TOSHIBA

Strata® S$_e$ & VI$_e$

Electronic Key Telephone Systems

General Description

THE FULL FEATURED
ELECTRONIC KEY
TELEPHONE SYSTEM
FOR THE GROWING
BUSINESS OFFICE

TOSHIBA AMERICA INFORMATION SYSTEMS, INC.

PUBLICATION INFORMATION

Toshiba America Information Systems, Inc., Telecommunication Systems Division, reserves the right, without prior notice, to revise this information publication for any reason, including, but not limited to, utilization of new advances in the state of technical arts or to simply change the design of this document.

Further, Toshiba America Information Systems, Inc., Telecommunication Systems Division, also reserves the right, without prior notice, to make such changes in equipment design or components as engineering or manufacturing methods may warrant.

WARRANTY

Toshiba America Information Systems, Inc., ("TAIS") warrants that this telephone equipment (except for fuses, lamps and other consumables) will, upon delivery by TAIS or an authorized TAIS dealer to a retail customer in new condition, be free from defects in material and workmanship for twelve (12) months after delivery. This warranty is void (a) if the equipment is used under other than normal use and maintenance conditions, (b) if the equipment is modified or altered, unless the modification or alteration is expressly authorized by TAIS, (c) if the equipment is subject to abuse, neglect, lightning, electrical fault, or accident, (d) if the equipment is defaced or missing, or (f) if the equipment is installed or used in combination or in assembly with products not supplied by TAIS and which are not compatible or of inferior quality, design or performance.

The sole obligation of TAIS or Toshiba Corporation under this warranty, or under any other legal obligation with respect to the equipment, is the repair or replacement by TAIS or its authorized dealer, with new or refurbished parts (at their option) of such defective or missing parts as are causing the malfunction. If TAIS or one of its authorized dealers does not replace or repair such parts, the retail customer's sole remedy will be refund of the price charged by TAIS to its dealers for such parts as are proven to be defective, and which are returned to TAIS through one of its authorized dealers within the warranty period and no later than thirty (30) days after such malfunction, whichever first occurs.

Under no circumstances will the retail customer or any user or dealer or other person be entitled to any direct, special, indirect, consequential or exemplary damages, for breach of contract, tort, or otherwise. Under no circumstances will any such person be entitled to any sum greater than the purchase price paid for the item of equipment that is malfunctioning.

To obtain service under this warranty, the retail customer must bring the malfunction of the machine to the attention of one of TAIS's authorized dealers within the twelve (12) month period and no later than thirty (30) days after such malfunction, whichever first occurs. Failure to bring the malfunction to the attention of an authorized TAIS dealer within the prescribed time, results in the customer being not entitled to warranty service.

THERE ARE NO OTHER WARRANTIES FROM EITHER TOSHIBA AMERICA INFORMATION SYSTEMS INC., OR TOSHIBA CORPORATION WHICH EXTEND BEYOND THE FACE OF THIS WARRANTY. ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING THE WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, AND FITNESS FOR USE, ARE EXCLUDED.

No TAIS dealer and no person other than an officer of TAIS may extend or modify this warranty. No such modification or extension is effective unless it is in writing.

Strata S*e* & VI*e*

RELEASE 2

GENERAL DESCRIPTION

FCC REGISTRATION

The STRATA S$_e$/VI$_e$ electronic key telephone systems are registered in accordance with the provisions of Part 68 of the Federal Communications Commission's Rules and Regulations.

FCC REQUIREMENTS

Means of Connection

The Federal Communications Commission (FCC) has established rules which permit the STRATA S$_e$/VI$_e$ electronic key telephone systems to be connected directly to the telephone network. A locally provided jack is used for this connection—jacks for this type of customer-provided equipment will not be provided on party lines or coin lines.

Incidence of Harm

If a STRATA S$_e$/VI$_e$ system is malfunctioning, it may also be disrupting the telephone network. The system should be disconnected until the problem can be determined and repaired. If this is not done, the telephone company may temporarily disconnect service.

Service or Repair

For service or repair, contact your local Toshiba telecommunications distributor. To obtain the nearest Toshiba telecommunications distributor in your area, call Toshiba America Information Systems, Telecommunication Systems Division in Irvine, CA (714) 583-3700.

Telephone Network Compatibility

The telephone company may make changes in its facilities, equipment, operations and procedures. If such changes affect the compatibility or use of the STRATA$_e$ system, the telephone company will notify you in advance to give you an opportunity to maintain uninterrupted service.

Notification of Telephone Company

Before connecting a STRATA$_e$ system to the telephone network, the telephone company may request the following:

1) Your telephone number.
2) FCC registration number:
   - STRATA$_e$ may be configured as a Key or Hybrid telephone system. The appropriate configuration for your system is dependent upon your operation of the system.
   - If the operation of your system is only manual selection of outgoing lines, it may be registered as a Key telephone system.
   - If you operation requires automatic selection of outgoing lines; such as dial access, Least Cost Routing, Pooled Line Buttons, etc., the system must be registered as a Hybrid telephone system. In addition to the above, certain features (Off-premises Lines, Off-premises Extensions, etc.) may also required Hybrid telephone system registration in some areas.
   - If you are unsure of your type of operation and/or the appropriate FCC registration number, contact your local Toshiba telecommunications distributor for assistance.

STRATA S$_e$:
   Key system: BF 287N-n1491-KF-E
   Hybrid system: BF 287N-19911-MF-E
STRATA VI$_e$:
   Key system: BF 287N-71465-KF-E
   Hybrid system: BF 287N-19899-MF-E

3) Ringer equivalence number: 0.5B

The ringer equivalence number (REN) is useful to determine the quantity of devices you may connect to your telephone line and still have all of those devices ring when your number is called. In most areas, but not all, the sum of the RENs of all devices connected to one line should not exceed five (5.0). To be certain of the number of devices you may connect to your line, as determined by the REN, you should contact your local telephone company to ascertain the maximum REN for your calling area.

4) USOC jack required: RJ-25C or RJ-11C

Items 2, 3, and 4 are also indicated on the equipment label.

You must notify the telephone company upon final disconnection of your equipment.

RADIO FREQUENCY INTERFERENCE

Warning: This equipment generates and uses radio frequency energy and if not installed and used in strict accordance with the manufacturer's instruction manual, may cause interference to radio and television reception. The equipment has been type-tested and found to comply with the limits for a Class B computing device pursuant to Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference in a residential installation. However, there is no guarantee that interference will not occur. If this equipment does cause interference to radio or television reception, which can be determined by turning the equipment off and on, correct the interference by one or more of the following measures:

- Reorient the receiving antenna.
- Reorient the telephone equipment with respect to the receiver.
- Move the telephone equipment away from the receiver.
- Plug the key service unit's power cord into a different AC outlet so that the KSU and receiver are on different circuits.

If necessary, the user should consult the dealer or an experienced radio/television technician for additional suggestions. The user may find the following booklet helpful (prepared by the Federal Communications Commission): How To Identify and Resolve Radio—TV Interference Problems. This booklet is available from the U.S. Government Printing Office, Washington, D.C. 20402, Stock No. 004-000-00345-4.

This system is listed with Underwriters Laboratory.

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In accordance with U.S. Copyright Law, a license may be required from the American Society of Composers, Authors and Publishers, or other similar organization, if radio or TV broadcasts are transmitted through the music-on-hold feature of this telecommunication system. Toshiba American Information Systems, Inc., hereby disclaims any liability arising out of the failure to obtain such a license.

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CENTREX

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DOOR PHONE/ MONITOR STATION

MODEM

VOICE MAIL

LEAST COST ROUTING **$$**

LCD ELECTRONIC TELEPHONE
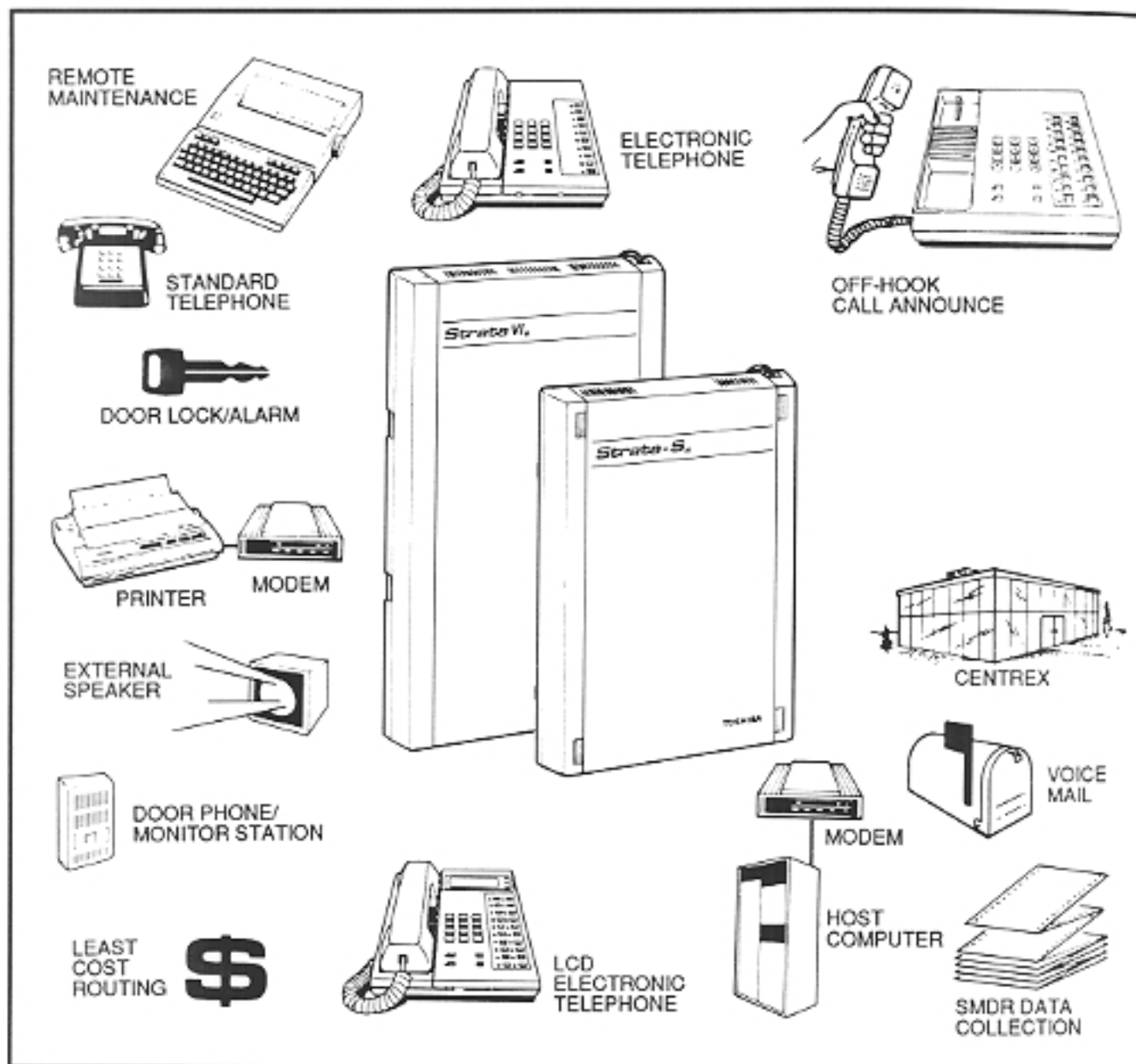
HOST COMPUTER

SMDR DATA COLLECTION

FIGURE 1—PERIPHERAL EQUIPMENT

1 GENERAL

Summary Description

STRATA S$_e$ and VI$_e$ are advanced electronic key telephone systems designed to function in a variety of situations. Both systems are electrically compatible with the public telephone network and can also be applied in a "behind" PBX, CENTREX, or IA2 environment.

Figure 1 shows all the basic electronic key system features, including CENTREX (CTX) capabilities, and the impressive package of optional features provided by these two systems. These features offer, among others, enhanced connectivity with stand-alone voice mail products, off-hook call announce (OCA), SMDR, remote administration/maintenance, and 32-character alphanumeric Liquid Crystal Display read-outs. Wherever a CO line interface is indicated in the following text, it can be a CO/CTX and/or PBX line.

Very similar in design, both systems are based on stored-program control, custom LSI circuitry, solid-state, space-division switching and reduced station cabling, and are housed in single cabinets.

System differences are restricted to the capacities of the key service units. STRATA S$_e$ has a maximum capacity of three incoming lines and eight stations, while STRATA VI$_e$ will accommodate up to six incoming lines with a maximum of 16 stations. Both systems have two intercom paths as a standard feature, with two additional paths available on the VIe as an optional feature.

Utilizing specially designed electronic telephones (each of which is connected to the system via industry-standard 2- or 3-pair cabling and equipped with a push-button dial pad), solid-state electronics within the key service unit translate signals from the station dial pad into either DTMF or rotary-dial signals, as required by the Central Office. If the system is to be equipped with off-hook call announce 3-pair cabling and modular cords must be used.

Maintenance

Maintenance procedures are based on quickly locating and replacing defective plug-in units, keeping service disruption to a minimum. In addition, remote administration/maintenance is also an available option for both systems.

2 PHYSICAL DESCRIPTIONS

Key Service Units

Designed for wall mounting, each key service unit is housed in a single metal and plastic cabinet (Figure 2) with the following dimensions:

STRATA S$_e$
Height: 16.5" (420 mm)
Width: 12.0" (306 mm)
Depth: 2.67" (67 mm)
Weight: 9.25 lbs. (4.2 kg

STRATA VI$_e$
Height: 21.25" (540 mm)
Width: 12.9" (330 mm)
Depth: 2.75" (70 mm)
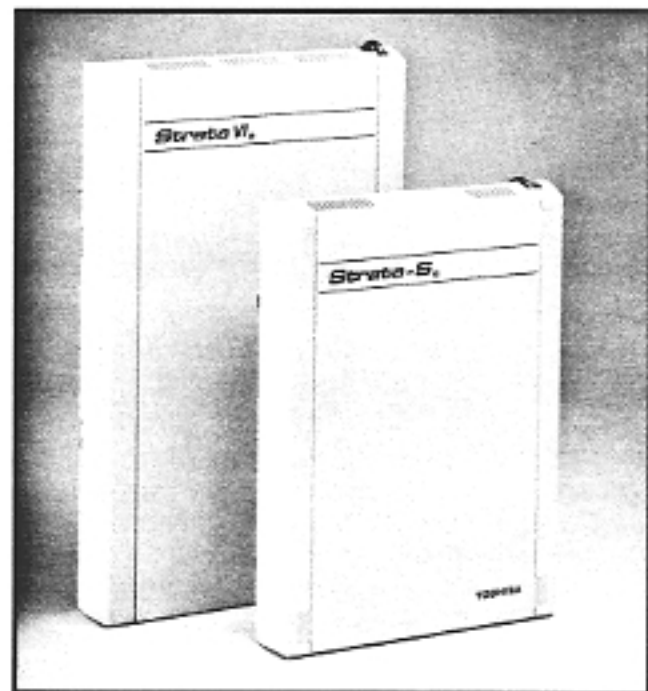Weight: 15.63 lbs. (7.1 kg)

FIGURE 2—STRATS S$_e$ and VI$_e$ CABINETS

The STRATA S$_e$ key service unit (Figure 3) is factory-equipped with two printed circuit boards (PCBs) and a power supply. The main PCB (SMAU) and power supply are secured to the cabinet base;
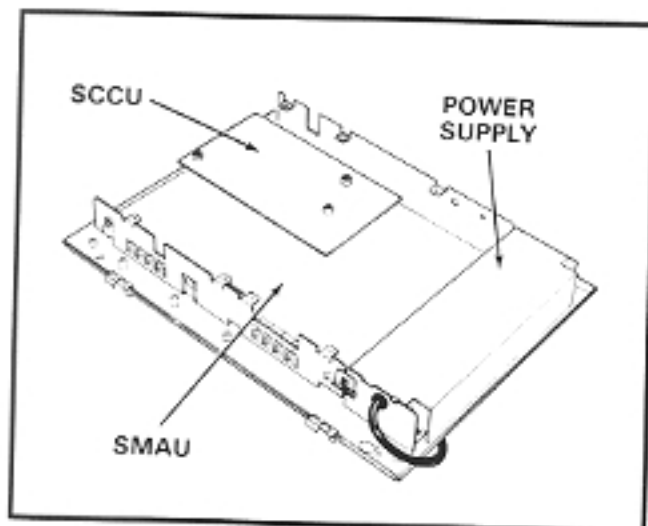
FIGURE 3—STRATA S$_e$ CABINET (Interior)

FIGURE 4—STRATA VI$_e$ CABINET (Interior)

the processor PCB (SCCU) is attached to the SMAU with four screws, and is connected to it via four 10-pin connectors. These PCBs' dimensions are:

Main Board (SMAU):
12.5 x 9.5" (318 x 241 mm)
Controller (SCCU):
7.9 x 3.4" (201 x 86 mm)

The STRATA VI$_e$ key service unit (Figure 4) is factory-equipped with two PCBs and a power supply. The main PCB (VMAU) and power supply are secured to the cabinet base; the processor PCB (VCCU) is attached to the VMAU with four screws, and is connected to it via four 10-pin connectors. These PCBs' dimensions are:
Main Board (VMAU):
9.8 x 15.3" (248 x 390 mm)
Controller (VCCU):
6.0 x 6.5" (152 x 165 mm)

Each key service unit will accommodate up to eight optional printed circuit boards. The various dimensions and designations of these are:
Station Interface (SSTU):
4.1 x 4.6" (105 x 117 mm)
OCA Interface (SVCU):
3.4 x 1.6" (86 x 41 mm)
External Page Interface (SEPU):
4.3 x 3.0" (108 x 76 mm)
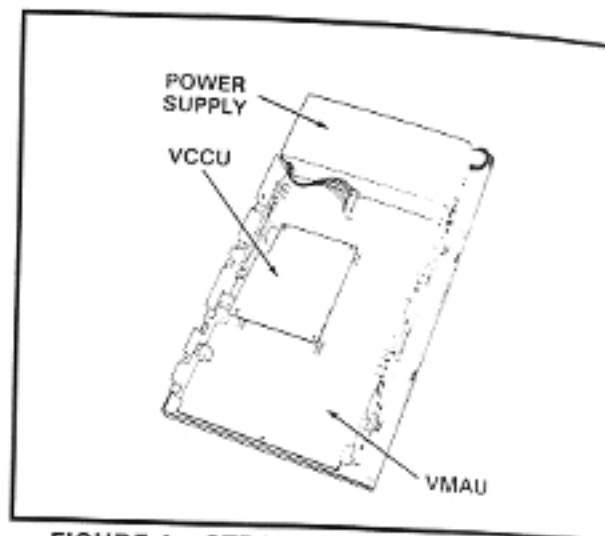Music-on-hold Interface (SMOU):
2.2 x 1.1" (57 x 29 mm)

Remote Administration/Maintenance (SDTU)
5.0 x 2.8" (128 x 70 mm)
S$_e$ CO Interface (SCOU):
4.1 x 4.6" (105 x 117 mm)
S$_e$ Power Fail Unit (SPFU):
4.3 x 3.0" (108 x 76 mm)
S$_e$ SMDR Interface (STMU):
5.0 x 3.0" (128 x 76 mm)
VI$_e$ CO Interface (VCOU):
5.7 x 10.6" (146 x 269 mm)

Peripheral Equipment

Several optional expansion modules are available to accommodate additional STRATA$_e$ features: Station Message Detail Recording (HSMB), 1A2 Interface (HCNB), Auxiliary Device Interface (HIOB), Off-premises Line (HOLB) and Off-premises Extension (HOXB). The two types of modules are identical in external appearance (Figure 5).

An HDCB, needed to support up to three door phones (Figure 6), is available, with two per system being the maximum. An external ring generator/power supply (MRGU) that can be used with the HOXB is also available (Figure 7). An external amplified speaker (HESB) can either be used to amplify the ringing bell of a telephone or as a paging speaker (Figure 8). When used in conjunction with the door phone unit, the HESB provides a talkback paging speaker capability.
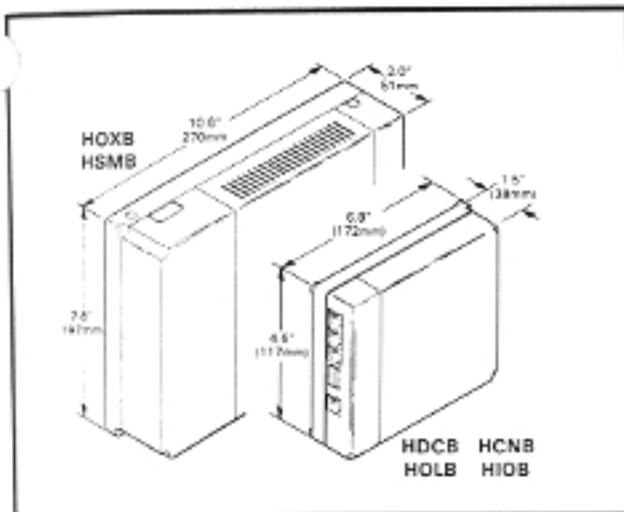
FIGURE 5—EXPANSION MODULES
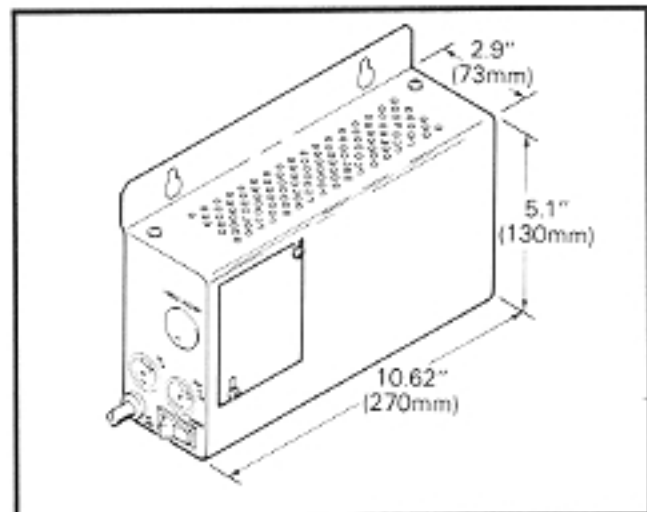
FIGURE 7—MRGU
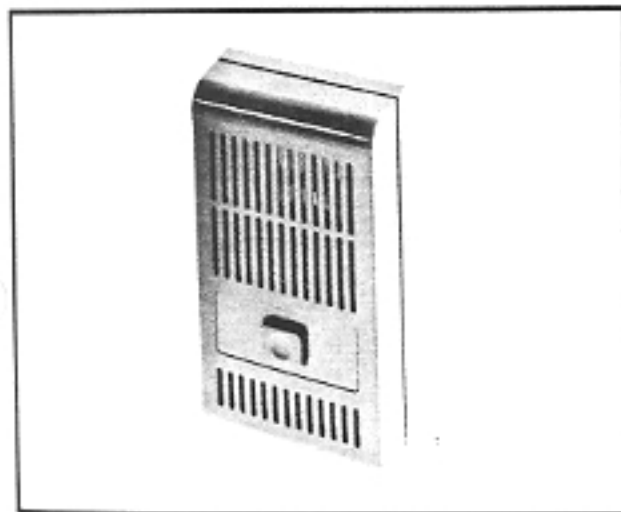
FIGURE 6—DOOR PHONE
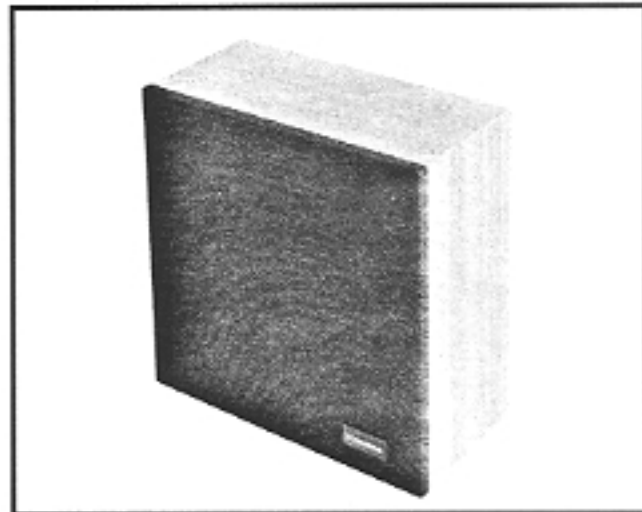
FIGURE 8—HESB

Electronic Telephones

Four different 6500-series electronic telephones may be used in either system (see Figures 9, 10 and 11). The phones are enclosed in a stylish, impact-resistant, charcoal gray case with a matte finish, and blend easily into a progressive office environment.

All 6500-series electronic telephones have the same dimensions:

Height: 3.6" (92 mm)
Width: 7.0" (178 mm)
Length: 9.0" (229 mm)

10-button Electronic Telephone (Figure 9): The 6510 model is available in two variations: as a speakerphone or with handsfree answerback

capability on intercom lines.

20-button Electronic Telephone (Figure 10): The 6520 model is available with handsfree-answerback capability on intercom lines.

20-button Liquid Crystal Display Electronic Telephone (Figure 11): The 6520SD is available only as a speakerphone unit with a 32-character, alphanumeric liquid crystal display (LCD) field. Numerous LCD features include:
- Alphanumeric Messaging
  - Busy Station Messaging
  - Called Station Messaging
  - Calling Station Messaging
  - Group Station Messaging
- Busy Lamp Field (BLF) Indication

FIGURE 9—10-button ELECTRONIC TELEPHONE

FIGURE 11—20-button LIQUID CRYSTAL
DISPLAY ELECTRONIC TELEPHONE

FIGURE 10—20-button ELECTRONIC TELEPHONE

- CO Line Identification
- Speed Dial Memo
- Timed Reminders

System software allows the customer to assign feature buttons on all electronic telephones in a completely flexible manner.

Electronic Telephone Upgrade Options: All electronic telephones may be upgraded with Off-hook Call Announce, Loud Ringing Bell and Headset capability.
- **Off-hook Call Announce Upgrade:** Each electronic telephone may be upgraded to receive intercom calls when the handset is off-hook by installing an Off-hook Call Announce upgrade assembly.

NOTE:
Only those telephones programmed to receive OCA announcements need the OCA upgrade.

The assembly consists of two PCBs, the HVSU and the HVSI, which install inside the telephone base with plug-in connectors.

- **Loud Ringing Bell/Headset** Upgrade: Each electronic telephone may also be upgraded to provide a loud ringing bell interface and a modular headset interface. To accomplish this, an upgrade assembly consisting of a small PCB (HHEU) installs on the main PCB inside the telephone, with a plug-in connector.

An External Speaker (HESB) is directly connected to the upgraded phone. When the phone rings, the HESB sounds a loud tone that mimics the phone's ring. See Peripheral Equipment.

Most standard headsets plug into the HHEU jack and are compatible with the electronic telephone.

An electronic telephone may use all available upgrade options simultaneously. For example, the same station may be upgraded with OCA, a Loud Ringing Bell and a headset.

More Electronic Telephone Standard Features:
All electronic telephones may be wall mounted without additional equipment. They are also hearing aid-compatible.

Each electronic telephone also features a standard modular handset cord, and is connected to the system with a 2-pair modular line cord. Various upgrade options, such as the Off-hook Call Announce and Loud Ringing Bell upgrade assemblies, require the telephone to be connected to the system with special wiring. (A 3-pair modular line cord is required for Off-hook Call Announce, and a custom external speaker cable is required for the Loud Ringing Bell.)

3 ELECTRICAL CHARACTERISTICS

General

The key service unit operates from an internal power supply, which connects to a standard 3-wire, 117 VAC, 60-Hz, grounded wall outlet.

Loss of AC power will cause operational failure of the system. System memory, however, is protected from loss due to power failure with a memory backup battery. Full system reserve power is available as an option.

NOTE:
The memory backup battery is designed to maintain full memory protection for approximately one year with no external power source applied.

The electrical characteristics of the system are summarized in Table A.

4 FEATURES and SERVICES

The features and services of these electronic key telephone systems are summarized in Tables B and C, which list the standard and optional features, respectively.

TABLE A
SUMMARY OF ELECTRICAL CHARACTERISTICS

Loop Limits

Station	1,000' (305 M), 24 AWG cable, 2 pair (3 pair
Door Phone Control Unit (HDCB)-to-KSU	1,000' (305 M), 24 AWG cable, 2 pair
Door Phone/Monitor Station-to-HDCB	1,000' (305 M), 24 AWG cable, 1-pair
HOXB-to-Station	500 ohms (including telephone), 48 VDC
HOLB-, HSMB-, HCNB-, HOXB-to-KSU	17' (5.2 M), 24 AWG cable, number of pair as
HIOB-to-KSU	650' (200 M), 24 AWG cable, 2-pair
HIOB-to-Peripheral	300 Ω maximum, including peripheral resistance

Ringing Tones

CO Line (idle station)	600/800 Hz, modulated by 16 Hz, 1 second on onds off
CO Line (busy station)	2,400 Hz, modulated by 10 Hz, 1 second on–3 off
HIOB Station (Intercom)	20 Hz, 150V P-P, 1 second on–3 seconds off
HIOB Station (CO call)	20 Hz, 150V P-P, 1/4 second on–1/4 second off second on–1/4 second off @ 4-second intervals
Intercom Line	600 Hz, 1 second on–3 seconds off
Door Phone A & C Tones	870 Hz, 1 second/710 Hz, 2-1/2 seconds (5 rings
Door Phone B Tone	870 Hz, 1/2 second/710 Hz, 2-1/2 seconds (5 rings

Busy Override Tone	2,400 Hz, 1 second on–3 seconds off
Dial Tone (Intercom)	400 Hz, continuous
Ringback Tone	400 Hz, 1 second on–3 seconds off
Busy Tone	400 Hz, 1/4 second on–1/4 second off
Do Not Disturb Tone	400 Hz, 1/8 second on–1/8 second off
Voice Page Warning Tone	600 Hz, 1 second on only (via electronic telephone speaker)
Off-hook Call Announce Warning Tone	600 Hz, 1-second on only (via electronic telephone speaker)
Executive Override Warning Tone	600 Hz, 1/2 second on only (via handset)
Hold Recall Tone	2,400 Hz, modulated by 10 Hz, 1 second on–1 second off
Dialing	Pushbutton; system-generated DTMF or dial pulse

Primary Power

	117 VAC, 60 Hz
HPSU 6120 (S$_e$)	40 watts
HPSU 7120 (VI$_e$)	100 watts

Environmental Specifications

Operating Temperature	32 ~ 122°F (0 ~ 50°C)
Operating Humidity	20 ~ 80% relative humidity without condensation

TABLE B
STANDARD FEATURES
SYSTEM

- All Call Voice Page
- Alternate Point Answer
- Automatic Dialing-System
- Automatic Hold Recall
- Automatic Release from Hold
- CO Line Call Pickup Groups (VI$_e$ only)
- Conferencing (non-amplified)
- CTX/PBX Compatible
- CTX Ringing Repeat
- Delayed Ringing
- Distinctive Ringing
- DTMF and Dial Pulse CO Line Compatible
- DTMF Signal Time (80/160 ms)
- Dual FCC Registration
- External Page Interface
- Flexible Intercom Numbering
- Flexible Button Assignment
- Flexible Line Ringing Assignment
- Forced Account Code
- Group Paging
- Least Cost Routing (VI$_e$ only)

- Live System Programming
- Message Waiting
- MF Signal Time (160/80 ms)
- Multiple Simultaneous Handsfree Intercom Paths
- Music-on-Hold Interface
- Night Ringing Answer Code
- Night Ringing Over External Page (VI$_e$ only)
- Night Transfer
- Non-blocking Dialing
- Outgoing Call Restriction
- Privacy/Non-privacy
- Relay Service (VI$_e$ only)
- Station Hunting
- Toll Restriction (6-digit)
- Toll Restriction Override by System Automatic Dialing
- Trunk-to-Trunk Connection
- Voice or Tone Signaling
- Wall Mountable Key Service Unit

STATION

- Automatic Callback (Intercom)
- Automatic Dialing Buttons
- Automatic Dialing-Station
- Automatic Off-hook Selection
- Busy Override
- Call Forward
- Call Pickup
- Call Transfer with Camp-on
- CO CTX PBX Feature Buttons
- Directed Call Pickup
- Direct Station Selection (DSS) Buttons
- Distinctive LED Indications
  - Incoming Call
  - In-use
  - On-hold
- Do Not Disturb
- Do Not Disturb Override
- DTMF Mode Change (TONE Button)
- Exclusive Hold
- Executive Override (Break-in)
- Flash Button (CTX/PBX Transfer or CO Dial Tone Recall)
- Handsfree Answerback

- Liquid Crystal Display Features
  - Alphanumeric Messaging
    - Busy Station Messaging
    - Called Station Messaging
    - Calling Station Messaging
    - Remote Station Messaging
  - Busy Lamp Field (BLF) Indications
  - CO Line Identification
  - Speed Dial Memo
  - Timed Reminders
- Microphone Cut-off Button
- Modular Handset and Line Cords
- On-hook Dialing
- Privacy Button
- Privacy Override
- Private CO Lines
- Pushbutton Dialing
- Remote Retrieval of Held Calls
- Repeat Last Number Dialed
- Ringing Line Preference
- Saved Number Redial
- Toll Restriction Override Code
- Trunk Queuing

TABLE C
OPTIONAL FEATURES

- 1A2 Key System Interface (HCNB)
- Amplified Conference
- Auxiliary Device Interface (HIOB)
  - Call Forward to Voice Mailbox
  - Message Waiting Indication
  - Voice Mail Control
- Background Music with Station Control
- Door Phone/Monitor Station
  - Alarm Button
  - Door Lock Button
- Electronic Telephones
  - 10-button Handsfree Answerback or speakerphone
  - 20-button Handsfree Answerback

- 20-button Liquid Crystal Display
- External Amplified Speaker (HESB)
  - Amplified Speaker
  - Loud Ringing Bell
  - Talkback Amplified Speaker
- External Page Amplifier
- Music-on-Hold Source
- Off-hook Call Announce
- Off-premises Extension
  - MRGU
- Off-premises Line
- Remote Administration/Maintenance
- Station Message Detail Recording (SMDR)
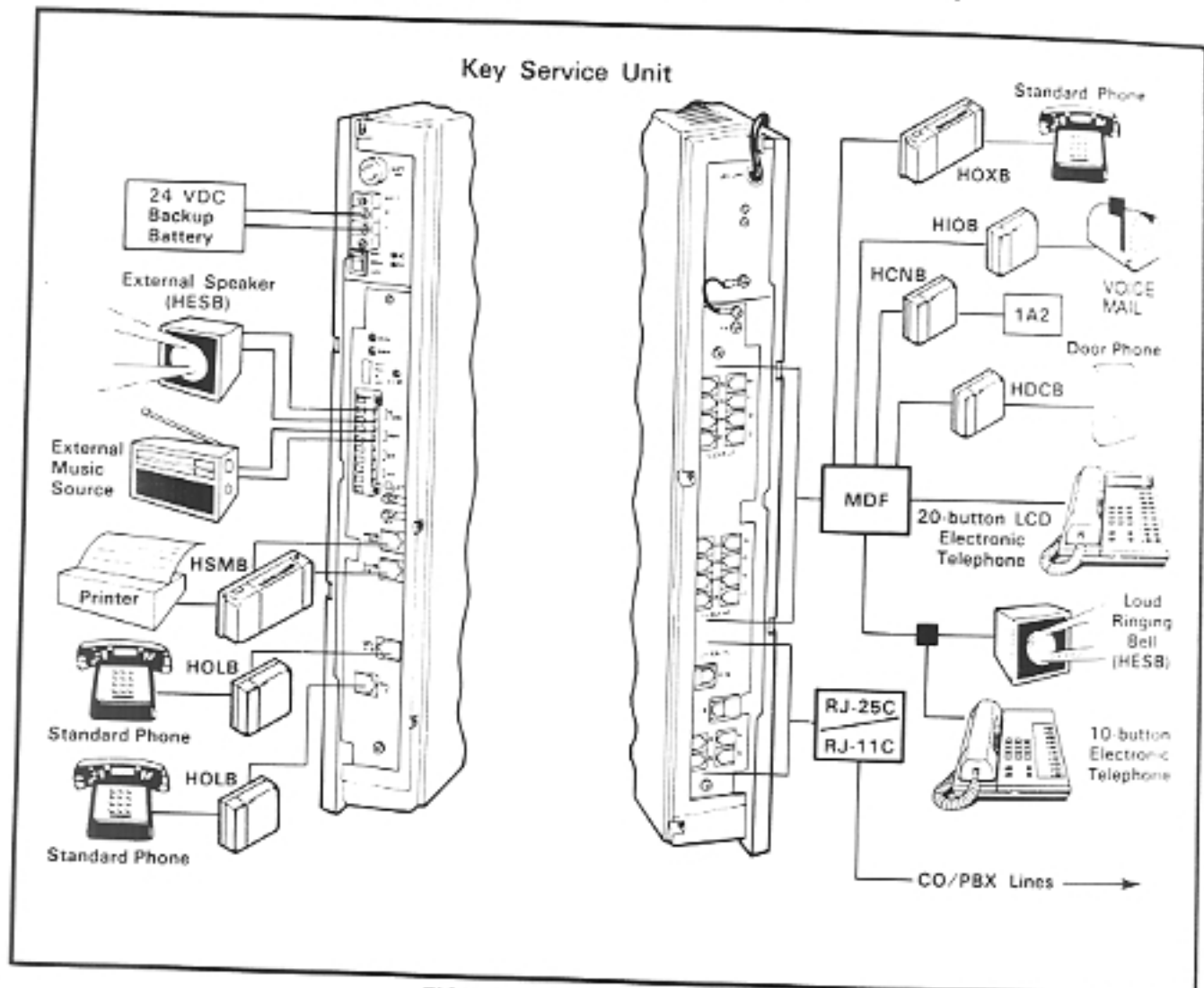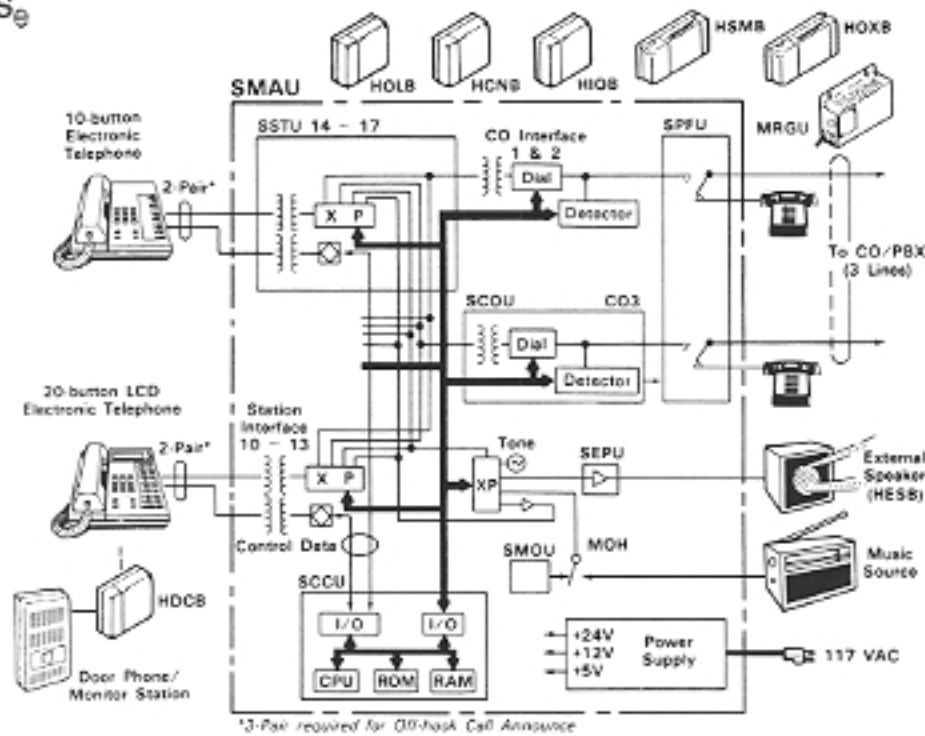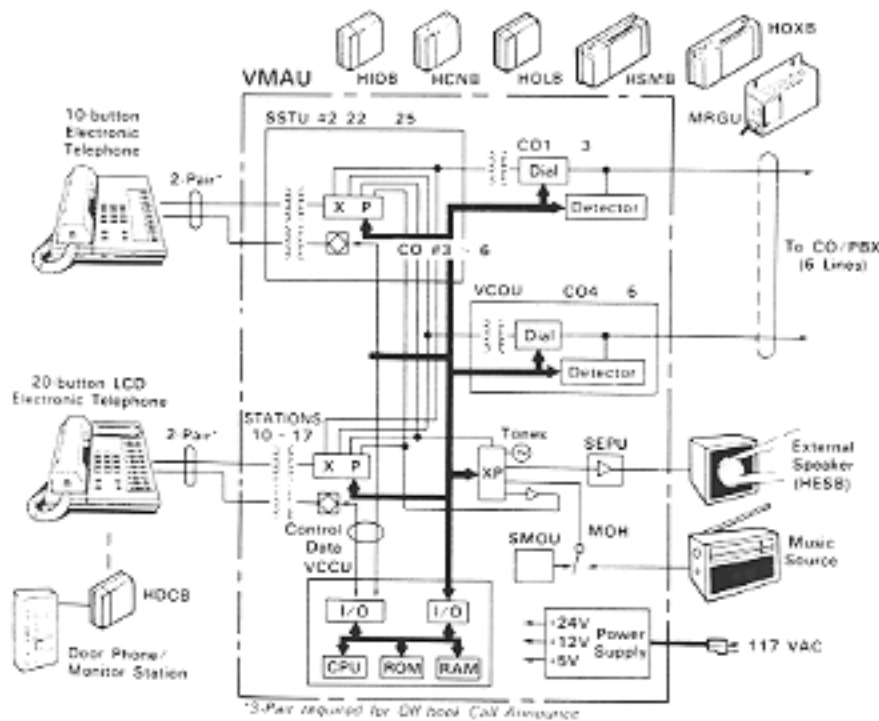- System Battery Backup

FIGURE 12—SYSTEM DIAGRAM
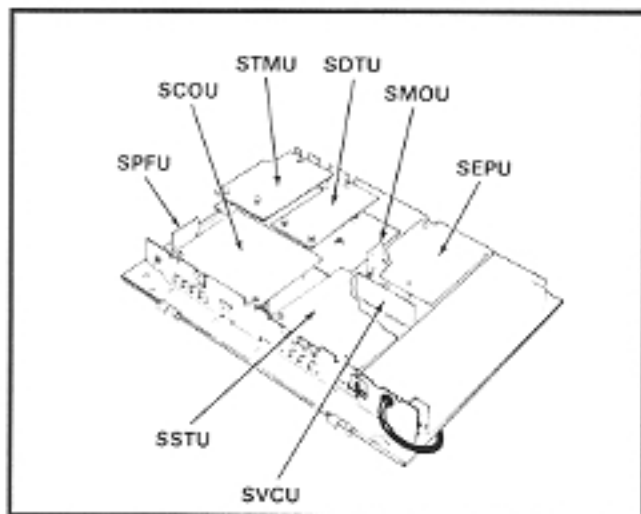
FIGURE 13—FUNCTIONAL BLOCK DIAGRAM

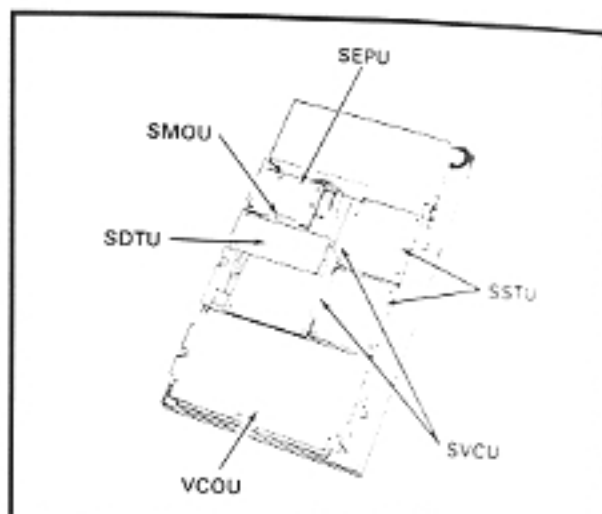**FIGURE 14—STRATA S$_e$ KEY SERVICE UNIT**

FIGURE 15—STRATA VI$_e$ KEY SERVICE UNIT

5 SYSTEM OPERATION

General

A system (Figure 12) consists of a key service unit (VI$_e$ HKSU is shown), power supply, up to 16 stations*, HIOB, HDCB, HCNB, HOLB, HSMB and HOXB optional modules, and a maximum of six door phones. The door phone control unit(s) (HDCB) occupy one or two station location(s). All connections between the key service unit and the telephones are made via a customer-provided main distribution frame. Using modular line cord(s), the CO lines are then connected between the left side panel and the locally provided RJ-25C (up to two each) or RJ-11C (up to six each) jacks. An external tuner (or equivalent) is required if the Music-on-Hold/Back-ground Music feature is utilized.

Some optional features reduce maximum station capacities (see Optional Features).

Functional block diagrams of both key service units are shown in Figure 13. Each consists of CO and station interfaces on the main PCB, including a solid-state, space-division matrix and the central control equipment (SCCU/VCCU). Optional interfacing equipment includes additional station connections (SSTU), off-hook call announce (SVCU), remote maintenance (SDTU), off-premises line (HOLB), station message detail record (HSMB/STMU*), 1A2 interface (HCNB), auxiliary device interface (HIOB), door phone controller (HDCB) and door phone/monitor station, external page

amplifier (SEPU), internal music-on-hold source (SMOU), and power failure (SPFU*) PCBs are also shown.

STRATA S$_e$ only

The system is entirely under the control of a single-chip microprocessor, located along with the system program and data memories on the SCCU/VCCU PCB (STRATA S$_e$/VI$_e$, respectively) which mounts on the SMAU/VMAU, respectively.

Connections between the station voice and the CO lines are via the switching matrix provided on the SMAU/VMAU PCB (STRATA S$_e$/VI$_e$, respectively). The SMAU/VMAU also provides a similar matrix for intercom connection, background music, paging connections and the distribution of various system tones (dial, busy, etc.).

6 SYSTEM CONFIGURATION

Key Service Unit

The STRATA S$_e$ key service unit arrangement illustrated in Figure 14 shows the locations of the various printed circuit boards and optional equipment.

The STRATA VI$_e$ key service unit arrangement illustrated in Figure 15 shows the locations of the various printed circuit boards and optional equipment.

NOTE:
The optional modules are used only when required. All internal boards connect to the main PCB (in some cases, they also attach to the key service unit's side panel).

Complete with all available options, both key service units utilize up to eight printed circuit boards internally (as shown in Figures 14 and 15) and various option modules. The names and functions are as follows:

SMAU/VMAU: The main printed circuit board of the key service unit consists of the following three functions:

a) **Station Interface:** An interface between the key service unit and up to four stations (S$_e$) or up to eight stations (VI$_e$), which includes the solid-state, space-division matrix used for voice connections between the stations and the CO/PBX lines. Two-pair wiring is required for each station; one pair carrying voice and other pair carrying control data to and from the station;

b) **CO Interface:** An interface between the key service unit and the public telephone network or PBX for up to two lines (S$_e$) or up to three lines (VI$_e$). Ring detection, hold and dial outpulsing for these lines are performed by this board. Depending upon local CO requirements, each incoming line can be separately connected and programmed to provide DTMF or rotary-dial outpulsing.

c) **Tone:** Performs a number of miscellaneous system functions:
  • General system tones
  • Provides the switching matrix for the delivery of tones for both paging and intercom connections.

SCCU/VCCU: All system control functions are performed by the single-chip microprocessor on this printed circuit board. The system program stored in ROM, RAM for system operations, and the RAM for system data storage are also located on this circuit board. A battery on this board protects system memory should a power failure occur.

SCOU/VCOU: An optional interface between the SMAU/VMAU and one/three additional CO line(s). Depending upon local CO requirements, the SCOU/VCOU is programmed to provide DTMF or rotary-dial outpulsing. The SCOU serves one CO line; the VCOU serves up to three CO lines, and both serve up to three off-premises lines.

SSTU: An optional interface between the key service unit and stations 18 ~ 25 (stations 14 ~ 17 on S$_e$). Each SSTU PCB serves up to four stations. Two-pair wiring is required for each station; one pair carrying voice and the other pair carrying control data to and from the station.

SMOU: An optional music-on-hold source that provides electronic synthesized music. A choice of two musical tunes are available, selected via a switch on this board. The SMOU is connected to the SMAU/VMAU via an 8-pin connector.

SEPU: An optional 3-watt amplifier for external paging, using a customer-supplied 8-ohm speaker (connected to the SMAU/VMAU via a 10-pin connector).

SVCU: The Off-hook Call Announce interface that mounts on the main printed circuit board of the key service unit to provide OCA access. One SVCU is required for every eight stations requiring OCA. (Adds two intercom lines in VI$_e$.)

SDTU: Provides Remote Administration/Maintenance access via its built-in 300/1200 bps modem. One SDTU per system is required for Remote Administration/Maintenance.

STMU: Required for connection to an HSMB to provide SMDR for a STRATA S$_e$ key service unit.

HPSU 6120/7120: Each system's required voltages are provided by one of these factory-installed power supplies. The HPSU connects to a standard 3-wire, 117 VAC, 60-Hz, grounded wall outlet, with a permissible AC input voltage range of 90 ~ 130 VAC.

HPFB: An optional battery backup unit that is available for the HPSU 6120 (S$_e$). With the optional battery backup assembly installed, all functions of the system will continue to operate

for approximately two to three hours after a loss of normal electrical power. Calls will not be disconnected during switch-over to or from battery power.

HPBU-7: An optional battery backup unit for the HPSU 7120 (VI$_e$). It is a printed circuit board that mounts inside the power supply housing and is connected to the recommended battery pack (which is customer-supplied, consisting of two 12 VDC, maintenance-free, automobile-type batteries—80 amp/hour maximum rating). With the optional battery backup assembly installed, all functions of the system will continue to operate for several hours (the actual time period is in direct ratio to the type and size of batteries selected) after a loss of normal electrical power. Calls will not be disconnected during switch-over to or from battery power. The HPBU-7 also provides a charge to the battery pack during normal operations.

Option Modules

HOLB: An off-premises line module that allows the bridging of a CO line, which appears in the system, with a conventional telephone; supervision is provided. Each HOLB provides three circuits, all three of which may be directed to an answering machine (or similar device) attached to the HUNT connector.

HDCB: An optional module (two per system maximum) connected to the key service unit at station 13 and/or 14 (station 11 and/or 12 on S$_e$) that allows up to three (each HDCB) door phone/monitor stations (MDFBs) to ring pre-selected stations. The HDCB has three outputs (A, B, C), which are modular connectors for the three MDFBs. Outputs B and C may be used for the Door Lock feature. An alarm monitor can be used at station 11/13C only.

HOXB: An external module that serves as an interface between the key service unit and conventional, standard telephones or off-premises extension (OPX) lines. Each HOXB PCB serves two extensions; S$_e$ supports two HOXBs, VI$_e$ supports four. An HOXB will operate with either DTMF or rotary-dial telephones. One auxiliary

ring generator/power supply (MRGU) is required for use with up to three HOXBs.

HSMB: Serves as an interface between the service unit and a printer or storage device for the SMDR feature. The module is equipped with an RS-232C interface and connects left side panel via one supplied 8-wire modular connector (one HSMB per system). requires an STMU PCB.)

HCNB: Provides an interface between a 1A2 system and the CO lines appearing there in a STRATA$_e$ system. One HCNB is required for every three lines where dual appearances are desired. Also, A-lead control, lamp signal detection and dial outpulsing are performed by this module (see Figure 16).
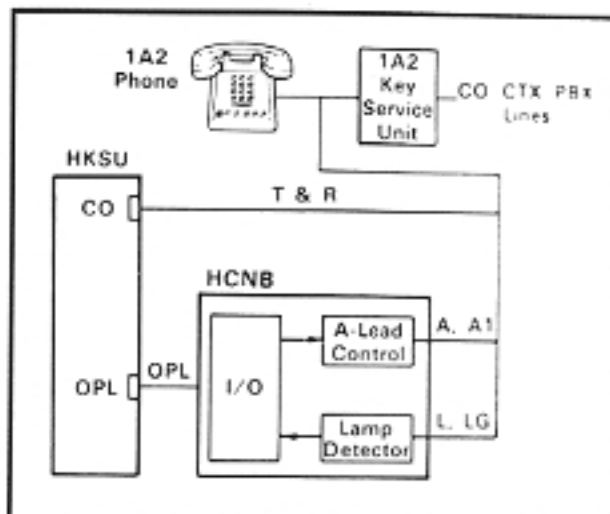
FIGURE 16
1A2 INTERFACE FUNCTIONAL BLOCK DIAGRAM

HIOB: Provides one circuit to interface with external devices such as voice mail port, answering machine, standard telephone, modem, etc. Up to eight HIOBs (four in S$_e$) may be installed in a system. A 24 VDC power supply, which connects to the unit via a 7' cord and plugs into a 117 VAC, 60 Hz outlet, is included with each HIOB. Each HIOB is connected to a proprietary station port, reducing station capacity accordingly.

Station Equipment

The principal components of the electronic

telephone are: handset, dial pad, speaker, microphone, two volume controls, four fixed feature buttons, an **INT** button, and 9 or 19 flexible CO/feature buttons. LED indicators are provided for all buttons except **HOLD** and **CONF**. See Figures 9, 10 and 11.

A 20-button Liquid Crystal Display electronic telephone (Figure 11) with speakerphone may be located at any or all of the stations. The 32-character alphanumeric display provides many capabilities—an accurate clock/calendar in its idle state, and elapsed time, dialed number, calling station and CO line are just a few of the features available. For additional explanations of the features listed below, see Liquid Crystal Display.

- Alphanumeric Messaging
  - Busy Station Messaging
  - Called Station Messaging
  - Calling Station Messaging
  - Remote Station Messaging
- Busy Lamp Field (BLF) Indication
- CO Line Identification
- Speed Dial Memo
- Timed Reminders

All phones are easily converted for wall mounting feature modular handset cords, are equipped with a second modular connector for headset connection, and are connected to the system via modular line cords.

The optional door phone/monitor station (Figure 6) allows distinctive ringing to preselected station s). When a station dials an individual door phone, a circuit providing monitoring capabilities on the intercom is established. This option requires station 13 and/or 14 (station 11 and/or 12 in STRATA S) to be replaced by a door phone control unit (HDCB) and up to six door phone units (MDFBs)—three each HDCB. One door phone/monitor (only station 13C for VI$_e$; 11C for S$_e$) can be replaced by an alarm control circuit on station 13/11 HDCB and the by a door lock control circuit on all HDCBs.

An external amplified speaker (HESB) may be connected in any one of the following three applications:

- **Loud Ringing Bell**: Allows you to amplify the tone of a paging/ringing signal without using

other manufacturer's equipment. Three-pair wiring is required for this application.
- **Amplified Speaker**: Allows you to use the HESB as a paging speaker, reducing the need for other manufacturer's paging equipment.
- **Talkback Amplified Speaker**: Allows you to provide a talkback speaker in areas where a telephone is not needed. For talkback operation, connect the HESB to the door phone unit (MDFB), which is used as a microphone; however, the push-button is inoperative.

The HESB is a 6" 3-watt speaker with an amplifier that is built into an attractive speaker box (Figure 8). A +12 VDC power supply (HACU-120), which connects to the back panel via an 8' cord, is included with each HESB.

Installation

The key service unit is configured for wall mounting only.

All external devices are connected to the key service unit via connectors and terminals on the side panels, as follows:

a) CO lines are connected to the key service unit right side panel via separate (one for each line) single-pair modular cords or a single 3-pair modular cord (S$_e$); or two 3-pair or six single-pair modular cords (VI$_e$).

b) The station connection points are extended from the key service unit to the main distribution frame using 3-pair modular line cords. The individual telephones are connected to the main distribution frame using 3-pair station cables.

c) A screw-terminal barrier strip is mounted on the left-hand side of the key service unit to provide attachment points for the music-on-hold source input, relay service (VI$_e$ only) and external page output).

d) Two (only one for S$_e$) modular connectors are also provided on the left side panel for two (only one for S$_e$) optional off-premises line modules (HOLBs).

The power supply is mounted inside the key service unit. In STRATA S$_e$ a connector is provided on the left side panel for optional system reserve power (HPFB). In STRATA VI$_e$ an optional battery

backup printed circuit board is available for the power supply.

Maintenance

Faults in the system are repaired by replacing any faulty component (printed circuit board, subassembly, telephone, etc.) and returning it to the manufacturer for repair.

In addition, remote administration/maintenance allows the system to interface via an SDTU (built-in modem) with a remote location. This reduces the cost of routine data base changes by eliminating the need of a technician to be on-site for each software change.

7 FEATURES and OPERATION

General

This section contains brief descriptions of the features listed earlier in Tables B and C and some associated operating instructions. For more detailed instructions, see the User Guide or Quick Reference Guide.

Standard Features

System

All Call Voice Page: Dialing a 2-digit access code permits a station user to page via all idle telephone speakers simultaneously. The system can also be programmed to include the External Page feature in an All Call Page.

Alternate Point Answer: CO calls can be answered from any station that shares common CO line appearances.

Automatic Dialing-System: Allows up to 40 numbers to be stored in the system memory. After selecting an outgoing line, any station user can cause one of the stored numbers to be outpulsed by dialing the proper access code.

Automatic Hold Recall: A CO line placed on hold by any station will recall that station after a programmable period of time. A different time period can be selected for each station.

Automatic Release from Hold: The system automatically releases held CO lines if disconnect signal is received from the Central Office.

CO Line Call Pickup Groups: In STRATA only, this feature, using a dial code or the `CPU` button, allows CO line calls to be picked up from another station. Two Call Pickup Groups can be defined in programming and buttons `CPU1` and `CPU2`) can be assigned to phones for each group.

Conferencing: The system will conference two CO lines and up to three stations (the CO lines must be conferenced first), or a maximum of four stations and one CO line. See Amplified Conference.

CTX/PBX Compatible: System features, such as Toll Restriction and Automatic Dialing, are compatible with CTX/PBX operation.

CTX Ringing Repeat: To facilitate the use of special calling/callback features on CO CTX PBX lines, the system will ring the called station with the same on/off cadence that is received from the outside line.

Delayed Ringing: A 12- or 24-second ring delay may be programmed for each station to permit alternate answering. The delayed ring is provided for each line selectively by each station.

Distinctive Ringing: CO and intercom calls are distinguished by different ringing tones.

DTMF and Dial Pulse CO Line Compatible: The system will interface with either DTMF or rotary-dial pulse CO lines on a line-by-line basis as determined by system programming.

Dual FCC Registration: Either system may be configured as a key or hybrid telephone system, with separate FCC registration numbers for each type. The appropriate configuration for the system is dependent upon its operation. See FCC requirements on the General End User Information page in the front of this document for more detail.

External Page Interface: A 600-ohm connection point is provided for a customer-provided external amplifier/speaker. An SEPU PCB (see External Amplified Speaker and External Page Amplifier) is mounted in the key service unit when a customer-provided external speaker only is used: the output impedance is 8 ohms. This page circuit can be accessed as part of the All Call Voice Page feature.

Flexible Intercom Numbering: A station intercom number can be flexibly programmed up to any 4-digit number. It is, therefore, possible to match a station's intercom and CTX line extension number.

Flexible Button Assignment: Allows each phone to be programmed for the optimum use of its CO or feature buttons.

Flexible Line Ringing Assignment: A programmable ring or no ring option is provided for each line selectively by each station.

Forced Account Code: Requires selected station(s) to dial an account code prior to dialing a number. Station users can also voluntarily enter an account code on any CO line call. The account code is recorded with call details on the SMDR report.

Group Paging: Special 2-digit access codes (81, 82, 83 or 84) permit voice paging to one of four zones. Zone assignment is via software and is totally flexible. Paging is via the speakers of idle telephones.

Least Cost Routing: Enables the customer to decide over which trunks outgoing voice and data calls will be routed. This can greatly reduce the cost of long distance calling. Three classes of LCR can be programmed to give priority routes to the users who need them (VI$_e$ only).

Live System Programming: Live system programming is accomplished without service interruption to other station users by placing the system in the special programming mode and inputting data via station 17 (station 13 in S$_e$) or Remote Administration/Maintenance. Station 17

(13) is the only station that is "down" if it is used for on-site programming. See Remote Administration/Maintenance.

Message Waiting: Any station (including the designated Message Center) can set a Message Waiting LED at any station with the Message Waiting LED of that station. The called station cancels the LED by lifting the handset or depressing the MW/FL button. See Flash Button and Liquid Crystal Display Features.

MF Signal Time (160/80 ms): The standard MF dial signal time is 80 milliseconds, but it may be extended to 160 milliseconds, if required by the Central Office or to activate remote equipment.

Multiple Simultaneous Handsfree Intercom Paths: Two intercom paths are standard in the systems. Both intercom lines are able to carry handsfree conversations simultaneously. (STRATA VI$_e$ may be increased to four paths optionally.)

Music-on-Hold Interface: An interface is included for a customer-provided music source. CO lines placed on hold will be connected to this source. In addition, this music may also be broadcast from electronic telephone speakers and external page when the background music programming options are selected.

Night Ringing Answer Code: A night ringing call may be answered from any station via a dial code.

Night Ringing Over External Page: As a programmable option, while the night mode is active, a system-generated ring tone will be transmitted via the external speaker whenever any line rings (VI$_e$ only).

Night Transfer: On a programmable optional basis, the system can function with two or three ringing patterns. If three patterns are selected, they are designated DAY, DAY 2, and NIGHT. If the two-pattern mode is selected, DAY and NIGHT designations are used. In both cases, the ringing modes are selected with the NT button on station 10.

Non-blocking Dialing: Dialing is permitted on all CO lines simultaneously.

Outgoing Call Restriction: Any station can be selectively restricted from originating calls on any or all CO lines. However, the station may still receive calls on the restricted line(s).

Privacy/Non-privacy: A private system prevents other stations from accessing the intercom or CO lines that are already in use. A non-private system provides conferencing on the CO and intercom lines.

Relay Service: In STRATA VI$_e$ only, the VMAU is equipped with two relays that provide the following signals for external equipment:

a) **External page**: The relay is activated whenever the external page circuit is accessed, a dry "make" contact is provided for control of background music on external page. This is required only when an external page amplifier is used.

b) **Night Relay Service**: The relay will provide a dry "make" contact at the **NR** terminals on the left side panel. A strap option on the VMAU allows the NR relay to function in one of two modes:

1) **Answering Machine Control**: If the strap remains intact, the relay is operated continuously when the system is in night service (intended for indirect control of an answering machine).

2) **Night Bell Control**: If the strap is cut, the relay pulses at a 1-second on/3-seconds off rate whenever the system is in Night Transfer mode and an incoming call is ringing the system (intended for indirect control of an external night bell).

Station Hunting: Hunting always starts with called station number and ends with the last station number in the prearranged group; however, the call is completed to the first idle number. The hunting sequence can be either consecutive or nonconsecutive.

Toll Restriction (6-digit): Selectively programmed on a station class of service basis. The system performs toll restriction by analyzing the first six or three digits (area/office code) dialed. Simple restriction by rejecting the numbers 0 and 1 can be programmed on a per-station basis, if desired.

Toll Restriction Override by System Automatic Dialing: A programmable system feature that permits numbers stored by the Automatic Dialing-System feature to be called by toll-restricted stations.

Trunk-to-Trunk Connection: Allows the system to set up a line-to-line connection (tandem switching), leaving the controlling station free to make other calls. A maximum of two (simultaneous) trunk-to-trunk circuit paths can be established.

Voice or Tone Signaling: A programmable system feature that optionally selects either tone ringing or voice page as the primary method of intercom call signaling. The calling station however, may choose the alternate method by dialing 1 following the station number.

Wall Mountable Key Service Unit: The key service unit is designated for wall mounting only.

Station

Automatic Callback (Intercom): Permits a station user who encounters a busy station on intercom to request a callback by depressing the dedicated button. The system then monitors the called station and signals the caller when that station becomes idle.

Automatic Dialing Buttons: This feature can be used with a telephone that includes **AD** buttons in its programmed assignments.

a) An outside telephone number or station number can be stored at each **AD** button.

b) A number stored in memory can be sent over a CO line by depressing the appropriate **AD** button after accessing the CO line or an intercom line after pressing the **INT** button.

NOTE:
Each **AD** *button is counted as one of the 40 possible stored numbers available to each station.*

Automatic Dialing-Station: Each station can store a private list of up to 40 telephone numbers. The Pause and Flash functions may also be stored when necessary.

Automatic Off-hook Selection: Allows CO line, CO group or intercom access by merely lifting the handset; depressing a CO/Intercom button is not required.

Busy Override: After calling a busy station and receiving a busy tone, the caller can dial **2** and cause a tone burst to be sounded via the called station's speaker.

Call Forward: Allows *all calls* to a station to be routed to another station. The activating station may be used to originate calls while this feature is active.

Call Pickup: Enables a station to pick up calls ringing at other stations or an external page by going off-hook and dialing an access code. Call Pickup (**CPU**) buttons can be assigned to stations to automatically pick up calls.

Call Transfer with Camp-on: Allows the transfer of an outside call to a station that is either idle or busy.

CO CTX/PBX Feature Buttons: Station Automatic Dialing buttons can be used to store access codes, plus any flashes or pauses necessary for feature access in the host switching system. These are fixed feature buttons and can only be changed by station 10. Every fixed button assigned to the station reduces the number of **AD** buttons.

Directed Call Pickup: *All calls* ringing at another station can be answered from any station by that station going off-hook and dialing the ringing station's number.

Direct Station Selection (DSS) Buttons: By depressing an assigned button, a station user causes the selected station to ring.

Distinctive LED Indications:
- **Incoming Call**: A distinctive flash appears on the respective LED at the station that is being called.
- **In-use**: A distinctive flash rate shows the line presently in use at a give station. Other stations see a steadily illuminated LED for that line.
- **On-hold**: The station user is shown a distinctive LED flash to indicate a line placed on hold at that station. All other stations see the usual on-hold flash.

Do Not Disturb: This feature is activated and deactivated by alternate depressions of the **DND** button. A station calling a station that is in the DND mode will receive a fast busy tone.

Do Not Disturb Override: After reaching a DND station, that station may be advised that a call is waiting by dialing **2**. A tone signal will be heard at the DND station.

DP/MF Mode Change (TONE Button): Allows a station to change between DP and MF modes via the **TONE** button, as required.

Exclusive Hold: Depressing the **HOLD** button twice holds that call securely for the station that placed it on hold.

Executive Override (Break-in): A station programmed for this feature will override the automatic privacy feature and enter any existing conversation within the system. A warning tone, however, is inserted before the overriding station is actually connected. After reaching a busy station, dial a **3** to override.

Flash Button (CTX/PBX Transfer or CO Dial Tone Recall): Ten- and 20-button electronic telephones can be equipped with a Message Waiting/Flash (**MW/FL**) button which, when operated while connected to an incoming line, causes a timed "flash" to be transmitted to that line. The timing of the flash can be programmed to signal a CTX/PBX for feature operation or can be long enough to cause a disconnect and dial tone recall on a CO line. See Message Waiting.

Handsfree Answerback: All electronic telephones are equipped for handsfree answerback on voice-announced intercom calls as a standard feature.

Liquid Crystal Display Features: The following features are standard, but require an optional Liquid Crystal Display telephone to operate.

a) **Alphanumeric Messaging**: Allows system and personal messages to be displayed on the 32-character Liquid Crystal Display. There are 40 system messages of up to 32 characters in length for use by all LCD telephones and controlled by station 10. In addition, a limited number of stations (four in S$_e$, six in VI$_e$) have 10 personal messages available—plus the system messages for the following features:

- **Busy Station Messaging**: When reaching a busy LCD station, a message can be sent to that station (an audible tone will also be heard). The two stations may respond with LCD messages back and forth during conversation, creating an interactive silent messaging conversation.

- **Called Station Messaging**: Your station number and a message indication may be sent to another LCD station. When the called station responds, the station will receive the 32-character message.

- **Calling Station Messaging**: A message displayed on your LCD phone will be automatically displayed on the calling station's LCD when dialed.

- **Remote Station Messaging**: Allows any station to set a Called Station Message for another station, the recipient to be a station or group of stations.

b) **Busy Lamp Field (BLF) Indications**: The Liquid Crystal Display can be used to indicate the on-/off-hook status of all telephones in the system. BLF status is displayed up to the maximum number of stations for each system.

c) **CO Line Identification**: Allows each CO line to be identified with a 16-character name. All LCD phones using that line will display the name instead of the CO line number.

d) **Speed Dial Memo**: Each LCD telephone user may program a 16-character name for each of their 40 personal speed dial numbers. The memo pad of names and numbers (including system names and numbers) may be scrolled to select the appropriate party.

Depressing a CO line button will cause the displayed number to be dialed automatically. Limited to four stations on S$_e$ and six stations on VI$_e$.

e) **Timed Reminders**: Allows five separate messages to be set at each LCD telephone. These messages will be displayed at the appropriate times (hour and minute) set by the station user. The messages can be repeated on a daily basis or displayed just once.

Microphone Cut-off Buttons: Electronic telephones may be programmed with an **MCO** button, allowing the microphone to be turned ON/OFF while a station is in the idle state (controls Handsfree Answerback).

Modular Handset and Line Cords: All electronic telephones are equipped with modular handset and line cords, and are also equipped with an additional modular headset jack.

On-hook Dialing: The system allows you to dial your calls with the handset still on-hook. Call progress can be heard via the telephone speaker; no need to pick up the handset until your party answers.

Privacy Button: Allows privacy or non-privacy to be selected (via the **PRV** button) on CO lines.

Privacy Override: A station programmed for this feature can enter any existing CO line conversation if the station is equipped with that **CO** line button. An initial warning tone is given, but no subsequent tones are provided. A maximum of two stations can be programmed for this feature.

Private CO Lines: Restrictions may be programmed into the system so that selected CO line(s) will appear only on selected station(s).

Pushbutton Dialing: All electronic telephones are equipped with pushbutton dial pads.

Remote Retrieval of Held Calls: Calls that have been placed on hold by a station can be retrieved by a different station with the Call Pickup feature.

Repeat Last Number Dialed: The last number

dialed by each station is always stored by the system and will be dialed automatically whenever the station user accesses a CO line and depresses the # or **RDL** button. See Saved Number Redial.

Ringing Line Preference: A line ringing a station can be answered by lifting the handset or depressing the **SPKR** button. The ringing line will be automatically selected.

Saved Number Redial: A programmable button that saves a dialed number for redial at a later time. May be used at any time and is exclusive of the Repeat Last Number Dialed feature.

Toll Restriction Override Code: Two special codes may be defined to override toll restriction from any station.

Trunk Queuing: Provides a means for station users to be "stacked" in a waiting queue for a busy outgoing trunk group by using the Automatic Callback feature. The station will then be signalled when a trunk in the group becomes available. As a programmable option, the system may be equipped with one trunk group (dial 9) or eight trunk groups (dial 91 ~ 98).

Optional Features

1A2 Key System Interface (HCNB): Utilizing an optional line interface printed circuit board, both systems can be connected to CO/CTX/PBX lines through 1A2-type key telephone systems. The system will detect lamp lead status and supply A-lead control.

Amplified Conference: In some applications, it may be necessary to amplify the CO line used in a multi-CO line conference. A customer-provided amplifier can be connected to the system for this purpose. Reduces the system capacity by two stations.

Auxiliary Device Interface (HIOB): Allows system interaction with customer-provided auxiliary devices such as standard telephones, recording/dictating machines, modems and voice mail equipment. The unit contains both a DTMF tone generator and receiver for use with auxiliary

devices. The following features are available through the voice mail interface.
- **Call Forward to Voice Mailbox**: Allows a station user to call forward to a voice mailbox location. The system will ring the voice mail system and forward the digits of the desired mailbox once answered.
- **Message Waiting Indication**: Allows the voice mail system to dial a special access code to set message waiting at the station when the voice mail system is the message center.
- **Voice Mail Control**: Allows the station user to control the voice mail equipment using the dial pad, as DTMF signals are received by the voice mail equipment.

Background Music with Station Control: Music from the music-on-hold source can (at the station user's option) be heard via the telephone's speaker. The same music may also be broadcast via the external page interface if an external speaker is installed.

Door Phone/Monitor Station: Allows door phone units(s) to distinctively ring pre-selected stations. A station dialing to an individual door phone unit provides monitoring capabilities on the intercom.
- **Alarm Button**: Turns off the alarm signal set in the system by a customer-suppled alarm system. The alarm signal is activated by a closure at the HDCB door phone C (station 13 on VI$_e$, 11 on S$_e$) output from a customer-supplied alarm system. The alarm signal will be heard from all idle stations until the **ALRM** button is depressed at station 10.
- **Door Lock Button**: Activates a dry contact relay closure for indirect control of a door lock or other devices. When the **DRLK** button is depressed, the HDCB door phone B output will close for a period of 3 or 6 seconds (programmable).

Electronic Telephones:
- **10-button Handsfree Answerback or Speakerphone**: A basic telephone available in two variations; with handsfree answerback on intercom calls or as a full speakerphone. This phone can be assigned to any

station, and is equipped with an intercom button and nine flexible buttons that may be assigned as CO line appearances or feature access.

- **20-button Handsfree Answerback**: A 20-button telephone with handsfree answerback, and is equipped with an Intercom button and 19 flexible buttons that are assigned as CO line appearances or feature access.

- **20-button Liquid Crystal Display**: This 20-button telephone features a 32-character, alphanumeric display, with handsfree answerback and full speakerphone capability, calling station identification, and the same button flexibility as the 20-button telephone. See Liquid Crystal Display Features.

External Amplified Speaker: An external amplified speaker (HESB) may be connected in any of the following three applications:

- **Amplified Speaker**: Allows the HESB to be used as a paging speaker.
- **Loud Ringing Bell**: Allows the tone of an electronic telephone ring to be amplified.
- **Talkback Amplified Speaker**: Provides a talkback speaker (via an MDFB) where a telephone is not needed.

NOTE:
If an HESB is installed, an external amplifier (SEPU PCB) is not necessary.

External Page Amplifier: This external page 3-watt amplifier (SEPU PCB) allows access to a customer-provided external 8-ohm speaker for paging.

Music-on-Hold Source: When installed, this electronic music source (SMOU PCB) eliminates the need for a customer-provided external music source and provides electronic-generated music to CO lines placed on hold.

Off-hook Call Announce: Allows a station user to call and speak to an off-hook, busy electronic telephone through the speaker. The called station user can reply via the telephone's microphone without interrupting the existing conversation. If the called station is currently in use via the speakerphone/handsfree, the caller will receive a busy signal. Feature is activated automatically or by dial access (**2**) on a station-by-station basis.

Off-premises Extension: Installing an HOXB allows the system to interface with conventional, standard telephones or off-premises circuits. The HOXB serves two extensions and replaces two stations in the system. (Maximum: two per S$_e$/four per VI$_e$.)

- **MRGU**: An auxiliary ringing/power supply for the HOXB, one supports up to three HOXBs.

Off-premises Line: Installing an HOLB allows the bridging of a CO/PBX line that appears in the system with a conventional telephone (or other device, such as a modem). During Night Service, all incoming calls on an HOLB's three circuits may be directed to an answering machine (or similar device) connected to the hunt connection. This option is set in programming.

Remote Administration/Maintenance: This feature is provided by the SDTU via its built-in 300/1200 bps modem. One SDTU per system is required for Remote Administration/Maintenance.

Station Message Detail Recording (SMDR): Adding an HSMB to a system allows data to be collected for each outgoing and incoming CO line call. This data is output to a printer or recording device via the RS-232C interface located on the HSMB (which is externally mounted). Account codes will be included in the call details (see Forced Account Codes).

System Battery Backup:
a) In STRATA S$_e$, an HPFB can be plugged into the HPSU to provide automatic switching to standby battery power. During normal power conditions, the batteries are kept fully charged by the power supply. The HPFB includes batteries and the charging unit.
b) In STRATA VI$_e$, an HPBU can be installed in the power supply to provide automatic switching to standby battery power (provided by customer). During normal power conditions, the batteries are kept fully charged by the power supply.
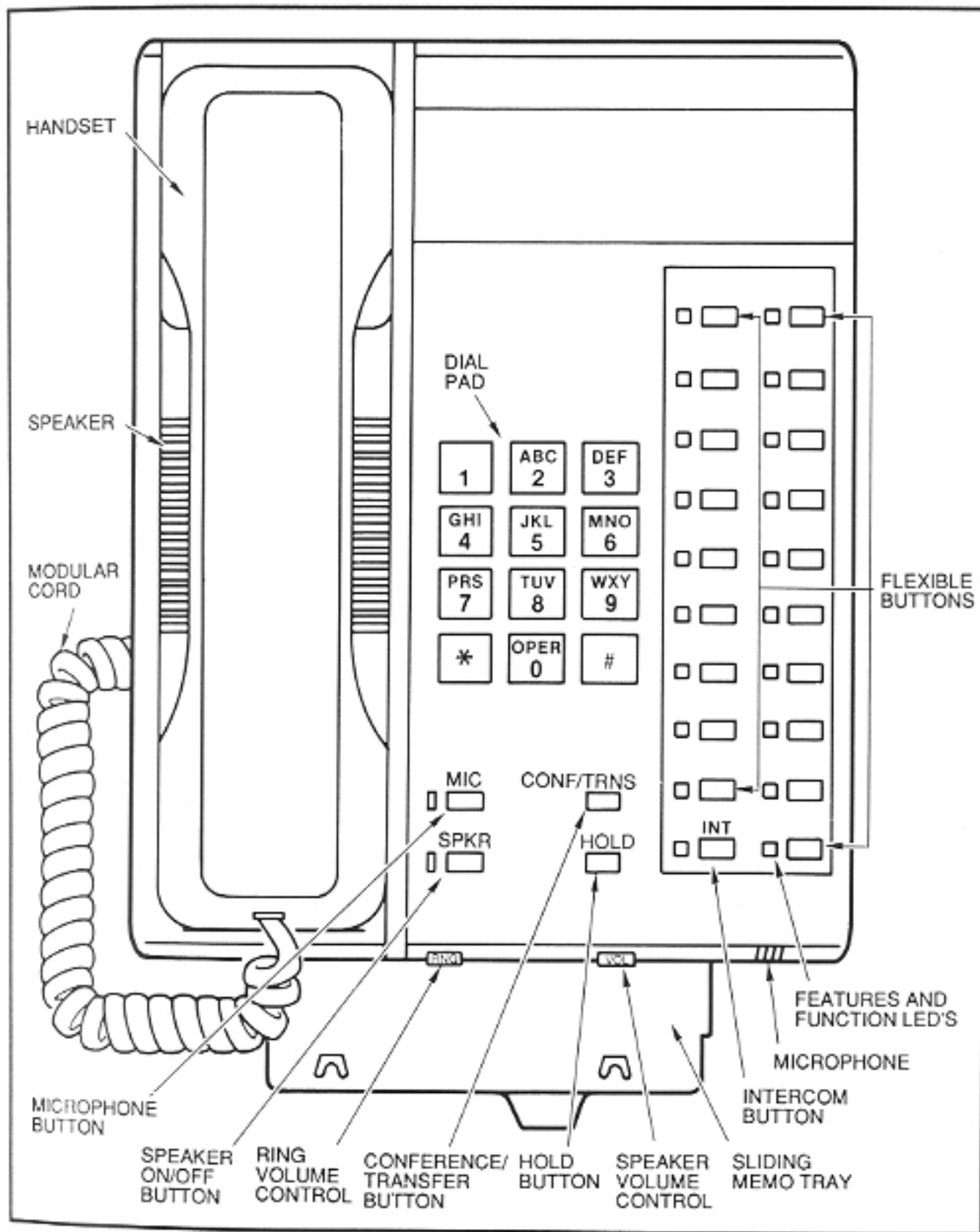
FIGURE 17—ELECTRONIC TELEPHONE DIAGRAM