MERLIN LEGEND™
Communications System

PBX System Planning

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Notice

Every effort was made to ensure that the information in this book was complete and accurate at the time of printing. However, information is subject to change.

Federal Communications Commission (FCC) Information

For important FCC interference, registration, and repair information, see 'Customer Support Information" in this book.

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Support Telephone Number

AT&T provides atoll-free customer Helpline (1-800-628-2888)24 hours a day (U.S.A. only). Call the Helpline, or your authorized dealer, if you need assistance when installing, programming, or using your system.

ERRATA

MERLIN LEGEND™ Communications System
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555-610-113

Ignore all references to the *small* processor module. The MERLIN LEGEND™ Communions System offers only one processor module. This processor module is referred to as a *large* processor module in this document.

Page 1-6
Table 1-2, Control Unit Space Requirements: *Ignore the reference to a small system. The backboard dimensions shown for a "small" system are the dimensions needed for a system with a basic carrier or a system with basic carrierr and one expansion carrier.*

Page 2-1
Under the "Processor Module" bullet: *Ignore the reference to the "small" processor module.*

Page 2-5
Under "Planning Form Instructions" for PBX System Form 1, System Planning, under the section "Size of Processor Module": *AIways check the box labeled "large."*

Appendix A - Forms
PBX System Form 1, System Planning, und`er the section "Size of Processor Module": *Always check the box labeled "large."*

October 1, 1991

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The exclamation point in an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the product.

IMPORTANT SAFETY INSTRUCTIONS

When installing telephone equipment, basic safety precautions should always be followed to reduce the risk of fire, electric shock, and injury to persons, including:

- **Read and understand all instructions.**
- **Follow all warnings and instructions marked on or packed with the product.**
- **Never install telephone wiring during a lightning storm.**
- **Never install telephone jacks in a wet location unless the jack is specifically designed for wet locations.**
- **Never touch uninsulated telephone wires or terminals unless the telephone wiring has been disconnected at the network interface.**
- **Use caution when installing or modifying telephone lines.**
- **Use only AT&T-manufactured MERLIN LEGEND™ circuit modules, carrier assemblies, and power units in the MERLIN LEGEND (511A) control unit.**
- **Use only AT&T-recommended/approved MERLIN LEGEND accessories.**
- **If equipment connected to the analog station modules (008/408/408 GS/LS) or to the MLX telephone module (008 MLX) is to be used for in-range out-of-building (IROB) applications, IROB protectors are required.**
- **Do not install this product near water, for example, in a wet basement location.**
- **Do not overload wall outlets as this can result in the risk of fire or electric shock.**
- **The MERLIN LEGEND is equipped with a three-wire grounding-type plug, a plug having a third (grounding) pin. This plug will fit only into a grounding-type power outlet. This is a safety feature. If you are unable to insert the plug into the outlet, contact an electrician to replace the obsolete outlet. Do not defeat the safety purpose of the grounding plug.**
- **The MERLIN LEGEND system requires a supplementary ground.**
- **Do not attach the power supply cord to building surfaces. Do not allow anything to rest on the power cord. Do not locate this product where the cord will be abused by persons walking on it.**
- **Slots and openings in the module housings are provided for ventilation. To protect this equipment from overheating, do not block these openings.**
- **Never push objects of any kind into this product through module openings or expansion slots, as they may touch dangerous voltage points or short-out parts, which could result in a risk of fire or electric shock. Never spill liquid of any kind on this product.**
- **Unplug this product from the wall outlet before cleaning. Do not use liquid or aerosol cleaners on this product. Use a damp cloth for cleaning.**

Customer Support Information

Support Telephone Number

AT&T provides a toll-free customer Helpline (1-800-628-2888) 24 hours a day (U.S.A. only). Call the Helpline, or your authorized dealer, if you need assistance when installing, programming, or using your system.

Federal Communications Commission (FCC) Electromagnetic Interference Information

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense.

Canadian Department of Communications (DOC) Interference Information

This digital apparatus does not exceed the Class A limits for radio noise emissions set out in the radio interference regulations of the Canadian Department of Communications.

Le Pr6sent Appareil Numerique, n'emet pas de bruits radioelectriques depassant Ies Iimites applicable aux apparails numeriques de la class A prescribes clans Ie reglement sur Ie brouillage radioelectrique edicte par Ie ministere des Communications du Canada.

FCC Notification and Repair Information

This equipment is registered with the FCC in accordance with Part 68 of its rules. In compliance with those rules, you are advised of the following:

- **Means of Connection.** Connection of this equipment to the telephone network shall be through a standard network interface jack: USOC RJ11C, RJ14C, RJ21X. Connection to E&M tie trunks requires a USOC RJ2GX. Connection to off-premises stations requires a USOC RJ11C or RJ14C. Connection to 1.544 Mbs digital facilities must be through a USOC RJ48C or RJ48X. Connection to DID requires a RJ11 C, RJ14C or RJ21X. These USOCs must be ordered from your telephone company.

  This equipment may not be used with party lines or coin telephone lines.

- **Notification to the Telephone Companies.** Before connecting this equipment, you or your equipment supplier must notify your local telephone company's business office of the following:

  - The telephone number(s) you will be using with this equipment.
  - The appropriate registration number and ringer equivalence number (REN), which can be found on the back or bottom of the control unit, is as follows:

    If this equipment is to be used as Key System, report the following number AS593M-72914-KF-E, and if the system provides both manual and automatic selection of incoming/outgoing access to the network, report AS593M-72682-MF-E. The ringer equivalence number for both systems is 1.5A.

  - For tie line connection, provide the telephone company the facility interface code (FIC) of TL31M and the service order code (SOC) 9. OF.

- For connection to off-premises stations, report the FIC OL 13C and SOC 9. OF.
- If this equipment is to be connected to digital service (1 .544 Mbs), the FIC is 04DU9-B for D4 framing format or 04DU9-C for extended framing format, and SOC 6.OP.
- If this equipment is to be connected to DID facilities, the FIC is 02RV2-T, and the SOC is 9. OF.
- The quantities and USOC numbers of the jacks required.
- For each jack, provide the sequence in which lines are to be connected: the type lines, the FIC, and REN by position when applicable.

You must also notify your local telephone company if and when this equipment is permanently disconnected from the line(s).

The REN is used to determine the quantity of devices which maybe connected to the telephone line. Excessive REN's on the telephone line may result in the devices not ringing in response to an incoming call. In most, but not all, areas the sum of the REN's should not exceed five (5.0). To be certain of the number of devices that maybe connected to the line, as determined by the total REN's, contact the telephone company to determine the maximum REN for the calling area.

Installation and Operational Procedures

The manuals for your system contain information about installation and operational procedures.

- **Repair Instructions.** If you experience trouble because your equipment is malfunctioning, the FCC requires that the equipment not be used and that it be disconnected from the network until the problem has been corrected. Repairs to this equipment can be made only by the manufacturers, their authorized agents, or by others who maybe authorized by the FCC. In the event repairs are needed on this equipment, please contact the National Service Assistance Center (NSAC) at 1-600-626-2666, or your authorized AT&T dealer.
- **Rights of the Local Telephone Company.** If this equipment causes harm to the telephone network, the local telephone company may discontinue your service temporarily. If possible, they will notify you in advance. But if advance notice is not practical, you will be notified as soon as possible. You will also be informed of your right to file a complaint with the FCC.

  Your local telephone company may make changes in its facilities, equipment, operations, or procedures that affect the proper functioning of this equipment. If they do, you will be notified in advance to give you an opportunity to maintain uninterrupted telephone service.
- **Hearing Aid Compatibility.** The custom telephone sets for this system are compatible with inductively coupled hearing aids as prescribed by the FCC.
- **Automatic Dialers.** WHEN PROGRAMMING EMERGENCY NUMBERS AND/OR MAKING TEST CALLS TO EMERGENCY NUMBERS:
  - Remain on the line and briefly explain to the dispatcher the reason for the call.
  - Perform such activities in the off-peak hours, such as early morning or late evening.

DOC Notification and Repair Information

NOTICE: The Canadian Department of Communications (DOC) label identifies certified equipment. This certification means that the equipment meets meets certain telecommunications network protective, operational, and safety requirements. The DOC does not guarantee the equipment will operate to the user's satisfaction.

Before installing this equipment, users should ensure that it is permissible to connect it to the facilities of the local telecommunications company. The equipment must also be installed using an acceptable method of connection. In some cases, the company's inside wiring for single-line individual service may be extended by means of a certified connector assembly (telephone extension cord). The customer should be aware that compliance with the above conditions may not prevent degradation of service in some situations.

Repairs to certified equipment should be made by an authorized Canadian maintenance facility designated by the supplier. Any repairs or alterations made by the user to this equipment, or any equipment malfunctions, may give the telecommunications company cause to request the user to disconnect the equipment.

Users should ensure for their own protection that the electrical ground connections of the power utility, telephone lines, and internal metallic water pipe system, if present, are connected. This precaution may be particularly important in rural areas.

CAUTION: Users should not attempt to make such connections themselves, but should contact the appropriate electric inspection authority or electrician, as appropriate.

To prevent overloading, the **Load Number** (LN) assigned to each terminal device denotes the percentage of the total load to be connected to a telephone loop used by the device. The termination on a loop may consist of any combination of devices subject only to the requirement that the total of the Load Numbers of all the devices does not exceed 100.

DOC Certification No. 230 4095A
CSA Certification No. LR 56260
Load No. 6

Renseignements sur la notification du ministere des Communications du Canada et la reparation

AVIS: L'etiquette du ministere des Communications du Canada identifie Ie materiel homologue. Cette etiquette certifie que Ie materiel est conforme a certiaines normes de protection, d'exploitation et de securite des reseaux de telecommunications. Le ministere n'assure toutefois pas que le materiel fonctionnera a la satisfaction de l'utilisateur.

Avant d'installer ce materiel, l'utilisateur doit s'assurer qu'il est permis de Ie raccorder aux installations de l'entreprise locale de telecommunication. Le materiel doit egalement etre installe en suivant une methode acceptee de raccordement. Dans certains cas, Ies fils interieurs de l'enterprise utilises pour un service individual a ligne unique peuvent etre prolonges au moyen d'un dispositif homologue de raccordement (cordon prolongateur telephonique interne). L'abonne ne doit pas oublier qu'il est possible que la conformite aux conditions enone6es ci-dessus n'empechent pas la degradation du service clans certaines situations. Actuellement, Ies entreprises de telecommunication ne permettent pas que l'on raccorde leur materiel a des jacks d'abonne, sauf dans Ies cas precis prevus par Ies tarifs particuliers de ces entreprises.

Les reparations de materiel homologue doivent etre effectuees par un centre d'entretien canadien autorise designe par Ie fournisseur. La compagnie de telecommunications peut demander a l'utilisateur de debrancher un appareil a la suite de reparations ou de modifications effectutees par l'utilisateur ou a cause de mauvais fonctionnement.

Pour sa propre protection, l'utilisateur doit s'assurer que tous Ies fils de mise a la terre de la source d'energie electrique, des lignes telephoniques et des canalisations d'eau metalliques, s'il y en a, sent raccordes ensemble. Cette precaution est particulierement importance clans les regions rurales.

AVERTISSEMENT L'utilisateur ne doit pas tenter de faire ces raccordements lui-meme; il doit avoir recours a un service d'inspection des installations electriques, ou a un electrician, selon Ie cas.

L'indite de charge (IC) assigne a chaque dispositif terminal indique, pour eviter toute surchage, Ie pourcentage de la charge totale qui peut etre raccordee a un circuit telephonique boucle utilise par ce dispositif. La terminaison du circuit boucle peut etre constitute de n'importe quelle combinaison de dispositifs, pourvu que la somme des indices de charge de l'ensemble des dispositifs ne depasse pas 100.

No d'homologation 230 4095A
Node certification CSA: LR 56260
L'indite de charge: 6

MERLIN LEGEND™ D.O.C. Location Label Placement

Ministèrè des Communications du Canada emplacement de l'étiquette

Security of Your System—Preventing Toll Fraud

As a customer of a new telephone system, you should be aware that there exists an increasing problem of telephone toll fraud. Telephone toll fraud can occur in many forms, despite the numerous efforts of telephone companies and telephone equipment manufacturers to control it. Some individuals use electronic devices to prevent or falsify records of these calls. Others charge calls to someone else's number by illegally using lost or stolen calling cards, billing innocent parties, clipping on to someone else's line, and breaking into someone else's telephone equipment physically or electronically. In certain instances, unauthorized individuals make connections to the telephone network through the use of remote access features.

The Remote Access feature of your system, if you choose to utilize it, permits off-premises callers to access the system from a remote telephone by using an 800 number or a 7- or 10- digit telephone number. The system returns an acknowledgement signaling the user to key in his or her authorization code, which is selected and administered by the system manager. After the authorization code is accepted, the system returns dial tone to the user. If you do not program specific egress restrictions, the user will be able to place any call normally dialed from a telephone associated with the system. Such an off-premises network call is originated at, and will be billed from, the system location.

The Remote Access feature, as designed, helps the customer, through proper administration, to minimize the ability of unauthorized persons to gain access to the network. Most commonly, phone numbers and codes are compromised when overheard in a public location, through theft of a wallet or purse containing access information, or through carelessness (writing codes on a piece of paper and improperly discarding it). Additionally, hackers may use a computer to "dial" an access code and then publish the information to other hackers. Enormous charges can be run up quickly. It is the customer's responsibility to take the appropriate steps to properly implement the features, evaluate and administer the various restriction levels, protect access codes, and distribute access codes only to individuals who have been fully advised of the sensitive nature of the access information.

Common carriers are required by law to collect their tariffed charges. While these charges are fraudulent charges made by persons with criminal intent, applicable tariffs state that the customer of record is responsible for payment of all long-distance or other network charges. AT&T cannot be responsible for such charges and will not make any allowance or give any credit for charges that result from unauthorized access.

To minimize the risk of unauthorized access to your communications system:

- Use a nonpublished Remote Access number.
- Assign authorization codes randomly to users on a "need-to-have" basis, keeping a log of ALL authorized users and assigning one code to one person.
- Use random sequence authorization codes, which are less likely to be easily broken.
- Deactivate all unassigned codes promptly.
- Ensure that Remote Access users are aware of their responsibility to keep the telephone number and any authorization codes secure.
- When possible, restrict the off-network capability of off-premises callers, via use of Call Restrictions and Disallowed List capabilities.
- When possible, block out-of-hours calling.
- Frequently monitor system call detail reports for quicker detection of any unauthorized or abnormal calling patterns.
- Limit Remote Call Forward to persons on a "need-to-have" basis.

Limited Warranty and Limitation of Liability

Limited Warranty

AT&T warrants to you, the customer, that your MERLIN LEGEND Communications System will be in good working order on the date AT&T or its authorized reseller delivers or installs the system, whichever is later ("Warranty Date"). If you notify AT&T or its authorized reseller within one year of the Warranty Date that your system is not in good working order, AT&T will without charge to you repair or replace, at its option, the system components that are not in good working order. Repair or replacement parts may be new or refurbished and will be provided on an exchange basis. If AT&T determines that your system cannot be repaired or replaced, AT&T will remove the system and, at your option, refund the purchase price of your system, or apply the purchase price towards the purchase of another AT&T system.

If you purchased your system directly from AT&T, AT&T will perform warranty repair in accordance with the terms and conditions of the specific type of AT&T maintenance coverage you selected. A written explanation of AT&T's types of maintenance coverage may be obtained from AT&T by calling 1-800-247-7000. If you purchased your system from an AT&T authorized reseller, contact your reseller for the details of the maintenance plan applicable to your system.

This AT&T limited warranty covers damage to the system caused by power surges; including power surges due to lightning.

The following will not be deemed to impair the good working order of the system, and AT&T will not be responsible under this limited warranty for damages resulting from

- failure to follow AT&T's installation, operation, or maintenance instructions
- unauthorized system modification, movement, or alteration
- unauthorized use of common carrier communication services accessed through the system
- abuse, misuse, or negligent acts or omissions of the customer and persons under the customer's control
- acts of third parties and acts of God

AT&T'S OBLIGATION TO REPAIR, REPLACE, OR REFUND AS SET FORTH ABOVE IS YOUR EXCLUSIVE REMEDY

EXCEPT AS SPECIFICALLY SET FORTH ABOVE, AT&T, ITS AFFILIATES, SUPPLIERS, AND AUTHORIZED RESELLERS MAKE NO WARRANTIES, EXPRESS OR IMPLIED, AND SPECIFICALLY DISCLAIM ANY WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

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About This Book

This book tells you how to plan a Hybrid/PBX communications system. It is intended for persons who plan, implement, coordinate, and manage the system (called system managers).

In addition to this book, you will need

- copies of the PBX System Planning Forms

  You will use these forms to

  - outline the decisions you make about how the system should be assembled and programmed—for example, what trunks will be connected to the control unit and in what order.
  - program the system following the form information. These forms are formatted to reflect the order, or sequence, of programming and include the category and entry titles found on the programming screens.

    create an external record of your system's configuration-its equipment, options, and features.
- the AT&T list of equipment ordered for the system
- the local telephone company's and long-distance vendor's trunk information lists
- copies of the Employee Communication Survey form
- a floor plan showing the locations of the equipment

Related Documentation

The following kinds of documentation are available to help you set up, use, and maintain the communications system:

- reference
- setup and modification
- telephone user support
- operator guides
- miscellaneous

How to Order Books

The books needed for operating the communications system were supplied with the system. You can order addtional copies of these and other books listed below from the AT&T Customer Information Center:

- Within the continental United States, call 1-800-432-6600.
- In Canada, call 1-800-255-1242.

MERLIN LEGEND Book Title	Order Number
System Setup and Modification	
PBX System Planning	555-610-113
PBX System Planning Forms only	555-610-117
Key System Planning	555-610-112
Key System Planning Forms only	555-610-116
Data Guide	555-610-114
Data Planning Forms only	555-610-118
System Programming	555-610-111
System Reference	
System Reference	555-610-110
Telephone User Support	
Analog Multiline Telephones User's Guide	555-610-120
MLX-10D,™ MLX-28D,™ and MLX-20L™ Digits//KDN Display Telephones User's Guide	555-610-122
MLX-10™ Digital/ISDN Non-Display Telephone User's Guide	555-610-123
MLX-10™ and MLX-10D™ User Cards	555-610-124
MLX-28D™ and MLX-20L™ User Cards	555-610-125
Single-Line Telephones User's Guide	555-610-121

MERLIN LEGEND Book Title	Order Number
Operator Guides	
Analog Direct-Line Consoles Operator's Guide	555-610-131
Digital/ISDN Direct-Line Consoles Operator's Guide	555-610-132
Digits//ISDN Queued Call Console Operator's Guide	555-610-133
Miscellaneous	
Calling Group Supervisor's Guide	555-610-130

Additional Ordering Information

For information on ordering replacement parts, accessories, and other equipment that is compatible with the system, see Appendix A in *System Reference.*

Product Safety Labels

Throughout this book, hazardous situations are indicated by an exclamation point inside a triangle, along with the word caution or warning:

WARNING

Warning indicates the presence of a hazard that could cause death or severe personal injury if the hazard is not avoided.

CAUTION

Caution indicates the presence of a hazard that will or can cause minor personal injury or property damage if the hazard is not avoided.

How to Comment on This Book

We welcome your feedback on this book. Please use the feedback form that follows. If the form is missing, send your comments to A. Sherwood, AT&T, 99 Jefferson Road, Rm. #2A25, Parsippany, NJ 07054.

Preparation

1

Several actions need to be completed before the system is installed:

- Review the system's hardware, features, and operation.
- Arrange for the location of the control unit.
- Survey telephone users on their needs.
- Find or create a floor plan.

System Components

To tailor the system for your company, you must know the number and types of telephones, outside trunks, and adjuncts that were ordered. Review the AT&T Equipment List provided by your AT&T representative or authorized dealer.

If you did not participate in ordering, talk with your management about how the equipment ordered will be used—for example, which employees will get what telephones, which consoles operators will be using, and where adjuncts will be located.

Figure 1-1 shows the components of a typical system. Your system may not have all the components pictured, or it may have additional or different components. The numbered items in the figure correspond to the descriptions that follow.

Note: The outside lines in systems operating in the Hybrid/PBX mode are called trunks.

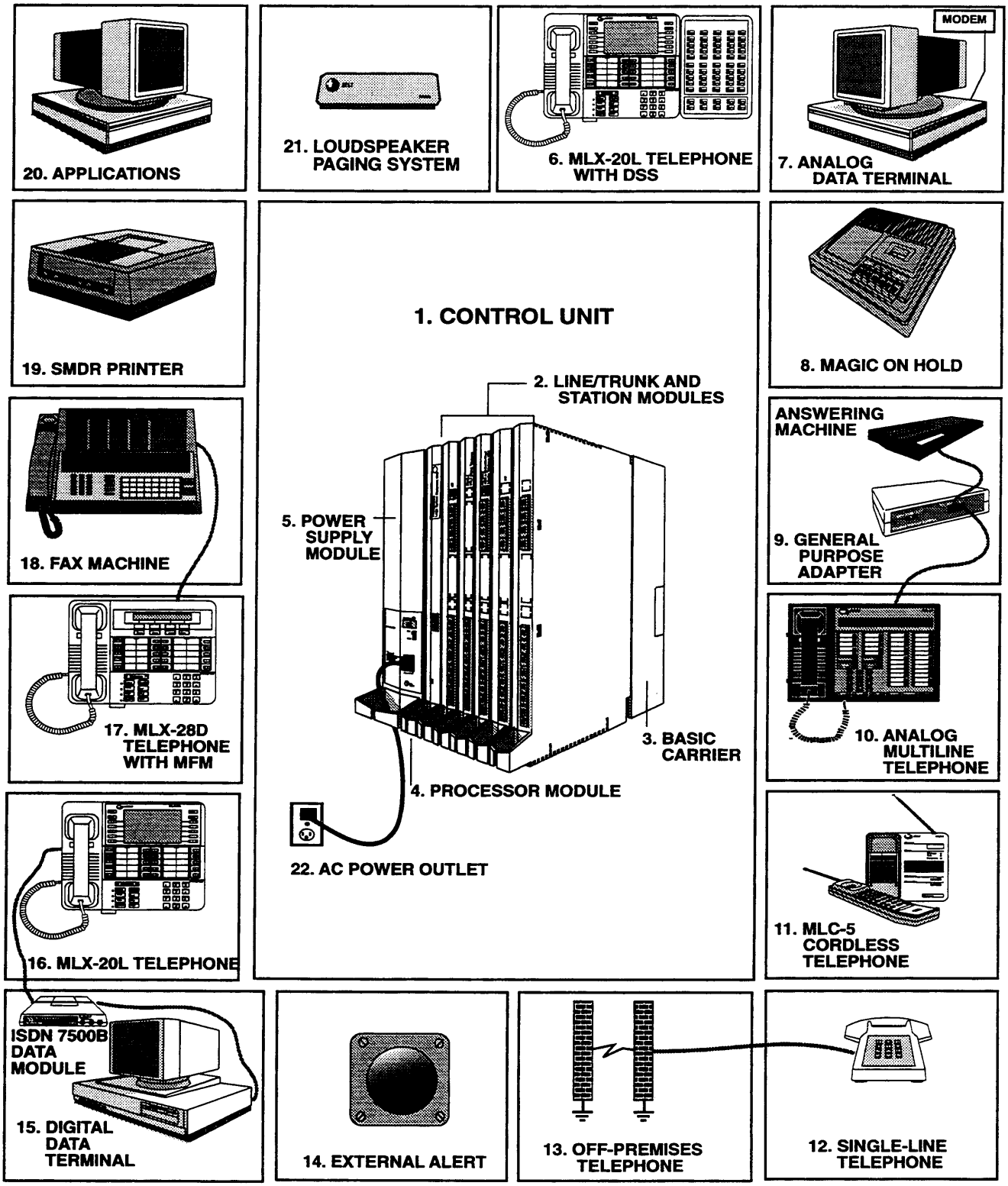

Figure 1-1 System Components

1. Control Unit. The backbone of the system, consisting of the basic and expansion carriers, power supply module, processor module, and trunk and station modules. The control unit connects telephone company trunks with stations such as telephones and adjuncts.
2. Trunk and Station Modules. The components that connect telephone company trunks and terminal equipment such as telephones, external alerts, and fax machines via jacks to the control unit.
3. Basic Carrier. The component attached to the backboard used to hold the modules needed for system operation. The basic carrier houses the processor module, power supply module, and up to five trunk and station modules. Each expansion carrier houses its own power supply module and up to six additional trunk and/or station modules. One or two expansion carriers can be added.
4. Processor Module. A miniature computer that controls most of the system's features and supplies the system's diagnostics. The processor module provides two jacks, one for Station Message Detail Recording (SMDR) and the other for system programming and maintenance via a personal computer (PC).
5. Power Supply Module. The component that supplies DC power for the modules and telephones (one power supply unit is needed per carrier). If the system's power requirements exceed the capacity of the power supply module, an auxiliary power supply unit can be added.
6. Direct Station Selector (DSS). A console that adds 50 buttons for one-touch extension dialing to the MIX-20L™ or MLX-28D™ telephone and speeds call handling.
7. Analog Data Terminal. A data terminal such as a PC, printer, or optical reader that connects via a modem (for transmitting and receiving analog signals) to a 012 basic telephone module or a 008 OPT module. A data terminal can also be connected to an MLX telephone using a Multi-Function Module (MFM) or to an analog multiline telephone using a General Purpose Adapter (GPA.)
8. Magic on Hold®. Optional equipment that connects to the system through a GS/LS jack programmed for Music-on-Hold. (A customer-provided music source can be connected instead of Magic on Hold.)
9. **General** Purpose Adapter (GPA). An adapter used to connect a variety of tip/ring (T/R) adjuncts to an analog multiline telephone (shown here with an answering machine).
10. Analog Multiline Telephone. A 34-button telephone with built-in speakerphone that connects to the system via an analog station jack. Other analog multiline telephones compatible with the system include the 22- and 34-button with built-in speakerphone and a one-line, 16-character display and the 10- and 22-button with built-in speakerphone, without display.
11. MLC-5 Cordless Telephone. A cordless multiline telephone that connects to the control unit via an analog station jack.
12. Industry-Standard Single-Line Telephone. A touch-tone or rotary industry-standard telephone connected to the system via a 012 basic telephone module or a 008 OPT module.

13. Off-Premises Telephone (OPT). A single-line, touch-tone or rotary, industry-standard telephone located in a different building from the control unit.

14. External Alerts. Alerting devices such as bells, chimes, and strobe lights that connect to a jack on a 012 basic telephone module or a 008 OPT module, or to an MFM or Supplemental Alert Adapter (SAA).

15. Digital Data Terminal. A data terminal such as a PC, printer, or optical reader that connects via an ISDN 7500B Data Module to a 008 MLX module and that can also include an MLX telephone.

16. MLX-20L Telephone. A digital/ISDN (MLX) telephone with 20 line buttons and a display with seven lines of 24 characters each. The MLX-20L™ telephone can also be used as a system programming console. Other MLX telephones include:
    - MLX-10™/MLX-10D™ Telephone. A 10-button MLX telephone with or without a two-line, 24-character display.
    - MLX-28D™ Telephone. An MLX telephone with 28 line buttons and a two-line, 24-character display.

17. Multi-Function Module (MFM). A circuit board mounted inside an MLX telephone that provides a jack to connect optional equipment such as answering machines, fax machines, external alerts, and modems to the telephone.

18. Fax machine. Industry-standard fax machines connected to the control unit via a jack on a 012 basic telephone module or a 008 OPT module, an MFM, or a GPA.

19. SMDR Printer. A printer for Station Message Detail Recording (SMDR) call records, connected via an RS-232 jack on the processor module.

20. Applications. Software and hardware for the MERLIN LEGEND™ Communications System that can be connected to the control unit to provide more functions:
    - Call Accounting System (CAS)
    - Call Accounting Terminal (CAT)
    - Call Management System (CMS)
    - MERLIN MAIL™ Voice Messaging System
    - MERLIN® Attendant
    - Integrated Solution II (IS II)
    - Call Accounting System (CAS) — IS II
    - AUDIX®Voice Power — IS II
    - Integrated Voice Power Automated Attendant-IS II
    - MERLIN LEGEND System Programming and Maintenance (SPM)

21. Loudspeaker Paging System. A single-zone or multizone system such as PagePac* with Zonemate† 9 or 39 that connects via an administered jack on a GS/LS module.

22. AC Power Outlet. A dedicated 115-VAC wall outlet (not controlled by an on/off switch) that supplies power to the control unit.

* PagePac is a registered trademark of Dracon, a division of Harris Corporation.

† Zonemate is a trademark of Dracon, a division of Harris Corporation.

Location of the Control Unit

Before installation, choose a room, closet, or other area where the system control unit can be mounted on the wall. The area must meet the environmental requirements in Table 1-1.

Table 1-1 Environmental Requirements

Distances	■ Within 25 feet of the network interface (cannot be installed outdoors) ■ Within 1000 feet of telephones ■ Within 5 feet of a dedicated AC power outlet (1 plug per carrier)
Heat Dissipation	■ Fully loaded basic carrier: 500 Btu/hr ■ Fully loaded 2-carrier: 1000 Btu/hr ■ Fully loaded 3-carrier: 1500 Btu/hr
Power Requirements	■ Basic carrier: 117 VAC 60 Hz±1% 160 W 3 amps ■ 2-carrier: 117VAC 60 Hz±1% 320 W 6 amps ■ 3-carrier: 117VAC60 Hz±1% 480 W 9 amps ■ 1 properly grounded plug needed per carrier ■ Additional outlets may be needed if installing printers and PCs.
Temperature	■ 40°-104°F; 4-40C (optimum temperature 60°F; 16C)
Humidity	■ 20%-80% relative humidity
Ventilation	■ Allow at least 1 inch of space on the right and left sides of the control unit and 12 inches above and below the control unit to prevent overheating.

Continued

Table 1-1 Continued

■	AC outlet for control unit should not be switch controlled.
■	Plugging control unit into an outlet that can be turned on and off by a switch can cause accidental disconnection of the system.
■	AC outlet must be property grounded via an AC receptacle for 3-prong plug.
■	Do not install control unit outdoors.
■	Do not place control unit near extreme heat (furnaces, heaters, attics, or direct sunlight).
■	Do not expose control unit to devices that generate electrical interference (such as arc welders or motors).
■	Each auxiliary power unit requires 1 outlet.
■	Do not expose control unit to moisture, corrosive gases, dust, chemicals, spray paint, or similar material.
■	Do not place anything on top of carriers.
■	Do not install under any device that may drip fluid, such as an air conditioner.

In addition, a 3/4-inch plywood backboard is needed to mount the system on the wall. The dimensions depend on the number of carriers, as shown in Table 1-2. in some areas, fire or electrical codes require a flame retardant backboard. Check with the appropriate authorities to ensure that the proper material is provided.

Table 1-2 Control Unit Space Requirements

Carrier	Dimensions
Basic carrier Basic carrier + 1 expansion carrier Basic carrier + 2 expansion carriers	14"wx23"hx12"d 25"wx23"hx12"d 37"wx23"hx12"d
Backboard	Dimensions
Small system (minimum needed) Large system (minimum needed)	4'wx3'hx3/4"d 6'wx3'hx3/4"d

It is important that the location you select for the control unit meets all of these specifications and that the backboard is in place before installation. If you've already selected a location and changes are needed, arrange for these changes as soon as possible before installation.

Telephone User Survey

The features and calling privileges you assign to each employee's telephone ensure that employees get the most benefit from the system.

If you were not involved in the planning and decision-making for the system, find out from your management and your AT&T representative or authorized dealer what telecommunications needs were identified.

To determine calling privileges, get answers to the following questions:

- Does management want to allow both local and toll calls to be made from every telephone?
- If any telephones are restricted, are there any numbers the users should be allowed to call?
- Are there any specific numbers (such as 900) that you want to restrict users from calling?
- Who, if anyone, will be given personal lines?
- Will access to central office trunks (outside lines) be restricted to certain employees?
- Do any departments receive frequent special calls (such *as* sales and service) so that calls should come to them directly, bypassing a system operator?

Use the Employee Communication Survey form (see Figure 1-2) to determine each employee's telecommunications needs. If it is not feasible to have each employee fill out a form, get the information you need from a knowledgeable person in each department, section, or work group. This person should have sufficient information and authority to make decisions about calling features and coverage assignments for others in the department.

Make the appropriate number of copies of the Employee Communication Survey form.

Name _____ Room _____ Extension _____

Name of work group (Sales, Customer Service) _____

Please answer each question below.

1. Do you regularly use any of the following outside lines? (Check any that apply)

- ❑ WATS
- ❑ FX (foreign exchange)
- ❑ Tie
- ❑ None of the above or don't know

2. Are your phone calls covered when you're away from your desk?

- ❑ No
- ❑ Yes By whom? _____

3. Do you cover phone calls for co-workers when they are away from their desks?

- ❑ No
- ❑ Yes For whom? _____

Which of those people should have a button on your phone used exclusively for his or her calls?

_____

When you are unable to cover calls, it is done by _____

Do you share the incoming call workload with others?

- ❑ No
- ❑ Yes With whom? _____

5. Would you say your phone use is

- ❑ Heavy
- ❑ Average
- ❑ Light

Figure 1-2 Employee Communication Survey Form

6. Do you have a data terminal or personal computer at your workstation?

- ❑ No Do you expect to get one within the next year?
  - ❑ No
  - ❑ Yes
- ❑ Yes Do you have a modem or ISDN 7500B Data Module?
  - ❑ No
  - ❑ Yes

7. Do you use account codes for charge-back of calls?

- ❑ No
- ❑ Yes Please list all the codes you use (attach another sheet if necessary):

_____

_____

_____

8. Approximately how many times do you transfer calls? _____ times/day

9. Do you need to dial the same number over and over every day?

- ❑ No
- ❑ Yes Please list these numbers:

_____

_____

_____

10. Do you want to be able to pick up other people's calls when you hear their phones ring?

- ❑ No
- ❑ Yes Please list these people:

_____

_____

_____

11. Do you want your phone number to appear on another person's phone for screening, or covering calls, or for other reasons?

- ❑ No
- ❑ Yes Please list these people:

_____

_____

_____

Figure 1-2 Continued

Use the information in Table 1-3 to interpret and analyze the results of the employee communication survey.

Table 1-3 Employee Communication Survey — Sample Analysis

1. Types of trunks (outside lines) used	Indicates toll calling habits. In most cases, assigning a button for each trunk is not necessary; the use of Automatic Route Selection (ARS) ensures that the preferred trunk is selected.
2. Calls covered by someone else (sender)	Suggests that this employee should be assigned as a sender in either Individual or Group Coverage arrangement, particularly if calls are covered by someone other than the operator.
3. Cover someone else's calls (receiver)	Suggests assignment as a receiver in either Individual or Group Coverage arrangements.
4. Share incoming calls	identifies calling group needs.
5. Frequency of use	Identifies heavy and light telephone users. Heavy users may benefit from additional System Access buttons and/or an additional System Access Originate Only button.
6. Data needs	Identifies existing and potential data terminal and personal computer users. See the *Data Guide.*
7. Use of account codes	Identifies current account codes used for charge-back of calls.
8. Frequency of transfers	Suggests that an additional System Access Originate Only button may be required.
9. Frequently dialed numbers	Identifies useful numbers for the System Speed Dial list.
10. Picking up calls	Identifies need for a pickup group.
11. Sharing lines/telephone numbers	Identifies Shared System Access buttons and/or common personal line appearances.

Floor Plan

Use a floor plan to make planning more manageable and to ensure that the correct telephone equipment is assigned to each employee.

If your organization is moving to a new location, a floor plan may already be prepared and you may be able to get a copy of it from your management.

Create a floor plan in two phases:

1. Indicate the location and type of telephones, adjuncts (fax, answering machines, etc.), and data terminals.
2. When you assign extension numbers, indicate the assigned numbers on the floor plan.

Note: In this book, telephones and associated adjuncts, such as answering machines or data terminals, or adjuncts connected directly to the control unit, are called stations.

Planning Instructions

1. Use a large sheet of paper and sketch your office layout. The location of office walls and other partitions is important when features are assigned to telephones that must be within hearing range of each other. For example, pickup group members must be able to hear each others' telephones rigning.
2. Indicate the location of each employee's telephone, other locations where there will be a telephone (such as in a conference room), and the locations of data terminals, PCs, and host computers. Use the symbols shown in Figure 1-3.
3. Indicate the tupe of telephone at each location, using an abbreviation that includes the number of programmable buttons. For example, write "MLX-10" at 10-button MLX telephones, "MLX-20L" at 20-button MLX display telephones, "BIS-34" at 34-button analog multiline telephones, and so forth.
4. Indicate the type of adjunct at each location. Write "fax," "ans. mach." (answering machine), "headset," or other type of adjunct beneath the symbol.

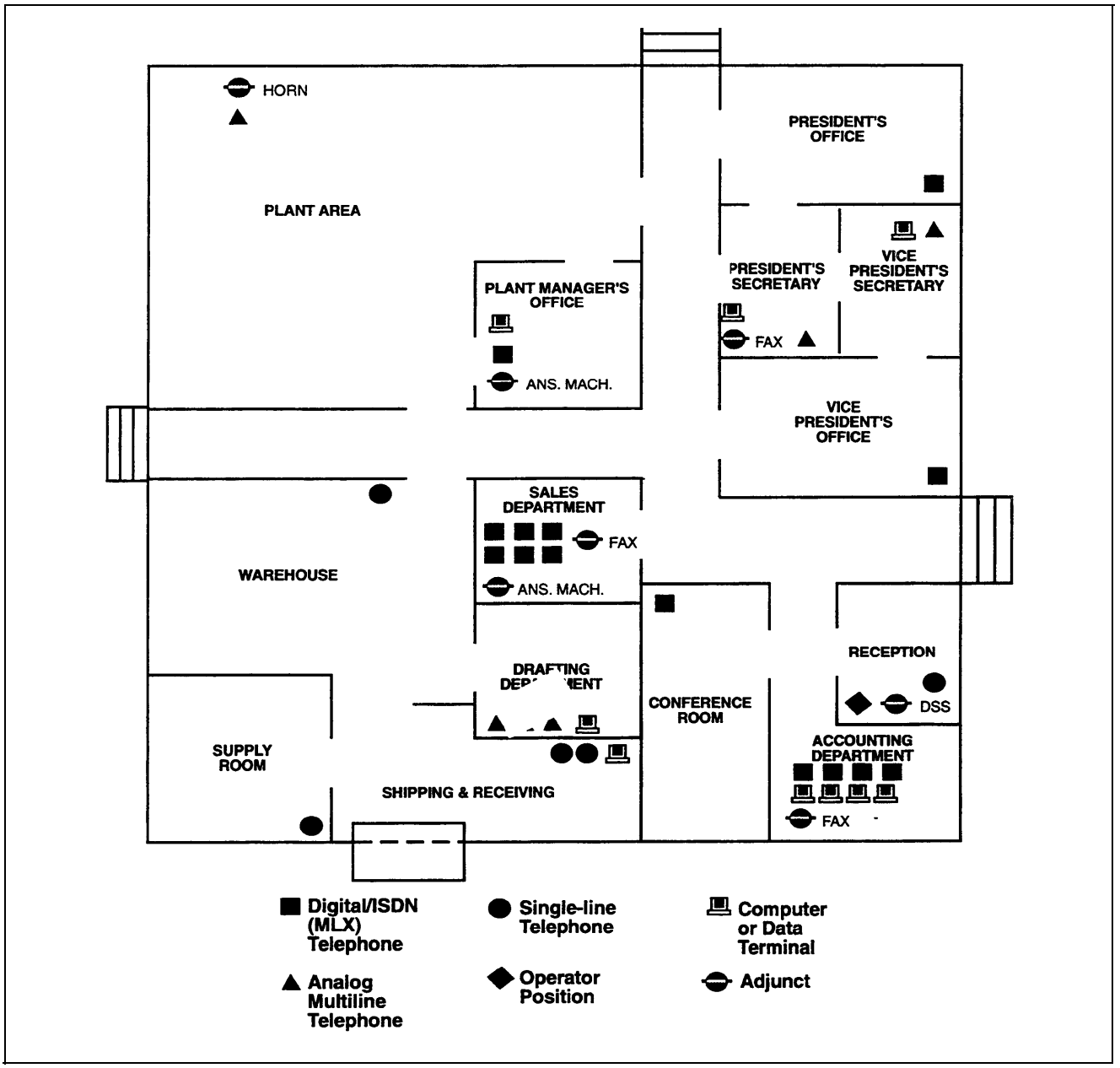

Figure 1-3 Floor Plan

As shown in Figure 1-3, the floor plan does not need to be elaborate or to scale. The telephone symbol should be large enough to accommodate the size of telephone and the assigned number, and if you find it helpful, the name of the employee.

Keep the floor plan. You will refer to it during planning and complete it (by filling in extension numbers) when you get to “System Numbering’ in Chapter 2.

Control Unit

2

Planning the control unit consists of deciding how to place the modules, setting the system operating conditions, and numbering the system.

Modules

Certain modules are required for every system:

- Processor module contains the memory that controls the system software and features. It also contains the software and firmware that supports built-in system diagnostics and the built-in data modem used for remote maintenance and system programming. The processor module is offered in two sizes:
  - The small processor module supports a maximum of 24 trunks and/or 56 stations.
  - The large processor module supports a maximum of 80 trunks and/or 144 stations.
- Power supply module provides power to the processor module and trunk and station modules, and to each telephone and adjunct. Each carrier in the control unit has one power supply module.
- Trunk and station modules contain the jacks for connecting stations and outside trunks to the control unit. The type of jack on a module determines the type of trunk or station that can be connected to it.

The trunk and station modules and the type(s) of jacks on each are shown in Figure 2-1.

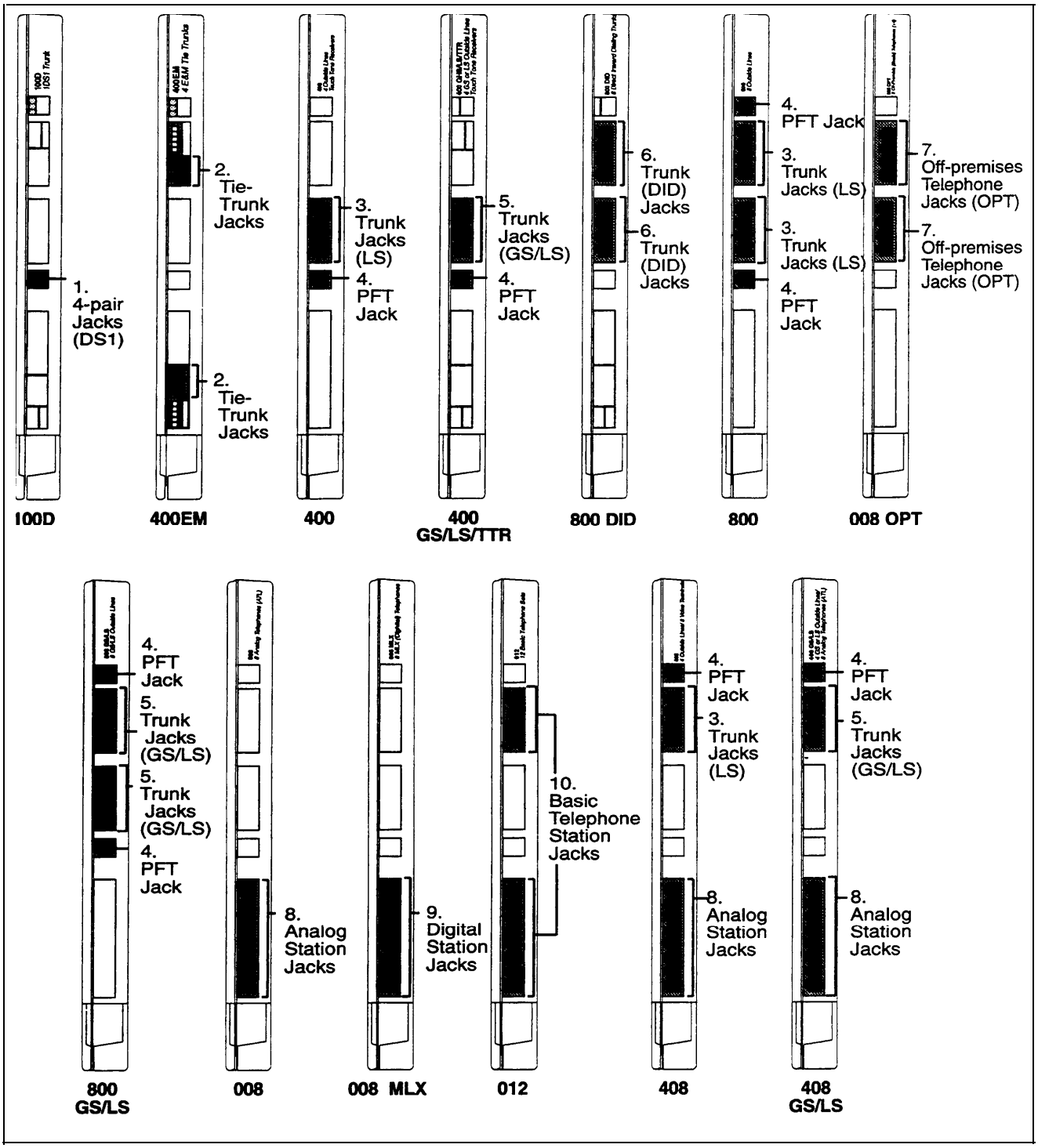

Figure 2-1 Trunk and Station Modules

The trunks and stations that can be connected to the jack types shown in Figure 2-1 are described below:

1. A DS1 trunk jack connects a Digital Signal 1 (DS1) facility provided by the telephone company. The DS1 facility can be set for either T1 or integrated Services Digital Network Primary Rate Interface (ISDN-PRI) operation.

   The DS1 facility programmed for T1 operation supplies 24-channel emulation of any combination of ground-start (GS), loop-start (LS), and tie trunks. When programmed for PRI operation, the channels are used to connect ISDN services such as Megacom® WATS.

2. Tie-trunk jacks connect private lines from other communications systems.
3. Trunk jacks (LS) connect loop-start trunks from the telephone company.
4. (PFT) jacks connect single-line telephones that work during power failures. Analog multiline telephones and digital/ISDN (MLX) telephones cannot be used as power failure telephones.
5. Trunk jacks (GS/LS) connect loop-start or ground-start trunks from the telephone company.
6. Trunk (DID) jacks connect Direct Inward Dial (DID) trunks.
7. Off-premises telephone (OPT) jacks connect off-premises tip/ring equipment such as single-line telephones, fax machines, or answering machines. Tip/ring equipment connects directly to an outside trunk and works on a single pair of wires.
8. Analog station jacks connect analog multiline telephones and adjuncts.

See the Data Guide *for more information on data stations*

9. Digital station jacks connect MLX telephones or data devices such as the ISDN 7500B Data Module.
10. Basic telephone station jacks connect tip/ring equipment such as single-line telephones, fax machines, or answering machines. Basic telephone station jacks also connect optional applications such as MERLIN Attendant or MERLIN MAIL Voice Messaging System for the MERLIN LEGEND Communication System.

Table 2-1 shows the capacities of each module.

Table 2-1 Module Capacities

Modules	Trunk Jacks	Station Jacks
100D	1 DS1 facility (PRI or T1)	
400EM	4 4-wire E&M tie trunks	
400	4 LS trunks with 4 ITR*	1 PFT jack
400 GS/LS/TTR	4 GS/LS trunks with 4 ITR*	1 PFT jack
800 DID	8 DID trunks and 2 ITR*	
800	8 LS trunks	2 PFT jacks
008 OPT	2 ITR*	8 OPT jacks
600 GS/LS	8 GS/LS trunks	2 PFT jacks
008		8 analog jacks
008 MLX		8 digital jacks
012	2 TTR*	12 basic jacks
408	4 LS trunks	8 analog jacks 1 PFT jack
408 GS/LS	4 GS/LS trunks	8 analog jacks 1 PFT jack

* TTR = Touch-tone receivers required for tip/ring equipment and Remote Access. TTRs are not used to connect trunks.

Trunk and Station Capacity

The numbers of jacks in Table 2-1 are the physical jacks on each module. In most cases, the number of physical jacks indicates capacity (the number of trunks and/or stations that can be connected to the module). The exception is the 100D module, with one physical jack, which because of the system's software capabilities supports 24 trunks.

Use the AT&T Equipment List (supplied with your system) to complete page 1 of PBX System Form 1, System Planning.

Planning Form Instructions

Under the section "Size of Processor Module," check the box describing the size of the processor module (small or large).

Under the "Trunks" headin in the "Capacity" section:

1. Fill in the number of each type of trunk module on the appropriate line.
2. Add the column and record the result next to the system totals.
3. Multiply the number of each type of module by the number of trunks it supports. Write the results in the "Total Trunks by Module Type" column.
4. Add the column and record the total tyrunk capacity of the system.

Station capacity is the number of stations that can be connected to the control unit, and it equals the number of physical jacks on the trunk and station modules.

See "System Numbering" in this chapter for detailed information.

One extension number is automatically assigned to each station jack, whether or not equipment is connected to it, except for the 008 MI-)(and 008 OPT modules:

- 008 MLX module has two extension numbers assigned to each physical jack, the first for a digital/ISDN (MLX) telephone and the second for any equipment connected to the telephone through an MFM.
- 008 OPT module has eight physical jacks, which the system reads as 12 jacks and assigns an extension number to each.

Planning Form Instructions

Under the heading "Stations":

1. Fill in the numbers of each type of station module on the appropriate lines.
2. Add the column and record the result by System Totals.
3. Multiply the number of each type of module by the number of physical jacks on it and record the results.
4. Add the column and fill in the "System Totals" line to show station capacity.

Planning Form Instructions - Continued

To determine the number of extensions assigned:

5. Multiply the number of physiocal jacks by module type by the number of station extensions the system assigns to each module's jack type.

   NOTE: Since the system assigns an additional four extensions to each 008 OPT module you must multiply the number of 008 OPT modules by four and add this subtotal to the result shown in the "Physical Jacks by Module Type" column.

6. Write the results in the "Total Station Extension Assigned" column.

7. Add the column and fill in the "System Totals" line.

Module Placement

Use the "Control Unit Diagram" on PBX System Form 1 and the following guidelines to plan where the modules are placed in the control unit:

- Put the power supply module in the far left slot of each carrier.
- Put the processor module in slot 00 of the basic carrier.
- Put trunk and station modules in any order in slots 01 through 17, with the following conditions:
  - Put the modules in each carrier from left to right with no empty slots between modules. (The system does not acknowledge modules in slots that follow an empty slot; slots to the right of the last module can be left empty.)
  - If the system includes a queued call console (QCC), make the 008 MLX module the first station module (located to the left of any 008, 408, or 408 GS/LS modules).
  - Put all 012 and 008 OPT modules in the same carrier whenever possible (These modules use a frequency generator.)
  - Group all 800 DID, 100D, and 400EM modules together according to type, whenever possible, to save time in system programming.

See "Station Jack Connections" in this chapter for information on QCCs

Each physical jack on the control unit is numbered sequentially from left to right and bottom to top:

- Station jacks are numbered from 1 to 144.
- Trunk jacks are numbered from 1 to 80.

This sequence of numbers is called the "logical ID." It is the basis for how you connect components to the control unit, as well as how the system assigns station extension numbers and trunk numbers.

Notes:

- Each 100D module is assigned 24 logical IDs even though the module has only one physical trunk jack.
- The 008 OPT module is assigned 12 logical IDs even though the module has only eight physical station jacks.
- Power failure transfer (PFT) jacks are not assigned logical IDs.

Planning Form Instructions

Mark the module placement on the "Control Unit Diagram" on the back of **Form 1.**

1. Write the type of module to be installed at the top of each slot. Use the labels listed in Tabvle 2-1 (008 MLX, 408, etc.).

2. Write the type of jack (S=station, T=trunk) and the associated logical ID for each trunk and station jack on each module.

Note:

- The "Unit Load" block above the diagram are reserved for occasions when equipment changes or maintenance require the installation technician to manually compute the values. See System Reference for details on computing unit loads.

- Logical ID labels for each trunk and station jack are provided with the system. When the control unit is assembled, the labels are attached to the modules.

Figure 2-2 shows a completed 'Control Unit Diagram" for a system with a large processor module with 32 trunks and 52 stations.

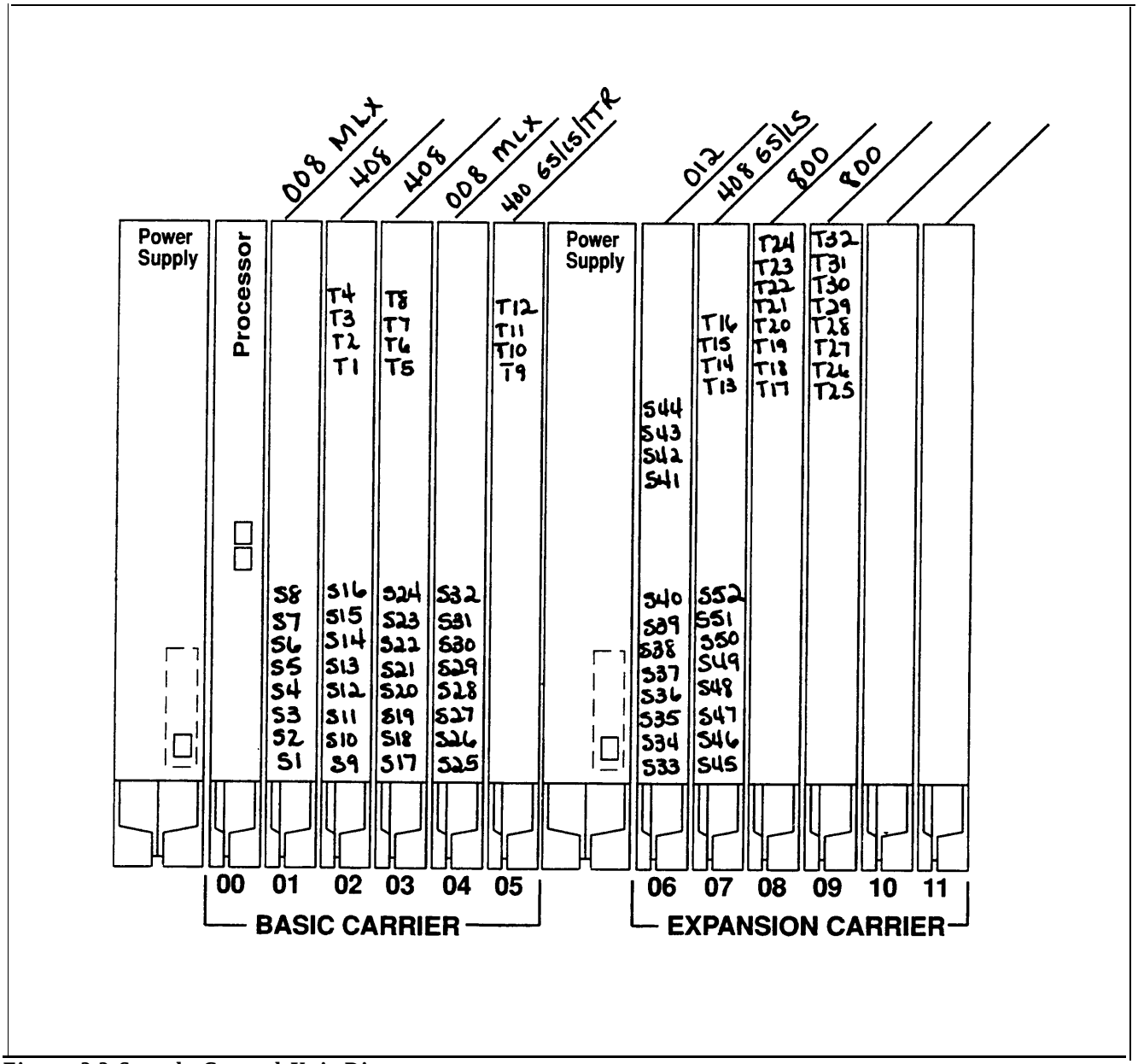

Figure 2-2 Sample Control Unit Diagram

System Operating Conditions

Record the following system operating conditions:

- programming equipment that will be used and its station jack assignment
- mode of operation
- whether Automatic Maintenance Busy is enabled
- a reminder to set the system time and date

Use the "Control Unit Diagram" on PBX System Form 1 as a reference and mark the "System Operating Conditions" section of that form.

Programming Equipment and Station Jack Assignment

Two types of equipment can be used for system programming:

- an MLX-20L telephone acting as a system programming console. The telephone is the first (lowest) station jack on the first MLX module and is factory set for system programming.
- a personal computer (PC) with MERLIN LEGEND System Programming and Maintenance (SPM) software. (Both DOS- and UNIX†-based SPM are available.) The PC is connected to the lower jack on the processor module.

Planning Form Instructions

Under the heading, "System Programming Console," on **Form 1:**

1. Do one of the following:
   - Check "No" if you are using a PC with SPM to program the system. Go to the "Mode of Operation" instructions.
   - Enter the Logical ID and Extension Number if you are using a system programming console.
2. To change the factory-set system programming jack, write in the new logical ID (using the information from the "Control Unit Diagram").

Note: You will fill in the extension number of the jack later.

In addition to being factory set for system programming, the first (lowest) station jack on the first MLX module is also factory set as the primary operator position. Since the primary operator position cannot be reassigned to another station jack, you may want to change the system programming assignment to ensure that future programming sessions do not interfere with the operator's work.

If you want the system programming jack to be different from that of a system operator, change the programming assignment to any one of station jacks 2 through 5 on the first MLX module in the control unit.

† UNIX is a registered trademark of UNIX System Laboratories, Inc.

Mode of Operation

See System Reference *for more information on modes.*

Your system is registered with the FCC to operate as either a Private Branch Exchange (PBX) or Hybrid system. However, you can program the system to operate in any of three modes:

- Hybrid/PBX
- Key (the factory setting)
- Behind Switch

The mode of operation determines

- how outside trunks are provided to users
- the types of operator consoles allowed
- the features available and how they work

Note: This book applies only to systems in the Hybrid/PBX mode. To plan a system in either the Key or Behind Switch mode, use Key *System P/arming.*

Hybrid/PBX Mode

See System Reference for information on trunk types.

The Hybrid/PBX mode handles large volumes of calls and telephone users, and offers the most flexibility of the three modes. Outside lines, called trunks, can be loop-start, ground-start, Direct Inward Dial (DID), DS1, or tie. The outside trunks can be grouped in pools for shared use. In addition, outside trunks can also be assigned to line buttons on multiline telephones for users who require a personal line.

Users access inside lines and outside trunks via System Access buttons. To make an outside call, the user enters a dial-out code, usually a 9, and the system automatically selects an available trunk. The Automatic Route Selection feature determines which trunk is used for each type of outgoing call.

Incoming calls can be handled by either a direct-line console (DLC) or a queued call console (QCC), or a combination of both. Calls handled by QCCs are directed to a QCC queue, where they are held until an operator is available.

Planning Form Instructions

Check "Hybrid/PBX" under the "Set System Mode" heading on **Form 1.**

Automatic Maintenance Busy

Automatic Maintenance Busy puts a malfunctioning trunk in a “maintenance busy” state, preventing outgoing calls on that trunk. Incoming calls are never blocked. A trunk in maintenance busy is tested by the internal maintenance software to try to put it back into service.

The factory setting for Automatic Maintenance Busy is “disabled,” which means that faulty trunks are not automatically put in a maintenance busy state. If you `plan to group trunks into pools, enable Automatic Maintenance Busy for optimum system performance.

Planning Form Instructions

Under the "Automatic Maintenance Busy" heading of **Form 1:**

1. Check "Disable" to keep the factory setting.

2. Check the second box to enable Automatice Maintenance Busy.

System Date and Time

See “System Features” in Chapter 4 for information on SMDR.

The system date and time is the month, day, year, and time shown on display telephones and Station Message Detail Recording (SMDR) reports. The system date and time is also shown on error reports used by AT&T or an authorized representative for maintenance.

Planning Form Instructions

Check "Yes" under the "Set System Date" and "Set System Time" headings on **Form 1** as a reminder to set the current date and time.

System Numbering

System numbering is the process of assigning extension numbers to stations (telephones and adjuncts), calling groups, paging groups, park zones, and remote access.

The instructions in this chapter deal only with assigning extension numbers to stations.

Number the stations in two stages:

Stage One. Decide in what order to connect the telephones and other equipment to the control unit. To do this, identify station jack types and match individual components with the jacks that support them.

When the system is turned on, it identifies the type of module installed in each control unit slot and automatically assigns extension numbers to the components in exactly the same order in which they are connected to the control unit. As you plan connections, therefore, you should be aware of the relationship between the jack's logical ID and the extension number the system assigns.

The stations are assigned 2-digit extension numbers starting with extension 10 at the station jack with the logical ID of 1. If a user needs a specific extension number, it is simpler (in terms of programming) to connect that user's telephone to the station jack that is automatically assigned the requested extension number.

Stage Two. Decide if the system-assigned extension numbers are appropriate or if you should renumber all, or some, of the extensions assigned. to the stations.

The system offers three predetermined numbering plans. In addition, you have the option of creating your own unique numbering plan with extensions of one to four digits.

Planning Form Instructions

Locate and review your **Floor Plan** and **AT&T Equipment List** to verify the equipment you have and how many of each kind of connection are needed.

Record equipment connections and extension numbers on **PBX System Form 2a, System Numbering - Station Jacks.**

Note: Form 2a is a multipage listing that accommodates entries for up to 144 stations. It shows the logical IDs for each station as well as the three predetermined numbering plans available.

you also need **PBX System Form 1, System Planning,** for both reference and to make additional entries.

Station Jack Connections

Planning station jack connections consists of identifying the jack types and matching the telephones and other equipment to the jacks that support them. Determine the station jack types in the control unit and plan connections in the following order:

- primary operator position
- additional operator positions
- Voice Announce to Busy and/or Simultaneous Voice and Data
- digits!/ISDN (MIX) telephones
- analog multiline telephones
- tip/ring equipment
- applications

Station Jack Types

Station jack type is determined by the module type. The station jack types and the equipment that can be connected to these jacks are listed in Table 2-2.

Use the completed "Control Unit Diagram" (Form 1) and Table 2-2 for reference and mark the station jack types on Form 2a.

Table 2-2 Station Jack Types

Station Jack Type	Module Type	Used to Correct
Analog	008 408 408 GS/LS	Analog multiline telephones Call Management System (CMS)
Digital	008 MLX	Digital/ISDN (MLX) telephones Digital data devices, such as ISDN 7500B Data Modules
Basic Telephone	012	Tip/ring equipment: Single-line telephones Adjuncts, such as answering or fax machines Analog data devices, such as modems Optional applications: MERLIN Attendant MERLIN MAIL Voice Messaging System AUDIX Voice Power—IS II Integrated Voice Power Automated Attendant-IS II
	008 OPT	Tip/ring equipment in another building or off-premises

Planning Form Instructions

In the "Jack Type" column of **Form 2a,** indicate the type of each station jack next to its logical ID.

1. Check "A" if the jack is analog, "D" if digital, or "B" if basic telephone.
2. The system reserves 12 logical IDs for the 008 OPT module even though only 8 are used. Cross off the last 4 logical IDs (they cannot be used).

Jacks for Primary Operator Position

The factory setting for the primary operator position is the lowest station jack on the first 008 MLX module. If the system doesn't have an MI-x module, it's the lowest station jack on the first module with analog station jacks. The factory setting for the primary operator position cannot be changed.

Two types of operator consoles can be used in the primary operator position:

- **Direct-Line Console (DLC).** Trunks are assigned on individual buttons; the console can have several calls ringing simultaneously. DLCs can be assigned to either a digital or analog station jack.
- **Queued Call Console (QCC).** Incoming calls are held in a queue and are directed to each QCC in sequence, one at a time. QCCs can be assigned only to digital station jacks, and the MLX-20L is the only phone that can be used as a QCC.

If the system includes QCCs, the primary operator position must be a QCC.

Planning Form Instructions

Mark jack assignments on **Form 2a.**

If the system does not include a system programming console, go to step 4.

1. See the "System Operating Conditions" section on the back **Form 1** for the logical ID of the station jack for the system programming console.
2. Mark the "Logical ID" column of **Form 2a** by writing "SPC" beside the preprinted logical ID for the system programming console station jack.
3. Write the name of the person who will be programming the system or the location of the system programming console in the "Person, Location, or Function" column.

If the system does not have QCCs, go to step 6.

4. Locate the first station jack showing a "D" (digital) type. Write "QCC" beside the preprinted lofical ID to indicate the primary QCC operator position.
5. Write the name or location of the primary QCC operator in the "Person, Location, or Function" column. Go to the "Jacks for Additional Operator Positions" instructions.

Planning Form instructions - Continued

If the system includes only DLCs.

6. Locate the first station jack showing a "D" (digital) or "A" (analog) type. Write "DLC" beside the preprinted logical ID to indicate the primary DLC operator position.

7. Write the name or location of the primary DLC operator in the "Person, Location, or Function" column.

Jacks for Additional Operator Positions

Use these instructions only if the system has more than one operator position.

The maximum numbers of both types of operator position are shown in Table 2-3.

Table 2-3 Maximum Number of Operator Positions

Positon Type	Telephone Type	Processor Module Size	Maximum Positions
Q C C	MLX-20L	Small or Large	4
DLC	MLX-20L MLX-28D	Small	6
DLC	MLX-20L MLX-28D	Large	8
DLC	Analog multiline telephones	Small or Large	8

Any combination of operator positions can be assigned as long as no more than four are QCCs and the total combined number is no more than six for a small processor module or eight for a large processor module. For example, a system with a small processor can have a combination that consists of four QCCs and two DLCs. Or, a system with a large processor can have a combination that consists of four QCCs, two digital/lSDN DLCs, and two analog DLCs.

Operator positions can be assigned as follows:

- Assign QCC positions to only the first and fifth station jacks on a digital module.

- Assign DLCs to only the first and fifth station jacks on a digital or analog module. This includes DLC positions used for calling group supervisors and for the optional Call Management System (CMS).

  The CMS equipment is connected to analog station jacks that are assigned as DLC positions. You must assign two DLC positions for each CMS (a maximum of two) connected to the system.

Planning Form Instructions

Use the "Control Unit Diagram" on **Form 1** to determine which station jacks can be used as operator positions:

1. Circle the first and fifth station jacks on each digital or analog module on the "Control Unit Diagram" until you have reached the maximym eaight positions.
2. Mark the station jacks to be used as additional operator positions on **Form 2a.**

If the system does not have QCCs, go to step 5.

3. Write the "QCC" beside the preprinted logical ID for each additional QCC position. Be sure to assign QCCs to only the first and fifth station jacks on each digital module.
4. Write the name or location of each additional QCC operator in the "Person, Location, or Function" column.
5. Write "DLC" beside the preprinted logical ID for each additional DLC position. Be sure to assign DLCs to only the first and fifth station jacks on each digital or analog module.
6. Write the name or location of each additional DLC operator in the "Person, Location, or Function" column.
7. If the system includes Call Management System(s), write "CMS" in the "Person, Location, or Function" column next to the logical ID for the two DLC positions assigned for each CMS.

Station Jack Pairs

Use these instructions only if the system has analog multiline telephones.

Two of the optional features for analog multiline telephones require an additional station jack:

- **Voice Announce to Busy.** A user whose telephone has this feature can hear an announcement through the speaker even though he or she is on a call. (MLX telephones can also use this feature but do not need an additional station jack. Single-line telephones cannot use this feature since they do not have speakers.)
- **Simultaneous Voice and Data.** A user whose telephone has this feature can use the telephone and a data terminal at the same time. (MLX telephones have this feature without requiring a second station jack.)

An analog muitiline telephone with either one of these features requires two consecutive analog station jacks on the control unit. The jacks are an odd-numbered analog station jack and the next higher (even-numbered) analog station jack.

The system assigns individual extension numbers to each of the jacks for either the Voice Announce to Busy or the Simultaneous Voice and Data feature. The extension number associated with the first (odd-numbered) station jack in the pair is the telephone's extension number. Calls cannot be placed to the extension number associated with the even-numbered station jack.

You can assign either of these features to any of the analog multiline telephones in the system, but you cannot assign both to the same telephone.

Planning Form Instructions

On **Form 2a,** mark the pairs of jacks for analog multiline telephones that have the Voice Announce to Busy or Simultaneous Vioce and Data feature.

1. In the "Logical ID" column, draw a box around the pair of station jack numbers that you plan to assign to each analog multiline station with either feature.
2. In the "Person, Location, or Function" column, next to the first (odd) number of each boxed pair, identify the station by person or location.
3. In the "Person, Location, or Function" column, next to the second (even) number of each boxed pair, write "voice/voice" for the Voice Announce to Busy feature or "voice/data" for the Simultaneous Voice and Data feature.

Jacks for Digital/ISDN (MLX) Telephones

Use these instructions only if the system has non-operator MLX telephones to assign to digital station jacks on 008 MLX modules.

Use the instructions in the Data Guide to plan connections for digital data equipment.

Although only one logical ID is assigned to each digital station jack, the system assigns two extension numbers. The extension number on Form 2a is the extension number automatically assigned to an MLX telephone connected to the digital station jack. The second extension number is reserved for an adjunct such as an answering machine that may be connected to the MLX telephone via a Multi-Function Module (MFM) or for an ISDN 7500B Data Module used to connect a data terminal.

The system automatically assigns both extension numbers whether or not the station includes an MFM or data module. Calls can be placed to both extension numbers independently.

The MFM can operate as either a Supplemental Alert Adapter (SAA) or as a tip/ring interface. The adapter is used when the MFM connects an external alert such as a bell or horn. The tip/ring interface is used when the MFM connects a tip/ring device such as an answering machine or modem.

Planning Form Instructions

Use the **Floor Plan** and **AT&T Equipment List** to verify that you have located all remaining MLX telephones and adjunts connected to them.

On Form 2a, mark the station jack assignments for the remaining MLX telephones.

1. In the "Jack Type" column, make sure there is a "D" checked next to the

2. In the "Person, Location, or Function: column, identify each MLX

Use the information from **Form 2a** as you mark the difital station adjuncts on **PBX System Form 2b, System Numbering - Digital/ISDN Station Adjuncts.**

3. In the "Logical ID" column, write the logical ID of each digital station jack (D jack type).

   Note: You will fill in the "Factory-Set Extension No." column later.

Complete the "MFM" and "7500B" columns.

4. If the jack does not have an adjunct connected, write "None" across the columns.

5. If an adjunct is connected to the MLX telephone:

   - Check "SAA" or "T/R" in the "MFM" column to show how the MFM connects the adjunct.
   - Check the "7500B" column if the station includes the data module.

6. Complete the last column.

7. Identify each adjunct or data module by type and by person, location, or function.

Jacks for Analog Multiline Telephones

Use these instructions only if the system includes the 408,408 GS/LS, or 008 modules.

Assign analog station jacks for all remaining non-operator analog multiline telephones in the system.

Planning Form Instructions

On **Form 2a,** mark the station jack assignments for the remaining analog multiline telephones:

1. In the "Jack Type" column, make sure there is an "A" checked next to the logical ID for each analog station jack.

2. In the "Person, Location, or Function" column, identify each analog multiline telephone by person, location, or function.

Jacks for Tip/Ring Equipment and Applications

Use these instructions only if the system includes 012 or 008 OPT modules.

Assign the basic telephone jacks on the 012 or 008 OPT modules to any tip/ring equipment such as single-line telephones, fax machines, or answering machines. Tip/ring equipment connects directly to an outside trunk and works on a single pair of wires. When connected to a 008 OPT module, the tip/ring equipment can be located off premises.

See System Reference *for more information on applications.*

Several optional applications, if used with the system, require a basic jack on a 012 module: MERLIN MAIL Voice Messaging System, MERLIN Attendant, AUDIX Voice Power—lS II, and Integrated Voice Power Automated Attendant—IS II.

Up to four applications can be connected to the system using the same 012 module. If there are four applications, the module must be used exclusively for this equipment. If you have fewer than four applications connected to a 012 module, some tip/ring devices can also be connected. If possible, the module should be used only for the application equipment.

Note: The applications discussed here do not work properly with 012 modules manufactured for older MERLIN® II systems. These applications must be connected to 012 modules with the code 517C13 or 517D13 on the label on the top of the module. Modules with the code 517A13 or 517B13 can be used to connect only single-line telephones and do not provide the disconnect signal required by answering machines and applications.

Planning Form Instructions

On **Form 2a,** mark the station jack assignments on the 012 and 008 OPT modules:

1. In the "Jack Type" column, make sure there is a "B" checked next to the logical ID for each basic telephone jack.
2. In the "Person, Location, or Function" column, identify each tip/ring device by person or location and by type, such as single-line telephone, fax, or answering machine.
3. If the system includes optional applications, indicate the type of application in the "Person, Location, or Function" column:
   - Write "Mail" to idicate MERLIN MAIL Voice Messaging System.
   - Write "MERLIN A" to indicate MERLIN Attendant.
   - Write "AVP" to indicate AUDIX Voice Power-IS II.
   - Write "IVP-AA" to indicate Integrated Voice Power Automated Attendant-IS II.

System Renumbering

Use these instructions to decide whether to keep the factory-set extension numbers or change them to numbers tailored to your company—for example, extension numbers that match room numbers.

The system offers three numbering plans, as shown on Form 2a, System Numbering — Station Jacks. Each plan allows you to renumber all or selected extensions:

- **Two-Digit-** designed for systems with fewer than 50 stations at businesses that do not anticipate growth to more than 50 stations in the next one or two years. The two-digit numbering plan is the factory setting.
- Three-Digit- designed for businesses with more than 50 stations.
- Set Up Space- designed for businesses that want to customize numbering and assign 1- to 4-digit extensions that are more convenient for users. As an example, hotels and motels may want to renumber extensions to match room numbers and to renumber services numbers (such as Housekeeping or Room Service) to 1-digit extension numbers.

When you reassign extension numbers, keep the following in mind:

- Extension numbers can contain the digits O through 9 in any combination, except that no extension number can begin with O. (The O is a fixed dial code representing the primary operator.)
- Extension numbers can contain one to four digits and must be unique. If you assign an extension number with one or two digits, you cannot use those digits as the leading digits for a longer extension number. For example, if you assign extension numbers 1, 2, 30, and 40, you cannot use those numbers as the first number in longer extension numbers such as 10, 200, 302, or 4052.
- The system-assigned numbers in the shaded areas of the figures on the following pages are automatically reserved. To use any of these numbers for a different station, you must assign a new extension to the station that already has the number you need to use.
- When you reassign an extension number, the extension number vacated is free for you to use.

Select the numbering plan that fits your needs and use the appropriate plan-specific instructions that follow to mark Forms 2a and 2b with your extension number assignments

Two-Digit Numbering Plan

The extension numbers you assign according to the factory-set two-digit numbering plan are shown in Figure 2-3. The numbers in the figure are arranged in blocks according to the first digit, The type of equipment or feature to which they are assigned is shown in the block.

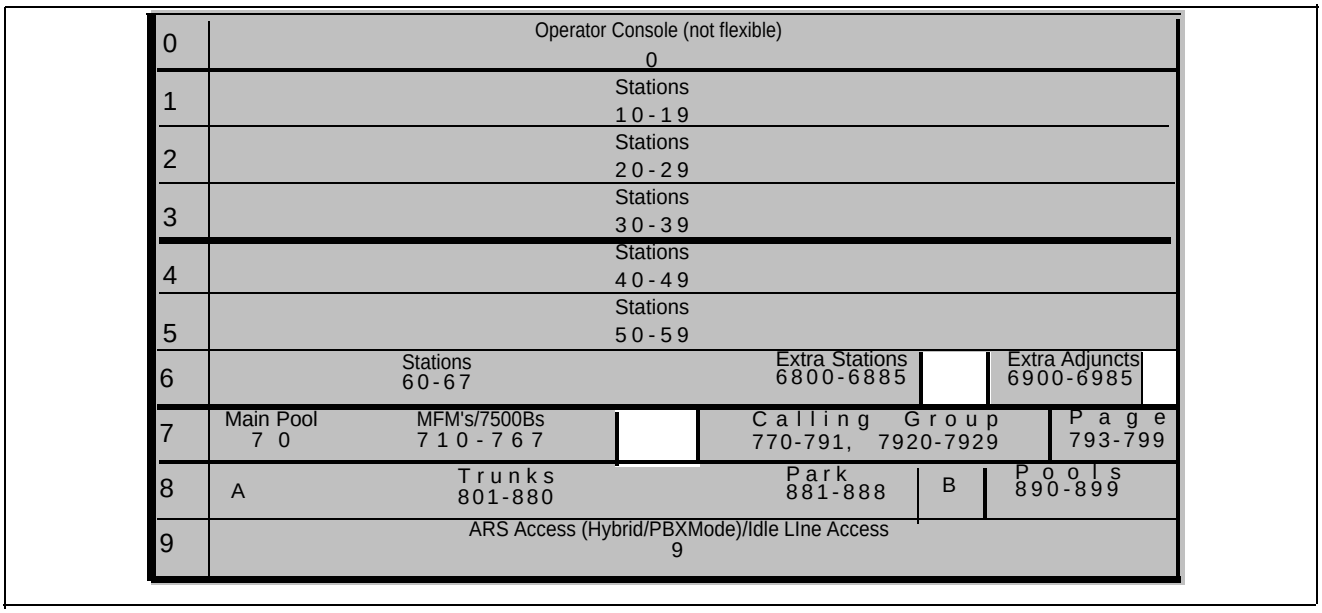

Figure 2-3 Two-Digit Numbering Plan

A = 800-Listed Directory Number (QCC Queue)
B = 889—Remote Access

Each of the first 58 station jacks is assigned a 2-digit extension number beginning with extension 10 and ending with extension number 67. The rest of the stations (68–144) are assigned 4-digit extension numbers 6800-6885. Extra adjuncts are assigned as extensions 6900–6985.

The extension numbers shown for MFMs/7500Bs (710–767) are reserved for station adjuncts connected to an MLX telephone such as a data terminal connected through an ISDN 7500B Data Module or an answering machine connected using an MFM. The extension numbers are reserved whether or not an adjunct is connected to the telephone.

For the first 58 digital station jacks, the actual extension number assigned to the adjunct is the extension number assigned to the MLX telephone preceded by a 7. For example, if the extension number assigned for an MLX telephone is 25, the extension number assigned for the adjunct on that telephone is 725. In this example, a call can be placed to the telephone by dialing extension 25 or to the adjunct by dialing extension 725. If you reassign the extension number of the telephone, the system does not automatically change the extension number of the MFM or data module.

See the CMS documentation for more information on reassigning numbers for CMS agent splits.

Note: If your system includes the Call Management System (CMS), it assigns extension numbers to agent splits.

The unshaded areas of the two-digit numbering plan in Figure 2-3 indicate the extension numbers available for reassignment. This means you can change selected extension numbers to one of the available numbers, for example, extensions 6886 through 6899. If the available numbers shown do not meet your needs, consider the three-digit numbering plan.

Planning Form Instructions

Use Figure 2-3 as you record extension number information.

1. If the system includes digital station adjuncts:
   - Locate **PBX System Form 2b, System Numbering - Digital/ISDN Adjuncts.**
   - Write the 3-digit adjunct extension number-the extension number from **Form 2a** with a 7 preceeding it-in the "Factory-Set Extension No." column of **Form 2b.**
2. If you do not need to renumber any of the factory-set extension numbers:
   - Check the "2-Digit" box under the "Renumber System" heading on **Form 2a.**
   - Go to the "Form and Floor Plan Update" instruction later in this chapter.
3. If you want to renumber only a few of the extension, and enough numbers are available:
   - Check the "2-Digit" and "Selected Extension Number" boxes under the "Renumber System" heading on **Form 2a.**
   - Write the new extension number(s) in the "Renumber To" column on **Form 2a** and **Form 2b.**
   - Go to the "Form and Floor Plan Update" instructions later in this chapter.

Three-Digit Numbering Plan

Figure 2-4 shows the numbers automatically assigned by the system when you renumber with the three-digit numbering plan. The numbers in the figure are arranged in blocks according to the first digit. The type of equipment or feature to which they are assigned is shown in the block.

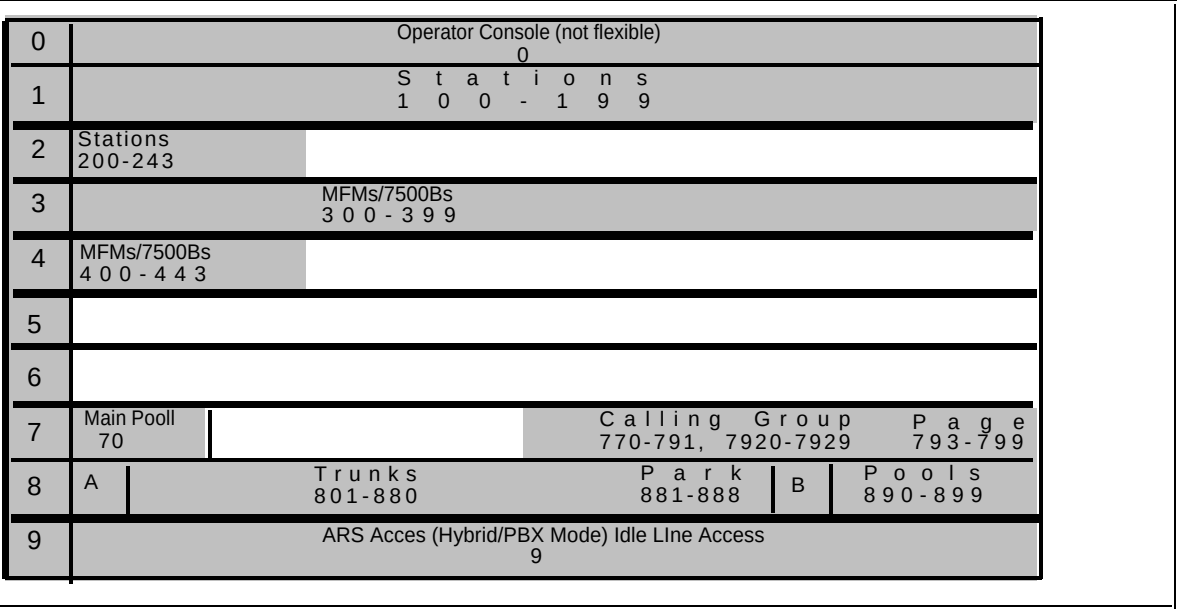

Figure 2-4 Three-Digit Numbering Plan

A = 800—Listed Directory Number (QCC Queue)
B = 889—Remote Access

All stations are assigned a 3-digit extension number beginning with extension 100 and ending with extension 243.

The extension numbers shown for MFMs/7500Bs (300-443) are resewed for station adjuncts connected to an MLX telephone, such as a data terminal connected through an ISDN 7500B Data Module or an answering machine connected using an MFM. The extension numbers are reserved whether or not an adjunct is connected to the telephone.

The actual extension number assigned to the adjunct is the extension number assigned to the MLX telephone increased by 200. For example, if the extension number assigned to an MLX telephone is 125, the extension number assigned to the adjunct on that telephone is 325. In this example, a call can be placed to the telephone by dialing extension 125 or to the adjunct by dialing extension 325. If you reassign the extension number of the telephone, the system does not automatically change the extension number of the MFM or data module.

See the CMS documentation for more information on reassigning numbers for CMS agent splits.

Note: If your system includes the Call Management System (CMS), it assigns extension numbers to agent splits.

The unshaded areas of the three-digit numbering plan in Figure 2-4 indicate the extension numbers available for reassignment. This means you can change the extension number automatically assigned by the system to one of the available numbers, for example, extension number 244 through 299. If the available numbers shown are not adequate to meet your needs, consider the set up space numbering plan.

Planning Form Instructions

Use Figure 2-4 as you record extension number information.

1. If the system includes digital station adjunct:
   - Locate **PBX System Form 2b, System Numbering - Digital/ISDN Station Adjuncts.**
   - Write the 3-digit extension number - the extension number from **Form 2a** increase by 200 (within the range of 300-443) - in the "Factory-Set Extension No." column of **Form 2b.**
2. If you do not need to renumber any of the factory-set extension numbers:
   - Check the "3-Digit" box under the "Renumber System" heading on **Form 2a.**
   - Go to the "Form and Floor Plan Update" instructions later in this chapter.
3. If you want to renumber only a few of the 3-digit extensions and enough numbers are available in the three-digit numbering plan.
   - Check the "3-Digit" and "Selected Extension Numbers" boxes under the "Renumber System" heading on **Form 2a.**
   - Write the new extension number(s) in the "Renumber To" column on both **Form 2a** and **Form 2b.**
   - Go to the "Form and Floor Plan Update" instructions later in this chapter.

Set Up Space Numbering Plan

Figure 2-5 shows the numbers automatically assigned when the system is renumbered using the set up space numbering plan. The numbers in the figure are arranged according to the first digit. The type of equipment or feature to which they are assigned is shown in the block.

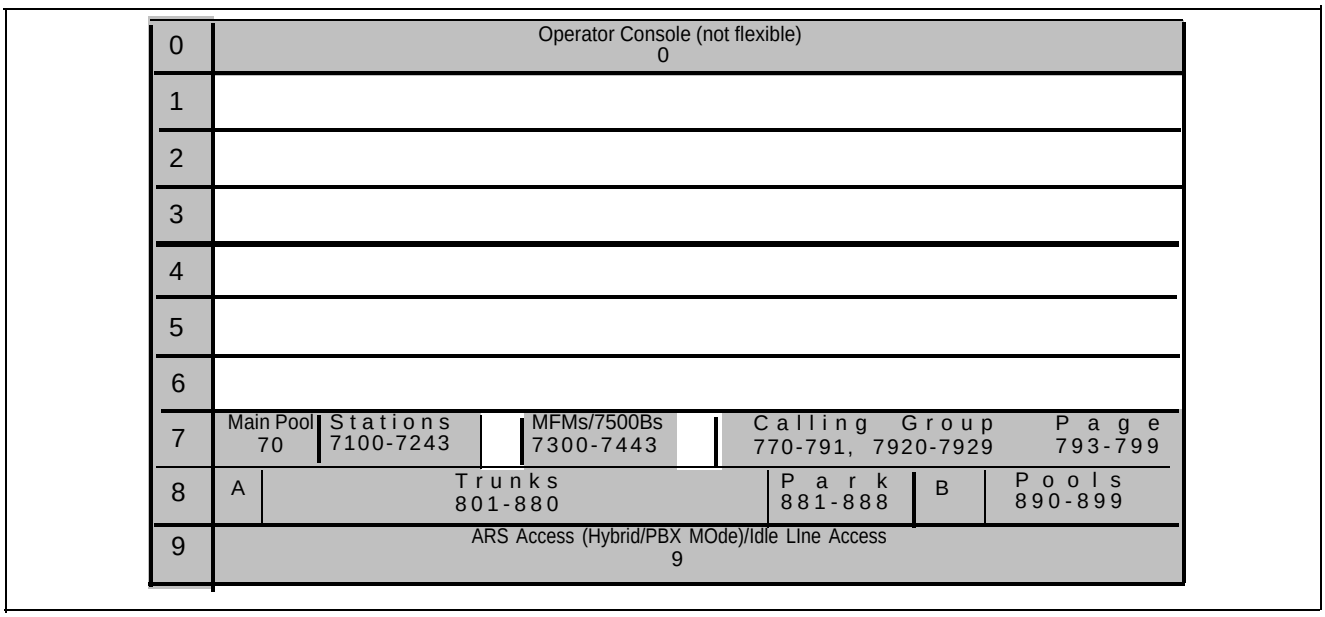

Figure 2-5 Set Up Space Numbering Plan

A = 800—-Listed Directory Number (QCC Queue)
B = 889--Remote Access

As shown in Figure 2-5, the system assigns extension numbers in the 7100 to 7243 range to stations. This makes numbers beginning with 1 through 6 available for use in reassigning extension numbers. These new extensions can be from one to four digits long. The unshaded areas of the setup space numbering plan in Figure 2-5 indicate the extension numbers available for reassignment.

The extension numbers shown for MFMs/7500Bs (7300-7443) are reserved for station adjuncts connected to an MLX telephone, such as a data terminal connected through an ISDN 7500B Data Module or an answering machine connected using an MFM. The extension numbers are reserved whether or not an adjunct is connected to the telephone.

The actual extension number assigned to the adjunct is the extension number assigned to the MLX telephone increased by 200. For example, if the extension number assigned to an MLX telephone is 7125, the extension number assigned to the adjunct on that telephone is 7325. In this example, a call can be placed to the telephone by dialing extension 7125 or to the adjunct by dialing extension 7325. If you reassign the extension number of the telephone, the system does not automatically change the extension number of the MFM or data module.

See the CMS documentation for more information on reassigning numbers for CMS on agent splits.

Note: If your system includes the Call Management System (CMS), it assigns extension numbers to agent splits.

Planning Form Instructions

Use Figure 2-5 as you record extension number information.

1. If the system includes digital station adjuncts:
   - Locate **PBX System Form 2b, System Numbering - Digital/ISDN Station Adjuncts.**
   - Write the 4-digit extension number - the extension number from **Form 2a** increased by 200 (within the range 7300-7443) - in the "Factory-Set" Extension No." column of **Form 2b.**
2. Under the "Renumber System" heading of **Form 2a:**
   - Check "Set Up Space."
   - Write the new extension number(s) in the "Renumber To" column on both **Form 2a** and **Form 2b.**

Form and Floor Plan Update

Make sure that your system numbering plan decisions are recorded on all the appropriate forms.

Planning Form Instructions

On the **Floor Plan,** add the extension numbeers underneath the description of the telephones and adjuncts.

On the **PBX System Form 1, System Planning,** in the "System Operating Conditions" section: if you are using a system programming console, add the new extension number of the console in the space next to the "Ext. No."

Trunks

3

Planning for trunks consists of deciding how to connect outside trunks to the system, selecting options for how those trunks will work, and assigning trunks to user stations.

Trunk Connections

Plan trunk connections by identifying trunk jack types and matching outside trunks and auxiliary equipment to the jack types that support them.

Use the "Control Unit Diagram" on PBX System Form 1 and the local telephone company trunk information list as you record connections on PBX System Form 2c, System Numbering — Trunk Jacks.

Trunk Jack Types

The trunk jack type is determined by the type of module. The following table shows the trunk jack types, the module types that contain them, and the outside trunk or equipment they support.

Table 3-1 Trunk Jack Types

		Used to Connect	
Trunk Jack Type	**Module Type**	**Trunk Type**	**Equipment**
Loop-start (LS)	400 800 408	■ Basic ■ Special purpose —FX, WATS	Music-on-Hold Loudspeaker paging systems Maintenance Alarm
Ground-start/Loop-start (GS/LS)	400 GS/LS/TTR 800 GS/LS 408 GS/LS	■ Basic ■ Special purpose —FX, WATS	Music-on-Hold Loudspeaker paging systems Maintenance Alarm
DID	800 DID	DID	
Tie	400EM	Tie	
DS1	100D	T1 ISDN-PRI	

If the system has 100D (DS1) modules, keep in mind that 24 logical IDs and associated trunk numbers are assigned to each module.

See *"DSI Facility (1OOD Module)" in this chapter for information on ISDN-PRI services.*

When the system is first set up, it automatically assigns the T1 type to the facility connected on a 100D module. This means you can dedicate the channels for use as T1 -type facility trunks and use the channels to emulate any combination of loop-start, ground-start, and/or tie trunks. If this is the case, your local telephone company supplies the telephone numbers associated with each of the channels on the DS1 facility.

You can also connect certain digital services such as Megacom® 800 to the TI -type facility or change the module's service type to ISDN Primary Rate Interface (ISDN-PRI) to allow connection of services such as Accunet® Switched Digital Service.

Note: You cannot mix T1 and ISDN-PRI types of service on the same 100D module.

Planning Form Instructions

Review the modules marked on the "Control Unit Diagram" on **Form 1.**

On **PBX System Form 2c, System Numbering - Trunk Jacks:**

1. Write the type of each trunk jack in the control unit in the "Jack Type" column. Use the codes shown in Table 3-2.

For systems that include the 100D module:

2. If the module is used only to emulate trunks:

- Fill in the jack-type codes for those trunks (T1-GS, T1-LS or T1-Tie).
- Write only "T1" in the "Jack Type" column for any of the channels not used at this time.

3. If the module is used to connect services:

- Write "T1-Tie" in the "Jack Type" column for those T1-type module channels where the services are assigned.
- Write "PRI" in the "Jack Type" column for all 24 logical IDs of ISDN-PRI-type modules.

TabIe 3-2 Coding Trunk Type

Jack Type Code	Trunk Type
LS	Loop-Start
GS/LS	Ground-Start/Loop-Start
DID	DID
Tie	Tie
T1-GS	DS1 facility used to emulate GS
T1 -LS	DS1 facility used to emulate LS
T1 -Tie	DS1 facility used to emulate tie or for digital service
PRI	DS1 facility used for lSDN-PRI service

Jacks for Outside Trunks

Identify the specific outside trunks you want to connect to each loop-start and ground-start/loop-start trunk jack. Connect outside trunks to a continuous sequence of trunk jacks on the control unit, beginning with the first trunk jack (logical ID 1). Use trunk jacks at the beginning of the sequence for basic ground-start and/or basic loop-start trunks. Use jacks later in the sequence for special-purpose trunks such as WATS or FX (foreign exchange).

Group trunks together according to type: basic loop-start trunks, basic ground-start trunks, special-purpose loop-start or ground-start trunks. DID, PRI, T1, and tie trunks are automatically grouped according to type since they require specific types of modules. Your local telephone company supplies the information you need to identify the specific trunks connected to each trunk jack on each DID and tie-trunk module and each channel on each 100D module.

Planning Form instructions

On **Form 2c:**

1. In the "Trunk Type" columns, write the type of trunk you plan to connect to each trunk jack or T1 channel - basic, FX, WATS (include band), DID, tie. (Refer to the local telephone company trunk information list.)

- If a trunk such as WATS is only inbound or outbound (not two-way), include that information along with the trunk type.
- If the jack type shown in the "Jack Type" column is GS/LS, next to the trunk type (basic, FX, WATS), write either "GS" or "LS" to indicate the trunk type. For a T1 trunk not used at this time, write "unequipped."

Note: For other T1 or PRI trunks, the kind of service connected (such as Megacom 800) will be completed later.

2. In the "Telephone Number or Equipment" column, write the telephone number for each outside trunk on the line with the logical ID for its trunk jack. If you don't yet know the telephone number, leave the column blank and enter the information later.

Note: Be sure the trunk type associated with each telephone number matches the jack type.

An example of a partially completed Form 2c is shown in Figure 3-1. The remaining entries (Rotary Dial, etc.) are covered in the 'Trunk Options' instructions later in this chapter.

PBX System Form 2c

System Numbering — Trunk Jacks

Music-on-Hold, Logical ID _____ Source _____ **Maintenance Alarm,** Logical ID_____

Loudspeaker Page, Logical ID _____ _____ _____ **Loop-Start Reliable Disconnect** ☐ No ✦ ☐ Yes

Logical ID	Jack Type (LS,GS, DID,Tie, DS1)	Trunk Number	Trunk Type (Basic LS, Basic GS, WATS,FX,etc.)	Telephone Number or Equipment	Outmode Rotary Dial		Toll Prefix Not Needed for LD		Short Hold Disconnect Interval		QCC Operator to Recieve Calls (No✦)	QCC Queue Priority Level (4✦)
					Yes	No✦	Yes	No✦	Yes	No✦		
1	GS	801	Basic GS	555-1200								
2	GS	802	Basic GS	555-1201								
3	GS	803	Basic GS	555-1202								
4	GS	804	Basic GS	555-1203								
5	GS	805	Basic GS	555-1204								
6	GS	806	Basic GS	555-1205								
7	GS	807	Basic GS	555-1206								
8	GS	808	Basic GS	555-1207								
9	GS	809	Basic GS	555-1208								
10	GS	810	Basic GS	555-1209								
11	GS	811	WATS-OUT	555-6789								
12	GS	812	WATS-OUT	555-6790								
13	GS	813	WATS-OUT	555-6791								
14	GS	814	WATS-IN	1-800-555-6759								
15	GS	815	WATS-IN	1-800-555-6760								
		816										
		817										

Figure 3-1 Partially Completed Form 2c, System Numbering — Trunk Jacks

Jacks for Auxiliary Equipment

Use these instructions only if the system has auxiliary equipment such as Music-on-Hold.

Auxiliary equipment can be connected only on loop-start (LS) or ground-start/ loop-start (GS/LS) jack types. You cannot use a trunk jack on an 800 DID, 100D, or 400EM module for auxiliary equipment.

If you plan to use Music-on-Hold, designate a trunk jack for the music source such as a radio, tape player, stereo system, or Magic on Hold equipment.

If the system includes loudspeaker paging, designate one or more trunk jacks for the paging equipment. A maximum of three trunk jacks can be designated for paging systems.

If you plan to use the Maintenance Alarm feature (an audible alert for system maintenance problems requiring immediate action), designate a trunk jack for the external alert.

To make it easier to add outside trunks in the future, use the last trunk jack(s) on the right-most module with either LS or GS/LS trunk jacks to connect auxiliary equipment.

Planning Form Instructions

Use the **Floor Plan and AT&T Equipment List** to verify the auxiliary equipment to be connected.

At the top of **Form 2c,** fill in the logical IDs for each type of auxiliary equipment planned.

1. Next to "Music-on-Hold," write the logical ID of the trunk jack for this equipment. Include the music source (tape, radio, etc.) on the line provided.
2. Next the "Loudspeaker Page,: write the logical ID(s) of the trunk jack(s) for the paging equipment (maximum of 3).
3. Next to "Maintenance Alarm," write the logical ID of the trunk jack for the Maintenance Alarm external alert.

Note: If you use equipment that rebroadcasts music or other copyrighted materials, you may be required to obtain a copyright license from, and pay license fees to, a third party such as the American Society of Composers, Artists, and Producers (ASCAP) or Broadcast Music Incorporated (BMI). Or, you can purchase a Magic on Hold system, which does not require you to obtain such a license, from AT&T or your authorized dealer.

Trunk Options

Choose from the following options for the outside trunks connected to the system and record your decisions on PBX System Form 2c, System Numbering— Trunk Jacks:

- Loop-Start Disconnect Reliability
- Rotary Dial Trunks
- Toll Prefix Dialing Requirements (Toll Type)
- Hold Disconnect
- QCC Operator Receiving Calls
- QCC Queue Priority

If the system includes any or all of the following additional trunk options, mark the Outside Trunks forms (3a, 3b, 3c, 3d, and 3e):

- Remote Access
- Pools
- DS1 Facility
- Tie Trunks
- DID trunks

Loop-Start Disconnect Reliability

The disconnect signal is sent by the telephone company to the system when an outside caller hangs up. Disconnect signals on incoming calls on loop-start trunks are classified as either reliable or unreliable. If reliable, on every call a disconnect signal is sent to the system by the local telephone company shortly after a caller hangs up. If unreliable, a disconnect signal is not sent by the local telephone company on every call.

Since the disconnect signal on most loop-start trunks is unreliable, the factory setting for the disconnect signal is "unreliable."

Specifying that the disconnect signal for loop-start trunks is reliable allows some features to function better-for example, Remote Call Forward, remote call transfers, and voice messaging systems such as MERLIN MAIL Voice Messaging System.

See "Hold Disconnect" later in this section.

Note: If the local telephone company uses a short Hold Disconnect interval, do not specify a reliable disconnect signal.

Before you change the setting to reliable, check with your telephone company to determine whether the disconnect signals for the loop-start trunks are reliable and to obtain the length of the Hold Disconnect interval.

Planning Form Instructions

At the top of **Form 2c,** under the "Loop-Start Reliable Disconnect" heading choose one of the following:

- Check "No" if the loop-start trunks have an unreliable disconnect signal.
- Check "Yes" if loop-start trunks have a reliable disconnect signal.

Rotary Dial Trunks

The system is factory set to generate touch-tone signals when users dial outside calls. Identify any rotary dial trunks that are connected to the system so that rotary dial signals can be used for these trunks.

Note: Touch-tone, single-line telephone users cannot make calls using rotary dial trunks.

Check with your local or long-distance telephone company to determine which, if any, trunks connected to the system are rotary dial trunks.

Planning Form Instructions

In the "Outmode Rotary Dial" column on **Form 2c,** check "Yes" to show rotary dial trunks or "No" to show touch-tone.

Toll Prefix Dialing Requirements (Toll Type)

Toll Type allows the system to classify calls as either local or toll, based on the number dialed by the user. Normally, people have to dial a toll prefix (1 or O) before dialing the area code and telephone number for atoll call. In some areas this is not necessary; dialing a prefix depends on local telephone company requirements and the type of trunk used.

Find out from your local telephone company which trunks require a toll prefix. This information is used by the system when a toll call is placed by a telephone or data terminal on ground-start or loop-start trunks.

Note: The Toll Type feature does not apply to tie trunks.

Planning Form Instructions

In the "Toll Prefix Not Needed for LD" column on **Form 2c,** check "Yes" next to any trunks on which people do not need to dial a prefix when placing toll calls.

Hold Disconnect

Hold Disconnect allows you to set the number of milliseconds (ins) before the trunk is released when a caller on hold hangs up and abandons the call. Local telephone companies use either a long (450 ms) or short (50 ms) interval. The factory setting for the system is the long interval since it is the interval used by most telephone companies.

Check with your local telephone company for the disconnect interval used.

If your local telephone company uses the short interval, you must change the factory setting. If you don't change the setting, when a caller waiting on hold hangs up, the trunk is not released.

Planning Form Instructions

In the "Short Hold Disconnect Interval" column on **Form 2c,** check "Yes" next to any trunks that you want to change from the long (450 ms) interval to the short (50 ms) interval.

Note: Be sure you have checked "No" for "Loop-Start Reliable Disconnect" if your local telephone company uses a short Hold Disconnect interval.

See "Loop-Start Disconnect Reliability" in this chapter.

QCC Operator Receiving Calls

Use these instructions only if the system has one or more QCCs.

Assigning the QCC operator to receive calls on each trunk determines, first, if incoming calls on each trunk ring into the QCC queue and, second, which QCC operator position answers the calls.

The factory setting for all trunks is that no QCC operator is assigned to receive calls. This means that the trunk does not ring into the QCC queue.

See "Tie Trunks" in this chapter for information on automatic-in tie trunks.

Decide if the QCC operator should receive calls for each ground-start, loop-start, and automatic-in tie trunk connected to the system:

- If you do not want the calls on a particular trunk to ring into the QCC queue, do not assign a QCC operator to receive the calls. This is appropriate for calls on trunks used as personal lines, those that are dedicated to incoming calls for calling groups, and those that are assigned to direct-line consoles (DLCs).
- If you want calls on a particular trunk to ring into the QCC queue, decide which operator position should receive the calls. You can specify that calls on each trunk be directed to one or more QCC operator positions or to all operator positions. This is useful when you want operators to handle only specific call types. For example, you might want one operator to handle all incoming customer calls and another to handle calls from sources, such as suppliers or other branches of your business.

See "Position Busy Backup" in the "Queued Call Console" section of Chapter 4.

Note: If an operator presses the Backup On button on the console, any incoming calls are directed to other operator positions (regardless of whether they normally receive such calls) or to the programmed backup extension number.

Planning Form Instructions

In the "QCC Operator to Receive Calls" column, on **Form 2c:**

Write the QCC operator position(s) to receive calls for each ground-start, loop-start, and automatic-in tie trunk.

- If you do not want the calls received on the trunk ring into the QCC queue, write "None."
- If you want all QCC operators to receive incoming calls on a trunk, write "all."
- If you want to specify one or more QCC operators to receive incoming calls on a trunk, write any combination of the extension numbers for up to four operator positions.

QCC Queue Priority

Use these instructions only if you assigned one or more trunks to ring into the QCC queue.

The QCC queue priority determines the order in which calls on each trunk are sent to QCC operator positions.

Decide the QCC queue priority for each ground-start, loop-start, and/or automatic-in tie trunk ringing into the QCC queue. You can assign a value of 1 to 7. A value of 1 is the highest priority of calls and 7 is the lowest. The factory-set priority for calls received on all trunks programmed to ring in the queue is 4.

Change the values according to the order you want calls answered. For example, if important customer calls come in on a particular trunk, assign a priority value of 1 so that the calls are answered before any other call types. Assign values of 2 through 7 on trunks used for less important calls such as calls from equipment suppliers or from other locations of your business.

Note: Since incoming calls on DID and non-automatic dial-in tie trunks route to specific extension numbers, you cannot assign a QCC queue priority for these types of trunks.

Planning Form Instructions

On **Form 2c:**

1. Locate each trunk with "all" or extension numbers in the "QCC Operator to Receive Calls" column.
2. Write the priority level (1-7) for each trunk used for incoming calls in the "QCC Queue Priority Level" column.

Remote Access

Use these instructions only if remote users need access to the system.

Remote Access allows people to use the system from a remote location. A person working away from the office can call into the system on one of the trunks programmed for remote access. The system answers the call, and the user can then do the following:

- dial extension numbers directly without going through the system operator. This means that a remote employee can call internal telephones, data terminals, or calling groups just as if the call were being placed from an internal telephone.
- select a trunk pool, Automatic Route Selection, or special-purpose trunk, such as WATS or FX, to make outgoing calls. If the trunk is busy, you can specify that the remote caller is eligible for Automatic Callback. This means the caller can remain on the call and not have to keep calling back to get an outgoing trunk.

  Note: Calls made via Remote Access to locations outside the system may vary in transmission quality.
- activate, change, or cancel the Call Forward telephone or extension number programmed on a telephone.

Remote Access also allows remote system programming and maintenance by AT&T or your authorized dealer.

To have Remote Access, the control unit must contain one or more 400, 400 GS/LS/TTR, 008 OPT, 800 DID, or 012 modules. These modules have touch-tone receivers, which are required to make the Remote Access feature work. Check the Control Unit Diagram on Form 1 to verify that one of these types of modules is present before you begin planning Remote Access.

Note: The trunks assigned Remote Access do not have to be connected to the module with the touch-tone receiver.

It is recommended, but not required, that Remote Access trunks appear on line buttons on an operator console. This allows the operator to manually disconnect a tail in case an incoming call on that trunk does not disconnect properly.

You can provide security for the system by requiring that people using Remote Access dial a password or barrier code to call into the system. When barrier codes are required, the caller dials a 4-digit number after the Remote Access special dial tone. After dialing the barrier code, the caller hears the system dial tone.

⚠ CAUTION

Under applicable tariffs, the customer is responsible for any charges incurred through the remote use of system facilities. Precautions should be taken to prevent unauthorized use of the system's outside lines by remote callers, also called toll fraud. See "Customer Support Information" at the front of this book for more information on security.

You must decide which trunks you want to be used for either Dedicated or Shared Remote Access:

- When you assign Dedicated Remote Access to a trunk, all calls coming in on that trunk receive the Remote Access treatment. This means that the caller hears the system dial tone if no barrier codes are setup for the trunk, or a special dial tone if you specify that a barrier code is needed.
- When you assign Shared Remote Access, calls coming in on that trunk receive the Remote Access treatment only when the system is in Night Service (see Chapter 4).

You can assign Remote Access to any outside trunk connected to the system except DID and dial-in tie trunks. For DID and dial-in tie trunks, Remote Access is achieved by dialing the factory-set Remote Access code, 889.

Note: If you want to allow Remote Access on DID trunks, one of the telephone numbers assigned by the telephone company must match the Remote Access code, 889.

You may want to begin by assigning Remote Access to only a few trunks and increasing the number later if more are needed. Keep in mind that Remote Access should not be assigned to trunks and tie trunks that are used for incoming customer calls.

See "System Numbering" in Chapter 2. Review the numbers available in the numbering plan you have selected.

Once you have decided which trunks are to be used for Remote Access, decide whether you want to change the factory-set access number from 889 for DID and dial-in tie trunks.

Planning Form Instructions

Mark **PBX System Form 3a, Outside Trunks - Remote Access**

1. To change the factory-set access code:
   - Write the new number in the "Renumber To" space.
   - Locate **PBX System Form 2d, System Numbering - Special Renumbers** and write the new number in the "Renumber To" column of the "Remote Access Code" section of that form.
2. Under the heading "Automatic Callback" at the top of **Form 3a:**
   - Check "Disable" if you do not want remote callers to use this feature.
   - Check "Enable" to allow this feature to remote callers.
3. Under the heading "Barrier Codes for DID and Tie Trunks":
   - Check "Yes" if you plan to assign barrier codes to these trunks.
   - Check "No" if no barrier codes are planned.
4. For "Barrier Codes for Non-Tie Trunks":
   - Check "Yes" if you plan to assign barrier codes.
   - Check "No" if no barrier codes are planned.

Planning Form Instructions - Continued

For all trunks to which you are assigning Remote Access:

5. Transfer the information from **PBX System Form 2c, System Numbering - Trunk Jacks to Form 3a.**
   - Write the logical ID and trunk number in the applicable column.
   - Check either the "DID or Tie Trunk" or "Non-Tie Trunk" column.
   - Complete the "Trunk Type and Description" column. Include the different bands (calling areas) or WATS trunks and different destinations for FX trunks.
6. Check the "Shared" column (to indicate shared access) **or** the "Dedicated" column (to indicate dedicated access) for the trunks.

Class of Restriction

The class of restriction is assigned to all trunks with Remote Access. If barrier codes are planned, you must also assign the class of restriction for each code.

Make the following decisions regarding class of restriction:

- Restriction. The setting determines whether users can make local and/or toll calls (the factory setting is for inside calls only). You can change the setting to unrestricted (the user can make local and toll outside calls) or restricted (the user can make only local outside calls).
- Automatic Route Selection (ARS) Restriction Level. If the system has ARS, you can restrict the use of outgoing trunks by selected users by assigning a restriction level that is less than the Facility Restriction Level assigned to the route.

See Chapter 4 for information on Allowed and Disallowed Lists.

- Allowed List Asslgnment When users are restricted from making local and/or toll calls, you can assign up to eight Allowed Lists that allow restricted users to call specific numbers (local or toll).
- Disallowed List Assignment When users are not restricted from making calls, you can assign a Disallowed List that prevents them from dialing specific numbers on the list.

Barrier Codes

To help safeguard against unauthorized system access, the system can be programmed to require that remote users enter a barrier code before gaining access to the system. AT&T strongly recommends the use of barrier codes.

CAUTION

Under applicable tariffs, the customer is responsible for any charges incurred through the remote use of system facilities. Precautions should be taken to prevent unauthorized use of the system's outside lines by remote callers, also called toll fraud. See 'Customer Support Information" at the front of this book for more information on security.

Barrier codes can be used for either DID and tie trunks or non-tie trunks. A maximum of 16 barrier codes is allowed, each with a different class of restriction. The class of restriction allows or denies the use of system features to individuals or groups of users.

Planning Form Instructions

Record class of restriction on Form 3a. Use page 3 for class of restriction without barrier codes and page 4 for class of restriction with barrier codes.

Note: Page 4 of Form 3a holds programming information for four barrier codes. Duplicate the form if more barrier codes are planned.

Page 3 of **Form 3a** has two sections: "DID or Tie Trunks" and "Non-Tie Trunks". For each section:

1. Check "Outward Restrict" to keep the factory setting.
2. Check either "Unrestricted" or "Toll Restrict" to change from outward restricted.

   Under the "Allowed List Access" and "Disallowed List Access" headings:

3. Check the boxes if you plan to assign these lists.

   Note: The ARS Restriction Level and Allowed and Disallowed List numbers will be filled in later.

On **page 4** of **Form 3a,** for each barrier code:

4. Write the barrier code number in the space provided. Start with 1 and number sequentially.
5. Write the 4-digit barrier code in the "Digits" space. To keep the code private, leave the space blank.
6. Repeat Steps 1 through 3 listed under the page 3 instructions.

Pools

Pools allow you to group the outside trunks so that users can select trunks by a System Access button on the telephone instead of having a separate button for each trunk in the system.

The system can have up to 11 pools with factory-set pool dial-out codes of 70 and 890-899. When the system is set up, the following pool assignments are made automatically:

- All loop-start (basic and special-purpose) trunks are assigned to the main pool. The factory-set extension number, or pool dial-out code, is 70.
- All dial-in tie trunks are assigned to the pool with the pool dial-out code number 891.
- All automatic-in tie trunks are assigned to the pool with the pool dial-out code 892.

See "Tie Trunks' in this chapter for information on dial-in and automatic-in tie-trunk types.

The factory setting for type of trunk connected to a 400 GS/LS/TTR, 800 GS/LS, or 408 GS/LS module is loop-start. For this reason, the system does not automatically assign ground-start trunks to pools, nor does the system automatically make pool assignments for loop-start, ground-start, or tie trunks that are emulated using a T1 facility. If you want any of these types grouped in a pool, you must manually assign each trunk to the pool of your choice.

Each pool can have as many or as few trunks as you want, but a trunk can be in only one pool. In addition, only direct-line consoles can have line buttons for trunks that have been assigned to pools.

Each pool should contain trunks of the same type (basic, WATS, FX, tie) because you cannot control which trunk is selected. Ground-start and loop-start trunks of the same type can be mixed in the same pool. For example, basic trunks (loop-start and ground-start) should be grouped together in one trunk pool, WATS trunks (loop-start and ground-start) in another pool, and FX trunks (loop-start and ground-start) in yet another pool.

Do not mix different bands of WATS or FX trunks to different cities or include both inbound-only or outbound-only trunks within a pool. DID trunks and/or trunks used for auxiliary equipment cannot be grouped in pools. If you plan to assign Pool buttons on telephones, do not group dial-in tie trunks in pools.

In typical pooled systems, all the trunks (except those mentioned previously) are grouped in pools except single special-purpose trunks and any basic trunks that are needed as personal lines assigned to a button on a telephone.

Group the trunks for the main pool first. The main pool should contain the trunks used most often. In most businesses the trunks used most often are the basic trunks. If your system includes ground-start basic trunks, reassign them from the dial 890 extension pool to the main pool.

Once you decide which trunks are assigned to the main pool, decide how to arrange the rest of the trunks in the remaining pools.

See "System Numbering' in Chapter 2.

Decide whether to change the pool dial-out codes. The same considerations apply as those used for reassigning station extension numbers.

Planning Form Instructions

Review **PBX System Form 2c, System Numbering - Trunk Jacks,** determine which trunks to group into pools, and mark each pool on the **PBX System Form 3b, Outside Trunks - Pools.**

1. Write the factory-set pool dial-out code in the first column.
2. To change the factory-set pool dial-out code:
   - Write the new number in the "Renumber To" column.
   - Locate **PBX System Form 2d, System Numbering - Special Renumbers** and write the new number in the "Renumber To" column of the "Pools" section of that form.
3. Transfer the information about all the trunks you plan to group into pool, from **Form 2c** to **Form 3b:**
   - Write the logical ID, trunk number, and trunk type in the columns.
   - Use the "Description" column to identify different bands (calling areas) of WATS trunks and different destinations for FX trunks.

DS1 Facility (1OOD Module)

Use these instructions only if the system has a 100D module. Because of the complexity of DS1 facility planning, consult with your AT&T representative or authorized dealer as you work through these instructions.

A Digital Signal 1 (DS1) facility is a transmission system that transports digital signals in the DS1 format. The 100D module is the interface that allows the connection of DS1 facilities to the system. Through this module, voice and data calls can be placed on or received by a DS1 facility.

Note: The small processor module supports one 100D module; the large processor module supports up to three 100D modules.

Twenty-four Digital Signal O (DSO) channels, each operating at 64 kbps, plus framing bits, are multiplexed, forming a DS1 signal of 1.544 Mbps. Each DSO channel within the DS1 signal corresponds to a logical endpoint. Even though there is only one physical jack, the 100D module supports up to 24 logical endpoints (IDs) or ports (one for each channel).

In DS1 format, calls to other digital communications systems (digital PBXs) or central offices remain digital, and signals do not need to be converted to analog for acceptance by the connecting trunk.

To connect the 100D module to a DS1 facility, a channel service unit (CSU) is normally used to regulate the transmission into and out of the 100D module so that the module matches the transmission of the outside facility. The CSU is a hardware component needed when two endpoints are located in different buildings or when the distance between the two endpoints makes line repeaters necessary. Repeaters re-amplify incoming signals so that signal strength is not lost over long distances.

To ensure that both ends of the DS1 facility “speak the-same language,” the following options are set during programming:

- Type of Service
- Frame Format
- Line Code
- Line Compensation
- Clock Synchronization
- Signaling Mode

The appropriate setting for each option is determined by the transmission facility to which the module is connected. Each option is discussed below.

Type of Service

The system supports two types of service for DS1 facilities: T1 and Integrated Services Digital Network Primary Rate Interface (ISDN-PRI). T1 service (the factory setting) transmits and receives voice and analog data; ISDN-PRI transmits and receives voice and analog and digital data.

Table 3-3 shows the kinds of services available through a DS1 facility and specifies the type of service that supports them. Review the table with your AT&T representative or authorized dealer and decide the type of service for the 100D module(s).

Table 3-3 Services on the DS1 Facility

Service	Description	T1 *	ISDN-PRI
Megacom (Megacom WATS)	An outgoing, domestic long-distance service used in place of WATS service.	X	X
Megacom 800	An incoming, domestic toll-free number service for voice calls.	X	X
Megacom/Megacom 800	Adding Shared Access for Switched Service (SASS) allows Megacom and Megacom 800 service on the same trunks.	X	X
Megacom 800 with Dialed Number Identification Service (DNIS)	An incoming, domestic toll-free number service that provides voice information service on an interactive basis. Calls can be routed to separate departments or prerecorded messages can be played for different groups of callers.	X	
Multi Quest®	An incoming domestic 900 number service for voice and data calls.	X	X
MultiQuest with DNIS	An incoming 900 number service that provides callers with voice and data information service on an interactive basis.	X	

* Factory setting.

Table 3-3 Continued

Service	Description	T1 ♦	ISDN-PRI
Software Defined Network (SDN)	A virtual private networking service for voice and circuit-switched analog data calls (up to 56 kbps). SDN lets businesses use portions of the AT&T Switched Network in concert with their dedicated private line networks. However, the system does not support "uniform dialing plan,' which is necessary for complete integration with SDN.	X	X
Accunet Switched Digital Service	A digital switching service between subscriber data stations and far-end connection. Useful for batch data or file transfers, high-speed faxes, etc.		X
Station Number Identification/Automatic Number Identification (SID/ANI) Note: The availability of the caller identification information may be limited by local-serving (caller's) jurisdiction, availability, or central office equipment.	A caller identification service for systems with display telephones, call report systems, etc. ■ SID allows the called station to display the station number of the caller. ■ ANI allows the called station to display the billing number (main telephone number) of the caller. Subscribers can choose to send their own calling information to other subscribers for display or to suppress the outgoing caller identification.		X

see "Tie Trunks" later in this chapter.

If you choose the T1 type for services, program the module to emulate tie trunks to the central office.

◆ Factory setting.

Planning Form Instructions

On **PBX System Form 2c, System Number - Trunk Jacks,** in the "Jack Type" column:

1. Find all trunks listed as "PRI."

   - Write the king of service connected to each channel in the "Trunk Type" column.

     Note: You cannot use the 24th channel for services.

   - Write "unequipped" in the "Trunk Type" column for any channel not used at this time.

See "Signaling Mode" in this chapter.

2. Find all trunks listed as "T1-Tie" that do not show "unequipped" in the "Trunk Type" column.

   - Write the kind of service connected to each channel in the "Trunk Type" column.

     Note: If the signaling type is common-channel, you cannot use the 24th channel and program the module for tie-trunk emulation.

On page 1 of **PBX System Form 3c, Outside Trunks - DS1 Facility (100D Module),** for each 100D module in the system:

3. Write the number of the control unit slot (in the "Slot No." blank) that contains the module. (Refer to the "Control Unit Diagram" on **Form 1.)**

   If more than one 100D module is used, complete the first column, "Module 1," to show the options assigned to the 100D module in the lowest number control unit slot. Use the second column for the second lowest number slot and the last column for the high number slot.

4. Show the service connected to each 100D module, under the "Type of Service" heading.

   - Check "T1" (the factory-setting) if the module is used for emulated trunks and/or services such as Megacom 800 with DNIS.

   - Check "ISDN-PRI" if the module is used exclusively for services such as Accunet Switched Digital Service.

Frame Format

To identify the DSO channels, the DS1 signal is segmented into blocks of 193 bits, called frames. A frame consists of 24 eight-bit words (one for each channel) plus a framing bit at the beginning of each frame: 24 words x 8 bits = 192 bits. Thus, a framing bit appears in every 193rd bit position of the 1.544-Mbps DS1 signal.

Frames repeat at a rate of 8000 per second, with each frame repeating DSO channels 1 through 24 sequentially.

Two methods of framing can be used by a 10OD module, but the framing chosen must match the framing at the far end:

- D4 Framing Format. The system is factory set for the most common framing format, D4 framing. A D4 frame consists of 24 eight-bit time slots and one framing bit. To synchronize the signals, the receiving equipment uses the framing information to identify the start of each frame and to identify which frames contain signaling information. The framing information repeats once every 12 frames; these 12 frames form the D4 superframe. This framing format is used by most DS1 equipment.
- ESF Framing Format The extended superframe (ESF) format extends the 12-frame D4 superframe to a 24-frame superframe, hence its name. The 24 framing bits include a cyclic redundancy check (CRC) for the entire extended superframe and a facility data link for maintenance. The ESF can detect more errors than D4 framing; however, ESF is not used universally by DS1 equipment. The ESF frame format is required for ISDN-PRI and international data transmission.

Line Code

The DS1 signal consists of a continuous bit stream of ones and zeros, encoded into bipolar pulses for transmission. Only the ones create a pulse; the zeros are represented as the absence of a pulse. The line-coding formats guarantee that the ones-density requirement is met to achieve clock recovery.

To meet the ones-density requirement, either alternate mark inversion zero code suppression (AMI-ZCS) or bipolar 8 zero substitution (B8ZS) line coding is used. The factory-set line coding is ZCS.

- AMI-ZCS. ZCS line coding monitors each DSO channel and prevents strings of eight or more zeros. Upon detecting eight consecutive zeros in a channel octet, ZCS line coding forcibly changes the seventh zero (second least significant bit) to a one.

  With ZCS line coding, any bit that is overwritten has no noticeable effect on voice and voice-grade data. However, the ZCS line-coding format can cause errors in digital data transmission.
- B8ZS. B8ZS line coding encodes an ail-zero channel octet into a unique binary sequence with a “bipolar violation” in bit positions 4 and 7. Normally, for bipolar transmission ones are encoded alternately as a positive then negative, or negative then positive, pulse. If two positive or two negative pulses are received in succession, a bipolar violation occurs.

  Ordinarily, bipolar violations are caused by noise hits on the signal. However, B8ZS line coding allows the 8-bit strings to be detected at the receiving end and converted back into the original sequence.

B8ZS line coding is preferred over ZCS because it does not cause errors in data transmission. B8ZS violations will be passed by the ESF TI Channel Service Unit, but not by other CSUs.

Line Compensation

Line compensation adjusts for the amount of cable loss in decibels (dBs). It is based on the length of cable between the 100D module and the CSU or between the module and another far-end connection—for example, a line repeater.

The factory setting is a value of 1, which allows a maximum loss of 0.6 dB. The other possible settings are shown in Table 3-4 (based on 22-gauge cable).

Table 3-4 Line Compensation Settings

Setting	dB LOSS	Cable Feet
1♦	-0.6	0-133
2	-1.2	133 – 266
3	-1.8	266-399
4	-2.4	399-533
5	-3.0	533-655

Planning Form Instructions - Continued

On **Form 3c,** for each module in the system:

5. Under the "Frame Format" heading:
   - Check "D4" to retain the factory setting.
   - Check "ESF" to chege the factory setting (required for ISDN-PRI and international data transmission).
6. Under the "Suppression" heading:
   - Check "AMI-ZCS" to retain the factory setting.
   - Check "B8ZS" to change the factory setting (required for ISDN-PRI).

Under the "Line Compensation" heading:

7. Fill in the approximate distance (number of cable feet) between the 100D module and its CSU or other far-end connection next to "Cable Feet."
8. Use Table 3-4 to select the line compensation setting needed.
   - Check "1" (.6 dB) to retain the factory setting.
   - Check the setting (2-5) required because of the distance between the module and tyhe CSU or other far-end connection.

◆ Factory setting.

Clock Synchronization

Clock synchronization is an arrangement in which digital facilities operate from a common clock. Whenever digital signals are transmitted over a communications link, the receiving end is synchronized with the transmitting end to receive the digital signals.

The system can synchronize itself to the far-end connection by extracting the timing signal from the DS1's incoming digital stream. The 100D module passes the signal to the time division multiplex (TDM) bus for use by the system. The factory setting is that the first 100D module in the control unit extracts the signal and provides primary synchronization.

if the system has more than one 100D module, you can assign the other module(s) to provide backup synchronization in the event of maintenance failure. You can also change the priority in which the modules provide synchronization by reassigning primary synchronization from Module 1 to either the second or third 100D module.

The source of clock synchronization is factory set to the external endpoint of the DS1 facility connected to Module 1 (loop clock reference source). For example, if the far end of the DS1 facility is another communications system (PBX), your system synchronizes itself to that PBX's clock. The factory setting can be changed to 'local clock reference source,' which means that the clock in your system is free-running (not synchronized to the far end of the DS1 facility). You must choose the clock synchronization source for all 100D modules in the system.

When the 100D module is used only to provide tie trunks to other communications systems, the two systems must be synchronized and one of the two systems will be the clock source for both.

If this system is the source, program 'local clock reference,' and then the far-end system will use your local clock for synchronization.

Be careful not to assign backup synchronization by other modules in your system in such a way that the system at the far end of the tie trunk derives its clock signal source from an improper source. For example, if the module providing secondary synchronization is programmed for Imp clock, it extracts the timing signal from its far-end connection. In a maintenance failure, that far-end clock will be used by your system and passed through the tie trunk to the system connected to Module 1. This is called a timing loop. (A timing loop exists if two systems derive their timing from each other, even if it passes through a third system).

Planning Form Instructions - Continued

Under "Priority" in the "Clock Synchronization" section of **Form 3c:**

9 . If installing only one 100D module:

- Check "Primary" to keep the factory setting. (this module provides synchronization for the system.)
- Check "None" if the synchronization source is other than through the 100D module.

Continue to Step 11.

10. If installing more than one 100 D module, decide which module, if any, provide the primary synchronization.

- If Module 1 provides clock synchronization, check "Primary" in the first column (the factory setting).
- If Module 2 (or Module 3) provides clock synchronization, check "Primary" in the column that describes that 100D module.
- If the synchronization source is other than through a 100D module, check "None.

If assigning backup sychronization:

- Check "Secondary" in the column that describes the 100D module providing secondary synchronization.
- Check "Tertiary" in the column that describes the 100D module providing tertiary backup.

11. Under the "Source" subheading in each column:

- Check "Loop" to retain the factory setting. The system uses the clock of the far-end connection.
- Check "Local" to change the setting (The clock is free-running.)

12. Under the "Activation" subheading in each column:

- Check "Active" if loop clock synchronization is taking place.
- Check "Not Active" if the clock is free-running.

NOTE: Normally, the primary synchronization source is et to "active" and other modules are set to "not active."

Signaling Mode

Signaling is the process of communicating channel-state information (such as dialing) from endpoint to endpoint. Two types of signaling can be used in T1 transmission: robbed-bit signaling (RBS) and common-channel signaling (CCS).

Note: The signaling mode setting does not apply to ISDN-PRI.

- Robbed-Bit Signaling. RBS replaces ('robs') the least significant bit of every sixth frame of each DSO channel with signaling information. (RBS is also called in-band signaling, since signaling information is embedded in the least significant bit of every sixth 8-bit word.)

  RBS is appropriate for voice and voice-grade data, but facilities using RBS cannot accurately transmit digital data because digital data uses high-speed data rates such as 64 kbps. Therefore, the channel is limited to voice and analog voice-band data applications.

- Common-Channel Signaling. CCS is an 'out-of-band' signaling format that places the signaling bits for channels 1 through 23 into the 8-bit word of the 24th channel. The 24th channel, therefore, cannot be used for voice or data transmissions.

Planning Form Instructions - Continued

13. Under the "Signaling Mode" heading of **Form 3c,** in all columns that describe T1 modules:

- Check "RBS" to retain the factory setting of robbed-bit signaling.
- Check "CCS" to change the factory setting to common-channel signaling.

CSU Setting for T1 Emulation

Use these instructions only if the 100D module type of service is T1 and outside trunks are to be emulated.

For loop-start and ground-start emulation with T1, specify whether the type of equipment provided by the local telephone company central office is foreign exchange (the factory setting) or special access.

Planning Form Instructions - Continued

14. Under the "Channel Service Unit" heading of **Form 3c,** in all columns that describe T1 modules used for trunk emulation:

- Check "Foreign Exchange" to retain the factory setting.
- Check "Special Access" to change the factory setting.

Primary Rate Interface Facility

Use these instructions only if the type of service on the DS1 facility is ISDN-PRI.

See System Reference for more detailed information.

Decide the following options for each ISDN-PRI facility:

- Telephone Number
- Telephone Number to Send
- Test Telephone Number
- Timers and Counters
- Terminal Equipment Identifier
- B-Channel Groups

Note: Because of the complexity of the timer, counter, and terminal equipment identifier information, the factory settings for them should rarely be changed. Incorrect settings can have an adverse affect on the operation of ISDN-PRI facilities. Consult with your AT&T representative or authorized dealer when you plan options for PRI facilities.

Record your decisions about these options in the "ISDN-PRI Facility Options" section of PBX System Form 3c (page 3). Make a copy of the form for each 100D module with an ISDN-PRI service type. Record the slot number in the 'Slot No." blank at the top of the form(s).

Telephone Number

To allow the system to route calls to the correct destination, you can assign a telephone number consisting of up to 12 digits.

The factory setting is that no telephone number is assigned. If you assign a telephone number to a channel, it must match the number that is dialed by the outside caller and sent to the system by the network. The numbers sent by the network are furnished by the ISDN-PRI service provider. The number you assign must also be unique within the same B-channel group and must be different from the associated test telephone number. B-channel groups and test telephone numbers are assigned later.

Planning Form Instructions

For all the channels you plan to assign a telephone number:

1. Transfer the information from the "Trunk Type" column of **PBX System Form 2c, System Numbering - Trunk Jacks** to **Form 3c.** Write the logical ID and trunk number in the applicable column.
2. Write the unique 12-digit telephone number furnished by the ISDN-PRI service provider in the "Telephone Number" column on **Form 3c.**

Telephone Number to Send

If your company subscribes to the AT&T INF02 automatic number identification (ANI) service, you can assign the telephone number the system sends to the network when outgoing calls are made on ISDN-PRI facilities. If the person being called also subscribes to the same identification service, the telephone number sent identifies who is calling.

The factory setting is that no telephone number to send is assigned. If you assign a telephone number to send, it does not have to be unique since the number is used only for identification and not for routing. The number assigned can be up to 12 digits.

Note: The availability of the caller identification information may be limited by local-serving (caller's) jurisdiction, availability, or central office equipment.

Planning Form Instructions

For all the channels you plan to assign a telephone number to send:

1. If you have not done so already, transfer the information from the "Trunk Type" column of **PBX System Form 2c, System Numbering - Trunk Jacks** to **Form 3c** on page 3. Write the logical ID and trunk number in the application column.
2. Write the 12-digit telephone number that identifies your company as the caller in the "Telephone Number to Send" column on **Form 3c** on page 3.

Test Telephone Number

For each 100D module with an ISDN-PRI service type, you can assign a test telephone number that is used for maintenance by the service provider.

See 'B-Channel Groups" in this chapter.

The factory setting is that a test telephone number is not assigned. The number you assign must be the same number as that furnished by the ISDN-PRI service provider. When you assign a test telephone number, it must be different from the numbers assigned to other channels assigned to the same B-channel group.

Planning Form Instructions

Next to the heading "Test Telephone Number" on **Form 3c** on page 3, write the 12-digit test telephone number used for maintenance.

Terminal Equipment Identifier

The terminal equipment identifier (TEI) is used by the network to identify a piece of equipment connected to each D channel. Normally only one is connected, and the network assumes its terminal identifier is O (the factory setting). You can change the value to from 1 to 63.

CAUTION

Consult your AT&T representative or authorized dealer before changing the value. It is not likely that you will ever need to change the factory setting.

Planning Form Instructions

Under the "Terminal Equipment Identifier (TEI)" heading on **Form 3c:**

1. Check "0" to keep the factory-set TEI.
2. To change the factory-set TEI from 0, write a value from 1 to 63 in the space provided.

Timers and Counters

Timers and counters are used to ensure that the system takes the appropriate corrective action when no response is received from the network before the programmed settings have expired.

CAUTION

Since incorrect settings could have an adverse effect on the operation of ISDN-PRI facilities, consult your A T&T representative or authorized dealer before you make any changes. The factory-set thresholds are standard settings and should rarely be changed.

The timers and counters, descriptions, factory settings, and allowable thresholds are shown in Table 3-5.

Table 3-5 Timers and Counters

Name	Description	Factory Setting	Allowable Threshold
T200 Timer	Times the delay in link-layer acknowledgement of a message sent over a D channel from the system to the network.	1 second	1000-3000 ms
T203 Timer	Times the interval of each exchange of messages on the D channel between the system and the network.	30 seconds	1-60 seconds
N200 Counter	Counts the times the system has transmitted a message on a D channel when no link-layer acknowledgement is received from the network.	3 transmissions	1–5 transmissions
N201 Counter	Counts the maximum number of layer-3 octets the system can send or receive in a single D-channel message.	260 octets	16-260 octets
K Counter	Counts the layer-3 unacknowledged messages sent on a D channel from the system to the network.	7 frames	1–1 5 frames
T303 Timer	Times the delay in network response when the system sends a setup message to initiate an outgoing call.	4 seconds	4–1 2 seconds
T305 Timer	Times the delay in network response when the system sends a disconnect message to clear a call.	4 seconds	4-30 seconds
T308 Timer	Times the delay in network response when the system sends a release message to clear a call.	4 seconds	4-12 seconds
T309 Timer	Times the duration of a D-channel data-link failure, which consists of a loss of signaling for the entire PRI connection.	90 seconds	30-120 seconds
T31O Timer	Times the network delay following the receipt of a call-proceeding message on an outgoing call.	10 seconds	2-10 seconds
T313 Timer	Times the delay in network response when the system sends a connect message that indicates the completion of an incoming call.	4 seconds	4-12 seconds
T316 Timer	Times the delay in network response when the system sends a restart message to clear a B channel.	120 seconds	3-120 seconds

Planning Form Instructions

Under the "Timers and Counters" heading on Form 3c.

1. To change the factory setting for any timer or counter, write the new threshold in the "Change To" column.
2. To keep the factory setting, leave the "Change To" column blank.

B-Channel Groups

To make the most effective use of ISDN-PRI service, assign B channels (channels 1 through 23) to groups. Once you establish B-channel groups, you can associate the channels used for ISDN service so that calls can be placed and received on the associated B channels.

Up to 69 B-channel groups can be established. Each B channel, and channels used for ISDN service, can be assigned to only one group. Each group can contain up to 23 channels, and all channels within each group must signal through the same D channel (connected to the same 100D module).

Assign B channels in the order that the system should search for an available channel. To minimize call attempts on the same channel, the best arrangement is the opposite order of the hunting arrangement furnished by the ISDN-PRI service provider.

Since B channels are not associated with any trunk number or logical ID, they can by identified only by use of the control unit slot and port number.

Planning Form Instructions

Determine which channels to group and record each group on **Form 3c, page 4,** "B-Channel Groups."

Note: Page 4 holds the programming information for two B-channel groups. Duplicate the form if more groups are planned.

In each column:

1. Write the group number (1-69) next to the "Group No." heading. Start with 1 and number sequentially.
2. Write the slot and port number of each B channel assigned to the group. (Refer to the "Control Unit Diagram," on **Form 1.)**

   When programmed for ISDN-PRI, the single DS1 jack on the 100D module supports 23 channels, or ports. (The 24th channel transmits signaling mode information.) To determine the port number, assume that port 1 is at the bottom of the module to which you are assigning B channels.

   Note: If you have completed the "Non-Complex Configuration" pages of **Form 3c,** transfer the slot and channel (port) information from that form.

For all channels you plan to associate with the group:

3. Transfer the information from **PBX System Form 2c, System Numbering-Trunks Jacks** to **Form 3c.** Write the logical ID and trunk number in the applicable column.

T1/ISDN-PRI Planner

To ensure compatibility with your system, all local offerings of DS1 configurations must be reviewed by AT&T National Technical Marketing (NTM) personnel. This review begins when NTM receives the "General Business Systems T1/ISDN-PRI Planner" **(pages 5** through **7** of **PBX System Form 3c).**

Planning Form Instructions

On **page 5** of **Form 3c:**

1. Fill in the customer name, telephone number, and address.
   Note: "Reference Number" is used by NTM.
2. Fill in the AT&T DOSS Order Number.
3. Identify the AT&T personnel handling the account: Account Executive's name and telephone number and the System Consultant's name and telephone number.
4. Identify the DS1 facility provider by writing the provider's name in the "T1/ISDN-PRI Vendor" space along with the contact person's name and telephone number.
5. Under the "Installation heading:
   - Write the date the installation is due to be complete.
   - Write the date the equipment is scheduled for delivery to your company next to the "Materials-on-Job-Date."
6. Under the "AT&T Installation Contacts" heading:

   List the names and telephone numbers of the AT&T personnel responsible for the equipment order and its installation: the Order Implementor, the National Technical Marketing Manager, the National Technical Service Center Engineer, and the Data Services Organization Manager.
7. Under the question about whether the order has been placed:
   - Check "Yes" if the order has been made and fill in the date.
   - Check "No" if the order has not been placed.
8. On **page 6** or **Form 3c,** complete one block for each 100D module.

   Transfer the options information for each module from the corresponding column of **page 1** of **Form 3c:**
   - Service Ordered or Planned (Type of Service)
   - Frame Format
   - Line Coding (Suppression)
   - Line Signaling Mode
   - Synchronization Timing (Clock Synchronization: Source)

An important part of the NTM review is to ensure that the synchronization integrity of the network-both this communications system and its far-end connections—is protected. To facilitate their evaluation, prepare the "Network Planning Map" on page 7 of Form 3c. Describe the entire network of DS1 facilities by summarizing the following for each 100D module:

- CSU used
- distance between the control unit and CSU or far-end connection
- types of facilities or services connected to each 100D module
- clock synchronization source

As an example, the system described in Figure 3-2 shows a large processor module system with two 100D modules.

The communications system in Figure 3-2 is configured as follows:

- Module 1 in slot 04 is connected to a model ESF-T1 CSU that is approximately 100 cable feet from the control unit. (The DS1 facility is connected to the ISDN-PRI network.)
- Module 2 in slot 05 is connected to a 551-T1 L1 CSU that is approximately 160 cable feet from the control unit. (The far end is another communications system.)
- The primary clock synchronization source is the ISDN-PRI network connected to Module 1. Its path is shown by a line and the letter P.

  Note: The dotted line between the control unit and the PBX in Connection 2 indicates that the PBX derives its timing signal from your system.
- The secondary clock synchronization path, shown by a line and the letter S, is the system internal clock.

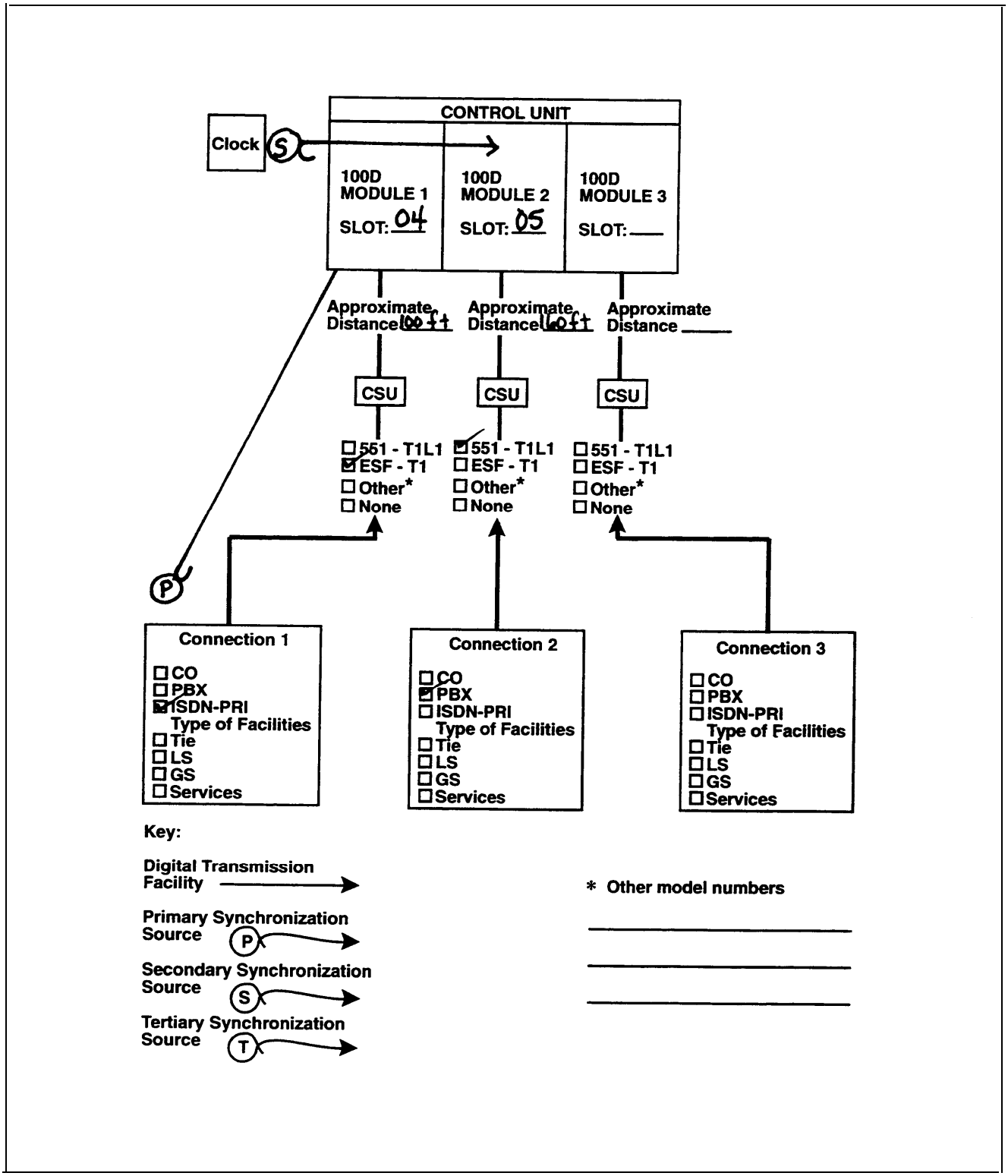

Figure 3-2 Sample Network Planning Map

Planning Form Instructions

On the "Network Planning Map" (page 7 of Form 3c):

1. Fill in the control unit slot number(s) of the CSU(s) connected to the 100D module(s).
2. Write the approximate number of cable feet between each module and its CSU or far-end connection. (Refer to "Line Compensation" on **page 1.)**
3. Check the model number(s) of the CSU(s).
   - If "Other," write the manufacturer's name and model number in the space provided at the bottom of the page.
   - If no CSU is needed, check "None."
4. In the connection block(s), describe the DS1's far-end connection.
   - Check "CO" if connected to the telephone company central office.
   - Check "PBX" if connected to another communications system.
   - Check "ISDN-PRI" if connected to the ISDN-PRI network.
   - Check the type(s) of emulated trunks if the facility's type of service is T1. Also check Services" if the facility includes services such as MultiQuest with DNIS.
5. Describe the clock synchronization sources according to the key at the lower left of the map.
   - Draw a circle and line from the clock source to the appropriate 100D module.
   - Label the circle "P" for primary, "S" for secondary, and "T" for tertiary.
6. Make a copy of the "General Business Systems T1/ISDN-PRI Planner" **(Pages 5-7 of Form 3c)** for your records and forward the original to AT&T National Technical Marketing (NTM).

NTM also evaluates the complexity of the facility configuration requested. Examples of complex configurations are connections into PBX networking applications, connections to multiplexing arrangements, or applications that involve customer engineering or design.

- If an order is considered complex, NTM directs you to the Business Communications System (BCS) National Engineering Center (NEC).
- If NTM notifies you that the order's configuration is not complex, Tier Ill General Business System (GBS) National Technical Service Center (NTSC) is authorized to approve the configuration.

The NTSC group's pre-authorization review is based, in part, on information you provide to them. Specifically, you must send them

- a copy of the planner (pages 5 through 7 of Form 3c)
- a completed 'Non-Complex Configuration' sheet (pages 9 through 11 of Form 3c) for each 100D module you plan to install

Planning Form Instructions

Complete one "Non-Complex Configuration" pafe of **Form 3c** for each 100D module. Label the top right corner of the copies "Page 1 of ____" (1, 2, 3).

On each page:

1 . Write the module number (1, 2, 3). Indicate the total number of 100D modules (maximum of 3 per large system).

2 . Fill in the control unit slot number. (Refer to **page 1** of **Form 3c.)**

In the "Services" section:

3 . Check the box next to each emulated trunk or service that will be connected. Check only those services allowed on the type of service (T1 or ISDN-PRI) selected for the module.

4 . Circle the channel(s) to which each emulated trunk or service will be assigned.

Note: No channel should show more than one trunk or service, and the 24th channel cannot be used if the signaling type is common channel.

If the type of service is ISDN-PRI, complete the "ISDN-PRI Identification Service" section.

5 . Do *one* of the following:

- Check the "No" box if you are not planning to use the number identification service. Continue to step 6.
- Check the "Yes, for" box if you are planning to use the identification services and check the service planned:
  - For incoming calls, check "ANI", "SID", or "Both." If both automatic and station identification service are planned, indicate the order in which the informtion should be displayed (ANI then SID or SID then ANI).
  - For outgoing calls, check either "ANI" or "SID" to indicate the service planned. If you are planning to prevent sending out your own caller identification information, check the box labeled "SID/ANI Privacy."

Note: The availability of the caller identification information may be limited by local-serving (caller's) jurisdiction, availability, or central office equipment.

In the "Channel Service Unit" section:

6 . Check the box that describes the channel service unit used. If you are not using one of the two AT&T models, check the third box and write in the manufacturer information that describes the unit.

7 . Forward all copies of this page along with a copy of the "General Business Systems T1/ISDN PRI Planner" (Pages 5-7 or Form 3c) to Tier III, General Business Systems, National Technical Service Center.

DS1 Facilities Ordering Discussion

After the contract is signed, your AT&T representative or authorized dealer contacts the DS1 facility vendor to discuss the T1/ISDN-PRI service order. The vendor needs information about the communications system as well as customer identification.

Table 3-6 describes the kind of information the facilities vendor requires. Review this table with your network representative or dealer so that you will be familiar with the details of the DS1 facilities order.

See your AT&T representative or authorized dealer for the current release and version numbers of the system

Table 3-6 Guide to DS1 Facilities Ordering

Communication System		
Manufacturer	AT&T	
Model	MERLIN LEGEND	
Type (Mode)	digital PBX	
Jack Type	RJ48C or RJ48X	
Facility interface Code	Digital D4 Framing 04 DU9-B Digital ESF Framing 04DU9-C Digital ESF and B8ZS 4DU95	
Digital PBX ■ Has the EIA standard CISA transmission path ■ Is slenderized ■ Is the equipment that must be timed ■ Has an internal stratum clock level of 4 ■ Provides automatic call distribution through Group Calling feature ■ Provides loopback (keep signal alive) through CSU		
Channel Service Unit		
	❑	❑ ❑ Other
Manufacturer	AT&T	AT&T _____
Model	551-T1 L1	ESF-T1 _____
Reg. Number	GI 472- 26819-DE-N	GIC 472- 16544-DE-N _____
Facility Interface Codes:	Digital D4 Framing 04DU9-B Digital ESF Framing 04 DU9-C Digital ESF and B82S 4DU95	
Standard CSU jacks and test points provided		
Audible Ringing Source ❑ Digital PBX ❑ Channel Service		
Testing Service ❑ AT&T ❑_____ If a CSU other than those listed above is used, AT&T will not accept the responsibility for its installation, connection, or testing.		
Echo Control Device — not used		

Tie Trunks

Use these **instructions** only if the system has tie trunks, including tie trunks emulated through a DS1 facility.

Tie trunks are private lines between your system and the central office or between two communications systems—for example, between this system and another system of the same type, or this system and a System 25 or a System 75.

Tie trunks must be configured to match central office requirements or the configuration of the system to which they tie. Review tie trunk operation with your AT&T representative or authorized dealer and make the following decisions about the way each tie trunk operates:

- Direction
- Signaling Type
- Dial Mode
- Dial Tone
- Answer Supervision Time
- Disconnect Time

Mark each tie trunk configuration on PBX System Form 3d, Outside Trunks — Tie.

Planning Form Instructions

Transfer the trunk identification from **PBX System Form 2c, System Numbering - Trunk Jacks,** to **Form 3d.** Write the logical ID and trunk number for each tie trunk connected to the system.

Direction

Decide if the tie trunks will send calls one way or two ways (the factory setting).

Two-way is preferable if you anticipate light call traffic; one-way is preferable if you anticipate heavy call traffic. Two-way in heavy call traffic increases the chance of users on both ends of a two-way tie trunk trying to use it at the same time, in which case neither call will go through.

If you choose one-way, also decide if the direction will be out or in. For example, if users need only to receive information from another location but do not need to return calls, an incoming tie trunk would be sufficient.

Planning Form Instructions

Under the "Direction" heading on **Form 3d,** check the direction for each tie trunk next to its trunk number.

- Check the factory-set "Two-Way" column it tie trunk is two-way.
- Check either "Outgoing" or "Incoming" for each one-way tie trunk.

Signaling Type

The choices for signaling type (also called seizure type) are wink, delay, immediate, and automatic. Of the four types, wink, delay, and immediate are similar in that they allow users to call people in the other system by dialing their extensions. With the automatic type, no dialing is needed: users call an operator who then transfers the call to the proper person.

Choose the same type as that used by the system to which you are connecting. For incoming-only or two-way tie trunks, the incoming type must be the same as the outgoing type of the remote system. For outgoing-only or two-way tie trunks, the outgoing type must be the same as the incoming type of the remote system.

Wink is the factory setting, and if available, it is the preferred type, followed by delay and then immediate.

See "Dial Mode" in this section.

Note: Immediate does not work with the touch-tone dial mode.

See 'DS1 Facility" earlier in this chapter, and Trunk Assignment later in this chapter.*

For T1 facilities used for services (for example, Megacom), consider the direction of the tie trunk and how trunk assignments will be made and select from the following:

- One-way, outgoing tie trunks. All outgoing calls are placed using Automatic Route Selection and tie trunks are not assigned to Personal Line or Pool buttons on telephones. Select wink signaling.
- One-way, outgoing tie trunks. Tie trunks are assigned to Personal Line or Pool buttons on telephones. Select immediate signaling.
- One-way, incoming tie trunks. Dialed Number Identification Service (DNIS) is included. Select wink signaling.
- One-way, incoming tie trunks. DNIS is not included. Select automatic signaling.

Planning Form Instructions

Under the "Signaling Type" heading on **Form 3d,** check eith "In" or "Out" under "Wink," "Delay," "Immediate," or "Automatic" for each tie trunk.

E&M Signal

Select one of the following signaling types to be used on the tie trunks:

- Select type 1 S (the factory setting) if the tie trunks are connected to the other system through the local telephone company.
- Select type 1 C if the tie trunks are connected directly to a system that uses type IS signaling and is located near this system.
- Select type 5 if the tie trunks are connected directly to a system that uses type 5 signaling and is located near this system.

Planning Form Instructions

Under the "E&M Signal" heading on **Form 3d,** check your choice of signal type for each tie trunk.

Dial Mode

Choose an incoming (inmode) and outgoing (outmode) dial mode, either touch-tone or rotary. For two-way tie trunks, you must choose a dial mode for incoming and outgoing. The system is factory set for rotary for both directions.

Note: If you have checked “Incoming” for a tie trunk’s direction and “immediate” for its signaling type, you cannot have touch-tone mode.

Planning Form Instructions

On **Form 3d:**

1. Under the "Inmode" heading, check either "Touch-Tone" or "Rotary for each incoming-only and each two-way tie trunk.

   Note: If you have checked "Incoming" for a tie-trunk's direction and "Immediate" for its type, you cannot have a touch-tone mode.

2. Under the "Outmode" heading, check either "Touch-Tone" or Rotary" for each outgoing-only and each two-way tie trunk.

Dial Tone

Decide if the system will provide a dial tone for users calling in on the tie trunk. The remote setting (the factory setting) causes the system to produce a dial tone. The local setting does not produce a dial tone.

Planning Form Instructions

Under the "Dial Tone" heading on **Form 3d,** check either "Remote" or "Local" for each tie trunk.

Answer Supervision Time

The answer supervision time is factory set at 300 milliseconds (ins). If the system needs a different setting, change the time to between 20 and 4800 ms. Use 20-ms increments.

Planning Form Instructions

Under the "Answer Supv. Time" heading on **Form 3d,** check "300" to keep the factory setting or write the new value (20-4800 ms) in the "Other" column.

Disconnect Time

The disconnect time is factory set at 300 ms. If the system needs a different setting, change the time to between 140 and 2400 ms. Use 10-ms increments.

Planning Form Instructions

Under the "Disconnect Time" heading on **Form 3d,** check "300" to keep the factory setting, or write the new value (140-2400 ms) in the "Other" column.

DID Trunks

Use these instructions only if Direct Inward Dial (DID) trunks are connected to the system.

DID trunks allow incoming calls to reach specific individuals, calling groups, the listed directory number (QCC Queue) or Remote Access without going through the operator. Blocks of DID numbers from the local telephone company are reserved for use in the system. These blocks of numbers correspond to the extension numbers in the system numbering plan you selected in the "System Renumbering" section of Chapter 2.

CAUTION

DID numbers that correspond to pool dial-out codes (or facility access codes) can be used to avoid toll restriction, leading to toll abuse and/or fraud. (See "Customer Support Information" in the front of this book for more information on security.)

The options assigned to the DID trunks affect the way incoming calls are directed to extension numbers in the system.

The options for DID trunks are as follows:

- Type of DID Trunks
- Expected Digits
- Delete Digits
- Add Digits
- Signaling
- Invalid Destination
- Assign Trunks to Blocks

The options are assigned to blocks of trunks, and a maximum of two blocks is allowed. Each block can be configured so that incoming calls can be directed to specific extension numbers included in your system numbering plan. For example, if the system has both 3- and 4-digit extension numbers, Block 1 could contain the options needed to reach the 3-digit numbers, and Block 2 the options needed to reach the 4-digit numbers.

Note: If you want to allow Remote Access on DID trunks, one of the telephone numbers assigned by the telephone company must match the Remote Access dial code. The factory setting is 889.

Record the DID trunk options on PBX System Form 3e, Outside Trunks — DID. If your system will have two blocks, make a copy of Form 3e and write the block number in the "Block Number" space.

Type of DID Trunks

The choices for the type of DID trunk are immediate-start and wink-start (the factory setting). If the local telephone company can support wink-start, keep the factory setting because it allows a greater probability of call completion during heavy calling periods. However, if the local telephone company can support only immediate-start, you must change the factory setting.

Planning Form Instructions

On **Form 3e,** under the "Type" heading:

1. Check "Wink-start" to keep the factory setting.
2. Check "Immediate-start" to change it.

Expected Digits

The system is capable of receiving from one to four digits from the local telephone company. The factory setting is three digits. Check with the local telephone company to determine the number of digits sent.

Planning Form Instructions

On **Form 3e,** under the "Expected Digits" heading:

1. Check "3" to show that the telephone company sends the factory-set number of digits.
2. Check "1," "2," or "4" to show the number of digits sent by the telephone company.

Delete Digits

Compare the number of digits sent by the local telephone company to the number of digits in your system numbering plan. If the number of digits sent by the local telephone company is more than the number of digits in your system numbering plan, specify that one to four digits be deleted from the digits sent. This is needed to route the call to the extension numbers in your system.

For example, the local telephone company sends four digits numbered from 1500 to 1650. Your numbering plan includes extension numbers from 500 to 650. You can specify that one digit be deleted.

Keep the factory setting of zero digits if the number of digits sent matches your system numbering plan.

Planning Form Instructions

On **Form 3e,** under "Delete Digits" heading:

1. Check "0" if your numbering plan matches the number of digits sent by the telephone company.
2. Check the number of digits that must be deleted from the telephone number sent by the telephone company (1, 2, 3, or 4).

Add Digits

Compare the number of digits sent by the local telephone company to the number of digits in your system numbering plan. If the number of digits sent by the local telephone company is fewer than the number of digits in your system numbering plan, specify that specific digits (1–9999) be added to the digits sent. This is needed to route the call to the extension numbers in your system.

For example, the local telephone company sends two digits. Your numbering plan includes extensions numbered from 1200 to 1299. You can specify that the digits 1 and 2 be added to the digits received from the local telephone company.

Keep the factory setting of zero digits if the number of digits sent matches your system numbering plan.

Planning Form Instructions

On **Form 3e,** under the "Add Digits" heading:

1. Check "0" if your numbering plan matches the number of digits sent by the telephone company.
2. Check "Add these digits" to indicate that digits must be added to the telephone number sent by the telephone company. Write the specific digits to be added in the space provided.

Signaling

Select the type of dialing signals sent from the local telephone company. The choices are rotary (the factory setting) or touch-tone.

Note: You cannot have touch-tone if you selected immediate-start.

Planning Form Instructions

On **Form 3e,** under the "Signaling" heading:

1. Check "Rotary" to specify the factory-set signal.
2. Check "Touch-tone" to change the setting.

Invalid Destination

When outside calls from DID trunks, Remote Access users, or dial-in tie trunks are made to an unassigned extension number, the system redirects the call to a backup position, normally the primary operator.

You can change the setting to specify that the caller is given a fast busy signal to indicate an invalid destination.

This setting applies to both blocks. You cannot specify a different setting for each block.

Planning Form Instructions

On **Form 3e,** under the "Invalid Destination" heading:

1. Check "Send to backup position" to indicate that calls to unassigned extension numbers go to the backup position.
2. Check "Return to fast busy" to indicate calls to unassigned extension numbers should receive a fast busy signal.

Assign Trunks to Blocks

Decide which DID trunks should be assigned to each block. Group the DID trunks into blocks according to how incoming calls must be routed to reach the proper extension number.

When the system is set up, all DID trunks are grouped in the first block.

Decide on the disconnect time for each DID trunk. The factory-set disconnect time is 500 ms. If a trunk needs a different setting, you can change it to from 10 ms to 2550 ms.

Planning Form Instructions

For all the trunks you plan to group into each block:

1. Transfer the information from **PBX System Form 2c, System Numbering - Trunk Jacks** to the "Trunk Included in Block" section of Form 3e. Write the logical ID, trunk number, and telephone number in the applicable column.
2. Check the "500 ms" column under "Disconnect Time," to keep the factory setting or write the new value (10-2550) in the "Other" column.

Trunk Assignment

Follow the instructions in the Data Guide *to assign trunks to data-only stations.*

Use these instructions to assign trunks to telephones and direct-line consoles. System trunk assignments to QCCs cannot be changed.

There are five different forms for recording trunk assignments. Prepare one copy of the appropriate form for each station.

- PBX System Form 4a, Analog Multiline Telephone
- PBX System Form 4b, Digital/ISDN (MLX) Telephone (the front for the telephone and the back for an adjunct connected using a Multi-Function Module)
- PBX System Form 4c, Tip/Ring Equipment
- PBX System Form 5a, Direct-Line Console (DLC) — Analog
- PBX System Form 5b, Direct-Line Console (DLC) — Digital/ISDN (the front for the telephone and the back for an adjunct connected using a Multi-Function Module)

Planning Form Instructions

On the front of **Form 4a** through **5b:**

1. Transfer the user identification from **PBX System Form 2a, System Numbering - Station Jacks** to each copy of all telephone forms.
   - Write the logical ID in the "Logical ID" space.
   - Write the extension number in the "Extension No." space.
   - Write the name of the person or the location of the equipment in the "Person or Location" space.
2. Locate any "voice/voice" or voice/date" entries in the "Person or Location" column of **Form 2a.** Under the "Station Jack Pair" heading on **Forms 4a** and **5a:**
   - Check the "Voice Announce to Busy" box or the "Simultaneous Voice and Data" box to indicate the type of station jack pairs.
   - Enter the logical ID and extension number under the "Even-numbered jack" heading.

On the back of **Forms 4b** and **5b:**

3. Fill in the user identification from **PBX System Form 2b, System Numbering - Digital/ISDN Station Adjuncts** for any adjuncts connected to an MLX telephone using an MFM:
   - Write the extension number in the "Extension No." space.
   - Write the name of the person or the location of the equipment in the "Person or Location" space.

Planning Form instructions - Continued

4. Identify the equipment at each station. (Refer to the **Floor Plan.)**

- Check the box that describes the telephone, console model, or type of tip/ring equipment.
- Check the box under "Adjuncts" that describes the adjuncts at the station.

Note: Checking the "Data Terminal" box is informational only. See the Data Guide.

Telephones

There are seven kinds of line buttons you can assign to telephones or adjuncts connected to an MLX telephone using an MFM (excluding QCC operator positions):

- System Access Ring button-used to make and receive inside and outside calls. When used to make inside calls, the called person hears one long ring to indicate an inside call. When used to make outside calls, the user selects an outside trunk by dialing either the code for Automatic Route Selection (ARS) or the dial-out code for a trunk pool. The system automatically assigns this type of button to all telephones.
- System Access Voice button-used to make and receive inside and outside calls. When used to make inside calls, the called person hears the caller's voice. When used to make outside calls, the user selects an outside trunk by dialing either the code for ARS or the dial-out code for a trunk pool. The system automatically assigns this type of button to all multiline telephones and MFMs.
- System Access Originate Only button-used only to make inside and outside calls; calls are not received on this button. The purpose of this button is to ensure that the user always has a button available to make calls. The button can be set to either voice or ring operation for inside calls. To make outside calls, the user selects an outside trunk by dialing either the code for ARS or the dial-out code for a trunk pool.
- Shared System Access button-used to allow a group of users to answer each other's calls, join conversations, or make or receive calls on each other's Voice or Ring button. The Shared button is used the same way as the type of button being shared (Voice or Ring).
- Personal Line button-used to dedicate an outside trunk for use by particular telephones in the system. The Personal Line button is used to make and receive only outside calls. To make an outside call, the user dials the area code and telephone number; the ARS code is not needed. The trunk cannot be assigned to a trunk pool, but it can appear on more than one teleohone (up to a maximum of 64 stations).

- **Pool button** -used to access a specific trunk pool (for example, a pool with WATS or FX trunks) without dialing a code. The Pool button is used to make only outside calls. To make a call, the user dials the area code and telephone number and does not need to dial the ARS code or dial-out code for the trunk pool. A Pool button can appear on a maximum of 64 stations.
- Loudspeaker Page button—used to make announcements over an optional loudspeaker paging system. To make a loudspeaker announcement, the user simply selects the Loudspeaker Page button, then speaks into the handset. The user does not need to dial the extension number for the loudspeaker paging system.

See Chapter 4 of System Reference *for additional information on modes and trunk assignments.*

The system is factory set to assign certain kinds of line buttons depending on the type of equipment. For non-operator multiline telephones, the system assigns a System Access Ring, System Access Voice, and System Access Originate Only button. See Figures 3-3 and 3-4.

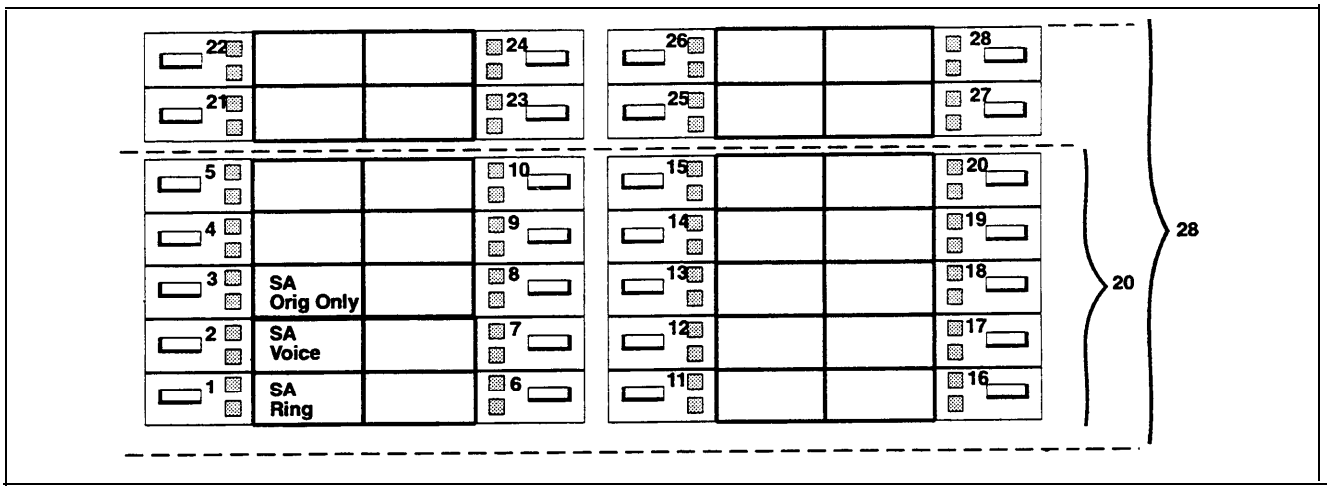

Figure 3-3 Factory-Set Assignment, Digital/ISDN (MLX) Telephones

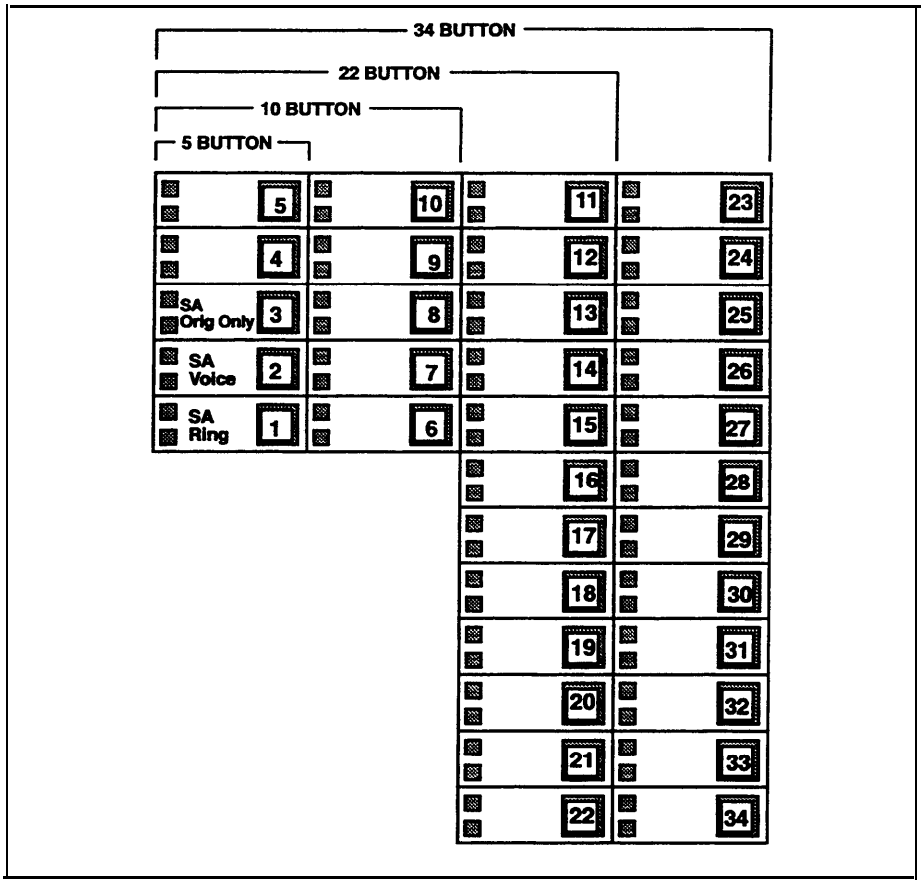

Figure 3-4 Factory-Set Assignment Analog Multiline Telephones

Although equipment such as single-line telephones, answering machines, and fax machines do not have buttons, the system treats them as multiline telephones with 34 buttons.

The system assigns one System Access Ring, one System Access Voice, and one System Access Originate Only button to every adjunct connected through an MFM to an MLX telephone. For equipment connected to a 012 or 008 OPT module, the system assigns two System Access Ring buttons.

Consider the following information as you select the types of buttons to assign to each telephone.

For multiline telephone users:

- You can assign a combination of up to 10 System Access Voice, System Access Ring, System Access Originate Only, or Shared System Access buttons to each telephone (excluding operator positions).
- If you plan to use Automatic Route Selection (ARS), consider keeping the factory-set button assignments. They ensure that if each user is busy on a call at least one additional button is available to receive a call and another is available to make a call. This leaves the rest of the buttons on multiline telephones free for customizing.
- Consider assigning Shared System Access buttons to small groups of users who need to be able to answer and distribute each other's calls easily or be able to join conversations. Each Shared System Access button you assign corresponds to a System Access Ring or System Access Voice button on another telephone. Therefore, to provide complete coverage within the group, you must be sure that each System Access Ring and System Access Voice button assigned to a telephone is also assigned to other members of the group. Each System Access Ring or System Access Voice button on a telephone can be assigned as a Shared System Access button on up to 16 other telephones.
- Assign a Pool button when a specific trunk pool (for example, WATS or FX) is used frequently. Also consider assigning Pool buttons if you do not plan to use ARS and the system includes only one or two pools.
- Assign Personal Line buttons when an exclusive private number is needed, for example, for a company executive. Any trunk connected to the system can be used as a personal line as long as it is not in a trunk pool.

For single-line telephones, answering machines, fax machines, or any other device connected to a 012 or 008 OPT module:

- The factory settings for System Access buttons can be changed; however, these settings should be adequate to meet most user needs since System Access buttons can be used to make and receive both inside and outside calls. Each station must have at least one System Access button.
- If you want the station to receive outside calls on a specific trunk, assign a Personal Line button; if you want the station to receive outside calls on a trunk included in a pool, assign a Pool button.

See *System Programming* for instructions.

For adjuncts connected using an MFM, it's recommended that you change the button 2 assignment to System Access Originate Only and remove the button 3 assignment.

Planning Form Instructions

Complete the "Button Diagram" section of each copy of **Forms 4a, 4b** (front and back), **4c,** and **5b** (back only).

Note: The button diagrams for DLCs (the back of **Form 5a** and the front of **Form 5b)** will be completed later.

1. Show the types of System Access buttons, by writing "SA Voice," "SA Ring," "SA Originate Only," "Shared SA," "Pool," or "Personal Line" on buttons 1 through 10.
   - For a Shared System Access button, include the extension number of the primary button owner. (Refer to **Form 2a.)**
   - For a Pool button, include the pool's extension number. (Refer to **Form 3b).**
   - For a Personal Line button, include the telephone number and, for future reference, record the trunk numbers (Refer to **Form 2c.)**
2. Assign Loudspeaker Page buttons by selecting the butoon and writing "Page" on it.

Direct-Line Consoles

Use these instructions only if the system has one or more direct-line consoles.

See the Direct-Line Consoles Operator's Guides *for more on DLCs.*

The line buttons automatically assigned to DLCs are different from those on other telephones. In typical systems, DLC operators are responsible for handling all incoming calls. Therefore, the factory setting for DLCs is that, in addition to a System Access Voice and a System Access Ring button, as many trunks as possible are assigned to each console. Each trunk appears on a separate button, which means that the number of trunks assigned is limited to the number of buttons on the console (up to a maximum of 32 on the 34-button analog DLC).

The system also assigns a Direct Station Selector (DSS) button for each extension number associated with a station and special-feature buttons that are used by the DLC operator for call handling.

The number of line, DSS, and feature buttons assigned depends on the type of telephone and the number of trunks connected to the system.

The figures that follow show initial trunk and feature assignments for digital/ISDN (MLX) and analog DLC consoles. See the appropriate figure as you decide trunk assignments for DLCs.

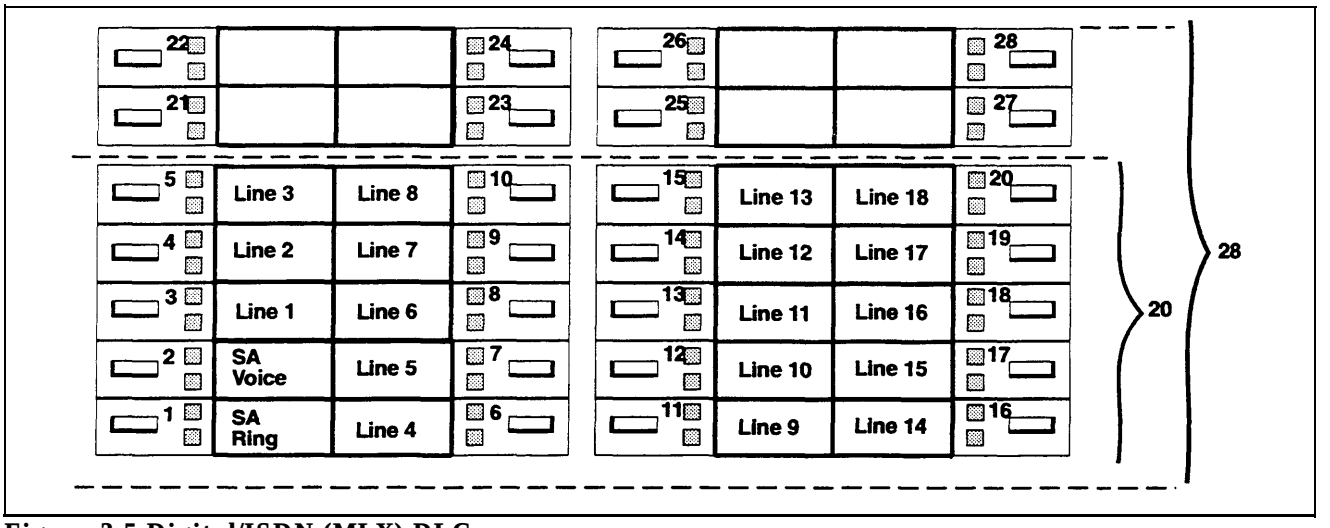

Figure 3-5 Digital/ISDN (MLX) DLC

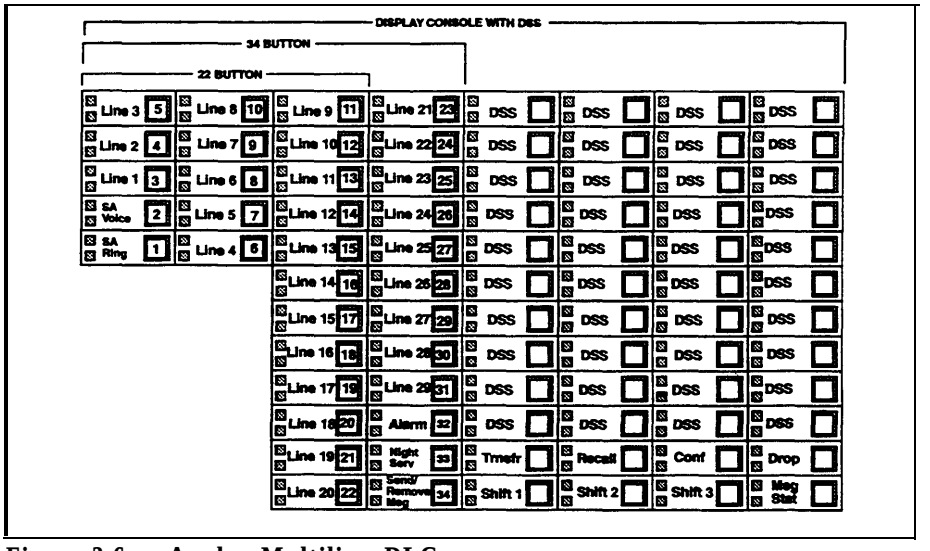

Figure 3-6 Analog Multiline DLC

The system assigns trunks to buttons on DLCs in the order in which the trunks are connected to the control unit. You can change the factory-set assignments by removing, adding, or changing the order in which trunks are assigned to buttons for each DLC operator.

If the system has more than the number of trunks factory assigned to operator consoles, be sure to change the trunk assignment so that all trunks you want answered by a DLC operator appear on at least one operator position.

Decide which trunks should appear on each DLC operator console based on each operator's call-handling responsibilities. All operators may not need the same assignments. For example, DLC operators responsible for answering all incoming calls usually need all trunks except, perhaps, personal lines. DLC operators who are responsible for answering calls for specific groups usually need only the trunks used by group members.

If the system includes a loudspeaker paging system, consider assigning a Loudspeaker Page button to DLC positions for one-touch access to the paging equipment.

If the system has fewer than 30 lines, the operator-only features Alarm, Night Service, and Send/Remove Message are factory assigned as shown in Figure 3-6. The factory assignments can be changed through centralized telephone programming or by a DLC operator.

Planning Form Instructions

Complete the "Button Diagram" on each copy of the back of **Form 5a** and the front of **Form 5b.**

1. Write the telephone number of the trunkyou want to assign in the space on the "Button Diagram." For future reference, record each trunk's number. (Refer to **Form 2c.)**

2. Assign Alarm, Night Service, or Send/Remove Message buttons by labeling the appropriate button "Alarm," "Nite Svc," or "Snd/Rem Msg."

3. Assign Loudspeaker Page buttons by selecting the button and writing "Page" on it.

Features

4

The communications system offers these optional features:

- Telephone Features—assigned to individual telephones, consoles, or adjuncts
- Operator Features- assigned to all operator consoles
- Group Assigned Features—apply to functional groups of users (such as separate departments)
- System Features-affect all or most of the users

Telephone Features

Instructions for assigning these features to the individual telephones used by both system operators and general users are:

- Pool Dial-Out Code
- Call Restrictions
- Forced Account Code Entry
- Microphone Operation
- Remote Call Forward
- Fax Message Waiting Receiver and Threshold

See System Reference *for a complete list of features.*

Additional telephone features can be programmed by each user or by centralized telephone programming. You can decide which telephones should have these features, or you can let users program their own telephones with the features they want.

Mark the feature assignments under "Optional Features" on the copies of the forms you used to assign trunks:

- PBX System Form 4a, Analog Multiline Telephone
- PBX System Form 4b, Digital/ISDN (MLX) Telephone (the front for the telephone and the back for an adjunct connected using a Multi-Function Module)
- PBX System Form 4c, Tip/Ring Equipment

- PBX System Form 5a, Direct-Line Console (DLC) — Analog
- PBX System Form 5b, Direct-Line Console (DLC) — Digital/ISDN (the front for the console and the back for an adjunct connected using a Multi-Function Module)

If the system includes QCCs, prepare and mark the optional feature assignments on **PBX System Form 5c, Queued Call Console (QCC).**

Planning Form Instructions

1. Duplicate **Form 5c,** if necessary. Note that the button diagram on this form is used as a guide for labeling the operator console buttons. You cannot change the button assignments shown.
2. Transfer the identification information from **PBX System Form 2a, System Numbering - Station Jacks,** to each copy of **Form 5c.** Fill in the "Logical ID", "Extension No.," and "Person or Location" spaces.
3. Check the box under "Adjuncts" that shows the equipment at the station. (Refer to the **Floor Plan.)**

Pool Dial-Out Code

When the system is set up, users can access any trunk pool via the dial-out code assigned to the pool. You can tailor this arrangement by restricting telephones from making calls on specific trunk pools—for example, those consisting of special-purpose trunks such as WATS or FX (foreign exchange). You can also use this restriction to reserve trunk pools for data communications only.

If you do not want to restrict trunk-pool access, continue to the “Call Restrictions” instructions.

Planning Form Instructions

Under the "Pool Dial-Out Code Restriction" heading on **Forms 4a** through **5c:**

1. Check the box next to "Yes, dial-out codes."
2. Write the dial-out codes in the space provided. (Refer to **PBX System Form 3b, Outside Trunks - Pools** for the dial-out codes.)

Call Restrictions

When the system is set up, users can place local and toll calls from all telephones. You can restrict selected telephones from making outside calls and allow only intercom (inside) calls—for example, telephones in a reception area or break room. Or, to control toll abuse, you can restrict telephones from making toll calls but still allow local and intercom calls.

See "Allowed Lists and 'Disallowed Lists" in this chapter for more information.*

If these restrictions are too limited, you can use the Allowed List feature to permit dialing numbers such as emergency numbers from a restricted telephone. Or, instead of restricting telephones, you can use the Disallowed List feature to prevent dialing numbers (such as '900' numbers) from any telephone.

Planning Form Instructions

Under the "Call Restriciton" heading of **Forms 4a** through **5c:**

1. Check "Unrestricted" to keep the factory setting (intercom, local, and toll calls can be placed).
2. Check "Outward Restrict" to restrict the telephone from making outside calls (only intercom calls can be made).
3. Check "Toll Restrict" to restrict the telephone from making toll calls (intercom and local calls can be made.)

*See also *Delay Announcement" in this chapter.*

Forced Account Code Entry

Forced Account Code Entry, requiring users to enter account codes (1 to 16 digits) before making outside calls, is used to associate calls with corresponding accounts, clients, or projects, or to track personal calls. Incoming calls, can be tracked with account codes, but you can neither "force" users to enter them nor verify them for accuracy.

Planning Form Instructions

Under the "Forced Account Code Entry" heading on **Forms 4a** through **5c:**

1. Check "No" if you do not want the feature assigned to the telephone.
2. Check "Yes" to require the user to enter an account code.

Microphone Operation

The microphone on MLX telephones and analog multiline telephones allows users to have conversations through a speakerphone without lifting the handset. You can disable the microphone on MLX telephones (but not on analog multiline telephones) in areas in which use of the speakerphone is disruptive.

Planning Form Instructions

Under the "Microphone Operation" heading on **Forms 4b, 5b** and **5c:**

1. Check "Enable" to keep the factory setting.
2. Check "Disable" to prevent speakerphone use.

Remote Call Forward

When the system is set up, it does not allow users to forward calls to outside numbers. Remote Call Forward provides this feature for selected telephones—for example, for users who often work away from the office. Calls forwarded to locations outside the system may vary in transmission quality.

If the telephone has a personal line assigned, you can specify that incoming calls on that trunk also can be forwarded to an outside number by assigning the telephone as the principal user of the personal line.

See "Coverage" in this chapter.

Notes:

- When a principal user is assigned, calls received on the personal line are also sent to individual or group coverage receivers unless the personal line button is set for no ring.
- Remote Call Forward cannot be assigned to queued call consoles.

Planning Form Instructions

Under the "Remote Call Forward" heading on **Forms 4a** through **5c:**

1. Check "Not allowed" to keep the factory setting.
2. Check "Allowed" to provide Remote Call Forward.

Under the "Principal User of Personal Line" heading:

3. Write the trunk number and telephone number in the spaces provided if you want the person to forward calls on the personal line to a remote number. (Refer to **PBX Xyxtem Form 2c, System Numbering - Trunk Jacks.)**

Fax Message Waiting Receiver and Threshold

Use these instructions only if the system has fax machines connected directly to the control unit via a 008 OPT or 012 module or connected to an MLX telephone using a Multi-Function Module (MFM). These instructions are not applicable to fax machines connected to an analog multiline telephone using a General Purpose Adaptor (GPA).

Fax Message Waiting Receiver allows you to designate from one to four telephones to receive message-waiting indications when a fax is received on a specific fax machine. Fax machines can only send message-waiting indications; they cannot receive message-waiting indications from other fax machines.

You can specify the Fax Message Threshold, which is the length of time (0-30 seconds) before the system assumes a fax has arrived and sends the message-waiting indication. The" factory setting is 10 seconds.

Planning Form Instructions

For fax machines connected to a 008 OPT or 012 module, use **PBX System Form 4c, Tip/Ring Equipment.**

For fax machine connected to an MLX telephone using an MFM, use the back of **PBX System Form 4b, Digital/ISDN (MLX) Telephone** or **PBX System Form 5b, Direct-Line Console (DLC) - Digital/ISDN.**

In the "Fax Machine Features" section, under the "Fax Machine Receiver" heading:

1. Check "No" if you are not assigning a receiver and continue to the Operator Features" instructions.

2. Check the second box to assign a Message Waiting Receiver. Write the extension number of the telephone acting as the receiver in the space provided. (Refer to **PBX System Form 2a, System Numbering - Station Jacks.)**

Under the "Fax Message Threshold" heading:

3. Check "10 second" to keep the factory-set threshold.

4. Check the second box to change the factory-set threshold. Write the number of seconds in the space provided.

Locate copies of Forms 4a through **5c** that describe specific telephone(s) designated as receiver(s) of fax message-waiting indications.

Under the "Message-Waiting Receiver" heading:

5. Write the extension number of the fax machine that sends a message-waiting indication to the telephone.

NOTE: You will fill in the rest of the optional telephone features later.

Operator Features

Operator features apply only to direct-line consoles (DLCs), queued call consoles (QCCs), and any Direct Station Selectors (DSSs) connected to them. Operator features you assign apply to all DLCs and QCCs in the system.

Mark the operator feature assignments on PBX System Form 6a, Optional Operator Features.

Direct-Line Console

Use these instructions only if the system has one or more DLCSs

There are two DLC operator features:

- Operator Hold Timer
- DLC Automatic Hold

Mark the DLC operator feature assignments in the "Direct-Line Console" section of PBX System Form 6a.

Hold Timer

Operator Hold Timer tracks the number of seconds callers are on hold for an operator. When a caller is on hold longer than the number of seconds programmed for the timer, the operator is reminded of the call by a single ring. You can set the Operator Hold Timer for 10-255 seconds; the factory setting is 60 seconds.

Planning Form Instructions

Under the "Operator Hold Timer" heading on **Form 6a,** do *one* of the following:

- Check "60 seconds" to keep the factory setting.
- Check the second box to change the factory setting. Write the number of second (up to 255 seconds) in the space provided.

DLC Automatic Hold

With DLC Automatic Hold, calls are placed on hold automatically when the operator presses another line button or a DSS button. The feature is disabled when the system is set up.

DLC Automatic Hold speeds the call handling for operators who frequently transfer calls using DSS buttons.

Planning Form instructions

Under the "DLC Automatic Hold" heading on **Form 6a,** do *one* of the following:

- Check "Disable" to keep the factory setting.
- Check "Enable" to enable the feature.

Queued Call Console

Use these instructions only if the system has one or more QCCs.

The following are QCC operator features:

- Hold Return
- Automatic Hold or Release
- Queue Over Threshold
- Elevate Priority
- Calls-in-Queue Alert
- Message Center Operation
- Automatic or Manual Extended Call Completion
- Return Ring
- Position Busy Backup
- Operator Hold Timer
- Call Types

Mark the QCC operator features in the "Queued Call Console" section of PBX System Form 6a.

Hold Return

Hold Return determines whether calls put on hold by a QCC operator stay on hold indefinitely or are returned to the QCC queue after the Hold Timer has expired twice. The factory setting is that calls stay on hold.

Planning Form Instructions

Under the "Hold Return" heading on **Form 6a,** do *one* of the following:

- Check "Remin on hold" to show that calls stay on hold after the hold timer has expired twice.
- Check "Return to queue" to show that calls on hold return to the QCC queue after the hold timer has expired twice.

Automatic Hold or Release

Automatic Hold or Release determines whether a call that is in progress on a Call button is automatically put on hold (Automatic Hold) or disconnected (Automatic Release) when the operator presses another Call button. The factory setting is Automatic Release.

Planning Form Instructions

Under "Automatic Hold or Release" on **Form 6a,** do *one* of the following:

- Check "Automatic Release" to specify that calls are automatically disconnected.
- Check "Automatic Hold" to specify that calls are automatically put on hold when another Call button is pressed.

Queue Over Threshold

Queue Over Threshold determines the maximum number of calls allowed in the QCC queue before operators are notified (with a tone through the receiver or headset) that calls are waiting. You can change the factory setting of O calls (operators are not notified) to any number from 1-99 based on volume of calls.

Planning Form Instructions

Under the "Queue Over Threshold" heading on **Form 6a:**

1. Check "0 calls" to keep the factory setting (operators are not notified).
2. Check the second box to show that operatos are notified when calls are waiting in queue. Write the maximum number of calls in queue before notification in the space provided.

Elevate Priority

Calls that ring into the QCC queue are assigned a priority level from 1 (highest priority) to 7 (lowest priority). This allows you to arrange the QCC queue so that important business calls are answered first. During high-volume calling periods, however, this means that only high-priority calls are delivered to a QCC within a reasonable amount of time, and low-priority calls go unanswered.

See "QCC Queue Priority" in Chapter 3 to review call priority assignments.

Elevate Priority allows you to determine the length of time (in seconds) before calls waiting in the QCC queue are automatically assigned a higher level of priority. Although the priority of every call in the queue is then increased to a higher level, a call is never increased to highest priority (1) since priority 1 calls are those that must reach the operator as quickly as possible.

You can change the factory setting of 0 seconds to 5-30 seconds depending on the number of priority levels assigned to calls ringing into the queue and the volume of incoming calls. Eight seconds is recommended for typical systems.

Planning Form Instructions

Under the "Elevate Priority" heading on **Form 6a:**

1. Check "0 seconds" to show that the order of priority is not changed.
2. Check the second box to show that calls are reordered. Write the number of seconds in the space provided.

Calls-in-Queue Alert

Calls-in-Queue Alert notifies all QCC operators (with a single ring) when a new call enters the QCC queue. You can change the factory setting (Calls-in-Queue Alert disabled) to enable this feature so that operators who cannot always monitor the display are notified when callers are waiting.

Planning Form Instructions

Under the "Calls-in-Queue Alert" heading on **Form** 6a:

1. Check "Disable" to keep the factory setting (QCC operators are not notified when calls are waiting in queue).
2. Check "Enable" so that specific QCC operators are notified (with a single ring) when a call enters the queue. Write the extension number of each QCC position that receives the notification in the space provided. (Refer to **Form 2a** or **Form 5c.**

Message Center Operation

Message Center Operation allows you to designate a QCC as a Message Center with the following options automatically set:

- The only incoming calls that go to the Message Center QCC are calls to the extension number of the QCC and calls sent to the QCC using Forward or Follow Me.
- Returning calls such as extended (transferred), operator-parked, and camp-on calls go to the Message Center QCC. This means that the Message Center position is different from that of the system operator who originally answered the call.
- Group Coverage calls go to the QCC Message Center.
- Direct Inward Dial (DID) calls to invalid destinations (unassigned extension numbers) go to the QCC Message Center.

CAUTION

DID numbers that correspond to pool dial-out codes (or facility access codes) can be used to avoid toil restriction, leading to toll abuse and/or fraud. (See 'Customer Support Information" in the front of this book for more information on security.)

Assign this feature when you have more than one QCC operator position and you want one centralized location for employees to retrieve messages. Only one Message Center position should be assigned.

Planning Form Instructions

Under the "Message Center" heading on **Form 6a:**

1. Check "No" to show that no Message Center operator is assigned.
2. Check the second box to assign a Message Center. Write the extension for QCC operator position in the space provided. (refer to **Form 2a** or **5c).**

Automatic or Manual Extended Call Completion

Use these instructions only if the system has a QCC with a Direct Station Selector (DSS).

The factory setting for Extended Call Completion is automatic. This allows QCC operators with a DSS to extend (transfer) calls by pressing a DSS button. The operator does not have to press the Release button to complete the call extending procedure. With automatic release, the operator cannot announce transferred calls.

You can change the setting to manual completion; the QCC operator must press the Release button when using a DSS button to extend a call.

Planning Form Instructions

Under the "Extended Call Completion" heading on **Form 6a:**

1. Check "Automatic completion" to keep the factory setting.
2. Check "Manual completion" if the operator must use the release button to extend calls.

Return Ring

Return Ring determines the number of rings before an unanswered, extended call is returned to the QCC queue (or QCC Message Center position). The factory setting is 4 rings. You can change the setting to 1 to 15 rings.

Planning Form Instructions

Under the "Return Ring" heading on **Form 6a:**

1. Check "4 rings" to keep the factory setting.
2. Check the second box to change the factory setting. Write the number of rings you want to assign in the space provided (up to 15 rings).

Position Busy Backup

Position Busy Backup allows you to assign another telephone to receive calls when all QCC operator consoles are in a position busy (Backup On) mode. Only a calling group can be assigned as a backup for a QCC operator position.

The factory setting is that no backup is designated. If you decide not to designate a backup, the system will not allow the last available operator position to go into the position busy state.

Planning Form Instructions

Under the "Position Busy Backup" heading on **Form 6a:**

1. Check "No" to show that no backup is assigned.
2. Check the second box to designate a backup. The extension number of the backup calling group will be completed later.

Operator Hold Timer

Operator Hold Timer is used to track the number of seconds that callers are on hold at an operator. When a caller is on hold longer than the number of seconds programmed for the timer, the operator is reminded by a single ring.

You can set the Operator Hold Timer from 10 to 255 seconds. The factory setting is 60 seconds.

Planning Form Instructions

Under the "Operator Hold Timer" heading on **Form 6a:**

1. Check "60 seconds" to keep the factory setting.
2. Check the second box to change the factory setting. Write the number of seconds (up to 255 seconds) in the space provided.

Call Types

Assigning a QCC operator to receive certain types of calls determines whether the calls ring into the QCC queue and which QCC position or positions answer the calls. You can assign a QCC operator to receive the following types of calls:

- dial 0 calls (calls to the system operator)
- Direct Inward Dial (DID) calls to invalid destinations (unassigned extension numbers)
- calls to the Listed Directory Number (the extension for the QCC queue)
- Group Coverage calls
- calls programmed to return to the QCC queue-return from extend (transfer) or camp-on, held calls, and operator-parked calls

The factory setting for dial O calls, DID calls to invalid destinations, calls to the Listed Directory Number, and Group Coverage calls is that they are directed to the primary operator position. For returning calls, the factory setting is that the call returns to the originator. You can change the settings so that each type of call is directed to a different and/or additional operator position, or is not directed to any of the operator positions.

CAUTION

DID numbers that correspond to pool dial-out codes (or facility access codes) can be used to avoid toll restriction, leading to toll abuse and/or fraud. (See 'Customer Supped Information" in the front of this book for more information on security.)

Calls sent to the QCC queue have a factory-set priority level of 4. You can change the priority level for the call types listed above as well as for the following call types:

- calls to a QCC operator extension number
- calls signed in (Follow Me) or forwarded to the system operator

A value of 1 is the highest priority and 7 is the lowest. Assign the values according to the order that you want calls answered. (Priority 1 should be reserved for high-priority incoming calls from special outside trunks.)

Planning Form Instructions

Under the "Call Types" heading on **Form 6a:**

1. In type "QCC Operator to Receive Calls" column, for each call type:
   - Write "None" if no QCC operator is to receive the call type.
   - Write any combination of the extension number(s) if one or more QCC operators are to receive the call type. (Refer to **Form 2a** or **5c.)**

   Note: You cannot assign an operator to either Follow Me calls or calls to QCC operator extensions.
2. In the "QCC Queue Priority Level" column, write the level for each call type. Assign a value of 1 through 7. The factory default is 4.

Note: The "Group Coverage Calls" section on the back of the form will be completed later.

Direct Station Selector

Page Buttons

Use these instructions only if the system has Direct Station Selectors (DSS) connected to digital/ISDN (MLX) operator consoles.

Operators use the buttons on a DSS for one-touch automatic dialing (Auto Dial) of station extension numbers. Each Auto Dial button may be assigned up to three different extension numbers, and the Page buttons determine which extension is dialed when an Auto Dial button is pressed.

If the operator presses the first Page button, the console is set to dial the first group of extensions assigned to the Auto Dial buttons. If the second Page button is pressed, the operator reaches the second group of extensions assigned to the buttons, and the third Page button dials-the third group of extension numbers.

See "System Renumbering' in Chapter 2 to review the numbering plans.

Set the three Page buttons to reach ranges of numbers that include the extension numbers in the station numbering plan and reflect the number of Auto Dial buttons available.

- If one DSS is connected to an operator console, set each Page button for a range of 50 numbers (matching the 50 available Auto Dial buttons).
- If two DSSs are connected, set each Page button for a range of 100 numbers. The Page buttons then control 100 Auto Dial buttons-50 on each DSS.

  Note: If two DSSs are used, the Page buttons on the second selector are not active.

For example, if your numbering plan contains extensions in the 100-149 and 200-294 ranges, and only one DSS is connected, set the first Page button to begin with extension 100 (the range includes extensions 100-149), the second Page button to begin with extension 200 (the range includes extensions 200-249) and the third Page button to begin with extension 250 (the range includes extensions 250-294). For a console with two DSSs connected, set the first Page button on the console to begin with 100 (the range includes extensions 100–1 99) and the second Page button to begin with extension 200 (the range includes extensions 200-294).

Note: Assign the lowest extension numbers in the plan to the first Page button, the middle range of numbers to the second Page button, and the highest extension numbers to the third Page button.

In addition to providing one-touch dialing of telephones, you can set the Page buttons to include one-touch feature use. For example, one Page button's range might be set to include the extension numbers reserved for Call Park codes or Group Calling extensions. (See the "Call Park Codes' instructions that follow.)

Use the information from PBX System Form 2a, System Numbering — Station Jacks, to assign the range of stations for each Page button.

Planning Form Instructions

Mark the "Direct Station Selector" section of **Form 6a:**

In the space under the "Page Buttons" heading, write the beginning extension for the range of the 50 or 100 extension numbers for each Page button.

Call Park Codes

Park allows users to put calls into a special type of hold so that the calls can be picked up from any telephone in the system. Through Call Park codes you can provide operators who have Direct Station Selectors with one-touch use of Call Park.

See "System Renumbering" in Chapter 2.

The system automatically reserves eight extensions (881 –888) for operator parking. Consider changing these factory-set extensions to numbers that fall within the Page button ranges. The same considerations apply as those used during reassignment of station extension numbers.

If you are not renumbering the factory-set Call Park codes, continue to the "Group Assigned Features" instructions.

Planning Form Instructions

Under the "Call Park Codes" heading on **Form 6a:**

1. Write the new codes assigned.
2. Locate **PBX System Form 2d, System Numbering - Special Renumbers** and write the new numbers in the "Renumber To" column of the "Call Park" section of that form.

Group Assigned Features

The system offers four features that facilitate the call-handling responsibilities of groups of users. The features and the corresponding PBX System Forms used to plan them are

- Call Pickup Groups, Form 6b
- Group Paging, Form 6c
- Group Call Coverage, Form 6d
- Group Calling, Form 6e

See Chapter 1 for information about analyzing Employee Communication Survey forms.

To determine if any of the group-assigned features is appropriate for your users, see the analysis of the Employee Communication Survey. You will also need other PBX System Forms as references; the specific forms needed are indicated within the instructions for each feature.

Call Pickup Groups

A call pickup group is a group of users who can answer each other's calls by pressing a programmed button on a multiline telephone or by dialing a code on a single-line telephone.

A group member does not need to know the extension number of the telephone through which the call came into pick up the call. The system automatically connects the ringing call when the button is pressed or the code is dialed. Both inside and outside calls can be picked up within a group.

Assign this feature to employees who work in a common area and who do not have a support person for coverage. You can assign up to 30 call pickup groups with up to 15 telephones per group. Each telephone can be assigned to only one group.

Compare with the 'Coverage" instructions in this chapter.

Unlike other coverage arrangements, ringing calls do not transfer from one telephone to the other automatically. Since users must choose to pick up a call, call pickup group members should be within hearing distance of each other's telephones.

Planning Form Instructions

Review the analysis of question 10 on the **Employee Communication** Survey, determine the number of call pickup groups needed, and mark **PBX System Form 6b, Call Pickup Groups.**

Note: Form 6b holds the programming information for eight call pickup groups. Duplicate the for if more groups are planned.

1. Write the group number in the "Group Number" space. Start with 1 and number the groups sequentially.

Planning Form Instructions - Continued

2. Write the name of a group, such as Customer Service in the "Group ID" space. (Refer to the survey analysis.)
3. Write the extension number for each group member in the "Ext. No." column. (Refer to **Form 2a.)**
4. Write each group member's name or location in the "Person or Location" column. (Refer to **Form 2a.)**

Group Paging

Group Paging allows users to make voice announcements that are heard by a particular group of employees or by everyone. The announcement is heard through the telephone speakers rather than on an external loudspeaker paging system.

You can assign six paging groups of selected employees, such as secretarial pools, committee members, or departments, who need to hear announcements. Each group can have as many as 10 extension numbers.

The seventh paging group is factory set to page all extension numbers. This group is useful if the system does not have an external loudspeaker paging system.

See Chapter 2 "System Renumbering" for more on reassigning extension numbers.

The system automatically reserves extension numbers 793 through 799 for paging groups. Extension 799 is the page-all group. Decide whether to keep or to reassign the factory-set extension numbers. Keep in mind that you can provide one-touch use of Group Paging to operators with Direct Station Selectors if you renumber to extensions within the Page button ranges.

Planning Form Instructions

Determine the number of paging groups needed and mark **PBX System Form 6c, Group Paging.**

1. Write the name of the group, such as Sales, in the "Group ID" space.
2. To change the factory-set extension numbers:
   - Write the new number in the "Renumber To" space.
   - Locate **PBX System Form 2d, System Numbering - Special Renumbers** and write the new numbers in the "Renumber To" column of the "Group Paging" section of the form.
3. Write the extension number for each group member in the "Ext No." column. (Refer to **Form 2a.)**
4. Write each group member's name or location in the "Person or Location" column. (Refer to **Form 2a.)**

Coverage

See "Coverage in Chapter 2 of* System Reference *for more information.*

Coverage allows calls to users (called senders) to be covered by one or more telephones (called receivers). Coverage can be individual or group assigned. These instructions are for both Individual and Group Coverage.

Individual Coverage

Individual Coverage allows a one-on-one arrangement in which calls from one sender are covered by one or more receivers.

A sender can have calls covered by up to eight receivers, and a receiver (such as a secretary) can provide Individual Coverage for more than one sender. Any type of telephone can be a sender; only a multiline telephone with programmable buttons available can be a receiver.

Individual Coverage is set up by programming a Cover button on a receiver's telephone. The receiver must have a programmed Cover button for each sender whose calls are being covered.

When a sender's telephone rings, the call is immediately sent to the receivers and the lights next to the Cover buttons flash. The telephones ring depending on the type of coverage and the ringing option set for each receiver telephone.

A receiver can provide

- Primary Individual Coverage with the following ringing options:
  - Immediate Ring. The receiver's telephone rings at the same time the sender's telephone rings.
  - Delayed Ring. The receiver's telephone rings after the Delayed Ring Interval programmed for the system.
  - No Ring. The receiver's telephone does not ring.
- Secondary Individual Coverage with the following ringing options:
  - Immediate Ring. The receiver's telephone rings after the sender's telephone rings twice. This two-ring Secondary Delay Interval is fixed and cannot be changed.
  - Delayed Ring. The receiver's telephone rings after the sender's telephone rings twice plus the Delayed Ring Interval programmed for the system. For example, if the Delayed Ring Interval is set to 2 rings, the receiver's telephone rings after the sender's telephone rings four times.
  - No Ring. The receiver's telephone does not ring.

See "Group Coverage" later in this section for more on the Delayed Ring Interval.

Both primary and secondary Individual Cover buttons can be programmed for each individual sender as long as the maximum does not exceed eight receivers.

Assign primary Individual Coverage when coverage is needed between two users—for example, an executive who wants calls answered by a secretary, or a DLC operator who routinely covers calls for another operator.

Assign secondary Individual Coverage for senders whose calls need less frequent coverage—for example, users who provide backup only during peak calling periods.

See "Personal Lines" in Chapter 2 of System Reference.

Calls received on personal lines programmed for immediate or delayed ring are eligible for coverage. Calls on personal lines programmed for no ring are not covered.

If a principal user is assigned, all calls are sent to the principal's receivers only. If the principal user has Remote Call Forward, calls are sent to an outside number rather than the coverage receivers.

Planning Form Instructions

Review the **Employee Communication Survey** analysis and determine which users (senders) need Individual Coverage.

To set up Individual Coverage, program Cover buttons on the receivers' telephones. Locate the specific receiver telephone forms from copies of

- PBX System Form 4a, Analog Multiline Telephone
- PBX System Form 4b, DIgital/ISDN (MLX) Telephone
- PBX System Form 4c, Tip/Ring Equipement
- PBX System Form 5a, Direct-Line Console (DLC) - Analog
- PBX System Form 5b, Direct-Line Console (DLC) - Digital/ISDN

Use **PBX System Form 2a, System Numbering - Station Jacks** for sender information. Use **Form 4a, 4b, 4c, 5a,** or **5b** to record this information.

1. On the forms for the sender telephone(s), under the "Individual Coverage Receivers" heading, write the extension number for each primary and secondary receiver in the spaces provided.
2. On the forms for the receir telephone(s), locate an available button on the "Button Diagram" and write "Ind Cover" and the sender's extension number. Write "P" to indicate primary or "S" to indicate secondary Individual Coverage.

Note: Single-line telephones cannot be receives, and QCCs cannot be senders or receivers.

Group Coverage

In Group Coverage, senders are organized into groups and calls received by any member of the group are sent to a receiver.

Any type of telephone (excluding QCCs) can be a member of a coverage group; however, no individual sender can be a member of more than one group. A maximum of 30 coverage groups can be set up, and there is no limit to the number of senders in each group.

Group Cover buttons are programmed on the receiver telephone for each coverage group whose calls are covered. Only Group Coverage receivers with display telephones can identify the individual sender. Non-display users can determine only that a call is from the coverage group.

Three types of receivers can be programmed:

- Multiline telephones. A maximum of eight Group Cover buttons can be programmed for each coverage group. All eight can be programmed on one multiline telephone, or the Group Cover buttons can be distributed over up to eight multiline telephones.

  A single receiver can have more than one Group Cover button for the same coverage group; however, each programmed button is counted in the eight Group Cover button maximum for the group.

  QCCs cannot be programmed as Group Coverage receivers.

  Note: Single-line telephones cannot be programmed individually as Group Coverage receivers; however, if a single-line telephone is programmed as a member of a calling group, it can receive Group Coverage calls.

  A receiver can program each Group Cover button for immediate ring, delayed ring, or no ring.

See "Call Types" in this chapter for information on QCC operator assignments.

- QCC queue. Up to four QCC operators can be assigned to receive calls for each coverage group. The QCC queue can be programmed as the only receiver or can be programmed in addition to the Group Cover buttons oh multiline telephones; it is not counted in the eight receiver maximum.

  When the QCC queue is assigned as a receiver, the calls enter the queue and are delivered to an available QCC operator.

- Calling groups. If a calling group is programmed as a receiver for a coverage group, it can be the only Group Coverage receiver for the group. No other types of group receivers can be programmed; however, both primary and secondary Individual Coverage receivers can be assigned.

  When a calling group is assigned a receiver, the calls enter the calling group queue and are delivered to the first available member. Since calls are sent to the queue, Cover buttons are not needed.

When a calling group or the QCC queue is programmed as a receiver, or both Individual and Group Coverage are programmed for a sender, Group Coverage has a system-wide Cover Delay Interval. The delay interval is the number of rings before a call is sent to the receiver.

Assign Group Coverage when more than one sender requires the same coverage arrangements—for example, for all members of a department whose calls are answered by a secretary. Also consider assigning more than one Group Cover button on one receiver's telephone (for example, on a DLC) if a coverage group is expected to get large numbers of calls.

You can assign up to 30 coverage groups, each with an unlimited number of members. Coverage senders can be a member of only one group.

Note: Group Coverage can be used alone or can be set up to work with either primary or secondary Individual Coverage, or both. This allows callers to get personal attention from the primary and/or secondary Individual Coverage receiver and backup from Group Coverage. For example, a receiver such as a secretary can have a Primary Cover button to provide Individual Coverage for a sender who is also a member of a coverage group.

Decide the interval for Coverage Delay and for Delayed Ring (the number of rings before a receiver telephone with the Delayed Ring option begins to ring).

You can change the factory-set, three-ring Coverage Delay Interval to an interval of from one to nine rings. The factory-set Delayed Ring Interval of two rings can be changed to an interval of from one to six rings.

Note: The ringing pattern heard by an outside caller is shorter than the audible ringing heard at an MLX or analog multiline telephone even though the total time is exactly the same. An outside caller hears from one to two rings in addition to the number of rings programmed for the Delayed Ring Interval and Coverage Delay Interval. For example, if the Delayed Ring Interval is programmed for two rings and the Coverage Delay Interval is programmed for one ring, an outside caller hears four rings before the call is sent to coverage. If both intervals are set to their maximum values, the caller will hear two additional rings.

Planning Form Instructions

Review the **Employee Communication Survey** analysis and determine the senders to be grouped. Record both sender groups and receivers on **PBX System Form 6d, Group Coverage.**

Note: Form 6d holds information for eight coverage groups. Duplicate the form if more groups are planned.

Locate **PBX System Form 2a, System Numbering - Station Jacks** for sender information and the specific recer forms from copies of **PBX System Forms 4a** through **5b.**
Under the "Coverage Delay Interval" heading at the top of **Form 6d:**

1. Check "3 rings" to keep the factory-set interval.

2. Check the second box to change the factory-set interval. Write the number of rings in the space provided.

Under the "Dlayed Ring Interval" heading:

3. Check "2 rings" to keep the factory-set interval.

4. Check the second box to change the factory-set interval. Write the number of rings in the space provided.

Planning Form Instructions - Continued

In each column:

5. Write the group number in the "Group No." space. Start with 1 and number the groups sequentially.

6. List the extension numbers of all senders in the group in the upper block. Refer to **Form 2a.)**

7. List the extension number of all receivers for the group in the lower block. (Refer to **Form 2a.)**

   - If designating a calling group as a receiver, write "Calling Group" next to the extension number. (Refer to **Form 6e.)**

     Note: If you have not yet created calling groups, your must defer naming them as receivers until later.

   - If naming the QCC queue as a receiver, check that box.

On each copy of **Forms 4a, 4b, 5a** and **5b** that describes a specific receiver:

8. Locate an available button in the "Button Diagram" area.

9. Write "Group Cover" and the coverage group number in the space available.

If designating the QCC Queue as a receiver, locate the "Group Coverage Calls" block on the back of **Form 6a.**

See "Call Types" in this chapter to review assigning QCC operators to receive calls.

10. Write the extension(s) for the QCC operator position(s) to receive the calls in the "QCC Operator to Receive Calls" column. (Refer to **Form 2a.)**

11. Write the level for each coverage group's calls in the "QCC Queue Priority Level" column. Assign a value of 1 (highest) through 7.

Group Calling

Group Calling allows you to group the telephones of people (such as ticketing agents) who all handle the same type of call. Through the Group Calling feature all telephones in the group are assigned to a single extension number that is used by both inside and outside callers to reach the group. The individual extension numbers of the telephones are still used by callers who need to reach a specific member of the calling group.

See "Extension Status" instructions later in this chapter for details.

Note: The Extension Status must be set for the Group Calling/CMS configuration in order for calling groups to be available.

Calls to the single extension number are distributed among the group members in a circular pattern. The system hunts for the first available telephone, starting with the one that received the last call. If no group member telephone is available, calls are held in a queue and the caller can be given a recorded announcement explaining the delay.

Group members make themselves available to take calls by logging in and unavailable to take calls by logging out using a programmed button or dialing a code. Calls for the group are received at the telephone only when the group member is logged in and is not busy on the telephone.

Calls to group members ring on System Access Voice, System Access Ring, or Shared System Access buttons. If the call is not answered within 30 seconds, the call is sent to another member or back to the queue. If the call is not answered, the system automatically logs out the telephone and makes it unavailable for subsequent calls until the group member logs in.

Assign Group Calling for people who handle the same type of incoming calls. Sales representatives, service representatives, and ticketing agents are good candidates.

- Assign up to 32 calling groups with up to 20 members per group. Each telephone user can be a member of only one calling group.
- Designate particular trunks to ring directly into a calling group. Incoming calls on a given trunk can be directed to only one calling group.
- If you are using the MERLIN Attendant or another voice messaging system, reserve one or more calling groups for that feature.

See "System Renubmering" in Chapter 2 for more on reassigning extension numbers.

The system automatically reserves extension numbers 770-791 and 7920-7929 for calling groups. (These may be changed.) If operators with DSSs need one-touch use of Group Calling, renumber to extensions that fall within the Page button ranges.

Planning Form Instructions

Review the **Employee Communication Survey** analysis and determine the number of calling groups needed. Make that number of copies of both sides of **PBX System Form 6e, Group Calling.**

Note: Form 6e has two sides. List the extensions (and trunks) assigned to the groups on the front and specify the options assigned to the group on the back.

Instructions for completing the back of Form 6e follow.

On the front of **Form 6e:**

1. Write the group number in the "Group No." space. Start with 1 and number sequentially.
2. Write the name of the group in the "Group ID" space. (Refer to the survey analysis.)
3. Write the factory-set extension number in the space provided (770 for group 1, 771 for group 2, etc.).

Planning Form Instructions - Continued

4. To change the factory-set extension number:
   - Write the new number in the "Renumber To" space.
   - Locate **PBX System Form 2d, System Renumbering - Special Renumbers** and write the Group ID and new number in the "Renumber To" column of the "Group Calling" section of that form.
5. In the "Stations" area of **Form 6e,** write the extension number of each member of the group in the "Ext No." column and the name of the person of location in the "Person or Location" column. (Refer to **Form 2a.)**

   Note: Before you complete the extension number and name entries, read the "Hunt Type" instructions that follow.
6. In the "Trunks" area of **Form 6e,** for each trunk that is to ring directly into the calling group, write the trunk number next to the logical ID. (Refer to **Form 2c.)**

If assigning a calling group as backup for a queued call console, mark **PBX System Form 6a, Optional Operator Features.**

7. Write the extension number of the calling group under the "Position Busy Backup" heading in the "Queued Call Console" section.

The following options are available for a calling group:

- Hunt Type
- Delay Announcement
- Message-Waiting Receiver
- Calls-in-Queue Alarm Threshold
- External Alert for Calls-in-Queue Alarm
- Overflow Coverage
- Overflow Threshold
- Group Type

Use the "Calling Group Options" section on the back of each copy of Form 6e to record each option. Copy the Group No. and ID from the front of the form.

Hunt Type

Hunt Type allows you to change the hunting pattern from the factory-set circular type to linear. The system then searches for an available telephone in the order that telephones are assigned to the calling group.

If you choose linear hunt, be sure you have listed the extension numbers and names in the 'Stations' area on the front of Form 6e in the order that you want the group searched. If you have not done this, go back and correct the front of the form so that the extensions are in the right order.

Planning Form Instructions

Under the "Hunt Type" heading on **Form 6e,** do *one* of the following:

- Check "Circular" to keep the Factory-set hunting pattern.
- Check "Linear" to change the factory-set hunting pattern.

Delay Announcement

Delay Announcement allows you to designate an announcement device to play messages to callers. The announcement plays once for each call that is placed in the queue.

The device designated for Calling Group delay announcement can be any device connected directly to the control unit on a 008 OPT or 012 basic telephone module. Also, the device can be connected to digital/lSDN (MLX) telephones using a Multi-Function Module (MFM) in the tip/ring mode.

See "Call Restrictions" in this chapter for information on toll restriction.

Only one announcement device can be designated for each calling group; however, more than one calling group can use the same announcement device. The announcement device should not be assigned as a group member, and it must be outward restricted to prevent anyone attaching a telephone and dialing unauthorized calls.

Planning Form Instructions

Under the "Delay Announcement" heading on **Form 6e:**

1. Do *one* of the following:
   - Check "No" if you do not want an announcement device and continue to the "Message Wating Receiver" instructions.
   - Check the second box to designate an announcement device. Write the extension number for the device in the space provided. (Refer to **Form 2a** or **2b.)**

Locate the copies of **Forms 4b, 4c,** and **5b** that describe the device(s) you are designating for delay announcement use.

In the "Type" or "Adjuncts" section under "Answering Machine":

2. Check the box that indicates that the answering machine is used as a delay announcement device.
3. Write the calling group extension number(s) for the group(s) using the device.
4. Verify that "Outward Restrict" is the selected Call Restriction option.

Message Waiting Receiver

Message Waiting Receiver allows you to designate a telephone to receive message-waiting indications for the group. The message receiver for a calling group does not have to be a member of the group.

Each calling group can have only one telephone assigned as its message receiver. The same telephone can be assigned as the message receiver for more than one calling group.

Planning Form Instructions

Under the "Message Waiting Receiver" heading on **Form 6e,** do *one* of the following:

- Check "No" if you are not assigning a receiver.
- Check the second box if assigning a receiver. Write the extension number of the the Message Waiting Receiver. (Refer to **Form 2a.)**

Calls-in-Queue Alarm Threshold

See "External Alert for Calls-in-Queue Alarm that follows.*

Calls-in-Queue Alarm Threshold allows you to set the limit for the number of unanswered calls that wait in the calling group queue before group members are notified. Once the threshold is reached, group members are notified with a light on the telephone and an external alert if one is assigned.

The factory-set threshold is 1 call. You can change the number of calls to up to 99 calls.

Planning Form Instructions

Under the "Calls-in-Queue Alarm Threshold" heading on **Form 6e,** do *one* of the following:

- Check "1 call" to keep the factory setting.
- Check the second box to change the factory-set nember of calls allowed in the queue before members are notified. Write the number of calls in the space provided.

External Alert for Calls-in-Queue Alarm

External Alert for Calls-in-Queue Alarm allows group members to be notified by an external alert when calls waiting in the queue are equal to or greater than the programmed threshold. The alerting signal remains active until the number of calls in the queue drops below the threshold.

Note: Since the signal is continuous, it is recommended that only lamp-type external alerting devices be used.

The external alert designated for Calls-in-Queue Alarm can be any alerting device connected through a Multi-Function Module (MFM) in the External Alert mode for digital/ISDN (MLX) telephones. Only one external alert can be designated for each calling group.

Note: An alert connected to a Supplemental Alert Adapter (SAA) for an analog multiline telephone should not be used as a Calls-in-Queue Alarm.

Planning Form Instructions

Under the "External Alert for Calls-in-Queue Alarm" on **Form 6e:**

1. Do *one* of the following:

- Check "No" if you do not want an external alert for Calls-in-Queue Alarm and continue to the "Overflow Coverage" instructions.
- Check the second box to designate an external alert. Write the extension number for the alert in the space provided. (Refer to **Form 2b).**

Locate the copies of **Form 4b** and **5b** that describe the alerting device you are designating for Calls-in-Queue Alarm use.

In the "Adjuncts" section, under "Alert device":

2. Check the box that indicates the alert is used as a Calls-in-Queue Alarm.
3. Write the calling group extension number in the space provided.

Overflow Coverage and Overflow Threshold

You can provide backup coverage for a calling group by designating another calling group or the QCC queue to receive calls when the number of calls waiting in the queue reaches a certain level.

A calling group can provide overflow coverage for more than one calling group; however, group members cannot tell which group's calls they are answering. In addition, callers do not hear the overflow group's delay announcement.

If you assign an overflow group, choose the threshold (the number of calls to wait in queue before they are sent to the overflow group). The factory setting is 1. You can change the setting to up to 99 calls.

Planning Form Instructions

Locate the copy of **PBX System Form 6e, Group Calling** that lists the extension number for the group to be designated as the overflow calling group.

Under the "Overflow Coverage" heading on **Form 6e:**

1. Check "No" if you do not want overflow coverage and continue to the "Group Type" instructions.
2. Check the second box to designate overflow coverage by another calling group. Write the calling group number of the overflow calling group in the space provided.
3. Check the third box to designate that overflow coverage will be provided by QCC operators.

Under the heading "Overthrow Threshold":

4. Check "1 call" to retain the factory setting.
5. Check the second box to change the threshol. Write the number of calls (up to 99) in the space provided.

Group Type

Group Type determines whether or not the system automatically logs in members of a calling group following a power failure. The factory setting is no automatic system login (auto logout).

You can change the factory setting to one of the following:

- Auto Login. Use this setting when a Call Management System (CMS) is connected to the system to specify that the system automatically logs in calling group members following a power failure and does not log out users who do not answer a call. This setting is also used for calling groups used for data (called data hunt groups). See the *Data Guide* for more detailed information.
- Integrated VMI. Use this setting when a voice messaging system such as AUDIX Voice Power—IS II or MERLIN MAIL Voice Messaging System, which requires special signaling for integrated operation, is connected to one or more station jacks assigned to a calling group. The system automatically logs in the group members following a power failure.
- Generic VMI. Use this setting when a voice messaging system such as MERLIN Attendant or Integrated Voice Power Automated Attendant-IS II, which does not require special signaling, is connected to one or more station jacks assigned to a calling group. The system automatically logs in the group members following a power failure.

Planning Form Instructions

Under the "Group Type" heading on **Form 6e:**

1. Check "Auto Logout" to keep the factory setting of no automatic login.
2. To change the factory setting from Auto Logout:
   - Check "Auto Login" to show automatice login for a CMS or a data station.
   - Check "Integrated VMI" to show automatic login for a voice messaging system that requires special signaling for integrated operation.
   - Check "Generic VMI" to show automatic login for a voice messaging system that does not require special signaling.

System Features

See System Reference *for more information on system features.*

System features affect all users and all or most of the telephones. Record your decisions about them on PBX System Form 6f, System Features.

Transfer of Calls Options

The Transfer feature allows users to transfer outside or inside calls to another telephone through the following options:

- Transfer Return Interval
- One-Touch Transfer
- Transfer Audible
- Type of Transfer

Transfer Return Interval

The Transfer Return Interval is the number of rings before a call transferred to another telephone is returned to the person transferring the call.

The factory-set number of rings is four. You can change the setting to one to nine rings or change the setting to zero if you do not want the calls to return to the original telephone.

Planning Form Instructions

Under the "Return Time Interval" heading in the "Transfer Options" section of **Form 6f,** do *one* of the following:

- Check "4 rings" to keep the factory setting.
- Check "0 rings" to indicate no return for transferred calls.
- Check the third box to change the factory-set number of rings. Write the number of rings in the space provided.

One-Touch Transfer

When the system is set up, it is set for One-Touch Transfer, which allows users to transfer calls to another person by pressing a preprogrammed Auto Dial button or DSS button for that person. You can change this option to One-Touch Hold so that people must use the Transfer button to initiate transfers.

If you decide to keep One-Touch Transfer, decide whether transfer completion is manual or automatic:

- Automatic completion (the factory setting) means that transfer is initiated and completed by pressing the Auto Dial or DSS button.
- Manual completion means that the person transferring the call can consult with the other person, and then complete the transfer by pressing another button (after pressing the Auto Dial button or DSS button).

Planning Form Instructions

Under the "One-Touch Call Handling" heading in the "Transfer Options" section of **Form 6f,** do *one* of the following:

- Check "One-Touch Transfer" to keep the factory setting.
  - To keep the factory-set automatic completion of transfers, check that box.
  - To change the factory setting to manual completion, check that box.
- Check "One-Touch Hold" if you do not want to keep the One-Touch Transfer feature.

Transfer Audible

The Transfer Audible option allows you to select whether an outside caller hears Music-on-Hold or ringing (called ringback) while being transferred.

Note: If you use equipment that rebroadcasts music or other copyrighted materials, you may be required to obtain a copyright license from, and pay license fees to, a third party such as the American Society of Composers, Artists, and Producers (ASCAP) or Broadcast Music Incorporated (BMI). Or, you can purchase a Magic on Hold system, which does not require you to obtain such a license, from AT&T or an authorized representative.

Planning Form Instructions

Under the "Transfer Audible" heading in the "Transfer Options" section of **Form 6f** do *one* of the following:

- Check "Music-on-Hold" if you plan to play music while callers are being transferred.
- Check "Ringback" if you're not providing music.

Type of Transfer

Type of Transfer determines whether the system automatically selects a Ring or Voice button when the person transferring a call presses either the Transfer button or an Auto Dial button for One-Touch Transfer. The factory setting is the Ring button. You can change the factory setting to the Voice button, which means that calls can be transferred with a voice announcement.

Planning Form Instructions

Under the "Type of Transfer" heading in the "Transfer Options" section of **Form 6f,** do *one* of the following:

- Check "Ring button" for the system to select a Ring button for transferred calls.
- Check "Voice button" for the system to select a Voice button for transferred calls.

Camp-On Return Time

Camp-On Return Time is the number of seconds a caller waits when a person uses the Camp-On feature to complete the transfer of a call to a busy telephone. If the telephone is still busy at the end of the programmed interval, the call returns to the person who transferred the call.

You can change the factory-set 90-second interval to 30-300 seconds.

Planning Form Instructions

Under the "Camp-On Return Time" heading on **Form 6f,** do *one* of the following:

- Check "90 seconds" to keep the factory-set interval.
- Check the second box to change the fatory-set interval. Write the number of seconds in the space provided.

Call Park Return Time

Call Park Return Time is the number of seconds a caller waits when a person uses the Call Park feature to put a call on hold. If the call is not picked up at the end of the programmed interval, the call returns to the person who parked the call.

You can change the factory-set 180-second interval to 30-300 seconds.

Planning Form instructions

Under the "Call Park Return Time" heading on **Form 6f,** do *one* of the following:

- Check "180 seconds" to keep the factory-set interval.
- Check the second box to change the factory-set interval. Write the number of second in the space provided.

Automatic Callback

Automatic Callback enables the system to automatically complete calls to busy trunks or extensions as soon as the extension or trunk becomes available.

The system alerts the user that the call is ready for completion by ringing the telephone. If the user does not answer within a certain number of rings, the system cancels the request. The number of rings before the system cancels the request is called the Automatic Callback Interval.

You can change the factory-set Automatic Callback interval of three rings to one to six rings.

Planning Form Instructions

Under the "Automatic Callback Interval" heading on **Form 6f,** do *one* of the following:

- Check "3-rings" to keep the factory-set interval.
- Check the second box to change the factory-set interval. Write the number of rings in the space provided.

Extension Status

Extension Status allows an operator, a calling group supervisor, or a Call Management System (CMS) supervisor to determine the status of a telephone at a glance. The lights next to the buttons on a DSS or next to Auto Dial buttons programmed with extension numbers indicate the status of the telephone.

There are two configurations for Extension Status:

- In the hotel configuration, employees at the front desk of hotels and motels use the feature to monitor room availability and to restrict the telephones " when the rooms are not occupied. There are three extension states:
  - Status O-green light is off. Room is occupied and telephone is in regular call-handling state.
  - Status 1-green light is flashing. Room is vacant and ready for cleaning, and outside calls cannot be made from the telephone.
  - Status 2-green light is on. Room is vacant and outside calls cannot be made from the telephone.

Hotels or motels may assign different meanings to the three extension states.

- In the Group Calling/CMS configuration, calling group or CMS supervisors use this feature to monitor the availability of agents to take calls directed to the calling group. There are two extension states:
  - Status 0-green light is off. Telephone is signed out from the group and the agent is unavailable to take calls.
  - Status 2-green light is on. Telephone is signed into the group and calls can be sent to the agent.

Decide on the configuration and assign operator positions to monitor extension status. If no positions are assigned, the feature is not active.

Planning Form Instructions

Under the "Extension Status" heading of **Form 6f:**

1. Check "Assign to operator positions." Write the extension number for each operator position in the space provided. (Refer to the appropriate copy of **Form 5a, 5b,** or **5c.)**
2. Check "Group Calling/CMS" to keep the factory-set configuration.
3. Check "Hotel" to change the configuration.

On all copies of **Form 5a, 5b** or **5c,** under the heading "Extension Status":

4. Check "No" or "Yes" to indicate whether the feature is active.

Station Message Detail Recording

Use these instructions only if connecting Station Message Detail Recording (SMDR).

SMDR allows you to keep track of telephone usage. Through this feature detailed call reports are generated that include information about incoming and outgoing calls, such as date and time, the length of the call, the trunk used, the user's extension number, the dialed number, and the account code.

The information in call reports is helpful for billing customers and internal departments for telephone calls. It helps to identify telephone misuse and develop records of telephone traffic patterns to improve system efficiency. SMDR works in conjunction with the Call Accounting System (CAS/B, CAS/H, CAT/B, or CAT/H) or a serial printer (AT&T 572 printer or equivalent) connected to the SMDR port on the control unit. The SMDR port is the upper RS-232 jack on the processor module.

Following are your choices of options if you use SMDR:

- Call Report Format Choose either the factory-set basic format or the ISDN format. Select the ISDN format if you subscribe to the AT&T INF02 automatic number identification (ANI) service. With the ISDN format, the ANI appears in the Number field of the call report.

  Note: The availability of the caller identification information may be limited by local-sewing (caller's) jurisdiction, availability, or central office equipment.

- Call Length. The system is factory set to record only calls that last at least 40 seconds. You can choose a new setting of from O to 255 seconds as the maximum length before it is recorded.

- Calls Reported. Choose whether information is to be recorded for the factory setting of incoming and outgoing calls or for outgoing calls only.

Note: To have accurate reports, the system date and time must be set to the current date and time when the system is installed. Be sure you checked "Yes" for each of these options on Form 1.

Planning Form Instructions

In the "SMDR Options" section of **Form 6f:**

Under the "Call Report Format" heading, do *one* of the following:

- Check "Basic" to keep the factory-set format.
- Check "ISDN" to change the report format.

Under the "Call Length" heading, do *one* of the following:

- Check "40 seconds" to keep the factory-set call length.
- Check the second box to change the factory-set call length. Write the number of seconds in the space provided.

Under the "Calls Reported" heading, do *one* of the following:

- Check "Incoming and outgoing" to keep the factory setting.
- Check "Outgoing only" to change the factory setting.

Inside Dial Tone

Two types of inside dial tone are offered, which make it easy to distinguish an inside line from an outside trunk—system internal dial tone (the factory setting) and outside trunk dial tone.

Some software applications, such as voice messaging systems, or hardware, such as modems, do not recognize the internal dial tone. In this case, change the system so that inside dial tone is the same as the outside dial tone to allow recognition by a third-party system.

Consult with AT&T or an authorized representative to help guide your decision.

Planning Form Instructions

Under the "Inside Dial Tone" heading on **Form 6f,** do *one* of the following:

- Check "Inside" to keep the factory-set system internal dial tone.
- Check "Outside" to change the dial tone to match the outside trunk dial tone.

Reminder Service Cancel

Through Reminder Service operators can have the system place reminder calls to people at preset times. For example, a hotel operator can set the time for a wake-up call to a room telephone. Reminder times can be set and canceled for any telephone in the system.

Reminder Service also allows regular telephone users to use the telephone like an alarm clock to remind them of an appointment or meeting. Users can set and cancel their own reminder times on their telephones.

You can set a time so that all reminders are canceled at that time every day—for example, at the end of the business day when all users have gone home and are not available to receive reminders.

Planning Form Instructions

Under the "Reminder Service Cancel" heading on **Form 6f,** do *one* of the following:

- Check "No" if you do not want to set a Reminder Service cancel time.
- Check the second box to set a time to cancel all reminders in the system. Write the time of day in the space provided.

Redirect Calls to Unassigned Extension Numbers

The factory setting for calls made to unassigned extension numbers by Remote Access users or on Direct Inward Dial (DID) or dial-in tie trunks is that the calls are redirected to the primary operator.

CAUTION

DID numbers that correspond to pool dial-out codes (or facility access codes) can be used to avoid toll restriction, leading to toll abuse and/or fraud. (See "Customer Support Information" in the front of this book for more information on security.)

You can change the setting so that calls are redirected to

- another extension number
- the QCC queue
- a calling group

Planning Form Instructions

Under the "Calls to Unassigned Extension" headin on **Form 6f,** do *one* of the following:

- Check "Primary Operator" to keep the factory setting.
- To change from the factory-set redirect to the primary operator:
  - Check "QCC" to redirect calls to a QCC operator. Write the extension number in the space provided. (Refer to **Form 2a.)**
  - Check "Another extension" to redirect calls to another telephone. Write the extension number in the space provided. (Refer to **Form 2a.)**
  - Check "Calling Group" to redirect calls to a calling group. Write the calling group extension number in the space provided. (Refer to **Form 6e.)**

Allowed Lists

Use these instructions only if call restrictions are assigned to any telephones.

An Allowed List is a list of telephone numbers that a restricted telephone can dial. For example, if a telephone is restricted from making toll calls, an Allowed List permits the user to call specific area codes and/or exchanges. Or, if a telephone is restricted from making any outgoing calls, you can design an Allowed List that permits calls to specific local or toll numbers, such as 911.

You can design up to eight lists, each with a maximum of 10 numbers. Each number can have up to six digits—for example, an area code followed by an exchange. You can include a leading 1, which the system doesn't count as one of the six digits, if a toll prefix is required. Once you have designed the lists, decide which restricted telephones have access to the list. Each restricted telephone can have access to one to eight lists.

If FX (foreign exchange) or tie trunks are connected to the system, you can allow people with restricted telephones to dial numbers to the area code for the FX or tie trunk if you enter the exchange in the Allowed List. For example, if you have an Albuquerque FX trunk (to the 345 exchange in the 505 area code), record "345' as the Allowed List entry, not '505345.'

As you design each list, consider which numbers need to be called by specific groups of restricted users. Suppose you had customer service representatives with toll restricted telephones in Colorado who need to speak with customers in New Mexico (area code 505) and Arizona (area code 602). You would design a list with area codes 505 and 602 and assign the customer service representatives access to that list.

Another list of emergency numbers could be designed for telephones that are restricted from local and toll calls. This ensures that telephones restricted from making outside calls can be used in an emergency.

Note: If you assign a zero as the first digit for any entry in an Allowed List, any toll restrictions assigned for calls to numbers that can be placed by local or toll operators are removed.

Planning Form Instructions

On PBX System **Form 6g,** Allowed Lists:

1. Write the name of the list in the space next to the list number.
2. Write the allowed area codes and/or exchanges in the column (a maximum of 10 entries per list).
3. Write the extension numbers of the telephones that need access to the list in the "Allow To Ext Nos." column. (Refer to **Form 2a.)**

See 'Remote Access" in Chapter 3.

If you planned Remote Access with restrictions and want to permit Allowed List numbers to remote access users, locat **PBX SYstem Form 3a, Outside Trunks-Remote Access.**

On page 3, "Class of Restrictions without Barrier Codes":

4. Write the list numbers under the heading "Allowed List Access" (for either or both tie and non-tie trunks).

On all copies of page 4, "Class of Restrictions with Barrier Codes:"

5. Write the list numbers under the heading "Allowd List Access" (for each barrier code assigned).

Note: Allowed List Class of Restriction assignments apply to all Remote Access users and cannot be assigned on an individual basis.

Disallowed Lists

Use Disallowed Lists to prevent people from making calls to specific numbers—numbers that even unrestricted telephones cannot dial. You can use this feature instead of restricting telephones totally from making toll or local calls.

For example, to prevent people from calling time and temperature, their horoscopes, or other services typically offered on the 976 exchange, disallow calls to that exchange. Or, to prevent employees from calling 'talk" lines typically offered in the 900 area code, disallow calls to that area code.

You can use a "wild card" character to indicate that you want calls to an exchange restricted in every area code—for example, the 976 exchange in any state. During system programming, a "pause" (entered using the Hold button) indicates a wild card character; therefore, use the letter "p" to indicate that a wild card character should be programmed.

You can design up to eight lists with a maximum of 10 numbers. Each number can have up to 11 digits—for example, a leading 1 (if a toll prefix is required for dialing) followed by the area code and telephone number. Once you have designed the lists, decide which telephones to restrict. You can assign each telephone to one to eight lists.

Note: Users cannot dial a number on an Allowed List if it matches a number on a Disallowed List assigned to the telephone.

Planning Form Instructions

On **PBX System Form 6h, Disallowed Lists:**

1. Write the name of the list in the space next to the list number.
2. Write the disallowed area codes and/or exchanges in the column (a maximum of 10 entries per list).

   Use the wild card charactor ("p") to restrict an exchange from being dialed in any area code. For example, to prevent users from directly dialing the 976 exchange in any area code, write "1ppp976."
3. Write the extension numbers of the telephones that you want to assign to the list in the "Disallow To Ext. Nos." column. (Refer to **Form 2a.)**

See 'Remote Access' in Chapter 3.

If you planned Remote Access and want to restrict callers through Disallowed Lists, locate **PBX System Form 3a, Outside Trunks - Remote Access.**

On page 3, "Class of Restriction without Barrier Codes":

4. Write the list numbers under the heading "Disallowed List Access" (for either or both tie and non-tie trunks).

On all copies of page 4, "Class of Restriction with Barrier Codes":

5. Write the list nubmers under the heading "Disallowed List Access" (for each barrier code).

Note: Disallowed List Class of Restriction assignments apply to all Remote Access users and cannot be assigned on an individual basis.

Night Service

Use these instructions only if Night Service is used for after-hours telephone operation.

Night Service offers three options for after-hours telephone operation. Choose any combination of these options:

- Night Service with Group Assignment
- Night Service with Outward Restriction
- Night Service with Time Set

Mark PBX System Forms 7a through 7c to show your option choices.

Night Service with Group Assignment

The Night Service with Group Assignment option allows you to assign all the calls or trunks associated with a particular operator position to a Night Service group. This makes it easier for users to answer after-hours calls.

Any call that comes in to the operator console while Night Service is in effect rings immediately at each available telephone in the group. Calls ring immediately even on trunks set for delayed ring or no ring.

You can create up to eight Night Service groups, one for each operator. There is no limit to the number of telephones assigned to each group, and each telephone can be assigned to more than one group.

Planning Form Instructions

Mark **PBX System Form 7a, Night Service - Group Assignment.**

Note: Form 7a has two sides and holds information for up to eight operators.

In each column:

1. Write the extension number for the operator whose calls are being answered in the "Operator Ext. No." space. (Refer to **Form 2a.)**
2. Write the extension number for each member of the group in the "Ext. No." column. (Refer to **Form 2a.)**
3. Write each group member's name in the "Name" column. (Refer to **Form 2a.)**

Night Service with Outward Restriction

The Night Service with Outward Restriction option allows you to set up the system so that only authorized users can place non-emergency calls when Night Service is in effect. This prevents unauthorized after-hours use of telephones.

When you select this option, people who need to make calls after hours must first enter a password. People who do not know the password can dial only emergency numbers that you specify, such as the telephone numbers for the police and fire departments. Calls to non-emergency numbers do not go through unless the password is entered first. You can include up to 10 telephone numbers on the Night Service Emergency Allowed List. Each number can have a maximum of 12 digits.

Once you specify that a password is required, the password applies to all telephones in the system when Night Service is activated at any operator position.

If users need to make after-hours calls and prefer not to enter a password, you can set up an Exclusion List that excludes those users from the password requirement. Telephones assigned to the Exclusion List keep the normal call restrictions, if any are assigned, when Night Service is in effect. However, these telephones are not protected in any other way from unauthorized after-hours use.

Planning Form Instructions

On **PBX System Form 7b, Night Service - Outward Restriction:**

1. Write the password in the "Password" space. The password must be four digits and can include the number 0 to 9 in any combination.

Note: To keep the password private, do not fill in the blank.

2. Write the nubers to be included in the list under "Telephone No." In the "Emergency Allowed List" section.

To exclude users from the password requirement, complete the "Exclusion List" section:

3. Write the extension number for each telephone in the "Ext. No." column. (Refer to **Form 2a.)**

4. Write each user's name in the "Name" column. **(Refer to Form 2a.)**

Night Service with Time Set

The Night Service with Time Set option allows you to set the system to automatically turn Night Service on and off at the times and days of the week you specify. This ensures that after-hours calls are handled properly even if an operator forgets to turn on Night Service.

Operators can still override the timer and turn Night Service on or off manually. The feature can also be deactivated through system programming for special conditions, such as a mid-week holiday.

Planning Form Instructions

On **PBX System Form 7c, Night Service - Time Set,** write the time of day you want Night Service truned on and off for each day of the week.

Use 24-hour number, called military time - for example, 5:30 pm = 1730.

If Night Service is to remain on throught the day - for example, on Sunday - don't enter an on and off time.

Labeling

Labeling enhances the capability of display telephones used with the system. Choose the labels to appear on display telephones:

- Trunks
- Stations and Calling Groups
- Posted Message
- System Directory/System Speed Dial

Trunks

Trunk labels identify the trunk being used or the department being called. For example, when a call comes in on one of the incoming trunks, a number, such as 5559876, or the name of the department to which it belongs, such as Sales, is displayed. Used with the AT&T INF02 automatic number identification (ANI) service, the labels also identify the number of the caller.

Note: The availability of the caller identification information may be limited by local-serving (caller's) jurisdiction, availability, or central office equipment.

The labels can contain up to seven characters, including capital letters, numbers, ampersand (&), dash (–), space, colon (:), asterisk (*), and pound sign (#).

Planning Form Instructions

On PBX System Form 8a, Label Form - Trunks, in the "Label" column:

Write the label for each trunk next to its trunk number.

Stations and Calling Groups

When the system is first set up, users with display telephones see only the extension number of the person calling them for inside calls, calling group calls, transfer returns, and Leave Word Calling messages.

You can associate alphanumeric labels with extension numbers so that both the name of the caller and the extension number are displayed. For example, you might assign the label "TERRY" to extension number 20. Then users with display telephones can see that they have incoming calls from Terry at extension 20 or that Terry at extension 20 has left "call me" messages. The labels can contain up to seven letters and/or numbers.

Planning Form Instructions

Review **PBX System Forms 2a, System Numbering - Station Jacks** and **6e, Group Calling** and determine the labels needed.

On **PBX System Form 8b, Label Form - Stations and Calling Groups:**

1. Write the extension number for each telephone and calling group in the "Ext. No." column.
2. Write the label to be displayed for each telephone and calling group in the "Label" column.

Posted Message

Posted Message allows users to post a message telling callers who have display telephones why they cannot answer.

There can be as many as 20 messages. The 10 messages shown on Form 8c are already programmed in the system. Ten others can be added, and the original 10 can be changed.

Posted messages can contain as many as 16 characters, including capital letters, numbers, ampersand (&), dash (–), space, colon (:), asterisk (*), and pound sign (#).

Planning Form Instructions

On **PBX System Form 8c, Label Form - Posted Message:**

1. To add posted messages, write each new message next to its message number (11 through 20) in the "Label" column.
2. To change existing messages, cross out the message and write the new message in the "Revised Standard Message" column.

System Directory/ System Speed Dial

Users may dial certain numbers frequently, such as the numbers of clients, suppliers, or branch offices. You can assign and store up to 130 four-character System Speed Dial codes with a large processor module, and up to 40 with the small processor module. To call these numbers, users simply dial the 4-character codes—a pound [#] sign or the Feature button followed by three digits.

Assign System Speed Dial codes to telephone numbers that shouldn't be displayed on telephones, such as numbers that contain access codes. You can also assign labels to the System Speed Dial codes. These labels are listed in the System Directory so that MLX telephone users can search for them and dial System Speed Dial numbers with the touch of a button.

Planning Form Instructions

Review the analyis of question 9 on the **Employee Communicaton Survey**

On **PBX System Form 8d, System Speed Dial and System Directory:**

1. Check "No" in the "Display" column if you do not want the number displayed.
2. Write each telephone number in the "Telephone Number" column.
3. Write the label to be displayed for the number in the "Label" column.

Automatic Route Selection

Automatic Route Selection (ARS) allows you to make the most efficient use of trunks connected to the system, which can mean significant savings for your business. Routing calls efficiently is especially important if the business has several different types of trunks, such as local, WATS, FX (foreign exchange), or tie, or uses an alternate long-distance company. If the system is pooled, you can use ARS to specify which trunk pool should be used for each call, based on the telephone number the caller dials.

How ARS Works

To use ARS, the user selects a System Access Ring, System Access Voice, or System Access Originate Only button and begins dialing an outside call by entering the ARS access code (usually a 9) followed by the phone number. The call is then 'routed" *over* a trunk pool that you have determined to be most cost effective. Calls are sent over a preferred route (Route 1) when possible, generally chosen because of lower cost. If all trunks in that route are busy, up to five alternate routes (Route 2, Route 3, etc.) can be specified to complete the call. If all the designated routes are busy, the system notifies the user with a fast-busy tone. The user can then place a request for the busy trunk using the Automatic Callback feature.

Note: With ARS, users must dial "1" before dialing any 7- or 10-digit toll number, even if the local telephone company does not require dialing a toll prefix.

The set of preferred and alternate routes to be used for a particular call is determined by the ARS table 'routing pattern" associated with that call's destination. The system lets you define up to 16 ARS tables (each with two subpatterns based on time of day). Four additional tables are factory set and are designed to save programming time.

ARS performs specific checks to ensure that the user has the appropriate permissions for making each call (including a check for Allowed and Disallowed List assignment). First, the dialed number is checked to see if it is an emergency number, for example, fire, police. If so, the call is placed over the main pool, regardless of any restrictions. If it is not an emergency call, the permissions are checked for any call restrictions (outside or toll). Finally, each route and each telephone is assigned an ARS Facility Restriction Level (FRL). Users are allowed access to particular routes in particular routing patterns only if their individual telephone's FRL is greater than or equal to the route's FRL.

In this section, you will define a set of ARS tables. This set includes a list of area codes and exchanges associated with each table, the preferred and alternate routes (if any) for each subpattern, and the FRL for each route. As you become more familiar with the calling patterns of your company, and with the intricacies of ARS, you may want to change these patterns to suit your particular installation.

Note: It is recommended that all systems operating in PBX mode use ARS, even if only central office trunks are available. This provides additional flexibility for future upgrading of facilities and allows predesignated emergency calls to be put through regardless of restrictions placed on a station.

ARS Worksheet

Fill out the Automatic Route Selection Worksheet (PBX System Form 9a) to decide how to best route calls. Use PBX System Form 3b, Outside Trunks — Pools to review the types of trunk pools available.

Planning Form Instructions

1. Record the number of exchanges in the local calling area in the blank at the top of **Form 9a.** If you aren't sure how many exchanges there are, consult your telephone directory.

2. Enter the number of each of the trunk pools (factory setting is 70 or 890 - 899) in the "Trunk Pool Number" column.

   Note: If you have renumbered the trunk pools, check the "Renumber To" column for **Form 3b** for the trunk pool extension numbers.

   Some trunk pools, such as in-state WATS trunk pools, can be used for both toll and local calls. (Note that with ARS a local call is any call that doesn't require dialing a 1.) If people will use a particular trunk pool for both toll and local calls, enter the number of that trunk pool in the worksheet twice, and note the reason.

   For example, McHale and Associates is based in Denver, Colorado (303 area code). McHale has a local trunk pool, an in-state WATS pool, and a cross-country WATS pool. Because Colorado has two area codes, 303 and 719, the in-state WATS trunk can be used for both toll and local calls. Therefore, there are two entries for Pool 890 on the ARS Worksheet.

Figure 4-1 shows the completed Automatic Route Selection Worksheet for the fictitous company McHale and Associates of Denver, Colorado. you may find it useful to consult the illustration as you fill out the worksheet.

PBX System Form 9a

Automatic Route Selection Worksheet

Number of exchanges in your calling area _____

Trunk Pool No.	Trunk Type	Type of Dial*	Number of Area Codes or Exchanges for which Trunk Pool is Used
70	Local	L	20 exchanges in local area
890 (for 303)	In-state WATS	L	All exchanges in area code 303
			minus 20 in local calling area
890 (for 619)	In-state WATS	T	1 area code
891	Cross-co WATS	T	All area codes in U.S.
			except 303 and 619

*T= Toll, L=Local

Preferred trunk pool for toll calls (Table 17) 891

Preferred trunk pool for locl calls (Table 18) 70

Figure 4-1 Completed ARS Worksheet

Planning Form Instructions - Continued

For each trunk pool number entered:

3. Record the type of trunk (local, FX, regional WATS, etc.) in the pool in the "Trunk Type" column.

4. Write the appropriate letter, T (toll) or L (local), in the "Type of Dial" column for the type of call that should be dialed on each trunk pool:

   - T = Toll: Any call that has a series of digits that begins with a 1, followqed by an exchanged or area code. When placing a toll call using ARS, callers dial 11 digits (1 + 3 [area code] + 3 [exchange] + 4 [last four digits of the number]) or 8 digits (1 + 3 [exchange] + 4 [last four digits og the number]).

     Keep in mind that callers must dial 1 before dialing the area code, even if they don't normally need to dial a toll prefix to make a toll call. Users who dial eight digits may want to avoid the delay while the system makes sure all digits are dialed by dialing a # after the eighth digit. This signals the system that all digits are dialed.

   - L + Local: Any call that does not fall under the definition of toll. This includes both 7-digit dialing and 1 + 7-digit dialing still required in some areas.

5. Enter the total number of different area codes or exchanges that the pool should serve in the "Number of Area Codes or Exchanges for which Trunk Pool is Used" column.

   If you don't know the exact number of exchanges or area codes, enter a note such as "All area codes in the U.S. except the 15 served by the regional WATS trunks." Keep in mind that you're recording how many different area codes or exchanges the pool should access, not the area codes or exchanges themselves.

   This step helps identify the preferred trunk pools for toll and local calls. (Preferred pools are the trunk pools on which the system places each call unless a different route has been specified for that particular type of call.)

Under the "Preferred Trunk Pools" heading:

6. Determine which of the toll tunk pools is used for calls to the greatest number of different area codes. Write the number of that trunk pool in the space next to "Toll Calls."

   In Figure 4-1, the cross-country WATS trunk pool serves the greatest number of different area codes, every are code in the country except the two area codes in Colorado. Therefore, it is the preferred trunk pool for toll calls.

7. Determine which of the local trunk pools is used for calls to the greatest number of different exchanges. Write the number of that trunk pool in the sopace next to "Local Calls."

   In the example, Figure 4-1, the in-state WATS trunk pool serves the greatest number of different exchanges. It is the preferred trunk pool for calls to every exchange in area code 303 except the 20 exchanges in the local calling area. Therefore, it is the preferred trunk pool for local calls

   Note: Table 17 and 18 will be explained later.

About ARS Tables

You'll use the information you recorded on the worksheet to prepare the ARS tables on PBX System Forms 9b and 9c. When your system is programmed for ARS, the information from these forms is entered into ARS tables stored in the system. The system can have as many as 20 ARS tables—16 are programmed and 4 are factory set (dial zero, special number, default local, and default toll tables).

Tables 1 through 16

You can set up as many as 16 tables to route calls to specific area codes and exchanges for which your business has economical trunk pools, such as in-state or regional WATS, FX, or tie-trunk pools. The best route for a call is determined by matching the telephone numbers dialed with the programmed tables of area codes, exchanges, and other numbers.

There are four possible types of programmable tables:

- 6-Digit
- Area Code
- Exchange
- 1 + 7

6-Digit Tables. For some businesses the cost of toll calls to telephone numbers in another area code varies according to the exchange the caller dials. The system may be set up to place calls to numbers in a particular area code on different trunk pools, depending on the exchange to which the call is placed. On the tables used to route these calls, an area code is the first entry and the remaining entries are exchanges within the area code. The system scans the first six digits of the number that was dialed (the area code and the exchange) to route the call.

Area Code Tables. Many businesses use only one type of trunk, such as a regional WATS trunk, for all calls placed to a particular area code. These calls are routed according to tables that associate the area code with the preferred pool. The system scans only the area code of the number being dialed to route the call.

Exchange **Tables.** In-state WATS trunks are used to make calls to a particular exchange within an area code. These calls are routed according to tables that associate the exchange with the preferred trunk pool. The system scans only the exchange of the number being dialed to route the call.

1 + 7 Tables. In some areas, callers must dial a 1 and 7-digit number to call certain exchanges even though the call is within the area code. The 1 + 7 Tables contain lists of all the exchanges that require dialing a 1 plus 7 digits.

For these areas, the ARS 1 + 7 Dial setting must be programmed to "within area code.' This setting specifies that 1 + 7-Digit Tables must be checked when a user dials a 1 and 7 digits. In the areas where the local telephone company does not require that the caller dial a 1, the ARS 1 + 7 Dial setting must be set to "not within area code." With this setting, the user is not required to dial the leading 1; however, the system adds the 1 to the dialed number to allow proper routing using the ARS tables.

Note: If the local telephone company requires a 1 to be dialed before placing calls to some 7-digit numbers, setting up 1 + 7 Tables speeds up call processing. However, users need to be instructed to dial the 1 if these tables are programmed and the ARS 1 + 7 Dial setting is set to "within area code." Users have two options for placing calls to 1 + 7-digit numbers:

- Users can dial 1, dial the 7-digit number, and wait for ARS to recognize after a time-out delay that no more digits are being dialed.
- Users can dial 1, dial the 7-digit number, and then press #. When the dialing sequence is ended with a #, the system knows that the user is finished dialing and eliminates the time-out delay.

Tables 17 and 18, the Default Tables

There are two default tables, one for toll calls and the other for local calls. These tables minimize the time it takes to plan and program ARS because you don't have to record the area codes and exchanges.

- Table 17, Default Toll Table, routes toll calls to all area codes that aren't listed in Tables 1 through 16.
- Table 18, Default Local Table, routes local calls to all exchanges that aren't listed in Tables 1 through 16.

Tables 19 and 20, the Special Number Tables

- The Dial O Table (number 19) routes calls when a user dials O. If the international dial code 011 is not included in any other table, calls are routed via the Dial O Table. You can specify the route to which dial O calls should be routed.
- The N11 Table (number 20) routes calls to these numbers: 411,611, 811, and 911. These calls are always placed on the main pool (the factory-set pool access code is 70).

ARS Table Matching

To place a call in a system that has ARS, a user dials a dial-out code (usually a 9) followed by the telephone number. The system determines the best route for the call by checking the telephone number dialed against the numbers (digits) in the ARS tables. ARS eliminates the tables until it finds one containing a match.

For example, if a user dials O, ARS eliminates all tables except the dial zero table and places the call using that table's programmed routes.

If a user dials 1-202-555-1234, ARS recognizes that it is a toll call (a 1 followed by 10 digits) and therefore eliminates all exchange tables.

ARS then checks the Area Code Tables and 6-Digit Tables for a match. If it finds a match on a 6-Digit Table, it checks the Area Code Tables for a match and routes the call. If a match is not found on any of the programmed Area Code or 6-Digit Tables, the call is routed according to the Default Toll Table.

Table Planning Forms

Because of the complexity of ARS routing, the instructions for filling out the planning forms are presented a few steps at a time with examples of completed forms shown after each group of steps. The instructions begin with the programmable tables (1 through 16) and introduce the factory-set tables midway through the completion process.

Locate PBX System Forms 9b, Automatic Route Selection Tables and 9c, Automatic Route Selection Default and Special Numbers TablesComplete Form 9b for each trunk pool listed on the ARS worksheet (Form 9a).

Planning Form Instructions
On each copy of **Form 9b:**

1. Write the table number in the "Table No." space (maximum 16). Start with 1 and number sequentially.
2. Check the appropriate box under the "Type of Table" heading: 6-Digit, Area Code, Exchange, or 1 + 7.

   If this is a 1 + 7 Table:

   - Check "not within area code" if users do not need to dial a 1 to each numbers within their own area code.
   - Check "within area code" if users need to dial a 1 to reach numbers within their own area code.

3. Complete the section of the form headed "Area Code/Exchanges":

   - If this is a 6-Digit Table, write the area code on the blank line next to entry 001. Then write each exchange in that area code that people would call on the numbered lines, beginning with the entry 002.

     Up to 99 exchanges can be listed in any oreder. If you need to list more area codes or exchanged, prepare antoher 6-Digit table.
   - If this is an Area Code, Exchange, or 1 + 7 Table, write the area codes or exchanges on the numbered lines, beginning with the entry 001.

     Up to 100 area codes or exchanges can be listed in any order, but area codes and exchanges cannot be on the same table.

   Note: The digits before the blank lines represent the table entry number used while programming.

Example one: If a business plans to use Table 1 to route calls to exchanges 333, 444, and 523 in area code 816, the upper section of the completed Form 9b will look similar to the one shown in Figure 4-2.

Page 1 of 7

PBX System Form 9b

Automatic Route Selection Tables

Maximum: 16 Tables. *Make copy for each table.*

Table No. 1

Type of Table

☑ 6-Digit
❑ Area Code
❑ Exchange
❑ 1 + 7, dialing from
  ❑ not within area code ●
  ❑ within area code

Area Code/Exchanges

001 816	021	041	061	081
002 333	022	042	062	082
003 444	023	043	063	083
004 523	024	044	064	084
005	025	045	065	085
006	026	046	066	086
007	027	047	067	087
008	028	048	068	088
009	029	049	069	089
010	030	050	070	090
011	031	051	071	091
012	032	052	072	092
013	033	053	073	093
014	034	054	074	094
015	035	055	075	095
016	036	056	076	096
017			077	097
018				

Figure 4-2 Example One, PBX System Form 9b

Example two: If the business plans to use Table 7 to route calls to the northeastern (band 1) WATS trunks as entries 001 through 015, the upper section of the completed form will look similar to the one shown in Figure 4-3.

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PBX System Form 9b

Automatic Route Selection Tables

Maximum: 16 Tables. *Make copy for each table.*

Table No. 7

Type of Table

- ☐ 6-Digit
- ☑ Area Code
- ☐ Exchange
- ☐ 1 + 7, dialing from
  - ☐ not within area code ✦
  - ☐ within area code

Area Code/Exchanges

001 413	021	041	061	081
002 617	022	042	062	082
003 203	023	043	063	083
004 508	024	044	064	084
005 401	025	045	065	085
006 516	026	046	066	086
007 518	027	047	067	087
008 914	028	048	068	088
009 717	029	049	069	089
010 201	030	050	070	090
011 603	031	051	071	091
012 207	032	052	072	092
013 215	033	053	073	093
014 802	034	054	074	094
015 609	035	055	075	095
016	036	056	076	096
017	037	057	077	097
018			078	
019				
020				

Figure 4-3 Example Two, **PBX System Form 9b**

Subpatterns

For each table (1 through 16, and the factory-set tables 17 and 18), you can select two subpatterns that specify routes that should be used depending on the time of day. You can specify up to six routes for each subpattern. For example, you may want calls to certain area codes routed over WATS trunks during the day, and after 11 p.m., when toll rates are less expensive on basic trunks, you may want the calls routed over the main pool.

Preferred and Alternate Routes

Pools. The column with the 'Pool" heading is used to list the trunk pools you want to use to route calls made to the area codes and/or exchanges listed in the "Area Codes/Exchange" section. You can specify up to six alternate routes for each subpattern.

Facility Restriction Level (FRL). The FRL is a number between O and 6 that is used to restrict user access to the route. You begin by assigning a value to each route you list in the 'Pool" section. A value of O is the least restrictive, and a value of 6 is the most restrictive. The factory setting is 3.

Assign a value of O, for example, for local calls. This makes the assigned routes available to all users. Assign a value of 1 through 6 according to any restrictions you plan for certain facilities. For example, if you want to limit use of a particular pool of WATS trunks only to top executives, assign an FRL of 6 for the route.

Note: You will assign an FRL value to telephones and Remote Access trunks that corresponds to the route FRL that determines whether the user can make calls using a particular route.

Other Digits. Extra digits or special characters maybe required so the system can route a call on a particular trunk pool. For example, some companies use an alternate long-distance company for calls to certain area codes. Accessing the alternate long-distance company requires dialing the number, waiting for a dial tone, and then dialing six more digits and waiting for the dial tone again. The pauses and extra digits can be automatically added to numbers dialed in the area codes listed on the table by specifying them in the 'Other Digits' column.

Digit Absorption. The column labeled 'Absorb' specifies how many, if any, of the digits dialed by the caller should be absorbed (not dialed) by the system when it places these calls. This ensures that the business gets the full benefit from any special-purpose trunks such as FX and tie. You include the number of digits to absorb (0-11, starting with the first digit) in the tables so the system can route all appropriate calls to these lower-cost pools.

Digit absorption doesn't interfere with Station Message Detail Recording (SMDR) or Call Restriction. The digits dialed by the caller are recorded on SMDR reports and are checked to be sure the call is allowed.

The factory-set value for digit absorption is O, which means the system places a call using all the digits that the caller dialed. The values 1–11 tell the system not to dial a certain number of digits, starting with the first digit dialed by the caller. If you want the system to absorb a leading 1, assign a value of 1. If you want the system to absorb a leading 1 and the area code, assign a value of 4, and so forth.

For example, a branch office in Albuquerque, New Mexico, has a tie-trunk pool to company headquarters in San Diego, California. The complete telephone number at headquarters is an 11-digit number, 1 + the area code + the exchange + the 4-digit number. People in the branch office dial all 11 digits, but the system dials only the last 4 digits to place these calls. This happens because an absorb value of 7 was assigned with the tie-trunk pool in the ARS table that routes calls to this area code and exchange. The absorption value of 7 in the table tells the system to absorb the 1, the area code, and the exchange, so the call can be placed on one of the tie trunks.

Planning Form Instructions - Continued

In the "Subpattern" sections on **Form 9b** and Form **9c:**

4. To direct calls differently according to time of day, write a time for each subpattern in the "Time of Day" space (for example, 8 a.m.).

5. To complete the "Pool" column for each subpattern, write the number of the preferred trunk pool next to the number 1. This is the pool on which calls to the area codes or exchanges listed in the "Area Code/Exchanges" section of this form should be placed.

   If you want to designate a backup pool in case all the trunks in the first-choice pool are busy, write the number of the backup trunk pool next to the number 2, and so on.

6. To complete the "FRL" column, enter a value of 0-6, which determines the Facility Restriction Level for users. The least restrictive is 0, and 6 is the most restrictive. Assign a value of 0 if you want all users to access the route and 1-6 to restrict calling for the route to specific users only.

Subpattern Example:The form for a typical Area Code Table, illustrated in Figure 4-4, shows a table to route calls to the 13 area codes served by the northeastern (band 1) WATS lines beginning at 8 a.m. with no restrictions. The number of the northeastern WATS pool, 891, is on the first line in the "Subpattern A" section. The time, 8:00 a.m., is in the "Time of Day" space, and a FRL of 0 indicates no restrictions, The 11 p.m. in the "Time of Day" space for Subpattern B and Pool 70 in the ‘Pool’ column indicates that calls to these area codes are to be routed over the main pool after 11 p.m.

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PBX System Form 9b

Automatic Route Selection Tables

Maximum: 16 Tables. *Make copy for each table.*

Table No. 2

Type of Table

- ☐ 6-Digit
- ☑ Area Code
- ☐ Exchange
- ☐ 1 + 7, dialing from
  - ☐ not within area code ✦
  - ☐ within area code

Area Code/Exchanges

001 413	021	041	061	081
002 617	022	042	062	082
003 203	023	043	063	083
004 508	024	044	064	084
005 401	025	045	065	085
006 516	026	046	066	086
007 518	027	047	067	087
008 914	028	048	068	088
009 717	029	049	069	089
010 201	030	050	070	090
011 603	031	051	071	091
012 207	032	052	072	092
013 215	033	053	073	093
014 802	034	054	074	094
015 609	035	055		
016	039		079	
	040		080	100

Subpattern A Time of Day 8:00 am

Pool	FRL✦	Other Digits	Absorb
1 891	0		1
2 890	4		2
3			3
4			4
5			5
6			6

Subpattern B Time of Day 11:00 pm

Pool	FRL✦	Other Digits	Absorb
1 70	0		1
2 890	4		2
3			3
4			4
5			5
6			6

✦ Factory setting.
FRL setting is 3.

Figure 4-4 Subpattern Example

Because calls to the 15 area codes shown on Figure 4-4 should be placed on the cross-country WATS trunks if all the northeastern WATS trunks are busy, the number of the cross-country WATS pool, 890, is used in both cases. An FRL of 4 is assigned to restrict some users from using the cross-country WATS trunks.

Planning Form Instructions - Cotinued

7. Extra digits may be required for the system to place a call on a particular pool. If so, enter the digits (0-9) in the same row as the pool number, in the column headed "Other Digits."

   These special accress or account codes can range from a single digit, such as 9, to a maximum of 20 digits.

Extra Digit Example: If a business uses an alternate long-distance company for calls to nine area codes in Canada, accessing the alternate long-distance company lines requires getting a local line and dialing seven digits. The completed form for the Area Code Table that routes these calls to the alternate long-distance company lines is shown in Figure 4-5.

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PBX System Form 9b

Automatic Route Selection Tables

Maximum: 16 Tables. *Make copy for each tab/e.*

Table **No.** 3

Type of Table
- ❑ 6-Digit
- ☑ Area Code
- ❑ Exchange
- ❑ 1 + 7, dialing from
  - ❑ not within area code ●
  - ❑ within area code

Area Code/Exchanges

001	604	021		041		061		081	
002	403	022		042		062		082	
003	306	023		043		063		083	
004	204	024		044		064		084	
005	807	025		045		065		085	
006	705	026		046		066		086	
007	519	027		047		067		087	
008	416	028		048					
009	613			049					
010									

Subpattern A Time of Day _____ Subpattern B Time of Day _____

Pool	FRL ♦	Other Digits	Absorb	Pool	FRL ♦	Other Digits	Absorb
1 70		9050129	1	1			1
2			2	2			2
3			3	3			3
4			4	4			4
5			5	5			5
6			6	6			6

♦ Factory setting
FRL setting is 3.

Figure 4-5 Extra Digit Example

Planning Form Instructions - Continued

8. If the system must absorb certain digits dialed by users to plance calls on a particular pool, enter the appripriate absorption numbner in the same row as the pool number, in the column headed "Absorb."

Assign a value of 0 if you do not want absorption. Assign a value of 1-11 according to the number of digits you want absorbed, starting with the first digit dialed.

Example: If a company has FX trunks for the 686 exchange in the 901 area code and wants to allow people to dial those calls the same way they dial toll calls to other area codes, an absorption number of 4 is assigned to the FX trunk pool, Pool 893. The completed form for the 6-Digit Table that routes calls to the FX trunk pool is shown in Figure 4-6.

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PBX System Form 9b

Automatic Route Selection Tables

Maximum: 16 Tables. *Make copy for each table.*

Table No. 4

Type of Table
- ☑ 6 - Digit
- ☐ Area Code
- ❑ Exchange
- ❑ 1 + 7, dlalmg from
  - ❑ not wlthin area code +
  - ❑ w!thin area code

Area Code/Exchanges

001 901	021	041	061	081
002 686	022	042	062	082
003	023	043	063	083
004	024	044	064	084
005	025	045	065	085
006	026	046	066	086
007	027	047	067	087
008	028	048	068	088
009	029	049	069	089
010	030	050	070	090
011	031	051	071	091
012	032	052	072	092
013	033	053	073	093
014	034	054	074	094
015	035	055	075	095
016	036	056	076	096
017	037	057	077	097
018	038	058	078	098
019	039	059	079	099
020	040	060	080	100

Subpattern A Time of Day _____ Subpattern B Time of Day _____

Pool	FRL ♦	Other Digits	Absorb	Pool	FRL ♦	Other Digits	Absorb
1	—		1	1	—		1
2	—		2	2	—		2
3	—		3	3	—		3
4	—		4	4	—		4
5	—		5	5	—		5
6	—		6	6	—		6

♦ Factory setting.
FRL setting IS 3.

Figure 4-6 Digit Absorption Example

After ARS is programmed, people in the Figure 4-6 company dial 1 + 901 + 686 XXXX to make these calls. The system absorbs the leading 1 and the area code and dials only the 7-Digit number to place these calls on one of the FX trunks.

Planning Form Instructions - Continued

9. If you have worked only one of your planned nondefault tables, complete all copies of **Form 9b.** Repeat steps 1 through 8 for each table (tables 1 through 16) that you need.

10. If you haven't completed the factory-set tables, do so now.

- For tables 17 and 18, repeat steps 4 through 8 to complete the subpattern and pool routing sections.
- For the Dial 0 table (number 19) complete the "Pool" routing, "FRL," and "Other Digits" entries following steps 5 through 7.
- If users need to dial an access code to call the special numbers 411, 611, 811, and 911, record that code on the Special Number Table, under the heading "Other Digits." Assign the FRL as shown in step 6.

11. If restricting stations and Remote Access users from specific routes, locate all copies of pages 3 and 4 of **Form 3a** and **Forms 4a** through **5 c .**

- Under the "Facility Restriction Level" heading on each telephon form, write the value (0 to 6) you want to assign.
- Under the "ARS Restriction Level" heading on pages 3 and 4 of Form 3a, check the value (0 to 6) you want to assign.

  Station and Remote Access FRL values equal to or greater than the FRL value assigned to routes allow users to access those routes. A value of 0 is the most restrictive, and a value of 6 is the least restrictive. The factory-set FRL value assigned to stations is 3. (There is no factory-set Remote Access FRL.)

  To restrict a station from specific routes, assign a FRL value to the station that is lower than the route's value.

  For example, if you want a telephone used by a top executive to have unlimited use of any ARS route, assign a value of 6. If you want to limit a user from making calls on pools with special-use trunks such as WATS, assign a value of 0.

Modifications

5

To modify the system:

- Decide what you want to change and identify the programming needed.
- Complete (or revise) the appropriate PBX System Planning Forms.
- Program the modification using Chapter 3 of *System Programming.*

This chapter presents a series of steps, which describe

- the actions you must take to add to the system
- the interrelated options or features you should consider
- the forms that must be revised or completed

References to the relevant sections of this and other books, where detailed instructions can be found, are included.

Preparation

Collect your file of PBX System Planning Forms. Although you may need to revise only one or two forms, it is suggested that you have all completed forms available for reference.

Note: If you need clean copies of the forms, see Appendix A of this book.

Review Chapter 1 for details on preparation for planning activities.

Before revising the PBX System Forms, analyze and document the modification planned. As examples:

- If adding stations to your system, adjust your Floor Plan to show the location of the new telephones and the kind of equipment to be used.
- If activating a feature such as System Speed Dial, survey employees to identify the numbers that should be programmed into the Speed Dial file.

Adding to the System

Adding to the system is defined as increasing its capacity or capability. This increase may mean adding more or different kinds of trunks, connecting auxiliary equipment, or installing more stations (telephones, consoles or tip/ring equipment).

Step 1

Determine the specific type of trunk, auxiliary equipment, or station to be added.

Use Table 5-1, shown on the opposite page, to determine the type of trunk and/or station module needed to support what you plan to add.

Step 2

Locate PBX System Form 1, System Planning. Review the completed "Control Unit Diagram' on the back of the form and determine if the module type needed is present.

- If the module is not in the control unit, continue to step 4.
- If the module type needed is already in the control unit, continue to step 3.

Step 3

Determine if there are jacks available on the module for the new trunk, auxiliary equipment, or station. Use PBX System Form 2a, System Numbering — Station Jacks, or PBX System Form 2c, System Numbering — Trunk Jacks, to identify jack availability.

- If there are sufficient jacks available on an existing module, plan to connect the added trunk, equipment, or station to them. Continue to step 5.
- If there aren't jacks available, continue to step 4.

Step 4

Plan the placement of the new module required to support the trunk, auxiliary equipment or station. Review the guidelines that follow and decide where the new module should be placed.

- The power supply module must be placed in the far left slot of each carrier.
- The processor module must be installed in slot O of the basic carrier.
- Trunk and/or station modules can be placed in any order in slots 1 through 17 (with two expansion carriers), with the following conditions:
  - Install the modules in each carrier from left to right with no empty slots between modules.
  - If the system includes a queued call console, the 008 MLX module that supports it must be the first station module in the control unit.
  - Place all 012 and 008 OPT modules in the same carrier whenever possible.
  - Group all 800 DID, 100D, and tie modules together whenever possible.

Table 5-1 Required Trunk and/or Station Modules

	100 D	400 E M	4 0 0	400 GS/ LS/ TTR	800 DID	8 0 0	008 OPT	800 GS/ L S	0 0 8	008 MLX	0 1 2	4 0 8	408 GS/ L S
Loop-start trunks			✔	✔		✔		✔				✔	✔
Ground-start trunks				✔				✔					✔
Tie trunks		✔											
Direct Inward Dial trunks					✔								
T1 facilities	✔												
Emulated loop-start trunks	✔												
Emulated ground-start trunks	✔												
Emulated tie trunks	✔												
ISDN-PRI services	✔												
Remote Access		✔	✔	✔	✔	✔	✔	✔			✔	✔	✔
Loudspeaker paging			✔	✔		✔		✔				✔	✔
Maintenance alarm			✔	✔		✔		✔				✔	✔
Music-on-Hold			✔	✔		✔		✔				✔	✔
Digital/ISDN (MLX) direct-line console										✔			
Queued call console										✔			
Analog direct-line console									✔			✔	✔
Digital/ISDN(MLX) telephone										✔			
Analog multiline telephone									✔			✔	✔
Tip/Ring equipment									✔	✔	✔	✔	✔
Off-premises telephone							✔			✔	✔		

Notes:

- DS1 facilities configured for T1 operation provide 24 channels.
- If planning Remote Access, at least one module with touch-tone receivers must be installed.
- If you use-equipment that rebroadcasts music or other copyrighted materials, you may be required to obtain a copyright license from, and pay license fees to, a third party such as the American Society of Composers, Artists, and Producers (ASCAP) or Broadcast Music Incorporated (BMI). Or, you can purchase a Magic on Hold system, which does not require you to obtain such license, from AT&T or your authorized dealer.
- If analog multiline telephones require either Simultaneous Voice and Data or Voice Announce to Busy, two consecutive station jacks are required.
- If connecting tip/ring equipment to the 008 MLX module, an MFM is required.
- If connecting tip/ring equipment to the 008, 408, or 408 GS/LS modules, a GPA is required.

Placing additional modules in the control unit calls for a recalculation of unit loads. See *System Reference* for instructions.

- If the control unit has an available slot to the right, and the guidelines permit placement there, continue to step 5.
- If you must rearrange existing modules to accommodate the new one, continue to step 6.

step 5 Revise or complete the required PBX System Planning Form(s) according to the directions shown in Tables 5-2,5-3, and 5-4.

Table 5-2 Adding New Trunks

If adding	Complete
■ Loop-start or ground-start trunks	All columns of Form 2c, System Numbering — Trunk Jacks
■ DS1 trunks	All columns of Form 2c, System Numbering — Trunk Jacks and Form 3c, Outside Trunks — DS1 Facility (100D Module)
■ Tie trunks	All columns of Form 2c, System Numbering — Trunk Jacks and Form 3d, Outside Trunks — Tie
■ DID trunks	All columns of Form 2c, System Numbering — Trunk Jacks and Form 3e, Outside Trunks — DID
	Consider revisions to outside trunks forms: ■ 3a, Remote Access ■ 3b, Pools
	Consider revisions to feature forms:
	■ 8a, Label Form — Trunks • 9a through 9c, Automatic Route Selection
	Button Diagram on appropriate copies of Forms 4a through 5b
	If personal line is assigned, consider Remote Call Forward

See Chapter 3, "Trunk Connections" and "Trunk Options."

See Chapter 4, "Labeling" and "Automatic Route Selection.'

See Chapter 3, Trunk Assignment."

See Chapter 4, "Remote Call Forward.."

If making more additions to the system, continue to Table 5-3. When planning is complete, continue to Chapter 3 of System ***Programming.***

Table 5-3 Adding Auxiliary Equipment

If adding	Complete
Maintenance Alarm Music-on-Hold Loudspeaker Paging	Form 2c, System Numbering — Trunk Jacks

See Chapter 3, Trunk Jack Connections for Auxiliary Equipment.'

If making more additions to the system, continue to Table 5-4. When planning is complete, continue to Chapter 3 of *System Programming.*

Table 5-4 Adding New Stations

If adding	Complete
■ New stations	All columns of Form 2a, System Numbering — Station Jacks
	Copy of appropriate telephone Form 4a through 5c
	Consider revisions to:
	■ Group Assigned Features (Forms 6b through 6e)
	■ Allowed and Disallowed List assignments (Forms 6g and 6h)
	■ Night Service assignments (Forms 7a and 7b)
	■ Station Labels (Form 8b)
■ Operator console	Consider revisions to:
	■ Operator Features (Form 6a)
	■ Extension Status assignment (Form 6f)

See Chapter 2, lStation Jack Connections" and, if appropriate, 'system Numbering."

See Chapter 3, "Trunk Assignment and Chapter 4, *'Features.'*

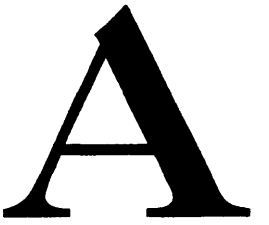
Continue to Chapter 3 of *System Programming.*

Step 6

If rearranging modules in the control unit, the numbering plan will revert to the factory-set two-digit plan. You must then reprogram the system.

- Collect a clean set of PBX System Planning Forms from Appendix A.
- Locate the AT&T Equipment List, the local telephone company trunk information list, the Floor Plan, and the analysis of the Employee Communications Survey forms. If any of these materials has been revised, you should have both the original and revised versions available.
- Work through this book, starting at Chapter 2.

Forms



This appendix contains one copy of the Employee Communication Survey form and one copy of all PBX System Planning Forms.

The forms are in numerical order and organized according to planning purpose as shown below.

Table A-1 PBX System Forms

Used for Planning	Form No.	Form Title
Features and Calling Privileges	N/A	Employee Communication Survey
Control Unit Assembly and Operating Conditions	1	System Planning
System Component Numbering	2a 2b 2c 2d 2e ♦	System Numbering — Station Jacks . System Numbering — Digital/ISDN Station Adjuncts System Numbering — Trunk Jacks System Numbering — Special Renumbers Systems Technician's Run Sheet
Outside Trunk Connections	3a 3b 3c 3d 3e	Outside Trunks — Remote Access Outside Trunks — Pools Outside Trunks — DS1 Facility (100D Module) Outside Trunks — Tie Outside Trunks — DID
Station Connections	4a 4b 4c 5a 5b 5c	Analog Multiline Telephone Digital/ISDN (MLX) Telephone and MFM Adjunct Tip/Ring Equipment Direct-Line Console (DLC) — Analog Direct-Line Console (DLC) — Digital/ISDN and MFM Adjunct Queued Call Console (QCC)
Features for Operators	6a	Optional Operator Features

♦ Form 2e is used by installation personnel.

Table A-1 Continued

Used for Planning	Form No.	Form Title
Features for User Groups	6b	Call Pickup Groups
	6c	Group Paging
	6d	Group Coverage
	6e	Group Calling
Features for System-Wide Use	6f	System Features
	6g	Allowed Lists
	6h	Disallowed Lists
	7a	Night Service — Group Assignment
	7b	Night Service — Outward Restriction
	7c	Night Service — Time Set
	8a	Label Form — Trunks
	8b	Label Form — Stations and Calling Groups
	8c	Label Form — Posted Message
	8d	System Speed Dial and System Directory
	9a	Automatic Route Selection Worksheet
	9b	Automatic Route Selection Tables
	9c	Automatic Route Selection Default and Special Numbers Tables

Employee Communication Survey

Name _____ Room _____ Extension _____

Name of work group (Sales, Customer Service) _____

Please answer each question below.

1, Do you regularly use any of the following outside lines? (Check any that apply)

- ❑ WATS
- ❑ FX (foreign exchange)
- ❑ Tie
- ❑ None of the above or don't know

2. Are your phone calls covered when you're away from your desk?

- ❑ No
- ❑ Yes By _____

_____

3. Do you cover phone calls for co-workers when they are away from their desks?

- ❑ No
- ❑ Yes For whom? _____

_____

Which of those people should have a button on your phone used exclusively for his or her calls?

_____

_____

When you are unable to cover calls, it is done by _____

_____

4. Do you share the incoming call workload with others?

- ❑ No
- ❑ Yes With whom? _____

_____

5, Would you say your phone use is

- ❑ Heavy
- ❑ Average
- ❑ Light

6. Do you have a data terminal or personal computer at your workstation?

- ❑ No — Do you expect to get one within the next year?
  - ❑ No
  - ❑ Yes
- ❑ Yes — Do you have a modem or ISDN 7500B Data Module?
  - ❑ No
  - ❑ Yes

7. Do you use account codes for charge-back of calls?

- ❑ No
- ❑ Yes — Please list all the codes you use (attach another sheet if necessary):

_____

_____

_____

8. Approximately how many times do you transfer calls? _____ times/day

9. Do you need to dial the same number over and over every day?

- ❑ No
- ❑ Yes — Please list these numbers:

_____

_____

_____

10. Do you want to be able to pick up other people's calls when you hear their phones ring?

- ❑ No
- ❑ Yes — Please list these people:

_____

_____

_____

11. Do you want your phone number to appear on another person's phone for screening, or covering calls, or for other reasons?

- ❑ No
- ❑ Yes — Please list these people:

_____

_____

_____

System Planning

Size of Processor Module

❑ Small — maximum 24 trunks and/or 56 stations
❑ Large — maximum 80 trunks and/or 144 stations

Capacity

Trunks

Module Type	Number of Modules		Trunks Supported by Module	Total Trunks by Module Type
400		x	4	
800		x	8	
408		x	4	
400 GS/LS/TTR		x	4	
800 GS/LS		x	8	
408GS/LS		x	4	
400EM		x	4	
800 DID		x	8	
100D		x	24*	
System Totals				

* The 1000 module has one physical jack that supports 24 trunks

Stations

Module Type	Number of Modules		Physical Jacks per Module	Physical Jacks by Module Type		Station Extensions Assigned	Total Station Extensions Assigned
008 MLX		x	8		x	2	
008		x	8		x	1	
408		x	8		x	1	
408 GS/LS		x	8		x	1	
012		x	12		x	1	
008 OPT		x	8		+	(x4)*	
System Totals							

* The 008 OPT module is assigned 12 extension numbers although there are only 8 physical station jacks.

Control Unit Diagram

Unit Load Total _____

Auxiliary Power Required

❑ Yes
❑ No

Unit Load Total _____

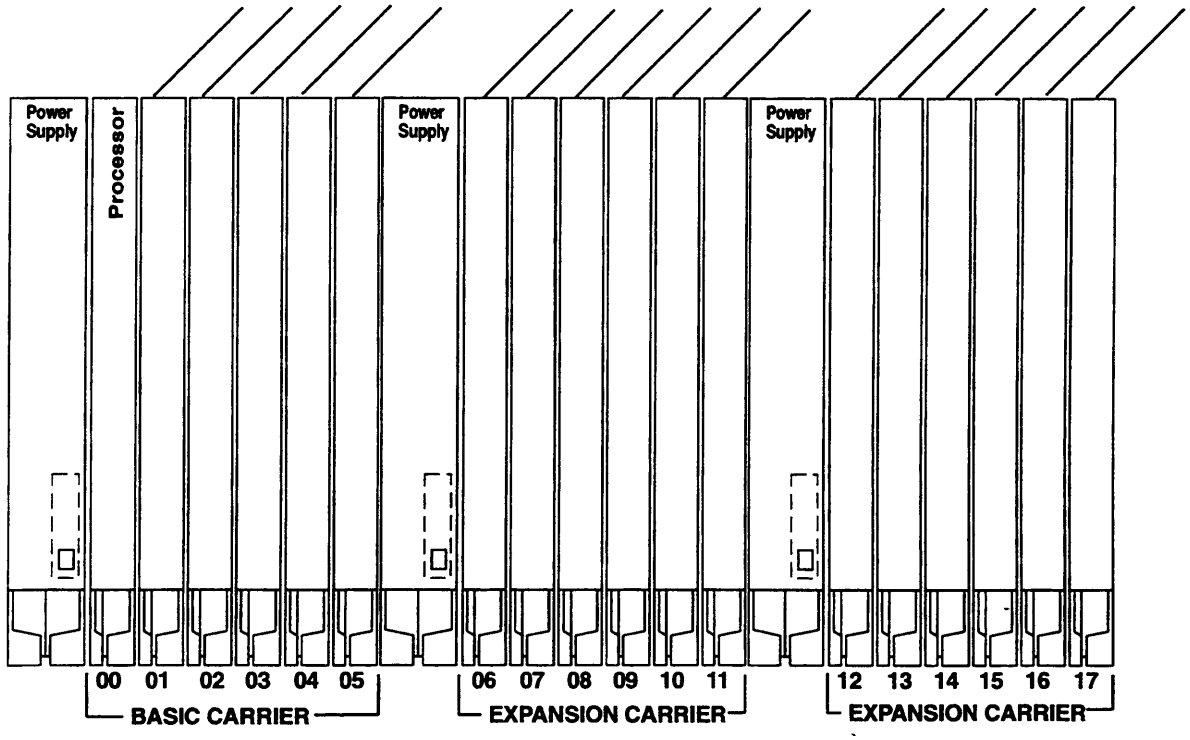
Auxiliary Power Required

❑ Yes
❑ No

Unit Load Total _____

Auxiliary Power Required

❑ Yes
❑ No



System Operatinq Conditions

System Programming Console

❑ No
❑ Logical ID_____ Ext. No. _____

Set System Mode

❑ Key ●
❑ Hybrid/PBX
❑ Behind Switch

Automatic Maintenance Busy

❑ Disable ●
❑ Enable

Set System Date

❑ Yes
❑ No

Set System Time

❑ Yes
❑ No

● Factory Setting

System Numbering — Station Jacks

Renumber System

- ❑ 2-Digit ●
- ❑ Selected Extension Numbers
- ❑ 3-Digit
- ❑ Set Up Space

Logical ID	Jack Type A	Jack Type D*	Jack Type B	2-Digit Ext.No. ◆	3-Digit Ext.No.	Set Up Space	Renumber To	Person, Location, or Function
1				10	100	7100		
2				11	101	7101		
3				12	102	7102		
4				13	103	7103		
5				14	104	7104		
6				15	105	7105		
7				16	106	7106		
8				17	107	7107		
9				18	108	7108		
10				19	109	7109		
11				20	110	7110		
12				21	111	7111		
13				22	112	7112		
14				23	113	7113		
15				24	114	7114		
16				25	115	7115		
17				26	116	7116		
18				27	117	7117		
19				28	118	7118		
20				29	119	7119		
21				30	120	7120		
22				31	121	7121		
23				32	122	7122		
24				33	123	7123		
25				34	124	7124		
26				35	125	7125		
27				36	126	7126		
28				37	127	7127		
29				38	128	7128		
30				39	129	7129		

Shaded lines indicate possible operator positions.

*Use Form 2b for adjuncts connected via MFM or ISDN 7500B Data Module.

◆ Factory Setting

PBX System Form 2a, Continued

Logical ID	Jack Type A	D*	B	2-Digit Ext.No ◆	3-Digit Ext.No.	Set Up Space	Renumber To	Person, Location, or Function
31				40	130	7130		
32				41	131	7131		
33				42	132	7132		
34				43	133	7133		
35				44	134	7134		
36				45	135	7135		
37				46	136	7136		
38				47	137	7137		
39				48	138	7138		
40				49	139	7139		
41				50	140	7140		
42				51	141	7141		
43				52	142	7142		
44				53	143	7143		
45				54	144	7144		
46				55	145	7145		
47				56	146	7146		
48				57	147	7147		
49				58	148	7148		
50				59	149	7149		
51				60	150	7150		
52				61	151	7151		
53				62	152	7152		
54				63	153	7153		
55				64	154	7154		
56				65	155	7155		
57				66	156	7156		
58				67	157	7157		
59				6800	158	7158		
60				6801	159	7159		
61				6802	160	7160		
62				6803	161	7161		
63				6804	162	7162		
64				6805	163	7163		
65				6806	164	7164		
66				6807	165	7165		
67				6808	166	7166		
68				6809	167	7167		

Shaded lines indicate possible operator positions.
*Use Form 2b for adjuncts connected via MFM or ISDN 7500B Data Module.
◆ Factory Setting

PBX System Form 2a, Continued

Logical ID	Jack Type A	Jack Type D*	Jack Type B	2-Digit Ext.No ◆	3-Digit Ext.No.	Set Up Space	Renumber To	Person, Location, or Function
69				6810	168	7168		
70				6811	169	7169		
71				6812	170	7170		
72				6813	171	7171		
73				6814	172	7172		
74				6815	173	7173		
75				6816	174	7174		
76				6817	175	7175		
77				6818	176	7176		
78				6819	177	7177		
79				6820	178	7178		
80				6821	179	7179		
81				6822	180	7180		
82				6823	181	7181		
83				6824	182	7182		
84				6825	183	7183		
85				6826	184	7184		
86				6827	185	7185		
87				6828	186	7186		
88				6829	187	7187		
89				6830	188	7188		
90				6831	189	7189		
91				6832	190	7190		
92				6833	191	7191		
93				6834	192	7192		
94				6835	193	7193		
95				6836	194	7194		
96				6837	195	7195		
97				6838	196	7196		
98				6839	197	7197		
99				6840	198	7198		
100				6841	199	7199		
101				6842	200	7200		
102				6843	201	7201		
103				6844	202	7202		
104				6845	203	7203		
105				6846	204	7204		
106				6847	205	7205		

Shaded lines indicate possible operator positions.
*Use Form 2b for adjuncts connected via MFM or ISDN 7500B Data Module.
◆ Factory Setting

PBX System Form 2a, Continued

Logical ID	Jack Type A	D*	B	2-Digit Ext.No. ◆	3-Digit Ext.No	Set Up Space	Renumber To	Person, Location, or Function
107				6848	206	7206		
108				6849	207	7207		
109				6850	208	7208		
110				6851	209	7209		
111				6852	210	7210		
112				6853	211	7211		
113				6854	212	7212		
114				6855	213	7213		
115				6856	214	7214		
116				6857	215	7215		
117				6858	216	7216		
118				6859	217	7217		
119				6860	218	7218		
120				6861	219	7219		
121				6862	220	7220		
122				6863	221	7221		
123				6864	222	7222		
124				6865	223	7223		
125				6866	224	7224		
126				6867	225	7225		
127				6868	226	7226		
128				6869	227	7227		
129				6870	228	7228		
130				6871	229	7229		
131				6872	230	7230		
132				6873	231	7231		
133				6874	232	7232		
134				6875	233	7233		
135				6876	234	7234		
136				6877	235	7235		
137				6878	236	7236		
138				6879	237	7237		
139				6880	238	7238		
140				6881	239	7239		
141				6882	240	7240		
142				6883	241	7241		
143				6884	242	7242		
144				6885	243	7243		

Shaded lines indicate possible operator positions,
*Use Form 2b for adjuncts connected via MFM or ISDN 7500B Data Module.
◆ Factory Setting

PBX System Form 2b

System Numbering — Digital/ISDN Station Adjuncts

Maximum: 127 Adjuncts

Logical ID	Factory-Set Extension No.	Renumber to	MFM SAA	MFM T/R	7500B	MLX Telephone Ext. No.	Person, Location Function, and Equipment Type

PBX System Form 2b, Continued

Logical ID	Factory-Set Extension No,	Renumber To	MFM		7500B	MLX Telephone Ext. No.	Person, Location, Function, and Equipment Type
			SAA	T/R			

PBX System Form 2b, Continued

Logical ID	Factory-Set Extension No.	Renumber To	MFM		7500B	MLX Telephone Ext. No.	Person, Location, Function, and Equipment Type
			SAA	T/R			

PBX System Form 2C

System Numbering — Trunk Jacks

Music-on-Hold, Logical ID _____ Source _____ Maintenance Alarm, Logical ID _____

Loudspeaker Page, Logical ID _____ Loop-Start Reliable Disconnect
❑ No ◆ ❑ Yes

Logical ID	Jack Type (LS,GS, DID,Tie, DS1)	Trunk Number	Trunk Type (Basic LS, Basic GS, WATS, FX, etc.)	Telephone Number or Equipment	Outmode Rotary Dial		Toll Prefix Not Needed for LD		Short Hold Disconnect Interval		QCC operator to Receive Calls (No ♦)	QCC Queue Priority Level (4 ♦)
					Yes	No ◆	Yes	No ◆	Yes	No ◆		
1		801										
2		802										
3		803										
4		804										
5		805										
6		806										
7		807										
8		808										
9		809										
10		810										
11		811										
12		812										
13		813										
14		814										
15		815										
16		816										
17		817										
18		818										
19		819										
20		820										
21		821										
22		822										
23		823										
24		824										
25		825										
26		826										
27		827										
28		828										
29		829										
30		830										
31		831										
32		832										
33		833										
34		834										
35		835										
36		836										

● Factory Setting

PBX System Form 2c, Continued

Logical ID	Jack Type (LS,GS, DID,Tie, DS1)	Trunk Number	Trunk Type (Basic LS, Basic GS, WATS,FX,etc.)	Telephone Number or Equipment	Outmode Rotary Dial		Toll Prefix Not Needed for LD		Short Hold Disconnect Interval		QCC Operator to Receive Call (No ◆)	QCC Queue Priority Level (4 ◆)
					Yes	No ◆	Yes	No ◆	Yes	No ◆		
37		837										
38		838										
39		839										
40		840										
41		841										
42		842										
43		843										
44		844										
45		845										
46		846										
47		847										
48		848										
49		849										
50		850										
51		851										
52		852										
53		853										
54		854										
55		855										
56		856										
57		857										
58		858										
59		859										
60		860										
61		861										
62		862										
63		863										
64		864										
65		865										
66		866										
67		867										
68		868										
69		869										
70		870										
71		871										
72		872										
73		873										
74		874										
75		875										
76		876										
77		877										
78		878										
79		879										
80		880										

◆ Factory Setting

System Numbering — Special Renumbers

Group Calling (Form 6e) Group ID	Factory-Set Number	Renumber To
	770	
	771	
	772	
	773	
	774	
	775	
	776	
	777	
	778	
	779	
	780	
	781	
	782	
	783	
	784	
	785	
	786	
	787	
	788	
	789	
	790	
	791	
	7920	
	7921	
	7922	
	7923	
	7924	
	7925	
	7926	
	7927	
	7928	

Listed Directory Number (QCC Queue)	Factory-Set Number	Renumber To
	800	

Pools (Form 3b) Description	Factory-Set Number	Renumber To
	70	
	890	
	891	
	892	
	893	
	894	
	895	
	896	
	897	
	898	
	899	

Group Paging (Form 6c) Group ID	Factory-Set Number	Renumber To
	793	
	794	
	795	
	796	
	797	
	798	
Page All	799 -	

Call Park (Form 6a)	Factory-Set Number	Renumber To
	881	
	882	
	883	
	884	
	885	
	886	
	887	
	888	

Remote Access Code (Form 3a)	Factory-Set Number	Renumber To
	889	

System Technician's Run Sheet

Logical ID	Type	Wire No.	Old Ext. No.	New Ext. No.	Miscellaneous	Person, Location, or Function
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						

PBX System Form 2e, Continued

Logical ID	Type	Wire No.	Old Ext. No.	New Ext. No.	Miscellaneous	Person, Location, or Function
19						
20						
21						
22						
23						
24						
25						
26						
27						
28						
29						
30						
31						
32						
33						
34						
35						
36						
37						

PBX System Form 2e, Continued

Logical ID	Type	Wire No.	Old Ext. No.	New Ext. No.	Miscellaneous	Person, Location, or Function
39						
40						
41						
42						
43						
44						
45						
46						
47						
48						
49						
50						
51						
52						
53						
54						
55						
56						
57						
58						

PBX System Form 2e, Continued

Logical ID	Type	Wire No.	Old Ext. No.	New Ext. No.	Miscellaneous	Person, Location, or Function
59						
60						
61						
62						
63						
64						
65						
66						
67						
68						
69						
70						
71						
72						
73						
74						
75						
76						
77						
78						

qPBX System Form 2e, Continued

Logical ID	Type	Wire No.	Old Ext. No.	New Ext. No.	Miscellaneous	Person, Location, or Function
79						
80						
81						
82						
83						
84						
85						
86						
87						
88						
89						
90						
91						
92						
93						
94						
95						
96						
97						
98						

PBX System Form 2e, Continued

Logical ID	Type	Wire No.	Old Ext. No.	New Ext. No.	Miscellaneous	Person, Location, or Function
99						
100						
101						
102						
103						
104						
105						
106						
107						
108						
109						
110						
111						
112						
113						
114						
115						
116						
117						
118						

PBX System Form 2e, Continued

Logical ID	Type	Wire No.	Old Ext. No.	New Ext. No.	Miscellaneous	Person, Location, or Function
119						
120						
121						
122						
123						
124						
125						
126						
127						
128						
129						
130						
131						
132						
133						
134						
135						
136						
137						
138						

PBX System Form 2e, Continued

Logical ID	Type	Wire No.	Old Ext. No.	New Ext. No.	Miscellaneous	Person, Location, or Function
139						
140						
141						
142						
143						
144						

Outside Trunks — Remote Access

DID and Tie Trunks

Remote Access Code: 889

Renumber To _____

Automatic Callback

❑ Disable ◆

❑ Enable

Barrier Codes for DID or Tie Trunks

❑ Yes

❑ No

Barrier Codes for Non-Tie Trunks

❑ Yes

❑ No

Logical ID	Trunk No.	DID or Tie Trunk	Non-Tie Trunk	Trunk Type and Description	Shared	Dedicated

◆ Factory Setting

PBX System Form 3a, Continued

Logical ID	Trunk No.	DID or Tie Trunk	Non-Tie Trunk	Trunk Type and Description	Shared	Dedicated

Class of Restriction without Barrier Codes

DID or Tie Trunks

Restriction

❑ Outward Restrict ◆
❑ Unrestricted
❑ Toll Restrict

ARS Restriction Level

❑ 0 ❑ 4
❑ 1 ❑ 5
❑ 2 ❑ 6
❑ 3 ◆

Allowed List Access

❑ List Nos. (1 -8)

___ ___ ___ ___
___ ___ ___ ___

Disallowed List Access

❑ List Nos. (1 -8)

___ ___ ___ ___
___ ___ ___ ___

Non-Tie Trunks

Restriction

❑ Outward Restrict ◆
❑ Unrestricted
❑ Toll Restrict

ARS Restriction Level

❑ 0 ❑ 4
❑ 1 ❑ 5
❑ 2 ❑ 6
❑ 3 ◆

Allowed List Access

❑ List Nos. (1 -8)

___ ___ ___ ___
___ ___ ___ ___

Disallowed List Access

❑ List Nos. (1 -8)

___ ___ ___ ___
___ ___ ___ ___

◆ Factory Setting

Class of Restriction with Barrier Codes

Barrier Code
Number _____
Digits _____ (4 digits, O-9)
Restriction
❑ Outward Restrict+
❑ Unrestricted
❑ Toll Restrict
ARS Restriction Level
❑ 0 ❑ 4
❑ 1 ❑ 5
❑ 2 ❑ 6
❑ 3 ◆
Allowed List Access
List Nos. (1 -8)
___ ___ ___ ___
___ ___ ___ ___
Disallowed List Access
List Nos. (1 -8)
___ ___ ___ ___
___ ___ ___ ___

Barrier Code
Number _____
Digits _____ (4 digits, O-9)
Restriction
❑ Outward Restrict+
❑ Unrestricted
❑ Toll Restrict
ARS Restriction Level
❑ 0 ❑ 4
❑ 1 ❑ 5
❑ 2 ❑ 6
❑ 3 ◆
Allowed List Access
List Nos. (1 -8)
___ ___ ___ ___
___ ___ ___ ___
Disallowed List Access
List ties. (1 -8)
___ ___ ___ ___
___ ___ ___ ___

Barrier Code
Number _____
Digits _____ (4 digits, O-9)
Restriction
❑ Outward Restrict ◆
❑ Unrestricted
❑ Toll Restrict
ARS Restriction Level
❑ 0 ❑ 4
❑ 1 ❑ 5
❑ 2 ❑ 6
❑ 3 ◆
Allowed List Access
List Nos. (1 -8)
___ ___ ___ ___
___ ___ ___ ___
Disallowed List Access
List Nos. (1 -8)
___ ___ ___ ___
___ ___ ___ ___

Barrier Code
Number _____
Digits _____ (4 digits, O-9)
Restriction
❑ Outward Restrict ◆
❑ Unrestricted
❑ Toll Restrict
ARS Restriction Level
❑ 0 ❑ 4
❑ 1 ❑ 5
❑ 2 ❑ 6
❑ 3 ◆
Allowed List Access
List Nos. (1 -8)
___ ___ ___ ___
___ ___ ___ ___
Disallowed List Access
List Nos. (1 -8)
___ ___ ___ ___
___ ___ ___ ___

◆ Factory Setting

Outside Trunks — Pools

Maximum: 11 pools with up to 80 trunks per pool

Pool Dial-Out Code	Renumber To	Logical ID	Trunk No.	Trunk Type (Basic LS, Basic GS, WATS, FX, etc.)	Description

Factory Settings: 70 (main), 891 (dial-in tie), 892 (automatic-in tie)

PBX System Form 3b, Continued

Pool Dial-Out Code	Renumber To	Logical ID	Trunk No.	Trunk Type (Basic LS, Basic GS, WATS, FX, etc.)	Description

Outside Trunks – DS1 Facility (100D Module)

Module 1 Slot No. _____

Type of Service
- ❑ T1 ◆
- ❑ ISDN-PRI

Frame Format
- ❑ D4 ◆
- ❑ ESF

Suppression (Line Code)
- ❑ AMI-ZCS ◆
- ❑ B8ZS

Line Compensation
_____Cable Feet
- ❑ 1 ◆ (.6dB)
- ❑ 2 (1.2 dB)
- ❑ 3 (1.8 dB)
- ❑ 4 (2.4 dB)
- ❑ 5 (3.0 dB)

Clock Synchronization Priority
- ❑ Primary ◆
- ❑ Secondary
- ❑ Tertiary
- ❑ None

Source
- ❑ Loop ◆
- ❑ Local

Activation
- ❑ Active ◆
- ❑ Not Active

Signaling Mode
- ❑ RBS ◆
- ❑ CCS

Channel Service Unit
- ❑ Foreign Exchange ◆
- ❑ Special Access

Module 2 Slot No. _____

Type of Service
- ❑ T1 ◆
- ❑ ISDN-PRI

Frame Format
- ❑ D4 ◆
- ❑ ESF

Suppression (Line Code)
- ❑ AMI-ZCS ◆
- ❑ B8ZS

Line Compensation
_____Cable Feet
- ❑ 1 ◆ (.6dB)
- ❑ 2(1.2 dB)
- ❑ 3 (1.8 dB)
- ❑ 4 (2.4 dB)
- ❑ 5 (3.0 dB)

Clock Synchronization Priority
- ❑ Primary
- ❑ Secondary
- ❑ Tertiary
- ❑ None

Source
- ❑ Loop ◆
- ❑ Local

Activation
- ❑ Active ◆
- ❑ Not Active

Signaling Mode
- ❑ RBS ◆
- ❑ CCS

Channel Service Unit
- ❑ Foreign Exchange ◆
- ❑ Special Access

Module 3 Slot No. _____

Type of Service
- ❑ T1 ◆
- ❑ ISDN-PRI

Frame Format
- ❑ D4 ◆
- ❑ ESF

Suppression (Line Code)
- ❑ AMI-ZCS ◆
- ❑ B8ZS

Line Compensation
_____Cable Feet
- ❑ 1 ◆ (.6dB)
- ❑ 2(1.2 dB)
- ❑ 3(1.8 dB)
- ❑ 4 (2.4 dB)
- ❑ 5 (3.0 dB)

Clock Synchronization Priority
- ❑ Primary
- ❑ Secondary
- ❑ Tertiary
- ❑ None

Source
- ❑ Loop ◆
- ❑ Local

Activation
- ❑ Active ◆
- ❑ Not Active

Signaling Mode
- ❑ RBS ◆
- ❑ CCS

Channel Service Unit
- ❑ Foreign Exchange ◆
- ❑ Special Access

◆ Factory Setting

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PBX System Form 3c, Continued

ISDN-Facility Options Module _____ Slot NO.

Logical ID	Trunk No.	Telephone Number (up to 12 digits)	Telephone Number to Send (up to 12 digits)
Test Telephone Number (up to 12 digits)			

Terminal Equipment Identifier (TEI)

❑ 0 ◆

❑ (____1 -63)

Timers and Counters

	Factory Setting	Change To
T200Timer	1 second	(1000-3000ms)
T203Timer	30seconds	(1-60 seconds)
N200 Counter	3 transmissions	(1 -5 transmissions)
N201 Counter	260 octets	(16-260 octets)
K Counter	7 frames	(1-15frames)
T303 Timer	4 seconds	(4-12 seconds)
T305 Timer	4 seconds	(4-30 seconds
T308 Timer	4 seconds	(4-1 2 seconds
T309Timer	90 seconds	(30-120 seconds)
T310 Timer	10 seconds	(2-10 seconds)
T313 Timer	4 seconds	(4-12 seconds)
T316 Timer	120 seconds	(3-1 20 second's)

◆ Factory Setting

B- Channel Groups

Maximum: 69 groups with up to 23 channels per group. *Make copy for each group.*

Group No. (1 -69) __________

B-Channel lot and Port No,	Trunks Logical ID	Trunks Trunk No.

Group No. (1 -69) __________

B-Channel Slot & Port #	Trunks Logical ID	Trunks Trunk No.

General Business Systems T1/ISDN-PRI Planner

Reference No. _____

Customer

❇ Name _____ Tel. No. _____

❇ Address _____

❇ AT&T DOSS Order Number _____

❇ Account Executive _____ Tel. No. _____

❇ Systems Consultant _____ Tel. No. _____

T1/ISDN-PRl Vendor

❇ Name _____

Contact _____ Tel,.No. _____

Installation

Due Date _____

Materials-on-Job Date _____

AT&T Installation Contacts

Implementor _____ Tel, No. _____

NTM Manager _____ Tel. No. _____

NTSC Engineer _____ Tel. No. _____

DSO Manager _____ Tel. No. _____

Has order been placed with the network provider for this service'?

❑ Yes, Date _____ ❑ No

❇ Required fields for presale.

PBX System Form 3c, Continued

❇ MODULE 1

Service Ordered or Planned
❑ ISDN-PRI
❑ T1

Frame Format
❑ ESF - Preferred.
Required for ISDN-PRI and international data transmission,

❑ D4 - May be used if required by local telephone company.

Line Coding (Suppression)
❑ B8ZS-Required for ISDN-PRI.
❑ AMI-ZCS

Line Signaling Mode
❑ Common Channel - Required for ISDN-PRI.
❑ Robbed Bit

Synchronization Timing
❑ Loop-Required for ISDN-PRI.
❑ Local

❇ MODULE 2

Service Ordered or Planned
❑ ISDN-PRI
❑ T1

Frame Format
❑ ESF - Preferred.
Required for ISDN-PRI and international data transmission.

❑ D4 - Maybe used if required by local telephone company.

Line Coding (Suppression)
❑ B8ZS - Required for ISDN-PRI.
❑ AMI-ZCS

Line Signaling Mode
❑ Common Channel - Required for ISDN-PRI.
❑ Robbed Bit

Synchronization Timing
❑ Loop-Required for ISDN-PRI.
❑ Local

❇ MODULE 3

Service Ordered or Planned
❑ ISDN-PRI
❑ T1

Frame Format
❑ ESF - Preferred.
Required for ISDN-PRI and international data transmission.

❑ D4 - May be used if required by local telephone company.

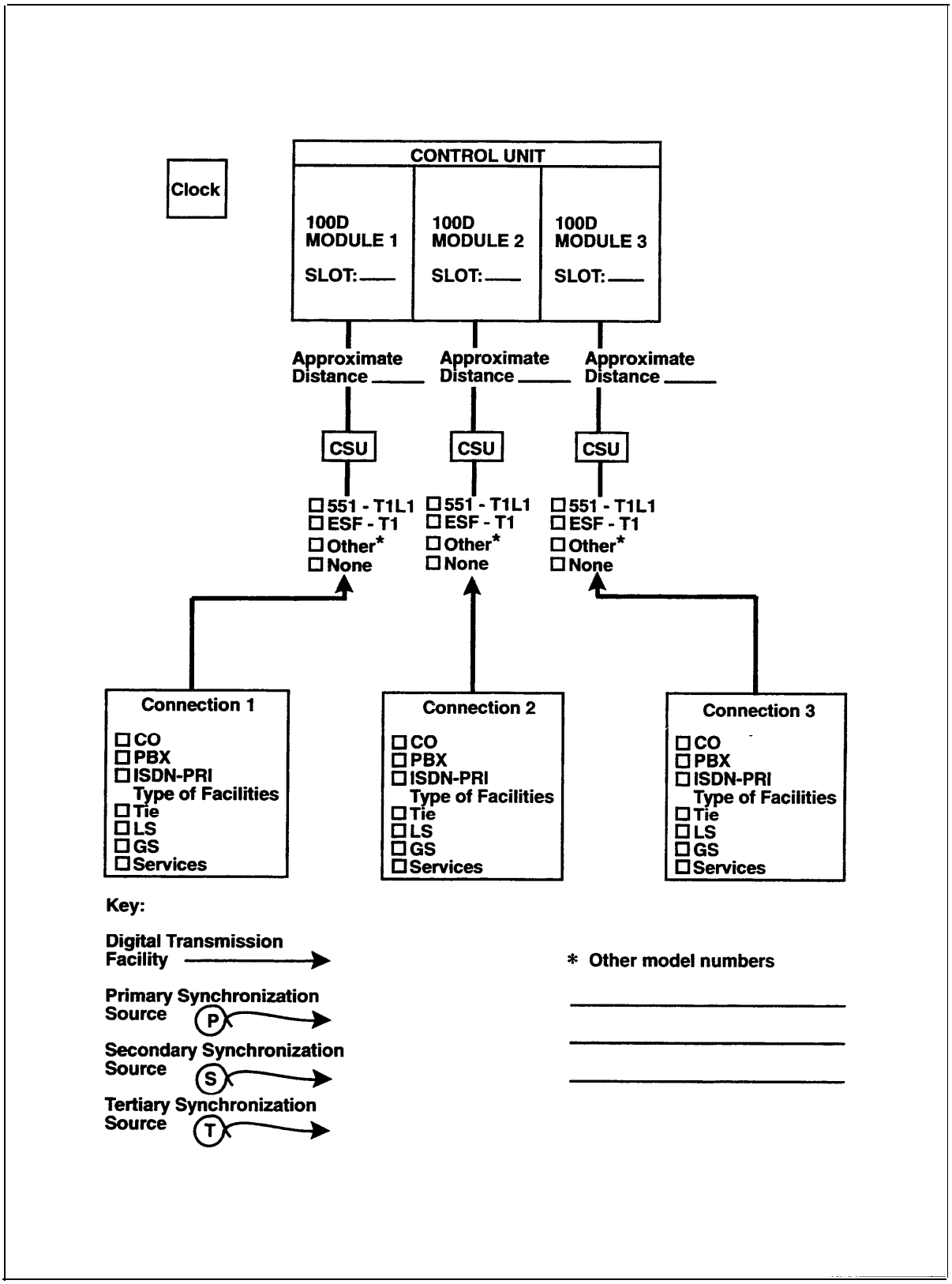
Line Coding (Suppression)
❑ B8ZS - Required for ISDN-PRI.
❑ AMI-ZCS

Line Signaling Mode
❑ Common Channel - Required for ISDN-PRI.
❑ Robbed Bit

Synchronization Timing
❑ Loop-Required for ISDN-PRI.
❑ Local

❇ All fields required for presale.

Network Planning Map



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PBX System Form 3c, Continued

Non-Complex Configuration

Module _____of_____ Slot No. _____

❇ Services

SUBSCRIBED TO:	CHANNELS ASSIGNED TO SERVICE
❑ Ground-start (T1 only)	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
❑ Loop-Start (T1 only)	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
❑ Tie Trunk T1 only)	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
❑ MultiQuest 900 (w/wo DNIS) (T1 only)	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
❑ Megacom (T1 or ISDN-PRI)	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
❑ Megacom 800 (w/wo DNIS) (T1 or ISDN-PRI)	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
❑ Megacom/Megacom 800 ml)	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
❑ Software Defined Network (T1 or lSDN-PRI)	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
❑ Accunet Switched Digital Service (ISDN-PRI only)	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
❑ Other	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
❑ Other	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

ISDN-PRI Identification Service

❇ Will SID/ANl be used? ❑ No ❑ Yes, for

Incoming calls ❑ ANI ❑ SID ❑ Both.. .Prefer_____ then _____

Outgoing calls ❑ ANI ❑ SID ❑ SID/ANI Privacy

Note: The DNIS service is supported only on T1 services.

Channel Service Unit

	❑	❑	❑ ❇
Mfr	AT&T	AT&T	_____
Md 1	551 -T1 L1	ESF-T1	_____
REG#	GI 472-1681 9-DE-N	GIC 472-1 6544 -DE-N	_____
FIC	4DU 158	4DN 188	_____

❇ If a CSU other than the two listed AT&T models is used, AT&T will not accept the responsibility for its installation, connection, or testing.

❇ Required fields for presale.

PBX System Form 3c, Continued

Non-Complex Configuration

Module _____of_____ Slot No. _____

❇ Services

SUBSCRIBED TO:	CHANNELS ASSIGNED TO SERVICE
❑ Ground-start (T1 only)	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
❑ Loop-Start (T1 only)	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
❑ Tie Line (T1 only)	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
❑ MultiQuest 900 (w/wo DNIS) (T1 only)	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
❑ Megacom (T1 or lSDN-PRI)	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
❑ Megacom 800 (w/wo DNIS) (T1 or lSDN-PRl)	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
❑ Megacom/Megacom 800 (T1)	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
❑ Software Defined Network T1 or lSDN-PRI)	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
❑ Accunet Switched Digital Service (lSDN-PRl only)	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
❑ Other	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
❑ Other	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

lSDN-PRl Identification Service

❇ WillSID/ANIbe used? ❑ No ❑ Yes, for

Incoming calls ❑ ANI ❑ SID ❑ Both.. Prefer_____ then_____

Outgoing calls ❑ ANI ❑ SID ❑ SID/ANI Privacy

Note: The DNIS service is supported only on T1 services.

Channel Service Unit

	❑	❑	❑❇
Mfr	AT&T	AT&T	_____
Md1	551-T1 L1	ESF-T1	_____
REG#	GI472-16819-DE-N	GIC472-16544-DE-N	_____
FIC	4DU 158	4DN 188	_____

❇ If a CSU other than the two listed AT&T models is used, AT&.T will not accept the responsibility for its installation, connection, or testing.

❇ Required fields for presale.

PBX System Form 3c, Continued

Non-Complex Configuration

Module _____of_____ Slot No. _____

i Services

SUBSCRIBED TO:	CHANNELS ASSIGNED TO SERVICE
❑ Ground-start (T1 only)	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
❑ Loop-Start (T1 only)	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
❑ Tie Trunk (T1 only)	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
❑ MultiQuest 900 (w/wo DNIS) (T1 only)	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
❑ Megacom (T1 or lSDN-PRI)	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
❑ Megacom 800 (w/wo DNIS) (T1 or ISDN-PRI)	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
❑ Megacom/Megacom 800 (T1)	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
❑ Software Defined Network (11 or ISDN-PRI)	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
❑ Accunet Switched Digital Service (lSDN-PRI only)	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
❑ Other	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
❑ Other	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

ISDN-PRI Identification Service

❇ Will SID/ANI be used? ❑ No ❑ Yes, for

Incoming calls ❑ ANI ❑ ISID ❑ Both... Prefer_____ then_____

Outgoing calls ❑ ANI ❑ SID ❑ SID/ANI Privacy

Note: The DNIS service is supported only on T1 services.

Channel Service Unit

	❑	❑	❑ ❇
Mfr	AT&T	AT&T	_____
Md 1	551-T1 L1	ESF-T1	_____
REG#	GI 472-16819-DE-N	GIC472-16544-DE-N	_____
FIC	4DU 158	4DN 188	_____

❇ If a CSU other than the two listed AT&T models is used, AT&T will not accept the responsibility for its installation, connection, or testing.

❇ Required fields for presale.

PBX System Form 3d

Outside Trunks — Tie

Logical ID	Trunk No.	Direction			Signaling Type								E&M Signal			Inmode		Outmode		Dial Tone		Answer Supv. Time		Disconnect Time	
		TwoWay✦	Outgoing	Incoming	Wink✦		Delay		Immediate		Automatic														
					In	Out	In	Out	In	Out	In	Out	1S✦	1C	5	Touch-Tone	Rotary✦	Touch-Tone	Rotary✦	Remote✦	Local	300✦	Other	300✦	Other

✦ Factory Setting

2

Logical ID	Trunk No.	Direction			Signaling Type								E&M Signal			Inmode		Outmode		Dial Tone		Answer Supv. Time		Disconnect Time	
					Wink✦		Delay		Immediate		Automatic														
		TwoWay✦	Outgoing	Incoming	In	Out	In	Out	In	Out	In	Out	1S✦	1C	5	Touch-Tone	Rotary✦	Touch-Tone	Rotary✦	Remote✦	Local	300✦	Other	300✦	Other

✦ Factory Setting

PBX System Form 3d, Continued

Logical ID	Trunk No.	Direction			Signaling Type								E&M Signal			Inmode		Outmode		Dial Tone		Answer Supv. Time		Disconnect Time	
		TwoWay✦	Outgoing	Incoming	Wink✦		Delay		Immediate		Automatic		1S✦	1C	5	Touch-Tone	Rotary✦	Touch-Tone	Rotary✦	Remote✦	Local	300✦	Other	300✦	Other
					In	Out	In	Out	In	Out	In	Out													

✦ Factory Setting

PBX System Form 3e

Outside Trunks — DID

Make copies for each block

Block Number (1 or 2) _____

Type
- ❑ Wink-start ◆
- ❑ Immediate-start

Expected Digits
- ❑ 1
- ❑ 2
- ❑ 3 ◆
- ❑ 4

Delete Digits
- ❑ 0 ◆
- ❑ 1
- ❑ 2
- ❑ 3
- ❑ 4

Add Digits
- ❑ 0 digits ◆
- ❑ Add these digits _____ (any number from 1 - 9999)

Signaling
- ❑ Rotary ◆
- ❑ Touch-tone

Invalid Destination
- ❑ Send to backup position ◆
- ❑ Return to fast busy

Trunks Included in Block

Logical ID	Trunk Number	Telephone Number	Disconnect Time	
			500 ms ◆	Other

◆ Factory Setting

2 Trunks included in Block

Logical ID	Trunk Number	Telephone Number	Disconnect Time	
			500 ms✦	Other

Logical ID	Trunk Number	Telephone Number	Disconnect Time	
			500 ms✦	Other

✦ Factory Setting

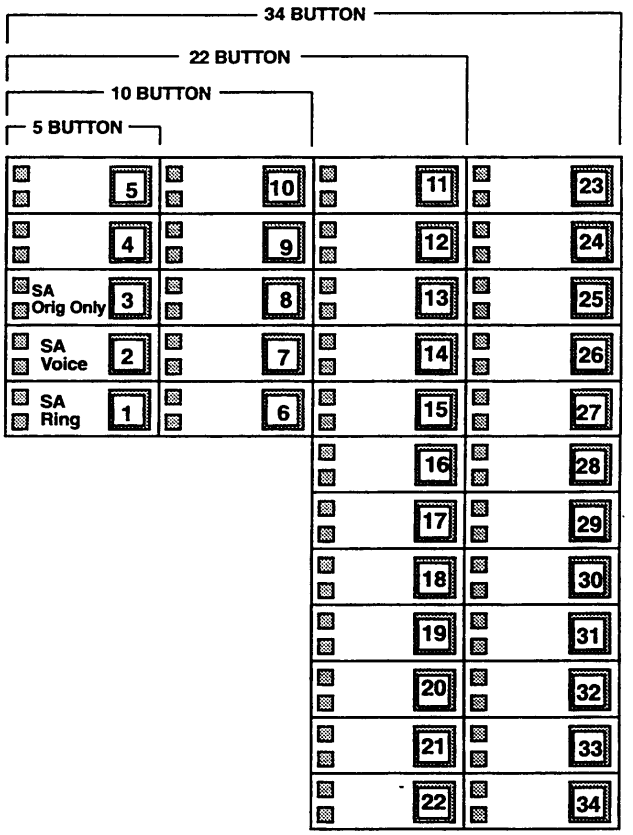
PBX System Form 4a

Analog Multiline Telephone

(Make a copy of this form for each telephone.)

Logical ID _____ Extension No. _____ Person or Location _____

Button Diagram



Station Jack Pair

- ❑ Voice Announce to Busy (voice/voice)
- ❑ Simultaneous Voice and Data (voice/data)
  Even-numbered jack
  Logical ID _____ Ext. No. _____

Telephone Model

- ❑ MLC-5
- ❑ BIS-10
- ❑ BIS-22
- ❑ BIS-22D
- ❑ BIS-34
- ❑ BIS-34D
- ❑ Other _____

Adiuncts

- ❑ General Purpose Adapter
  - ❑ Fax machine
  - ❑ Answering machine
  - ❑ Data terminal
  - ❑ Other _____
- ❑ Supplemental Alert Adapter
  Alert device type _____
- ❑ Headset
- ❑ Headset adapter
- ❑ Hands-free unit
- ❑ Hearing-impaired handset
- ❑ Noisy environment
- ❑ Other _____

Optional Features

Pool Dial-Out Code Restriction
- ❑ Yes, dial-out codes
  _____ _____
  _____ _____

Call Restriction
- ❑ Unrestricted ◆
- ❑ Outward Restrict
- ❑ Toll Restrict

Forced Account Code Entry
- ❑ No ◆
- ❑ Yes

Remote Call Forward
- ❑ Not allowed ◆
- ❑ Allowed

Principal User of Personal Line
Trunk No. (801- 880) _____
Tel. No. _____

Message-Waiting Receiver
- ❑ Fax machine at Extension No. _____

Individual Coverage Receivers
Primary receivers
_____ _____ _____ _____
_____ _____ _____ _____
Secondary receivers
_____ _____ _____ _____
_____ _____ _____ _____

Group Coverage
- ❑ No ◆
- ❑ Group No. _____

Facility Restriction Level
- ❑ 3 ◆
- ❑ _____(0 - 2, 4 - 6)

◆ Factory Setting

PBX System Form 4b

Digital/ISDN (MLX) Telephone

Make a copy of this form for each telephone.

Logical ID _____ Extension No. _____ Person or Location _____

Telephone Model

- ❑ MLX-20L™
- ❑ MLX-28D™
- ❑ MLX-10D™
- ❑ MLX-10™

Adjuncts

- ❑ Headset
- ❑ Hearing-impaired handset
- ❑ Noisy environment
- ❑ Multi-Function Module (MFM) Extension No. _____
  - ❑ Fax machine
  - ❑ Answering machine
  - ❑ Data terminal
  - ❑ Alert device, type _____
  - ❑ Other _____

Optional Features

Pool Dial-Out Code Restriction

- ❑ Yes, dial-out codes

  _____ _____ _____ _____

  _____ _____ _____ _____

Call Restriction

- ❑ Unrestricted ◆
- ❑ Outward Restrict
- ❑ Toll Restrict

Forced Account Code Entry

- ❑ No ◆
- ❑ Yes

Microphone Operation

- ❑ Enable ◆
- ❑ Disable

Remote Call Forward

- ❑ Not allowed ◆
- ❑ Allowed

Principal User of Personal Line

Trunk No. (801 - 880) _____

Tel. No. _____

Message-Waiting Receiver

- ❑ Fax machine at Ext. No. _____

Individual Coverage Receivers

Primary receivers

_____ _____ _____ _____

_____ _____ _____ _____

Secondary receivers

_____ _____ _____ _____

_____ _____ _____ _____

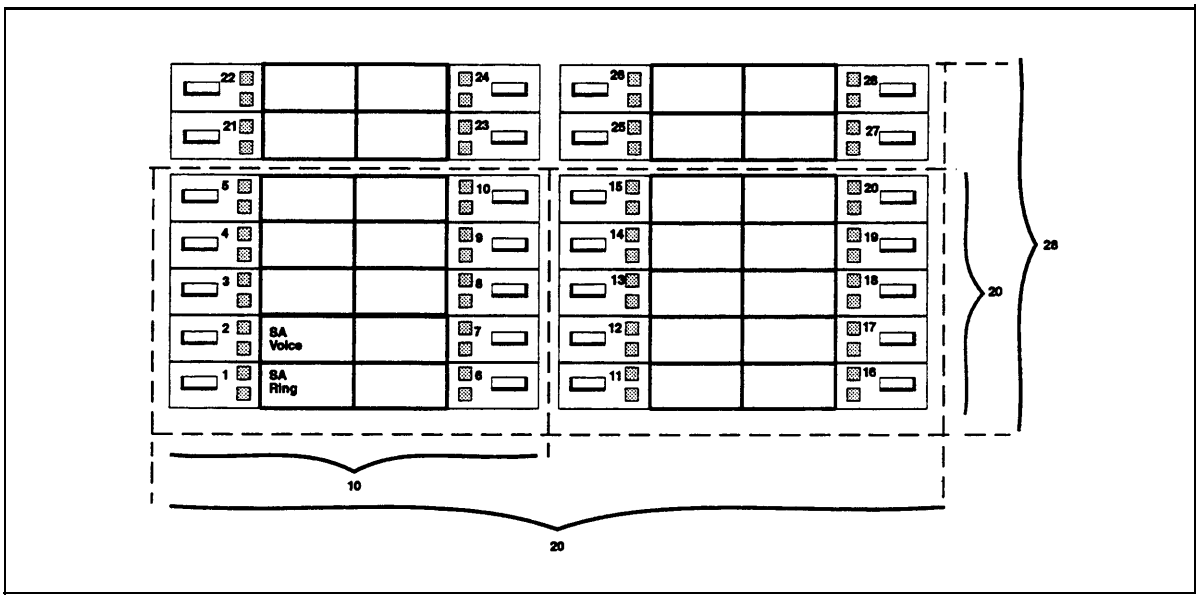
Group Coverage

- ❑ No ◆
- ❑ Group No. _____

Facility Restriction Level

- ❑ 3 ◆
- ❑ _____(0 - 2, 4 - 6)

Button Diagram



◆ Factory Setting

MFM Adjunct

Extension No. _____ Person or Location _____

Adjuncts

- ❑ Fax machine
- ❑ Answering machine
  - ❑ Used as delay announcement device for calling groups Ext. No.
    — — — .
    — — . .
- ❑ Data terminal
- ❑ Alert device, type _____
  - ❑ Used as Calls-in-Queue Alarm device for calling groups Ext. No. _____
- ❑ Other _____

Button Diagram

5	10
4	9
SA Orig. Only 3	8
SA Voice 2	7
SA Ring 1	6

Optional Features

Pool Dial-Out Code Restriction

❑ Yes, dial-out codes

____ ____ ____ ____
____ ____ ____ ____

Call Restriction

- ❑ Unrestricted ◆
- ❑ Outward Restrict
- ❑ Toll Restrict
  (If designated as delay announcement, outward restrict)

Forced Account Code Entry

- ❑ No ◆
- ❑ Yes

Remote Call Forward

- ❑ Not allowed ◆
- ❑ Allowed

Principal User of Personal Line

Trunk No. (801 - 880) _____
Tel. No. _____

Centralized Programming Requirements

- ❑ Disable Voice Announce
- ❑ Change button 2 assignment to System Access Originate Only and remove button 3 assignment
- ❑ Enable Ringing/Idle Line Preference
- ❑ Change Automatic Line Selection order to: (1) System Access Ring, (2) System Access Originate Only, (3) outside trunks assigned to buttons 3 through 10
- ❑ Set Ringing Option to No Ring for each personal line on which calls are not received

Fax Machine Features

Fax Machine Receiver

- ❑ No ◆
- ❑ Extension No. _____

Fax Message Threshold

- ❑ 10 seconds ◆
- ❑ _____ seconds (0 - 9, 11- 30)

Facility Restrictional Level _____

- ❑ 3 ◆
- ❑ ____(O-2,4-6)

◆ Factory Setting

Tip/Ring Equipment

Make a copy of this form for each device

Logical ID _____ Extension No. _____ Person or Location _____

Button Diagram

5	10
4	9
3	8
2 SA Ring	7
1 SA Ring	6

Type

- ❑ Single-line telephone
- ❑ Answering machine
  - ❑ Used as delay announcement device for calling groups Ext. No.

    ____ ____ ____ ____

    ____ ____ ____ ____
- ❑ Fax machine
- ❑ Other

Adjuncts

- ❑ Speakerphone
- ❑ Hearing-impaired handset
- ❑ Noisy environment

Optional Features

Pool Dial-Out Code Restriction

- ❑ Yes, dial-out codes

  _____

  _____

Call Restriction

- ❑ Unrestricted ◆
- ❑ Outward Restrict
- ❑ Toll Restrict
  (If designated as delay announcement, outward restrict)

Forced Account Code Entry

- ❑ No ◆
- ❑ Yes

Remote Call Forward

- ❑ Not allowed ◆
- ❑ Allowed

Principal User of Personal Line

Trunk No. (801 - 880)_____

Tel. No._____

Fax Machine Features

Fax Message Receiver

- ❑ No ◆
- ❑ Ext. No. _____

Fax Message Threshold

- ❑ 10 seconds ◆
- ❑ _____ seconds (0 - 9, 11- 30)

Individual Coverage Receivers

Primary receivers

____ ____ ____ ____

____ ____ ____ ____

Secondary receivers

____ ____ ____ ____

____ ____ ____ ____

Message-Waiting Receiver

- ❑ Fax machine at Ext. No. _____

Facility Restriction Level

- ❑ 3 ◆
- ❑ _____ (0-2,4-6)

◆ Factory Setting

PBX System Form 5a

Direct-Line Console (DLC) — Analog

Make a copy of this form for each telephone

Logical ID _____ Extension No. _____ Person or Location _____

Station Jack Pair

❑ Voice Announce to Busy (voice/voice)

❑ Simultaneous Voice and Data (voice/data)
Even-numbered jack
Logical ID_____ Ext. No._____

Console Model

❑ MERLIN II System Display Console

❑ BIS-34D

❑ BIS-34

❑ BIS-22

Adjuncts

❑ General Purpose Adapter
- ❑ Fax machine
- ❑ Answering machine
- ❑ Data terminal
- ❑ Other _____

❑ Supplemental Station Alert Adapter
Alert Device type _____

❑ Headset

❑ Headset adapter

❑ Hearing-impaired handset

❑ Noisy environment

❑ Other _____

Optional Features

Call Restriction

❑ Unrestricted ◆

❑ Outward Restrict

❑ Toll Restrict

Forced Account Code Entry

❑ No ◆

❑ Yes

Remote Call Forward

❑ Not allowed ◆

❑ Allowed

Principal User of Personal Line

Line Number (801 -880) _____

Telephone No. _____

Message-Waiting Receiver

❑ Fax machine at Ext. No. _____

Individual Coverage Receivers

Primary receivers

_____ _____

_____ _____

Secondary receivers

_____ _____

_____ _____

Group Coverage

❑ No ◆

❑ Group No. _____

Extension Status

❑ No ◆

❑ Yes

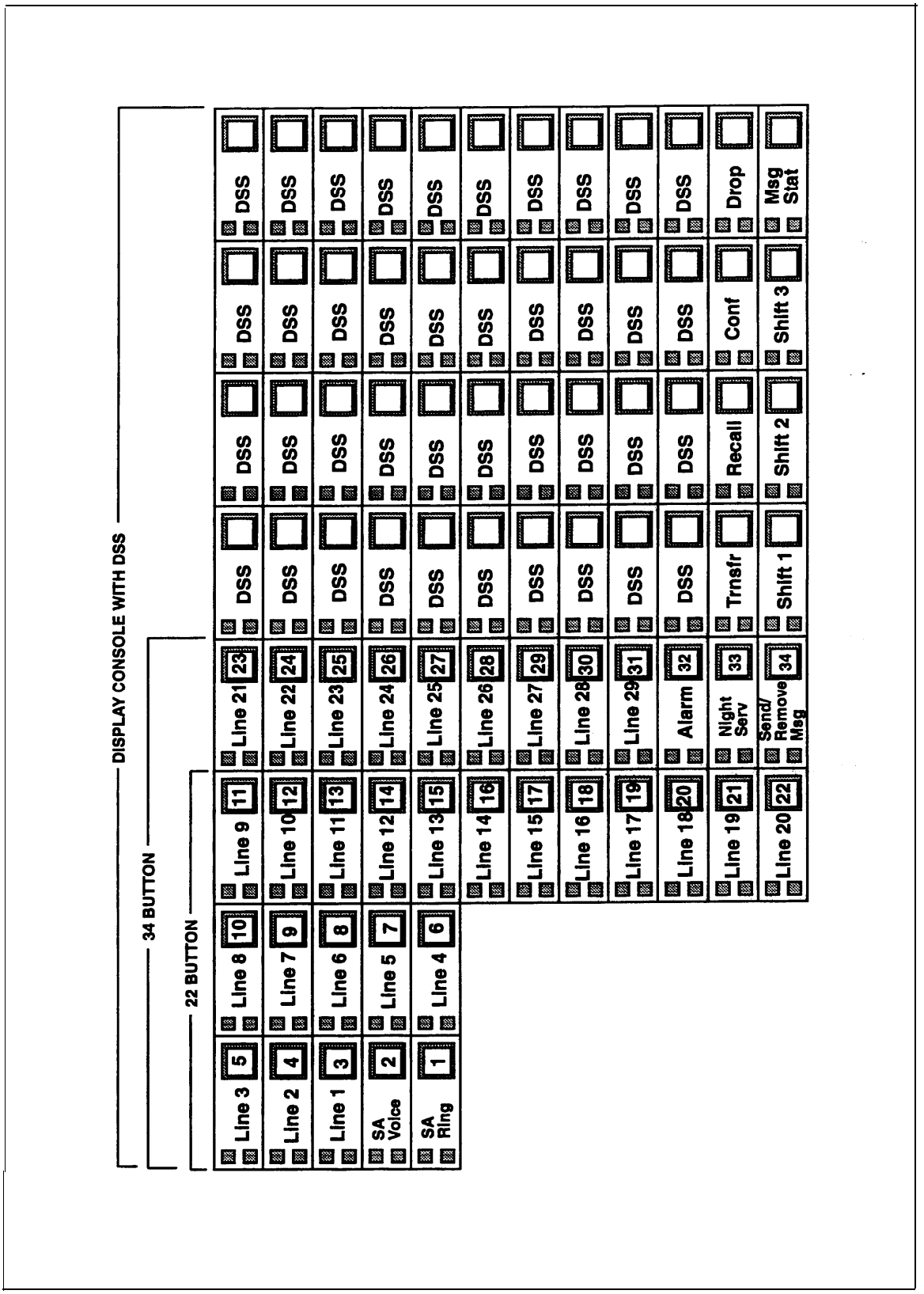
Facility Restriction Level

❑ 3 ◆

❑ ____(0 - 2,4-6)

See back for button diagram

◆ Factory Setting



Assignment of outside trunks to console buttons begins with button number 3.

PBX System Form 5b

Direct-Line Console (DLC) — Digital/ISDN

Make a copy of this form for each console.

Logical ID _____ Extension No. _____ Person or Location _____

Console Model

- ❑ MIX-20L™
- ❑ MLX-28D™

Adjuncts

- ❑ Direct Station Selector
  Number (1 or 2) _____
- ❑ Multi-Function Module
  (MFM) Extension No. _____
  - ❑ Fax machine
  - ❑ Answering machine
  - ❑ Data terminal
  - ❑ Alert device
    Type _____
  - ❑ Other _____
- ❑ Headset
- ❑ Hearing-impaired handset
- ❑ Noisy environment

Optional Features

Pool Dial-Out Code Restriction

- ❑ Yes, dial-out codes
  ___ ___ ___ ___
  ___ ___ ___ ___

Call Restriction

- ❑ Unrestricted+
- ❑ Outward Restrict
- ❑ Toll Restrict

Forced Account Code Entry

- ❑ No ◆
- ❑ Yes

Microphone Operation

- ❑ Enable ◆
- ❑ Disable

Remote Call Forward

- ❑ Not allowed ◆
- ❑ Allowed

Principal User of Personal Line

Trunk No. (801 - 880)_____

Tel.No. _____

Message-Waiting Receiver

- ❑ Fax machine at
  Ext. No. _____

Individual Coverage Receivers

Primary receivers

___ ___ ___ ___
___ ___ ___ ___

Secondary receivers

___ ___ ___ ___
___ ___ ___ ___

Group Coverage

- ❑ No ◆
- ❑ Group No_____

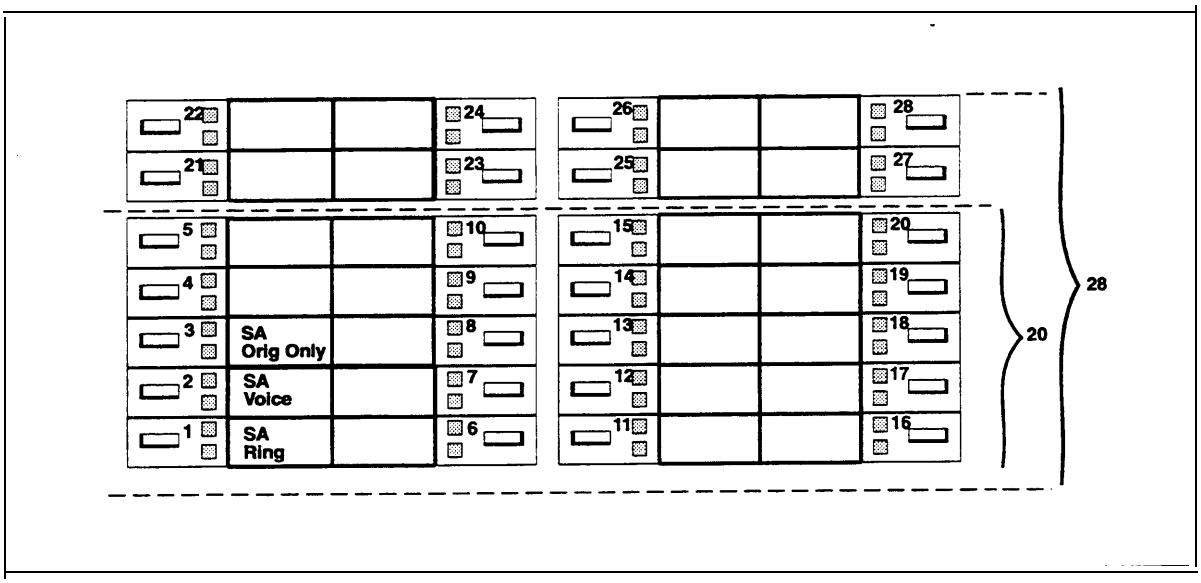
Extension Status

- ❑ No ◆
- ❑ Yes

Facility Restriction Level

- ❑ 3 ◆
- ❑ ____(0 - 2, 4 - 6)

Button Diagram



Assignment of outside trunks to console buttons begins with button number 6.

◆ Factory Setting

PBX System Form 5b, Continued

MFM Adjunct

Extension No. _____ Person or Location _____

Adiuncts

- ❑ Fax machine
- ❑ Answering machine
  - ❑ Used as delay announcement device for calling groups
    Ext. No.
    _____ _____ _____ _____
    _____ _____ _____ _____
- ❑ Data terminal
- ❑ Alert device, type _____
  - ❑ Used as Calls-in-Queue Alarm device for calling groups
    Ext. No. _____
- ❑ Other _____

Optional Features

Pool Dial-Out Code Restriction

Yes, dial-out codes

_____ _____ _____ _____
_____ _____ _____ _____

Call Restriction

- ❑ Unrestricted ◆
- ❑ Outward Restrict
- ❑ Toll Restrict
  (If designated as delay announcement, outward restrict)

Forced Account Code Entry

- ❑ No ◆
- ❑ Yes

Remote Call Forward

- ❑ Not allowed ◆
- ❑ Allowed

Principal User of Personal Line

Trunk No. (801 - 880) _____

Tel. No. _____

Fax Machine Features

Fax Machine Receiver

- ❑ No ◆
- ❑ Extension No. _____

Fax Message Threshold

- ❑ 10 seconds ◆
- ❑ _____ seconds (0 - 9, 11- 30)

Facility Restrictional Level

- ❑ 3 ◆
- ❑ _____ (0 - 2, 4 - 6)

◆ Factory Setting

5	10
4	9
SA Orig. Only 3	8
SA Voice 2	7
SA Ring 1	6

Centralized Programming Requirements

- ❑ Disable Voice Announce
- ❑ Change button 2 assignment to System Access Originate Only and remove button 3 assignment
- ❑ Enable Ringing/Idle Line Preference -
- ❑ Change Automatic Line Selection order to: (1) System Access Ring, (2) System Access Originate Only, (3) outside trunks assigned to buttons 3 through 10
- ❑ Set Ringing Option to No Ring for each personal line on which calls are not received.

PBX System Form 5C

Queued Call Console (QCC)

Make a copy of this form for each telephone.

Logical ID_____ Extension No._____ Person or Location: _____

Adjuncts

- ❑ Direct station selector
- ❑ Number (1 or 2) _____
- ❑ Headset
- ❑ Hearing-impaired handset
- ❑ Noisy environment

Message Center Operator

- ❑ No
- ❑ Yes

Optional Features

Pool Dial-Out Code Restriction

- ❑ Yes, dial-out code

  _____ _____ _____ _____

  _____ _____ _____ _____

Call Restriction

- ❑ Unrestricted ◆
- ❑ Outward Restrict
- ❑ Toll Restrict

Forced Account Code Entry

- ❑ No ◆
- ❑ Yes

Microphone Operation

- ❑ Enable ◆
- ❑ Disable

Message-Waiting Indication Receiver

- ❑ Fax machine at Ext. No. _____

Extension Status

- ❑ No ◆
- ❑ Yes

Facility Restriction Level _____

Button Diagram

5	CALL 5	POS BUSY	10	15	ALARM	FCD REL	20
4	CALL 4	SND/RMV MSG	9	14	NIGHT SERV	POOL STAT	19
3	CALL 3	HEAD MUTE	8	13	HEAD STAT	HEAD AA	18
2	CALL 2	SOURCE	7	12	DEST	JOIN	17
1	CALL 1	START	6	11	RELEASE	CANCEL	16

◆ Factory Setting

Optional Operator Features

Direct-Line Console

Operator Hold Timer
- ❑ 60 seconds ◆
- ❑ ____seconds (10 - 59, 61 - 255)

DLC Automatic Hold
- ❑ Disable ◆
- ❑ Enable

Queued Call Console

Hold Return
- ❑ Remain on hold ◆
- ❑ Return to queue

Automatic Hold or Release
- ❑ Automatic Release+
- ❑ Automatic Hold

Queue Over Threshold
- ❑ 0 calls ◆ (operators not notified when calls are in queue)
- ❑ _____ calls (1- 99)

Elevate Priority
- ❑ 0 seconds ◆ (calls are not automatically reprioritized)
- ❑ _____ seconds (5 - 30)

Calls-in-Queue Alert
- ❑ Disable ◆
- ❑ Enable, Operator Extension No. _____ _____ _____ _____

Message Center
- ❑ No
- ❑ Operator Extension No. _____

Extended Call Completion
- ❑ Automatic completion ◆
- ❑ Manual completion

Return Ring
- ❑ 4 rings ◆
- ❑ _____ rings (1- 15)

Position Busy Backup
- ❑ No ◆
- ❑ Extension no. of calling group backup _____

Operator Hold Timer
- ❑ 60 seconds ◆
- ❑ _____ seconds (10 - 59, 61 - 255)

Call Types	QCC Operator to Receive Calls	QCC Queue Priority Level (4 ♦)
Dial O		
Call Follow/Forward	N/A	
Unassigned DID		
Listed Directory Number		
QCC Extension	N/A	
Returning		

◆ Factory Setting

PBX System Form 6a, Continued

Call Types, Continued

Group Coverage Calls

Group No.	QCC Operator to Receive Calls	QCC Queue Priority Level (4♦)	Group No.	QCC Operator to Receive Calls	QCC Queue Priority Level (4♦)
1			16		
2			17		
3			18		
4			19		
5			20		
6			21		
7			22		
8			23		
9			24		
10			25		
11			26		
12			27		
13			28		
14			29		
15			30		

Direct Station Selector

Page Buttons

Page Button	1	2	3
Beginning extension for range			

Enter first extension number for range of 50 (1 DSS) or 100(2 DSSs) extensions for each Page button.

Call Park Codes

Factory-Set Extension No.	Renumber To	Factory-Set Extension No.	Renumber To
881		885	
882		886	
883		887	
884		888	

◆ Factory Setting

PBX System Form 6b

Call Pickup Groups

Maximum 30 groups. Make additional copies if more than *8* groups are assigned.

Group Number _____ Group ID _____			Group Number _____ Group ID _____		
	Ext. No	Person or Location		Ext, No.	Person or Location
1			1		
2			2		
3			3		
4			4		
5			5		
6			6		
7			7		
8			8		
9			9		
10			10		
11			11		
12			12		
13			13		
14			14		
15			15		

Group Number _____ Group ID _____			Group Number _____ Group ID _____		
	Ext. No.	Person or Location		Ext. No.	Person or Location
1			1		
2			2		
3			3		
4			4		
5			5		
6			6		
7			7		
8			8		
9			9		
10			10		
11			11		
12			12		
13			13		
14			14		
15			15		

PBX System Form 6b, Continued

Group Number Group ID _____			Group Number Group ID _____		
	Ext. No.	Perosn or Location		Ext.No.	Person or Location
1			1		
2			2		
3			3		
4			4		
5			5		
6			6		
7			7		
8			8		
9			9		
10			10		
11			11		
12			12		
13			13		
14			14		
15			15		

Group Number _____ Group ID _____			Group Number _____ Group ID _____		
	Ext.No.	Person or Location		Ext.No.	Person or Location
1			1		
2			2		
3			3		
4			4		
5			5		
6			6		
7			7		
8			8		
9			9		
10			10		
11			11		
12			12		
13			13		
14			14		
15			15		

Group Paging

Group No. 1 Group ID _____
Factory-Set Ext.No. 793 Renumber to _____

	Ext.No.	Person or Location
1		
2		
3		
4		
5		
6		
7		
8		
9		

Group No. 2 Group ID _____
Factory-Set Ext.No. 794 Renumber to _____

	Ext.No.	Person or Location
1		
2		
3		
4		
5		
6		
7		
8		
9		

Group No. 3 Group ID _____
Factory-Set Ext.No. 795 Renumber to _____

	Ext.No.	Person or Location
1		
2		
3		
4		
5		
6		
7		
8		
9		

Group No. 4 Group ID _____
Factory-Set Ext.No. 796 Renumber to _____

	Ext.No.	Person or Location
1		
2		
3		
4		
5		
6		
7		
8		
9		

Group No. 5 Group ID _____
Factory-Set Ext.No. 797 Renumber to _____

	Ext.No.	Person or Location
1		
2		
3		
4		
5		
6		
7		
8		
9		

Group No. 6 Group ID _____
Factory-Set Ext.No. 798 Renumber to _____

	Ext.No.	Person or Location
1		
2		
3		
4		
5		
6		
7		
8		
9		

Group No. 7 Page All
Factory-Set Ext.No. 799 Renumber to

PBX System Form 6d

Group Coverage

Maximum: 30 groups. *Make additional copies if more than 8 groups are assigned.*

Coverage Delay Interval

- ❑ 3 rings ◆
- ❑ _____ rings (1 - 2, 4 - 9)

Delayed Ring Interval

- ❑ 2 rings ◆
- ❑ _____ rings (1, 3 - 6)

Group No. _____ Sender Extension Nos.	Group No. _____ Sender Extension Nos.	Group No. _____ Sender Extension Nos.	Group No. _____ Sender Extension Nos.

Receivers* Extension Nos.	Receivers* Extension Nos.	Receivers* Extension Nos.	Receivers* Extension Nos.
1	1	1	1
2	2	2	2
3	3	3	3
4	4	4	4
5	5	5	5
6	6	6	6
7	7	7	7
8	8	8	8
QCC queue	QCC queue	QCC queue	QCC queue

❇ A maximum of 8 multiline telephones can be used as receivers. The QCC queue can also be receiver, but it is not counted in the 8 receiver maximum, If a calling group is the receiver," it must be the only receiver for a coverage group.

◆ Factory Setting

PBX System Form 6d, Continued

Group No. _______ Sender Extension Nos.	Group No. _______ Sender Extension Nos.	Group No. _______ Sender Extension Nos.	Group No. _______ Sender Extension Nos.

↓ ↓ ↓ ↓

Receivers* Extension Nos.	Recievers* Extension Nos.	Receivers* Extension Nos.	Receivers* Extension Nos.
1	1	1	1
2	2	2	2
3	3	3	3
4	4	4	4
5	5	5	5
6	6	6	6
7	7	7	7
8	8	8	8
QCC queue	QCC queue	QCC queue	QCC queue

* A maximum of 8 multiline telephones can be used as receivers. The QCC queue can also be a receiver, but il is not counted in the 8 receiver maximum. If a calling group is the receiver, it must be the only receiver for a coverage group.

PBX System Form 6e

Group Calling

Maximum: 32 groups. *(Make a copy of this form for each group.)*

Group No. (1- 32) _____ Group ID_____

Factory-Set Ext. No. _____ Renumber To _____

Stations

	Ext. No.	Person or Location		Ext. No.	Person or Location		Ext. No.	Person or Location		Ext. No.	Person or Location
1			6			11			16		
2			7			12			17		
3			8			13			18		
4			9			14			19		
5			10			15			20		

Trunks

Logical ID	Trunk No.	Logical ID	Trunk No.	Logical ID	Trunk No.	Logical ID	Trunk No.T
1		21		41		61	
2		22		42		62	
3		23		43		63	
4		24		44		64	
5		25		45		65	
6		26		46		66	
7		27		47		67	
8		28		48		68	
9		29		49		69	
10		30		50		70	
11		31		51		71	
12		32		52		72	
13		33		53		73	
14		34		54		74	
15		35		55		75	
16		36		56		76	
17		37		57		77	
18		38		58		78	
19		39		59		79	
20		40		60		80	

PBX System Form 6e, Continued

Group No. _____

Group ID _____

Calling Group Options

Hunt Type

❑ Circular ◆
❑ Linear

Delay Announcement

❑ No ◆
❑ Extension No. _____

Message-Waiting Receiver

❑ No ◆
❑ Extension No.. _____

Calls-in-Queue Alarm Threshold

❑ 1 call ◆
❑ _____ calls (2 - 99)

External Alert for Calls-in-Queue Alarm

❑ No
❑ Extension No. _____

Overflow Coverage

❑ No ◆
❑ Calling Group No. _____
❑ QCC queue

Overflow Threshold

❑ 1 call ◆
❑ _____ calls (2 - 99)

Group Type

❑ Auto Logout ◆
❑ Auto Login
❑ Integrated VMI
❑ Generic VMI

◆ Factory Setting

System Features

Transfer Options

Return Time Interval

❑ 4 rings ◆

❑ 0 rings

❑ _____ rings (1 - 3, 5 - 9)

One-Touch Call Handling

❑ One-Touch Transfer ◆

- ❑ Automatic Completion ◆
- ❑ Manual Completion

❑ One-Touch Hold

Transfer Audible

❑ Music-on-Hold ◆

❑ Ringback

Type of Transfer

❑ Ring button ◆

❑ Voice button

Camp-On Return Time

❑ 90 seconds ◆

❑ _____seconds (30 - 89, 91 - 300)

Call Park Return Time

❑ 180 seconds ◆

❑ _____ seconds (30 - 179, 181 - 300)

Automatic Callback Interval

❑ 3 rings ◆

❑ _____rings (1- 2, 4 - 6)

Extension Status

❑ Assign to operator positions

_____

_____

❑ Group Calling/CMS ◆

❑ Hotel

SMDR Options

Call Report Format

❑ Basic ◆

❑ ISDN

Call Length

❑ 40 seconds ◆

❑ _____ seconds (0 - 39, 41 - 255)

Calls Reported

❑ Incoming and outgoing ◆

❑ Outgoing only

Inside Dial Tone

❑ Inside ◆

❑ Outside

Reminder Service Cancel -

❑ N o

❑ _____time of day

Calls to Unassigned Extensions

❑ QCC, Ext. No. _____

❑ Primary Operator ◆

❑ Another extension, Ext. No. _____

❑ Calling Group, Ext. No._____

Note: If you use equipment that rebroadcasts music or other copyrighted matierial, you may be required to obtain a copyright license from, and pay license fees to, a third party such as the American Society of Composers, Artists, and Producers (ASCAP) or Broadcast Music Incorporated (BMI). Or you can purchase a Magic on Hold system, which does not require you to obtain such a license, from AT&T or an authorized representative.

◆ Factory Setting

Allowed Lists

List 1 _____	
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	

List 2 _____	
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	

List 3 _____	
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	

List 4 _____	
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	

Allow To Ext.Nos.

Allow To Ext.Nos.

Allow To Ext.Nos.

Allow To Ext.No.

PBX System Form 6g, Continued

List 5	
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	

List 6	
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	

List 7	
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	

List 8	
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	

Allow To Ext.Nos.

Allow To Ext.Nos.

Allow To Ext.No.

Allow To Ext.Nos.

Disallowed Lists

List 1	
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	

List 2	
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	

List 3	
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	

Disallow To Ext. Nos.	Disallow To Ext. Nos.	Disallow To Ext. Nos.

PBX System Form 6h, Continued

List 4	
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	

List 5	
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	

List 6	
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	

Disallow To Ext. Nos.

Disallow To Ext. Nos.

Disallow To Ext. Nos.

PBX System Form 6h, Continued

List 7 _____	
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	

List 8_____	
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	

Disallow To Ext. Nos.

Disallow To Ext.Nos.

Night Service — Group Assignment

Operator Ext. No. ______		Operator Ext. No. ______		Operator Ext. No. ______		Operator Ext. No. ______	
Ext. No.	Name	Ext. No.	Name	Ext. No.	Name	Ext. No.	Name

PBX System Form 7a, Continued

Operator Ext. No. ______		Operator Ext. No. ______		Operator Ext. No. ______		Operator Ext. No. ______	
Ext. No,	Name	Ext. No.	Name	Ext. No,	Name	Ext. No.	Name

PBX System Form 7b

Night Service — Outward Restriction

Password _____ (To keep your password private, do not fill in the blank.)

Emergency Allowed List

Item No.	Telephone No. (12 digits maximum)	Item No.	Telephone No. (12 digits maximum)
0		5	
1		6	
2		7	
3		8	
4		9	

Exclusion List (Telephones not restricted during Night Service)					
Ext. No.	Name	Ext. No.	Name	Ext. No.	Name

PBX System Form 7b, Continued

Exclusion List (Telephones not restricted during Night Service)					
Ext. No.	Name	Ext. No.	Name	Ext. No.	Name

PBX System Form 7C

Night Service — Time Set

Day	Start Time*	Stop Time*
Sunday (0)		
Monday (1)		
Tuesday (2)		
Wednesday (3)		
Thursday (4)		
Friday (5)		
Saturday (6)		

* Hours and minutes in 24-hour (military) time

PBX System Form 8a

Label Form — Trunks

Trunk No.	Label (7 characters maximum)	Trunk No.	Label (7 characters maximum)
801		841	
802		842	
808		843	
804		844	
805		845	
806		846	
807		847	
808		848	
809		849	
810		850	
811		851	
812		852	
813		853	
814		854	
815		855	
816		856	
817		857	
818		858	
819		859	
820		860	
821		861	
822		862	
823		863	
824		864	
825		865	
826		866	
827		867	
828		868	
829		869	
830		870	
831		871	
832		872	
833		873	
834		874	
835		875	
836		876	
837		877	
838		878	
839		879	
840		880	

Label Form — Stations and Calling Groups

Ext. No.	Label (7 characters maximum)	Ext. No.	Label (7 characters maximum)	Ext. No.	Label (7 characters maximum)

PBX System Form 8b, Continued

Ext. No.	Label (7 characters maximum)	Ext. No.	Label (7 characters maximum)	Ext. No.	Label (7 characters maximum)

Label Form — Posted Message

Message No.	Label (16 characters Maximum)	Revised Standard Message
1	DO NOT DISTURB	
2	OUT TO LUNCH	
3	AT HOME	
4	OUT SICK	
5	IN A MEETING	
6	IN CONFERENCE	
7	WITH A CLIENT	
8	WITH A CUSTOMER	
9	AWAY FROM DESK	
10	OUT ALL DAY	
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		

System Speed Dial and System Directory

Dial Code	Display Yes✦	Display No	p Number (40 digits maximum)	Labels characters maximum)
#600				
#601				
#602				
#603				
#604				
#605				
#606				
#607				
#608				
#609				
#610				
#611				
#612				
#613				
#614				
#615				
#616				
#617				
#618				
#619				
#620				
#621				
#622				
#623				
#624				
#625				

✦ Factory Setting

Dial Code	Display Yes✦	Display No	Telephone Number (40 digits maximum)	Labels (11 characters maximum)
#626				
#627				
#628				
#629				
#630				
#631				
#632				
#633				
#634				
#635				
#636				
#637				
#638				
#639				
#640				
#641				
#642				
#643				
#644				
#645				
#646				
#647				
#648				
#649				
#650				
#651				

✦ Factory Setting

PBX System Form 8d, Continued

Dial Code	Display Yes◆	Display No	Telephone Number (40 digits maximum)	Labels (11 characters maximum)
#652				
#653				
#654				
#655				
#656				
#657				
#658				
#659				
#660				
#661				
#662				
#663				
#664				
#665				
#666				
#667				
#668				
#669				
#670				
#671				
#672				
#673				
#674				
#675				
#676				

◆ Factory Setting

PBX System Form 8d, Continued

Dial Code	Display Yes✦	Display No	Telephone Number (40 digits maximum)	Labels (11 characters maximum)
#677				
#678				
#679				
#680				
#681				
#682				
#683				
#684				
#685				
#686				
#687				
#688				
#689				
#690				
#691				
#692				
#693				
#694				
#695				
#696				
#697				
#698				
#699				
#700				
#701				
#702				

✦ Factory Setting

PBX System Form 8d, Continued

Dial Code	Display Yes✦	Display No	Telephone Number (40 digits maximum)	Labels (11 characters maximum)
#703				
#704				
#705				
#706				
#707				
#708				
#709				
#710				
#711				
#712				
#713				
#714				
#715				
#716				
#717				
#718				
#719				
#720				
#721				
#722				
#723				
#724				
#725				
#726				
#727				
#728				
#729				

✦ Factory Setting

Automatic Route Selection Worksheet

Number of exchanges in your calling area _____

Trunk Pool No.	Trunk Type	Type of Dial *	Number of Area Codes or Exchanges for which Trunk Pool is Used

* T = Toll, L = Local

Preferred trunk pool for toll calls Table 17) _____

Preferred trunk pool for local calls (Table 18) _____

PBX System Form 9b

Automatic Route Selection Tables

Maximum: 16 Tables. *Make copy for each table.*

Table No. _____

Type of Table

- ❑ 6-Digit
- ❑ Area Code
- ❑ Exchange
- ❑ 1 + 7, dialing from
  - ❑ not within area code ◆
  - ❑ within area code

Area Code/Exchanges

001 _____	021 _____	041 _____	061 _____	081 _____
002 _____	022 _____	042 _____	062 _____	082 _____
003 _____	023 _____	043 _____	063 _____	083 _____
004 _____	024 _____	044 _____	064 _____	084 _____
005 _____	025 _____	045 _____	065 _____	085 _____
006 _____	026 _____	046 _____	066 _____	086 _____
007 _____	027 _____	047 _____	067 _____	087 _____
008 _____	028 _____	048 _____	068 _____	088 _____
009 _____	029 _____	049 _____	069 _____	089 _____
010 _____	030 _____	050 _____	070 _____	090 _____
011 _____	031 _____	051 _____	071 _____	091 _____
012 _____	032 _____	052 _____	072 _____	092 _____
013 _____	033 _____	053 _____	073 _____	093 _____
014 _____	034 _____	054 _____	074 _____	094 _____
015 _____	035 _____	055 _____	075 _____	095 _____
016 _____	036 _____	056 _____	076 _____	- 096 _____
017 _____	037 _____	057 _____	077 _____	097 _____
018 _____	038 _____	058 _____	078 _____	098 _____
019 _____	039 _____	059 _____	079 _____	099 _____
020 _____	040 _____	060 _____	080 _____	100 _____

Subpattern A Time of Day _____

Pool	FRL ♦	Other Digits	Absorb
1 _	—	_____	1 ____
2 —	—	_____	2 ____
3 _	—	_____	3 ____
4 —	—	_____	4 ____
5 _	—	_____	5 ____
6 _	—	_____	6 ____

Subpattern B Time of Day _____

Pool	FRL ♦	Other Digits	Absorb
1 _	—	_____	1 ____
2 _	—	_____	2 ____
3 _	—	_____	3 ____
4 _	—	_____	4 ____
5 _	—	_____	5 ____
6 _	—	_____	6 ____

◆ Factory setting
FRL setting is 3.

PBX System Form 9b, Continued

Table No. _____

Type of Table

- ❑ 6-Digit
- ❑ Area Code
- ❑ Exchange
- ❑ 1 + 7, dialing from
  - ❑ not within area code ◆
  - ❑ within area code

Area Code/Exchanges

001 _____	021 _____	041 _____	061 _____	081 _____
002 _____	022 _____	042 _____	062 _____	082 _____
003 _____	023 _____	043 _____	063 _____	083 _____
004 _____	024 _____	044 _____	064 _____	084 _____
005 _____	025 _____	045 _____	065 _____	085 _____
006 _____	026 _____	046 _____	066 _____	086 _____
007 _____	027 _____	047 _____	067 _____	087 _____
008 _____	028 _____	048 _____	068 _____	088 _____
009 _____	029 _____	049 _____	069 _____	089 _____
010 _____	030 _____	050 _____	070 _____	090 _____
011 _____	031 _____	051 _____	071 _____	091 _____
012 _____	032 _____	052 _____	072 _____	092 _____
013 _____	033 _____	053 _____	073 _____	093 _____
014 _____	034 _____	054 —. . —	074 _____	094 _____
015 _____	035 _____	055 _____	075 _____	095 _____
016 _____	036 _____	056 _____	076 _____	096 _____
017 _____	037 _____	057 _____	077 _____	097 _____
018 _____	038 _____	058 _____	078 _____	098 _____
019 _____	039 _____	059 _____	079 _____	099 _____
020 _____	040 _____	060 _____	080 _____	100 _____

Subpattern A Time of Day _____

Pool	FRL ♦	Other Digits	**Absorb**
1 _	—	_____	**1** _____
2 _	—	_____	**2** _____
3 _	—	_____	**3** _____
4 _	—	_____	**4** _____
5 —	—	_____	**5** _____
6 _	—	_____	**6** _____

Subpattern B Time of Day _____

Pool	FRL ♦	Other Digits	**Absorb**
1 _	—	_____	**1** _____
2 _	—	_____	**2** _____
3 _	—	_____	**3** _____
4 _	—	_____	**4** _____
5 _	—	_____	**5** _____
6 _	—	_____	**6** _____

● Factory setting.
FRL setting is 3.

Automatic Route Selection Default and Special Numbers Tables

Table 17: Default Toll Table

Subpattern A Time of Day _____ **Subpattern B Time of Day** _____

Pool	FRL ◆	Other Digits	Absorb	Pool	FRL ◆	Other Digits	Absorb
1			1 —	1			1
2			2 —	2			2
3			3 —	3			3
4			4 —	4			4
5			5 —	5			5
6			6 —	6			6

Table 18: Default Local Table

Subpattern A Time of Day _____ **Subpattern B Time of Day** _____

Pool	FRL ◆	Other Digits	Absorb	pool	FRL ◆	Other Digits	Absorb
1			1 —	1			1
2			2 —	2			2
3			3 —	3			3
4			4 —	4			4
5			5 —	5			5
6			6 —	6			6

Table 19: Dial O

Pool	FRL ◆	Other Digits
1		

Table 20: N11 (411 611, 811, 911)

Pool*	FRL ◆	Other Digits
1		

◆ Factory setting for FRL is 3.
***** Always set to first pool in system, cannot be changed.

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