.08 CALLBACK: Pressing the CALLBACK button allows the attendant to activate the callback feature on a call originated at the console.

4.09 CANCEL: The CANCEL key allows the attendant to cancel a misdialed call, or a call directed to a busy number.

4.10 HOLD 1, 2, 3, 4: These buttons allow the attendant to hold up to four independant calls at the console. When the attendant presses a HOLD key the associated LED lights and the active call at the console is held. If the attendant, or an extension using the HOLD PICK-UP feature, does not retrieve the held call within the hold recall time the HOLD LED flashes indicating that the call has been returned to the console. If two consoles are used, up to eight calls may be held, calls 1, 2, 3 and 4 being held at Console 1 and calls 5, 6, 7 and 8 being held at Console number 1/2 and the Maintenance Console.

4.11 FLASH: This button allows the attendant to recall the telephone company operator on an operator-assisted long distance call,

4.12 SERIAL CALL: Pressing the SERIAL CALL button when the attendant has an incoming CO trunk call on the console, causes the call to be returned to the console when the initial call is completed or cancelled.

4.13 CONF (Conference): The CONF button is used to set-up an attendant controlled conference. The attendant dials each conferee in turn, and, after the answer, presses the CONF button to enter them into the conference.

The CONF LED is lit whenever the conference is active. The attendant may be recalled to the conference by one of the parties in the conference flashing the extension switchhook. This causes the CONF LED to flash. The attendant answers the recall by pressing the CONF button, which reconnects the attendant to the conference.

4.14 PAGE: Pressing the PAGE key connects the console handset, or headset, directly to the paging equipment allowing the attendant to make all-zone paging announcements. If multi-tenant service is in operation attendant console 1 may access pager 1 and attendant console 2, pager 2. Shared consoles access both zones. The PAGE LED is lit whenever the paging circuit is in use. The attendant has priority access to the paging circuits and may override any extension that is using the paging equipment by pressing the PAGE button, the extension being automatically released.

4.15 OVERRIDE: This button allows the attendant to override a busy number and enter the call.

4.16 RELEASE: The RELEASE button allows the attendant to release a call from the console. The call may be released in the busy or the ringing state, or after a talking connection has been established:

4.17 RECALL: The RECALL LED flashes to indicate that a call has not been answered within the timeout period and has been returned to the console. Pressing the RECALL button connects the console to the returned call.

4.18 DIAL 0: When an extension user calls the attendant the DIAL 0 LED flashes, indicating a dial 0 call. If the DIAL 0 button is pressed the console will be connected to the call. The LED may also indicate; intercepts, callbacks, recalls, manual lines, contact monitors and serial call recalls.

4.19 **LDN 1,** 2, 3, 4: These buttons allow the attendant to answer incoming calls to the customer's Listed Directory Numbers. When an outside call is made to the console, the LED associated with the incoming call flashes, allowing the attendant to select the call by pressing LDN 1-4 and answer with the correct response.

4.20 SOURCE: This button allows the attendant to hold the destination side of a call, and speak privately to the source party.

4.21 **BOTH:** The BOTH button allows the attendant to simultaneously speak to both parties of a call.

4.22 **DEST (Destination):** This button allows the attendant to hold the source side of a call, and speak privately to the destination party.

4.23 **ANSWER:** The ANSWER button allows the attendant to answer any incoming call to the console. When a call is presented to the console the LED associated with the call type and the ANSWER LED flash. If the attendant presses the ANSWER button, the LED associated with the first call in the console queue lights, indicating the call type, and the ANSWER LED lights indicating the attendant is connected to the call. The LEDs associated with the remaining calls in the console queue continue to flash. Pressing the ANSWER button to answer incoming calls will answer calls to the console in the order in which they arrive at the console, independent of the call type.

Displays

4.24 The console displays provide the attendant with all relevant information on calls directed to or made by the attendant. The following descriptions detail the information provided by each display.

4.25 **TRUNK GROUP STATUS:** The trunk group status display shows the operational status of ten trunk groups. Two LEDs are associated with each trunk group. The BUSY LED, when lit, indicates that all trunks in that trunk group are busy. The ATT LED, when lit, indicates that the attendant has made the trunk group "attendant access only".

4.26 **CW (Call Waiting):** The call waiting display shows the current number of calls in the attendant queue. As calls are answered or new calls are directed to the console the display is updated to reflect the new status of the queue.

4.27 **TIME:** Each attendant console is equipped with a digital clock. The clock continuously displays the time in hours and minutes with a choice of either a 12 or 24 hour clock display. If the 12 hour clock display is selected, an LED lights to indicate AM or PM. Optionally, the date may be displayed. The clock is driven by pulses

derived from the CPU master clock circuit, and is therefore a direct indication that the CPU is working.

4.28 **ALARM:** The ALARM display contains the MAJOR, MINOR and CONSOLE alarm LEDs. When the system detects an alarm condition the appropriate LED flashes or lights, and the console ringer sounds. A MAJOR alarm indicates that a malfunction has been detected which affects complete system operation and an emergency transfer has taken place. A MINOR alarm is raised when the system detects a fault which degrades system operation, but does not stop call processing. A CONSOLE alarm indicates that a malfunction has occurred within the console. Call processing continues but the console operation is impaired.

4.29 **BUSY LAMP FIELD:** The Busy Lamp Display shows the busy (LED lit)/(LED off) states of the trunks and/or extension numbers. The numbers displayed may be assigned to any extension, tie trunk, or CO trunk. The Busy Lamp Display may also show Do Not Disturb, Message Waiting, Room Status and Busied Out conditions.

4.30 **SOURCE:** The SOURCE display (Fig. 4-4) consists of two digital and five LED displays which provide the following information on all calls directed to the console.
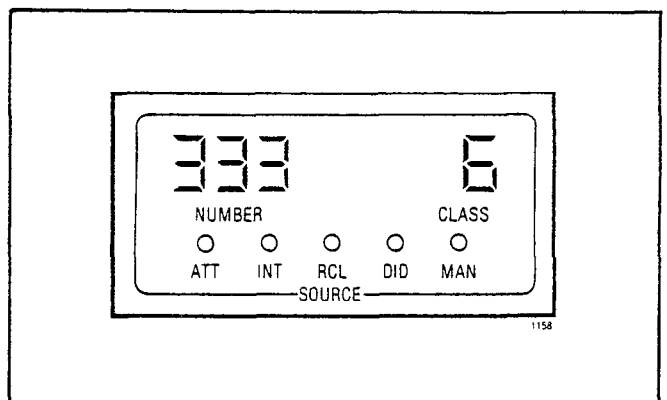

Fig. 4-4   Source Display

NUMBER—displays the number of the calling extension or the equipment number of a calling trunk

CLASS—this area shows the class-of-service number assigned to the calling extension or trunk

ATT—this LED, when lit, indicates that the
attendant is connected to the calling source
party

INT—this LED lights to indicate that the
call is an intercept call

RCL—when lit, identifies the call as a recall

DID—identifies the call as a Direct Inward
Dial call to the attendant

MAN—identifies the call as a manual line
service call

This display is also used to read-out all other in-
formation.

4.31 DESTINATION: The DESTINATION display
(Fig. 4-5) holds two digital and four LED
displays which provide the following information
on all calls made from the console.
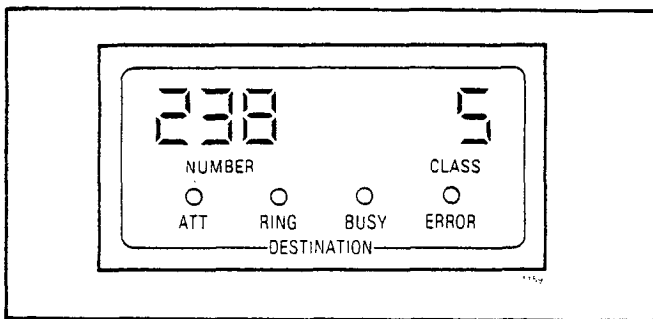
Fig. 4-5   Destination Display

NUMBER—displays the extension number or the
trunk equipment number dialed by the attendant

CLASS—displays the class-of-service number
assigned to the called extension or trunk

ATT—this LED, when lit, indicates that the
attendant is connected to the called party

RING—indicates that the call is in the ring-
ing state

BUSY—indicates that the called party is busy

ERROR—indicates that the number dialed
is unassigned or illegal

This display is also used to read-out all other in-
formation.

5.   GENERIC 203 FEATURES

General

5.01 The following features are provided with
Generic 203 in addition to those described
in Part 4.

Buttons and Indicators

5.02   DO NOT DSTB: This feature allows an ex-
tension user to have all incoming calls
routed to the attendant. It may be activated by the
extension user or the attendant. The attendant
may see which extensions have the DO NOT
DSTB set on the busy lamp field (by pressing the
DO NOT DSTB button when the console is idle).
When active and the attendant calls the extension
the console DO NOT DSTB LED flashes and the
ERROR lamp lights in the DESTINATION display.
The attendant may override this in an emergency,
by pressing the DO NOT DSTB button, and the ex-
tension will be rung.

5.03   MSGE WAIT: This feature allows the atten-
dant to inform a guest that there is a
message waiting. This may be done by either a
flashing lamp (at 60ips) on the extension as soon
as it becomes idle, or a distinctive ring every 20
minutes (3 cycle of 3.5ips ringing) 10 seconds
after it becomes idle. If the extension is busy or
has Do Not Disturb active when Message Waiting
is activated, the message waiting indication is in-
itiated after the extension becomes idle. The at-
tendant may see which extensions have a
message waiting on the busy lamp field (by press-
ing the MSGE WAIT button when the console is
idle).

6.   GENERIC 204 FEATURES

General

6.01 The following features are provided with
Generic 204 in addition to those described
in parts 4 and 5.

Console Date Display

6.02   IDENT: This button while depressed causes
the time display (4.27) to show the current
2-digit month and 2-digit day. This display is in ad-
dition to those described in 4.06.

System Identifier

6.03 This feature allows the attendant to set,
modify or display the system ID. The ID will
appear in the SOURCE display and in the Traffic
Measurement Reports.

7.   ATTENDANT FUNCTION ACCESS CODES

7.01 Table 7-1 lists access codes which enables
the attendant to perform certain system
functions.

TABLE 7-1
ATTENDANT FUNCTION ACCESS CODES

These codes assume the use of * as the Attendant Function code (Feature number 18).
For Attendant Function codes used in Traffic Measurement see Section MITL9105/9110-98-450.

To cancel all call forwarding:

  a) Dial * 1, or * 11
  b) Dial #
  c) Press RELEASE

To access an individual trunk:

  a) Dial * 2
  b) Dial individual trunk access number (equipment number)
  c) Dial *
  d) Press RELEASE

To force-release an individual trunk:

  a) Dial * 2
  b) Dial individual trunk access number (equipment number)
  c) Dial # #
  d) Press RELEASE

To make flexible night service assignments:

  a) Dial * 3
  b) Dial individual trunk access number (equipment number)
  c) Press Night 1 or Night 2
  d) Dial extension number
  e) Press RELEASE

To cancel all system callbacks:

  a) Dial * 4
  b) Dial #
  c) Press RELEASE

To set the clock time:

  a) Dial * 5
  b) Dial time (hour plus minutes)
  c) Dial * for p.m., otherwise a.m.
  d) Press RELEASE

To make trunk group dial access:

  a) Dial * 6
  b) Dial trunk group (1 through 12)
  c) Dial #
  d) Press RELEASE

To make trunk group attendant access:

  a) Dial * 6
  b) Dial trunk group (1 through 12)
  c) Dial *
  d) Press RELEASE

To change the Direct Inward System Access Code:

  a) Dial * 7
  b) Dial DISA code
  c) Press RELEASE

To cancel a minor alarm:　(Note 1)

  a) Dial * 8
  b) Dial #
  c) Press RELEASE

†To busy out an individual trunk:

  a) Dial * 9
  b) Dial individual trunk access number (equipment number)
  c) Dial *
  d) Press RELEASE

†To de-busy an individual trunk:

  a) Dial * 9
  b) Dial individual trunk access number (equipment number)
  c) Dial #
  d) Press RELEASE

To set up call forwarding:　(Note 2)

  a) Dial * 11nnn, where nnn is the extension number of the forwarding extension
  b) Dial call forwarding code (1-3)
  c) Dial mmm, where mmm is the number to which the calls are to be forwarded
  d) Press RELEASE

TABLE 7-1 (CONT'D)
ATTENDANT FUNCTION ACCESS CODES

To cancel call forwarding for an extension: (Note 2)

   a) Dial ✳ 11nnn, where nnn is the extension number of the forwarding extension

   b) Dial #

   c) Press RELEASE

†To busy out an extension: (Note 2)

   a) Dial ✳ 12nnn, where nnn is the number of the extension to be busied out

   b) Dial #

   c) Press RELEASE

†To de-busy an extension: (Note 2)

   a) Dial ✳ 12nnn, where nnn is the number of the extension to be de-busied

   b) Dial #

   c) Press RELEASE

†To suspend the printer: (Note 3)

   a) Dial ✳ 14 ✳

   b) Press RELEASE

†To purge and ignore the printer: (Note 3)

   a) Dial ✳ 14 00

   b) Press RELEASE

†To enable the printer: (Note 3)

   a) Dial ✳ 14 #

   b) Press RELEASE

To change the date: (Note 3)

   a) Dial ✳ 15 and 3 or 4 digit date (one or two digit month, two digit day)

   b) Press RELEASE

†To change the system identity: (Note 3)

   a) Dial ✳ 17 n(nn) (1 to 3 digit ID, 0-999)

   b) Press RELEASE

To display current system identity: (Note 3)

   a) Dial ✳ 17

   b) Press RELEASE

Note 1   The errors will be sequentially stacked in the memory and may be recalled sequentially (most recent first) by repeating the above procedure.

Note 2   Applies to Generic 203/up

Note 3   Applies to Generic 204

† Requires system option programming

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SX-100* AND SX-200*
SUPERSWITCH*
ELECTRONIC PRIVATE AUTOMATIC BRANCH EXCHANGE
ATTENDANT CONSOLE HOTEL/MOTEL DESCRIPTION

1. GENERAL

1.01 The SX-100 and SX-200 PABX's can be installed for use by Hotels or Motels that require facilities not normally required for other types of establishments. This section describes the attendant functions of the Hotel/Motel SX-100/SX-200 console and contains a brief description of each button and display. For a full description of all features provided by the PABX's refer to Section MITL9105/9110-98-105. Section MITL9105-98-100 and Section MITL9110-98-100 are general descriptions of the SX-100 PABX and SX-200 PABX respectively.

Reason for Reissue

1.02 This section has been reissued to update all Generic 204 information.

2. BRIEF DESCRIPTION

General

2.01 The attendant console (Fig. 2-1) is designed specifically for use with the SX-100 and the SX-200 PABX. The console provides the attendant with a number of unique features which increase the speed of operation and ease of call processing. It also provides facilities and displays particularly suited to a hotel/motel environment.

2.02 The following physical features are provided by the attendant console.

- Ivory Base, Black Faceplate
- 12 Button Dial Pad
- 30 Operating Keys and LEDs
- 10 Trunk Group Busy Indicators
- 3 Alarm Indicators
- Calling and Called Number Displays
- Busy Lamp Field
- Digital Date
- Digital Clock
- Call Waiting Display

Release Loop Operation

2.03 Release loop operation is used by the SX-100 and SX-200 systems. This method of operation allows the attendant to camp-on, or connect a call to a trunk or extension, and release from the call before the called number answers. If the released call is not answered within the selected time-out period, it is returned to the console as a recall.

A   Alarm Indicators
B   Call Waiting Indicator
C   Digital Clock
D   Trunk Group Busy Indicators
E   Busy Lamp Field
F   Calling Number Display
G   Called Number Display
H   Dial Pad
J   Operating Keys and LED's
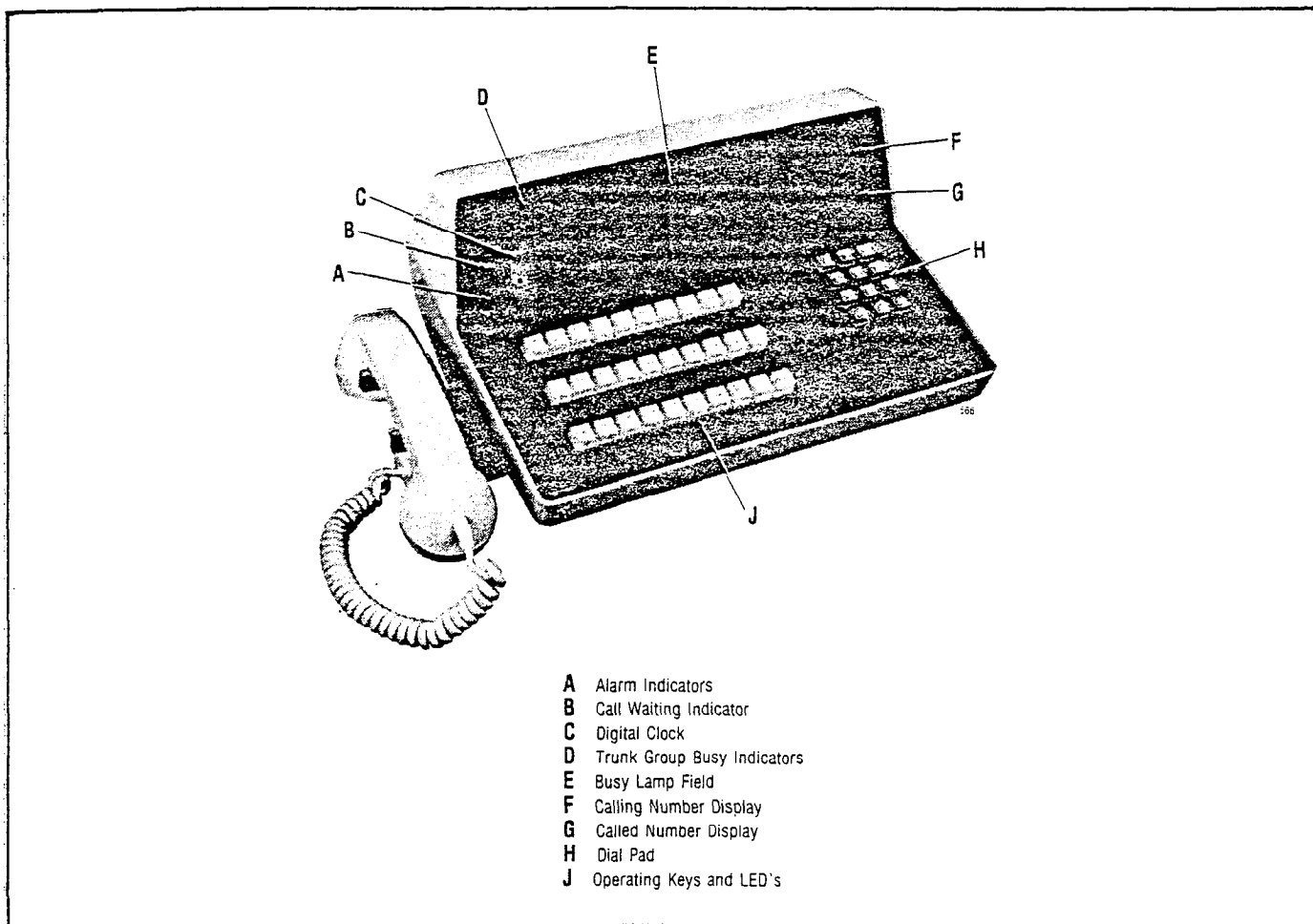
Fig. 2-1   Attendant Console (Hotel/Motel)

3. PHYSICAL DESCRIPTION

General

3.01 The major components of the attendant console are interconnected by a connectorized cable harness allowing easy replacement of a defective item. The following paragraphs describe each of the major components shown in Fig. 3-1.

Housing

3.02 The console housing consists of a formed aluminum base holding the cable harness, Power Fail Transfer (PFT) switch, console connector, and handset/headset jacks. The PFT switch and the console connector are located on the base of the console. Located at either end of the console housing is a handset/headset jack. These jacks allow the use of a standard G-3 type handset or a lightweight type headset. The overall dimensions of the console housing are 13.75in. (349mm) wide, 9.25in. (234mm) deep, 6.8in. (172mm) high.

Dial Pad

3.03 The console dial is a conventional 12 button key pad but does not include the tone generator (which is not required). The pad is connected to the console key assembly mother board by a connector-ended cable.

Key Assembly

3.04 The key assembly consists of the console mother board, three key strips and three lamp strips. Each key strip holds ten non-locking keys and plugs into the mother board, the strip being secured to the mother board by four screws. The ten LED's associated with each key strip are mounted on a single printed circuit board, which plugs into the key strip and forms a single assembly. The complete key assembly is attached to the console by the cable harness.
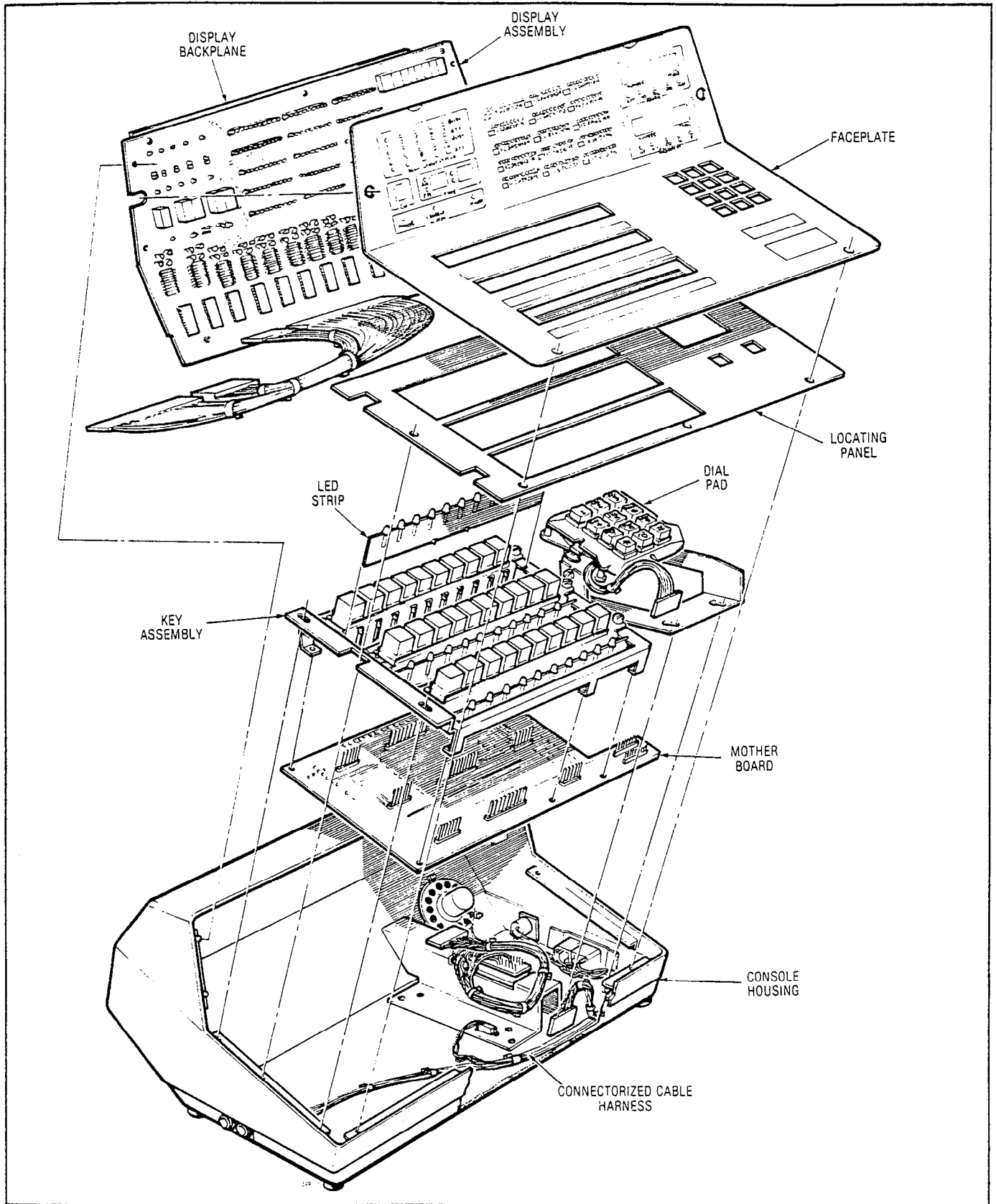
Fig. 3-1   Console Major Components

Display Assembly

3.05 The display assembly is made up of two boards, the main display board and the display backplane. The display backplane holds the display control circuits and plugs into the main display board. This display board holds the LED's for the TRUNK GROUP STATUS, CALL WAITING, ALARM, BUSY LAMP FIELD and the SOURCE, DESTINATION and CLOCK displays. The complete assembly is mounted at the top of the console housing and connected to the other assemblies through the main cable harness.

Locating Panel

3.06 This panel ensures that the key strips and the dial pad are located correctly within the console housing. It also provides a firm base for the console faceplate.

Faceplate

3.07 The faceplate completes the console housing and provides the required designations for the LED displays.

4. FUNCTIONAL DESCRIPTION

General

4.01 The attendant console faceplate layout is shown in Fig. 4-1. This layout differs from the standard layout described in Section MITL9105/9110-98-300, in that certain keys bear different designations because of the need to tailor program requirements to a hotel (or motel) environment. Some of these functions may be applicable to needs other than a hotel environment. It is emphasised that the physical and electrical configuration has not changed.

4.02 The keys affected are as shown below, with the first (or standard function) being changed to the second (or hotel function) item:

- Key NIGHT 2 becomes ROOM RESTR (or ROOM STATUS)
- Key HOLD 4 becomes CALL BLOCK
- Key SERIAL CALL becomes GUEST ROOM

4.03 The description of the buttons and displays are grouped under three main headings, for ease of explanation, as follows:

- Hotel Key Buttons
- Standard Key Buttons
- Displays

Hotel Key Buttons

4.04 GUEST ROOM: This button is used to give a number of facilities specifically for hotel or motel use. Its prime purpose is to display information about a hotel room and to give room occupants additional facilities (or restrictions). These features are summarized as follows:

- The display of the status of each room can be given in respect to whether it is occupied (rented) or vacant, and whether it is clean or requires cleaning. In addition, the display indicates whether the maid is in the room. This display is accomplished by pressing the GUEST ROOM button and dialing the room number. Fig. 4-2 shows a typical room display with status "3", indicating that the room is vacant but requires cleaning. If a period (.) appears after the status code it indicates that a maid is currently in the room. Having pressed the GUEST ROOM button, and dialed a room number, the attendant can update the room status by dialing a special code. See Table 4-1. This provides the attendant with a view of a room's status.

- A vacant room (i.e. code 1 or 3 in Table 4-1), may be restricted from making outgoing trunk calls. A similar restriction can be applied by the use of the ROOM RESTR button for "non-vacant" rooms. This facility is detailed under the ROOM RESTR description.

- A hotel guest may request that all calls to his or her room be intercepted by the attendant, i.e. a "Do Not Disturb" condition is required. This condition may be overriden in an emergency. The details are given in the description for the DO NOT DSTB button.

- The hotel attendant can inform a hotel guest that he or she has a message waiting, by arranging for the room telephone to ring or flash a lamp every 20 minutes. This facility is discussed more fully in the description under the MSGE WAIT button.
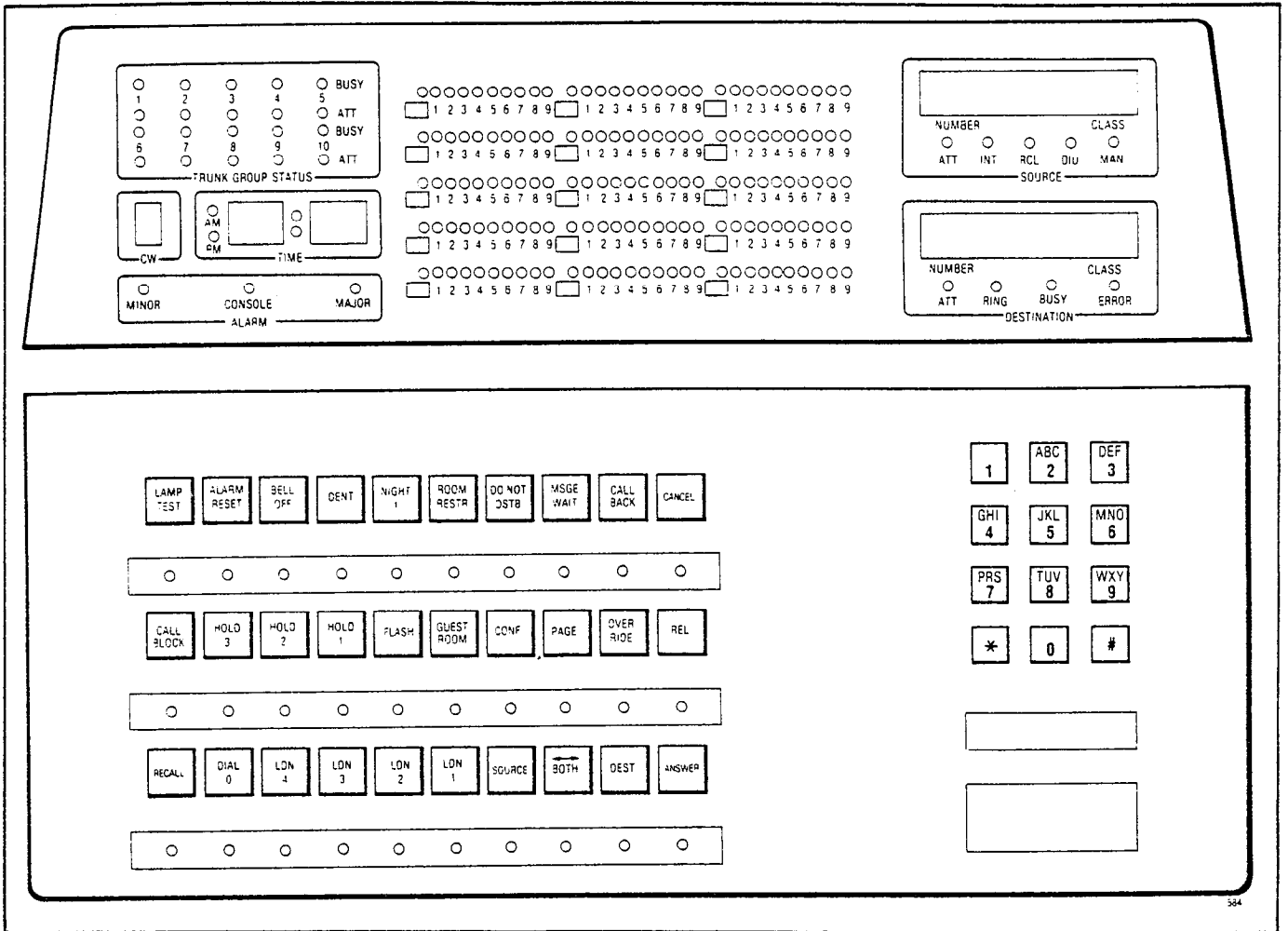
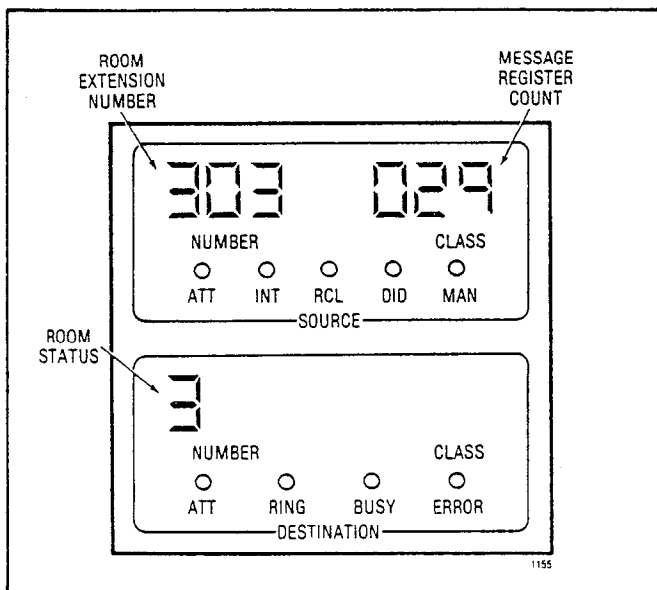**Fig. 4-1 Console Faceplate Layout**

Fig. 4-2 Typical Status Display

- If the room telephone has a message waiting lamp, the lamp will flash (at 60ipm) for the "message waiting" period. Only one type of message waiting indication can be employed by the system at any time. The message waiting feature is also described under the MSGE WAIT button description.

- Message registration can be provided for each room. This feature keeps count of all local calls made from a room. Flexible charging allows the Message Register to be tailored to an individual hotel's needs. By pressing the GUEST ROOM button and entering the room number, the room number and message "count" is displayed in the SOURCE display. The "count" can be read on checkout for charging purposes; then under the same conditions the register is cleared by pressing the "#" button. Fig. 4-2 illustrates a typical display of this facili-

TABLE 4-1
ROOM STATUS CODE DESCRIPTION

Status Code	Description
0	Displays which rooms are currently occupied by a maid. This status cannot be changed by the attendant.
1	The room is vacant and ready for occupancy.
2	The room is occupied and has been cleaned.
3	The room is vacant but needs cleaning.
4	The room is occupied but requires cleaning.

NOTE: Codes are dialed by attendant after pressing ROOM STATUS button, to result in BUSY LAMP FIELD displays (see 4.06).

OR

Attendant uses GUEST ROOM button and dials room number to obtain a DESTINATION display (see 4.04 and Fig. 4-2). (digits 1-4 are shown with a period if the maid is in the room).

ty showing the room number (303), the message register total (29) and the room status (3 - indicating that the room is vacant but requires cleaning).

- The foregoing facilities, and message registration are displayed when the GUEST ROOM button is pressed and the room number dialed. In brief these are:

  (1) The room number and the "Message Register" status (Fig. 4-2) in the SOURCE display.
  (2) "Room Status" indicated by a digit (followed by "." if the maid is in the room) in the DESTINATION display (Fig. 4-2)
  (3) The "Do Not Disturb" status (indicated by DO NOT DSTB lamp)
  (4) The "Message Waiting" status (indicated by MSGE WAIT lamp)
  (5) The "Controlled Outgoing Restriction" status (indicated by ROOM RESTR lamp)

4.05   CALL BLOCK: Rooms may be restricted from calling other rooms for specific time periods. This restriction is controlled by the attendant. When the console CALL BLOCK button is

pressed, the restriction is set up for calls (usually during the night period), and the associated LED will light. Upon pressing the CALL BLOCK button again, the restriction is lifted and the LED will be extinguished.

NOTE: The button features described in 4.06 and 4.07 are alternative features. The System can be either programmed with a "room status" facility (4.06) or with a "call-restrict" facility (4.07); and the button accordingly annotated either as ROOM STATUS or ROOM RESTR. It should be noted that the "room status" facility may still have the "call-restrict" function available which is controlled automatically by the status.

4.06   ROOM STATUS: The function of this button is to monitor the status of each room. Pressing this button and dialing one of five possible single-digit codes indicates, on the BUSY LAMP FIELD display, which rooms correspond to a particular status condition (by lighting the room lamps on the display) and shows in columns 3 to 5 of the SOURCE display the total number of rooms with the status selected. For example when digit 3 is dialed and held depressed it indicates those

rooms that are vacant but are not available for renting (eg. they may require cleaning). Table 4-1 lists the dial codes (status) and their significance. If the "room status" option is not programmed in the system and it is still required to restrict outgoing calls then the ROOM STATUS button becomes the ROOM RESTR button (see 4.07).

4.07 ROOM RESTR: The ROOM RESTR button is used to prevent unauthorised outgoing calls from guest rooms when they are vacant. This feature is enabled or disabled by the attendant pressing the GUEST ROOM button, dialing the room number and pressing the ROOM RESTR button. The ROOM RESTR lamp is lit when the restriction is active and off when disabled. The ROOM RESTR button may be pushed while conversing with the extension.

4.08 DO NOT DSTB: This feature enables a guest at his request not to receive incoming calls. This is enabled or disabled by the attendant pressing the DO NOT DSTB button while talking to the guest or after pressing the GUEST ROOM key and dialing the room number. When in effect the DO NOT DSTB lamp lights, and the BUSY LAMP FIELD lamps will indicate not only the normal "busy" lines but those rooms with the "Do Not Disturb" facility. On pressing the DO NOT DSTB key all lamps in the busy lamp field with the exception of the "do not disturb" lamps will be extinguished and the SOURCE display changes to show in columns 3 to 5 the total number of rooms with DO NOT DISTURB selected. The attendant may override by pressing the DO NOT DISTURB button.

4.09 MSGE WAIT: This feature is enabled by the attendant calling a room and pressing the MSGE WAIT button. This causes the room telephone to receive a burst of 3 rings every 20 minutes or flash a lamp. Re-operation of the MSGE WAIT button cancels the requirement and the associated lamp is extinguished. This feature can alternatively be arranged to flash a lamp (if installed) in the telephone. In this case the lamp is flashed once per second. A call to the console from a room with Message Waiting applied causes the MSGE WAIT lamp on the console to light. Pressing the MSGE WAIT button causes all lamps in the BUSY LAMP FIELD with the exception of the "Message Waiting" lamps to be extinguished, and the SOURCE display to show in columns 3 to 5 the number of rooms with "messages" waiting.

Standard Key Buttons

4.10 LAMP TEST: This button allows the attendant to test all indicators, lamps and displays on the console. Pressing the key causes all lamps on the console to light and the ringer to sound. If the key is then released and pressed again all the lamps go dark, the ringer stops and all segments of all displays show the figure 8. This operation allows the attendant to verify that a faulty lamp or display exists.

4.11 ALARM RESET: If an alarm condition is detected by the system, the console ALARM lamp flashes (see 4.34) and the tone ringer sounds. Pressing the ALARM RESET button cuts off the tone ringer and causes the error code associated with the alarm condition to be displayed in the SOURCE and DESTINATION displays. The ALARM lamp stays lit until the condition is cleared. The ALARM RESET button when pressed, may also be used to display all busied-out trunks and lines, and all locked-out lines on the BUSY LAMP FIELD.

4.12 BELL OFF: This button, when pressed, disables the console tone ringer and lights the BELL OFF lamp. With the console ringer disabled, incoming calls to the attendant console are indicated by a flashing lamp only and no audible signal is given. If the BELL OFF button is pressed when its associated lamp is lit, the tone ringer will be reactivated and the LED extinguished.

4.13 IDENT: Pressing the IDENT key when the console is idle causes the console to display the firmware generic number and the revision level in the SOURCE display; and the internal firmware code and the console number (0 for Programming/Maintenance; 1 for Attendant Console 1, and 2 for Attendant Console 2) in the DESTINATION display (Fig. 4-3).

If the IDENT key is pressed while the console is connected to either a source or destination party the system will display the equipment number and speech path in use (Fig. 4-4).

4.14 NIGHT 1: This button is used to switch the system into and out of Night Service. When the NIGHT SERVICE key is pressed, the associated lamp lights, and the system switches the selected incoming trunks to the required TAFAS equipment or extension lines.
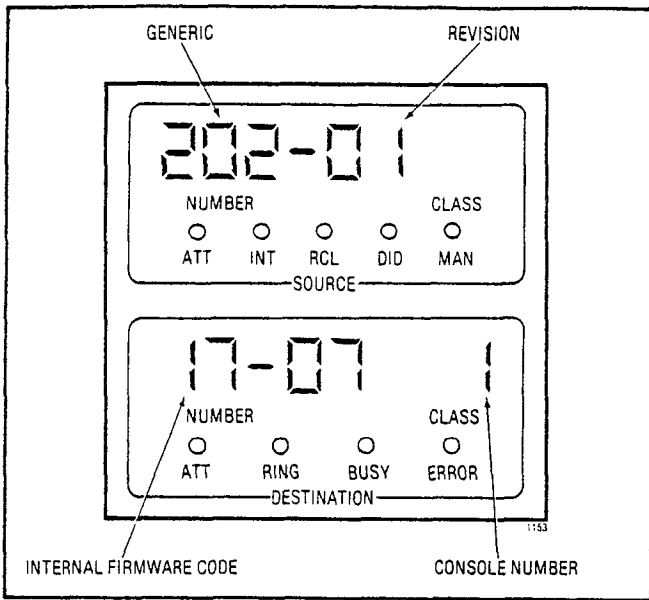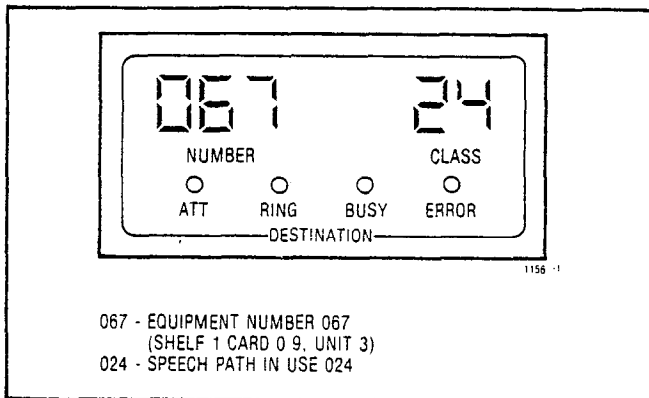
Fig. 4-3 Typical Identification Display

067 - EQUIPMENT NUMBER 067
(SHELF 1 CARD 0 9, UNIT 3)
024 - SPEECH PATH IN USE 024

Fig. 4-4 Typical Display

4.15 CALLBACK: Pressing the CALLBACK button allows the attendant to activate the callback feature on a call originated at the console.

4.16 CANCEL: The CANCEL key allows the attendant to cancel a misdialed call, or a call directed to a busy number.

4.17 HOLD 1, 2, 3: These buttons allows the attendant to hold up to three independant calls at the console. When the attendant presses a HOLD key the active call at the console is held. If the attendant does not retrieve the held call within the hold recall time, the HOLD lamp flashes indicating that the call has been returned to the console.

4.18 FLASH: This button allows the attendant to recall the telephone company operator on an operator-assisted long distance call.

4.19 CONF: The CONF (Conference) button is used to set-up an attendant controlled conference. The attendant dials each conferee in turn, and, after they answer, presses the CONF button to enter them into the conference. The CONF lamp is normally lit when the conference is active. The attendant may be recalled to the conference, by one of the parties in the conference flashing the switchhook. This causes the CONF lamp to flash. The attendant answers by pressing the CONF button which re-connects the attendant to the conference.

4.20 PAGE: Pressing the PAGE key connects the console handset, or headset, directly to the paging equipment allowing the attendant to make all-zone paging announcements. This action overrides any other user.

4.21 OVERRIDE: This button allows the attendant to override a busy number and enter the call.

4.22 REL: The REL (Release) button allows the attendant to release a call from the console. The call may be released in the busy or the ringing state, or after a talking connection has been established.

4.23 RECALL: The RECALL lamp flashes to indicate that a call has not been answered within the time-out period and has been returned to the console. Pressing the RECALL button connects the console to the returned call.

4.24 DIAL 0: When an extension user calls the attendant the DIAL 0 lamp flashes, indicating a dial 0 call. If the DIAL 0 button is pressed the console will be connected to the call.

4.25 LDN 1, 2, 3, 4: These buttons allow the attendant to answer incoming calls to the customer's Listed Directory Numbers. When an outside call is made to the console, the lamp associated with the incoming call flashes, allowing the attendant to answer the call by pressing the associated LDN button and being connected to that trunk.

4.26 SOURCE: This button allows the attendant to hold the destination side of a call, and speak privately to the source party.

4.27 BOTH: The BOTH button allows the attendant to simultaneously speak to both parties of an established call.

4.28 DEST: This button allows the attendant to hold the source side of a call, and speak privately to the destination party.

4.29 ANSWER: The ANSWER button allows the attendant to answer any incoming call to the console. When a call is presented to the console the LED associated with the call type and the ANS LED flash. If the attendant presses the ANSWER button, the LED associated with the first call in the console queue goes on, indicating the call type, and the ANSWER LED lights indicating the attendant is connected to the call. The LEDs associated with the remaining calls in the console queue continue to flash. Incoming calls are queued i.e. when the ANSWER button is pressed by the attendant the calls are answered in the order in which they arrive, irrespective of the call type.

Displays

4.30 The console displays provide the attendant with all relevant information on calls directed to or made by the attendant, and on the status of trunks and extensions. The following descriptions detail the information provided by each display.

4.31 TRUNK GROUP STATUS: The trunk group status display shows the operational status of ten trunk groups. Two lamps are associated with each trunk group. The BUSY lamp, when lit, indicates that all trunks in that trunk group are busy. The ATT lamp is lit to indicate that the attendant has made the trunk group "attendant access only".

4.32 CW: The CW (Call Waiting) display shows the current number of calls in the attendant queue. As the calls are answered or new calls are directed to the console the display is updated to reflect the new status of the queue.

4.33 TIME: The TIME display is a digital clock continuously displaying the time in hours and minutes. A choice of either a 12 or 24 hour clock display may be selected. In the case of a 12 hour clock display an adjacent LED lights to indicate whether the time is AM or PM. The clock is driven by pulses derived from the CPU master clock and thus serves a secondary purpose of indicating that the CPU is operational.

4.34 ALARM: The ALARM display contains the MAJOR, MINOR and CONSOLE alarm lamps. When the system detects an alarm condition the appropriate lamp flashes or lights, and the console ringer sounds. A MAJOR alarm indicates that a malfunction has been detected which affects complete system operation and emergency transfer has taken place. A MINOR alarm is raised when the system detects a fault which degrades system operation, but does not stop call processing. A CONSOLE alarm indicates that the console is defective. Call processing continues.

4.35 BUSY LAMP FIELD: The Busy Lamp display normally shows the busy (lamp lit) or idle (lamp off) state of all trunk or extension numbers. The numbers displayed may be assigned to any extension, tie trunk, or CO trunk. Additionally they can show the "room status" as described in 4.06, 4.08 and 4.09.

4.36 SOURCE: The SOURCE display consists of one digital and five lamp indicators which provide information on all calls directed to the console, and on "status" information required by the attendant for room services. The display shows the following information:

NUMBER - displays the number of the calling extension, or the equipment number of a calling trunk, or the total number of rooms with a selected status

CLASS - this area shows the class-of-service number assigned to the calling extension or trunk or a message register for accounting purposes

ATT - when lit, this lamp indicates that the attendant is connected to the calling party

INT - this lamp lights to indicate that the call is an intercept call

RCL - identifies the call as a recall

DID - identifies the call to the attendant as a Direct Inward Dial call

MAN - identifies the call as a manual line service call

4.37 **DESTINATION:** The DESTINATION display holds one digital and four lamp indicators which provide information on all calls made from the console, or for room status purposes, and is detailed below:

NUMBER - displays the room number or the trunk equipment number dialed by the attendant, or gives the room status of the extension

CLASS - displays the class-of-service number assigned to the called extension or trunk

ATT - when lit this lamp indicates that the attendant is connected to the called party

RING - indicates that the call is in the ringing state

BUSY - indicates that the called party is busy

ERROR - indicates that the number dialed is unassigned

5. GENERIC 204 FEATURES

General

5.01 The following features are provided with Generic 204 in addition to those described in Part 4. Specific details and console operating procedures are given in Section MITL9105/9110-98-105.

Automatic Wake-Up

5.02 An extension user may request an Automatic Wake-Up call to ring the extension at a predetermined time. A Wake-Up call can also be placed from the extension by dialing the Wake-Up code and Wake-Up time. All Wake-Up times may be set, modified or displayed at the console. Automatic Wake-Up will override DO NOT DISTURB. Printed records of all Wake-Up attempts can be obtained.

Console Date Display

5.03 This feature allows the attendant to set and or display the date in place of the time display on the console. This date will appear on all printouts that occur from the system. The date increments automatically at midnight as determined by the digital clock.

Message Register Audit Print

5.04 This feature allows the attendant to obtain a printed copy of the number of local calls made by an extension. The printout will be in the format of, room number, date, time and the number of call units.

Message Waiting Change Print

5.05 This feature gives a printed record of all message waiting activities.

Room Audit

5.06 This feature allows the attendant to request a printed list of all rooms that have made local calls and the call units for each extension. The printout format includes date, time, room numbers and message register value for each room.

Room Status Audit

5.07 This feature allows the attendant to request a printed list of all rooms with their room status codes. Unclean rooms are marked with a *.

System Identifier

5.08 This feature allows the attendant to set, modify or display the system ID. The ID will appear in the source display and in the Traffic Measurement reports.

Attendant Access Codes

5.09 Table 6-1 lists access codes which enables the attendant to perform certain system functions.

TABLE 5-1
ATTENDANT FUNCTION ACCESS CODES

These codes assume the use of * as the Attendant Function code (Feature number 18).
For Attendant Function codes used in Traffic Measurement see Section MITL9105/9110-98-450.

To cancel all call forwarding:

a) Dial * 1, or * 11
b) Dial #
c) Press RELEASE

To access an individual trunk:

a) Dial * 2
b) Dial individual trunk access number (equipment number)
c) Dial *
d) Press RELEASE

To force-release an individual trunk:

a) Dial * 2
b) Dial individual trunk access number (equipment number)
c) Dial # #
d) Press RELEASE

† To make flexible night service assignments:

a) Dial * 3
b) Dial individual trunk access number (equipment number)
c) Press Night 1 or Night 2
d) Dial extension number
e) Press RELEASE

To cancel all system callbacks:

a) Dial * 4
b) Dial #
c) Press RELEASE

To set the clock time:

a) Dial * 5
b) Dial time (hour plus minutes)
c) Dial * for p.m., otherwise a.m.
d) Press RELEASE

To make trunk group dial access:

a) Dial * 6
b) Dial trunk group (1 through 12)
c) Dial #
d) Press RELEASE

To make trunk group attendant access:

a) Dial * 6
b) Dial trunk group (1 through 12)
c) Dial *
d) Press RELEASE

To change the Direct Inward System Access Code:

a) Dial * 7
b) Dial DISA code
c) Press RELEASE

To cancel a minor alarm: (Note 1)

a) Dial * 8
b) Dial #
c) Press RELEASE

† To busy out an individual trunk:

a) Dial * 9
b) Dial individual trunk access number (equipment number)
c) Dial *
d) Press RELEASE

† To de-busy an individual trunk:

a) Dial * 9
b) Dial individual trunk access number (equipment number)
c) Dial #
d) Press RELEASE

To change the status of all occupied clean rooms to occupied and needs cleaning:

a) Dial * 10
b) Dial *
c) Press RELEASE

To change the status of all occupied rooms in the need of cleaning to occupied clean:

a) Dial * 10
b) Dial #
c) Press RELEASE

1503

TABLE 5-1 (CONT'D)
ATTENDANT FUNCTION ACCESS CODES

To set up call forwarding: (Note 2)

  a) Dial * 11nnn, where nnn is the extension number of the forwarding extension
  b) Dial call forwarding code (1-3)
  c) Dial mmm, where mmm is the number to which the calls are to be forwarded
  d) Press RELEASE

To cancel call forwarding for an extension: (Note 2)

  a) Dial * 11nnn, where nnn is the extension number of the forwarding extension
  b) Dial #
  c) Press RELEASE

To display call forwarding set for an extension

  a) Dial * 11nnn, where nnn is the extension number of the forwarding extension
  b) Press RELEASE

† To busy out an extension: (Note 2)

  a) Dial * 12nnn, where nnn is the number of the extension to be busied out
  b) Dial *
  c) Press RELEASE

† To de-busy an extension: (Note 2)

  a) Dial * 12nnn, where nnn is the number of the extension to be de-busied
  b) Dial #
  c) Press RELEASE

† To suspend the printer: (Note 3)

  a) Dial 14 *
  b) Press RELEASE

† To purge and ignore the printer: (Note 3)

  a) Dial * 14 00
  b) Press RELEASE

† To enable the printer: (Note 3)

  a) Dial * 14 #
  b) Press RELEASE

To change the date: (Note 3)

  a) Dial * 15 and 3 or 4 digit date (one or two digit month, two digit day)
  b) Press RELEASE

† To print the room register audit: (Notes 3 and 4)

  a) Dial * 16
  b) Press RELEASE

† To change the system identity: (Note 3)

  a) Dial * 17 nnn   (1 to 3 digit ID, 0-999)
  b) Press RELEASE

To display current system identity: (Note 3)
  a) Dial * 17
  b) Press RELEASE

To print the "room status" audit: (Notes 3 and 4)

  a) Dial * 18
  b) Press RELEASE

1504

Note 1   The errors will be sequentially stacked in the memory and may be recalled sequentially (most recent first) by repeating the above procedure.
Note 2   Applies to Generic 203/up
Note 3   Applies to Generic 204
Note 4   Printer starts after RELEASE key is pressed.

   † Requires system option programming

SX-100* AND SX-200*
SUPERSWITCH*
ELECTRONIC PRIVATE AUTOMATIC BRANCH EXCHANGE
PROGRAMMING AND MAINTENANCE CONSOLE DESCRIPTION

CONTENTS

1. General

1.01 This Section describes the SX-100/SX-200 Console when used as a programming and maintenance console. The console is normally used as an attendant console, and is described in Section MITL9105/9110-98-300. Section MITL9105/9110-98-210 should be consulted for complete programming instructions and MITL9105/9110-98-500 for general maintenance information.

Reason for Reissue

1.02 This section has been reissued to include Generic 205 information.

2. BRIEF DESCRIPTION

2.01 The SX-100/SX-200 console (Fig. 2-1) may be used as a programming and maintenance console by servicing personnel or by the attendant. Where a separate dedicated console is not used, the attendant's console may be employed. The main items used in its construction are as follows:

- Ivory Base, Black Faceplate
- 12 Button Dial Pad
- 30 Operating Keys and LED's
- 10 Trunk Group Busy Indicators
- 3 Alarm Lamps
- 2-8 Character Alpha-Numeric Displays
- Busy Lamp Field
- Digital Clock
- Digital Date
- Call Waiting Display

3. PHYSICAL DESCRIPTION

General

3.01 The major components of the programming and maintenance console are intercon-

A   Alarm Indicators
B   Call Waiting Indicator
C   Digital Clock
D   Trunk Group Busy Indicators
E   Busy Lamp Field
F   Calling Number Display
G   Called Number Display
H   Dial Pad
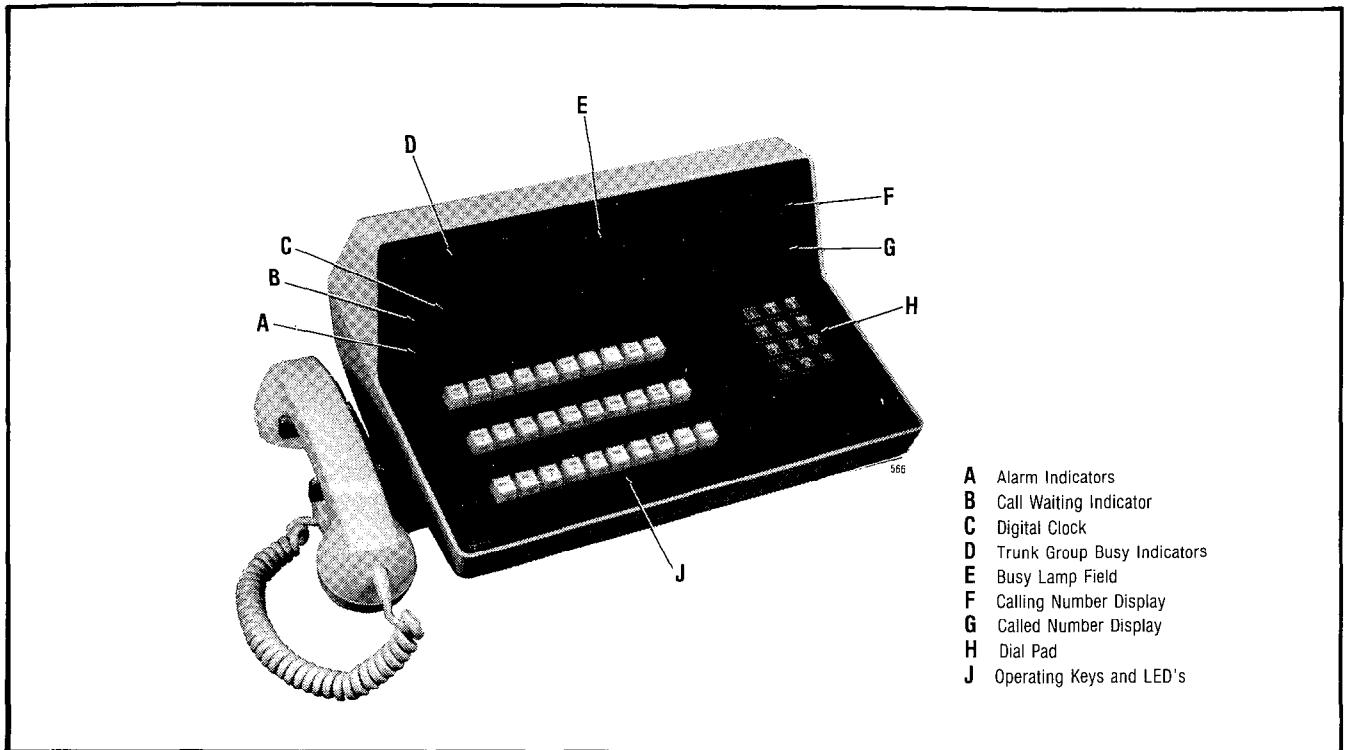J   Operating Keys and LED's

Fig. 2-1   Programming and Maintenance Console

nected by a connectorized cable harness to allow easy replacement of a defective item. The following paragraphs describe each of the major components as shown in Fig. 3-1.

Housing

3.02   The console housing consists of a formed aluminum base holding the cable harness, Power Fail Transfer (PFT) switch, console connector, and handset/headset jacks. The PFT switch and the console connector are located on the base of the console. Located at each end of the console housing is a handset/headset jack. These jacks allow the use of a standard G-3 type handset or a lightweight type headset. The overall dimensions of the console housing are 13.75in. (349mm) wide, 9.25in. (234mm) deep, and 6.8in. (172mm) high.

Dial Pad

3.03   The console dial is a conventional 12 button key pad minus the tone generators. The pad is connected to the console key assembly mother board by a connector-ended cable.

Key Assembly

3.04   The key assembly consists of the console mother board, three key strips and three LED strips. Each key strip holds ten non locking keys and plugs into the mother board, the strip being secured to the mother board by four screws. The ten LED's associated with each key strip are mounted on a single printed circuit board, which plugs into the key strip to form a single assembly. The complete key assembly is attached to the console by the cable harness.

Display Assembly

3.05   The display assembly is made up of two boards, the main display board and the display backplane. The display backplane holds the display control circuits and plugs into the main display board. This display board holds the LED's for the TRUNK GROUP STATUS, CW (Call Waiting), ALARM and BUSY LAMP FIELD and also the SOURCE, DESTINATION, and CLOCK displays. The complete assembly is mounted at the top of the console housing and connected to the other assemblies through the main cable harness.
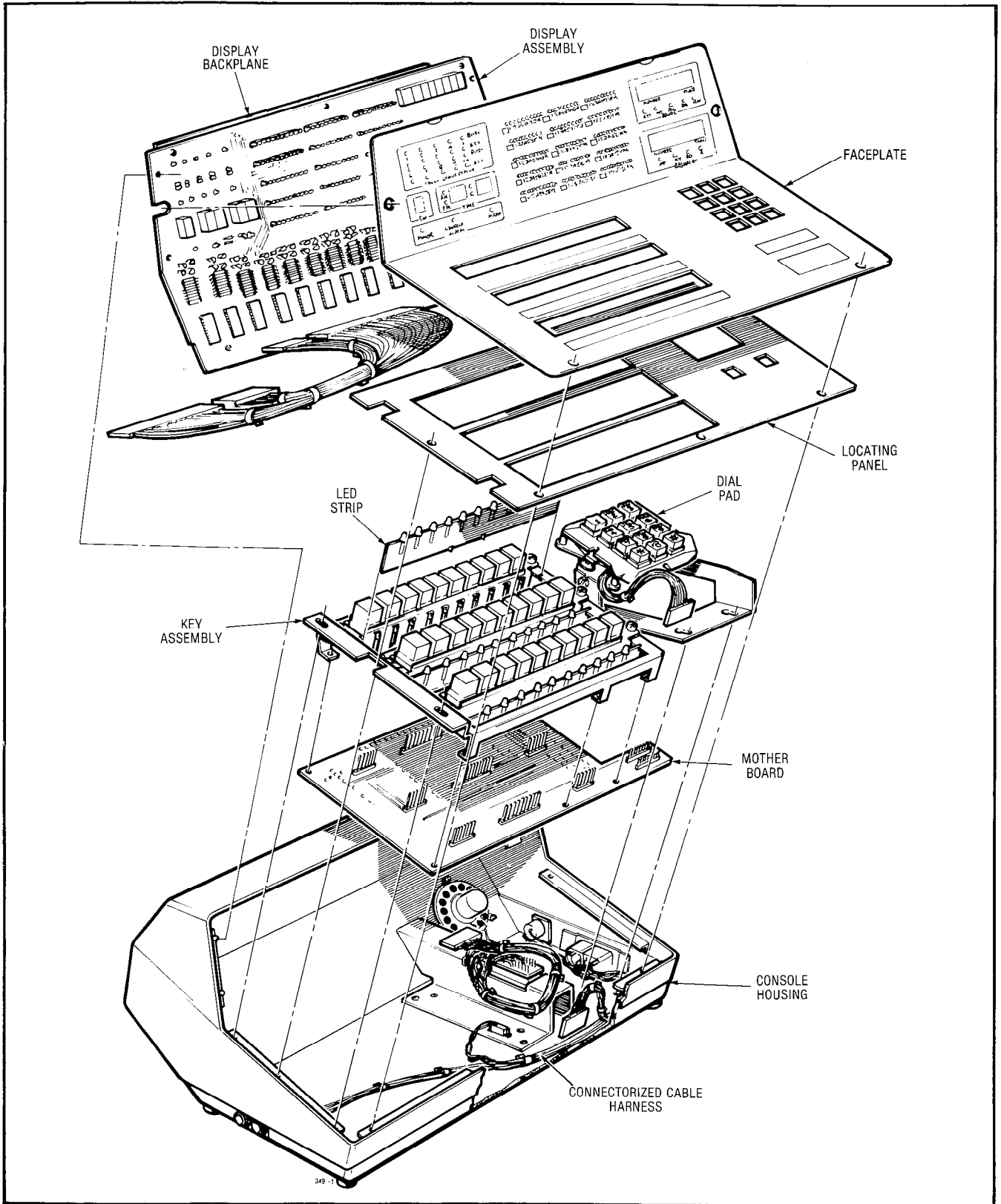
Fig. 3-1   Console Major Components

Locating Panel

3.06 This panel ensures that the key strips and the dial pad are located correctly within the console housing. It also provides a firm base for the console faceplate.

Faceplate

3.07 The faceplate completes the console housing and provides all required lamp and display designators.

4. FUNCTIONAL DESCRIPTION GENERIC 202

General

4.01 The Programming and Maintenance Console has its 30-button key assembly differently identified from that of the normal Attendant Console Key assembly. This is illustrated in Fig. 4-1.

4.02 The programming functions may be simulated by placing a Console Programming Overlay over the key assembly of a normal Attendant Console, when it is desired to use this console for programming or maintenance functions. On one side of the overlay are the button designations for use during basic programming and on the reverse, the designations for extended programming. Fig. 4-2 illustrates the different button designations.

4.03 The following descriptions detail the functions performed by Generic 202 equipment. For additional functions and descriptions which have been embodied in Generic 203/204/205, see Parts 5, 6 and 7 of this Section.
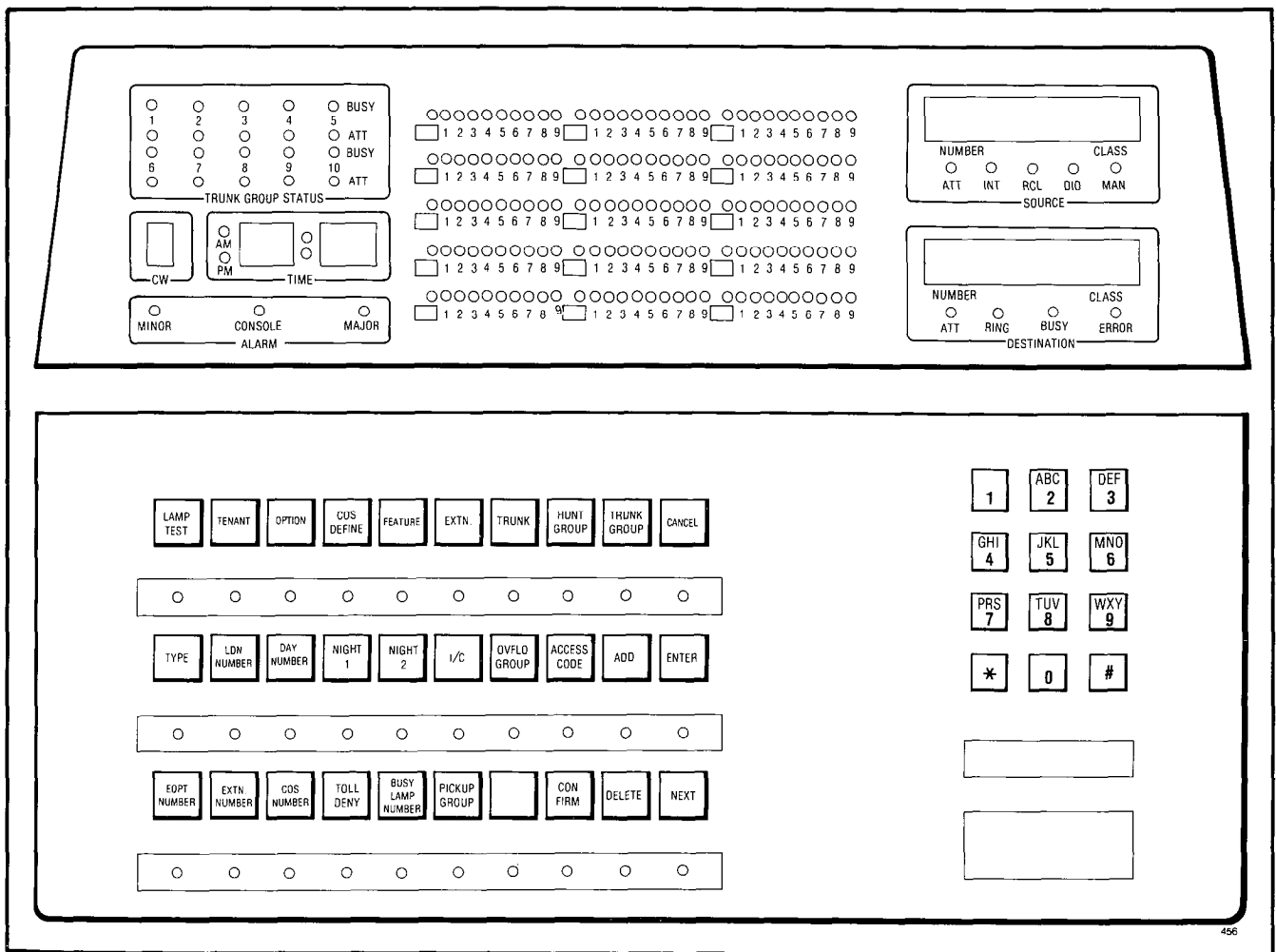

Fig. 4-1   Programming and Maintenance Console Faceplate Layout

Introduction

4.04 Each button on the console faceplate (Fig. 4-1) has associated with it an LED. When a program is selected, the LED associated with the program lights, and remains lit for as long as the program remains selected. During programming, the LED indicating the parameter to be entered lights, and remains lit until all data associated with that parameter is entered. This does not apply to extended programming (see 6.02).

Buttons—Programming Mode

4.05 The following paragraphs describe the function of each button and the type of data that must be entered.

LAMP TEST
The LED associated with the LAMP TEST key is lit when the console is in the programming mode. Pressing the LAMP TEST key, while the switches on the tone control are set for programming, (or
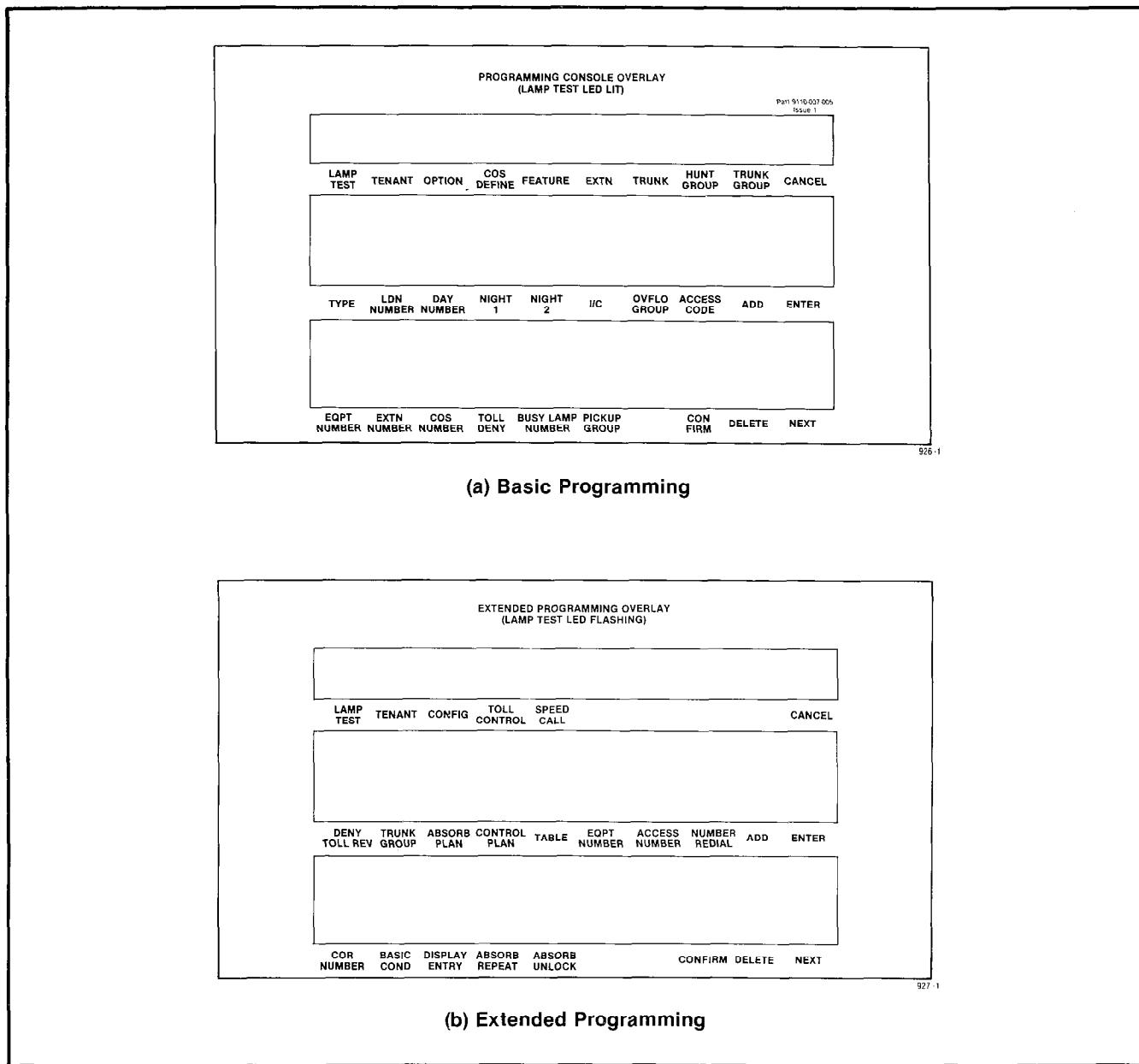

PROGRAMMING CONSOLE OVERLAY
(LAMP TEST LED LIT)

Part 9110-037-005
Issue 1

| LAMP TEST | TENANT | OPTION | COS DEFINE | FEATURE | EXTN | TRUNK | HUNT GROUP | TRUNK GROUP | CANCEL |

| TYPE | LDN NUMBER | DAY NUMBER | NIGHT 1 | NIGHT 2 | I/C | OVFLO GROUP | ACCESS CODE | ADD | ENTER |

| EQPT NUMBER | EXTN NUMBER | COS NUMBER | TOLL DENY | BUSY LAMP NUMBER | PICKUP GROUP | | CON FIRM | DELETE | NEXT |

926-1

(a) Basic Programming

EXTENDED PROGRAMMING OVERLAY
(LAMP TEST LED FLASHING)

| LAMP TEST | TENANT | CONFIG | TOLL CONTROL | SPEED CALL | | | | | CANCEL |

| DENY TOLL REV | TRUNK GROUP | ABSORB PLAN | CONTROL PLAN | TABLE | EQPT NUMBER | ACCESS NUMBER | NUMBER REDIAL | ADD | ENTER |

| COR NUMBER | BASIC COND | DISPLAY ENTRY | ABSORB REPEAT | ABSORB UNLOCK | | | CONFIRM | DELETE | NEXT |

927-1

(b) Extended Programming

Fig. 4-2 Console Overlay Designations

dialing the maintenance security code Generic 204 or 205 only), changes the operational mode of the console; if the console is in the call processing mode it enters the programming mode.

OPTION

Pressing the OPTION key allows entries and changes to be made to the list of active system options. The LED associated with the button remains lit for as long as the OPTION program is selected. It is also used to define the active COS options of a specific COS, if the COS DEFINE program is selected.

COS DEFINE

Pressing this key selects the COS program and allows new entries to be made or existing entries changed in any of the sixteen available COS. The LED associated with this button remains lit for as long as the COS program is selected.

ACCESS CODE

The data entered after pressing this key is dependant on the program selected. If the Feature program is selected, the code entered will be assigned as a feature access code. If the active program is the Trunk or Hunt Group program, the access code will be assigned to the trunk or hunt group being programmed.

ADD

In the Option or COS define program pressing the ADD key adds the option code entered to the active list of options. If an extension or trunk is to be denied toll access, pressing the ADD key after the TOLL DENY key adds the extension or trunk to the list of "toll-denied" equipment.

ENTER

Pressing this button transfers the entered data from the system temporary storage to permanent memory.

EQPT NUMBER

The number entered after pressing this button defines the unit at that address as a line or trunk unit. If the EQPT NUMBER button is pressed and the address of an extension or trunk unit is entered while the Hunt or Trunk Group program is active, the equipment number entered is assigned to the hunt or trunk group being defined.

EXTN NUMBER

The 1, 2, 3 or 4 digit number entered after pressing

the EXTN NUMBER key assigns the extension number to the equipment being programmed.

FEATURE

Pressing this key selects the Feature program and allows access codes to be assigned, changed, or removed for any feature. The FEATURE LED remains lit for as long as the program is selected.

EXTN

Pressing this key selects the Extension program and allows the data defining an extension to be made or changed. The EXTN LED remains lit while the Extension program is active.

TRUNK

Pressing the TRUNK key selects the trunk program and allows the data describing each trunk to be entered or changed. The TRUNK LED remains lit while the Trunk program is active.

HUNT GROUP

Pressing this key allows equipment numbers forming a hunt group to be entered or removed from the system. The HUNT GROUP LED remains lit for as long as the Hunt Group program is active.

TRUNK GROUP

Pressing this key selects the Trunk Group program and allows new data describing each trunk group to be entered or existing data to be changed. The TRUNK GROUP LED remains lit for as long as the Trunk Group program is active.

CANCEL

Pressing the CANCEL button after making a data entry, will remove all new data from temporary storage, and allows the correct information to be entered.

TYPE

Pressing the TYPE key allows the single digit code identifying the type of trunk being programmed to be entered, or the 4 digit trunk group code to be entered when programming a trunk group.

LDN NUMBER

The single digit entry made, pressing the LDN NUMBER button, while programming a trunk specifies the LDN appearance on the attendant console at the trunk. If the trunk is not to appear on the attendant console, no entry is required.

DAY NUMBER
Pressing this key allows the day assignment of a trunk to be entered. The trunk may be assigned to TAFAS equipment, individual extensions or the attendant or hunt group.

NIGHT 1 AND 2
These keys allow the night assignment of incoming trunks to be made. The trunks may be assigned to TAFAS equipment, individual extensions or the attendant or hunt group.

OVFLO GROUP
Pressing the OVFLO GROUP button allows the number of the overflow trunk group to be entered. If all trunks within the trunk group being defined are busy, additional calls to the trunk group are routed to the overflow trunk group.

COS NUMBER
Pressing this key and dialing the required COS number allows the extension or trunk access to the features and services associated with the COS number entered.

TOLL DENY
The toll access of individual extensions and trunks may be specified by pressing the TOLL DENY then pressing the ADD key (add this trunk or extension to the list of Toll Denied equipment) or the DELETE key (remove this extension or trunk from the list of Toll Denied equipment).

BUSY LAMP NUMBER
Pressing this key while programming an extension or trunk allows the busy lamp number associated with the equipment to be specified.

PICK-UP GROUP
The entry made after pressing this key specifies the number of the pick-up group of which the extension is to be a member.

CONFIRM
During assignment of Busy Lamp positions the CONFIRM LED may flash. This indicates that the Busy Lamp position entered is already assigned to some other equipment number. If the entry is correct pressing the CONFIRM button will remove the existing data from that assignment and enter the new data into the system memory. If the data entered was not correct, the entry may be changed by pressing the button associated with the lit LED and keying the required information.

DELETE
If an extension or trunk is to have toll access, pressing the DELETE key after the TOLL DENY key removes the extension or trunk from the "toll-denied" list, allowing the equipment to have toll access. This key is also used to delete system options, COS option features, extensions, hunt groups, trunks and trunk groups from the data base.

NEXT
Entries in a program may be reviewed by selecting the desired program and pressing the NEXT button. Each time the NEXT button is pressed, the next entry in the program selected is displayed.

Displays - Programming Mode

4.06 The following paragraphs describe the function of the SOURCE and DESTINATION displays.

SOURCE
In the programming mode the SOURCE display shows the existing entry in the program selected.

DESTINATION
This display area shows the entry made and any error codes associated with the entry.

5. FUNCTIONAL DESCRIPTION GENERIC 203

General

5.01 Generic 203 includes additional functions to those described for Generic 202. Part 4 of this Section describes the button functions associated with Generic 202; and should be referred to in conjunction with the additional button functions described below.

Buttons - Programming Mode

5.02 The following paragraphs describe the function of the additional (Generic 203) buttons and the type of data that must be entered.

TENANT
This button is used when multi-tenant service is required. The TENANT key is used to program required facilities for a particular tenant; by pressing the key and dialing the single-digit tenant number prior to entering the required program.

I/C

The I/C (INCOMING) key is used when programming DID or CCSA trunks. It is used in conjunction with the TRUNK key; and when pressed it allows appropriate data to be entered to determine incoming dialed digit absorption and the addition of digits as required.

6. FUNCTIONAL DESCRIPTION GENERIC 204

General

6.01 Generic 204 includes additional functions to those described for Generics 202/203. Parts 4 and 5 of this Section describe the button functions associated with Generics 202/203, and should be referred to for some button functions used in Generic 204. Generic 204 may also utilize the Extended Programming Console Overlay (Fig. 4-2) with the additional button functions as described below.

Extended Programming

6.02 Extended programming is used to program the non volatile RAM on the PROM/RAM Expander Card. When the system is in Standard Programming mode the Extended Programming mode may be entered as under:

- If the top three thumbwheel switches are set to 777X on the Tone Control card, press the console LAMP TEST key, then the NEXT key.

- If the Tone Control card switches are not set to 777X, dial the programming security code (the LAMP TEST LED should turn on), then press the NEXT key. The LAMP TEST LED now flashes.

The system is now in Extended Programming mode. Extended Programming may be exited by depressing the LAMP TEST key followed by the NEXT key, which will put the system into Standard Programming mode.

Buttons - Extended Programming Mode

6.03 The following paragraphs describe the function of the additional (Generic 204) buttons and the types of data that must be entered. For full details refer to MITL9105/9110-98-212.

TRUNK GROUP

Pressing this key allows the selection of a specific Trunk Group for programming of specific Toll Control parameters.

CONFIG

Pressing this key allows the extended non volatile RAM to be initialized.

TOLL CONTROL

Pressing this key initiates the selection of different programming modes of Multi-Digit Toll Control.

DENY TOLL REV

Pressing this key will enable the addition or deletion of Toll Reversal within a Control Plan.

ABSORB PLAN

Pressing this key allows the definition or display of an absorb plan. If the system is in Toll Control Trunk Group Programming this key may define an Absorb Plan to be used for the selected trunk group.

CONTROL PLAN

If this key is pressed any one of the 15 Control Plans in the Toll Control may be examined or defined. If the system is in Toll Control Trunk Group Programming the Control Plan may be used to assign a Control Plan to each COR of the selected trunk group.

TABLE

This key may be used to examine or modify a restriction table. The Table key may also be used to define exceptions or additions to Basic Conditions or Table entrys of a Control Plan in Table entries.

COR NUMBER

This key when pressed allows the selection of a Class of Restriction within Toll Control Trunk Group Programming for a specific trunk group.

BASIC CONDITION

This key when pressed allows the selection of a Basic Condition number within Toll Control Trunk Group Programming.

DISPLAY ENTRY

This key allows the last entry by the programmer to be displayed.

ABSORB REPEAT
This key allows the Absorb Repeat digits of an Absorb Plan to be defined.

ABSORB UNLOCK
This key allows the Absorb Unlock digits of an Absorb Plan to be defined.

7. FUNCTIONAL DESCRIPTION GENERIC 205

General

7.01 Generic 205 includes additional functions to those described in Generics 202 to 204 in the preceding paragraphs. Generic 205 provides two main features which are Station Message Detail Recording (see Section MITL9105/9110-98-451) and Speed Call (see Section MITL9105/9110-98-220). The latter feature uses extended programming, and additional button functions are used in the Extended Programming Mode to implement the feature as described in the following paragraphs.

Buttons - Extended Programming Mode

7.02 The following paragraphs describe the functions of the buttons which are used in the Extended Programming Mode. The additional button designations are shown on the Extended Programming Overlay (Fig. 4-2) and are described below.

SPEED CALL
Pressing this key allows the selection of the Speed Call program so that subsequent entries (below) are effective in programming the feature.

TABLE
After pressing this key, a Speed Call table number is dialed, to select a table which may then be associated with an equipment number, an access number and a number redial facility, as described below.

EQPT NUMBER
Pressing this key and dialing an equipment number associates the equipment with the selected Speed Call table.

ACCESS NUMBER
After a table has been selected, an entry access number may be assigned to it, by pressing the Access Number key and dialing a 2-digit number.

NUMBER REDIAL
Pressing this key after a table has been selected, enables a saved number redial facility to be associated with the table. This allows the station subsequently to store a Speed Call number which may be redialed when required.

8. MAINTENANCE FUNCTION ACCESS CODES

8.01 Table 8-1 lists the access codes required to perform maintenance functions. A full description of their use is contained in Section MITL9105/9110-98-500.

TABLE 8-1
MAINTENANCE FUNCTION ACCESS CODES

To select any of the functions the access code assigned for the maintenance function must be dialed (Feature Number 19). The code 555 is used in the following part for the maintenance code this may be dialed from the test line or console in Generic 203/up.

Clear all errors:

a) Dial 555 + 1

Direct trunk or station access:

a) Dial 555 + 2
b) Dial individual equipment number (3 digit equipment number for trunk or station)

Busy out of a receiver:

a) Dial 555 + 3
b) Dial equipment number of receiver

Busy out of a speech path:

a) Dial 555 + 33
b) Dial speech path number (01-31)

De-busy a receiver:

a) Dial 555 + 4
b) Dial equipment number of receiver

De-busy a speech path:

a) Dial 555 + 43
b) Dial speech path number (01-31)

Initialize card slot:

a) Dial 555 + 5
b) Dial card slot number (01-17, 31-42)

†**System reset: (Note 2)

a) Dial 555 + 6

**To initiate system dump (from test line):

a) Dial 555 + 7 and hang up
b) Go off hook
c) Dial 555 + 8 + # (or 2)

**To initiate system dump (from console)

a) Dial 555 + 7
b) Dial *14#

†**To suspend printer:

a) Dial 555 + 8 + * (or 1), or
b) Dial * 14 * (console only)

†**To enable printer:

a) Dial 555 + 8 + # (or 2), or
b) Dial * 14 # (console only)

†**To purge and ignore printer:

a) Dial 555 + 8 + 00, or
b) Dial * 1400 (console only)

† Requires System Option Programming
 * Generic 203/Up
** Generic 204/Up

Notes
1. For Traffic Measurement Access Codes see MITL9105/9110-98-450.
2. System Reset requires thumbwheel switches be set to 777n (n = 0 to 9) on Tone Control card for Generic 203/up.

SX-100* AND SX-200*

SUPERSWITCH*

ELECTRONIC PRIVATE AUTOMATIC BRANCH EXCHANGE

TRAFFIC MEASUREMENT

1. GENERAL

Introduction

1.01 This section describes the principles of obtaining telephone traffic measurement data, the various modes that can be employed to output this data and a description of the programming and operating procedures to obtain Traffic Measurement data for the SX-100 and SX-200 PABX's. Traffic measurement is applicable only to Generic 204.

Reason for Reissue

1.02 This section has been reissued to update the Generic 204 information.

1.03 The traffic measurement results may be examined to determine not only the adequacy of equipment provisioning, but the effectiveness of programmed options and features. The results may thus be used to determine and implement changes to the system by reprogramming and/or reprovisioning action to improve performance.

1.04 Traffic measurement accumulates data in the form of peg counts and usage data. Over a specified period of time a peg count is the total number of times a device, service or feature is employed irrespective of its time duration. Usage usually implies the length of time or duration for which such a facility is used, but in certain applications it may only be required to know the peak value of the facility during the period (see 2.06).

1.05 The values are accumulated and stored in individual active registers; and the totals transferred to storage registers at the end of each hour, where they may be accessed from an RS232 port at any time during the next hourly period.

1.06 The active registers are zeroed after transferring their contents to the storage registers; and the foregoing action is repeated for the period of the traffic measurement run, which has been set from the console.

2. DATA ACCUMULATION METHODS

General

2.01 As outlined in 1.04 the total values of each device feature or service in the active registers are transferred to storage registers. These registers may be printed or written to magnetic tape as desired.

Register Storage Methods

2.02 170 traffic measurement registers are provided. Each register, whether usage or peg count, takes 2 bytes of memory and is output as 5 ASCII digits. The type of data accumulated and its register number is contained in Table 2-1. This data appears under four major headings as follows:

- System Services Data indicating the extent of the activity of the basic system services including console traffic activity

- Features Data indicating the activity of those features which have been programmed for the installation

- Outgoing Trunk Group Peg Count and Usage Data

- Incoming Trunk Peg Count and Usage Data

2.03 Traffic measurement data is accumulated in one hour blocks. The start time and the run time is entered from the console. The start time may be specified to the nearest minute, and the run time is entered as the number of required hours. The basic one hour block time is invariable. Once set, and until changed, the traffic measurement run will occur at the same time each day. If the run is set for 24 hours it will run continuously.

2.04 Referring to Fig. 2-1 and considering Active Register 001, data is accumulated during the first hour (Block 1), and at the end of that block transferred to Storage Register 001 with the Active Register count reverting to zero. The data is held for 1 hour, during which time it may be accessed and is then replaced by the data count accumulated during Block 2 time. If the run time is less than 24 hours the last block transferred will remain in the storage register up to one hour after the run commences the following day.
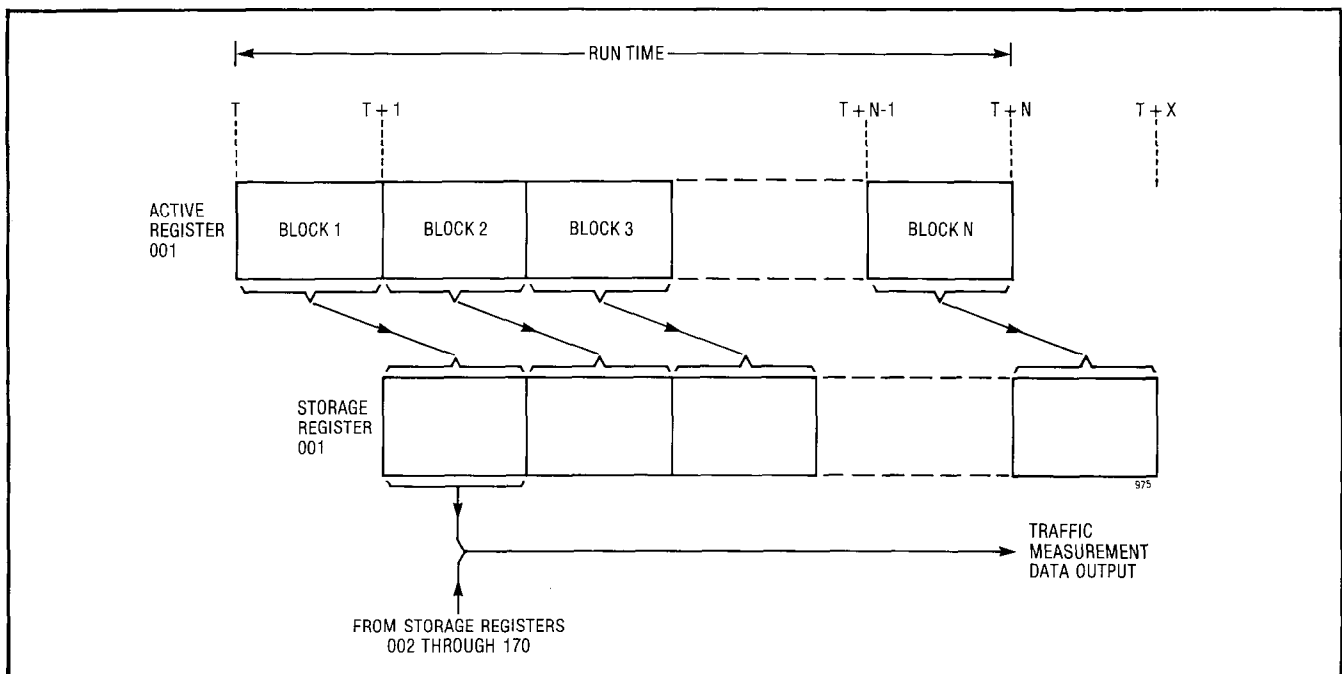

Fig. 2-1   Traffic Measurement Collection and Output Diagram

2.05 The foregoing method of transferring data values from the Active to the Storage Registers is used in the Standard Mode method of operation. An exception to this data transfer method occurs under Extreme Value Mode opera- tion. When this latter mode is used the Active Register data value is only transferred if it exceeds the value held in the Storage Register (see 3.03) at the end of the hourly period.

TABLE 2-1

TRAFFIC REGISTER LISTING AND DESCRIPTION

REG. NO.	DESCRIPTION
	A - SYSTEM SERVICES AND CONSOLE ACTIVITY
001	**3 Second Dial Tone Delay Peg Count.** This register is incremented every time that an extension or dial-in trunk has to wait 3 or more seconds for dial tone. It does not include the Test Line.
002	**Extension Originations Peg Count.** Each time an idle extension goes off-hook it causes this register to increment by one count. It does not increment when a ringing extension goes off-hook.
003	**Receiver Peg Count.** This register is incremented every time an extension or trunk is given a receiver.
004	**2 Second Dial Tone Delay Peg Count.** This register is incremented every time that an extension or dial-in trunk has to wait 2 or more seconds for dial tone. It does not include the Test Line.
005	**Maximum Junctors.** At each scanning interval the number of junctors in use are determined and compared to the number held by the active register. If the number is greater than that held by the register it replaces the held number. The register will thus reflect the maximum of junctors which were used at any one time during the traffic hour. The value will include the two junctors used by the diagnostics. Even if the system handled no calls the register will contain a "2" (unless the system was in the programming mode)
006	**Junctor Usage.** At each scanning interval the number of junctors in use are added to the value contained in the register. At the end of the traffic hour the register will thus reflect the total usage of the junctors during the period. It includes the use of junctors by the diagnostic and thus will not be zero even if the system handled no calls during the period.
007	**1 Second Dial Tone Delay Peg Count.** This register is incremented every time an extension or dial-in trunk has to wait 1 or more seconds for dial tone. It does not include the Test Line.
008	**Vacant/Illegal Calls Peg Count.** This register increments whenever an extension, the attendant or a dial-in trunk dials a vacant or illegal number. It increments regardless of whether intercept to attendant or Reorder Tone occurs.

TABLE 2-1 (CONT'D)

TRAFFIC REGISTER LISTING AND DESCRIPTION

REG. NO.	DESCRIPTION
009	**System Activity Peg Count.** Each time a line or trunk card interrupt is processed, or a timer expires this register increments. It thus provides a relative measure of system activity to determine the busiest hour during a Traffic Measurement run.
010	**Calls Waiting Usage.** At each scan the number of calls waiting in the attendant queue is added to the register. The hourly accumulation represents the occupancy of calls waiting (in ccs)
011	**Calls to Attendant Peg Count.** This register contains a count of all calls directed to the attendant. It includes calls that hang up before they are answered. The register total will not be the sum of the following register totals because abandoned calls are not included.
012	**LDN 1 Peg Count.** This register is incremented for each LDN 1 call answered by the attendant.
013	**Console 1 Busy Usage.** This register records the length of time during the hour for which the console was in use. "In use" means the attendant was dialing or had a Source or Destination or both. It does not include any time for which the attendant had a call on hold.
014	**Dial 0 Peg Count.** This register increments every time the attendant answers a 'Dial 0' call. It includes Intercepts, for which a separate count is maintained. It also includes Manual Lines and Contact Monitors.
015	**LDN 2 Peg Count.** This register is incremented for each LDN 2 call answered by the attendant.
016	**Console 2 Busy Usage.** This register records the length of time during the hour for which the console was in use. "In use" means the attendant was dialing or had a Source or Destination or both. It does not inlude any time for which the attendant had a call on hold.
017	**Recall Peg Count.** This register is incremented for each Recall answered by the attendant. This includes Serial and Callback Recalls.
018	**LDN 3 Peg Count.** This register is incremented for each LDN 3 call answered by the attendant.
019	**Attendant Originated Calls Peg Count.** This register is incremented each time the attendant makes a call and whether the attendant has a Source or not. It is incremented even if the attendant receives Busy or Reorder Tone.

TABLE 2-1 (CONT'D)

TRAFFIC REGISTER LISTING AND DESCRIPTION

REG. NO.	DESCRIPTION
020	**Intercept Peg Count.** This count is incremented for each Intercept answered by the attendant.
021	**LDN 4 Peg Count.** This register is incremented for each LDN 4 call answered by the attendant.
	B · FEATURES
022	Spare Register
023	Spare Register
024	Spare Register
025	**TAFAS Peg Count.** This register is incremented when a TAFAS code is dialed, even when busy tone is received.
026	**Override Peg Count.** This register is incremented whenever an extension dials the Executive Busy Override code or the attendant presses the OVERRIDE button. It only increments when the override is completed.
027	**Call Pickup Peg Count.** This register is incremented whenever one of the Dial or Directed Call Pickup codes is legally dialed.
028	**Maid in Room Peg Count.** This register is incremented whenever an extension dials the Maid in Room access code. It increments both on entering and leaving the room.
029	**Paging Peg Count.** This register is incremented when an extension, dial-in trunk or the attendant dials one of the three Paging codes and when the attendant presses the PAGE button. Illegal accesses are excluded.
030	**Attendant Conference Peg Count.** This register is incremented whenever the attendant presses the CONF button to set up a new conference.
031	**Hold Pickup Peg Count.** This register is incremented when the Hold Pickup code is legally dialed.
032	**Call Forward Peg Count.** This register is incremented whenever an extension dials one of the three Call Forward codes to set up forwarding. It is also incremented when the attendant sets up forwarding on behalf of an extension.

TABLE 2-1 (CONT'D)

TRAFFIC REGISTER LISTING AND DESCRIPTION

REG. NO.	DESCRIPTION
033	**Wakeup Peg Count.** This register is incremented whenever the attendant sets up wakeup for a room. It is also incremented when a room dials the Alarm Call access code to set up or change a wakeup, but is not incremented when a room dials "9999" to cancel a wakeup.
034	**Attendant Hold Peg Count.** This register is incremented whenever the attendant puts a party on Hold.
035	**Station Controlled Conference Peg Count.** This register is incremented whenever an extension flashes to add someone to a conversation that already has two other parties.
036	**Do Not Disturb Peg Count.** This register is incremented when the attendant sets up Do Not Disturb for a room. It is also incremented if the room dials the Room Do Not Disturb Setup code.
037	**Camp-On Peg Count.** This register is incremented whenever an extension or trunk is camped on another extension or a trunk group.
038	**Call Hold Peg Count.** This register is incremented whenever an extension dials the Call Hold code.
039	**Meet-Me Conference Peg Count.** This register is incremented when an extension or dial-in trunk dials the Meet-Me Conference code.
040	**GUEST ROOM/SERIAL CALL Peg Count.** This register is incremented whenever the attendant uses the GUEST ROOM/SERIAL CALL button. If GUEST ROOM is pressed while in "room mode", it also increments.
041	**Callback Peg Count.** This register is incremented whenever an extension successfully dials the Callback-Busy or Callback-Don't Answer code or the Attendant presses the CALLBACK button.
042	**Call Park Peg Count.** This register is incremented when the Call Park code is dialed.
043	**Flash and Hold Peg Count.** This register is incremented whenever an extension flashes and puts another party on Hold.
044	**Message Waiting Peg Count.** This register is incremented whenever the attendant sets up Message Waiting for a room.

TABLE 2-1 (CONT'D)

TRAFFIC REGISTER LISTING AND DESCRIPTION

REG. NO.	DESCRIPTION
045 through 56	**C - OUTGOING TRUNK GROUPS** *CAUTION* *Since the system only records traffic data for 40 trunks, the Trunk Group Usage may be incomplete if the system has more than 40 trunks.* **Trunk Group Peg Count.** This register is incremented every time someone dials the group's access code, even if the caller receives busy tone. It also increments when a busy overflow occurs from another group into this one. It does not increment if the access is illegal or if the group is 'attendant access only' and the caller is not the attendant. Each of the 12 trunk groups is respectively allotted to the 12 registers 045 through 056.
057 through 068	**Trunk Group Usage.** If any trunk in the group is found to be in use outgoing when it is scanned, this register is incremented. The hourly total thus reflects the duration of usage. Each of the 12 trunk groups is respectively allotted to the 12 registers 057 through 068.
069 through 080	**Trunk Group Busy/Overflow Peg Count.** This register is incremented every time someone dials the access code and all trunks in the group are busy. Each of the 12 trunk groups is respectively allotted to the 12 registers 069 through 080.
081 through 090	**Trunk Group Attendant Busy-Out Usage.** If the trunk group has been made 'attendant access only' when it is scanned, this register is incremented. The hourly total thus reflects the duration of usage. Each of the first 10 trunk groups is respectively allotted to the 10 registers 081 through 090.
091 through 130	**D - INCOMING TRUNKS** TRUNK DATA (Note: Traffic data is accumulated for a maximum of 40 trunks. The system assigns the first 40 equipment numbers programmed as trunks at the beginning of each hour.) **Trunk Incoming Peg Count.** This register is incremented each time a trunk is seized incoming. Each of the 40 trunks is respectively allotted to the 40 registers 091 through 130.
131 through 170	**Trunk Incoming Usage.** If a trunk is in use incoming when it is scanned, this register is incremented. Each of the 40 trunks is respectively allotted to the 40 registers 131 through 170. *NOTE* If a trunk is 'Busied-Out' when it is scanned, the Incoming Usage is reported as '✱✱✱✱✱' in the Standard Report and as "99999" in the Compact Report. (see Fig. 3-1 and Fig. 3-2)

Types of Register Counts

2.06 There are two basic types of data which are accumulated in the registers, peg counts and usage counts; of which usage counts may be further divided into normal usage and maximum value usage counts, as outlined in the following sub-paragraphs:

(a) **Peg Counts:** Each time a device, service or feature is used the Call Processing firmware causes the register to be incremented by 1 count. A peg count is not concerned with the time duration.

(b) **Normal Usage Count:** The period of time for which a device service or feature is used may be calculated from the usage count. This is accomplished by the Call Processing firmware scanning the relevant circuit at 10 second intervals, and incrementing the register by 1 count if the circuit is in use. The time during which a circuit is in use is directly related to the usage count. Each accumulated usage count is converted in terms of ccs units (see Note) for the Standard Report format. This conversion is not done for the Compact Report format, as the data will be processed at a later date.

(c) **Maximum Value Usage Count:** This type of usage count is obtained in a similar manner to that outlined in (b) above, except for the method of register entry. The value obtained at each scan does not increment the register. Instead the value obtained is compared with the register value and is only entered if its value exceeds that in the register. The register value will thus reflect, at the end of the hourly period, the maximum or peak value of usage and not total usage.

Note: A call which lasts for 100 seconds is said to have a value of 1ccs (hundred-call-seconds). For example a "usage count" total of 128 represents 1280 seconds of usage, equivalent to 12.8ccs.

Register Count Examples

2.07 The following examples respectively illustrate these "count" methods. The register descriptions are abstracted from Table 2-1.

(a) **Register 002.** Extension Originations Peg Count
Each time an idle extension goes off-hook it causes the register to increment by one count. Thus it is a measure of the number of calls originated by the extension. It does not increment when a ringing extension goes off-hook. Table 3-1 as an example, shows this register to have a value of 858, i.e. the call originations (or off-hook originations) during the period totalled 858.

(b) **Register 006.** Junctor Usage
At each scanning interval the number of junctors in use are added to the value contained in the register. At the end of the traffic hour the register will thus reflect the total usage of the junctors during the period. It includes the use of junctors by the diagnostic and thus will not be zero even if the system handled no calls during the period. Table 3-1 shows an example value of 570, i.e. the occupancy time for all junctors used during used the period totalled 570ccs traffic units.

(c) **Register 005.** Maximum Junctors
At each scanning interval the number of junctors in use are determined and compared to the number held by the active register. If the number is greater than that held by the register it replaces the held number. The register will thus reflect the maximum of junctors which were used at any one time during the traffic hour. The value will include the two junctors used by the diagnostics. Even if the sytem handled no calls the register will contain a "2" (unless the system was in the programming mode). The example in Table 3-1 indicates that during the period a peak or maximum number of 22 junctors were in use at some particular instant.

Output Methods

2.08 The traffic measurement data can be obtained in different modes and formats and output to a local or remote terminal. These are discussed in Part 3.

Multiple Consoles

2.09 Separate counts are not maintained if there are two consoles, except in the case of the two "console busy usage" registers which are in-

dividually incremented whenever the particular console is not idle. All other registers include activity on both consoles.

Tenant Service

2.10 In Tenant Service, separate registers are not maintained for each tenant. In this case trunk use may be determined for a particular tenant from the traffic data because trunks and trunk groups are not shared by tenants. However, console, system and feature data is only collected for the system as a whole.

Register Data Descriptions

2.11 Table 2-1 details the storage registers used, and describes the type of output obtained from each one, under the major headings of:

- System Services and Console Activity

- Features

- Outgoing Trunk Groups

- Incoming Trunks

Additional Data Information

2.12 In addition to the data supplied by the Traffic Measurement reports (Part 3) certain data can be obtained as outlined below:

(a) **Calls Answered Peg Count.** The total number of calls answered by the attendant is obtained as the sum of Registers 012 (LDN 1), 014 (Dial 0), 015 (LDN 2), 017 (Recall), 018 (LDN 3) and 021 (LDN 4).

(b) **Abandoned Calls Peg Count.** The number of abandoned calls to the attendant is the difference between Registers 011 (Calls to Attendant) and the preceding "Calls Answered Peg Count".

(c) **Average Speed of Answer.** The average speed of answer by the attendant may be calculated from Registers 011 (Call to Attendant) and 010 (Calls Waiting).

2.13 The following information is provided to clarify the data provided by trunk group overflow conditions. As an example it is assumed

that trunk group A has overflow to trunk group B, and that trunk group B has no overflow. Trunk group A is now accessed and the following conditions can occur:

(a) If all trunks in group A are not busy, then Trunk Group A peg count is incremented

(b) If all trunks in group A are busy but not all trunks in group B are busy, then both Trunk Group A and B peg counts are incremented. In addition group A's Busy/overflow peg count is incremented

(c) If all trunks in group A and B are busy the Trunk Group peg counts and the Busy/overflow peg counts of both groups are incremented.

3. TRAFFIC MEASUREMENT MODES AND REPORTS

General

3.01 Traffic data is collected as described in Part 2 and it's output dependant on the particular system options selected and programmed on site. Fig. 3-1 illustrates the results of selecting these options, and these options are described in the following paragraphs.

Standard Mode Collection

3.02 Standard Mode collection is described in 2.04 and illustrated in Fig. 2-1. It represents the method of collecting data on active registers, and replacing the contents of the storage registers at the end of the hourly run with the new active register values.

Extreme Value Mode Collection

3.03 Extreme Value Mode collection is basically similar to the Standard Mode collection (2.05) except that a particular active register's contents are only transferred to the storage register if it exceeds the value contained in the storage register. Upon the termination of a Traffic Measurement run the individual storage outputs will thus reflect the hourly peak readings obtained during the run.

3.04 The following points should also be noted with regard to differences between the Standard and Extreme Value Modes:
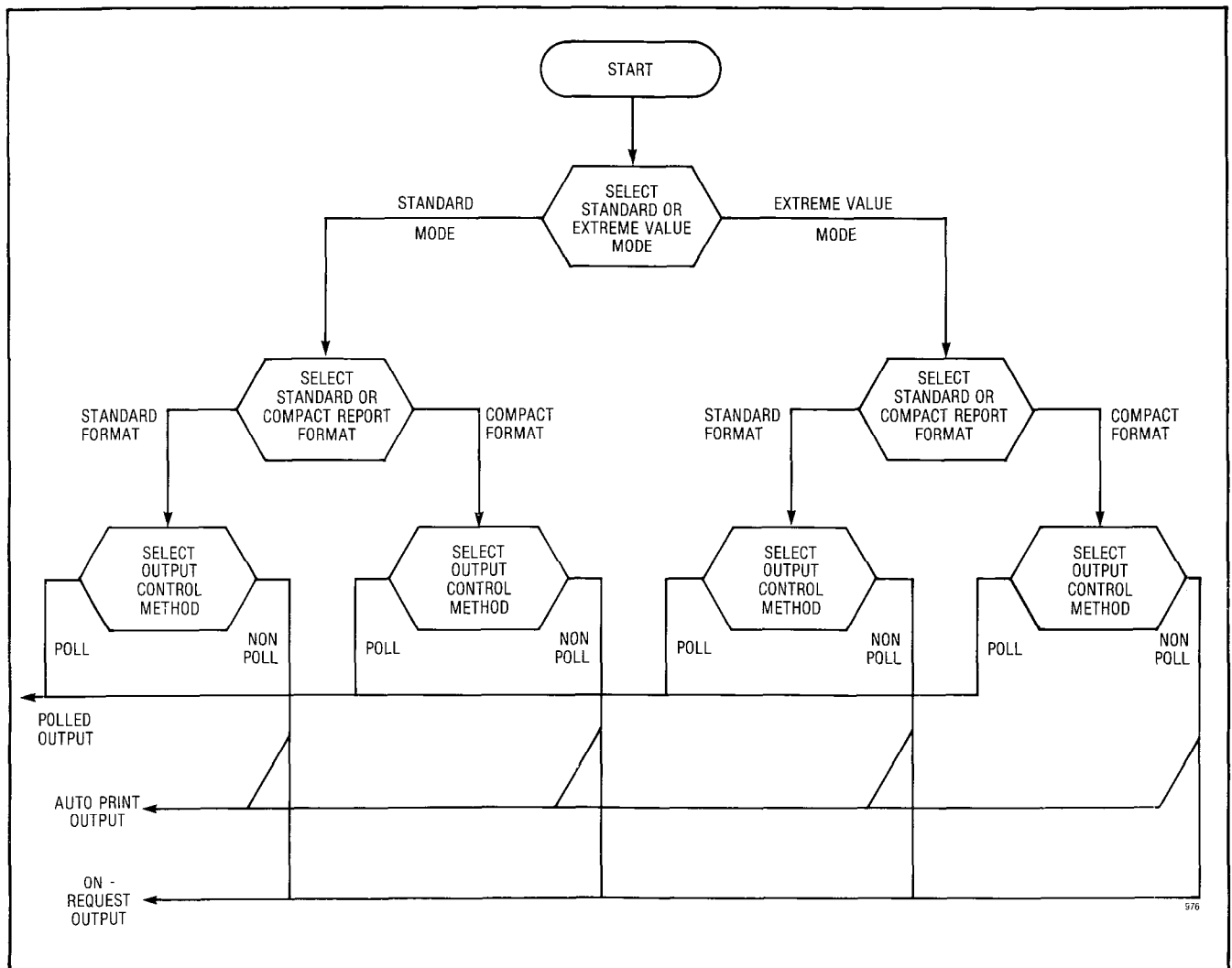
Fig. 3-1   Types of Data Output

(a) In the case of Standard Mode the storage registers may be interrogated for their content value at the end of a Traffic Measurement run, and up until 1 hour after the commencement of a subsequent Traffic Measurement run. However for the Extreme Value Mode the registers may only be interrogated up until the commencement of the subsequent Traffic Measurement run as they are zeroed at this point, (but see below).

(b) In the Extreme Value Mode, if Trafffic Measurement is running continuously the storage registers are not zeroed at the start of the run and the maximum may be accumulated over several days.

Output Formats

3.05 Two types of output formats are possible as under:

• Standard Traffic Report and

• Compact Traffic Report

Standard Traffic Report

3.06 The Standard Traffic Report is intended for the user who wants to work with the traffic data as output by the PABX without processing it first. It is in the form of a report with headings and text to make it easily readable. It is much less compact than the Compact Report.

3.07 The format of a Standard Traffic Report is illustrated at Table 3-1. The header is similar in the Compact Traffic Report, but the data contains explanatory titles to make it readable. It requires more space than the Compact Report. For Extreme Value Mode reporting the words TRAFFIC REPORT in the header will be replaced by the words TRAFFIC MAXIMA.

TABLE 3-1

STANDARD TRAFFIC REPORT

```
     08/13  3:06P SYS200  TRAFFIC REPORT  08/13  2:00P TO  3:00P


 3S DIAL TONE DELAY PEG 00000   EXT ORIGINATIONS PEG 00858   RECEIVERS  PEG 00952
 2S DIAL TONE DELAY PEG 00000   MAX JUNCTORS     --- 00022   JUNCTORS   USE 00570
 1S DIAL TONE DELAY PEG 00001   VAC/ILL CALLS    PEG 00024   ACTIVITY   PEG 04680
 CALLS WAITING      USE 00015   CALLS TO ATT     PEG 00147   LDN 1      PEG 00087
 CONSOLE 1 BUSY     USE 00017   DIAL 0           PEG 00033   LDN 2      PEG 00000
 CONSOLE 2 BUSY     USE 00000   RECALL           PEG 00020   LDN 3      PEG 00000
 ATT ORIGINATIONS   PEG 00110   INTERCEPT        PEG 00000   LDN 4      PEG 00000


                               FEATURES

 TAFAS     00000    OVERRIDE  00000    CALL PICKUP  00004    MAID IN ROOM     00000
 PAGING    00043    ATT CONF  00000    HOLD PICKUP  00008    CALL FORWARD     00000
 WAKEUP    00001    ATT HOLD  00031    STATION CONF 00000    DO NOT DISTURB   00000
 CAMP-ON   00025    CALL HOLD 00003    MEET-ME CONF 00007    SERIAL/GUEST RM  00000
 CALLBACK  00059    CALL PARK 00000    FLASH & HOLD 00037    MESSAGE WAITING  00000


 TRUNK GROUP     PEG       USAGE     BUSY PEG  AAO USE

    1     9     00416     00095      00348     00000
    2    82     00055     00073      00000     00000
    3    83     00265     00080      00218     00000
    4    84     00006     00002      00004     00000


                        INCOMING TRUNKS


 SLOT  PEG   USAGE    SLOT  PEG   USAGE    SLOT  PEG   USAGE    SLOT  PEG   USAGE

 050  00011 00031    052  00010 00035    054  00004 00016    056  00005 00012
 058  00014 00033    060  00018 00031    062  00004 00006    064  00002 00005
 066  00015 00028    068  00005 00035    070  00000 00002    072  00000 00000
 074  00000 00000    076  00000 00000    078  00000 00000    080  00000 00000
 082  00000 00000    084  00000 00000    086  00000 00000    088  00000 *****
```

Notes: 1. The header shown is for Standard Mode operation. In Extreme Value Output the words "TRAFFIC MAXIMA" appear in place of "TRAFFIC REPORT" (see 3.07).

2. See 2.12 and Table 2-1 for register details.

3. Trunk groups 1 to 4 have been programmed in this example.

4. Usages are in ccs.

Compact Traffic Report

3.08 The Compact Traffic Report is designed for following data processing. The traffic registers are written in succession in compact format, which can then be processed by a computer, although it may be directed to a printer. The Standard Traffic Report is more suitable when an immediate readable printout is needed.

3.09 Fig. 3-2 shows a sample of the header, first line and the last four lines of a Compact Traffic Report. Each subsequent line of text prints out the readings for 10 registers each in 5 digit format, commencing at Register 001 and, over 17 lines, accomodating a total of 170 register readings. The header information contains the following information:
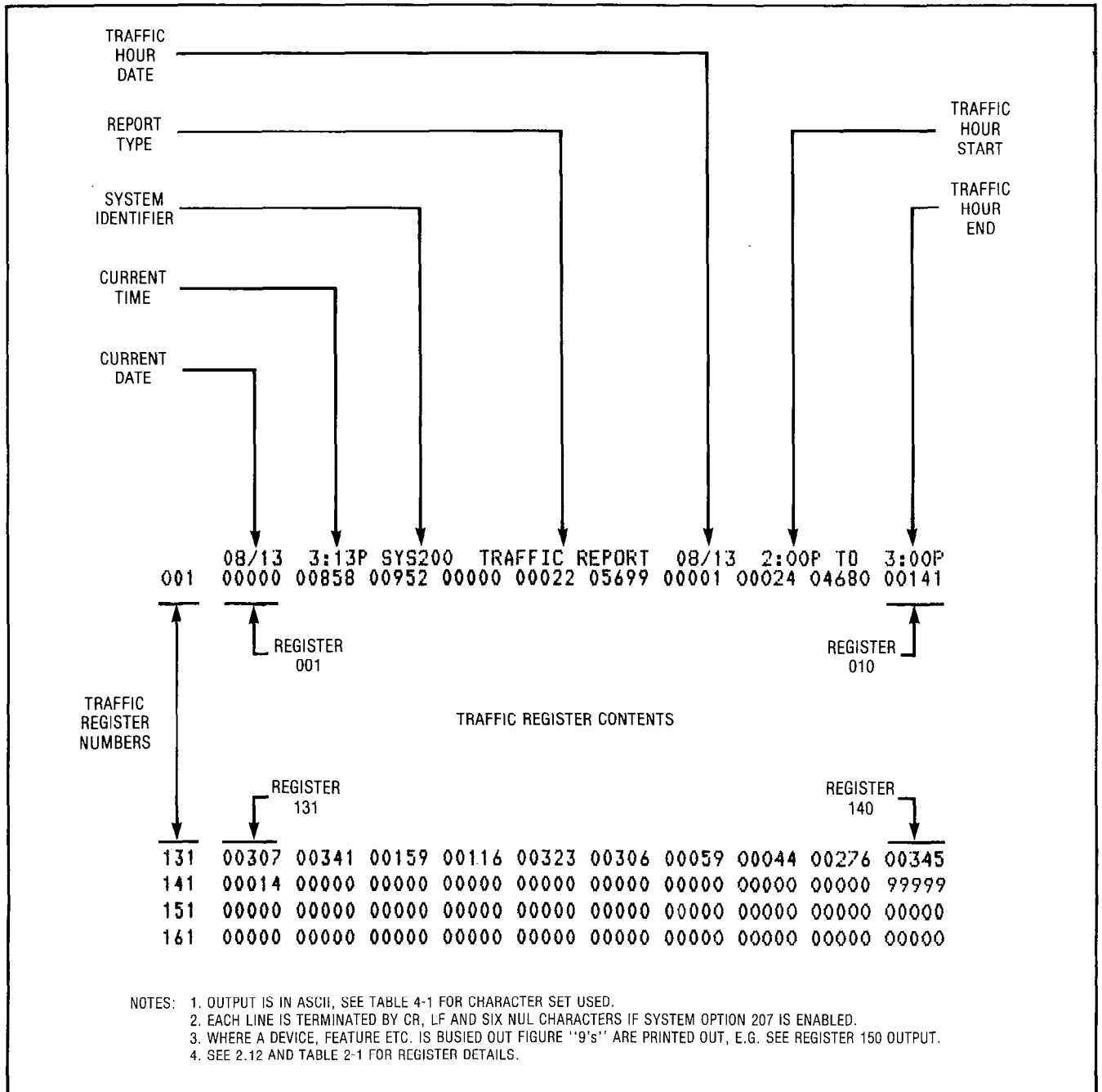

NOTES: 1. OUTPUT IS IN ASCII, SEE TABLE 4-1 FOR CHARACTER SET USED.
2. EACH LINE IS TERMINATED BY CR, LF AND SIX NUL CHARACTERS IF SYSTEM OPTION 207 IS ENABLED.
3. WHERE A DEVICE, FEATURE ETC. IS BUSIED OUT FIGURE "9's" ARE PRINTED OUT, E.G. SEE REGISTER 150 OUTPUT.
4. SEE 2.12 AND TABLE 2-1 FOR REGISTER DETAILS.

Fig. 3-2   Compact Traffic Report

(a) The Current Date

(b) The Current Time

(c) The PABX System Identifier (number)

(d) The words TRAFFIC REPORT (Note: These words are replaced by the words TRAFFIC MAXIMA if the report is in the Extreme Value Mode)

(e) The Traffic Hour Date (Note: If this report were that for the last hour block of the previous day it would be different to that shown for the "Current Date"

(f) The Traffic Hour Start Time

(g) The End of Traffic Hour Time

3.10 It should be noted that usage values shown in the Standard Report are output in ccs units. In the Compact Report the usage values are in 10 second units.

3.11 Actual format details for the purpose of processing a Compact Traffic Report are contained in the following Tables:

(a) Table 3-2 details the Header format. This header is the same for the Compact and Standard Reports

(b) Table 3-3 details the format for the traffic register details

(c) Table 3-4 shows the Header format when an Invalid Compact Report is output. The header is the same for the Invalid Standard Report. However it should be noted that only the header appears for an Invalid Standard Report.

Invalid Output Format

3.12 If a power failure occurs during a traffic hour, the registers are zeroed. A special headers record is sent so that the user can disregard that hour's data. An example of an Invalid Compact Report is shown in Table 3-5. An Invalid Standard Report is identical to that for an Invalid Compact Report except that only the header is printed out.

3.13 After a restart, the time on the console will be '0:00' and will flash to say that it is not valid. If traffic is polled, the current time will be '0:00'.

TABLE 3-2

REPORT HEADER FORMAT

Columns	Format	Description	Notes
1-3	— — —	Record Identifier	_ = Space
4-5	— —	Spacer	_ = Space
6-10	mm/dd	Current Date	mm = Month, dd = Day
11	—	Spacer	_ = Space
12-17	hh:mmp	Current time	hh = Hours, mm = Minutes p = P (PM), = _ (AM) or 24 hour clock
18-21	_SYS	System Id Message	Text
22-24	nnn	System Id	nnn = 000 (no Id), = 001 - 999 (Assigned Id)
25-26	— —	Spacer	_ = Space
27-40 27-40	TRAFFIC REPORT OR TRAFFIC MAXIMA	Traffic Header Message OR Header in Extreme Value Mode	 Text
41-42	— —	Spacer	_ = Space
43-47	mm/dd	Date of Traffic Hour	mm = Month, dd = Day
48	—	Spacer	_ = Space
49-54	hh:mmp	Start of Traffic Hour	hh = Hours, mm = Minutes p = P (PM), = _ (AM) or 24 hour clock
55-58	_TO_	Hour Separator	Text (Note 3)
59-64	hh:mmp	End of Traffic Hour	hh = Hours, mm = Minutes p = P (PM), = (AM) or 24 hour clock (Note 3)

Notes: 1. The header is the same for the Standard Report and the Compact.
2. See Table 3-1 for example of Standard Report, and Fig. 3-2 for Compact Report example.
3. If Traffic data collecting equipment (similar to Alston 724) that needs a specific character string to be defined to identify a traffic report, columns 55-61 are recommended for this purpose.

TABLE 3-3

COMPACT REPORT REGISTER DETAILS

Columns	Format	Description	Notes
1-3	rrr	Traffic Register Number	See Table 2-1 (001 by 10 per line)
4	_	Spacer	_ = Space
5-10	_nnnnn	Contents of Register rrr preceded by a space	00000 to 65535 Decimal 99999 Busied out trunk
11-16	_nnnnn	Contents of Register rrr + 1 preceded by a space	00000 to 65535 Decimal 99999 Busied out trunk
17-22	_nnnnn	Contents of Register rrr + 2 preceded by a space	00000 to 65535 Decimal 99999 Busied out trunk
23-28	_nnnnn	Contents of Register rrr + 3 preceded by a space	00000 to 65535 Decimal 99999 Busied out trunk
29-34	_nnnnn	Contents of Register rrr + 4 preceded by a space	00000 to 65535 Decimal 99999 Busied out trunk
35-40	_nnnnn	Contents of Register rrr + 5 preceded by a space	00000 to 65535 Decimal 99999 Busied out trunk
41-46	_nnnnn	Contents of Register rrr + 6 preceded by a space	00000 to 65535 Decimal 99999 Busied out trunk
47-52	_nnnnn	Contents of Register rrr + 7 preceded by a space	00000 to 65535 Decimal 99999 Busied out trunk
53-58	_nnnnn	Contents of Register rrr + 8 preceded by a space	00000 to 65535 Decimal 99999 Busied out trunk
59-64	_nnnnn	Contents of Register rrr + 9 preceded by a space	00000 to 65535 Decimal 99999 Busied out trunk

Note: See Table 3-3 for Header Detail and Fig. 3-2 for example of report.

TABLE 3-4

INVALID HEADER FORMAT

Columns	Format	Description	Notes
1-3	✱✱✱	Invalid Report Identifier	Identifies invalid report
4-5	──	Spacer	＿ = Space
6-10	mm/dd	Current Date	mm = Month, dd = Day
11	─	Spacer	＿ = Space
12-17	hh:mmp	Current time	hh = Hours, mm = Minutes p = P (PM), = ＿(AM) or 24 hour clock
18-21	＿SYS	System Id Message	Text
22-24	nnn	System Id	nnn = 000(No Id), = 001 - 999 (Assigned Id)
25-26	──	Spacer	＿ = Space
27-40	TRAFFIC＿REPORT	Traffic Header Message	Text
41-42	──	Spacer	＿ = Space
43-59	＿＿Not＿Available＿＿	Registers Invalid Message	Text
60-61	──	Spacer	＿ = Space
62-64	✱✱✱	Invalid Report Identifier	

Note: 1. The header is the same for the Standard Report and the Compact Report.
2. See Table 3-5 for an example of a report.

TABLE 3-5

INVALID COMPACT REPORT

```
*** 01/17 15:04  SYS000  TRAFFIC REPORT    NOT AVAILABLE   ***
001  00000 00000 00000 00000 00000 00000 00000 00000 00000 00000
011  00000 00000 00000 00000 00000 00000 00000 00000 00000 00000
021  00000 00000 00000 00000 00000 00000 00000 00000 00000 00000
031  00000 00000 00000 00000 00000 00000 00000 00000 00000 00000
041  00000 00000 00000 00000 00000 00000 00000 00000 00000 00000
051  00000 00000 00000 00000 00000 00000 00000 00000 00000 00000
061  00000 00000 00000 00000 00000 00000 00000 00000 00000 00000
071  00000 00000 00000 00000 00000 00000 00000 00000 00000 00000
081  00000 00000 00000 00000 00000 00000 00000 00000 00000 00000
091  00000 00000 00000 00000 00000 00000 00000 00000 00000 00000
101  00000 00000 00000 00000 00000 00000 00000 00000 00000 00000
111  00000 00000 00000 00000 00000 00000 00000 00000 00000 00000
121  00000 00000 00000 00000 00000 00000 00000 00000 00000 00000
131  00000 00000 00000 00000 00000 00000 00000 00000 00000 00000
141  00000 00000 00000 00000 00000 00000 00000 00000 00000 00000
151  00000 00000 00000 00000 00000 00000 00000 00000 00000 00000
161  00000 00000 00000 00000 00000 00000 00000 00000 00000 00000
```

Notes: 1. See 3.10 and 3.11 for explanation.
2. An Invalid Standard Report has an identical header line, but the register numbers and contents do not appear below the header.

4. OUTPUT CONFIGURATION

General

4.01 Fig. 4-1 shows the external connections to the PABX data port connector P302. The port may be connected via a RS232 Adapter either to an external modem for the remote polling facility or to a local terminal (printer). Both types of connections cannot be simultaneously employed.

Output Control

4.02 Traffic output may be controlled in one of three ways:

- By polling from an external device,

- By specifying that the data be printed automatically every hour (Autoprint)

- By requesting output from the console via an attendant function.

External Polling Mode

4.03 The polling mode of operation allows an external device to poll the PABX and request that traffic data be output to it. The device sends control characters to the PABX via the RS232 port to enable or suspend the output. Other types of printouts e.g. Message Registration Printing cannot be obtained in the polling mode.

Autoprint Mode

4.04 As an alternative to the Polling mode the hourly printout may be output automatically (Autoprint). The Polling mode and Autoprint mode cannot be simultaneously enabled (see Fig. 3-1 and Table 6-2).

Console - Controlled Outputs

4.05 Traffic measurement data may be printed on request from the console if the Polling mode is not selected. Part 6 details the required operation. This data may be obtained at any time except under the following conditions:
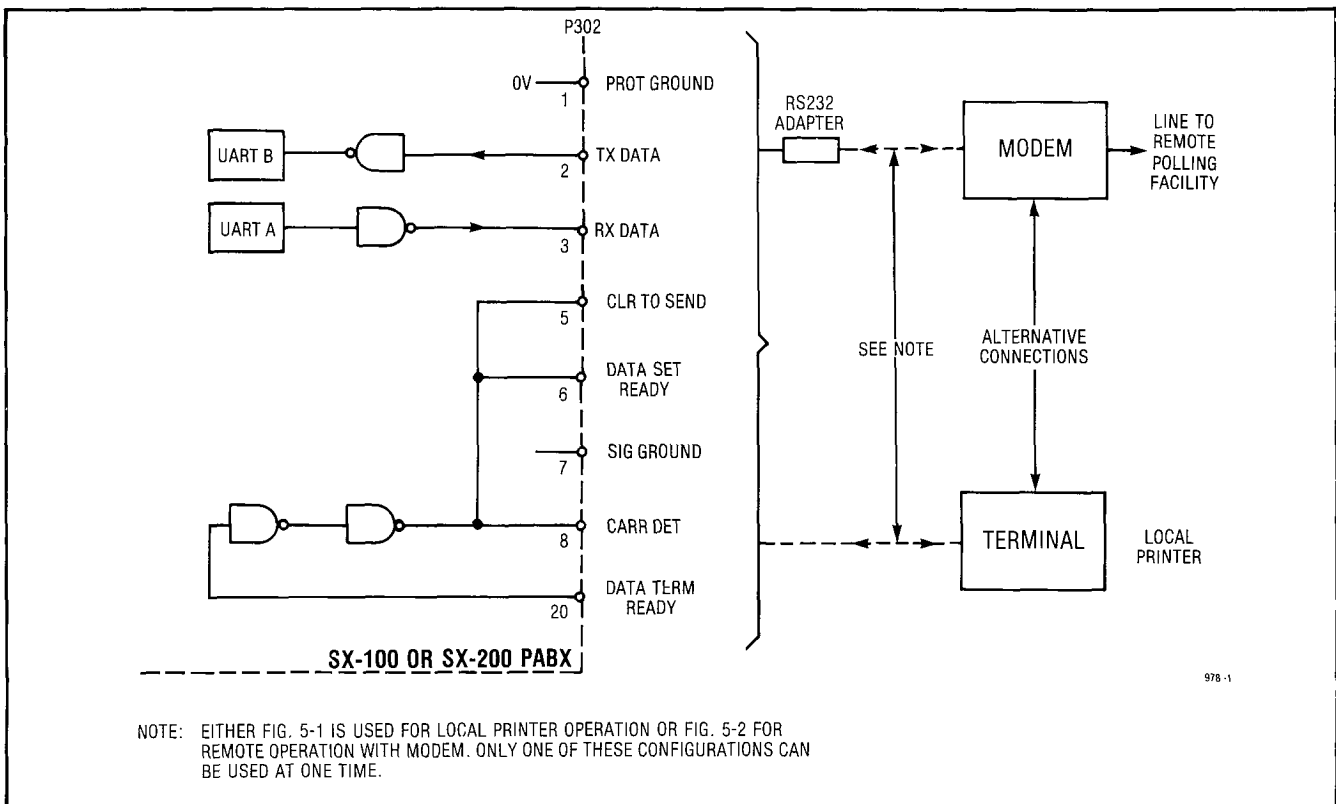
NOTE: EITHER FIG. 5-1 IS USED FOR LOCAL PRINTER OPERATION OR FIG. 5-2 FOR REMOTE OPERATION WITH MODEM. ONLY ONE OF THESE CONFIGURATIONS CAN BE USED AT ONE TIME.

Fig. 4-1 Alternative Configurations - PABX Data Port

(a) Printouts cannot be requested if the Polling mode has been selected

(b) If Autoprint mode has been enabled and the PABX is in the process of printing a Traffic Report at the time a Hotel/Motel printout is requested the latter printout will not occur until completion of the Autoprint printout

Printer Requirements

4.06 The speed of the data transmission can be switch-selected at the PABX for 110 or 300 baud ASCII code with odd parity. A line length of 80 characters is used for the Standard Report and 64 lines for the Compact Report. The printout of each line is terminated by a "CR" (carriage return) and "LF" (line feed) character, followed by 6 NUL characters if System Option 207 has been selected. The Standard Traffic Report (Table 3-1), is preceded by an "FF" (form feed) character before being output. These function characters (non-printing) are not included in the line length. The subset of required ASCII characters are shown in Table 4-1.

4.07 If the printer characteristics require a delay before the next line is to be printed, this can be provided by enabling System Option 207. This causes six "NUL" (non-printing) characters to be transmitted immediately following the "carriage return" and "line feed" characters. If this option is not selected, no "nulls" are sent.

5. INSTALLATION

General

5.01 Installation to meet the Traffic Measurement requirements consist of the following steps:

(a) Verification that Generic 204 software is included in the SX-100 or SX-200 PABX system

(b) Determination of the required mode (see Fig. 3-1)

(c) Determination of the required output configuration (see Fig. 4-1)

TABLE 4-1

CHARACTER SET

			b_4	b_3	b_2	b_1	ROW \ COLUMN	0 (000)	1 (001)	2 (010)	3 (011)	4 (100)	5 (101)
			0	0	0	0	0	NUL		SP	0	@	P
			0	0	0	1	1		DC1	!	1	A	Q
			0	0	1	0	2			"	2	B	R
			0	0	1	1	3		DC3	#	3	C	S
			0	1	0	0	4				4	D	T
			0	1	0	1	5			%	5	E	U
			0	1	1	0	6			&	6	F	V
			0	1	1	1	7	BELL		/	7	G	W
			1	0	0	0	8			(	8	H	X
			1	0	0	1	9			)	9	I	Y
			1	0	1	0	A	LF		*	:	J	Z
			1	0	1	1	B			+	;	K	
			1	1	0	0	C	FF		,		L	
			1	1	0	1	D	CR		—	=	M	
			1	1	1	0	E			.		N	
			1	1	1	1	F			/	?	O	

(BIT NUMBERS: b_7, b_6, b_5, b_4, b_3, b_2, b_1)

NOTES 1. Control DC1 or a "break" or NULL causes printing.
2. Control DC3 suspends printer.

(d) Installing the hardware items

(e) Programming and operation of the completed installation

5.02 The installation of the required hardware items are discussed in the following paragraphs. Part 6 should be referred to for programming and operation of the completed system.

Cabling and Cross-Connections

5.03 Section MITL9105/9110-98-200 details the installation of SX-100 and SX-200 PABX systems. Parts 9 (Installation Requirements) and 10 (Cabling and Cross-Connections) of this Section show the procedures to be used, and should be consulted in conjunction with the following paragraphs.

Cabling Requirements, Local Printer

5.04   When a local printer is employed it should
        be located as near as possible to the PABX.
A 25 conductor connectorised cable must be run
and connected between the local printer and the
PABX data port (plug P302). Table 10-2 of Section
MITL9105/9110-98-200 shows the connections of
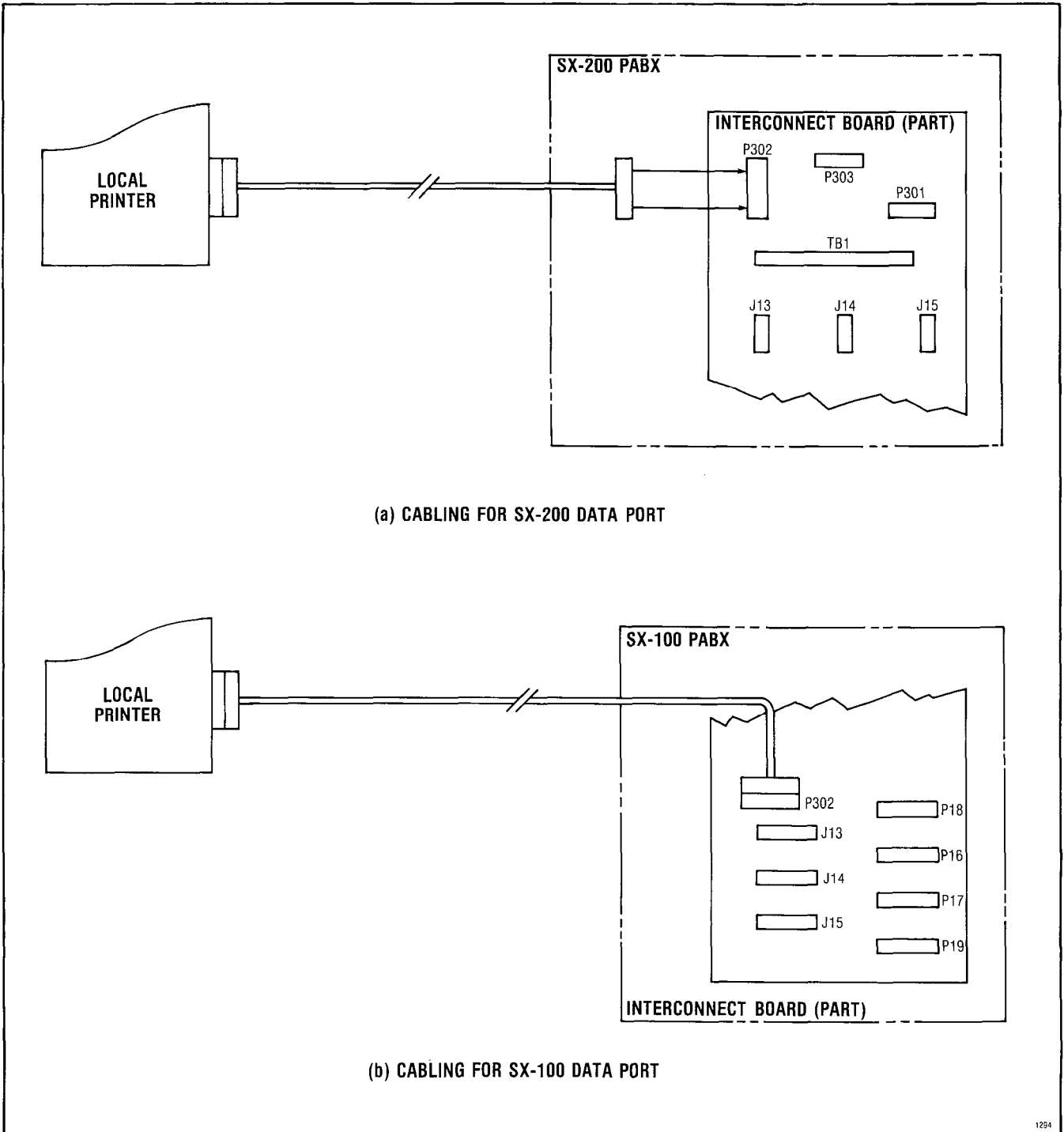plug P302. Fig. 5-1 illustrates this cabling require-
ment.

(a) CABLING FOR SX-200 DATA PORT

(b) CABLING FOR SX-100 DATA PORT

Fig. 5-1   Cabling to Local Printer

Cabling Requirements, Remote Facility

5.05 When the PABX data port interconnects with a remotely located facility, requiring the use of a modem, an RS232 Adapter (Mitel P/N 9110-052) is installed between the data port and the connectorised cable to the modem. The RS232 Adapter presents the proper interface connections required when the data port (P302) is cabled to the modem. The modem is connected via the cross-connect field to the external facility following standard installation practices. Fig. 5-2 illustrates these cabling arrangements.
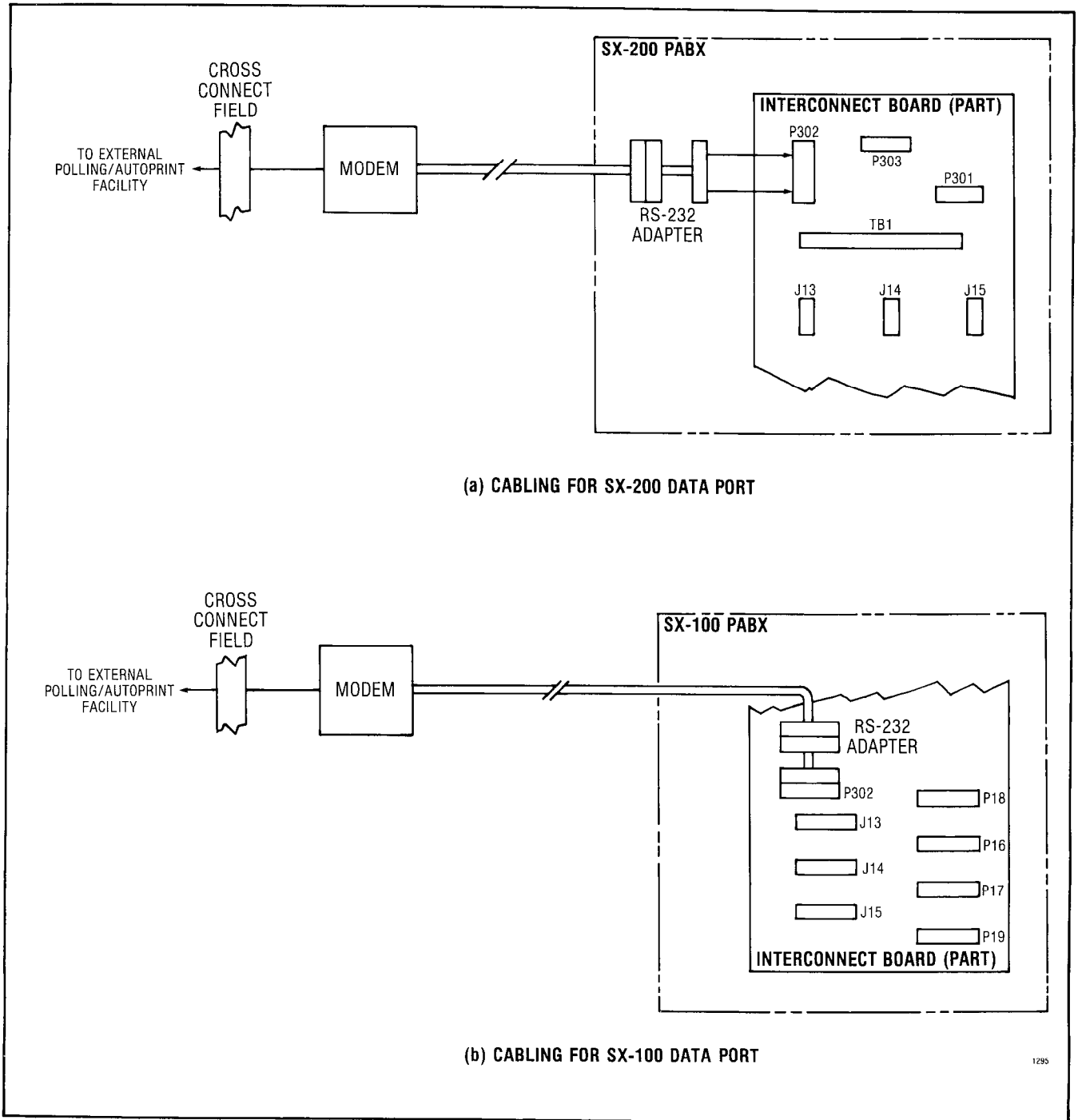
Fig. 5-2 Cabling to Remote Printer

6. PROGRAMMING AND OPERATION

General

6.01 This Part describes the programming options and the operation of the utilities required in connection with traffic measurements.

6.02 Traffic Measurement data may be obtained in various modes and formats as outlined in Part 3. These modes and formats are dependant on actual requirements as outlined below (see Fig. 3-1):

(a) **Polling Mode.** The PABX may be polled by an external Agency at prescribed intervals with the data obtained being in the form of a Standard or Extreme Value Mode, and either as a Standard or Compact Traffic Report.

(b) **Autoprint Mode.** The PABX may automatically output the traffic data at regular hourly intervals to an external Agency. Alternately this mode may be employed with the local printer.

(c) The same type of data ouput may be called up from the PABX console to a local printer.

Programming

6.03 Telephone Company Traffic personnel and users may select and perform measurements in the variety of modes and formats outlined above with the flexibility of changing these modes and formats to meet changing requirements.

6.04 Programming of the PABX to enable required features and options is performed at the time of installation. Other features and options may be subsequently entered, if required, to modify the facilities. The procedures are outlined in the following Sections:

- Section MITL9105/9110-98-205 Installation Forms

- Section MITL9105/9110-98-210 System Programming

6.05 Where traffic measurement is a requirement the relevant options are entered in the same manner as for the options mentioned in the above Sections. The type of traffic measurement options required should be determined from paragraph 6.02 and implemented as noted in the following paragraphs.

6.06 Table 6-1 lists the Traffic Measurement System Options. Option 200 must be enabled for the traffic measurement feature. The remaining options listed in Table 6-1 are then enabled as required, but note that certain Hotel/Motel printout System Options cannot be enabled if System Option 203 (Polling) is selected. The reason is that when a local printer is used for printouts, the PABX data port cannot be used for the polling function. This and other conflicts are listed in Table 6-2.

Remote Operation

6.07 When the required System Options have been entered in the PABX the necessary operations to obtain traffic measurement data at the remote location are as follows:

(a) **Polling Mode.** To request traffic data the character DC1 or NUL is transmitted from the remote terminal to the PABX data port. The NUL code also results when a BREAK is sent from the remote equipment. Hence a BREAK may be used to initiate polling. These characters are ignored while in the middle of outputting a report. On receipt of any one of these signals traffic data will then be transmitted from the PABX to the remote device over the line. To suspend the flow of traffic data the character DC3 is sent from the remote terminal. This will immediately suspend the traffic data flow. Traffic data flow may be resumed by transmittal of character DC1.

(b) **Autoprint Mode.** If System Option 204 (Autoprint) is selected, hourly traffic measurement data is transmitted automatically from the PABX data port. Note that if this data is to be printed on a local printer, and a Hotel/Motel printout is requested during an Autoprint printout, then the Hotel/Motel printout will not occur until after the completion of the Autoprint report.

TABLE 6-1

TRAFFIC MEASUREMENT SYSTEM OPTIONS

SYSTEM OPTION	DESCRIPTION
196	**Ignore Print Enable.** This option must be enabled if the attendant function code ✳1400 (see Table 6-3) is to be effective.
200	**Traffic Measurement Enable.** This option must be enabled for the Traffic Measurement feature.
201	**Traffic Measurement: Extreme Value Mode.** This option must be selected if traffic collection is to operate in 'Extreme Value Mode'. If this Option is not selected then Standard Mode results. See paragraph 3.03.
202	**Traffic Measurement: Compact Traffic Report.** If selected, this option causes the traffic data to be output in a compact format. Otherwise the standard format will be used. See paragraph 3.08.
203	**Traffic Measurement: Polling.** This option must be selected if the traffic data is to be polled by an external device. See paragraph 3.12.
204	**Traffic Measurement: Autoprint.** This option must be selected if the traffic data is to be output automatically at the end of each hour. See paragraph 6.02 and Note 1 below.
209	**Console Function Enable (Traffic Measurement).** This option must be enabled if the functions ✳130 to ✳133 are to be legal (Table 6-3). If it is not enabled then ✳13 causes an error to be displayed. See also Note 2.
210	**Attendant Printer Control Enable.** This option must be selected to enable the use of the printer control commands ✳14 (Table 6-3)

Notes: 1. Printouts may be obtained by request of the console. See paragraphs 4.05 and Table 6-2.
2. By not enabling System Option 209 the Telco is assured that a Traffic Measurement run cannot be interrupted by Console Function ✳130 to ✳133. However the option must be reselected before traffic parameters can be changed or printing a report via the traffic utilities.

TABLE 6-2

SYSTEM OPTION CONFLICTS

System Option Selected	System Option Conflict
203 - Traffic Measurement Polling	191 - Automatic Wakeup Printout
	193 - Room Register Audit Enable
	194 - Room Status Audit Enable
	195 - Message Register and Message Waiting Change Print Enable
	204 - Traffic Measurement Autoprint
204 - Traffic Measurement Autoprint	203 - Traffic Measurement Polling

Console Operation

6.08 Traffic Measurement data may be obtained by console commands. The appropriate commands are listed in Table 6-3. System Option 200 must have been enabled. Note that Polling mode is not applicable for local printer operation, but Autoprint mode can be employed (see 6.07(b)).

CAUTION: It should be noted that reprogramming trunks and trunk groups in the middle of a Traffic Measurement run may cause invalid data results.

Additional Operating Notes

6.09 The following additional operating procedures should be noted:

(a) The Start and Run times must be selected by the console irrespective of the type (polling, autoprint or console) of output.

(b) If System Option 200 and 209 are not selected the traffic utilities are illegal.

(c) If the attendant resets the digital clock during a traffic run, a traffic report could be missed or printed twice. For example, assume that Autoprint is in effect and a Traffic Report is due at 10:00. If the clock is reset from 9:55 to 10:05 the report will be lost. If it is reset from 10:05 to 9:55, two reports will be printed of the 10:00 to 11:00 data. The attendant should be cautioned against resetting the clock around the time of a Traffic Report.

(d) In addition, the system does not adjust for changes in time. In the above case, if the clock were changed from 9:40 to 9:55, only 45 minutes of data will appear at 10:00.

(e) Traffic Measurement is applicable to Tenant-Service, with the parameters noted in 2.10.

TABLE 6-3

TRAFFIC MEASUREMENT FUNCTION CODES

Function Code	Description
	PART A - CONSOLE FUNCTION CODES
	Note: See description for System Option 209 in Table 6-1.
*130	**Select start time.** The start time for a Traffic Measurement run may be displayed and/or set by the console attendant as follows: • Enter *130 from keypad • SOURCE display shows: hhmmx (existing time) where: hh = hours mm = minutes x = P if p.m. x = (SP) if a.m. or 24 hour clock • Enter new start time hhmmy (new time) where: y = * if p.m. y is not required if a.m. or 24 hour clock • Press RELEASE key
*131	**Select Length of Run.** The run length (in multiples of 1 hour) may be displayed and/or set by the console attendant as follows: • Enter *131 from keypad • SOURCE display shows: tt (number of hours) • Enter new run time tt (1 to 24) • Press RELEASE key A run length of 24 means that Traffic Measurement will run continuously.
*132	**Print Traffic Data.** Traffic data may be output by the console attendant as follows: • Enter *132 from keypad • Press RELEASE key The current count held in the storage registers are output to printer or tape but see paragraph 4.05.
*133	**Cancel Traffic Measurement.** The traffic measurement run, if in progress, may be cancelled by the attendant as follows: • Enter * 133 from keypad • Press RELEASE key This function results in resetting the start time to 0:00, the run length to 0, and zeroing the traffic registers. To restart traffic measurement new start and run times must be entered.

TABLE 6-3 (CONT'D)

TRAFFIC MEASUREMENT FUNCTION CODES

Function Code	Description
✳14✳	**Suspend Printout.** Traffic data output may be suspended by the console attendant, in order to change paper for example. The command is as follows: • Enter ✳14✳ from keypad • Press RELEASE key Printout is suspended at the end of a current line if one is being printed. No output is lost. Caution should be observed in using this function code because if it is set for an extended period it may, for example, result in the termination of wake-up activities. System Option 210 must be enabled for this command to be effective.
✳14#	**Resume Printout.** Traffic data output may be resumed after either a "suspend" or "ignore" (see below) by the console attendant as follows: • Enter ✳14# from keypad • Press RELEASE key System Option 210 must be enabled for this command to be effective.
✳1400	**Purge and Ignore Printout.** Traffic data output may be ignored (inhibited) by the console operator if the requirement arises to use the printer for other purposes. The command is as follows: • Enter ✳1400 from keypad • Press RELEASE key All printout is ignored and lost. System Options 196 and 210 (see Table 6-1) must be enabled for this command to be effective. **PART B - MAINTENANCE FUNCTION CODES** Some of the console function codes may be duplicated from the PABX test line and perform the same function. These are listed below:
555 + 8 + ✳	**Suspends printout.** The last symbol may be replaced by 1 on a rotary dial.
555 + 8 + #	**Resumes printout.** The last symbol may be replaced by 2 on a rotary dial.
555 + 8 + 00	**Ignore printout.** System Option 196 (see Table 6-1) must be enabled for this function to be effective.

SX-100*/SX-200*

ELECTRONIC PRIVATE AUTOMATIC BRANCH EXCHANGE

STATION MESSAGE DETAIL RECORDING

1. GENERAL

Introduction

1.01 This Section gives a general description of the Station Message Detail Recording (SMDR) feature which is applicable to SX-100 and SX-200 Private Automatic Branch Exchanges when fitted with the Generic 205 software package. It also describes the installation, programming and operational parameters for the SMDR feature.

Related Documents

1.02 Table 1-1 lists the MITEL practices associated with the SX-100/SX-200 PABX Systems.

Brief Description

1.03 Station Message Detail Recording, also known as 'Call Detail Recording', allows a business to analyze, and thus control, its telephone costs. Data is collected for each outgoing and/or incoming trunk call. Each such call generates a call record which is available at the RS232 port of the PABX. This output can be connected to:

- A local printer which gives an on-line printout at the termination of each trunk call, or

- A magnetic tape recorder which collects data for each event, for subsequent processing by a service bureau to produce reports on telephone usage for management, or

- Directly to a service bureau via a dedicated line for more timely processing.

* Trademark of MITEL Corporation

1.04 Each time a trunk is seized by a call outgoing from the PABX a record is generated. This record is applicable irregardless of the call duration, the identity of the originating party (ie. an extension, the attendant or another incoming trunk) or whether the call is completed. Examples of such calls are contained in Part 5. If the trunk cannot be seized (e.g. the trunk is busy), a record is not made of the call. Certain types of calls may not be recorded (see System Options 225, 226 or 227, Table 4-1).

1.05 Incoming trunk call data may be recorded. The record is generated irregardless of the call duration, or whether the call is completed (e.g. the called party is busy).

1.06 Internal calls i.e. calls between extensions or between the extension and the attendant are not recorded.

1.07 Closely associated with Station Message Detail Recording is the ability, when required and enabled, to incorporate account codes on the SMDR record. Account codes may be used by the customer for the purpose of client billing or management reports. The account code feature with its variable options and associated operating procedures is described in Appendix 1.

TABLE 1-1
SX-100/SX-200 DOCUMENTATION

VOLUME I	
Section No.	Title
MITL9105/9110-98-000	Documentation Index
MITL9105-98-100	SX-100 General Description
MITL9110-98-100	SX-200 General Description
MITL9105/9110-98-105	Features and Services Description
MITL9105-98-150	Physical Description and Ordering Information
MITL9110-98-150	Physical Description and Ordering Information
MITL9105/9110-98-180	Engineering Information
MITL9105/9110-98-212	Multi Digit Toll Control
MITL9105/9110-98-220	Speed Call
MITL9105/9110-98-300	Attendant Console Description - Commercial
MITL9105/9110-98-310	Programming and Maintenance Console Description
MITL9105/9110-98-450	Traffic Measurement
MITL9105/9110-98-451	Station Message Detail Recording
MITL9105/9110-98-500	General Maintenance Information

VOLUME II	
Section No.	Title
MITL9105/9110-98-000	Documentation Index
MITL9105/9110-98-200	Shipping, Receiving and Installation
MITL9105/9110-98-205	Installation Forms
MITL9105/9110-98-210	System Programming
MITL9105/9110-98-215	Installation Test Procedures
MITL9105/9110-98-320	Extension Test Procedures
MITL9105/9110-98-350	Troubleshooting

2. DETAILED DESCRIPTION

General

2.01 Each time a trunk is seized, information is collected for the trunk until the trunk is released. The descriptive record is formatted and is available as output. If two or more trunks are involved in a call a separate record is generated for each trunk. This allows each trunk to be analyzed for costing purposes. If an extension dials a trunk, talks to it, then transfers it to another extension, only one call record is generated. However, the number of the second extension appears in the record.

Recorded Information

2.02 SMDR data which is recorded provides information on the following items:

(a) Outgoing, and Incoming calls

(b) Digits Dialed on the Trunk (maximum capacity 26 digits)

(c) Account Codes of up to 12 Digits

(d) Meter Pulses (option)

(e) Outgoing and Incoming Trunk Numbers

(f) System Identity (option)

(g) Long Calls Identified (with programmed durations)

(h) Time to Answer for Incoming Calls

(j) Identifies second Extension in a Transfer

(k) Identifies Conferences and Transfers

(m) Records Answer Supervisions

(n) Indicates if the Attendant was involved in the call.

2.03 The data is output at the RS232 port (Part 3), and each record occupies an 80 character row. If it is also required to print out the System Identifier then System Option 222 (Table 4-1) must be enabled; and the row increases to 84 characters in length.

2.04 A description of each field, which appears in an SMDR record, is shown below; and the complete group of fields is summarized in Table 2-1. This Table includes information with regard to the field symbols used in the following descriptions.

- Long Call Indicator. This optional field contains a '-' for calls of duration 5 to 14 minutes 59 seconds, a '%' for calls of duration 15 to 29 minutes 59 seconds, and a '+' for calls of 30 or more minutes. This is useful when records are to be manually scanned.

- Date (mm/dd). The date is reported numerically as a 2 digit month followed by day. The year is not reported.

- Start Time (hh:mmp). The start time of a call is reported in hours and minutes. Either 12-hour or 24-hour format may be employed.

- Duration of Call (ddddd). The call duration is reported in hours, minutes and seconds). Leading zeroes are output. (Maximum time = 18 hrs, 12 min, 16 sec).

- Calling Party (pppp). This is the party that originated the call. It may be an extension, the attendant, or an incoming trunk, as described below:

(a) Extension Number as Calling Party (cccc). An extension number may be from 1 to 4 digits (0-9, *, #).It is left-justified and space-filled. If tenanting is enabled, the tenant number (1-4) is output as the first digit, and an extension number of from 1 to 3 digits follows it.

(b) Attendant as Originating Party (ATTm). Calls originated by the attendant that do not involve a third party report a calling party of 'ATT' followed by the console number (0-2). If the attendant calls an outside party on behalf of an extension or trunk, that extension or trunk is reported as the caller but the Attendant Flag symbol * appears in the "Attendant was Involved" field (5.03)

(c) Trunk Equipment Number as Calling Party (Tnnn or Xnnn). If the originating party is an incoming trunk, it is output as 'Tnnn' for CO trunks and 'Xnnn' for non-CO trunks. The 'nnn' is the equipment number of the trunk. It has a range from 002 to 112, or 162 to 256. It is always even and includes leading zeroes. The 'T' or 'X' ensures that this number is not confused with an extension number; and CO Attendant trunks may be distinguished from tie trunks.

• Attendant made or answered the Call (f). This one digit field identifies calls originated by or initially answered by the attendant, and reported as a "*". This flag will not appear under other circumstances ie. if a call is transferred to the attendant.

• Trunk Group Access Code (gggg). This field applies to outgoing calls. For incoming calls this field is used to report Time to Answer (see below). The trunk group access code may be from 1 to 4 digits long (0-9, *, #). It is left-justified and space-filled. If tenanting is enabled, the tenant number is output first, followed by an access code from 1 to 3 digits.

• Time to Answer (ttt). This is the number of seconds from the time the trunk is seized incoming until the call is answered. If the call is never answered, this field displays ***. It applies to incoming calls only, the same field is used to define the Trunk Group Access Code for outgoing calls (see above). Leading zeroes are output. It reverts to zero after reaching 256.

• Digits Dialed on the Trunk (xxx ..... x). The maximum number of digits (0-9, *, #) recorded is 26. If the 'SMDR: Record Meter Pulses' option is selected, this reduces to 20, to leave room for the 5 digit meter. On outgoing calls, this field does not include the trunk group access code unless it is an 'Identified Trunk Group' in which case this is pulsed out on the trunk in front of the digits dialed. On dial-in trunk calls, the digits dialed in on the trunk are recorded. If more than 26 digits are dialed, the 26th is overwritten. No digits are recorded if the number is confidential.

• Meter Pulses (mmmmm). The number of reversals received from an outgoing trunk is, optionally, recorded. The range is 0 to 65536. Leading zeroes are output. The 'SMDR: Record Meter Pulses' option must be selected. The maximum number of digits recorded reduces from 26 to 20. The trunk group must be programmed for 'Answer Supervision'; that is, the first digit of the trunk group 'Type' must be '2' or '4'. Meter pulses are not recorded for other groups.

• Call Completion Status (h) (Outgoing Calls). This field is used to report the completion of an outgoing call in so far as the PABX is able to determine it. If the outgoing call fails the toll deny checking, and is dropped, this field contains a 'T'. If the trunk group is programmed to take 'Answer Supervision' (i.e. first digit of its 'Type' is '2' or '4'), and a supervision is received, an 'A' is reported. If the trunk group is programmed for 'Toll Reversal' (i.e. first digit of its 'Type' is '3'), and a supervision is received, a 'T' is reported.

• Call Completion Status (Incoming Calls). On incoming calls, the PABX knows the outcome of the call and thus can report it more fully. If the extension or hunt group to which the call is directed is busy, a 'B' is reported. If an incoming dial-in trunk dials an invalid number and receives reorder tone an 'E' is reported. The field is blank for incomplete calls. A "T" is reported if the incoming trunk is answered with TAFAS.

• Speed Call (S). This field contains an "S" if the number was speed dialed, and a space if not.

• Called Party (qqqq). This is the party to whom the call is directed. It may be an extension number, the attendant or, for outgoing calls, the equipment number of the trunk. The format in which the called party is output is identical to that used for the calling party. See Calling Party (pppp). On incoming calls directed to the attendant, the called party would be the attendant unless the attendant transfers it to an extension; in which case, it is the extension

number. For direct-in lines, it would be the extension number. For more information, see 5.05.

- Transfer/Conference Call (K). Calls that involve three or more parties are indicated by means of this field. It contains a 'T' for supervised transfers, 'X' for unsupervised transfers (i.e. dead transfer or transfer into busy) and a 'C' for three-way conversations and conferences.

- Third Party (rrrr). The third party field contains the number of the extension to which a trunk call has been transferred by another extension. If several transfers take place for one trunk call, the first party is the only one reported. The format is identical to that of the Calling Party (pppp).

- Account Code (aaa ..... a). This is an optional field and is only present if the 'Account Code' feature is used. See Appendix 1 for a discussion of account codes. Account codes may only contain digits from 0 to 9, and their maximum length is 12 digits. Leading zeroes are reported if they are dialed.

- System Identifier (iii). This optional 3-digit field may contain values from '000' to '999'. '000' means no identifier has been entered.

3. INSTALLATION

General

3.01 Installation to meet the Station Message Detail Recording requirements consists of the following steps:

(a) Verification that Generic 205 software is included in the SX-100 or SX-200 PABX system.

(b) Determination of the required output configuration (Figs. 3-1 and 3-2).

(c) Installing the hardware items.

(d) Programming and operation of the completed system (Parts 4 and 5).

Printer Configuration

3.02 The SX-100 and SX-200 PABX has an RS232 data port to the SMDR facility. A local printer may be connected to this port to provide on-premises printout (Fig. 3-1). The port may also be connected to a remotely-located facility via an RS232 adapter and a modem (Fig. 3-2). The required printer characteristics are as follows:

(a) 80 character line length. If the system identifier is to be printed (System Option 222 enabled), an 84 character line length is required.

(b) 110 or 300 baud character rate. Baud rate is switch-selectable on the PABX scanner card to accomodate the rate.

(c) The subset of required ASCII characters is illustrated in Fig. 3-3.

(d) Each line printout from the PABX data port is terminated by a "carriage return" and "line feed" character. For printers which require an extra delay six "NUL" characters may be added to the termination (System Option 207).

Magnetic Tape Recorder Configuration

3.03 The data port may also be (locally or remotely) terminated by an RS232 compatible magnetic tape recorder instead of a printer. The SMDR data thus stored may be subsequently retrieved as required.

Cabling and Cross-Connections

3.04 Section MITL9105/9110-98-200 details the installation of SX-100 and SX-200 PABX systems. Parts 9 (Installation Requirements) and 10 (Cabling and Cross-Connections) of the Section show the general procedures to be used in making these connections.

Cabling Requirements, Local Terminal

3.05 The printer or recorder should be located as near as possible to, and no further than 50 feet from the PABX. A 25 conductor connectorized cable must be run and connected between the local printer and the PABX data port

TABLE 2-1
SUMMARY OF FIELDS IN SMDR RECORDS

Name	Columns	Format	Definition	Notes
Long Call	1	z	- = 5-9 mins % = 10-29 mins + = 30 or more mins	See System Options Table
Date	2-6	mm/dd	mm = Month dd = Day	mm = 01-12 dd = 01-31
Spacer	7		_ = Space	
Start Time	8-13	hh:mmp	hh = Hours mm = Minutes p = p or	1-12 or 00-23 00-59 pp = PM (12 hour clock) = AM or 24 hour clock
Spacer	14		_ = Space	
Duration of call	15-22	hh:mm:ss	hh:mm:ss = duration in hours:minutes:seconds	hh = 00-18, mm = 00-59 and ss = 00-59
Spacer	23		_ = Space	
Calling Party	24-27	pppp	cccc = Extension Number tccc = Tenant, ext. number Tnnn = Trunk Equipment Number (CO) Xnnn = Trunk Equipment Number (Non-CO) ATTm = Attendant	c = 0-9, *, #; left-justified t = 1-4 nnn = 002-112; 162-256 m = Console No. (0-2)
Spacer	28		_ = Space	
Attendant	29	f	* = Attendant _ = Attendant not involved	Attendant answered or initiated the call, then transferred it to an extension
Trunk Group Access	30-33	gggg	cccc = Access Code tccc = Tenant Code Outgoing and Tandem Calls Only	c = 0-9, *, #, left-justified t = 1-4
Time to Answer (Alternate)	30-33	Ottt	Ottt = Time in seconds (000-256) *** = Call unanswered	Leading zeroes output. Incoming calls only.

TABLE 2-1 (CONT'D)
SUMMARY OF FIELDS IN SMDR RECORDS

Name	Columns	Format	Definition	Notes
Digits Dialed on the trunk	34-59	xx x	Up to 26 (20 if metering) digits dialed on the trunk	x = 0-9, *, or #; left-justified. No digits if number is confidential
Meter (Optional)	55-59	mmmm	mmmm = Number of meter pulses	mmmm = 00000 to 65536 Leading zeroes
Call Completion Status	60	h	A = Answer Supervision B = Callee is Busy E = Caller Error T = Toll Denied or TAFAS answered	Outgoing Incoming Direct/Dial-In Incoming/Dial-In Incoming Incoming/Outgoing
Speed Call	61	S or	S = Number was Speed called	Outgoing
Called Party	62-65	qqqq	cccc = Extension Number tccc = Tenant ext. number Tnnn = Trunk Equipment No. (CO) Xnnn = Trunk Equipment No. (Non-CO) ATTm = Attendant	C = 0-9, *, #; left-justified. t = 1-4 nnn = 0002-256 m = Console No. = 0-2
Transfer/ Conference Call	66	K	T Supervised Transfer X = Unsupervised Transfer C = Three-Way or Conference	'Dead Transfer' or 'Transfer Into Busy'
Spacer	67		_ = Space	
Third Party	68-71	rrrr	cccc = Extension Number tccc = Tenant Ext. No.	c = 0-9, *, ; left-justified t = 1-4
Account Code (Optional)	73-84	aa .... a	Length of 1 to 12 digits	a = 0-9 space-filled
Spacer (Optional)	85		_ = Space	
System Identifier (Optional)	86-88	iii	Entered by System Id Console Function (*17)	i = 0-9 iii = 000-999 000 = 'No Code entered'

(plug P302). Table 10-2 of Section MITL9105/9110-98-200 shows the connections of plug P302.

Cabling Requirements, Remote Facility

3.06 When the PABX data port interconnects with a remotely located facility, requiring the use of a modem, an RS232 Adapter (Mitel P/N 9110-052) is installed between the data port and the connectorized cable to the modem. The RS232 Adapter presents the proper interface connections required when the data port (P302) is cabled to the modem. The modem is connected via the cross-connect field to the external facility following standard installation practices. Fig. 3-2 illustrates these cabling arrangements.

4. PROGRAMMING

General

4.01 This Part describes the programming options and procedures which are required in connection with Station Message Detail Recording and also refers to other options which are of particular interest to SMDR.

4.02 System and COS Options which are directly applicable to SMDR, and other options which are required for printer operation are described in Table 4-1.

4.03 Console Access Function codes which are required to perform printer control functions from either an attendant or a maintenance console are listed in Table 4-2.

4.04 Account Code programming options and features are described in Appendix I.

Programming Procedures

4.05 Programming procedures for the SX-100 and SX-200 PABX's are detailed in Section MITL9105/9110-98-210. When the SMDR facility is a requirement (Generic 205 software must be used), the SMDR options and features should be programmed with the other options and features for new installations; or they may be added for existing installations.

4.06 The SMDR facility is not effective unless the proper trunk group type is programmed. Thus SMDR reporting can be restricted to only certain trunk groups. When so programmed only this type will force an account code (Appendix 1) to be entered before dialing the trunk group. When entering the trunk group program as detailed in Section MITL9105/9110-98-210 the four digit type must have, as the second digit entered, the digit "3" or "4". When the digit "4" is entered the Message Registration feature also applies to this trunk group.

4.07 On completion of programming the SMDR facility will be operational. A brief outline of the operational procedures with examples of SMDR printouts is contained in Part 5.

5. OPERATIONAL PARAMETERS

General

5.01 There are no special operational procedures employed by the attendant or extension, except when account codes are required to be reported. In this case the procedures outlined in Appendix 1 are followed. The following operational parameters should be noted when SMDR is used.

Non-Recording Conditions

5.02 SMDR is initiated when an outgoing trunk is seized, and (if enabled) when an incoming trunk is seized. SMDR is not initiated under the following conditions:

- Busy tone is obtained by the attendant or an extension when a trunk is dialed (because all trunks in the group are busy).

- Reorder tone is obtained by the caller.

- The attendant intercepts an extension attempting to access a trunk group.

- During a power fail condition no SMDR records are made because storage is in the volatile RAM.
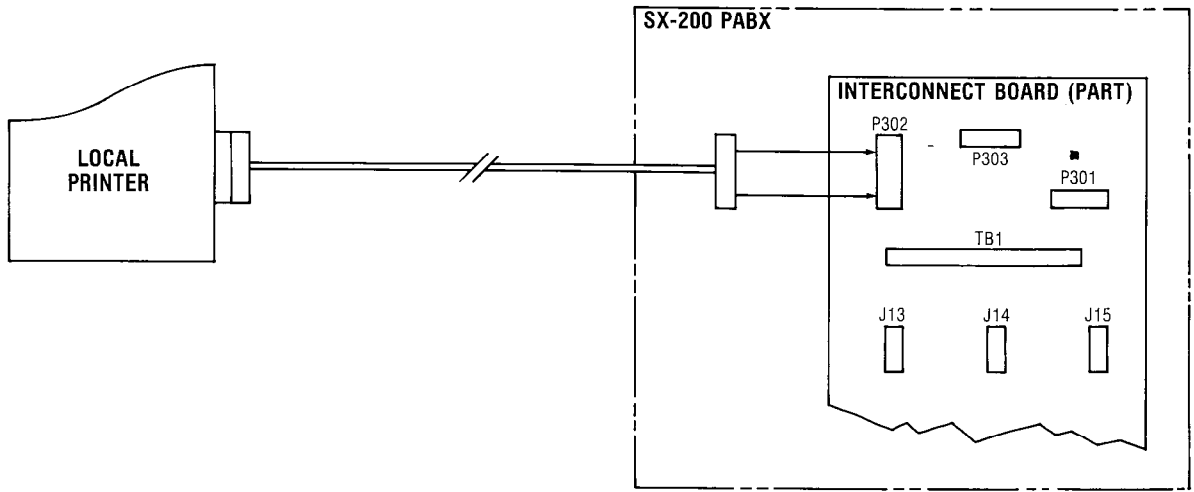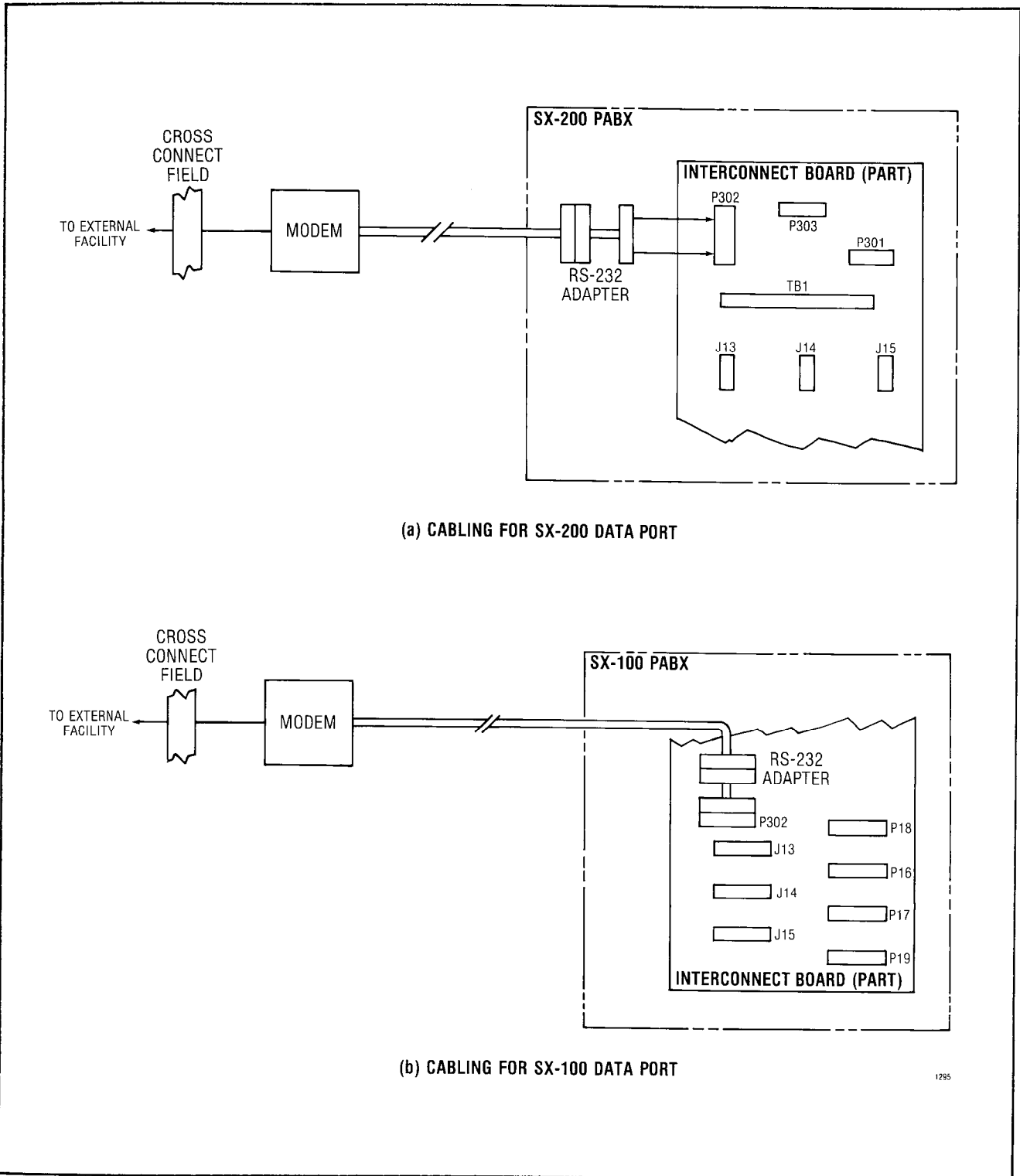
(a) CABLING FOR SX-200 DATA PORT

(b) CABLING FOR SX-100 DATA PORT
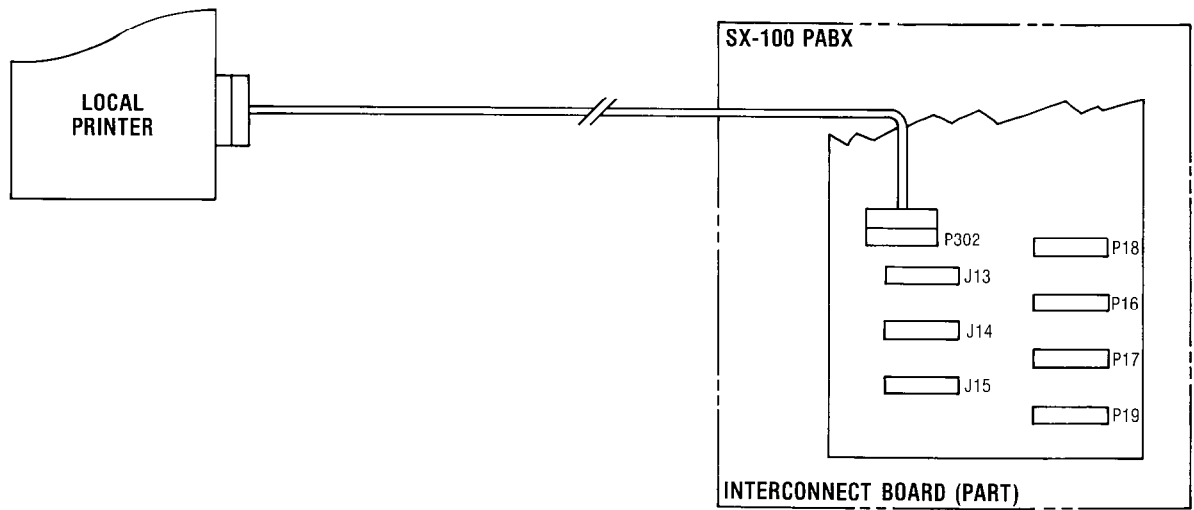
Fig. 3-1   Cabling to Local Printer

(a) CABLING FOR SX-200 DATA PORT

(b) CABLING FOR SX-100 DATA PORT

Fig. 3-2   Cabling to Remote Printer

TABLE 3-3
CHARACTER SET

BIT NUMBERS							COLUMN → / ROW ↓	0 0 0	0 0 1	0 1 0	0 1 1	1 0 0	1 0 1
b7	b6	b5	b4	b3	b2	b1		0	1	2	3	4	5
			0	0	0	0	0	NUL		SP	0	@	P
			0	0	0	1	1		DC1	!	1	A	Q
			0	0	1	0	2			"	2	B	R
			0	0	1	1	3		DC3	#	3	C	S
			0	1	0	0	4				4	D	T
			0	1	0	1	5			%	5	E	U
			0	1	1	0	6			&	6	F	V
			0	1	1	1	7	BELL		′	7	G	W
			1	0	0	0	8			(	8	H	X
			1	0	0	1	9			)	9	I	Y
			1	0	1	0	A	LF		*	:	J	Z
			1	0	1	1	B			+	;	K	
			1	1	0	0	C	FF		,		L	
			1	1	0	1	D	CR		—	=	M	
			1	1	1	0	E			.		N	
			1	1	1	1	F			/	?	O	

NOTES 1. Control DC1 or a "break" or NULL causes printing.
2. Control DC3 suspends printer.

TABLE 4-1
SMDR OPTIONS
A - SYSTEM OPTIONS

System Options	Description
196	Ignore Print Enable. This option must be enabled if the attendant function * 1400 (Table 4-2) is to be effective.
207	Printer Carriage Return Delay. The option causes six nulls to be sent to the printer following Carriage Return/Line Feed. This delay is not required by some printers. If this option is not selected, no nulls are sent.
210	Attendant Printer Control Enable. This option must be selected to enable the use of the printer commands * 14 (Table 4-2).
220	Station Message Detail Recording: Outgoing Calls. This option enables the Station Message Detail Recording feature for outgoing trunk calls.
221	Station Message Detail Recording: Incoming Calls. This option enables the Station Message Detail Recording feature for incoming trunk calls. (NOTE 2).
222	SMDR: Extended Record. If this option is enabled, the length of the SMDR record is extended from 80 to 88 columns. This allows the last four columns of 12 digit account codes and the System Id to be reported.
223	SMDR: Record Meter Pulses. If this option is selected, the number of meter pulses generated by the Central Office is reported in the SMDR record. With this option, the number of digits recorded on the trunk is 20. If it is not selected, the number of digits recorded is 26. This option is not meaningful unless System Option 220 is also selected.
224	SMDR: Indicate Long Calls. If this option is selected, calls of 5 minutes or longer are flagged in the SMDR record (see also Table 2-1).
225	SMDR: Drop Incomplete Outgoing Calls. If this option is selected, outgoing calls that are incomplete are not reported. If a trunk group is programmed for Answer Supervision, calls that do not receive Supervision are not reported. If a group is not programmed for Supervision, a "pseudo-answer supervision" timeout must be assumed. Calls that last less than that time are not reported. The same timer is used as for Message Registration, i.e. it is 20, 30 or 40 seconds depending on the status of options 158 and 159.
226	SMDR: Record Only Incoming CO Calls. If this option is selected, incoming calls on incoming CCSA and non-dial tie trunks are not recorded. DID calls and standard CO calls are recorded. The recording of incoming calls on dial-in tie trunks and DISA trunks is controlled via COS option "No SMDR Record For This Line".
227	SMDR: Drop Calls of Less Than 8 Digits. If this option is selected, outgoing calls in which less than 8 digits are dialed on the trunk are not reported. This option is only meaningful if option 220 is also enabled.

5.03 SMDR is also not initiated if the trunk group is not programmed for SMDR (4.06); or the following System Options are enabled and the relevant conditions (Table 4-1) apply:

- System Option 225 – SMDR: Drop Incomplete Outgoing Calls

TABLE 4-2
SMDR CONSOLE FUNCTIONS CODES

System Options	Description
	Part A - Attendant Function Codes
14	Suspend Printout. SMDR output may be suspended by the console attendant, in order to change paper for example. The command is as follows: • Enter *14* from keypad • Press RELEASE key Printout is suspended at the end of a current line if one is being printed. No output is lost. Caution should be observed in using this function code because if it is set for an extended period it may result in the build up of busy conditions on outgoing trunk groups and the prevention of incoming trunk calls.
*14#	Resume Printout. Traffic data output may be resumed after either a "suspend" or "ignore" (see below) by the console attendant as follows: • Enter *14# from keypad • Press RELEASE key
*1400	Purge and Ignore Printout. SMDR output may be ignored (inhibited) by the console operator if the required arises to use the printer for other purposes. The command is as follows: • Enter *1400 from keypad • Press RELEASE key All printout is ignored and lost. System Option 196 (see Table 4-1) must be enabled for this command to be effective. **Part B - Maintenance Function Codes** (It is assumed that 555 is the maintenance function code in this list.) Some of the console function codes may be duplicated from the PABX test line and perform the same function. These are listed below:
555 + 8 + * or 1	Suspends printout. The last symbol may be replaced by 1 on the rotary dial.
555 + 8 + # or 2	Resumes printout. The last symbol may be replaced by 2 on the rotary dial.
555 + 8 + 00	Ignore printout. System Option 196 (see Table 4-1) must be enabled for this function to be effective.

- System Option 226 – SMDR: Record only Incoming Calls

- System Option 227 – SMDR: Drop Calls of Less Than 8 Digits.

Attendant Handled Calls

5.04 The following conditions are reported as shown when the attendant handles a call (see also 2.04):

- If the attendant dials a trunk with no extension or trunk involved, the calling party is the attendant.

- Direct Trunk Accesses by the attendant are reported. The 'Trunk Group Access Code' field is blank.

- If the attendant makes an unsupervised transfer to an extension the called party is the attendant, and the extension appears as a third party.

- If the attendant answers a trunk call and does not transfer it to an extension, the called party is the attendant.

- If the attendant dials a trunk while it has an extension as its source, the calling party reported is the extension and '*' appears in the 'Attendant was involved', field.

- If the attendant dials a trunk, then takes an extension off hold and hits Release, the calling party is the extension and '*' appears in the 'Attendant was Involved' field.

- If the attendant has a trunk as Source, then dials an extension the extension answers, the attendant presses RELEASE, the calling party is the trunk, the called party is the extension, and '*' appears in the 'Attendant was Involved' field.

Incoming Calls

5.05 When SMDR is enabled for incoming calls (System Option 221) the following conditions are reported:

- Digits dialed on incoming DID, DISA or dial-in tie trunks are reported in the 'Digits Dialed on the Trunk' field. If the dial-in trunk dials an illegal or vacant number or hangs up before completing the number, the call is still reported. The called party is the extension dialed. The DISA Security Code is not reported.

- The called party is the attendant unless the attendant then dials an extension. In that case, the called party becomes the extension and an '*' is reported in 'Attendant was Involved'. Attendant-handled calls are further discussed in 5.04.

- Direct-in trunks will show the extension number as the called party; as for dial-in trunks. However, the 'Digits Dialed' field is blank. If the trunk is directed to a hunt group, the extension that answered the call is reported.

- On incoming calls, an "E" is reported if the trunk hangs up while listening to reorder tone or a "B" if the trunk hangs up while listening to busy tone. A "T" is reported if the incoming call is answered with TAFAS.

Examples

5.06 Typical SMDR printouts are shown in Table 5-1.

TABLE 5-1
SMDR PRINTOUTS

```
0          1          2          3          4          5          6          7          8          9
12345678901234567890123456789012345678901234567890123456789012345678901234567890123456789012345678901234567890
```

EXAMPLE 1 TWO PARTY OUTGOING CALL

```
-06/13 11:42  00:08:29 214    9    16135922122                      A-T054          419356          000
```

On June 13th at 11:42 AM, extension 214 dialed an account code of "419356", then dialed "9" to get an outside line. The extension obtained trunk equipment number 54 and dialed "1-613-592-2122". Answer supervision was provided. The conversation lasted 8 minutes, 29 seconds.

EXAMPLE 2 TWO PARTY OUTGOING CALL

```
 05/17 10:51  00:01:52 213    5    201                              A-X082                          000
```

On May 17 at 10:51 AM, extension 213 dialed 5 to get an identified trunk group, then 201 to obtain an extension in the other PABX. The other PABX provided supervision and the conversation lasted 1 minute, 52 seconds. The trunk equipment number was 082.

EXAMPLE 3 TWO PARTY INCOMING CALL

```
 01/30 03:10P 00:02:22 T102   008 201                              201                             000
```

On January 30 at 3:10 PM, incoming direct-in trunk number 102 range in to extension 201. The extension answered after 8 seconds and they talked for 2 minutes, 22 seconds.

EXAMPLE 4 TWO PARTY INCOMING CALL

```
 03/12 09:11  00:01:12 X116   007 63                               224                             000
```

On March 12 at 9:11 AM, dial-in tie trunk 116 dialed hunt group with access code "63". Extension 224 answered after 7 seconds, and the conversation lasted 1 minute, 12 seconds.

EXAMPLE 5 ATTENDANT HANDLED CALL - OUTGOING TRUNK

```
+01/30 03:27P 00:35:11 201    *9    16545996951                     A-T052                          000
```

On January 30 extension 201 dialed the attendant and asked for an outside line. The attendant dialed 9 followed by 1-654-599-6951 then pressed Release. At 3:27 PM the other party answered and the conversation lasted 35 minutes, 11 seconds. Trunk equipment 52 was used.

TABLE 5-1
SMDR PRINTOUTS (CONT'D)

```
0         1         2         3         4         5         6         7         8         9
1234567890123456789012345678901234567890123456789012345678901234567890123456789012345678901234567890
```

EXAMPLE 6 ATTENDANT HANDLED CALL - INCOMING TRUNK

```
04/05 01:42P 00:00:31 T090   009                                ATT2                    000
```

On April 5th at 1:42 PM, trunk 90 rang into the attendant. After 9 seconds the attendant at console 2 answered. The trunk party spoke to the attendant for 31 seconds then hung up.

EXAMPLE 7 CALLING EXTENSION TRANSFER CALL

```
04/02 09:36  00:04:55 103    91    59222122                     T162T 100               000
```

On April 2nd at 9:36 AM, extension 103 dialed trunk access code 91 followed by 592-2122. The called party answered, and after conversing the caller transferred the called party to extension 100. After further conversation extension 100 hung up. The total period for both conversations was 4 minutes, 55 seconds. Trunk equipment 162 was used for the call.

EXAMPLE 8 CALLED EXTENSION TRANSFER CALL

```
03/12 07:42  00:03:06 T162  *003                                241T 215                000
```

On March 12th at 7:42 AM, trunk 162 rang the console and requested to speak to extension 241. The attendant took 3 seconds to answer the call. After speaking to extension 241 the latter extension then tranferred the call to extension 215. The total conversation lasted 3 minutes, 6 seconds.

EXAMPLE 9 ATTENDANT CONTROLLED CONFERENCE (WITH TRUNK)

```
%03/10 09:48  00:13:40 ATT1 *93    5924130                      T178C                   000
```

At 9:48 AM on March 10th the attendant dialed CO trunk access code 93 and seized trunk equipment 178. The call was then completed by dialing 592-4130. After speaking to the called party the attendant set up a controlled conference by dialing three internal extensions and adding them to the conference in turn. The conference lasted for 13 minutes, 40 seconds. The record will not show what extensions were added.

APPENDIX 1
ACCOUNT CODES

GENERAL

A1.01 Account codes may be used by the customer for the purpose of client billing or management reports. In addition if an extension is programmed with COS options 56 and 83 it is unable to access a trunk circuit unless the proper account code is entered. Account codes may be from 1 to 12 digits in length.

PROGRAMMING

A1.02 A list of the System Options available is shown in Table A1-1. This illustrates the variations possible with regard to the length of the account code.

A1.03 Related additional programming requirements for use with Account code operation is as follows:

- Class of Service Option 56 – Account Code Entry. An extension with this option may dial an account code before making a trunk call.

- Class of Service Option 83 – Forced Account Code Entry. An extension with this option in its COS must dial an account code before making an outgoing trunk call. It is effective only if COS Option 56 is enabled.

- Feature 31 – Account Access Code. An extension may dial this code followed by an account code prior to making a trunk call.

- Attendant Function. The attendant Account Access Code function is accessed by dialing *0.

OPERATION

A1.04 An account code may contain only the digits 0 through 9. * and # are illegal digits. If variable codes (Option 234) are used the number of dialed digits (including the delimiter #) must be between 1 and the maximum length.

Extension Operation

A1.05 An extension, allotted an account code, proceeds to make a trunk call according to the abbreviated sequence shown below:

- The account access code is dialed.

- The account number is dialed. This may require the addition of the delimiter symbol # (see Option 234, 1).

- The trunk group access code is dialed. If busy tone is heard the call should be placed later, as it is not possible to set up a camp-on or callback when account codes are applicable.

- When dial tone is heard the normal calling digits are dialed to obtain the required party

Attendant Operation

A1.06 The attendant may include an account code for a trunk call. The abbreviated sequence of operations is as follows:

- The account access code (*0) is dialed.

- The account number is dialed followed by #.

- The trunk group access and required party number digits are dialed.

TABLE A1-1
ACCOUNT CODE SYSTEM OPTIONS

System Options	Description
230	Account Code Enable. This option enables the Account Code feature. If has no effect unless one of the Station Message Detail Recording Options (220 and/or 221) is also enabled.
231	Account Code Length = 4 Digits. If this option is selected, the length or maximum length of an account code is 4 digits. This option is only meaningful if option 230 is also selected.
232	Account Code Length = 8 Digits. If this option is selected, the length or maximum length of an account code is 8 digits. This option is only meaningful if option 230 is also selected.
233	Account Code Length = 12 Digits. If this option is selected, the length or maximum length of an account code is 12 digits. This option is only meaningful is option 230 is also selected.
234	Variable Length Account Codes. If this option is selected, DTMF extensions and the attendant may enter an account code of less digits than the length defined by options 231/232/233. This is done by dialing a '#' as a delimiter. If this option is not selected, only account codes of a fixed length, may be entered. This option is not meaningful unless option 230 is also enabled.
NOTES:	1. If neither 231, 232, or 233 is selected, the length of account codes is 16 digits.
	2. Only one of the options 231, 232 or 233 should be selected. If more than one is set, the lowest is chosen.

SX-100* AND SX-200*
SUPERSWITCH*
ELECTRONIC PRIVATE AUTOMATIC BRANCH EXCHANGE
GENERAL MAINTENANCE INFORMATION

CONTENTS	PAGE

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1. INTRODUCTION

A. General

1.01 This section contains a brief description of the maintenance and diagnostic procedures used to maintain the SX-100 and SX-200 Electronic Private Automatic Branch Exchanges (EPABX).

Reason For Issue

1.02 This section is issued to include Generic 205 information.

2. SYSTEM OVERVIEW

A. General

2.01 The SX-100 and SX-200 are advanced Electronic Private Automatic Branch Exchanges (EPABX) employing digitally controlled solid-state space-division switching and stored program control. One hundred and twelve of the ports are available for assignments to lines, trunks and receivers. The remaining 48 ports are reserved for control and special functions. Fig. 2-1 shows the maximum line and trunk configuration for the SX-100. In the SX-200 two hundred and eight ports are available for assignments to lines, trunks and additional receivers. There are 48 ports reserved for control and special functions. Fig. 2-1 shows the maximum line and trunk configuration for the SX-200. The SX-100 and SX-200 are electrically compatible with most existing extension, key telephone, Private Branch Exchange (PBX) and Central Office (CO) equipment and provides—

- service to a maximum of four individual customers

- the use of a flexible numbering plan

- the simultaneous use of DTMF and rotary dial stations

- optional use of attendant consoles—2 maximum

- the sharing of attendant consoles between customers

- extensive selection of standard and optional features

- freedom from scheduled maintenance

- automatic diagnostics

- six power fail transfer trunks (SX-100)

- twelve power fail transfer trunks (SX-200)

- optional reserve power supply
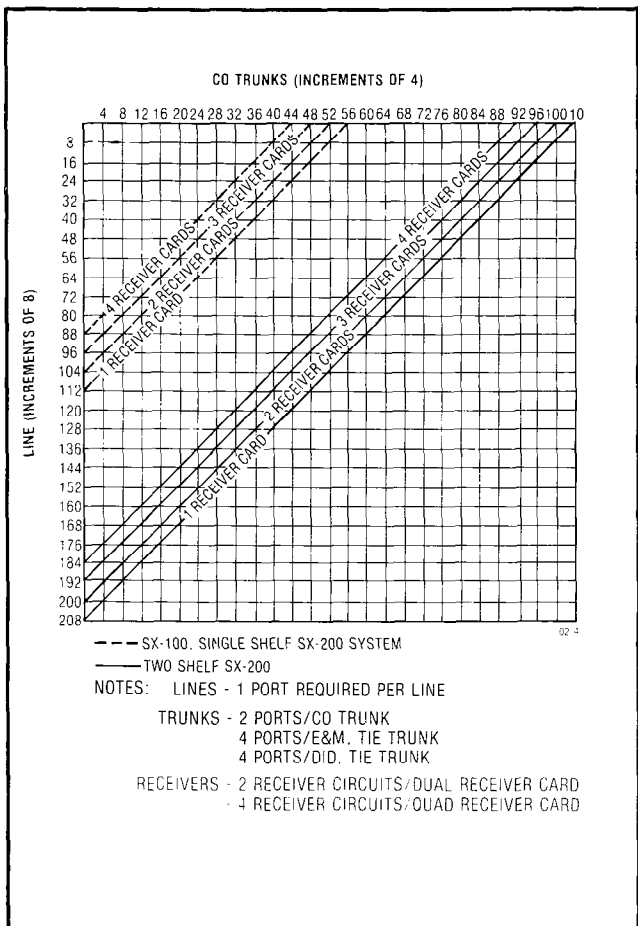
**Fig. 2-1
Maximum Line and Trunk Configuration**

2.02 The SX-100 and the SX-200 each consist of a single cabinet (containing the switching circuitry and the system power supplies) and a cordless desk type attendant console equipped with pushbutton dial pad and control keys. Connections between the equipment cabinet, the console, and the distribution frame are made using connectorized 25 pair cables.

2.03 Noiseless operation, exceptionally small size, and environmental tolerance allow a wide choice of locations for the equipment cabinet.

B. Maintenance

2.04 The modular design and functional packaging of the PABX systems permit rapid location and replacement of defective equipment. Circuit malfunctions are detected by diagnostic routines automatically initiated by the CPU. These diagnostic routines are detailed in MITL9105/9110-98-350 and by the use of MITEL Action Procedures (MAPs) locate the defective circuit card or assembly, and indicate to the service personnel the required field-replaceable unit. Diagnostic routines and maintenance procedures do not interfere with users not affected by the malfunction. Because the system employs only electronic circuits, preventative maintenance is not required.

2.05 System expansion is achieved by the addition of plug-in line and trunk printed circuit cards. Lines are added in increments of eight, CO trunks in increments of four, special trunks in increments of two.

C. Physical Description

2.06 The SX-100 and the SX-200 equipment cabinets are of metal construction and are shown in Fig. 2-2 and 2-3.

2.07 All connections from the cross-connecting terminals to the PABX equipment cabinet are made using connectorized cables. Connections between the cross-connecting terminals, the attendant console and external equipment are made in accordance with accepted practice.

2.08 A reserve power supply and battery charging system are available as an option. The reserve power supply is designed to maintain system operation for a minimum of two hours in the event of a primary power failure. These items can be mounted within the SX-200 cabinet, but are packaged into a shelf that forms a pedestal for the SX-100.
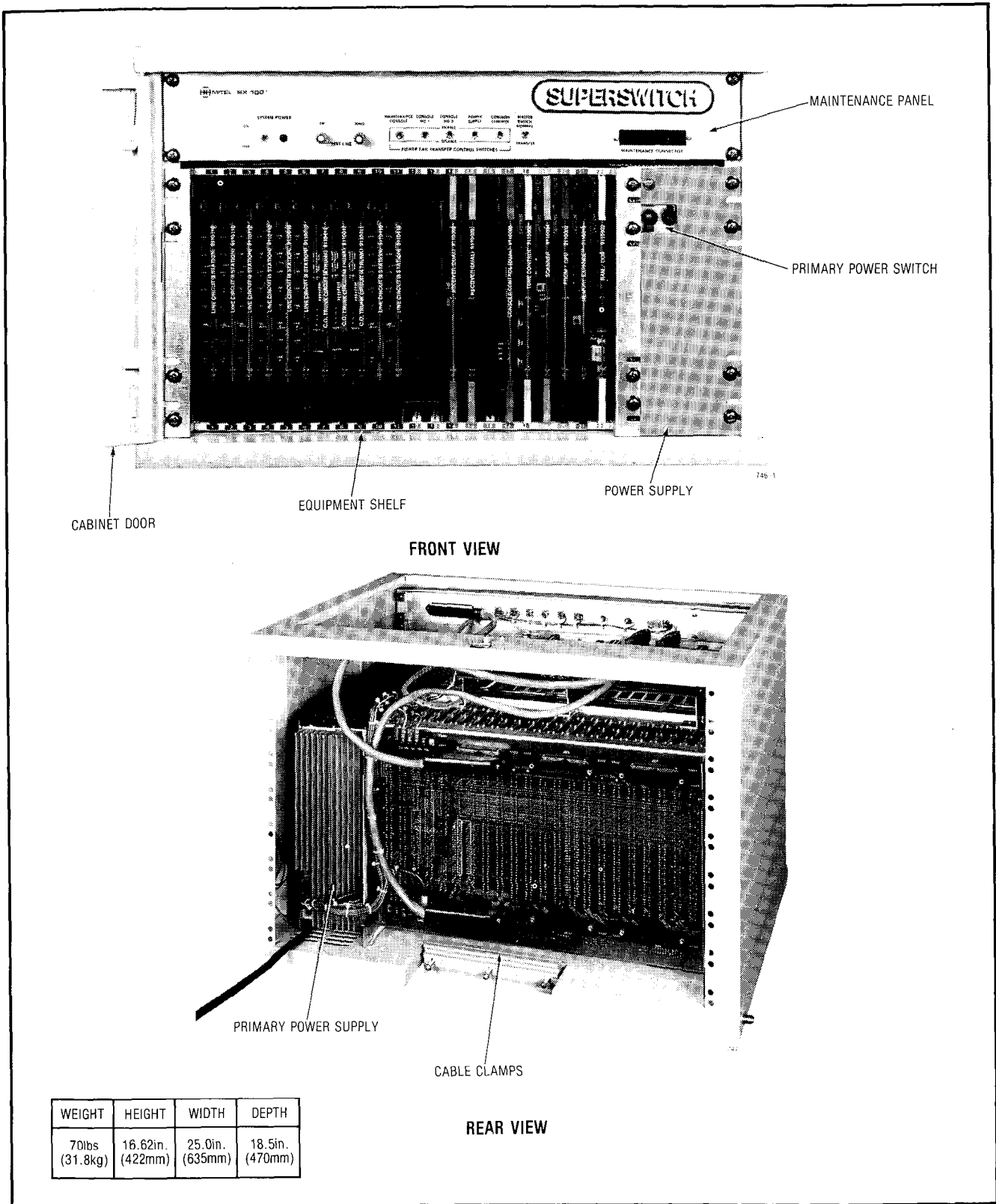
D. SX-100 Equipment Cabinet

2.09 The door on the front of the SX-100 cabinet provides access to the system maintenance panel and the printed circuit cards (Fig. 2-2). The removable rear panel provides access to the system power supply, and the line and trunk connections. Cable entry to the equipment cabinet is provided through a cable duct in the rear of the cabinet. The maintenance panel, mounted at the top of the cabinet, provides access to the system from the maintenance console through a 50 pin connector. To the left of the maintenance plug is the master power fail transfer switch, five power fail transfer control switches, and the system POWER ON/OFF switch. In addition, a test line is provided which allows service personnel to access individual lines and trunks. Mounted directly below the maintenance panel is the equipment shelf. This shelf contains the system common control cards plus a number of trunk, line, and receiver cards. The optional reserve power supply is contained in a separate unit that the equipment cabinet may sit on.

E. SX-200 Equipment Cabinet

2.10 The door on the front of the cabinet provides access to the system maintenance panel, printed circuit cards and reserve battery supply shelf (Fig. 2-3). The hinged rear panels hold the system power supply, and provide access to the line and trunk connections, and the reserve power controls. Cable entry to the equipment cabinet is provided through cable ducts on either side of the cabinet.

2.11 The equipment cabinet holds the maintenance panel, a maximum of two equipment shelves, the optional reserve battery supply, and the primary power supply. The maintenance panel, mounted at the top of the cabinet, provides access to the system from the maintenance console through a 50 pin connector. To the left of the maintenance plug is the master power fail transfer switch, five power fail transfer control switches and the system POWER ON/OFF switch. In addition, a test line is provided which allows service personnel to access individual lines and trunks. Mounted directly below the maintenance panel is equipment shelf 2. This shelf holds line and or trunk cards. Below equipment shelf 2 is equipment shelf 1. This shelf contains the system common control plus a number

FRONT VIEW

REAR VIEW

WEIGHT	HEIGHT	WIDTH	DEPTH
70lbs (31.8kg)	16.62in. (422mm)	25.0in. (635mm)	18.5in. (470mm)

Fig. 2-2   SX-100 Equipment Cabinet

Front View

MAINTENANCE PANEL

EQUIPMENT SHELF 2

EQUIPMENT SHELF 1

RESERVE POWER SHELF

536 -1

Rear View

CABLE ENTRY

PRIMARY POWER SUPPLY

537 -2

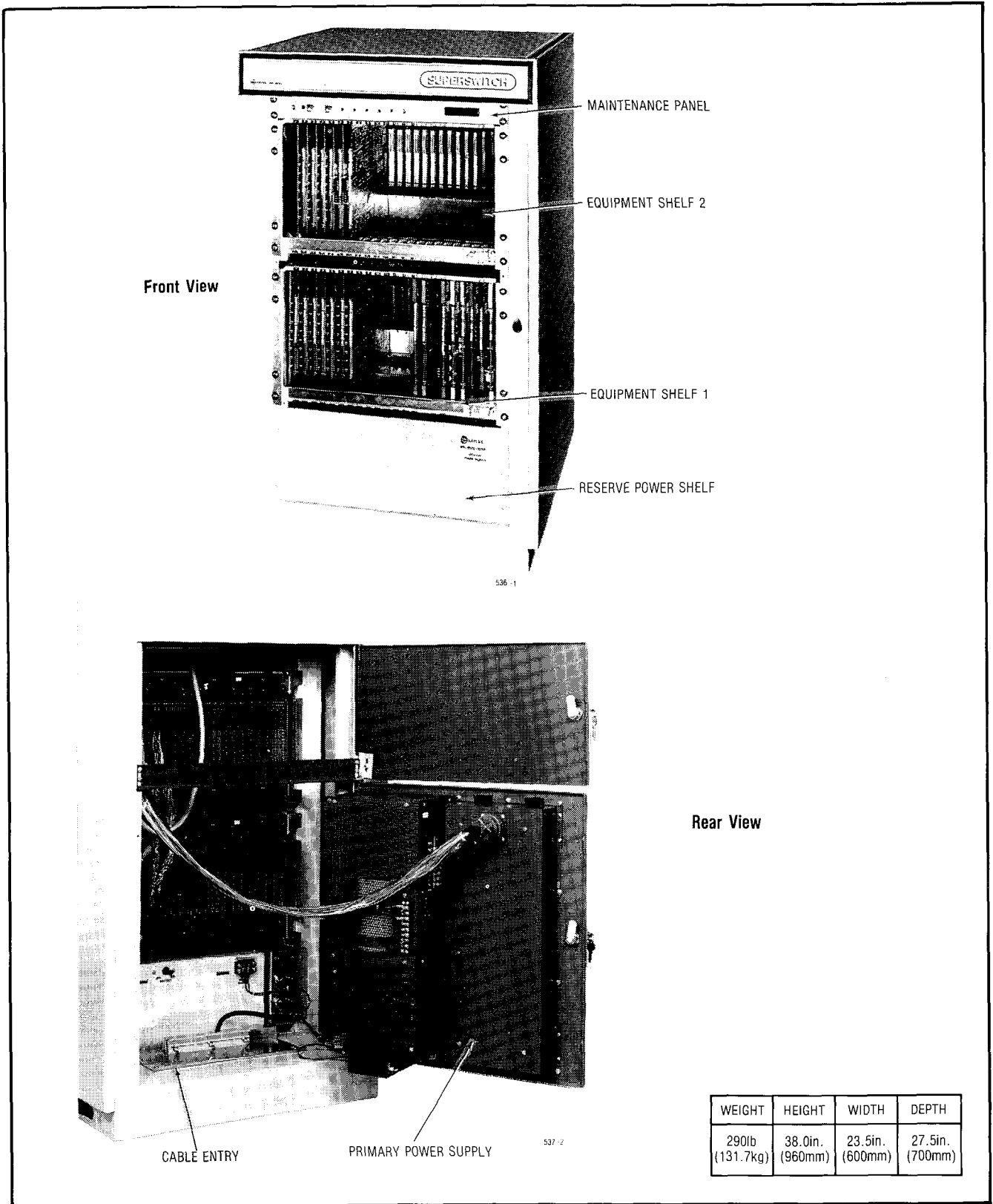| WEIGHT	HEIGHT	WIDTH	DEPTH
290lb (131.7kg)	38.0in. (960mm)	23.5in. (600mm)	27.5in. (700mm)

Fig. 2-3   SX-200 Cabinet Layout

number of trunk, line, and receiver cards. The optional reserve power supply is contained in a completely enclosed shelf located at the bottom of the cabinet. All connections between shelves and external equipment are made by connectorized cables from the rear of each shelf. The system primary power supply, held on the lower hinged back panel of the cabinet, converts the commercial input power to the required system voltage levels.

F. Maintenance Panel

2.12 The plug on the right of the maintenance panel permits the service personnel to perform maintenance tasks and enter new, or modify existing customer data using the maintenance console. The test line terminals on the panel allow the use of a standard hand test-set (butt-in) to establish calls through the system using preselected circuits.

G. Equipment Shelves

2.13 The equipment shelves used in the SX-100 and the SX-200 are identical and hold up to 22 printed circuit cards which plug into the shelf back plane. On the rear of the back plane are a number of 25 pair plugs providing interconnections between the shelves and external equipment. In addition to the plugs are a number of screw down terminals allowing shelf connection to the primary power supply unit. The equipment shelves (Fig. 2-4) measure 10.75in. (273mm) high, 19in. (480mm) wide, 16.37in. (415mm) deep and weigh approximately 27lbs. (12.2kg) fully equipped.

H. Printed Circuit Cards

2.14 All circuit cards (Fig. 2-5) used in the PABX's are identical in construction and consist of a fiberglass board with printed wiring patterns on both of its faces. Riveted to the front of each board is a transparent faceplate which allows the LEDs mounted on the front of the boards to be easily seen. The two color-coded card extractors located at the top and bottom of the faceplate identify the card position within a shelf and ensure that the card is seated correctly in the backplane connector.
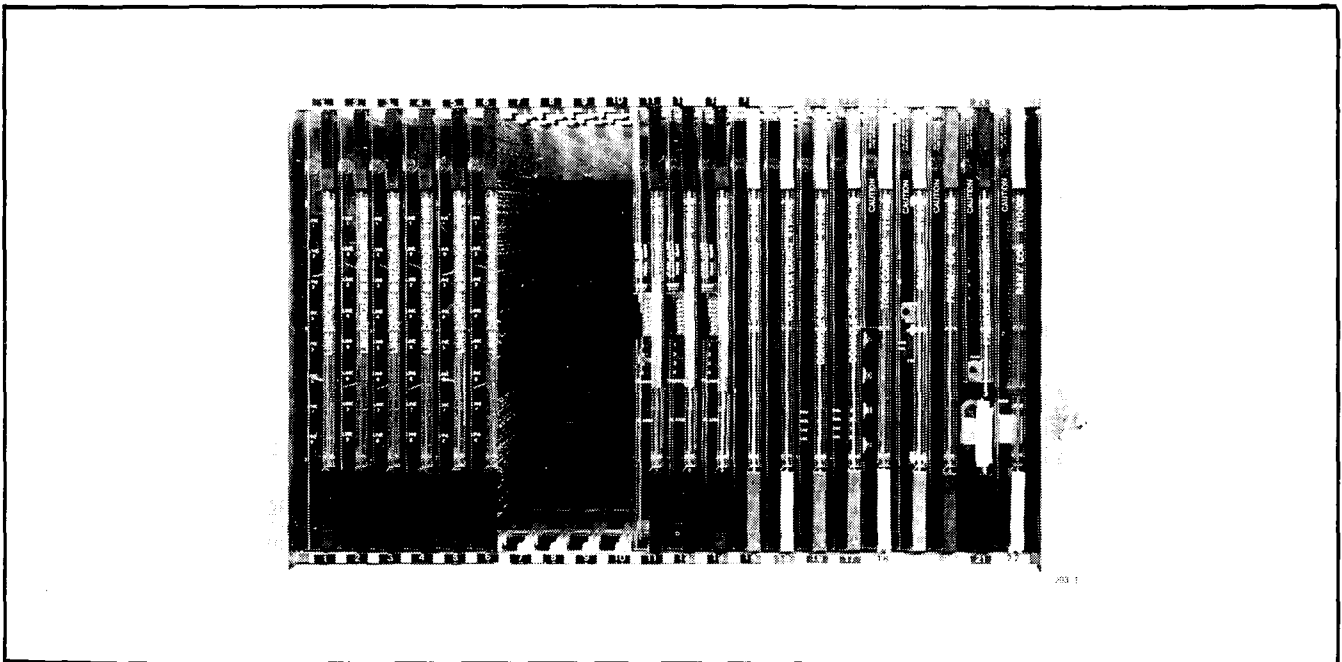

Fig. 2-4 Equipment Shelf

CAUTION NOTICE

PART NUMBER

TRANSPARENT FRONT PANEL

CARD EXTRACTOR
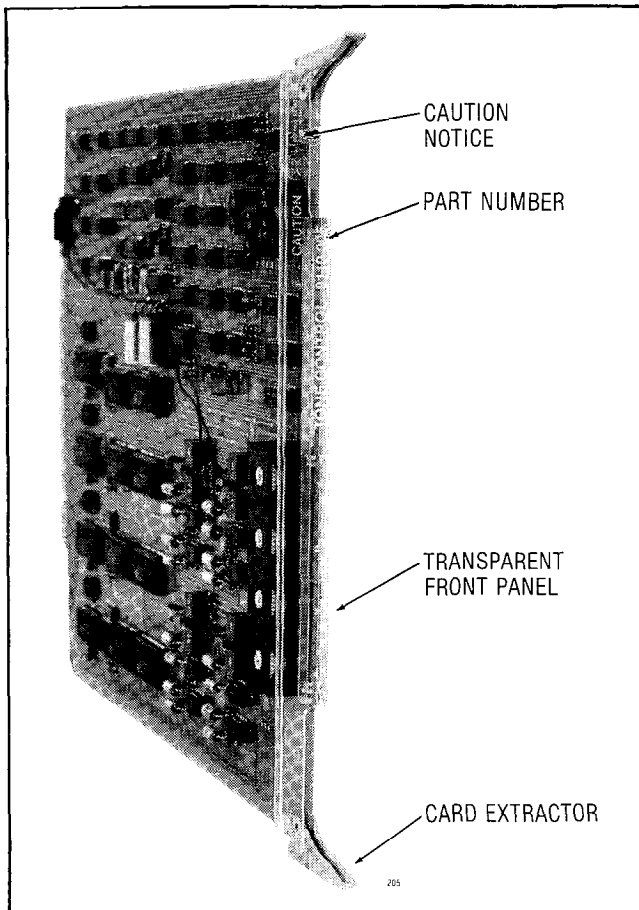
Fig. 2-5   Printed Circuit Card

I.   Primary Power Supply

2.15   The system primary power supply (Fig. 2-6 and 2-7), provides all system power from a 115Vac. In the SX-200 optional factory strapping provides 220Vac operation. The SX-100 has a 220Vac adapter to provide power to the system.

J.   Electrical Characteristics

2.16   The electrical characteristics of the SX-100 and the SX-200 are listed in Table 2-1.

2.17   Both PABX's are designed to operate from a 48Vdc source. A 48Vdc power supply operating from commercial power is standard equipment. The systems may be optionally equipped with a charger and battery arrangement which provides a minimum of 2 hours reserve power in the event of commercial power failure.

2.18   In the event of a power failure with no reserve power available, up to six SX-100 or twelve SX-200 Central Office (CO) trunks can be arranged to be automatically connected to pre-selected extensions.

INTERCONNECT BOARD

PRIMARY POWER SUPPLY

EQUIPMENT SHELF

Fig. 2-6   SX-100 Primary Power Supply

TABLE 2-1
SX-100/SX-200 ELECTRICAL CHARACTERISTICS

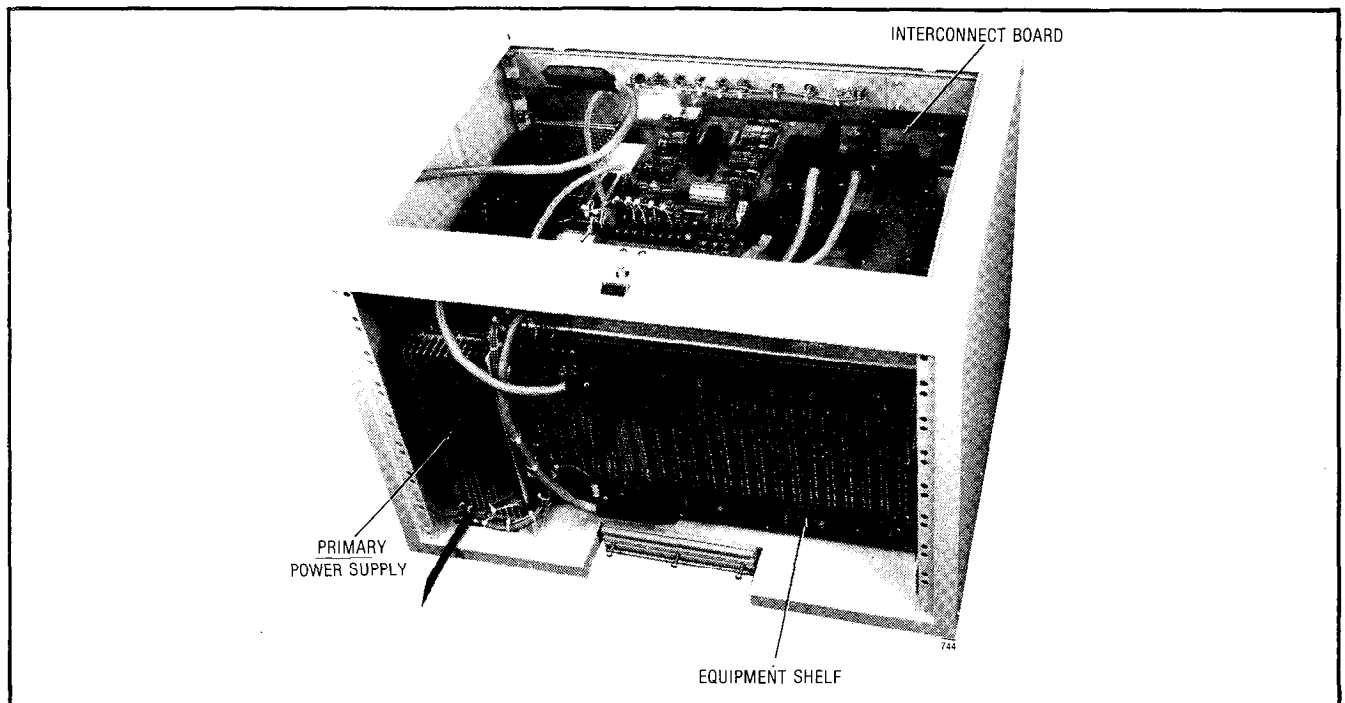|	
Station Loop Limit	1200 ohms including set
Maximum Number of Ringers per Line	7
Ringing	90V, 20Hz - immediate ringing (option of 17Hz or 25Hz)
Standard	1s on, 3s off
Special	0.5s on, 0.5s off, 0.5s on, 2.5s off
Ring Trip	During silent or ringing period
Dial Tone	350/440Hz, continuous
Transfer Dial Tone	350/440Hz, 3 bursts of 100ms on/off, then continuous
Busy Tone	480/620Hz, interrupted at 60ipm
Special Busy Tone	350/440Hz interrupted at 60ipm
Standard Ringback Tone	440/480Hz, 1s on, 3s off
Special Ringback Tone	440/480Hz, 0.5s on, 0.5s off, 0.5s on, 2.5s off
Callback	6 rings of standard ringing
Reorder Tone	480/620Hz, interrupted at 120ipm
Conference Tone	440Hz, 1 burst of 1s
Camp-On Tone	440Hz, one burst of 200ms for station camp-on
	440Hz, two bursts 100ms on, 50ms off, 100ms on
	for trunk camp-on
Override Tone	440Hz, one burst of 800ms followed by a 200ms
	burst every 6s
Crosstalk Attenuation	75dB minimum
Insertion Loss,	
Station-to-Station	5dB ± 0.5dB at 1004Hz
Station-to-Trunk	0.5dB ± 0.3dB at 1004Hz
Trunk-to-Trunk	0.5dB ± 0.3dB at 1004Hz
Tie Trunk to Station on Non-VNL Trunk	2.5dB ± 0.3dB at 1004Hz
Longitudinal Balance	54dB minimum,
Return Loss	14dB minimum
Idle Circuit Noise	16dBrnC maximum
Impulse Noise	No counts over 46dBrnC
Envelope Delay Difference	200µs maximum
System Impedance	600 ohms nominal for lines
	600 or 900 ohms nominal for trunks
Traffic Capacity	7.5ccs/line minimum at 100 lines at P = 0.01
Primary Power	100-125V, 47-63Hz, 4A maximum
Central Office Trunk Loop Limit	1600 ohms
Maximum Distance of Console from Equipment	1000ft. (300m) of 26AWG cable
Operating Environment	0°C to 40°C, 10% to 90% Relative Humidity

K. Attendant Console

2.19 The SX-100/200 attendant console (Fig. 2-8) is enclosed in a housing with a black plastic faceplate. Located on either side of the console are a pair of headset/handset jacks allowing simultaneous operation and supervision. The console keyboard holds three rows of ten nonlocking keys for the selection of features and completion of calls. On the right of the keyboard is a 12-key pushbutton dial pad. The console display, mounted above the keyboard, displays the active states of calls in progress. In addition to the call status display is a busy lamp field, a trunk group status field, a call waiting indicator, a digital clock, and three alarm indicators. The weight of the attendant console is approximately 13lbs (5.9kg) and its dimensions are: 13.75in. (350mm) wide, 6.8in. (176mm) high, and 9.25in. (236mm) deep.

1275

Fig. 2-7 SX-200 Primary Power Supply

A complete description of the attendant consoles is given in sections MITL9105/9110-98-300 Attendant Console Description and MITL9105/9110-98-305 Hotel/Motel Attendant Console Hotel/Motel Description.

L. Programming and Maintenance Console

2.20 The construction of the programming and maintenance console is identical to that of the attendant console, the only difference is in the functions of the call and feature selection keys. A complete description of the maintenance console is given in section MITL9105/9110-98-310 Programming and Maintenance Console Description.

M. Features

2.21 The System features are provided in the form of feature packages (Generics). Table 2-2 lists the contents of these Generics. For a detailed description refer to Section MITL9105/9110-98-105.

Fig. 2-8 Attendant Console

TABLE 2-2
SYSTEM FEATURES

	202	203	204	205
Account Codes				•
Alphanumeric Display for Attendant Position	•	•	•	•
Attendant Camp-On	•	•	•	•
Attendant CCSA Access		•	•	•
Attendant Console (Maximum 2)	•	•	•	•
Attendant Control of Trunk Group Access	•	•	•	•
Attendant Controlled Conference		•	•	•
Attendant Flash Over Trunks	•	•	•	•
Attendant Lockout	•	•	•	•
Attendant Position (2 Max.)	•	•	•	•
Attendant Transfer - All Calls	•	•	•	•
Automatic Callback Busy/Don't Answer (Station to Station Calls)	•	•	•	•
Automatic Callback - Busy (Station to Trunk)	•	•	•	•
Automatic Night Service Switching	•	•	•	•
Automatic Queuing to Attendant Position	•	•	•	•
Broker's Call	•	•	•	•
Busy Lamp Field	•	•	•	•
Busy Verification of Station Lines	•	•	•	•
Call Forwarding - All Calls	•	•	•	•
Call Forwarding - Busy And Don't Answer	•	•	•	•
Call Forwarding - Busy Line (DID)		•	•	•
Call Forwarding - Don't Answer (DID)		•	•	•
Call Hold		•	•	•
Call Pick-Up	•	•	•	•
Call Waiting Service				
Attendant Call Waiting	•	•	•	•
Terminating Call Waiting	•	•	•	•
Distinctive Tone Signals	•	•	•	•
Calling Number Display to Attendant	•	•	•	•
Calls Waiting Indication at Attendant Position	•	•	•	•
CCSA Access		•	•	•
Class of Service Display to Attendant	•	•	•	•
Code Calling Access	•	•	•	•
Code Restriction			•	•
Conference Calling	•	•	•	•
Contact Monitor†	•	•	•	•
Controlled Outward Restriction		•	•	•
Controlled Station-To-Station Restriction		•	•	•
Controlled Termination Restriction		•	•	•
Controlled Total Restriction		•	•	•
Data Restriction	•	•	•	•
Date Display on Console(s)			•	•
Diagnostics - Automatic	•	•	•	•
Dial Access to Attendant	•	•	•	•
Digital Clock on Attendant Position	•	•	•	•
Direct Department Calling (DDC)	•	•	•	•
Direct Inward Dialing (DID)		•	•	•
Direct Outward Dialing (DOD)	•	•	•	•
Direct Termination of Miscellaneous Circuits On Attendant Position (Paging)†	•	•	•	•
Direct Trunk Group Selection (DTGS)	•	•	•	•
Directed Call Pick-Up	•	•	•	•
Hold-For-Pick-Up Option	•	•	•	•
Distinctive Ringing	•	•	•	•
DTMF And/Or DCKP On Attendant Position	•	•	•	•
DTMF Calling	•	•	•	•
DTMF To Dial Pulse Conversion	•	•	•	•
Dump and Load of Customer Data			•	•
Executive Override	•	•	•	•
Flash for Attendant	•	•	•	•
Flexible Numbering of Stations	•	•	•	•
Foreign Exchange (FX) Access	•	•	•	•

	202	203	204	205
Fully Restricted Station	•	•	•	•
Identified Trunk Group			•	•
Immediate Audible Ring on Attendant Handled Calls	•	•	•	•
Immediate Ring	•	•	•	•
Incoming Call Identification (ICI)	•	•	•	•
Indication of Camp-On	•	•	•	•
Intercept Treatment				
Attendant Intercept	•	•	•	•
Intercept Tone	•	•	•	•
Interposition Calling	•	•	•	•
Interposition Transfer	•	•	•	•
Inward Restriction		•	•	•
Line Lockout With Warning	•	•	•	•
Listed Directory Number (LDN) Service	•	•	•	•
Loudspeaker Paging†				
Direct Access by Attendant	•	•	•	•
Dial Access	•	•	•	•
Multizone	•	•	•	•
Priority Paging	•	•	•	•
Main/Satellite Service			•	•
Manual Originating Line Service	•	•	•	•
Manual Terminating Line Service			•	•
Meet Me Conference	•	•	•	•
Message Waiting (Audible)		•	•	•
Message Waiting (Lamp)		•	•	•
Miscellaneous Trunk Restriction	•	•	•	•
Multiple Listed Directory Numbers (LDN)	•	•	•	•
Multiple Access Codes for a single trunk group (10 max.)			•	•
Music On Hold†	•	•	•	•
Music on Attendant Position Hold†	•	•	•	•
Night Console Position	•	•	•	•
Night Service				
Fixed	•	•	•	•
Flexible	•	•	•	•
Night Station Service - Fixed Service	•	•	•	•
Night Station Service - Full Service	•	•	•	•
Origination Restriction	•	•	•	•
Outgoing Trunk Call Back	•	•	•	•
Outgoing Trunk Camp-On	•	•	•	•
Outgoing Trunk Queueing	•	•	•	•
Outward Restriction	•	•	•	•
Power Failure Transfer - Station	•	•	•	•
Priority Queue	•	•	•	•
Privacy and Lockout	•	•	•	•
Radio Paging Access†	•	•	•	•
Recall Dial Tone	•	•	•	•
Recorded Telephone Dictation Access†	•	•	•	•
Remote Access to PBX Services	•	•	•	•
Remote Administration and Maintenance (hardware option)	•	•	•	•
Re-ring From Toll (on Toll Terminal)	•	•	•	•
Reserve Power (hardware option)	•	•	•	•
Room Audit			•	
Room Status		•	•	•
Rotary Dial Calling	•	•	•	•
Route Advance	•	•	•	•
Saved Number Redial				•
Serial Call	•	•	•	•
Sharing (4 Tenant)		•	•	•
Shared Attendant Service		•	•	•
Single Digit Dialing (Non-conflicting)	•	•	•	•

† Requires external customer provided equipment

TABLE 2-2 (CONT'D)
SYSTEM FEATURES

	202	203	204	205		202	203	204	205
Single Digit Dialing (Conflicting)		•	•	•	Tie Trunk Access	•	•	•	•
Speed Call					Timed Reminders	•	•	•	•
System - wide				•	Toll Restriction				
Personal				•	Battery Reversal	•	•	•	•
Splitting					0/1 Access	•	•	•	•
One-Way Manual Splitting	•	•	•	•	Multi Digit			•	•
Two-Way Manual Splitting	•	•	•	•	Toll Terminal Access	•	•	•	•
One-Way Automatic Splitting	•	•	•	•	Total "Do Not Disturb" Display		•	•	•
Two-Way Automatic Splitting	•	•	•	•	Total "Message Waiting" Display		•	•	•
Station Hunting					Total "Room Status" Display		•	•	•
Terminal Hunting	•	•	•	•	Traffic Data Collection†			•	
Circular Hunting	•	•	•	•	Traffic Display to Customer			•	
Secretarial Hunting	•	•	•	•	Transfer into Busy		•	•	•
Station Message Detail Recording				•	Trunk Answer From Any Station	•	•	•	•
Station Message Register Service		•	•	•	Trunk Group Busy (TGB) Indicators on Attendant Position	•	•	•	•
Electronic Storage and Display		•	•	•	Trunk Status Field	•	•	•	•
Internal Charging		•	•	•	Trunk-To-Trunk Connections	•	•	•	•
Station Override Security	•	•	•	•	Trunk Verification by Customer (TVC)	•	•	•	•
Station-to-Station Calling	•	•	•	•	Trunk Verification by Station (TVS)	•	•	•	•
Straightforward Outward Completion	•	•	•	•	Uniform Call Distribution (UCD)	•	•	•	•
Switched Loop Operation	•	•	•	•	Wake-Up Service			•	
Tandem Tie Trunk Switching		•	•	•	WATS Access	•	•	•	•
Termination Restriction	•	•	•	•	Wideband Data Switching	•	•	•	•
Threeway Conference Transfer	•	•	•	•	Wide Frequency Tolerant Power Plant	•	•	•	•
Through Dialing	•	•	•	•					

† Requires external customer provided equipment

1309-5

3. SYSTEM OPERATION

3.01 The systems are solid-state PABX's employing space division switching and microprocessor control of call processing. A block diagram of the PABX is shown in Fig. 3-1.

3.02 The SX-100 has a capacity of 112 ports and the SX-200 of 208 ports, which may be assigned to receivers, lines, and trunks. The ports are scanned sequentially for detection of signals every 3.2 milliseconds.

3.03 Call origination is detected during scanning, an interrupt signal to the microprocessor is generated, and a speech path and receiver are assigned to the originating station. After dialing, the receiver is released and the called party is connected to the same speech path as the originator. There are 31 speech paths available and each of the ports has access to all 31 speech paths.

4. MAINTENANCE

A. General

4.01 The PABX contains no moving parts and therefore requires no routine preventative maintenance. The sole item requiring periodic maintenance is the Random Access Memory Battery Pack (9110-020) which should be changed at 4 year intervals. In the event of a malfunction the system design allows for the rapid location and replacement of the suspect item. Maintenance features include —

- power-up diagnostics

- automatic diagnostics

- dynamic diagnostics

- low number of cards

- low number of card types

- power fail transfer control switches

- status LED's on almost all cards

- busy switches and LEDs on trunk cards

- fault read-out on the console

- test line

- console clock

4.02 The system maintenance philosophy assumes that faulty printed circuit cards or assemblies are replaced in the field, the faulty items being returned to Mitel for repair.

B.   Power-Up Diagnostics

4.03 Each time power is applied to the system, the Power-Up Diagnostics check the Random Access Memory (RAM), the Programmable Read Only Memory (PROM), and the Non-Volatile Random Access Memory. The RAM is checked by
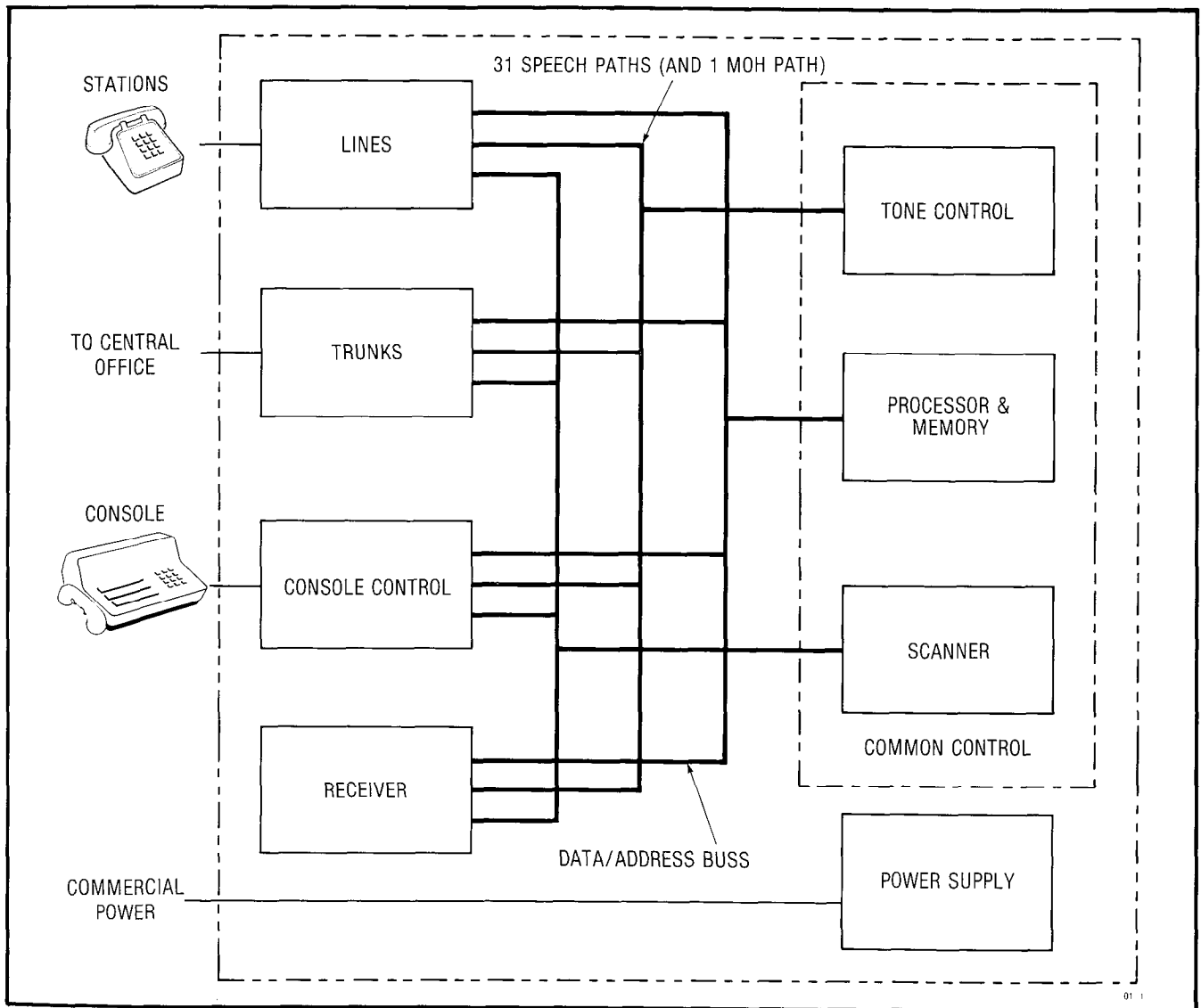

Fig. 3-1   System Block Diagram

setting all bits to 1 then to 0 and a check is performed to ensure that each bit is set correctly. If an error is detected a major alarm is raised. The PROM check consists of compiling a check sum of all the PROM bits and comparing the result with the check sum produced when the PROM was manufactured. A difference in the two check sums will result in a major alarm. The Non-Volatile RAM check consists of compiling a check sum of all the bits in the Non-Volatile RAM and comparing this with the check sum generated when the Non-Volatile RAM was last programmed. A difference in the check sums will result in a minor alarm.

4.04 During the power-up sequence, the scanner operation is also checked. If a malfunction is detected a major alarm is raised. If the system powers up correctly, the console clock displays 00.00 and starts to run.

C. Automatic Diagnostics

4.05 The Automatic Diagnostics test the speech path connections, tone and rotary receivers, tone and rotary generators, supervisory tones, and speech path biasing. The automatic diagnostics run at all times except when there are four or less speech paths free in the system, or when a console is in the programming mode. In Generic Programs 203/up, the diagnostics will not use a receiver if any other equipment is waiting for a receiver.

4.06 Faults found are reported as minor alarms, and the failing unit is busied out, if possible. The automatic diagnostics will not busy-out more than half the receivers, generators, or speech paths to guard against the possibility that an error in the fault detection circuitry could shut down the system.

4.07 Organization. The automatic diagnostics consist of a set of test routines called from a sequencer. The sequencer picks a free speech path and calls a set of tests. It then picks the next free speech path and calls the set of tests. When it has done this for all the free speech paths from 1 to 31, it makes a new, similar, pass, and keeps repeating this procedure.

4.08 Some tests, the quick ones, are performed for each speech path. Other, slower, ones

are performed only once per pass (e.g. on speech path 1 in pass 1, on speech path 2 in pass 2, etc.). One normal pass of the diagnostic takes 13 seconds times the number of receivers, when the system is idle. This applies to the first 16 passes. The next 16 take only 4 seconds each because the Receiver and Generator test is skipped. After the first normal pass, all supervisory tone generators, DTMF generators, and receivers will have been checked on at least one speech path, all speech paths will have been tested for shorts, and the speech path connections to the card in slot 1 will have been tested. Approximate times are:

	4 receivers	8 receivers	16 receivers
1 normal pass	1 min	2 mins	4 mins
31 passes	15 mins	30 mins	60 mins

Test Performed Each Time

4.09 Basic Speech Path: The basic speech path check is as follows:

(a) The speech path test circuit is checked to see that it reads "high" when not in use. Detection of a malfunction results in ERROR 004 - all self-testing stops.

(b) The speech path under test is checked using the speech path test circuit to see that it is "high", i.e. not connected to anything. Detection of a malfunction results in ERROR 018 - speech path busied out - sequencer picks next speech path.

4.10 Speech Path Short & Bias Check: The speech path short & bias check is as follows:

(a) All idle speech paths other than the speech path under test are checked using the speech path circuit to see if any are not "high". The result of this is used in (c) below.

(b) Speech path bias is applied to the speech path under test, and it is checked using the speech path test circuit to see that it goes to "0". Detection of a malfunction results in ERROR 005 - speech path busied out - sequencer picks next speech path.

(c) If all other speech paths were "high" when checked in (a), they are all checked again to see that none went to "0", which would indicate a short to the speech path under test. Detection of a malfunction results in ERROR 006 - speech path under test busied out - sequencer picks next speech path.

4.11 Supervisory Tones: The supervisory tones - speech path connection check is as follows:

(a) For internal reasons, this test is only run if all other speech paths are idle.

(b) Each supervisory tone in turn is connected to the speech path under test, and the speech path test circuit used to check that the speech path goes to "0". Detection of a malfunction results results in ERROR 007 -speech path busied out - sequencer picks next speech path.

4.12 Speech Path Connection Test: The lines -speech path connection test is as follows:

(a) The sequencer initially sets the self test function to test slot 1 in this test. At the end of each pass through the speech path the slot number is incremented by the sequencer. After 31 passes all possible slots will have been tested.

(b) Each of the possible 8 lines in the slot is checked to see if it has been programmed as a station or trunk. If so, and the line is currently idle, the line is connected to the speech path under test which is then checked using the speech path test circuit to see that it is now at "0". If it is not at "0" it could be that the line has just gone on or off-hook so the test is repeated up to 2 more times at 50ms intervals. If it does not got to "0", and the line is still idle (i.e. the system has not detected an off-hook) then this will cause ERROR 012 - no more tests will be performed on this slot in this or subsequent passes.

4.13 Memory Test: A small section of memory is tested each time, so that all memory will have been tested after 31 passes. The tests are similar to those in the Power-Up Diagnostic except that the errors are reported here as MINOR.

Once a memory error has been reported no more memory testing takes place until the diagnostics are restarted, by a system reset.

Tests Performed Once Per Pass

4.14 Supervisory Tones: Supervisory tone -Tone Presence Test:

(a) This test is skipped if a supervisory tone presence error was detected previously.

(b) The dial tone detector on the receiver is used to detect tone presence.

(c) One pair of receivers is picked, the pair changing each pass. If either receiver is busied out, or no receiver card exists, the test is skipped.

(d) The test is performed once per pass for dial tone.

(e) Using each of the 2 receivers in turn, the test waits for the receiver to become free, then connects it and the tone to the speech path under test. After 350ms the dial tone detector is checked to see if it has detected the tone.

(f) If neither receiver detected the tone it is assumed to be missing. Detections of a malfunction results in ERROR 013 - testing for supervisory tone presence is no longer performed.

(g) If one receiver detected the tone but the other did not, it is assumed that the tone is present but one receiver is faulty. This results in ERROR 014 - receiver is busied out.

4.15 Receiver & Generator: The receiver & generator test is as follows:

(a) This test uses both the speech path under test and the fifteenth higher speech path. If the speech path under test is numbered 17-31, the test is skipped.

(b) If any tone generator has been busied out, this test is skipped.

(c) The receiver and generator test is performed for each of four tone digits ("1, 5, 9, #") and for the rotary digit "6". It is also performed for each pair of receivers in the system. If either has been busied out or if the receiver card is not present, the test for that pair is skipped.

(d) Each digit is sent eight times, using all combinations of the two receivers, two speech paths, and two generators. If any errors are detected, they are analyzed to see if they correspond to a single receiver, speech path or generator error. If they do, the error is reported as follows:

ERROR 008 (receiver, tone, error)
ERROR 009 (receiver, rotary, error)
ERROR 010 (generator error)
ERROR 011 (error isolated to a speech path)

If it is not possible to isolate which unit has failed, the error is reported as ERROR 015 -probable receiver error. The generator is busied out to ensure that the error is not re-reported in each pass.

(e) Errors 008-010 result in the receiver or generator being busied out. Error 011 could be either on the receiver card or the generator card (tone control card) so no device is busied out.

D. Dynamic Diagnostics

4.16 Each time an extension goes off-hook or a trunk rings in it is connected to a speech path. The dynamic diagnostics check the speech path to ensure that the speech path connection is good. If a bad path is detected the processor assigns a new speech path and rechecks the connections. If, after four attempts the speech path still tests bad, it is assumed that the test sequence is at fault and the connection is maintained. The automatic diagnostics will detect any bad speech path and raise the required alarm condition.

E. Circuit Cards

4.17 Both the SX-100 and SX-200 employ fourteen types of cards (Fig. 4-1), which may be used in either system minimizing stocking and control problems for field maintenance. The cards used in the system are described below.

RAM/COS Card. This printed circuit card contains the system 8K byte scratch pad Random Access Memory, together with 2K bytes of CMOS (Non-Volatile) Random Access Memory which is used for the storage of customer configuration data. (Class of Service options, numbering plan etc.). No functions other than memory read/write functions are performed on this card (See Fig. 4-2).

PROM/CPU Card. The PROM/CPU card contains the system Generic program in Programmable Read Only Memory (PROM), and also contains the microprocessor, which together with the Generic program constitutes the intelligence of the PABX. The basic system clock is also located on this card (See Fig. 4-2).

Memory Expander Card. This card has the capability of carrying 28K bytes of Programming Read Only Memory (PROM) containing generic programs. The Memory Expander card holds four diagnostic LEDs:

- the top LED, when flashing indicates that the automatic diagnostics are running. This LED will not flash (the diagnostics do not run) when the system is in programming mode, or when less than 4 speech paths are idle. Under these circumstances, the LED may be either on or off, its state has no special meaning.

- the second LED, when lit, indicates that the system is in the programming mode.

- the third LED, when lit, indicates that the RS232 port is in use (Generic 204 and up).

- the fourth LED, when lit, indicates that a Data Dump or Load is in progress (Generic 204 and up).

PROM/RAM Expander Card (Optional). The PROM/RAM Expander card can be used in place of the Memory Expander. It contains an additional 2K of CMOS RAM. A fifth LED on the battery pack indicating the the battery pack is seated correctly and is charging.

Line Card. The line card contains 8 separate line circuits. The line circuit detects on and off-hook conditions, which are recognized by the scanner, and reported to the processor for appropriate action. Dial signals
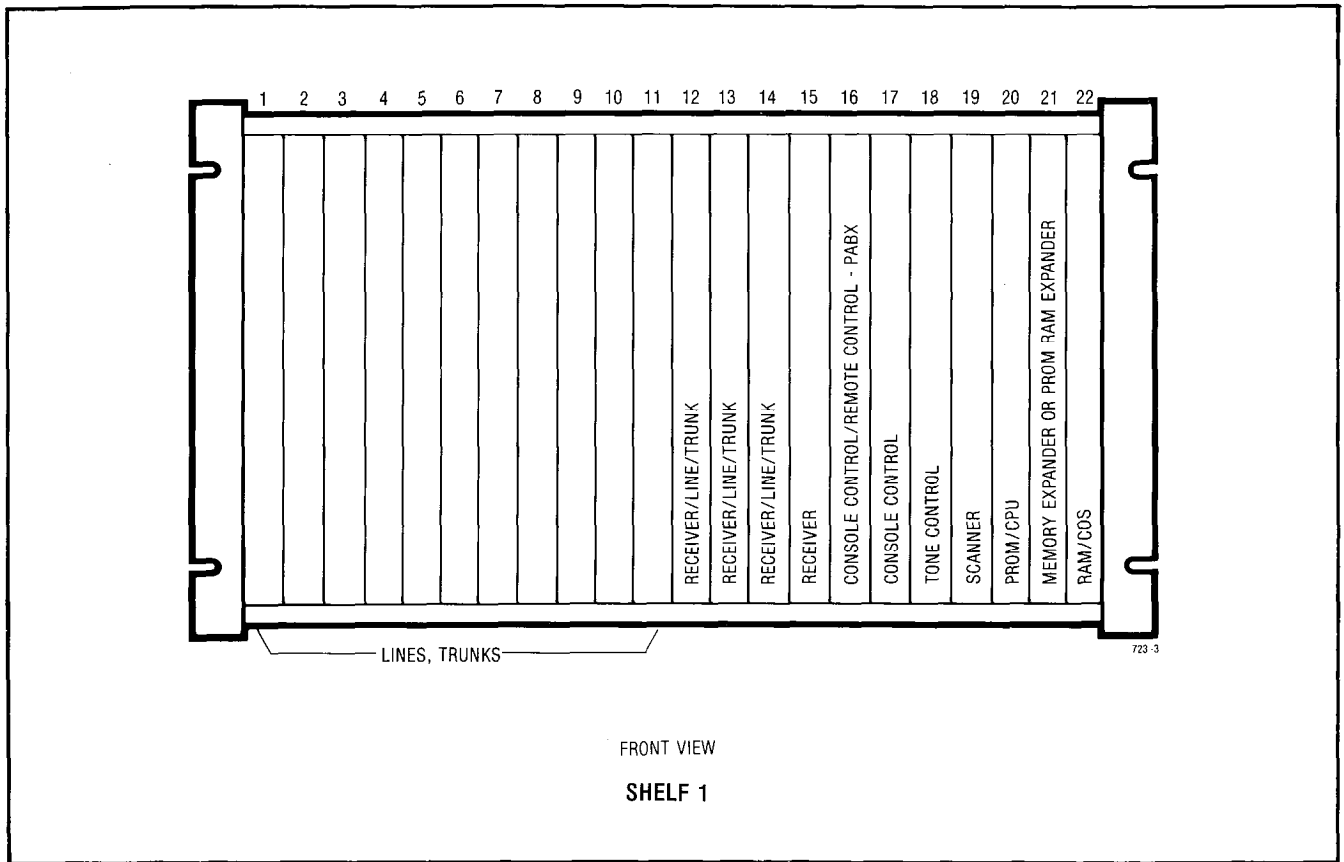
Fig. 4-1   Equipment Card Locations

(rotary dial or DTMF) are passed to a receiver over the speech path selected for the conversation (See Fig. 4-2).

Trunk Card. The Trunk Card contains either two or four trunks depending on trunk type. (4 CO Trunks, 2 E&M Trunks, or 2 DID Trunks). These circuits provide the interface between the PABX and the Central Office or other PABX's. Each trunk circuit repeats dial pulse signals from the speech path to the Tip and Ring and passes DTMF signals directly from the speech path to the Tip and Ring for outgoing calls. The busy switches on the trunk card may be used to make a trunk continuously busy. If the trunk is in use when the switch is set the existing call is not disturbed, but the trunk is made busy as soon as the call ends. The trunk may also be busied out from the attendant console (See Fig. 4-3).

Scanner Card. The basic function of the scanner card is to sequentially scan each port (line, trunk, console, receiver), in order to detect signals re-

quiring processor action. If such a signal (eg. off-hook from a line circuit) is detected, the scanner informs the processor of the port involved. The processor then takes over any subsequent action required. Additional functions of the scanner card include a two digit alarm display which identifies any malfunctioning card, the master reset button, and a data speed (110 or 300 baud in later versions 300 or 1200 baud) selector switch for the RS232 interface. In addition to the above, the relays for night service, and night bells 1, 2 and 3 are located on this card (See Fig. 4-2).

Tone Control Card. This card provides the tone generators for dial tone, busy tone, reorder tone, ringback tone and miscellaneous tone, along with two DTMF generators and two rotary dial generators which are used by the diagnostic routines and the attendant. The four thumbwheel switches used with the test line and programming are also located on the tone control card. In addition, the circuits for Page 1 and Page 2 outputs, and the music on hold input are located on this card (See Fig. 4-2) .
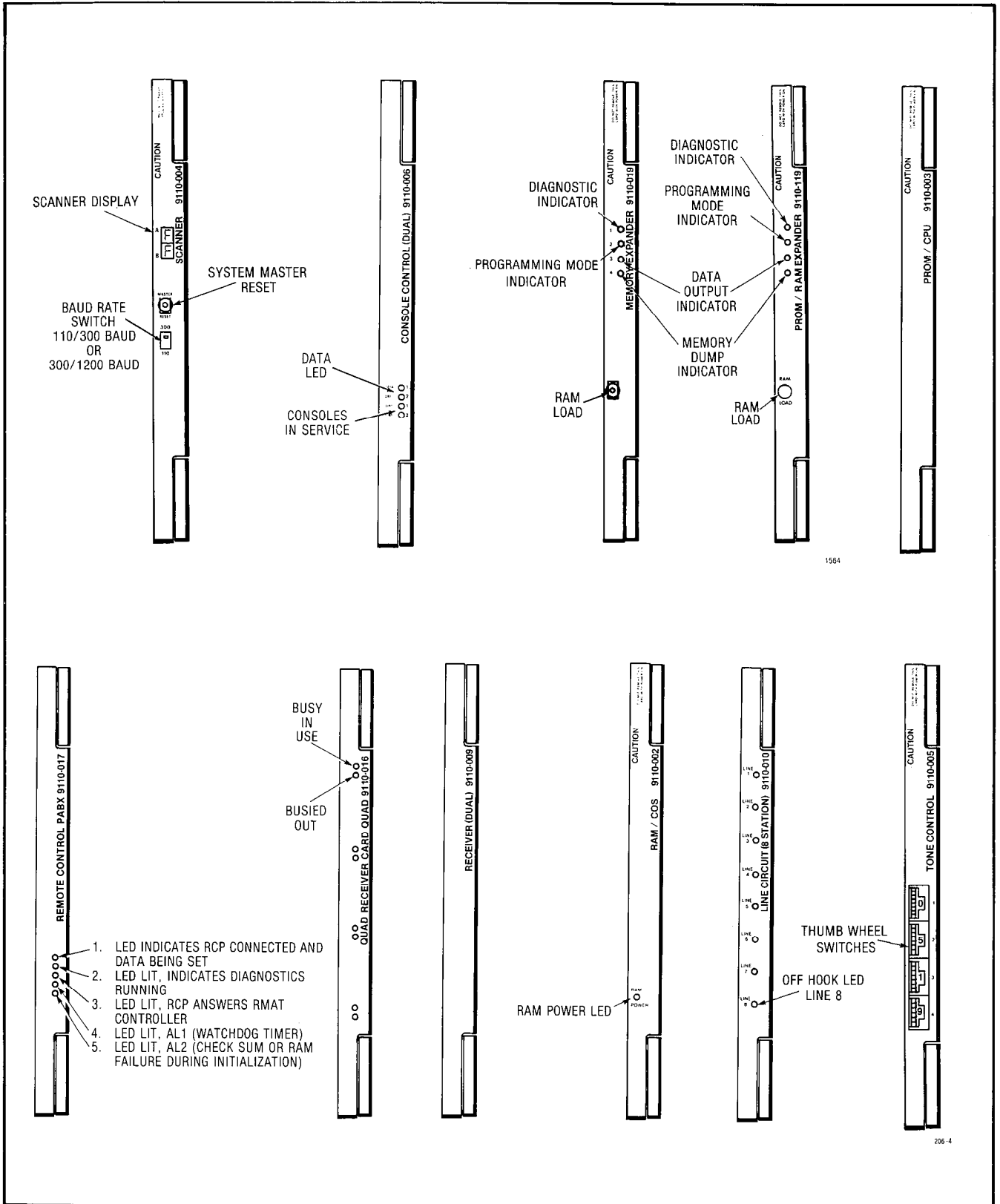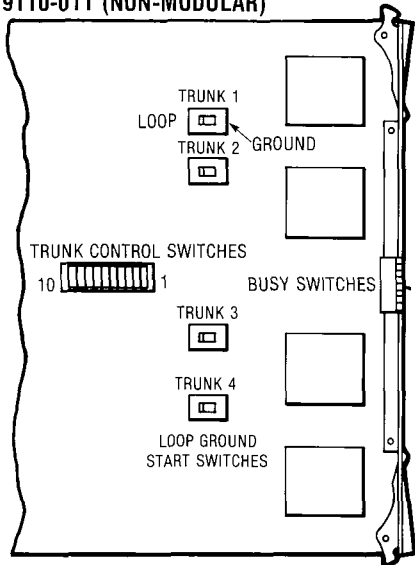
SCANNER DISPLAY

SYSTEM MASTER RESET

BAUD RATE SWITCH 110/300 BAUD OR 300/1200 BAUD

SCANNER 9110-004

CONSOLE CONTROL (DUAL) 9110-006

DATA LED

CONSOLES IN SERVICE

DIAGNOSTIC INDICATOR

PROGRAMMING MODE INDICATOR

MEMORY EXPANDER 9110-019

RAM LOAD

DIAGNOSTIC INDICATOR

PROGRAMMING MODE INDICATOR

DATA OUTPUT INDICATOR

MEMORY DUMP INDICATOR

PROM / RAM EXPANDER 9110-119

RAM LOAD

PROM / CPU 9110-003

1564

REMOTE CONTROL PABX 9110-017

1. LED INDICATES RCP CONNECTED AND DATA BEING SET
2. LED LIT, INDICATES DIAGNOSTICS RUNNING
3. LED LIT, RCP ANSWERS RMAT CONTROLLER
4. LED LIT, AL1 (WATCHDOG TIMER)
5. LED LIT, AL2 (CHECK SUM OR RAM FAILURE DURING INITIALIZATION)

BUSY IN USE

BUSIED OUT

QUAD RECEIVER CARD QUAD 9110-016

RECEIVER (DUAL) 9110-009

RAM / COS 9110-002

RAM POWER LED

LINE CIRCUIT (8 STATION) 9110-010

LINE 1
LINE 2
LINE 3
LINE 4
LINE 5
LINE 6
LINE 7
LINE 8

OFF HOOK LED LINE 8

TONE CONTROL 9110-005

THUMB WHEEL SWITCHES

206-4

Fig. 4-2   Circuit Cards

TWO VERSIONS OF CO TRUNK CIRCUIT CARD 9110-011 DO EXIST

9110-011 (NON-MODULAR)

TRUNK 1
LOOP
TRUNK 2 GROUND

TRUNK CONTROL SWITCHES

10 [IIIIIIIII] 1   BUSY SWITCHES

TRUNK 3

TRUNK 4

LOOP GROUND
START SWITCHES

THIS IS A NON MODULAR CO TRUNK
CARD. IT HAS THE ABILITY TO MAKE FOUR
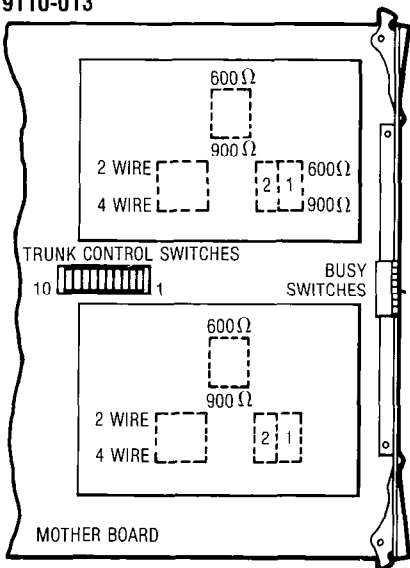INDIVIDUAL TRUNKS EITHER LOOP OR
GROUND START.

9110-011 (MODULAR)

TRUNK SWITCHES ON REVERSE OF BOARD

GROUND
LOOP

TRUNKS 1, 2

TRUNK CONTROL SWITCHES

10 [IIIIIIIII] 1   BUSY SWITCHES

LOOP GROUND
START SWITCHES
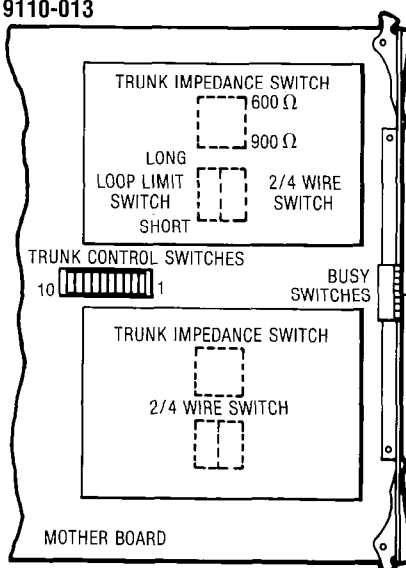TRUNKS 3, 4

MOTHER BOARD
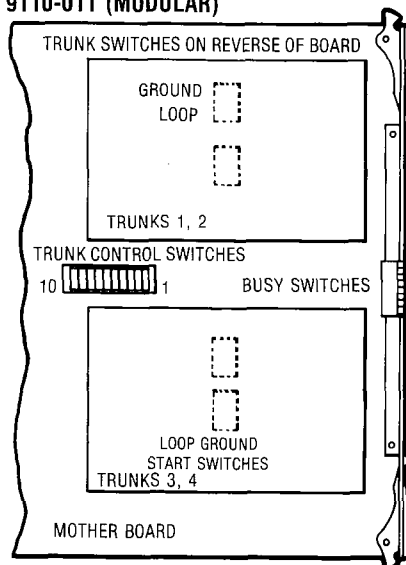
THIS IS THE MODULAR CO TRUNK CARD.
FOUR INDIVIDUAL TRUNKS MAY BE SET
FOR EITHER LOOP OR GROUND START.

TWO VERSIONS OF E&M TRUNK CIRCUIT 9110-013 DO EXIST

9110-013

600 Ω

900 Ω

2 WIRE   600 Ω
4 WIRE   [2 1] 900 Ω

TRUNK CONTROL SWITCHES

10 [IIIIIIIII] 1   BUSY
SWITCHES

600 Ω

900 Ω

2 WIRE
4 WIRE   [2 1]

MOTHER BOARD

9110-013

TRUNK IMPEDANCE SWITCH
600 Ω
900 Ω
LONG
LOOP LIMIT   2/4 WIRE
SWITCH   SWITCH
SHORT

TRUNK CONTROL SWITCHES

10 [IIIIIIIII] 1   BUSY
SWITCHES

TRUNK IMPEDANCE SWITCH

2/4 WIRE SWITCH

MOTHER BOARD

1296-2

THIS IS A MODULAR E&M TRUNK CARD.
TWO E&M TRUNK CIRCUITS ARE AC-
COMODATED. THE TRUNKS MAY BE SET
FOR WINK START, STOP DIAL, 2 OR 4
WIRE OPERATION, SPECIAL GAIN AND
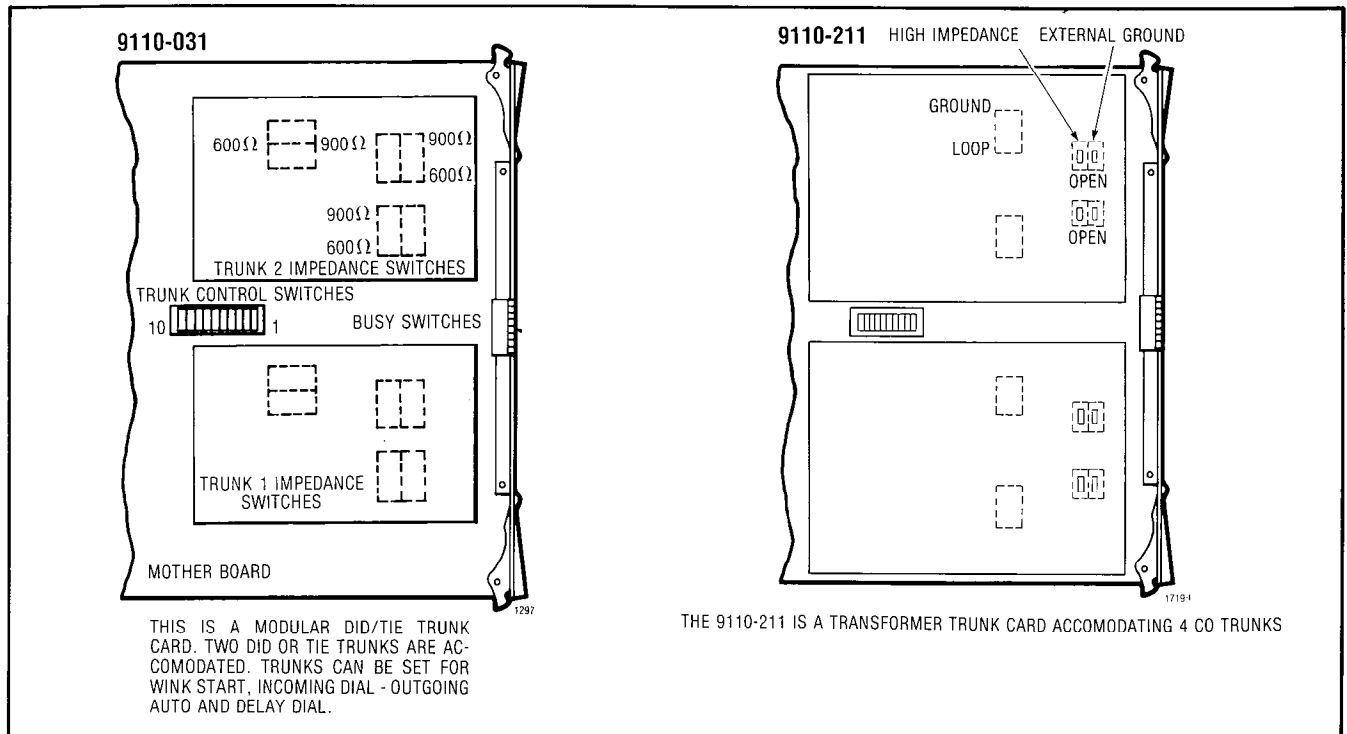600 Ω OR 900 Ω IMPEDANCE.

Fig. 4-3   Trunk Cards

Fig. 4-3   Trunk Cards (Cont'd)

Console Control Card. The console control card provides the interface between the PABX and two consoles. Console control card number 1 (position 17) is allocated to the maintenance console connector and the attendant console number 1 connector. Console control card number 2 (position 16) is allocated to the attendant console number 2 connector. The card provides both voice and data signals to and from each console (See Fig. 4-2).

Remote Control PABX. The Remote Control PABX (RCP) card, can be fitted in slot 16 of the PABX shelf to provide the PABX console button functions remotely, under the control of the RMAT Controller (see MITL9105/9110-98-101). The main components of the RCP card are as follows:

- The Micro Processor Unit (MPU), which acts on commands received from the RMAT Controller via the modem.

- MEMORY PROM/RAM, which contains programmed memory and scratch pad memory for storage and execution of commands.

- MODEM, which provides the necessary tone transmitter and receiver, and contains the handshaking circuitry required to interface the MPU with the external 2-wire line.

- TRUNK INTERFACE, to provide the proper termination to the line with regard to impedance, ringing and supervisory condition.

- MASTER/SLAVE INTERFACE, to enable the MPU to access the PABX data bus and control lines.

Receiver Card. The Dual receiver card contains two rotary dial and DTMF receivers. The Quad receiver card contains four rotary dial and four DTMF receivers. Having received each dialed digit, the receiver informs the processor and prepares for the next digit. On extension to extension calls, the receiver is released after the last digit has been dialed, except when the dialed number is busy, in which case the receiver remains for 10 seconds to accept override or call back codes. On extension to trunk calls, the receiver is disconnected after the trunk access code has been dialed (See Fig. 4-2), unless:

(a) Tone to pulse conversion is required, in which case the receiver remains connected until all digits have been dialed, or 10 seconds after the last digit dialed

(b) Toll restriction or SMDR is provided, in which case the receiver remains connected until the call is either denied or allowed depending on the toll restriction provide and the digits dialed.

F. Equipment Cabinet Maintenance Aids

4.18 Most of the cards employed in the system hold LEDs to display the status of the card. In addition to the LEDs some cards have a number of switches. Fig. 4-1 shows the card positions, and Fig. 4-2 shows the location of all switches and LEDs. The functions of each switch and indicator is described below.

Line Circuit Off-Hook LED: The LED on each line circuit is an indication that the line circuit has detected an off-hook condition. The LED is driven directly from the off-hook detect circuit in the line circuit, and turns ON when an off-hook condition is detected and will flash when dial pulses are sent.

Trunk Busy/Idle LEDs: Each trunk circuit has associated with it an LED which shows the busy/idle status of the trunk as follows:

- Trunk circuit idle - LED OFF
- Trunk circuit seized - LED ON
- Trunk circuit busied out (by switch on card or from the console) - LED FLASHING

Trunk Incoming and Outgoing Busy Switches: Associated with each trunk circuit are two busy switches, one for making the trunk busy outgoing and one for defining the incoming trunk busy condition. Table 4-1 lists the switch settings and describes their effect. For a detailed description of all other Trunk card switches, refer to Section MITL9105/9110-98-200.

Tone Control Thumbwheel Switches: The four thumbwheel switches on the Tone Control card may be used for both programming and maintenance functions. The number settings read from top to bottom (See Table 4-3) and are used for Programming and Maintenance Functions.

(a) **Maintenance Functions:** The thumbwheel switches may be used in conjunction with the test line to select receivers and speech paths. The top two switches are used to select a receiver by setting the switches to the last digits of the required receiver equipment number. (even numbers only, 90-20). If set to 99, any free receiver will be selected. The bottom two switches are used to select a speech path (01-31 for speech paths, or 32 for the music on hold speech path). If set to 99, any free speech path will be selected.

TABLE 4-1
OUTGOING/INCOMING SWITCH SETTINGS

Trunk Busy Switches

1. Outgoing busy switches (1 per trunk) can be set for either of the following conditions:

   Idle or Busy

2. The "Outgoing Busy" condition may be set either by the outgoing busy switch (Note 1), or by the console "Trunk Busy Out" function. When this condition is in effect the incoming busy switch affects the trunk condition as follows:

   Idle Setting - No answer will be given to incoming CO calls

   Busy Setting - A permanent seizure condition is given towards the CO

(b) **Programming Functions:** The console that may enter programming is defined.

(c) **The Customer Program Dump/Load Function (Generic 204/up):** Requires the switches to be set to 5623 to initiate a load from an external storage device.

Scanner Digit Display: The scanner card (position 19, shelf 1) contains a two digit display which is used to display faulty card positions, and may also be used in conjunction with the test line to display the status of selected circuits. The two-digit display should always be read from top to bottom. The display will show the position number of the faulty card (01-22 for equipment shelf 1 and 31-42 for equipment shelf 2). When used in conjunction with the test line, the display shows the status of the receiver and/or the speech path which has been selected. The top display shows receiver status and the bottom display shows the speech path status. The displays used are shown in Table 4-2.

Scanner Reset Button: The Master Reset button is used in the initial programming process as part of the RAM clearing procedure and may also be used to reset the system. When the Master Reset button is pressed, the processor is momentarily turned off, all existing calls are dropped, and all

system crosspoints are released. The baud rate switch selects the RS232 baud rate as either 110 or 300 baud (or in later versions 300 or 1200 baud).

Memory Expander or PROM/RAM Expander Diagnostic LEDs: The Memory Expander card holds four diagnostic LEDs.

* the top LED, when flashing indicates that the automatic diagnostics are running

* the second LED, when lit indicates that the system is in the programming mode

* the third LED, when lit, indicates that the RS232 port is in use (Generic 204/up)

* the fourth LED, when lit, indicates that a Data Dump is in progress

PROM/RAM Expander RAM Load Button: This button is used to initiate a system load.

RAM Battery Pack LED: The battery pack is used for back-up power for the customer data. This battery pack holds an LED which when lit indicates that the battery pack is seated correctly in its connector and being charged.

TABLE 4-2
SCANNER DISPLAYS

DISPLAY	MEANING
A	Available — not in use.
C	Conversation — in use.
E	Error — found faulty by diagnostics.
F	Found — in use by test line.
O	Option — no specific circuit selected.

TABLE 4-3
SWITCH SETTINGS

SWITCH SETTINGS	FUNCTION
7770	Enter Maintenance Console into programming mode
7771	Enter Attendant Console 1 into programming mode
7772	Enter Attendant Console 2 into programming mode
7776	Initialize System Configuration (Clear RAM)
XXXn	Take any console out of programming mode (one of the X = any digit except 7, n = 0-9)
777n	Enables reset from test line or console (n = 0-9)
5623	Load Function

1494

Console Control Line and Data LEDs: LINE 1 and LINE 2 LEDs when lit indicate that the associated console is active, i.e. when the handset or headset is plugged in. The designations 1 and 2 refer to the two consoles handled by the card. The LEDs labelled DATA 1 and DATA 2 flicker whenever data is transmitted from the corresponding console to the console control card (Data is transmitted whenever a console button is pressed.) These LEDs can therefore be used to check console button operation and to check voice pair continuity to the console(s).

G. Maintenance Panel

4.19 At the top of the equipment cabinet is the maintenance panel (Fig. 4-4). This panel provides the service personnel with access to the system through the maintenance console connector and test line terminals. Also housed on the maintenance panel are the six Power Fail Transfer Control switches, a system Power ON/OFF switch and a Power ON LED.

Maintenance Console Connector: This connector is provided to allow the installer/repair person to plug in a console for administration purposes, i.e. to program changes in system data.

Power Fail Transfer Control Switches: These switches are used to determine the source of a power fail transfer. Power fail transfer will occcur whenever a Major Alarm occurs. A Major Alarm may be caused by a common control failure, a power supply failure, or by the operation of a

failure transfer switch on one of the consoles. The power fail switches have two positions, ENABLE and DISABLE. When set to ENABLE the system allows power fail transfer to be initiated from the designated source. When set to DISABLE the designated source cannot initiate power fail transfer, eg. with the COMMON CONTROL power fail transfer control switch set to ENABLE, a common control failure will cause a power fail transfer. The MASTER power fail transfer switch will set the PABX to power fail transfer when operated to the TRANSFER position. For regular operation this switch should be set to NORMAL. The switches associated with a console must be set to disable when that console is not in use.

Test Line Terminals: The test line TIP and RING terminals may be used in conjunction with a test set (butt-in) and the thumbwheel switches on the tone control card, to access individual speech paths, receivers, and trunks for test purposes. The test line also has the capability of resetting system errors, busying out and de-busying receivers and speech paths and controlling the printer. See Part 5 for a full description of the use of the Test Line.

H. Console Alarm LEDs and Maintenance Aids

4.20 Each attendant console (Fig. 4-5) is equipped with a number of maintenance aids and keys which are associated with maintenance functions. The following paragraphs describe the function of each LED and key.
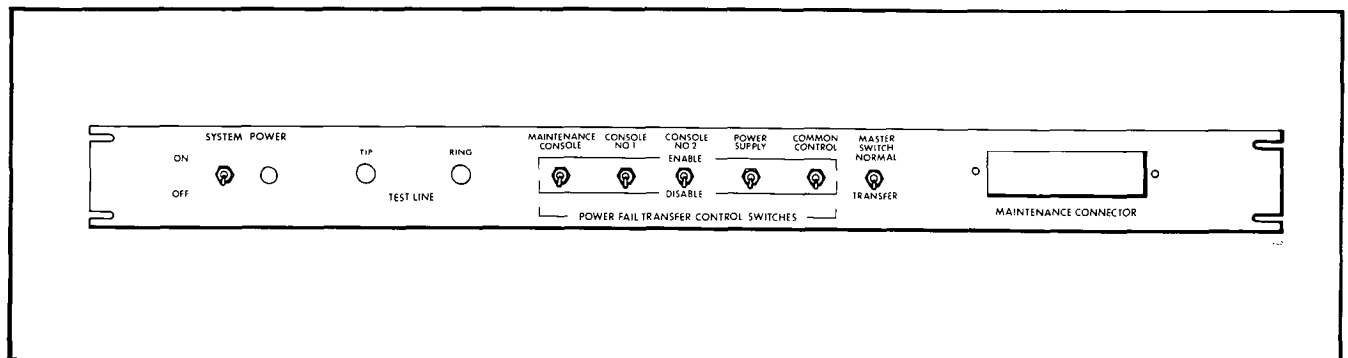

Fig. 4-4   Maintenance Panel

Minor Alarm LED: This LED will flash whenever the automatic diagnostics detect a malfunction which is not sufficiently serious to cause a complete system failure. Typical examples would include receiver malfunction, speech path malfunction and crosspoint malfunction.

Console Alarm LED: The Console Alarm LED flashes to indicate a console malfunction. The LED will go off when the alarm has been cleared or cancelled.

Major Alarm LED: The LED turns ON to indicate that a malfunction has occured which has caused the power fail transfer relays to operate.

- When the MAJOR ALARM LED is ON, the PABX is automatically in power fail transfer mode

- Typical examples of major alarms include Scanner failure or CPU malfunction

- The MAJOR ALARM LED, unlike the other console LEDs is hardwired from the PABX cabinet to the console

Alarm Reset Key: This key is used to reset the flashing minor alarm LED and the audible signal associated with the minor alarm indication. When the key is pressed it -

- Resets the flashing LED so that the LED remains on steady and audible alarm signal associated with the alarm condition is turned off

- Displays in the SOURCE and DESTINATION give the details of the alarm condition, including the location of the printed circuit card that has malfunctioned.

- Does not reset the raised alarm nor does it de-busy faulty circuitry

A typical alarm readout in the SOURCE display would be as shown in Fig. 4-6. In addition, with Generic 203 or higher, if the Alarm Reset key is pressed, the Busy Lamp Field changes to display lines and trunks which are locked out or have been busied out. This display remains for as long as the Alarm Reset key is held down.
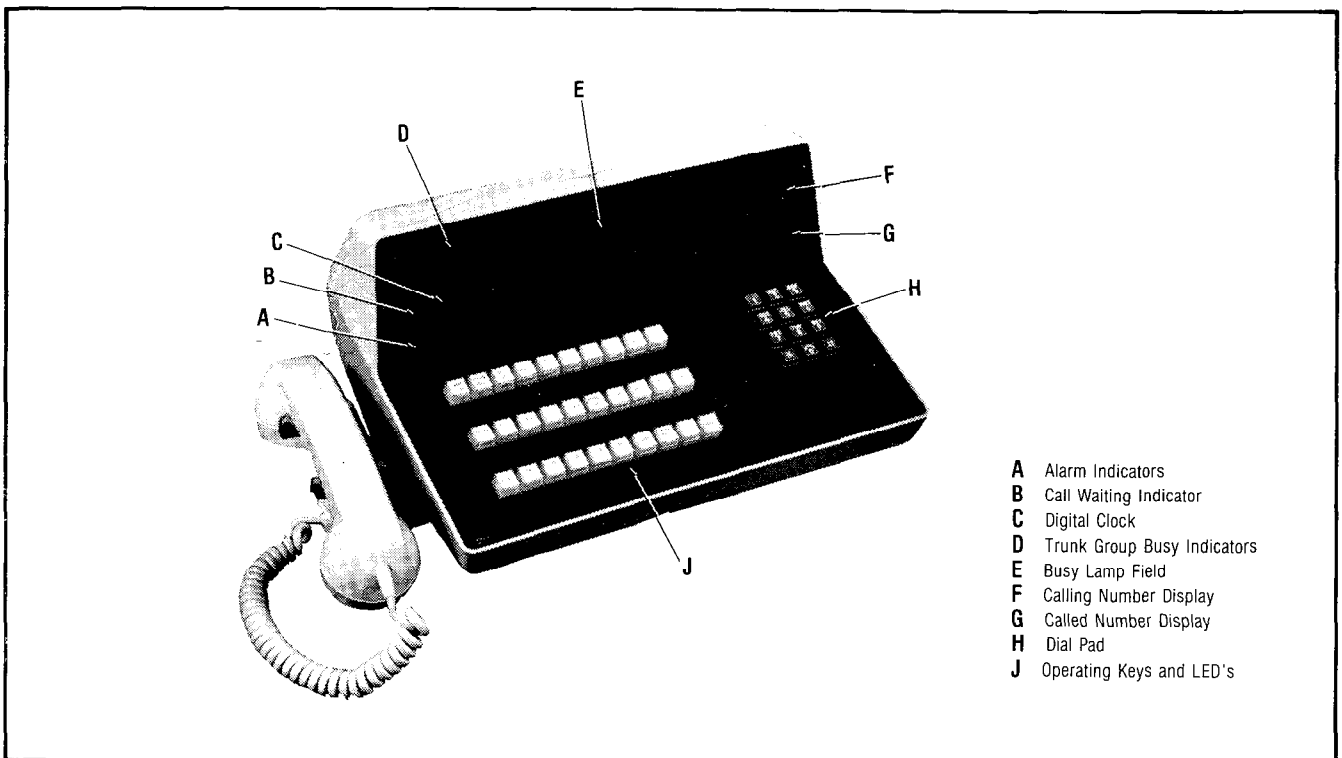

A Alarm Indicators
B Call Waiting Indicator
C Digital Clock
D Trunk Group Busy Indicators
E Busy Lamp Field
F Calling Number Display
G Called Number Display
H Dial Pad
J Operating Keys and LED's
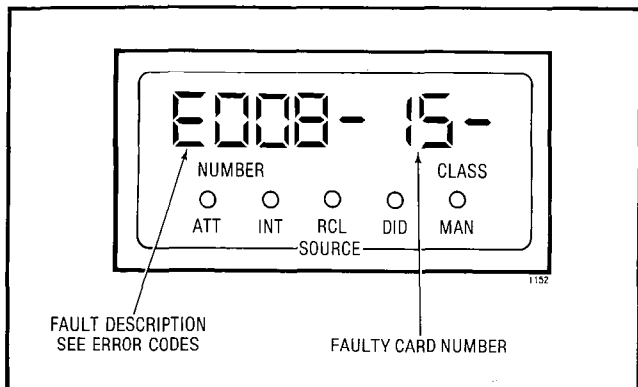
Fig. 4-5 Attendant Console

Fig. 4-6 Typical Readout

Identify Key: If the IDENT key is pressed when the console is idle, the SOURCE display will show the installed firmware generic number and its revision, the DESTINATION display shows the number of the console at which the key was pressed and an internal firmware code. See Fig. 4-7. If the IDENT key is pressed when the attendant is connected to either a source or destination party, the SOURCE and DESTINATION displays will change to show the equipment numbers and speech path number being used. In Generic 204 when the IDENT button is pressed the current date is shown in place of the time.
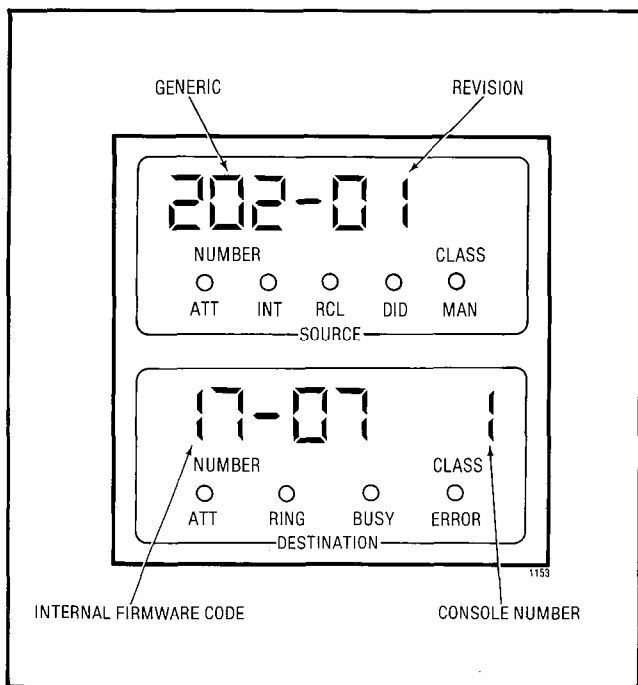

Fig. 4-7 Typical Identification Display

Power Fail Transfer Switch: The switch, when in the TRANSFER position, manually switches the PABX into power fail transfer (unless the appropriate power fail transfer control switch on the maintenance panel is in the DISABLE position). Operation of the switch from the NORMAL to the TRANSFER position will cause all existing calls on the transferred trunks to be released, and the MAJOR alarm LED to light. The switch should only be operated in emergency situations. For normal operation, the switch should be in the NORMAL position.

4.21 Digital Clock: The console digital clock is driven by pulses derived from the PABX master clock circuit and therefore is a direct indication that the system master clock is running and that the data connection is properly connected. The colon between the hour and minute display is a positive indication, that the console is receiving power from the PABX.

4.22 Error Codes: The error codes, Table 4-4, displayed on the console indicate the card causing the malfunction and the type of malfunction. Fig. 4-8 shows a typical error display and its interpretation. Fig. 4-9 shows the equipment numbers and card positions. The alarm may be cancelled and removed from the console by dialing ✱ 8 # (assuming the use of ✱ as the attendant function), then pressing the RELEASE button. This will remove the alarm from the console but will not de-busy the affected circuit. To display the remaining errors, the preceeding errors must be cancelled by the service person.
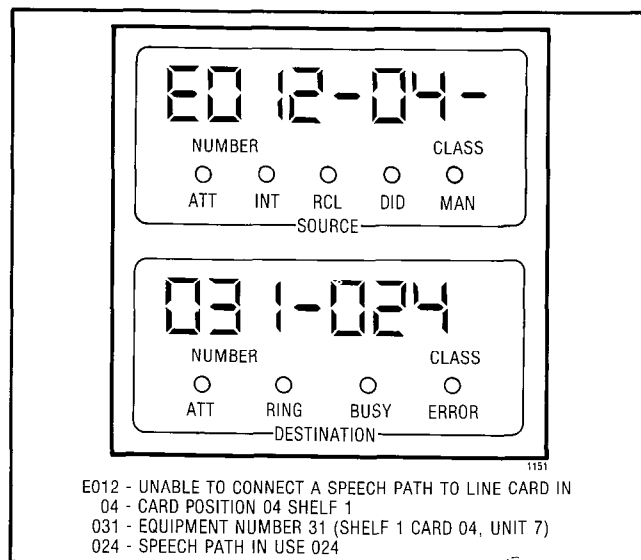

E012 - UNABLE TO CONNECT A SPEECH PATH TO LINE CARD IN
04 - CARD POSITION 04 SHELF 1
031 - EQUIPMENT NUMBER 31 (SHELF 1 CARD 04, UNIT 7)
024 - SPEECH PATH IN USE 024

Fig. 4-8 Typical Error Display

TABLE 4-4
ERROR CODES

Code	Major Minor	Slot	Reason	First 3 digits of Destination Display	Last 3 digits of Destination Display	See Note
E001	major*/ minor	22	Error In RAM	Hi byte of address	bits found in error	7.
E002	major*/ minor	20 or 21	PROM checksum error	0 if slot 20 1-7 if slot 21- (PROM page number)	—	7.
E003	major	19	Clock/scanner error	1 = 1st interrupt missing 2 = 2nd interrupt missing	—	
E004	minor	18	Speech path check circuit not "hi" when disconnected	—	—	1.
E005	minor	18	Bias circuit not connected to Speech path	Speech path number	—	2.
E006	minor	99 (slot not known)	Speech path short	Speech path that has bias applied	other speech path number on which bias was seen	2.
E007	minor	18	Dial tone circuit not connected to speech path	Speech path number		2.
E008	minor	Receiver Card	Receiver not receiving tone digits	Receiver equipment number	—	3.

* During Power-Up sequence only

Notes

1. No more tests using the check circuit will be performed.

2. The speech path shown in the first two digits of DESTINATION display is busied out, a maximum of 16 speech paths may be busied out.

3. The receiver is busied out, maximum one receiver on a Dual Receiver card and two receivers on a Quad Receiver card.

4. The generator is busied out, maximum 1. No further generator tests are performed.

5. No further tests on this slot are performed. This error will occur if a card is not installed for a programmed line.

6. No further test for supervisory tone presence are performed.

7. No further tests are performed.

8. E021 will be lost if the system is reset or the power is turned off, except in Generic 202.05 where it may be cleared by initializing the RAM and reprogramming the system.

TABLE 4-4 (CONT'D)
ERROR CODES

Code	Major Minor	Slot	Reason	First 3 digits of Destination Display	Last 3 digits of Destination Display	See Note
E009	minor	Receiver Card	Receiver not receiving pulse digits	Receiver equipment number	—	3.
E010	minor	18	Generator error	Generator number (1 and 2 are tone. 3 and 4 are pulse)	—	4.
E011	minor	Receiver Card	Generator/Receiver error isolated to a speech path NOTE-error could be on receiver card or on tone control card (slot 18)	Speech path number	—	2.
E012	minor	Line or Trunk Card	Unable to connect the speech path to the line programmed as a "station" or "trunk".	Equipment number	Speech Path number	5.
E013	minor	18	Supervisory tone missing		—	6.
E014	minor	Receiver Card	Receiver dial-tone detector not working	Receiver equipment number	—	3.
E015	minor	Receiver Card	Probable receiver error	—	—	4.
E018	minor	99 (slot not known)	Speech path shorted out	Speech path number	—	2.
E019	minor	18	16 speech paths have been found in error, probably a fault in the checking circuit	—	—	1.
E020	minor	16 or 17	Excessive errors in console data circuits	Console number 0 - maintenance console 1 and 2 - attendant consoles	—	
E021	minor	21	Non-Volatile RAM check sum error (Generic 204)	—	—	8.
E021(22)	minor	22	Non-Volatile RAM check sum error	—	—	8.
E022	minor	22	Generic 204 software conflict	—	—	

PLUG 7	PLUG 9	PLUG 11		EXTENSION UNIT NO.	TRUNK UNIT NO. (4 TRUNK)	TRUNK UNIT NO. (2 TRUNK)
161 169 177 185 193 201	209 217 225 233 241 249			1		
162 170 178 186 194 202	210 218 226 234 242 250			2	1	1
163 171 179 187 195 203	211 219 227 235 243 251			3		
164 172 180 188 196 204	212 220 228 236 244 252			4	2	
165 173 181 189 197 205	213 221 229 237 245 253			5		
166 174 182 190 198 206	214 222 230 238 246 254			6	3	2
167 175 183 191 199 207	215 223 231 239 247 255			7		
168 176 184 192 200 208	216 224 232 240 248 256			8	4	
1 2 3 4 5 6	7 8 9 10 11 12	13 14 15 16 17 18	19 20 21 22	CARD POSITION		
31 32 33 34 35 36	37 38 39 40 41 42	43 44 45 46 47 48	49 50 51 52	SLOT NUMBER		
PLUG 8	PLUG 10	PLUG 12				

HARDWARE POSITION NUMBER

SHELF 2 (SX-200 ONLY)

PLUG 1	PLUG 3	PLUG 5		EXTENSION UNIT NO.	TRUNK UNIT NO. (4 TRUNK)	TRUNK UNIT NO. (2 TRUNK)
001 009 017 025 033 041	049 057 065 073 081 089	097 105		1		
002 010 018 026 034 042	050 058 066 074 082 090	098 106		2	1	1
003 011 019 027 035 043	051 059 067 075 083 091	099 107	RESERVED	3		
004 012 020 028 036 044	052 060 068 076 084 092	100 108	FOR	4	2	
005 013 021 029 037 045	053 061 069 077 085 093	101 109	COMMON	5		
006 014 022 030 038 046	054 062 070 078 086 094	102 110	CONTROLS	6	3	2
007 015 023 031 039 047	055 063 071 079 087 095	103 111		7		
008 016 024 032 040 048	056 064 072 080 088 096	104 112		8	4	
1 2 3 4 5 6	7 8 9 10 11 12	13 14 15 16 17 18	19 20 21 22	CARD POSITION		
1 2 3 4 5 6	7 8 9 10 11 12	13 14 15 16 17 18	19 20 21 22	SLOT NUMBER		
PLUG 2	PLUG 4	PLUG 6				

(RECEIVER NO. 1, CONSOLE CONTROL CARD, CONSOLE CONTROL CARD, TONE CONTROL)

HARDWARE POSITION NUMBER

642-1

SHELF 1

NOTES: 1. EQUIPMENT POSITION 001 IS RESERVED FOR THE TEST LINE AND MUST THEREFORE BE EQUIPPED WITH A LINE CARD.
2. TRUNK EQUIPMENT NUMBER IS SAME AS INDIVIDUAL TRUNK ACCESS CODE.

Fig. 4-9   Hardware/Equipment Numbering

5.   MAINTENANCE FUNCTIONS

A.   General

5.01   The test line is the line on equipment number 001, and appears both on the connector and on terminal posts on the maintenance panel. It must be programmed to be an extension, and should have full trunk access for use by maintenance personnel. The test line has the ability to:

- directly access a trunk or an extension

- initiate a data dump (Generic 204/up)

- set and clear the busy-out conditions of speech paths and receivers

- initialize a card slot

- clear all errors

- control the RS232 port (Generic 204/up)

- select a specific speech path and receiver for use and display their status

- reset the system (Generic 203/up)

Most of the above features require a special access code (the Maintenance Function codes Table 6-4), which will normally be "555", but may be different if necessary to avoid number-plan conflicts. This document assumes the use of the code 555. (This code should only be dialed from one source at a time.)

Any console in the system can perform the same functions using the Maintenance Function code if Generic 203/up is used with the exception of accessing a specific speech path and receiver. Some Maintenance functions can only be performed from a console. (Table 6-4)

Note: The rotary switches on the tone control card (slot 18) should usually be set so that the top switch is NOT 9, 0, 1 or 2. See 5.05 "Select a Speech Path" for the use of these switches.

B. Direct Station or Trunk Access

5.02 The test line or console (Generic 203/up) dials 555 + 2 + nnn where "nnn" is the 3 digit equipment number including leading zeros. Reorder tone indicates that the equipment number is not that of an extension or trunk. Busy tone indicates that the equipment is not idle, otherwise the line is connected. If the trunk is a member of a group programmed "wait for dial tone", the connection is not made until dial tone is received.

C. Set and Clear Busy-Out of Receivers and Speech Paths

5.03 The test line or console (Generic 203/up) dials 555 + 3 + nnn (set) or 555 + 4 + nnn (clear) where "nnn" is either the 3 digit equipment number of a receiver, or is 3 + the 2 digit speech path number (i.e. 301-331). Reorder tone indicates that the number is invalid, and dial tone indicates that the operation is completed.

D. Clear All Errors

5.04 The test line or console (Generic 203/up) goes off-hook and dials 555 + 1. Dial tone is returned. All outstanding minor alarms are cleared. All busied out receivers, generators, and speech paths are set back to normal, and the self-test function is restarted.

E. Select A Speech Path

5.05 This procedure is used to select a speech path and/or a receiver when the test line goes off-hook, and can be used to display the status of a speech path or receiver. This function is only active when the top switch on the tone card is set to 9, 0, 1, or 2 and may only be done from the test.

The top 2 switches on the tone control card select the receiver to be used. The switches should be set to the last two digits as the low two digits of the receiver equipment number (even numbers, 90-20). If set to 99, any free receiver is used. (See Fig. 5-1) The bottom two switches select a speech path to be used, set up as the speech path number (01-31), or the music-on-hold speech path may be selected as 32 (in which case no receiver will be connected). If set to 99, any free speech path is used.

Hardware Position Number				Dual Receiver	Quad Receiver
089	097	105	113		
090	098	106	114	✕	✕
091	099	107	115		
092	100	108	116	✕	✕
093	101	109	117		
094	102	110	118		✕
095	103	111	119		
096	104	112	120		✕
12	13	14	15	Card Position	

Fig. 5-1 Receiver Equipment Numbers

After setting the switches, when the test line goes off-hook, it waits for the selected speech path to become free and seizes it. It then waits for the selected receiver to become free. A busied out speech path or receiver may be selected; the speech path may be used normally but the receiver will not respond to dialing. If an illegal number is set up, no device will be selected. The two seven-segment displays on the scanner card show the status of the receiver and/or speech path when a specific one has been selected. The top display is for the receiver and the bottom display for the speech path. The readouts are:

A — Available — not in use
C — Conversation — in use
E — Error — found faulty by diagnostics
F — Found — in use by test line
O — Optional — no specific circuit selected

5.06 Once the test line has obtained a speech path and a receiver, it does not change its selection until it originates a new call. Changing the switch settings meanwhile will cause the display to change to reflect the status of the receiver and speech path whose numbers are on the switches. If a valid speech path is selected, but an invalid receiver is selected (e.g. 91), then the line is connected to the speech path, no receiver is selected, and no dial tone is introduced. This provides the ability to listen to a speech path for the presence of noise. The test line, since it has not been assigned a receiver, will not time out and revert to reorder tone. It is possible to listen to any unused speech path by remaining off-hook and selecting the speech path number with the bottom two switches.

F. Slot Initialization

5.07 Occasionally, when circuit cards are plugged into a shelf, the logic circuits on the card may not reset completely. In order to guarantee complete reset of all card logic, a slot initialization procedure must be performed. This procedure allows the service personnel to insert a card into a shelf and initialize the card slot. To initialize the card slot dial 555 + 5 + nn from the test line or the console (Generic 203/up), where nn is the

card slot number (1-17 shelf 1, 31-42 shelf 2). Since inserting a card may cause diagnostic errors, this procedure is normally followed by dialing 555 + 1 to clear all system errors.

G. System Reset

5.08 The test line or console (Generic 203/up) may reset the system by dialing 555 + 6.

H. Customer Program Dump/Load (Generic 204/up)

5.09 This feature allows service personnel to dump the contents of the non volatile RAM into a recording device. The device may be used to load the system at a later date.

5.10 To perform a System Dump the service person suspends any device connected to the system's RS232 port, then disconnects it. The recording device with the tape rewound to the beginning is then connected to the RS232 port. The dump may be initiated from the test line by dialing 555 + 7 dial tone returned - hang up, go off-hook again and dial 555 + 8 # or 82. From the console dial 555 + 7. then dial * 14 #. LEDs numbers three and four on the memory expander card are lit for the duration of the dump. When the dump is complete, the recording device will be suspended automatically. The service person then disconnects the Write function of the recording device, selects Rewind and labels the tape. If there was a device connected to the RS232 port it is reconnected and initialized by the Printer Enable code from the test line or console. If Call Detail Recording or Traffic Measurement Polling were in effect before the Dump they must be restarted at this time.

5.11 To perform a System Load the service personnel suspends and disconnects any device connected to the system's RS232 port. The recording device (with the tape rewound to the beginning) may then be connected to the port. The switches on the tone control card must be set to 5623 and the Auto Load button on the PROM/RAM Expander Card pressed. Any calls in progress will be lost and the system placed in Power Fail Transfer. The LEDs on the scanner card will read

01-99 in the first block, 01-31 in the second block during the dump.

I. Data Port Control (Generic 203/up)

5.12 To enable the data port dial * 14 # from the console or 555 + 8 # or 555 + 82 from the test line. To disable the data port (and to stop all system activities that require a printout) dial * 14 '* from the console or 555 + 8 '* or 555 + 81 from the test line. To ignore or purge any printing dial |* 1400 from the console or 555 + 800 from the test line.

J. Forced Trunk Release

5.13 This feature allows service personnel to force a busy trunk into the idle state. At the console dial * 2nnn ## (* is the attendant function code), where nnn is the individual trunk equipment number; press the RELEASE key. Care should be taken when force releasing a trunk. The trunk will be forced into the idle state even if the trunk is legitimately in use.

K. Current Speech Path Display

5.14 This procedure is used to display the speech path number being used by a source or destination party. If the console has a destination party, pressing the console IDENT key causes the number of the speech path in use to be displayed in segments 7 and 8 or the DESTINA-TION display. Similarly, if the console has a source party, pressing the IDENT key causes the speech path number to be displayed in segments 7 and 8 of the SOURCE display.

L. Line & Trunk Status Display

5.15 This function allows the attendant to display certain information regarding the status of a selected line or trunk. This feature aids Mitel Field Engineers to diagnose malfunctions

from a remote location. To display the line or trunk status dial * #nnn # from the console or test line (Generic 203/up), where nnn is the equipment number of the line or trunk. Care should be taken when recording the status display. The record must include any blanks, dashes, or symbols exactly as shown in the SOURCE and DESTINATION displays. For further information see section MITL9105/9110-98-350 SX-100 and SX-200 Troubleshooting.

M. Cancelling a Minor Alarm

5.16 A minor alarm may be cancelled and removed from the console by dialing * 8 #, and pressing the RELEASE button (where * is the attendant function code). This allows alarms to be recalled sequentially from a queue (maximum 16), but does not de-busy any of the circuits.

N. Setting the System Identifier (Generic 203/up)

5.17 The system identification number for use in Traffic reports may be set by dialing *̄ 17 n (nn), and pressing the RELEASE button (where n (nn) is the 1 to 3 digit system number).

6. SYSTEM PARAMETERS

A. General

6.01 System parameters are included in the following tables:

- Table 6-1 System Feature Limitations

- Table 6-2 Timeout Information

- Table 6-3 Attendant Function Access Codes

- Table 6-4 Maintenance Function Access Codes

TABLE 6-1
SYSTEM FEATURE LIMITATIONS

Maximum number of simultaneous calls = 31.
Maximum number of speech paths used by any call = 2. (During a Conference)
Maximum number of simultaneous consultations = 15.
Maximum number of simultaneous add-on (3 way) calls = 30.
Maximum number of simultaneous station controlled conference calls = 30.
Maximum number of calls that can simultaneously be camped on to an extension, trunk group or hunt group = 30.
Maximum number of simultaneous callbacks that can be enabled = 32.
Maximum number of simultaneous call forwards that can be enabled = 208 (SX-200); 112 (SX-100).
Maximum number of simultaneous "dial 0" calls = 31.
Maximum number of hunting groups = 12.
Maximum number of calls that can be simultaneously connected to music on hold = 31.
Maximum number of stations in a station hunting group = 200 (SX-200); 112 (SX-100).
Maximum number of stations in a call pick up group = 200 (SX-200); 112 (SX-100).
Maximum number of dial call pick up groups = 50.
Maximum number of trunks assignable to night stations = 100 (SX-200); 52 (SX-100).
Maximum number of trunks in a trunk group = 104 (SX-200); 56 (SX-100).
Maximum number of trunk groups = 12.
Maximum number of calls that can override a given extension = 1.
Maximum number of calls that can be simultaneously parked = 31.
Maximum number of simultaneous meet-me conferences = 1.
Maximum number of simultaneous attendant controlled conferences = 1 (Two if tenanting with separate consoles)
Maximum number of calls that can be simultaneously held by one attendant = 4.
Maximum number of simultaneous incoming calls that can be separately identified by the attendant = 6. (Recall, Dial 0, LDN 1 through LDN 4)
Maximum number of LDNs that can be identified at the attendant's console = 4.
Maximum number of simultaneously ringing Wake-Ups = 10.
speed call tables = 25.
Maximum number of personal speed call tables = 18
PABX numbering schemes may be 1, 2, 3 or 4 digit or a combination of 1, 2, 3 and 4 digit, as long as there are no conflicts in the first digits.
Maximum number of trunk buffers for SMDR = 31.
Maximum number of speed call digits that may be stored = 56. (per table)
Maximum number of tenants = 4 (Two with consoles)

TABLE 6-2
TIMEOUT INFORMATION

Attendant Timed Recall (Don't Answer)	20s, 30s, or 40s
Attendant Timed Recall (Camp-On)	20s, 30s, or 40s
Attendant Timed Recall (Hold)	20s, 30s, or 40s
Automatic Night Switching	20s, 30s, or 40s
Dial Tone Timeout	15s
Interdigit Timeout	15s lines, 10s trunks
Lockout Timeout	45s
Callback Clear Timeout	8 hours
Callback Don't Answer Reset	6 rings
Call Park Recall	2, 3 or 4 minutes
Call Hold Recall	2, 3 or 4 minutes
Call Forward - Don't Answer Timeout	20s, 30s, or 40s
Switchhook Flash	190ms to 1.5s
Ringing Timeout	5 minutes
Automatic Wake-Up Ringing	6 rings (1s on, 3s off)
Automatic Wake-Up Attempts	3 at 5 minute intervals

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TABLE 6-3
ATTENDANT FUNCTION ACCESS CODES

These codes assume the use of ✳ as the Attendant Function code (Feature number 18).

To cancel all call forwarding:
a) Dial ✳ 1 or ✳ 11
b) Dial #
c) Press RELEASE

To access an individual trunk:
a) Dial ✳ 2
b) Dial individual trunk access number
   (equipment number)
c) Dial #
d) Press RELEASE

† To make flexible night service assignments:
a) Dial ✳ 3
b) Dial individual trunk access number
   (equipment number)
c) Press Night 1 or Night 2
d) Dial extension number
e) Press RELEASE

To cancel all system callbacks:
a) Dial ✳ 4
b) Dial #
c) Press RELEASE

To set the clock time:
a) Dial ✳ 5
b) Dial time (hour plus minutes)
c) Dial ✳ for p.m., otherwise a.m.
d) Press RELEASE

To make trunk group attendant access:
a) Dial ✳ 6
b) Dial trunk group (1 through 12)
c) Dial ✳
d) Press RELEASE

To make trunk group dial access:
a) Dial ✳ 6
b) Dial trunk group (1 through 12)
c) Dial #
d) Press RELEASE

To change the Direct Inward System Access
Code:
a) Dial ✳ 7
b) Dial DISA code
c) Press RELEASE

To cancel a minor alarm:
a) Dial ✳ 8
b) Dial #
c) Press RELEASE

NOTE: The errors will be sequentially stacked
in the memory and may be recalled se-
quentially (most recent first) by
repeating the above procedure.

† To busy out an individual trunk:
a) Dial ✳ 9
b) Dial individual trunk access number
   (equipment number)
c) Dial ✳
d) Press RELEASE

† To de-busy an individual trunk:
a) Dial ✳ 9
b) Dial individual trunk access number
   (equipment number)
c) Dial #
d) Press RELEASE

† To change the status of all occupied clean
rooms to occupied and needs cleaning:
(Note 1)
a) Dial ✳ 10
b) Dial ✳
c) Press RELEASE

† To change the status of all occupied rooms in
need of cleaning to occupied clean: (Note 1)
a) Dial ✳ 10
b) Dial #
c) Press RELEASE

To set up call forwarding for an extension: (Note 1)
a) Dial ✳ 11nnn (where nnn is the equipment
   number), followed by the number of the
   extension requesting the call forwarding
b) Dial the required call forwarding code
      1 - Call Forward - Busy
      2 - Call Forward - Don't Answer
      3 - Call Forward - Follow Me
c) Dial the number to which the calls are to
   be forwarded
d) Press RELEASE

TABLE 6-3 (CONT'D)
ATTENDANT FUNCTION ACCESS CODES

To cancel call forwarding for an extension: (Note 1)
a) Dial * 11nnn, where nnn is the extension number of the forwarding extension
b) Dial #
c) Press RELEASE

To cancel all call forwarding:
a) Press * 11 or * 1
b) Dial #
c) Press RELEASE

† To busy out an extension: (Note 1)
a) Dial * 12nnn, where nnn is the number of the extension to be busied out
b) Dial *
c) Press RELEASE

† To de-busy an extension: (Note 1)
a) Dial * 12nnn, where nnn is the number of the extension to be de-busied
b) Dial #
c) Press RELEASE

† To suspend the printer: (Note 2)
a) Dial * 14 *
b) Press RELEASE

† To purge and ignore the printer: (Note 2)
a) Dial * 14 00
b) Press RELEASE

† To enable the printer: (Note 2)
a) Dial * 14 #
b) Press RELEASE

† To change the date: (Note 2)
a) Dial * 15 and 3 or 4 digit date (one or two digit month, two digit day)
b) Press RELEASE

† To print the room register audit: (Notes 2 and 3)
a) Dial * 16
b) Press RELEASE

† To display the system identity: (Note 2)
a) Dial * 17 ID appears
b) Press RELEASE

† To change the system identity: (Note 2)
a) Dial * 17 n(nn) (1 to 3 digit ID, 0-999)
b) Press RELEASE

† To receive a print of Room Audits:
a) Dial * 18
b) Press RELEASE

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For additional codes see Sections MITL9105/9110-98-450 and MITL9105/9110-98-220

Note 1: Applies to Generic 203/up
Note 2: Applies to Generic 204/up
Note 3: Printer starts after pressing the RELEASE button

† requires system option programming

TABLE 6-4
MAINTENANCE FUNCTION ACCESS CODES

To select any of the functions the access code assigned for the maintenance function must be dialed (Feature Number 19). The code 555 is used in the following part, for the maintenance code and may be dialed from the test line or console (Generic 203/up).

Clear all errors:

a) Dial 5551

Direct trunk or station access:

a) Dial 5552
b) Dial individual equipment number

Busy out of a receiver:

a) Dial 5553
b) Dial equipment number of receiver

Busy out of a speech path:

a) Dial 55533
b) Dial speech path number (01-31)

De-busy a receiver:

a) Dial 5554
b) Dial equipment number of receiver

De-busy a speech path:

a) Dial 55543
b) Dial speech path number (01-31)

Initialize card slot:

a) Dial 5555
b) Dial card slot number (01-17, 31-42)

†*System reset:

a) Dial 5556

**To initiate system dump from the console:

a) Dial 555 + 7
b) Dial * 14 #

**To initiate system dump from the test line:

a) Dial 555 + 7 hang up
b) Go off-hook dial 555 + 8 # or 82

†**To suspend printer:

a) Dial 555 + 8 + * or 1 or
Dial * 14 * (console only)

†**To enable printer:

a) Dial 555 + 8 + # or 2 or
Dial * 14 # (console only)

†**To purge and ignore printer:

a) Dial 555 + 8 + 00 or
Dial * 1400 (console only)

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For Traffic Measurement Access Codes see MITL9110-98-450.

† Requires System Option Programming
* Generic 203/up
** Generic 204/up