

**Lucent Technologies**  
Bell Labs Innovations



**MERLIN MAGIX™**  
**Integrated System**  
**Release 1.0i**

**Installation and Maintenance**

**Issue 1**  
**June 2000**

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## Notice

Every effort has been made to ensure that the information in this guide is complete and accurate at the time of printing. Information, however, is subject to change. See Appendix A, "Customer Support Information," in *Feature Reference* for important information.

## Your Responsibility for Your System's Security

Toll fraud is the unauthorized use of your telecommunications system by an unauthorized party—for example, persons other than your company's employees, agents, subcontractors, or persons working on your company's behalf. Note that there may be a risk of toll fraud associated with your telecommunications system, and, if toll fraud occurs, it can result in substantial additional charges for your telecommunications services.

You and your System Manager are responsible for the security of your system, such as programming and configuring your equipment to prevent unauthorized use. The System Manager is also responsible for reading all installation, instruction, and system administration documents provided with this product in order to fully understand the features that can introduce risk of toll fraud and the steps that can be taken to reduce that risk. Lucent Technologies does not warrant that this product is immune from or will prevent unauthorized use of common-carrier telecommunication services or facilities accessed through or connected to it. Lucent Technologies will not be responsible for any charges that result from such unauthorized use. For important information regarding your system and toll fraud, see Appendix A, "Customer Support Information," in *System Programming*.

## Federal Communications Commission Statement

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 their own expense. For further FCC information, see Appendix A, "Customer Support Information," in *Feature Reference*.

## Year 2000 Compliance

The MERLIN MAGIX Integrated System is certified to be Year 2000 compliant. Additional information on this certification, and other issues regarding Year 2000 compliance, is available online at <http://www.lucent.com/enterprise/sig/yr2000>.

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If you need assistance when installing, programming, or using your system contact your support organization or your Lucent Technologies authorized dealer.

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Corporate Security**

Whether or not immediate support is required, all toll fraud incidents involving Lucent Technologies products or services *should be reported*. Contact your support organization or your Lucent Technologies authorized dealer to report toll fraud incidents or for instructions on obtaining consultation on security issues, investigation support, referral to law enforcement agencies, and educational programs.

**Lucent Technologies  
Fraud Intervention**

If you *suspect you are being victimized* by toll fraud and you need technical support or assistance, contact your support organization or your Lucent Technologies authorized dealer.

**Warranty**

Lucent Technologies provides a limited warranty on this product. Refer to "Limited Warranty and Limitation of Liability" in Appendix A, "Customer Support Information," of *Feature Reference*.

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## IMPORTANT SAFETY INSTRUCTIONS



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.

To reduce the risk of fire, electrical shock, and injury to persons, follow these basic safety precautions when installing telephone equipment:

- 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 a telephone jack 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 Lucent Technologies-manufactured MERLIN MAGIX™ Integrated System circuit modules, carrier assemblies, and power units in the MERLIN MAGIX Integrated System control unit.
  - Use only Lucent Technologies-recommended/approved MERLIN MAGIX Integrated System accessories.
  - If equipment connected to the 024 TDL telephone modules, the 008 and 016 MLX telephone modules, or the 016 ETR telephone module 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 electrical shock.
  - The MERLIN MAGIX Integrated System is equipped with a 3-wire grounding-type plug with 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 MAGIX Integrated 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 electrical shock. Never spill liquid of any kind on this product.
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## Installation and Maintenance

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- Unplug the product from the wall outlet before cleaning. Use a damp cloth for cleaning. Do not use cleaners or aerosol cleaners.
- Auxiliary equipment includes answering machines, alerts, modems, and fax machines. To connect one of these devices, you must first have a Multi-Function Module (MFM).
- Do not operate telephones if chemical gas leakage is suspected in the area. Use telephones located in some other safe area to report the trouble.



### **WARNING:**

- To eliminate the risk of personal injury due to electrical shock, DO NOT attempt to install or remove an MFM from your MLX telephone. Opening or removing the module cover of your telephone may expose you to dangerous voltages.
- ONLY an authorized technician or dealer representative shall install, set options, or repair an MFM.

**SAVE THESE INSTRUCTIONS**

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# Installation and Maintenance

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# Customer Support Information



## Contact Information

If you need assistance installing, programming, or using your system, contact your support organization or your Lucent Technologies authorized dealer.

## 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.

## Security

As a customer of new telecommunications equipment, you should be aware of the significant and growing problem of theft of long distance services by third parties, known commonly as "toll fraud." It is particularly important that you understand and take appropriate steps to deal with this crime because under applicable tariffs, you will be responsible for payment of associated toll charges. Lucent Technologies can not be responsible for such charges and will not make any allowance or give any credit resulting from toll fraud.

Toll fraud can occur despite the preventive efforts of network providers and equipment manufacturers. Toll fraud is a potential risk for every customer with telecommunications equipment having one or more of the following features: (1) remote access, (2) automated attendant, (3) voice mail, (4) remote administration and maintenance, and (5) call forwarding (remote). This is not a product or design defect, but a risk associated with equipment having one or more of the features described above. If your new telecommunications equipment possesses any of these features, please consult the relative portion of your documentation for further details and specific procedures to reduce the risk of toll fraud or contact your Lucent Technologies representative for further details. The Remote Access feature must be properly administered to help reduce the risk of unauthorized use. It is your responsibility to take the appropriate steps to implement the feature

properly, evaluate and administer the various restriction levels, and protect and carefully distribute access codes.

To reduce the risk of unauthorized access to your MERLIN MAGIX Integrated System, you should observe the following procedures:

- Use a nonpublished Remote Access telephone number.
- Assign passwords, barrier or access codes randomly to users on a need-to-know basis, keeping a log of ALL authorized users and assigning one code to one person.
- Ensure that Remote Access users are aware of their responsibility to keep the telephone number and any access codes secure.
- Use random sequence access codes. These are less easily broken.
- Deactivate all unassigned access codes promptly.
- When possible, restrict the off-network capability of callers via use of Call Restrictions and Disallowed Lists.
- When possible, block off-hours calling.
- Frequently monitor system call detail reports for quicker detection of any unauthorized or abnormal calling patterns.

## Physical Security, Social Engineering, and General Security Measures

Criminals called hackers may attempt to gain unauthorized access to your communications system and voice messaging system in order to use the system features. Hackers often attempt to trick employees into providing them with access to a network facility (line/trunk) or a network operator. This is referred to as social engineering. Hackers may pose as telephone company employees and employees of Lucent Technologies or your authorized dealer. Hackers will go through a company's trash to find directories, dialing instructions, and other information that will enable them to break into the system. The more knowledgeable they appear to be about the employee names, departments, telephone numbers, and the internal procedures of your company, the more likely it is that they will be able to trick an employee into helping them.

**Preventive Measures.** Take the following preventive measures to limit the risk of unauthorized access by hackers:

- Provide good physical security for the room containing the communications equipment and the room with administrative tools, records, and system manager information. These areas should be locked when not attended.
- Provide a secure trash disposal for all sensitive information, including telephone directories, call accounting records, or anything that may supply information about your communications system. This trash should be shredded.
- Educate employees that hackers may try to trick them into providing them with dial tone or dialing a number for them. All reports of trouble, requests for moving extensions, or any other administrative details associated with the MERLIN MAGIX Integrated System should be

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handled by one person (the system manager) or within a specified department. Anyone claiming to be a telephone company representative should be referred to this person or department.

- No one outside of Lucent Technologies needs to use the MERLIN MAGIX Integrated System to test facilities (lines/trunks). If a caller identifies themselves as a Lucent Technologies employee, the system manager should ask for a telephone number where the caller can be reached. The system manager should be able to recognize the number as a Lucent Technologies telephone number. Before connecting the caller to the administrative port of the MERLIN MAGIX Integrated System, the system manager should feel comfortable that a good reason to do so exists. In any event, it is not advisable to give anyone access to network facilities or operators, or to dial a number at the request of the caller.

## **Limited Warranty and Limitation of Liability**

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### **Limited Warranty**

LUCENT TECHNOLOGIES AND ITS AFFILIATES MAKE NO WARRANTIES, EXPRESS OR IMPLIED, ABOUT OR RELATING TO YOUR MERLIN MAGIX INTEGRATED SYSTEM AND SPECIFICALLY DISCLAIM ANY WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

You should check with the reseller from whom you purchased your system to determine if it offers a limited warranty.

## **Limitation of Liability**

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# About This Book



This book provides technical information about the MERLIN MAGIX™ Integrated System. It is intended for persons who install and maintain the system.

## Ordering Information

If you wish to order copies of manuals, replacement parts, accessories, or other equipment that is compatible with the system, contact your Lucent Technologies representative.

## 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, property damage, or loss of data if the hazard is not avoided.*

## Installation and Maintenance

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## Product Safety Labels

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The MERLIN MAGIX system has been developed for the medium-size business market. Electronically, it is very similar to a MERLIN LEGEND Communications System. However, new modules and new telephones have been developed to work with the MERLIN MAGIX system.

## Modes of Operation

The system is designed for customers in the 10- to 200-station range. It can be configured to operate in one of two modes:

- Hybrid/PBX
- Key

**NOTE** ► Behind Switch mode is not supported in MERLIN MAGIX R1.0i.

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### Hybrid/PBX Mode

The Hybrid/PBX mode handles a large volume of calls and users and provides the most flexibility of the two modes. Outside facilities consist of loop-start trunks, direct inward dialing (DID) trunks, direct inward/outward dialing (DIOD) trunks, tie trunks, and E1 facilities. The trunks can either be grouped in pools for shared use, or can be assigned to line buttons on multiline telephones for users who need 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 should be used for each type of outgoing call. Incoming calls can be handled by a direct-line console (DLC) or a queued call console (QCC), or by a combination of both console types.

## Key Mode

In the Key mode, each outside line appears on a button on one or more multiline telephones. The line buttons allow users to see activity on other telephones, join conversations, place calls, or receive calls. Separate intercom buttons are used to make and receive internal calls.

A Key system automatically assigns the first eight outside lines to all telephones. This arrangement can be customized through system programming by assigning lines to individual telephones or to selected groups of telephones.

## System Components

The system consists of required and optional components:

- Required components
  - Control unit
  - Telephones
- Optional components
  - Auxiliary equipment
  - Adapters
  - Applications

These components are described in the following pages.

## The Control Unit

The control unit of the MERLIN MAGIX system consists of a basic carrier and, optionally, one or two expansion carriers. The carriers contain the power supplies, processor module, and line/trunk modules that comprise the system. The control unit is housed in a carrier for protection.

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## The Carriers

The basic and expansion carriers for the MERLIN MAGIX system are made of metal. Like the MERLIN LEGEND Communications System, the MERLIN MAGIX system can contain up to 17 line/trunk modules. The basic carrier contains a power supply and a processor module and five slots for line/trunk modules. Each expansion carrier contains a power supply and six slots for line/trunk modules. A maximum of two expansion carriers can be connected to a basic carrier.

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## Power Supply Module

**CAUTION:**

*Grounding circuit continuity is vital for safe operation of the MERLIN MAGIX system. Never operate with the grounding conductor disconnected. The ground-screw connection is located on the carrier.*

The 491D1 (100–240 V AC) power supply modules can provide up to 96 unit loads of current per carrier; therefore, an auxiliary power unit is not required with these modules. In addition, three test points are provided for measuring DC voltage outputs.

**NOTE** ▶ Outside the North American continent, the power cord plug on the 491D1 power supply module may need to be replaced with an IEC (International Electrotechnical Commission) approved plug (at least 10 amps and 250 volts).

## Power Specifications

Each 491D1 power supply draws a maximum current of 5.4 amperes at 117 V AC (60 Hz); the 491D1 power supply draws a maximum current of 3.1 amperes at 220 V AC (50 Hz). Output power is:

+5.1 V DC (10A), –5.1 V DC (1.5A), –48 V DC (3.0A)

## Test Points

There are three voltage test points, one each for the +5.1 V DC, –5.1 V DC, and –48 V DC outputs. These test points enable service personnel to measure the +5.1 ( $\pm 5\%$ ), –5.1 ( $\pm 5\%$ ) and –48 V DC ( $\pm 10\%$ ) outputs delivered to the MERLIN MAGIX backplane. Use the ground terminal when measuring the output voltages at these test points.

## Station Module Specifications

491D1 Power Supply Module:

- Power Input: 100–240 V AC, 5A, 50/60 Hz
- Power Output: +5.1 V DC  $\pm 5\%$  (10A), –5.1 V DC  $\pm 5\%$  (1.5A), –48 V DC  $\pm 10\%$  (3.0A)
- Capacity: 96 unit loads

## Processor Module

Placed in slot 00 of the basic carrier, the processor module controls system features and programming via the processor and memory boards. The processor module supports up to 80 CO or tie lines/trunks and 200 stations.

The main board contains the 68EC020 processor at 16 MHz, a built-in 1200/2400 bps modem, built-in diagnostics, 1.5 MB RAM backup for 4 days, a real-time clock, interrupt circuitry, a PCMCIA interface, and interfaces to the other modules through the I/O bus on the carrier backplane.

The processor module has three modular RS-232 jacks: one for debugging (plugged to prevent access), one for Station Message Detail Recording (SMDR), and the other for system programming and maintenance via a PC.

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## Line/Trunk and Extension Modules

The system supports different types of modules that vary in the types of lines/trunks that they support and the types of telephones or other equipment that can be connected to them. Table 1-1 describes the line/trunk extension modules in detail.

The names of the modules identify their capacities and capabilities. The first digit tells you the number of line/trunk jacks a module supports, while the last two digits describe the number of extension jacks it supports. Letters can follow to indicate the type of trunk it supports—for example, *LS* for *loop-start* or *OPT* for *off-premise telephone*; if the number indicates line/trunk support and no letters follow, the module supports trunks.

For example, the 024 TDL module has no line/trunk jacks but does have 24 extension jacks.

The two modes of operation support different lines/trunks, as follows:

- Key mode
  - Loop-start lines
  - Tie trunks
  - E1 facility programmed for tie or loop-start operation
- Hybrid/PBX mode
  - Loop-start trunks
  - Tie trunks
  - Direct inward dialing (DID) trunks
  - E1 facility programmed for tie, loop-start, DID, or direct inward/outward dialing (DIOD)

Table 1-1. Line/Trunk and Extension Modules

Module	Line/Trunk	Description
008 MLX <sup>1</sup>	none	<p><b>Capacity:</b> 8 digital extension jacks; each extension jack is assigned two extension numbers. The second extension number is used for the device connected to the Multi-Function Module (MFM) installed in the MLX telephone.</p> <p><b>Supports:</b> MLX extensions, including:</p> <ul style="list-style-type: none"> <li>■ MLX voice only</li> <li>■ MLX voice with Voice Announce to Busy</li> <li>■ MLX voice and MFM with T/R adjunct</li> <li>■ MLX voice and MFM with Supplemental Station Adapter (SSA)</li> <li>■ ISDN terminal adapter only</li> <li>■ Access device for data communications between a PC on the system and a high-speed Internet connection, connection to remote node LAN access server, or ISDN router</li> </ul>
008 OPT <sup>2</sup>	none	<p><b>Capacity:</b> 8 T/R extensions on 2-way voice transmission path with support for telephones with message-waiting lights, 2 TTRs</p> <p><b>Supports:</b> On-premises or off-premises single-line telephones</p>
016 (T/R) <sup>1</sup>	none	<p><b>Capacity:</b> 16 T/R extensions on 2-way voice transmission path with support for telephones with message-waiting lights, 4 TTRs</p> <p><b>Supports:</b> Single-line telephones, Intuity AUDIX<sup>®</sup>, Octel 100, T/R adjuncts (such as answering or fax machine), and analog data devices (such as modems)</p>
016 ETR <sup>1</sup>	none, TTR	<p><b>Capacity:</b> 16 ETR extension jacks including 4 TTRs</p> <p><b>Supports:</b> ETR, Business Cordless 905, and TransTalk 9031 MDW telephones</p>
016 MLX <sup>1</sup>	none	<p><b>Capacity:</b> 16 digital extension jacks; each extension jack is assigned two extension numbers. The second extension number is used for the device connected to the MFM installed in the MLX telephone.</p> <p><b>Supports:</b> MLX extensions, including:</p> <ul style="list-style-type: none"> <li>■ MLX voice only</li> <li>■ MLX voice with Voice Announce to Busy</li> <li>■ MLX voice and MFM with T/R adjunct</li> <li>■ MLX voice and MFM with SSA</li> <li>■ ISDN terminal adapter only</li> <li>■ Access device for data communications between a PC on the system and a high-speed Internet connection, connection to remote node LAN access server, or ISDN router</li> <li>■ CTI link</li> <li>■ Videoconferencing systems using 1 jack and 2B data feature or 2 jacks with ISDN terminal adapters (depending on video system)</li> </ul>

**Table 1-1. Line/Trunk and Extension Modules—Continued**

Module	Line/Trunk	Description
<b>024 TDL</b>	none	<b>Capacity:</b> 24 digital extension jacks; each extension jack is assigned 2 extension numbers. The second extension number can be used as a “phantom” extension (for example, for voice mail configurations)  <b>Supports:</b> 4400, 4400D, 4406D+, 4412D+, 4424D+, and 4424LD+ Telephones
<b>100E<sup>1</sup></b>	E1	<b>Capacity:</b> 30 lines/trunks for voice and analog data with 2 channels used for signaling  <b>Supports:</b> E1 emulates 30 lines/trunks: loop-start, tie, Direct Inward Dial (DID; Hybrid/PBX mode only), and Direct Inward/Outward Dial (DIOD; Hybrid/PBX mode only). E1 supports transmission speeds up to 64 kbps per trunk. Signaling is DTMF or R2/CaS with the optional MFC06 module. Termination impedance is either 75 ohm or 120 ohm.
<b>800 DID</b>	DID, TTR	<b>Capacity:</b> 8 lines/trunks, 2 TTRs; there are two different models of the 800 DID module: one for Argentina and Mexico, and one for Brazil
<b>800 LS/CPTD</b>	LS	<b>Capacity:</b> 8 lines/trunks, 2 dialtone detectors, 2 PFT telephone jacks; there are two different models of the 800 DID module: one for Argentina and Mexico, and one for Brazil
<b>MERLIN Messaging<sup>3</sup></b>	none	<b>Capacity:</b> 7 internal, system-defined T/R jacks; 2 TTRs; internal remote maintenance device; serial port for PC connection  <b>Supports:</b> MERLIN Messaging System resides on this module
<b>MFC06</b>	none	<b>Capacity:</b> 6 MFC dialers, each with a generator and a detector  <b>Supports:</b> Multifrequency Compelled (MFC) Register Signaling (R2)

- 1 For newer vintages of this module, firmware can be upgraded by using a PCMCIA card.
- 2 The system software recognizes the OPT module as having 12 jacks. Even though the OPT module has only 8 jacks, it uses 12 ports of capacity, thereby decreasing overall extension capacity by 4 extensions for every OPT module.
- 3 The system assigns 12 logical IDs and extensions to the MERLIN Messaging module. The first 6 are available for use as MERLIN Messaging ports and the 12<sup>th</sup> is used by the Remote Maintenance Device (RMD). The 7<sup>th</sup>–11<sup>th</sup> are not used and are not available for other tip/ring devices or applications.

## 024 TDL Module

The 024 TDL module contains 24 extension ports for connection to the 4400-Series telephones. The module has potential operator positions at the first, fifth, thirteenth, and seventeenth ports. If the 024 TDL module is in Slot 1, you can connect a 4424LD+ Telephone to the first extension port and use that telephone as the system programming console.

**NOTE** ► The slot/port numbering for adjunct ports on a 024-TDL module begins at 25. For example, on a 024-TDL module in slot 1 of the carrier, to access adjunct port 710, you would enter 0125 as the slot/port number (01 indicates slot 1 on the carrier).

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## Telephones

The MERLIN MAGIX Release 1.0i system supports the following telephones:

- 4400-Series
- MLX
- ETR
- Single-line
- Transtalk<sup>®</sup> MDW 9031

**NOTE** ► The MERLIN MAGIX Release 1.0i system does not support analog multiline telephones.

For more information about the 4400-Series telephones, see the *4406D+*, *4412D+*, *4424D+*, and *4424LD+ Telephones User's Guide*; and the *4400 and 4400D Telephones User's Guide*.

## System Operator Consoles

System operator consoles are telephones that are programmed for call handling and other operator duties. An operator console can be configured as a Direct-Line Console (DC) or a Queued Call Console (QCC).

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### DLCs

In a DLC configuration, lines/trunks are assigned to individual buttons, and the console can have several calls ringing at the same time. The following telephones can function as DLCs and must be connected to digital extension jacks on a 008 MLX, 016 MLX, or 024 TDL module:

- 4424LD+ Telephone
- 4424D+ Telephone
- MLX-20L telephone
- MLX-28D telephone

**NOTE** ► One or two Direct Station Selectors (DSSs) can be added to each 4400-Series or MLX DLC to provide 50 or 100 additional extension buttons.

## QCCs

In a QCC configuration, only one call rings at a time. Additional incoming calls are held in queue, and each call in turn is directed to a QCC as it becomes available. The system must be operating in Hybrid/PBX mode if QCCs are needed.

**NOTE** ► In a Hybrid/PBX system, only the 4424LD+ and MLX-20L telephones can be QCCs.

The QCC system operator console must be connected to the first jack on the first 024 TDL, 008 MLX, or 016 MLX module. Additional QCCs can be connected, and they must be connected to one of these modules as well. See the *System Programming* guide for specifications.

## PCMCIA Translation Card

The 2MB translation card (10A2) is used to maintain “Back-Up” System translations for the MERLIN MAGIX system. The procedures for using a 2MB translation card are the same as those for the 4MB card used with the MERLIN LEGEND Communications System.

## Touch-Tone Receivers

See “Touch-Tone Receivers” in the MERLIN MAGIX Release 1.0 *Feature Reference*.

## Auxiliary Equipment

The following table provides a list of other equipment that is available for use with the system. If you are interested in adding any of this equipment, contact your Lucent Technologies representative or authorized dealer.

**Table 1-2. Auxiliary Equipment**

Equipment Type	Description
<b>Alerts (AC)</b>	Any audible or visual alert—such as an external ringer—that operates on 20–30 Hz ringing signals. These alerts are associated with a specific extension (MFM in T/R mode or connected to T/R extension jack).
<b>Alerts (DC)</b>	Any audible or visual alert—such as a bell, chime, or strobe—that operates on 48 V DC ringing signals. These alerts are associated with a specific extension (MFM in SSA mode) or work on a programmed trunk port (external alert).
<b>Answer/record machine</b>	An industry-standard answering machine or remote answering system telephone with the ability to recognize 600-ms disconnect signal or other means of automatic disconnect.

Table 1-2. Auxiliary Equipment—Continued

Equipment Type	Description
<b>Cordless telephone</b>	Must have Touch-Tone dialing capability when connected via a Multi-Function Module (MFM); rotary or Touch-Tone dialing can be used on a T/R port.
<b>Credit card verification terminal</b>	Must have Touch-Tone dialing capability when connected via an MFM; rotary or Touch-Tone dialing can be used on a T/R port.
<b>Dial dictation</b>	A device that requires contact closure can be used on an LS/GS line jack only with PagePAC <sup>®</sup> .
<b>Direct Station Selector (DSS)</b>	<p>Connects to telephones to enhance call handling capabilities of operator and programming consoles. A maximum of 2 DSSs can be connected to an operator console.</p> <p>The DSS 4450—which is nearly identical to the DSS that works with the MLX telephones—is used with the 4424D+ and 4424LD+ Telephones. An auxiliary power supply is required, and is ordered separately, when one or more DSSs is connected to a 4424D+ Telephone. The 4424LD+ Telephone requires an auxiliary power supply whether or not a DSS is connected; the auxiliary power supply automatically comes with the 4424LD+ Telephone.</p> <p>If 2 DSSs are connected to an MLX-20L or MLX-28D telephone, an auxiliary power supply is also required.</p>
<b>Fax machine</b>	Must have Touch-Tone dialing capability when connected via an MFM; rotary or Touch-Tone dialing can be used on a T/R port. Rotary must be enabled if rotary dialing is used.
<b>Group Calling delay announcement</b>	An industry-standard device which must provide automatic disconnect. Each of the 32 Calling Groups can have its own announcement (up to 10 primary and 1 secondary for each Calling Group). A device can provide delay announcement for more than one group.
<b>Headset for Multiline 4400-Series, MLX, MLS, and ETR telephones</b>	Connects to multiline 4400-Series, MLX, MLS, and ETR telephones via a modular base unit for hands-free telephone operation.
<b>Loudspeaker Paging</b>	External paging system using dual-tone multi-frequency (DTMF) signaling connected to an LS or GS line jack. CPE paging systems require an interface unit; if CPE has 2-wire input, the PagePal interface can be used.
<b>Message Waiting indicator unit</b>	Connects directly to single-line telephones.
<b>Modem</b>	If the modem supports Touch-Tone dialing via the associated data terminal, the keyboard can be used for dialing. If the modem does not support Touch-Tone dialing, a single-line telephone can be used for dialing.
<b>Music-On-Hold</b>	Any FCC-registered 8-ohm music source or recorded announcement device. If you use equipment that re-broadcasts 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 such a license, from Lucent Technologies or an authorized dealer.

**Table 1-2. Auxiliary Equipment—Continued**

Equipment Type	Description
<b>SMDR printer</b>	Connects to upper RS-232-C jack on the processor module. Must be located within 50 feet of the control unit, or an ADU and peripheral interface unit can be used to extend distance.
<b>Speakerphone</b>	Connects directly to single-line telephones.

## System Capacities

Table 1-3 lists the hardware and software capacities of the system. Some constraining factors appear with a checkmark (✓). These are discussed in detail in Table 1-4.

**Table 1-3. System Capacities**

Item	Limit	Constraining Factor
<b>100E Module</b> (maximum 2 per carrier)	3	✓
<b>800 NI-BRI Module</b> (maximum 3 per carrier)	5	
<b>MFC06 Module</b> (maximum 4 per carrier)	6	✓
<b>Account Codes</b>		
Characters per code	16	
<b>Allowed/Disallowed Lists</b>		
Number of lists	8	
Entries per lists	10	
Digits per entry	7	
<b>Authorization Codes</b>		
Digits per code	11	
<b>Automatic Route Selection (ARS)</b>		
Number of ARS tables	16	
Subpatterns per table	2	
Routes per subpattern	6	
Entries per table	100	
Entries across all tables	1600	
Default tables	4	
<b>Callback Calls in Queue</b>	64	

**Table 1-3. System Capacities—Continued**

<b>Item</b>	<b>Limit</b>	<b>Constraining Factor</b>
<b>Calling Groups</b>		
Number of groups	32	
Members per group		✓
Local extensions only	20	
Non-local extensions only	1	
Total agents and supervisors	200	
Total supervisors	8	
Groups per member	1	
Primary delay announcements per system	200	
Secondary delay announcements per system	32	
Primary delay announcements per group	10	✓
Secondary delay announcements per group	1	✓
Groups per delay announcement	32	
External alerts per group	1	
Coverage groups per group	1	
Priority Queuing		
Support group	31 home	
Home group	1 support	
<b>Carriers</b>		
	3	
Line/trunk and extension module slots per basic carrier	5	✓
Line/trunk and extension module slots per expansion carrier	6	
Maximum slots available for line/trunk and extension modules	17	
<b>Coverage Groups</b>		
Number of groups	30	
Senders per group	400	✓
Groups per sender	1	
Receiver buttons per group	8	
Groups per QCC receiver	30	
<b>Direct Inward Dialing; Direct Inward/Outward Dialing</b>		
Number of blocks	2	
Number of trunks	80	

**Table 1-3. System Capacities—Continued**

Item	Limit	Constraining Factor
<b>Directories</b>		
System Directory	1	
Listings	130	
Extension Directory	1	
Listings	200	
Personal Directory	48	
(4424LD+ and MLX-20L telephones only) Listings	50	
<b>Endpoints (devices)</b>	400	
<b>Extensions</b>		
Total physical jacks	200	
Total endpoints	400	
<b>Fax machines with Message Waiting</b>	16	✓
<b>Lines/Trunks</b>	80	
<b>Message Waiting Lamp Messages</b>	1499	
<b>Night Service</b>		
Groups	8	
Members per group	400	
Calling Groups per group	1	
Groups per member	8	
Emergency Allowed List entries	10	
<b>Park codes (number of codes)</b>	8	
<b>Personal Lines</b>	64	
<b>Pool Buttons</b>	64	
<b>Ports (not simultaneously)</b>		
Voice Announce to Busy extensions	200	
Voice Messaging Interface (VMI)	24	✓
ISDN Terminal Adapter	200	
Paging	3	
Primary delay announcements	200	✓
Secondary delay announcements	32	✓
<b>Remote Access</b>		
Number of barrier codes	16	
Digits per code, system-wide	4–11	

**Table 1-3. System Capacities—Continued**

<b>Item</b>	<b>Limit</b>	<b>Constraining Factor</b>
<b>Service Observing Groups</b>		
Number of groups	16	
Observers per group	1	✓
Members per group	400	✓
<b>Shared System Access Buttons</b>		
Number of buttons per principal extension	27	
<b>Speed Dial</b>		
Personal Speed Dial		✓
Entries per telephone	24	
Entries per system	1200	
Digits per entry	28	
System Speed Dial		
Entries per system	130	
Digits per entry	40	
<b>System Operator Consoles</b>		
Direct-line consoles (DLCs)		✓
4424D+ or 4424LD+	8	
MLX-20L or MLX-28D	8	
Queued Call Consoles (QCCs)	4	
4424LD+ or MLX-20L	8	✓
Combination of DLCs plus QCCs	16	
DSSs		
Number of consoles per module	2	
008 MLX	4	
016 MLX or 024 TDL		
<b>System Programming Equipment</b>		
4424LD+ or MLX-20L telephone	1	✓
RS-232 jack for PC with WinSPM	1	
Modem (built-in processor module)	1	

**Table 1-3. System Capacities—Continued**

Item	Limit	Constraining Factor
<b>Telephones</b> (not simultaneously)		
4424LD+ or MLX-20L	48	✓
All other MLX telephones (with/without ISDN terminal adapter/MFM)	200	✓
All other 4400-Series telephones	200	✓
Single-line	200	✓
ETR	200	✓
Power failure transfer	20	
<b>Two-Party Conversations</b>	108	
<b>Voice Messaging Systems</b>	24	

**Table 1-4. Constraining Factors**

Item	Constraints
<b>100E Modules</b>	The system can contain up to three 100E modules. Up to two 100E modules may be in a carrier with other modules. If an MFC06 module is in the same carrier, only one 100E module can be in the carrier.
<b>Calling Groups</b>	<p><b>Members of Groups.</b> QCCs cannot be members of Calling Groups because the QCC position is set up as a system operator and has its own queue that is different from the group's queue.</p> <p><b>Members per Group.</b> The maximum number of local extensions in a Calling Group is 20. The maximum number of non-local extensions in a Calling Group is 1. A Calling Group cannot contain both local and non-local extensions.</p> <p><b>Primary and Secondary Delay Announcements.</b> Up to 10 primary and 1 secondary announcement device can be designated for each Calling Group. Each announcement device decreases the 200 tip/ring station capacity.</p>
<b>Carriers</b>	The first slot of the basic carrier is used for the processor module with a maximum of 5 port/board slots.
<b>Coverage Groups</b>	<b>Senders per Group.</b> QCCs cannot be senders because they do not have coverage available and use Position-Busy instead.
<b>Fax Machines with Message-Waiting</b>	The system can support more than 16 fax machines, but those in excess of 16 cannot use fax message waiting indication.
<b>MFC06 Modules</b>	The system can contain a maximum of 6 MFC06 modules. Up to 4 can be contained in a dedicated carrier, but only 2 can be in a carrier with other modules. If a 100E module resides in the carrier, only one MFC06 module can be in that carrier.

Table 1-4. Constraining Factors—Continued

Item	Constraints
<b>Ports (not simultaneously)</b>	<p><b>Voice Messaging Interface.</b> Although the system software supports up to 24 VMI ports, all VMI ports must be in the same Calling Group, and the maximum number of extensions in a Calling Group is 20.</p> <p><b>Primary and Secondary Delay Announcements.</b> Up to 10 primary and 1 secondary announcement devices can be designated for each Calling Group. Each announcement device decreases the 200 tip/ring station capacity.</p>
<b>Service Observing Groups</b>	<p>A Service Observer station must be a 4406D+, 4412D+, 4424D+, 4424LD+, or MLX telephone (except QCC). A Service Observing group member station may be any telephone except a QCC link. Maximum number of members per Service Observing group is equal to the maximum number of extensions in the system.</p> <p>Service Observing may be subject to federal, state, or local laws, rules, or regulations or require the consent of one or both of the call parties. You must check in your jurisdiction and comply with all applicable laws, rules, and regulations before using this feature. Failure to comply may result in severe penalties.</p>
<b>Speed Dial</b>	<p><b>Personal Speed Dial.</b> Single-line and 5- or 10-button telephones.</p>
<b>System Operator Consoles</b>	<p><b>DLCs.</b> Two consoles are allowed for each 008 MLX module. Up to 4 consoles may be connected to an 016 MLX or an 024 TDL module. A maximum of 8 consoles is allowed per system. Up to two DSSs can be attached to an operator console.</p> <p><b>QCCs.</b> In Hybrid/PBX mode only. Two consoles are allowed for each 008 MLX. Four consoles are allowed for each 016 MLX or 024 TDL module. Up to 4 consoles are permitted on a system.</p>
<b>System Programming Equipment</b>	<p>Remote Access overrides onsite programming except during backup or restore.</p>
<b>Telephones (not simultaneously)</b>	<p><b>4424LD+ and MLX-20L.</b> RAM limit and the total includes the 4424LD+ or MLX-20L telephone used for system programming.</p> <p><b>All other 4400-Series and MLX Telephones.</b> RAM limit. An MFM and an ISDN terminal adapter cannot be connected to the same MLX telephone (including the MLX-20L) at the same time.</p> <p><b>Single-Line.</b> Software dial plan limit.</p> <p><b>Power Failure Transfer.</b> One for each 4 LS/GS line/trunk jacks.</p> <p><b>MLS/ETR.</b> RAM limit.</p> <p><b>Distance limitations.</b> All telephones within 1000 feet of the control unit, except 4400-Series and MLX telephones. 4400-Series telephones with 26-gauge wire must be within 2000 feet; with 24-gauge wire within 3000 feet. MLX telephones must be within 3000 feet. Add IROBs if needed.</p>





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If you have not read Chapter 1, “Introduction,” do so before continuing with this chapter.

## Overview

Installing the control unit involves the following procedures:

- Preparation requirements
- Installing the backboard
- Meeting the power and grounding requirements
- Checking the total unit load
- Installing the carrier
- Installing any expansion carriers
- Installing the power supply
- Installing the processor
- Installing the line/trunk and extension modules
- Connecting the control unit to AC power
- Powering up the system
- Powering down the system

The following sections provide detailed instructions for these installation procedures. Follow the procedures in the order in which they are presented.

## Environment

The control unit must be installed on a backboard. The placement of the backboard, and the control unit on it, requires careful consideration. Make sure you install the backboard in an area that meets all of the environmental requirements listed in Table 2-1.

**Table 2-1. Environmental Requirements**

Parameter	Value
Operating Temperatures	40°–104°F (4°–40°C) Optimal temperature: 60°F (15.6°C)
Humidity	20%–80%
Airborne Contamination	Do not expose the control unit to moisture, corrosive gases, dust, chemicals, spray paint, or similar material.
Ventilation	Allow at least 1 inch (2.54 cm) on the right and left sides of the control unit and at least 12 inches (30.48 cm) above and below it to prevent overheating.  Do not place the control unit near extreme heat sources (for example: furnaces, heaters, attics, or direct sunlight).
Electrical Fields	Do not expose the control unit to devices that generate electrical currents causing interference (such as arc welders or motors).
Heat Dissipation	Basic carrier: 500 BTU/hr  Basic carrier: with one expansion carrier, 1000 BTU/hr  Basic carrier: with two expansion carriers, 1500 BTU/hr



### **WARNING:**

*Do not install the control unit outdoors.*

## Electrical Noise/Radio-Frequency Interference

In most cases, electrical noise is introduced into the system through trunk or telephone cables. However, electromagnetic fields near the control unit can also cause noise in the system. Therefore, you should not place the control unit and cable runs in areas where a high electromagnetic field strength exists.

Radio transmitters (AM and FM), television stations, induction heaters, motors (with commutators) of 0.25 horsepower (200 watts) or greater, and similar equipment are leading causes of radio-frequency interference (RFI). Small tools with universal motors are generally not a problem when they operate on separate power lines. Motors without commutators generally do not cause interference.

Field strengths below 1.0 volt per meter are unlikely to cause interference. To estimate the field strength produced by radio transmitters, divide ( $\div$ ) the square root ( $\sqrt{\quad}$ ) of the emitted power, in

kilowatts, by the distance from the antenna, in kilometers, which equals (=) the field strength in volts per meter.

Example:  $\sqrt{49 \text{ kw}} = 7 \text{ kw} \div 10 \text{ km (6.2 miles)} = 0.7 \text{ volts per meter}$

This yields the approximate field strength in volts per meter and is relatively accurate for distances greater than about half a wavelength (492 feet, or 150 m, for a frequency of 1000 Hz). If the result exceeds 1.0 volt per meter, you may have to install shielded cables and/or Z200A filters. See Appendix A, "Customer Support Information," in *Maintenance and Troubleshooting*, for FCC Part 15 radio frequency regulations.

---

## Control Unit Dimensions and Location

The following are the dimensions and location requirements for the control unit:

- Dimensions
  - Basic carrier: 11 inches wide by 20 inches high by 11 inches deep
  - Basic carrier and one expansion carrier: 22 inches wide by 20 inches high by 11 inches deep
  - Basic carrier and two expansion carriers: 33 inches wide by 20 inches high by 11 inches deep
- Location
  - Within 5 feet (152 cm) of an AC power outlet that is not switch-controlled
  - Within 25 feet (762 cm) of the network interface, or use an Off-Premises Range Extender (OPRE)
  - Within 1000 cable feet of telephones (except MLX and 4400-Series), or use an OPRE (for basic telephones)
  - Within 3000 cable feet of MLX telephone (IROBS if needed)
  - Within 2000 cable feet of any 4400-Series telephone when using 26 gauge cable
  - Within 3000 cable feet of any 4400-Series telephone when using 24 gauge cable
  - Within 5000 cable feet of any 4400-Series telephone when using 22 gauge cable



### **CAUTION:**

*The AC outlet for the control unit cannot be switch-controlled. Plugging the control unit into such an outlet invites accidental disconnection of the system.*

---

## Backboard Requirements

The backboard should be wide enough to accommodate the carrier and up to two additional carriers, assuming that system growth is anticipated. There should be enough room on each side of the control unit for the necessary wiring fields.

## Installation and Maintenance

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To accommodate the maximum control unit size, make sure the backboard meets the following requirements:

- **Material**
  - ¾ inch plywood
  - Check with the local building code enforcement agency to see whether fire-retardant material is required
  - Make sure that the material meets local building codes
- **Dimensions**
  - With Systimax® wiring: 7 feet wide by 4 feet high
  - Without Systimax wiring: 6 feet wide by 3 feet high

---

## Installing the Backboard

When you are certain that the backboard meets the requirements indicated above, mount the backboard using the following mounting hardware:

- For a wood mounting surface, use wood screws.
- For brick, cinderblock, or concrete, use masonry anchors.
- For plaster or plasterboard, use toggle bolts.
- For sheet metal, use sheet-metal screws and attach them to the structural members.

**NOTE** ► The mounting hardware should resist a combined pullout force of at least 650 pounds (295 kilograms).

---

## AC Power and Grounding

Proper power and grounding are essential for the system to run correctly and safely.

 **CAUTION:**

*If any of the following requirements are not met, the customer must contact a licensed electrician. Do not install the system until all requirements are met.*

Verify that all of the following power and grounding requirements are met:

- The load center of appropriate current rating must be equipped with circuit breakers labeled 120 V AC, 15 amps.
- Each breaker must protect one dedicated quad AC outlet or two dedicated duplex AC outlets.
- All AC outlets must connect to the same load center and the ground wire must connect to the single-point ground bar on the first AC outlet (see Figure 2-1).
- One outlet must have an attached ground bar connected by a #6 AWG copper wire to an approved ground (see “Approved Grounds” later in this chapter for a description of approved grounds). This ground bar is the system’s single-point ground (see Figure 2-1).
- To prevent someone from accidentally shutting off the power, do not connect the control unit to a switch-controlled outlet.
- The AC outlet should be within 5 feet (152 cm) of the control unit.
- Each carrier requires one AC outlet receptacle.
- Auxiliary equipment requires additional AC outlets.
- If a printer or PC is installed on the system, it must be plugged into the same AC branch as the power supply of the basic carrier.
- If the printer or PC is 50 feet (15 m) or more from the control unit, or is plugged into a different AC circuit, Asynchronous Data Units (ADUs) must be installed as well.
- The AC power requirements indicated in “AC Outlet Tests,” must be met.

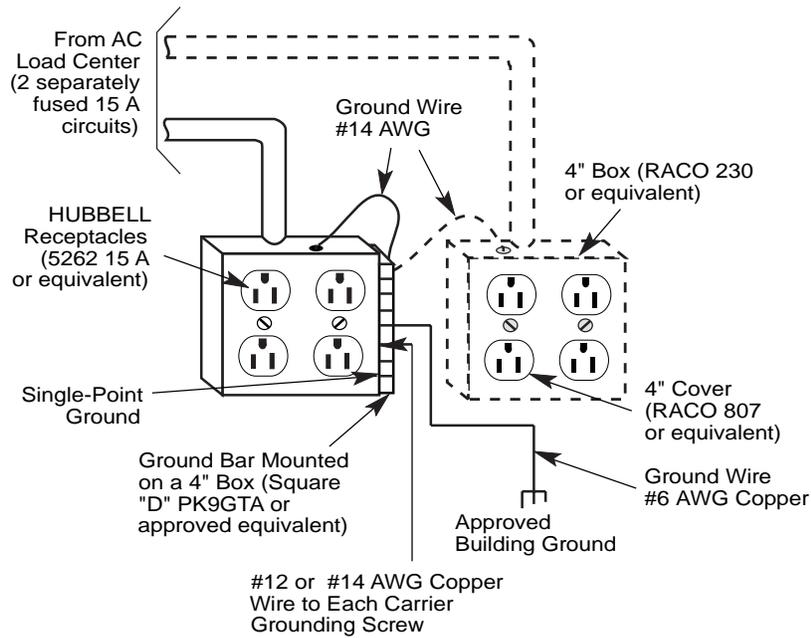


Figure 2-1. AC Grounding Requirements

**CAUTION:**

*The AC outlet for the control unit cannot be switch-controlled. Plugging the control unit into such an outlet invites accidental disconnection of the system. The AC outlet must be properly wired as described in "AC Outlet Tests."*

---

## AC Outlet Tests

If the AC outlet tests indicate that any of the power requirements in Table 2-2 are not met, your customer must contact a licensed electrician. Do not install the system until all requirements are met.

**Table 2-2. Power Requirements**

---

Parameter	Value
Nominal voltage	117 V AC
Voltage range	110–125 V AC
Frequency	60 Hz +/- 5%
Maximum current	5 amps per power supply

---

If the AC outlet tests reveal any of the following conditions, they must be corrected before you install the system:

- Open ground
- Hot and neutral reversed
- Open hot
- Open neutral
- Hot and ground reversed



**WARNING:**

*Hazardous voltages are present during the following tests. Follow all instructions carefully when working with AC power line voltages.*

### Using an Ideal 61-035 Circuit Tester (or Equivalent)

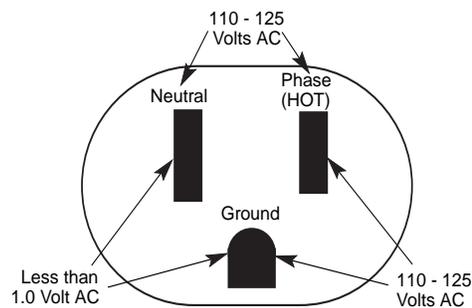
Follow these steps to use an Ideal 61-035 Circuit Tester or its equivalent:

1. Plug the circuit tester into the outlet that you want to test.  
If the circuit is properly grounded, the yellow and white lights on the tester turn on.
2. Unplug the circuit tester.

## Using a Volt-Ohm Milliammeter (VOM)

Follow these steps to use a VOM:

1. Set the VOM to the lowest scale on which you can read 130 V AC.
2. Measure the AC outlet voltages. See Figure 2-2 on page 2-8.
  - Phase to ground should be 110 to 125 V AC.
  - Neutral to ground should be less than 1 V AC.
  - Phase to neutral should be 110 to 125 V AC.



---

**Figure 2-2. Measuring the AC Outlet Voltages**

### **WARNING:**

*If the voltage readings do not measure the values required, the AC outlet is improperly wired—**do not install the system**. Advise the customer to have a licensed electrician correct the problem.*

---

## Grounding Requirements

Proper grounding of the installation site safeguards the system by protecting it from the following:

- Lightning
- Power surges
- Power crosses on central office trunks
- Electrostatic discharge (ESD)

 **WARNING:**

*When installing the control unit, make sure you meet the following grounding requirements:*

- *The control unit, the central office trunk protector, and the AC power service panel should be as close to each other as possible.*
- *Because equipment can be located throughout a building, the National Electrical Code requires that the ground point for the central office trunk protector be bonded to the AC power ground as shown in Figure 2-3.*
- *The AC outlet and the single-point ground bar must be properly grounded as shown in Figure 2-1 and Figure 2-3.*
- *Each control unit ground-screw terminal must be connected to the single-point ground bar by a #12 AWG or a #14 AWG solid copper wire. Figure 2-1 and Figure 2-3 show this connection.*
- *This wire run should be as short as possible, preferably within 5 feet (152 cm), and not to exceed 10 feet (305 cm). See “Approved Grounds” later in this chapter for more information.*
- *The AC outlet must be connected to the 145D protector with a #12 AWG or a #14 AWG solid copper wire.*

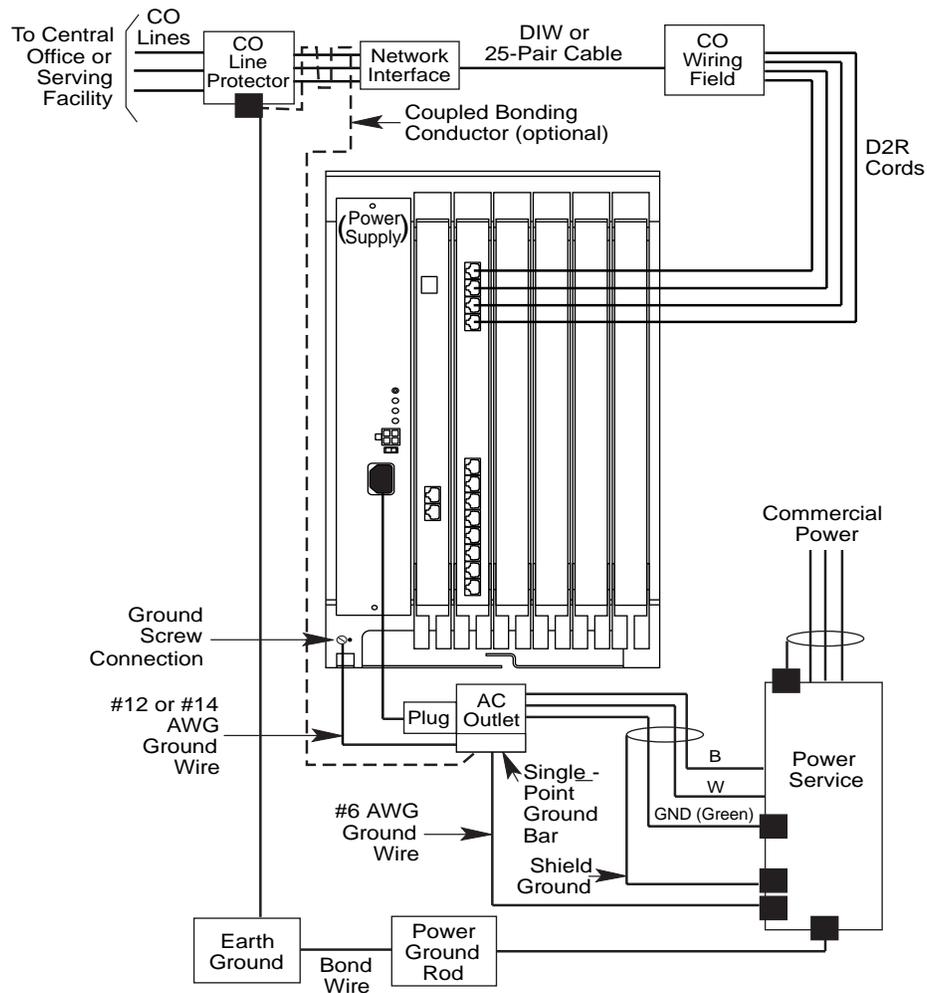


Figure 2-3. Central Office and AC Grounds

**⚠ WARNING:**

*An improper ground can cause equipment failures, service outages, and electrical shock. Verify that the AC power uses an approved ground for its primary ground, that all voltage-limiting devices are grounded to an approved ground, and that the ground is one of the approved grounds listed below.*

## Approved Grounds

Approved grounds are listed below, in order of preference:

- Most preferred ground:

It must be a metal, not plastic or vinyl, underground water pipe at least 1/2 inch (1.27 cm) in diameter, and in direct contact with the earth for at least 10 feet (3 m).

It must be electrically continuous so that the protector ground is uninterrupted. (Check for insulated joints, plastic pipe, and plastic water meters that might interrupt electrical continuity.)

A metallic underground water pipe must be supplemented by the metal frame of the building, a concrete-encased ground, or a ground ring. If these grounds are not available, the water pipe ground can be supplemented by one of the following types of grounds:

- Other local metal underground systems or structures, such as tanks and piping systems, but not gas pipes.
- Rod and pipe electrodes, a 5/8 inch (1.58 cm) solid rod or 1/4 inch (0.63 cm) conduit or pipe electrode driven to a minimum depth of 8 feet (244 cm).
- Plate electrode, a minimum of 2 square feet (61 square cm) of metallic surface exposed to the exterior soil.

- Next preferred ground:

It must be an electrode consisting of one of the following:

- At least 20 feet (6.1 m) of one or more steel reinforcing rods, each at least 1/2 inch (1.27 cm) in diameter
- 20 feet (6.1 m) of bare copper conductor not smaller than #4 AWG, encased in 2 inches (5 cm) of concrete

**NOTE** ► This electrode must be located within and near the bottom of a concrete foundation or footing that is in direct contact with the earth.

- Ground ring, consisting of at least 20 feet (6.1 m) of bare copper conductor (not smaller than #2 AWG) encircling the building. The ground ring must be in direct contact with the earth and buried at least 2-1/2 feet (77 cm) below the earth's surface.



**WARNING:**

*Do not use a metal underground gas piping system—this is a safety risk.*

## Central Office Trunk Protection

The local telephone company is responsible for providing the following protection of central office trunks at the entrance to the site:

- Carbon blocks or gas discharge tubes connected to an approved ground
- Adequate bonding of the central office trunk protector ground and the power company ground

 **CAUTION:**

*Check these requirements with a simple, visual inspection. If you cannot verify that the central office grounding requirements are met, contact the central office. Do not connect the control unit to the central office trunks until you are certain that these requirements are met.*

### Heavy Lightning Protection

The MERLIN MAGIX 491D1 power supply has built-in AC line protection. This built-in protection handles almost all situations.

Occasionally, additional protection may be needed if the customer is located in a heavy lighting area. In such instances, the 145D and 146 protectors are available for the MERLIN MAGIX system as needed.

In addition to providing CO line protection, 146 protectors are designed as In-Range, Out-of-Building (IROB) protectors. An IROB protector is used when telephones are installed within 1,000 feet of the control unit but are in another building. You must use IROB protectors whenever out-of-building telephones are installed.

**NOTE** ► 146C and/or the 146F protectors are recommended for CO line protection at all potential lightning trouble sites.

Connect a 145D protector to the system to limit surges from the AC lines. For CO trunk and/or IROB protection, add any combination of 146 protectors shown in Table . For an example, see Figure 2-4.

### Capacities and Recommended Application for 146 Protectors

Protector	Recommended Application
146C	4 CO Lines 4 T/R IROB telephones
146D	2 T/R IROB telephones 2 MLS or ETR IROB telephones
146E	2 MLX IROB telephones 2 4400-Series IROB telephones
146F	25 CO Lines 25 T/R IROB telephones
145D	6 protected AC outlets

**NOTE** ► For detailed installation instructions, see the documentation packaged with the protectors.

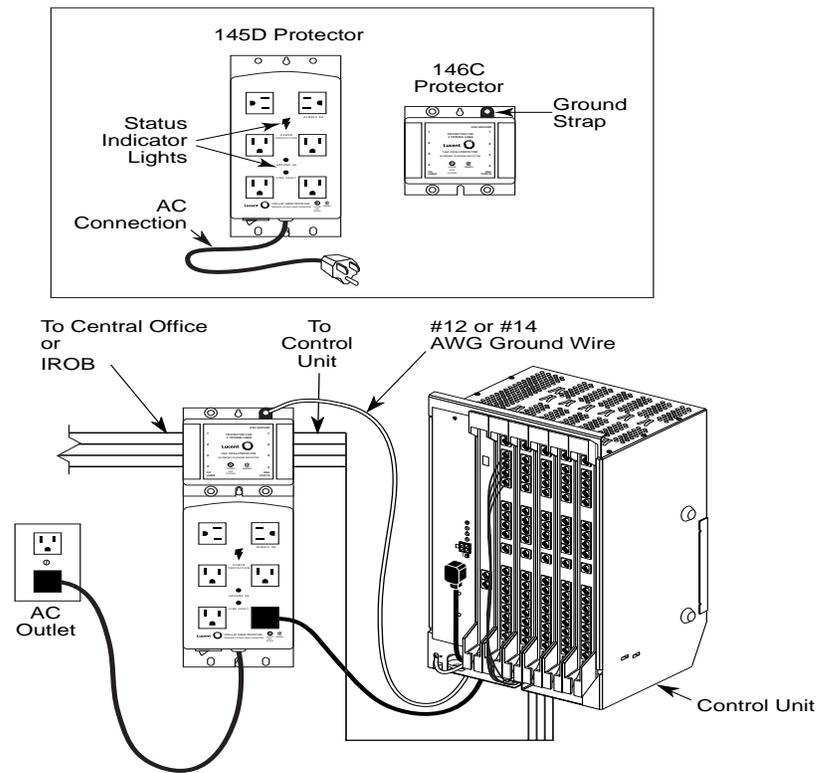


Figure 2-4. Configuring Power Surge and Protectors

## Unit Loads

A unit load is a measure of power (1.9 watts) that you use to determine the electrical load that the components listed below place on the control unit's power supply.

- Telephones and adjuncts
- 800 DID modules

Only the telephones and adjuncts that connect to the digital extension jacks (ports) on the control unit require unit load calculation. When calculating unit load, do not include any equipment with its own power supply (for example DSS).

### **WARNING:**

*Warning: Never have more than two (2) DS1 modules (100D), two (2) INA modules (100R), or more than one (1) 100D and one (1) 100R module in a carrier. Also, you can have any combination of the following three -5 V DC modules per carrier, but do not exceed three: Processor, DS1 module, INA module, and the MERLIN Messaging module. If you exceed three -5 V DC modules in a single carrier, the system will fail to come on line.*

---

## Calculating Unit Loads

The 491D1 power supply for the MERLIN MAGIX Integrated System provides up to 96 unit loads of power. If the unit loads in a carrier exceed 96 unit loads, reconfigure the carrier so that the unit loads are 96 or less. For Example:

- In Key mode, the MERLIN MAGIX 491D1 power supply can generally support up to three 016 MLX, 024TDL, or 016 ETR modules, as long as no DID, TDL or E&M Tie Line modules are in the same carrier.
- In the Hybrid/PBX mode, the 491D1 power supplies can generally support up to four 016 MLX, 024TDL and 016 ETR modules, as long as no DID, TDL or E&M Tie Line modules are in the same carrier.

In many circumstances a more accurate unit load calculation may be useful. This may include situations where modules are not fully utilized, a predominance of large multi-button sets are used, there is a change in the equipment, or you suspect that a particular carrier has more unit loads than the power supply can handle.

To calculate the actual unit loads per carrier:

1. Add up the unit loads for each type of module using Table 2-3 on page 2-15. If the total doesn't exceed 96, no further calculations are necessary. Table 2-3 assumes a mix of set types with no more than 50% of sets being large, multi-button sets (4424LD+, 4424D+, 4412D+, MLX 20L & 28D, and/or ETR 34D & 18D) sets.

**Table 2-3. Unit Loads Per Module (48vDC)**

Circuit Module App Code	Type	UNIT LOAD
617A52	412 LS-TDL	13
617A58	024 TDL	24
617C21	008 MLX	13.5
617A54	016 MLX	27
617E34	016 T/R	12.8
617A56	016 ETR	24
617G20	800 DID	8.0
617 E28	008 OPT	8.0
617D14	400 E&M	8.0
617B31	800 LS/GS/ICLID	0
617 E29	408GS/LS-MLX/ICLID	13.5
617A49	MERLIN Messaging	0

- If unit loads calculated from Table 2-3 exceed 96 or if >50% of the sets are large multi-button sets, calculate the actual total using the Unit Load values in Table 2-4 on page 2-15 for each type of station device and trunk shown in Table 2-4 (include DSS and adjuncts powered from the Processor).

**Table 2-4. Unit Loads Per Port**

Port Load	Hybrid/PBX Mode	Square-Key Mode
<b>TDL module for 4400-Series Sets</b>		
4424LD+	1.1	1.3
4412D+/4424D+	1.1	1.3
4400/4400D/4406D+	0.9	1.0
DSS	0	0
<b>MLX Set/Adjunct</b>		
MLX 20L	1.1	1.6
MLX 28	1.2	1.7
MLX 5/10/16 w/ or w/o Disp	0.9	1.2
DSS	0.7	0.9
MFM (use local PSU)	0	0
<b>Tip Ring</b>		
T/R Set	0.6	0.7
<b>ETR Set/Adjunct</b>		
ETR-6	0.9	1.0
ETR-18	1.0	1.2
ETR-18D	1.2	1.4

**Table 2-4. Unit Loads Per Port—Continued**

Port Load	Hybrid/PBX Mode	Square-Key Mode
ETR-34D	1.5	1.7
<b>Trunk</b>		
GS-LS	0	0
DID	1.0	1.0
E&M	1.4	1.4
DS1	0	0

**NOTE** ► If the total exceeds the maximum unit loads per power supply, try to exchange modules between carriers to reduce the load below the maximum. No empty slots are permitted between modules.

As a general rule, if you can distribute the 800 DID modules and telephone modules equally across the carriers, you prevent unnecessary drain on any one carrier.

## Installing the Carriers

Installation of the basic and expansion carriers involves mounting the carriers to the backboard, connecting the ground, placing the power supply, processor, and modules into the carriers, and attaching the front cover.

### Mounting the Carrier and Expansion Carriers

There are two different procedure that you can use to mount the carrier:

- Mounting the carrier with the power supply and port modules already installed in the carrier.
- Mounting the carrier with the power supply and port modules removed from the carrier.

#### Mounting both the Carrier and Expansion Carriers With the Power Supply and Port Modules Already Installed in the Carrier

This installation procedure requires the use of 4 mounting brackets supplied with each carrier.

**NOTE** ► A basic carrier should be mounted on a backboard with 29 inches (73.66 cm) of empty space to the right. This allows enough room for system expansion of two additional carriers. There should be at least 12" of clearance from the top of the control unit to the ceiling to allow adequate ventilation for cooling.

**⚠ WARNING:**

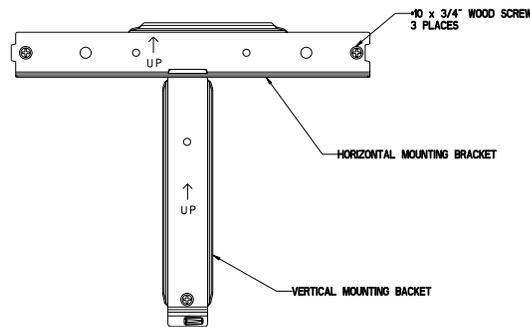
*Continue with this procedure only if you have met all of the requirements discussed earlier in this chapter.*

To install the carrier, follow the steps below:

1. Install the horizontal mounting bracket on the backboard using at least two #10 X 3/4" long wood screws supplied.

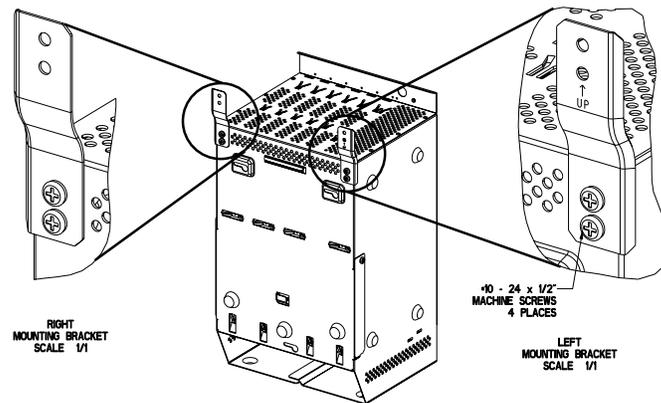
Make sure that the bracket is level.

2. Install the top of the vertical mounting bracket into the slot on the horizontal mounting bracket to form a "T" as shown in Figure 2-5. Secure the vertical mounting bracket with at least one #10 X 3/4" long wood screw in the bottom hole.



**Figure 2-5. Mounting the T brackets**

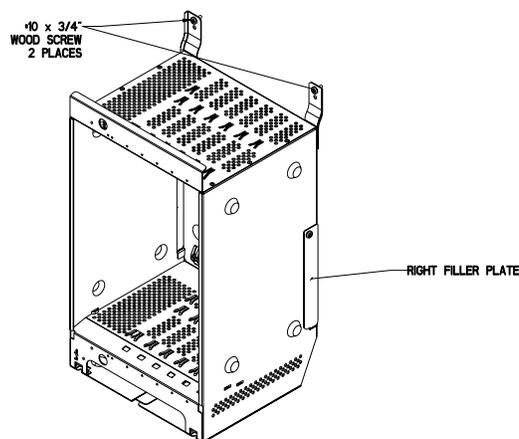
3. Install the left and right mounting brackets on the rear of the carrier with the four #10 - 24 X 1/2" long machine screws supplied as shown in Figure 2-6.



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**Figure 2-6. Fastening the left and right brackets on the carrier**

4. Place the carrier on to the horizontal mounting bracket approximately 2" to the right of its final position.  
The hook on the back of the carrier should rest on the top flange of the horizontal mounting bracket.
5. Slide the carrier to the left until it stops when it bottoms out on the vertical mounting bracket.  
Make sure that the bottom of the carrier is secured by the vertical mounting bracket.
6. Secure the left and right mounting brackets to the backboard with a minimum of one #10 X 3/4" long wood screw in each bracket as shown in Figure 2-7.



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**Figure 2-7. Securing the left and right bracket**

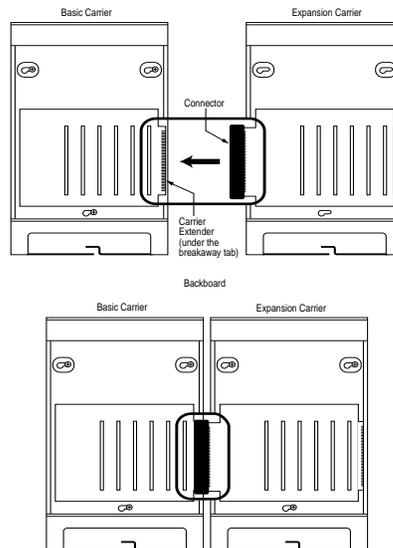
**To Install the Expansion Carrier:**

- a. Abut the second horizontal mounting bracket to the first horizontal mounting bracket.
- b. Repeat steps 1 through 3 to secure the bracket and attach the mounts to the carrier.
- c. Remove the filler plate from the right side of the basic (first) carrier. See Figure 2-7 above.
- d. Place the carrier on to the horizontal mounting bracket approximately 2" to the right of its final position.

The hook on the back of the carrier should rest on the top flange of the horizontal mounting bracket.

- e. Slide the expansion carrier to the left, align the backplane connectors and seat the expansion carrier with the basic carrier.

Make sure the connectors are seated securely and completely as shown in Figure 2-8.



**Figure 2-8. Connecting the Carriers**

- f. Secure the left and right mounting brackets to the backboard with a minimum of one #10 X 3/4" long wood screw in each bracket as shown in Figure 2-7.
7. Connect the ground-screw on the carrier to an approved ground using a #12 AWG or #14 AWG solid copper wire. See Figure 2-3 on page 2-10.

## Mounting Both the Carrier and Expansion Carriers With the Power Supply and Port Modules Removed from the Carrier

This installation procedure does not require the 4 mounting brackets supplied with each carrier.

**NOTE** ▶ A basic carrier should be mounted on a backboard with 29 inches (73.66 cm) of empty space to the right. This allows enough room for system expansion of two additional carriers. There should be at least 12" of clearance from the top of the control unit to the ceiling to allow adequate ventilation for cooling.

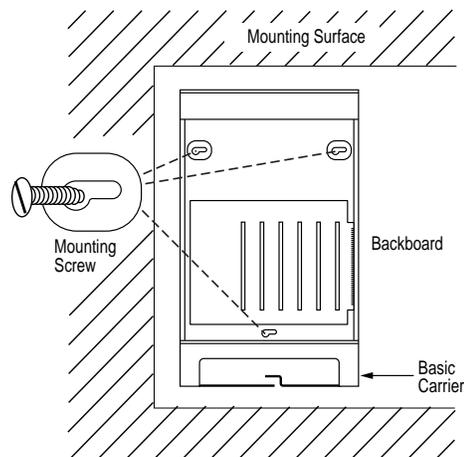
### **!** WARNING:

*Continue with this procedure only if you have met all of the requirements discussed earlier in this chapter.*

To install the carrier, follow these steps:

1. Mark the screw-hole locations on the backboard using the carrier or the diagram in Figure 2-9 as a guide.

Make sure the carrier is level before marking the holes.



**Figure 2-9. Marking the Basic Carrier Screw Holes**

2. Drill a pilot hole in the center of each of the three screw-hole marks.
3. Anchor the screws approximately halfway into the backboard.
4. Position the carrier on the screws and slide the carrier to the left.
5. Tighten the screws.

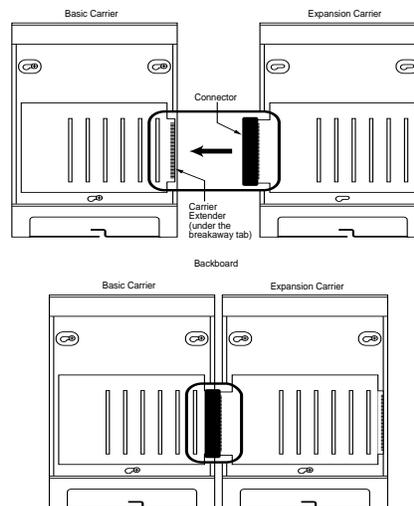
6. Connect the ground-screw on the carrier to an approved ground using a #12 AWG or #14 AWG solid copper wire.

To install the expansion carrier, follow these steps:

1. Remove the filler plate from the right side of the basic (first) carrier.
2. Align the two backplane connectors.
3. Repeat steps 1 to 3.
4. Slide the expansion carrier to the left, align the backplane connectors and seat the expansion carrier with the basic carrier.

Make sure the connectors are seated securely and completely as shown in Figure 2-10.

5. Secure the three screws.
6. Connect the ground-screw on the carrier to an approved ground using a #12 AWG or #14 AWG solid copper wire.



**Figure 2-10. Connecting the Carriers**

## Installing the Power Supply

### **WARNING:**

*Do not install the power supply unless the carrier is connected to an approved ground.*

*Before touching leads, connectors, pins, and other components, use a properly grounded wrist strap to prevent damage from electrostatic discharge (ESD). The wrist strap can be clipped to the ground screw or plugged into the hole next to the ground screw.*

*Do not attach any cables or power cords to the power supply until it is installed in the carrier.*

*Do not power up the control unit until all of the modules and power equipment are installed. Once they are installed, refer to “Powering Up the System,” later in this chapter. Failure to comply with this procedure can result in shock hazard and/or damage to the equipment.*

## Installing the Power Supply Module in the Carrier

Follow these steps to install the power supply module in the carrier:

1. Align the circuit board guides inside the carrier, and slide the power supply module into the slot.
2. Make sure the connector on the back of the module mates properly with the connector on the carrier.
3. Secure the module with two screws, one on top and one on the bottom.

**NOTE**  The power supply may make a ticking sound when plugged in but not turned on. This is normal operation.

---

## Installing the Processor

### **CAUTION:**

*Before touching leads, connectors, pins, and other components when handling the circuit board, use a properly grounded wrist strap to prevent damage from electrostatic discharge (ESD). The wrist strap can be clipped to the ground-screw or plugged into the hole next to the ground-screw.*

Installing the processor includes the following procedures:

- If both of the following conditions are true, follow the procedures in “Modifying the Processor for Key Mode” in Chapter 9 of the *Installation, SPM, Maintenance, and Troubleshooting Guide*.
  - Form 1, System Planning, indicates Permanent Key mode.

- Form 2c, System Numbering: Line/Trunk Jacks, indicates no GS (ground-start) trunks in the Incoming Trunk Type column.
- Insert the processor into the carrier as indicated in “Installing the Processor in the Carrier,” later in this chapter.

## Installing the Processor in the Carrier

**NOTE** ► If the system is programmed for Permanent Key mode, check the switch setting. Refer to “Modifying the Processor for Key Mode” in Chapter 9 for detailed procedures. If the switch is set to Permanent Key-only operation, all trunks revert to loop-start. If the switch is not set, any programmed designation for ground-start trunks is retained.

The ground-start pool never has trunks assigned to it automatically but must be programmed after the ground-start ports are designated. Ground-start trunks are assigned to the ground-start pool on initialization, except in a system switched for Permanent Key mode operation.

The processor module contains a PCMCIA memory card interface capable of accommodating a 4MB memory card. This card is used to install or upgrade system software and perform firmware upgrades on circuit modules. It can be used to back up and restore system programming.

To install the processor in the carrier, follow the steps below. Refer to Figure 2-11.

1. Align the circuit board guides inside the carrier, and slide the processor module into the slot.
2. Make sure that the connector on the module mates properly with the connector on the carrier as you push the processor back into place.

 **CAUTION:**

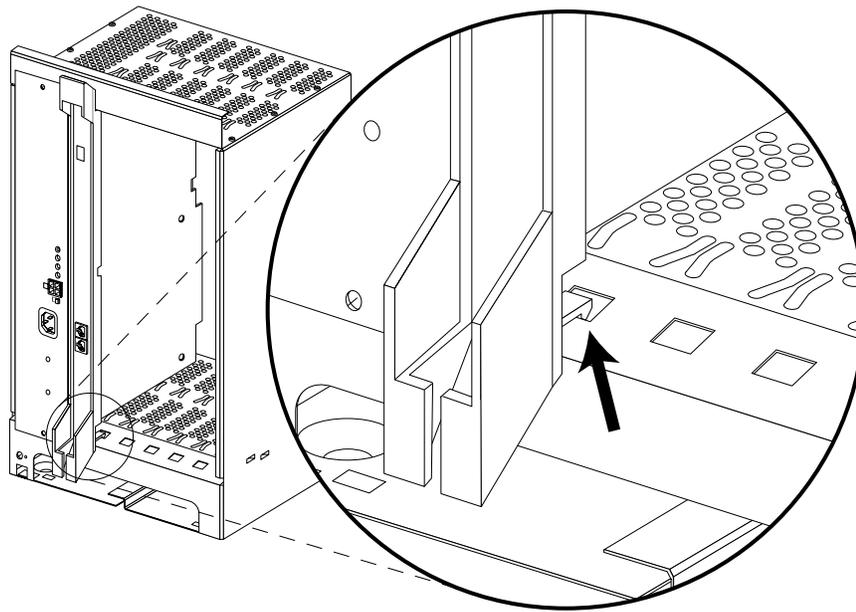
*To avoid damage, do not force the module. If the module does not insert easily, pry the bottom-front locking tab with a flat-blade screwdriver, remove the module, and inspect the module and carrier for damage or obstruction. The bottom-front locking tab is shown in Figure 2-11. This tab is used on all modules.*

*If there is no damage and no obstruction, reinsert the module.*

*A damaged carrier or module must be replaced.*

3. Firmly push the processor into the carrier until it locks into place.

The processor should be securely attached to the carrier and locked in place by the locking tab on the bottom front of the processor.



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**Figure 2-11. Installing the Processor into the Carrier**

---

## Installing the Modules

### CAUTION:

*When installing the modules, use a properly grounded wrist strap to prevent damage from electrostatic discharge (ESD), and avoid touching leads, connectors, pins, and other components. The wrist strap can be clipped to the ground-screw or plugged into the hole next to the ground-screw.*

### WARNING:

*All unused slots must be covered with a blank panel. Remove back panels **only** from slots where modules will be installed.*

## Guidelines

Follow these guidelines when you install modules, as indicated on the Control Unit Diagram of Form 1, System Planning:

- Do not leave empty slots between modules. The system ignores modules installed beyond any empty slot.
- If a phantom module (a programmed empty slot) is indicated on the Control Unit Diagram, make sure the slot remains empty and do not install any modules to the right of it. The system ignores any modules installed to the right of a programmed empty slot.
- Remove a blank panel from a slot by prying up the latch at the bottom of the panel with a flat bladed screwdriver.
- Make sure you install each module in its assigned slot. If you install a module in the wrong slot, the system will not function properly.
- Once you have installed the power supply and the processor in the basic carrier, use the remaining slots for the modules as follows:
  - Basic carrier: slots 1 through 5
  - First expansion carrier: slots 6 through 11
  - Second expansion carrier: slots 12 through 17

## Placing the Modules into the Carrier

To install modules starting from slot 1 (the first open slot next to the processor), follow the steps below:

1. Align the circuit board guides inside the carrier, and slide the module into the slot. See Figure 2-11 on page 2-24.
2. Make sure the connector on the module mates properly with the connector on the carrier.
3. Firmly push the module into the carrier until it locks into place.

 **CAUTION:**

*To avoid damage, do not force the module. If the module does not insert easily, pry the bottom-front locking tab with a flat-blade screwdriver, remove the module, and inspect the module and carrier for damage or obstruction. The bottom-front locking tab is shown in Figure 2-11. This tab is used on all modules.*

*If there is no damage and no obstruction, reinsert the module.*

*A damaged carrier or module must be replaced.*

4. Repeat Steps 1 through 4 for each module you want to install.

---

## Installing the Cover

The cover is installed only after all equipment has been connected to the control unit and after all system testing has occurred. The top edge of the front cover hooks over the top flange of the carrier. The bottom of the front cover is secured to the carrier with two captive screws.

**NOTE** ► The two captive screws should not be removed from the front cover.

 **WARNING:**

*The cover must be installed for continued safe operation of the control unit.*

## Labeling

After all modules have been installed, label the jacks by using the numbered labels provided with the feature module. There are two types of labels:

- Line/trunk labels have green numbers on off-white background.
- Telephone labels have blue numbers on off-white background.

See Figure 2-12 on page 2-28 for the locations of line/trunk jacks and telephone jacks on each module, and label them as described next.

Follow these steps to label the jacks on the modules:

1. Label each line/trunk jack on the modules sequentially, 1 through 80. Begin with the module in slot 1, numbering from bottom to top on each module and working from left to right across the carrier or carriers.

The 100E module has 32 numbers assigned to the line/trunk jack.

2. Label each telephone jack sequentially, 1 through 200. Begin with the module in slot 1, numbering from bottom to top on each module and working from left to right across the carrier or carriers.

 **CAUTION:**

*The 008 OPT module is assigned 12 logical IDs, and the last four numbers are not assigned to jacks. For example, if the previous module (on the left) is labeled with logical IDs 1 through 8, label the 008 OPT jacks with logical IDs 9 through 16. Skip numbers 17 through 20. When you label the next module (on the right), label the first jack as logical ID 21.*

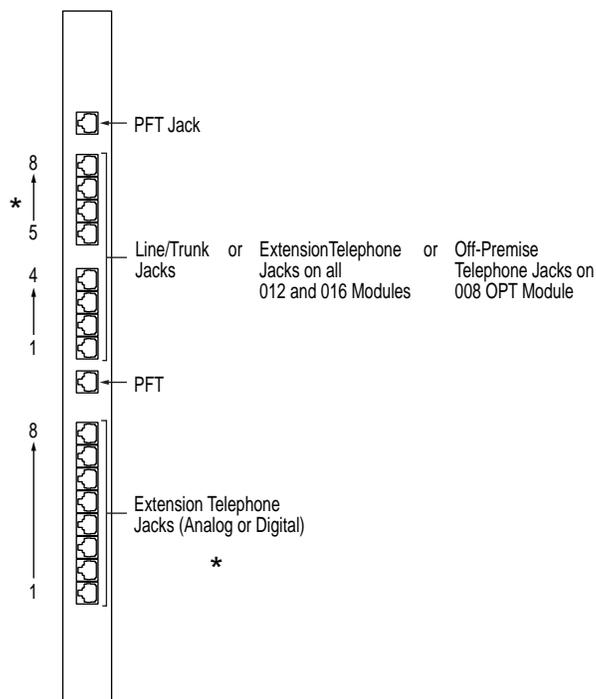


Figure 2-12. Line/Trunk and Telephone Jack Locations on Each Module

## Replacing a Module

### CAUTION:

*This section does not apply to the processor or power supply.*

*Before inserting or removing a module, the power switch on all power supplies must be turned off.*

*When you replace a module, use the same module type. For example, do not put a 008 MLX module in place of a 400 GS/LS/TTR module. If a module is replaced with another type of module, or if a module is added to the system without powering down the system first, a cold start (System Reset) occurs.*

*If you move any module to a different slot, be sure to renumber the modules by selecting Board Renumber from system programming. See System Programming for information about board renumbering.*

---

## Replacing a Module in a Carrier

To remove and replace a module in a carrier, follow the steps below. See Figure 2-13.

 **CAUTION:**

*Power down the system before removing or replacing modules. "Hot swaps" should not be performed.*

1. Label all cords (if they are not labeled already), and then unplug them from the module.

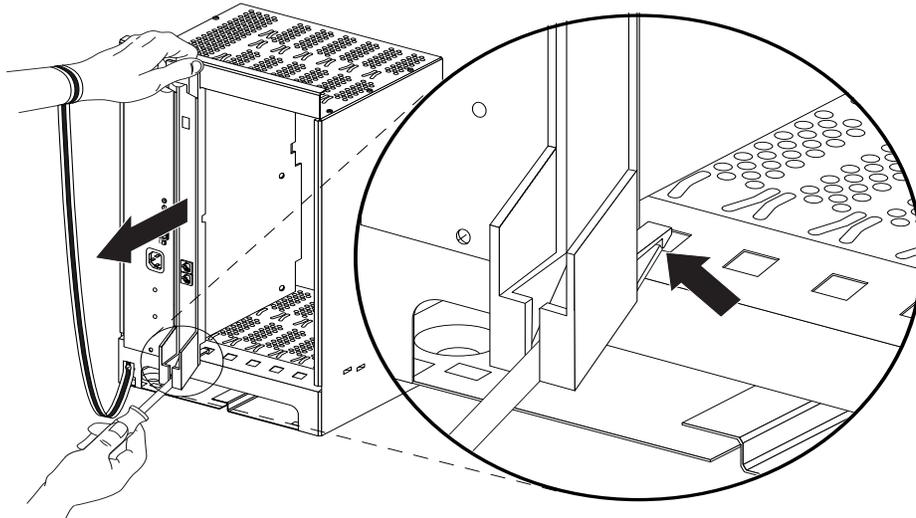
For information about labeling trunk and extension cords, see Chapter 3, "Installing Icon-Labeled 4400-Series Telephones," and Chapter 4, "Connecting the Control Unit to the Network Interface." For instructions on checking unlabeled wiring, see "Checking Unlabeled Wiring" in Chapter 3 of *Maintenance and Troubleshooting*.

2. Power down the system. To power down the system, follow the steps below.

 **CAUTION:**

*Follow these steps in the exact sequence.*

- a. Turn off the power supply on the basic carrier.
  - b. Turn off the power supplies on the expansion carriers.
  - c. Unplug the system from the AC outlet.
3. Remove the module from the carrier. Follow these steps:
    - a. Using a screwdriver, pry the tab at the bottom front of the module.
    - b. While prying the tab, pull the top handle on the module towards you and away from the carrier.
  4. Inspect the module for visible damage.
  5. Insert the new module (see Figure 2-11).
  6. Restore the module. See *System Programming* for instructions.
  7. Connect the trunk and extension cords.
  8. Attach a tag, error printout, and any information that will help identify any visible problems or failure symptoms.



---

**Figure 2-13. Removing a Module from the Carrier**

## Connecting the Control Unit to an AC Outlet

**⚠ CAUTION:**

*Make sure the AC outlet has been tested for proper grounding. The outlet should be 117 V AC, 60 Hz, 3-wire (phase, neutral, ground). See "AC Outlet Tests," earlier in this chapter, for instructions.*

*To prevent someone from accidentally shutting off the power, do not connect the control unit to a switch-controlled outlet. The AC outlet should be within 5 feet (152 cm) of the control unit.*

To connect the control unit to a dedicated AC outlet, follow the steps below.

1. Turn the basic carrier's power supply switch to the OFF position.
2. Turn off the power supply switches on the expansion carriers.
3. Plug one end of the power cord into the AC INPUT connector located to the right of the power switch on the front of the basic carrier's power supply.
4. Plug the other end of the power cord into the AC outlet, allowing at least 1 foot (30.4 cm) of slack in the cord.
5. Repeat Steps 4 and 5 for each expansion carrier.

**CAUTION:**

*Do not attach the power cord or cords to any building surfaces.*

## Powering Up the System

**CAUTION:**

*Follow the procedure below to power up the system only if the system is completely installed. Failure to comply with this procedure can result in shock hazard or damage to the equipment.*

*Do not power up the system unless all carriers are connected to an approved ground.*

1. Complete the procedure "Connecting the Control Unit to an AC Outlet" on page 2-30.
2. Turn on the power switch for each expansion carrier: start with the power supply in the rightmost carrier.

The green power lights on each expansion carrier power supply should turn on.

3. Turn on the power switch on the basic carrier power supply.
  - The dot on the one-character display LED flashes.
  - The green light on the power supply turns on.
  - The red light on the processor should turn on for 15 to 45 seconds and then turn off.
  - All indicators on the 100D, 100R, and 400EM line/trunk modules (if present) turn on and then off. They remain off when the modules are idle.
4. If any of these conditions are not met, refer to *Maintenance and Troubleshooting*.

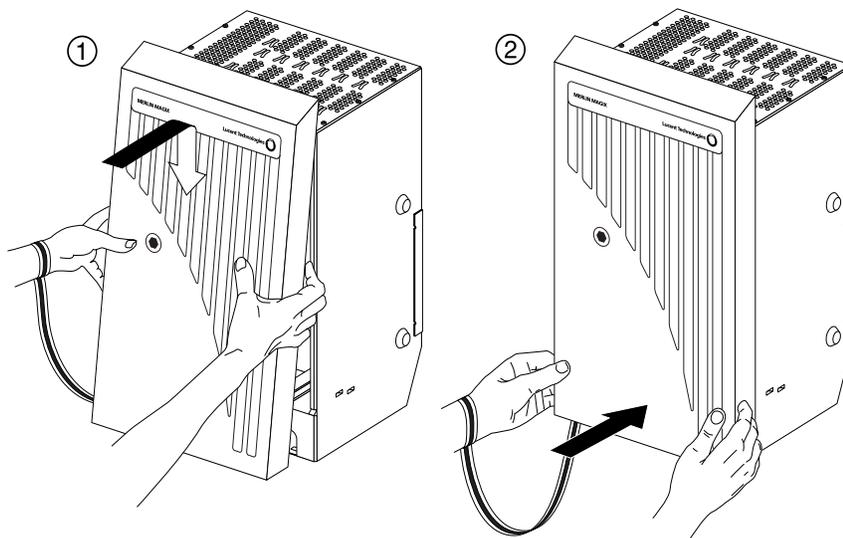
## Installing the Cover on the Carrier

**⚠ WARNING:**

*The cover must be installed for continued safe operation of the control unit.*

A front cover is needed for the carrier. Follow these steps to install the cover (see Figure 2-14):

1. Be sure all wires have been passed through the wire managers and wire trays at the bottom of the control unit.
2. Hook the top of the cover onto the top of the carrier.
3. Push in the bottom of the cover until it locks securely onto the base of the wire managers on the carrier.
4. Tighten the two screws at the bottom of the cover.



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**Figure 2-14. Installing the Cover for the Carrier**



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## Overview

The icon-labeled 4400-Series telephones are digital single-line and multiline telephones designed for use with Lucent Technologies' MERLIN MAGIX™ Integrated System Release 1.0i. Most of the instructions for the use of these telephones appear in the *4400 and 4400D Telephone User's Guide* and the *4406D+, 4412D+, 4424D+, and 4424LD+ Telephone User's Guide*.

## IMPORTANT SAFETY INSTRUCTIONS



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.

To reduce the risk of fire, electrical shock, and injury to persons, follow these basic safety precautions when installing telephone equipment:

- Read and understand all instructions.
- Placing equipment or other articles within two inches of the microphone, may decrease the quality of performance of the speakerphone. For 4424LD+ and 4424D+ telephones, care should be taken when connecting a DSS 4450 to ensure that placement of the DSS 4450 does not interfere with the performance of the microphone on the right side of the telephone.
- Follow all warnings and instructions marked on or packed with the product.
- This product is intended to be installed and serviced by qualified service personnel only. Do not disassemble this product. There are no user-serviceable parts inside.
- Never push objects of any kind into this product through cabinet slots, as they may touch dangerous voltage points or may short out parts, which could result in a risk of fire or electrical shock.
- Never install telephone wiring during a lightning storm.
- Never touch uninsulated telephone wires or terminals unless the telephone wiring has been disconnected at the network interface.
- Never install a telephone jack in a wet location (for example a wet basement) unless the jack is specifically designed for wet locations.
- Do not install this product near water—for example, in a wet basement location.
- Use caution when installing or modifying telephone lines.

- Use only Lucent Technologies 1151A Power Supply Unit (PEC 2404-010) with the appropriate input power cord PEC (24799). The Power Supply Unit is required for icon-labeled 4424LD+ telephones or with the icon-labeled 4424D+ when connecting a DSS 4450. The country-specific input power cord is ordered by selecting the appropriate country attribute.
- The 1151A Power Supply Unit is to be connected only to the type of main power source indicated on the marking label. The main power source wall outlet must be installed near the equipment and be readily accessible. Do not overload the wall outlet or use an extension cord.
- The input power cord used with the 1151A Power Supply Unit is equipped with a grounding-type plug appropriate for the country in which it is installed. 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.
- Do not staple or otherwise secure the input power cord to the building surfaces. Do not allow anything to rest on top of the cord. Do not locate the equipment where the cord will be abused by persons walking on top of it.
- Use only Lucent Technologies-recommended/approved 4400-Series telephone accessories.

## Line Cords

Line cords are shipped with all 4400-Series telephones and the DSS 4450. The line cord varies according to the equipment:

- **Clear** 14-foot, 6-position line cord with two conductors (D2R)—used to connect the 4400, 4400D, 4406D+, 4412D+, and 4424D+ telephones to the communications system wall jack. If auxiliary power is needed, used to connect the 1151A Power Supply Unit to the communications system wall jack.
- **Silver-Gray** 14-foot, round line cord (M4BK)—used to connect the 1151A Power Supply Unit to the 4424LD+ telephone or the 4424D+ telephone when connected to a DSS 4450. One end of the M4BK cord has an 8-position plug and the other end has a 6-position plug.
- 3-foot, 8-position line cord with eight conductors (D8Y)—used to connect a DSS 4450 to a 4424LD+ or 4424D+ telephone or to another DSS 4450 via the jacks on the bottom of the DSS 4450 and the telephone.

## 1151A Power Supply Unit

An 1151A Power Supply Unit (PEC 2404-010) with the appropriate input power cord PEC (24799) is **not** automatically shipped with the telephone and must be ordered separately. The 1151A Power Supply Unit is required for icon-labeled 4424LD+ telephones or with the icon-labeled 4424D+ when connecting a DSS 4450. The country-specific input power cord is ordered by selecting the appropriate country attribute.

See “Jacks and Placement of Cords” later in this document for instructions on installing the 1151A Power Supply Unit for an icon-labeled 4424LD+ or with the icon-labeled 4424D+ when connected to a DSS 4450.

 **CAUTION:**

*Do not use a different type of power supply from any other piece of equipment. Using another power supply can severely damage the DSS 4450, the 4424LD+ telephone, or the 4424D+ telephone.*

## Microphone

The microphone on the 4406D+ is located on the bottom right front of the telephone. The microphone on the 4412D+, 4424LD+, and 4424D+ telephones is located on the right side of each telephone.

 **CAUTION:**

*Placing equipment or other articles within two inches of the microphone, may decrease the quality of performance of the speakerphone. For 4424LD+ and 4424D+ telephones, care should be taken when connecting a DSS 4450 to ensure that placement of the DSS 4450 does not interfere with the performance of the microphone on the right side of the telephone.*

## DSS 4450

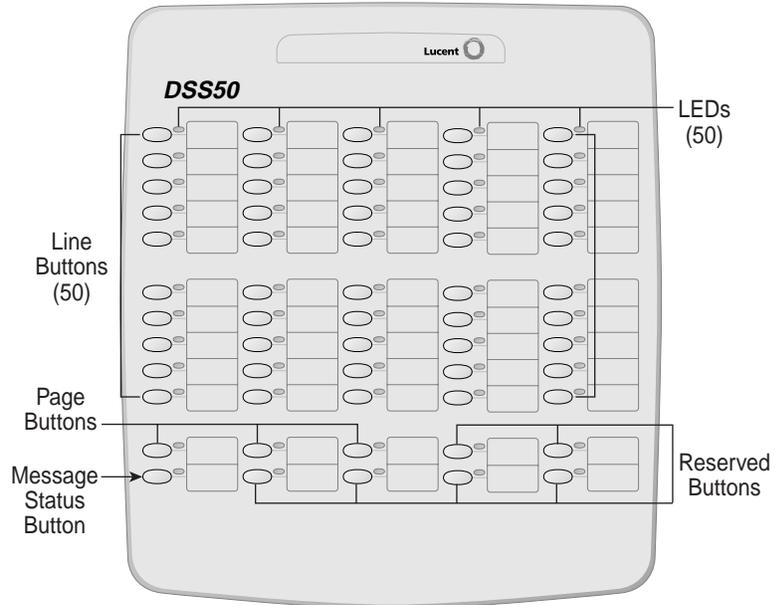
One or two DSS 4450s can be connected to a 4424LD+ or 4424D+ telephone to enhance the call-handling capabilities of a system operator with a Direct-Line Console (DLC) or a Queued Call Console (QCC). When connected to a 4424LD+ telephone used as a system programming console, the DSS 4450 facilitates system programming and centralized telephone programming procedures. Most of the instructions for the use of the DSS 4450 by a system operator appear in the *Direct-Line Console Operator's Guide* and the *Queued Call Console Operator's Guide*. Instructions for use of the DSS 4450 during system programming or centralized telephone programming appear in *System Programming*.

The DSS 4450 has three "pages" of 50 extensions or numbers. You can select the page you want by pressing one of the page buttons on the bottom of the DSS 4450.

The DSS 4450 has the following characteristics:

## Installation and Maintenance

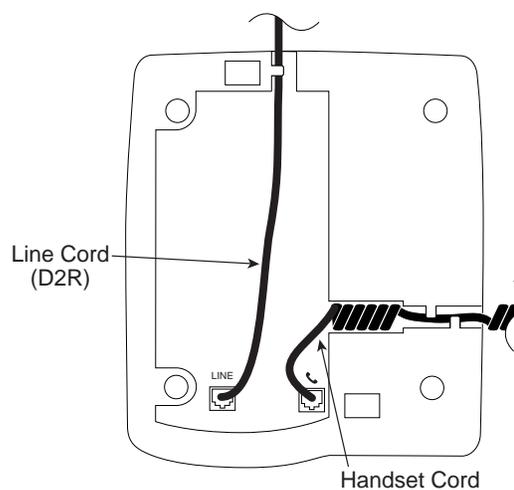
- 50 line buttons with red LEDs
- 3 page buttons with green LEDs
- 6 buttons with green LEDs reserved for future use



## Jacks and the Placement of Cords

Jacks exist on the bottom of the 4400-Series telephones as follows:

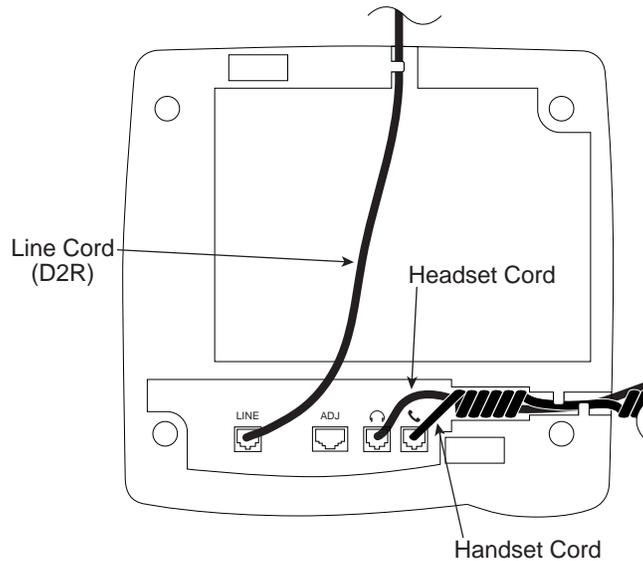
- On the 4400 and 4400D telephones the jacks on the bottom accommodate the connection of the handset and the line cord. Refer to Figure 1 for jacks and placement of cords for the 4400 and 4400D telephones.



**Figure 3-1. Jacks and Placement of Cords for the 4400 and 4400D Telephones**

- On the 4406D+, 4412D+, 4424D+, and 4424LD+ telephones the jacks on the bottom accommodate the connection of the handset, the line cord, and a headset. For the 4424LD+ and the 4424D+ telephone, a wider jack marked “ADJ” is used to connect a DSS 4450.

Refer to Figure 2 for jacks and placement of cords for the 4406D+, 4412D+, and 4424D+ telephones when no auxiliary power is needed.



**Figure 3-2. Jacks and Placement of Cords for the 4406D+, 4412D+ and 4424D+ Telephones (when no auxiliary power is needed)**

**NOTE** ► The 4406D+ telephone does not have a jack for the DSS 4450. The 4412D+ also has a jack marked “ADJ”, however, the jack is reserved for future use and **cannot be used** to connect a DSS 4450

Follow these instructions and refer to Figure 3 to connect the 1151A Power Supply Unit to the 4424LD+ or to any 4400-Series telephone when auxiliary power is needed (for example, when connecting one or two DSS 4450s to a 4424D+):

1. Turn the telephone and each DSS 4450 face down.
2. Connect the one end of the D8Y line cord (supplied with the DSS 4450) to the ADJ jack on the telephone. Connect the other end of the D8Y line cord to the IN jack of the first DSS 4450 (next to the telephone).

3. If you are connecting only one DSS 4450, go to Step 4.

If you are connecting a second DSS 4450, connect one end of the D8Y line cord (supplied with the DSS 4450) to the OUT jack of the first DSS 4450 connected in Step 2. Connect the other end of the D8Y line cord to the IN jack on the second DSS 4450 (farthest from the telephone).

4. Connect the 6-position plug at one end of the **silver-gray** M4BK line cord (ordered with the 1151A Power Supply Unit) to the LINE jack of the telephone. Connect the 8-position plug at the other end of the silver-gray M4BK line cord to the PHONE jack of the 1151A Power Supply Unit.

### **IMPORTANT NOTE:**

This drawing in Figure 3 includes the cords used for connecting the 1219A Power Supply Unit used with non-icon 4400-Series telephones. For 1151A Power Supply Unit used with icon-labeled 4400-Series telephones substitute a silver-gray M4BK line cord for the satin-silver D4BU cord shown in the drawing.

5. Connect one end of the **clear** D2R line cord (packaged with the 4400-Series telephones and the DSS 4450) to the LINE jack of the 1151A Power Supply Unit. Connect the other end of the clear D2R line cord to communications system wall jack.
6. Connect the 1151A Power Supply Unit into a wall outlet.
7. Turn the telephone and the DSS 4450s face up.

- NOTES** ►
- If the telephone will be wall mounted using the optional wall-mounting stand, you must run the headset and handset cords out the channel on the side of the telephone.
  - The 4424LD+ telephone and the DSS 4450 cannot be wall mounted.
  - If the telephone does not work properly after all cords are connected, check to be sure that the silver-gray M4BK line cord and the clear D2R line cords are connected properly as shown in Figure 3.

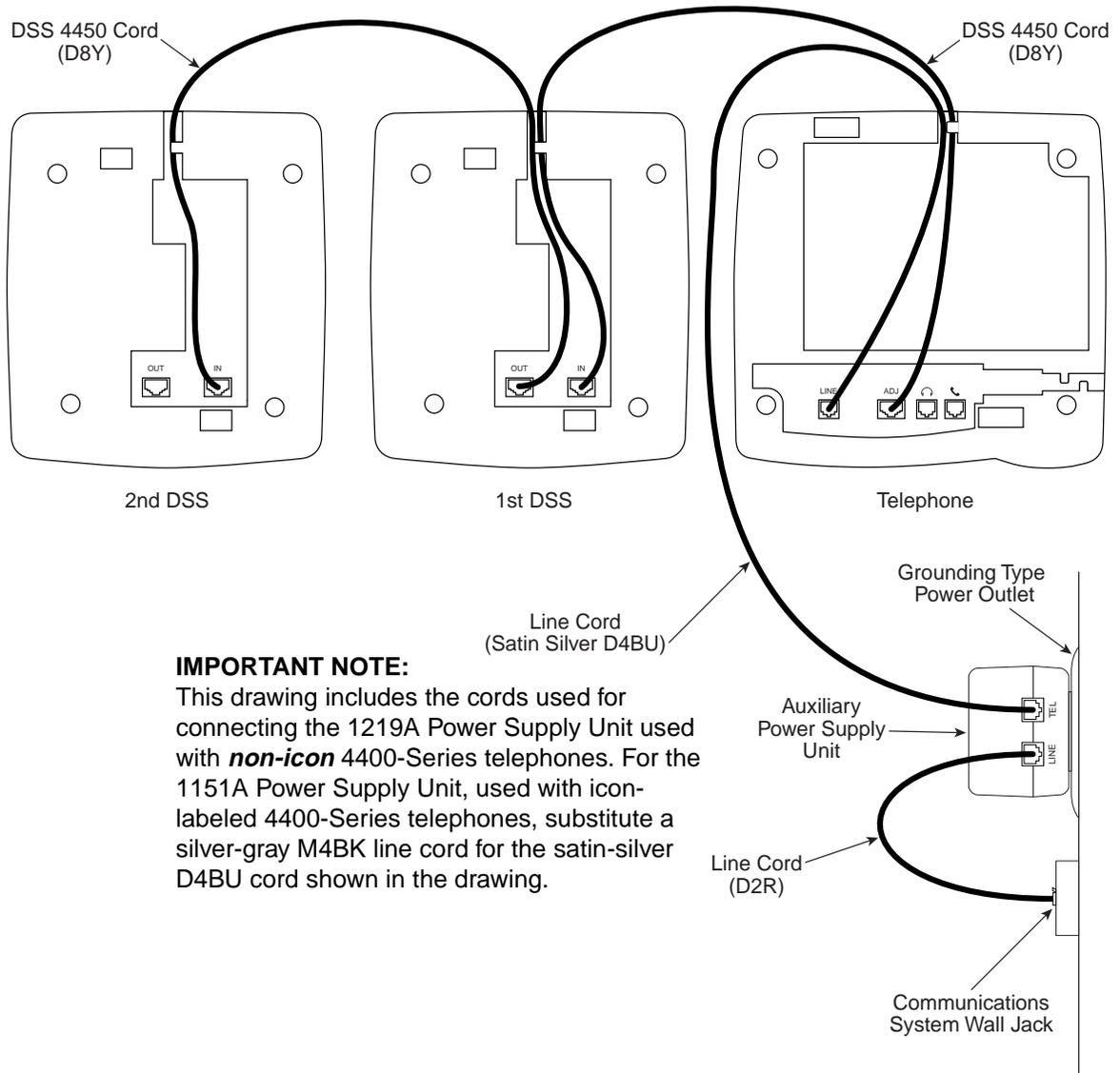


Figure 3-3. Jacks and Placement of Cords for the 4424LD+ and 4424D+ Telephones Including 1151A Power Supply Unit and two DSS 4450s

## Wall-Mounting the Telephone

You can mount all the 4400-Series telephones except the 4424LD+ on a wall by using the optional color-contrasted stand. The DSS 4450 cannot be wall mounted.

**NOTE** ► The optional wall-mounting stand can also be used with all 4400-Series telephones and the DSS 4450 to increase the viewing angle when used on a desk.

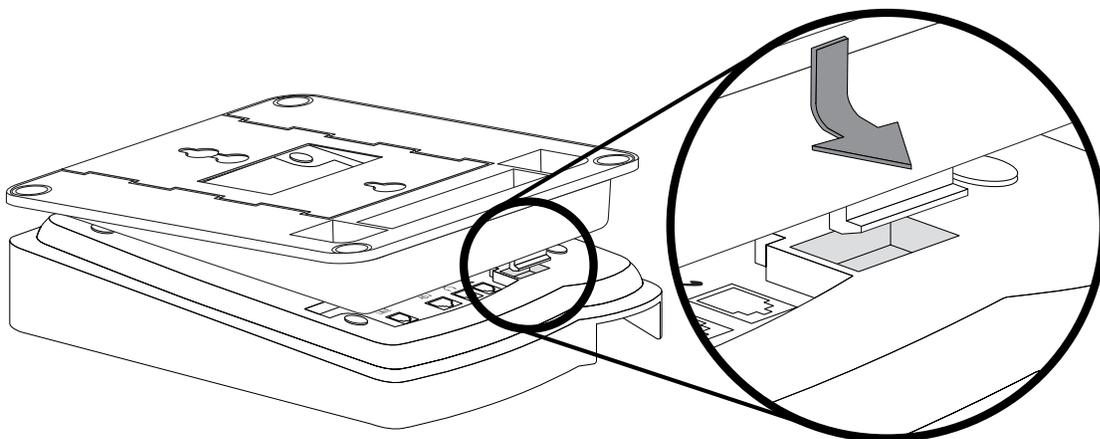
The wall-mounting stand is available in gray only. The ordering codes are as follows:

- Small Wall-Mounting Stand for use with the 4400, 4400D, and 4406D+ telephones:
  - PEC 4499-SML, comcode 108541210
- Large Wall-Mounting Stand for use with the 4412D+ and 4424D+ telephones:
  - PEC 4499-LRG, comcode 108541293

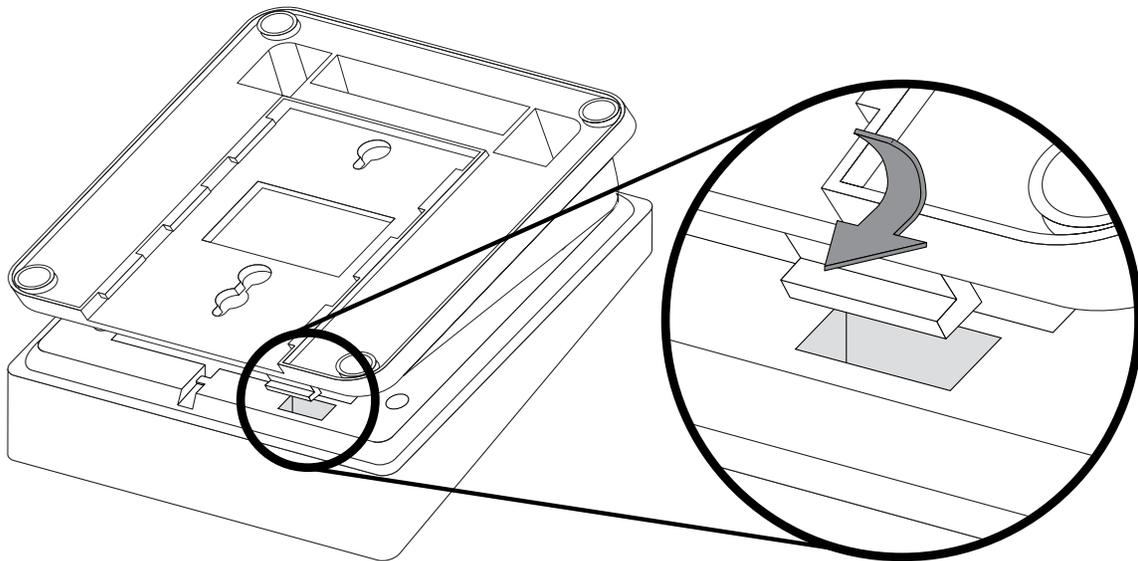
To wall mount a 4400-Series telephone, follow these steps to attach a stand to a 4400-Series telephone:

- NOTES** ►
- Before you assemble the stand, you must have all cords attached and running through their proper channels.
  - To use the stand to increase the angle of a 4400-Series telephone on a desk follow the steps below but turn the stand around so that the thinner end of the stand is at the bottom of the back side of the 4400-Series telephone and the thicker end is at the top of the 4400-Series telephone.

1. Place the tab on the thicker end of the stand (this is the moveable tab) into the slot at the bottom of the back side of the 4400-Series telephone



2. Push up on the stand toward the top of the telephone, and place the tab on the thinner end of the stand into the slot at the top of the 4400-Series telephone.



3. After you have attached the stand to the telephone, plug the line cord into the wall jack and store the extra line cord in the open pocket space between the telephone and the stand.
4. Place the telephone against the wall so that the screwheads on the mounting plate enter the holes in the stand. Then pull the telephone down so that the screwheads slide into the cutout channels.

## Installing MLX Telephones

The control unit supports the MLX-5, MLX-5D, MLX-10, MLX-10D, MLX-10DP, MLX-16DP, MLX-20L, and MLX-28D telephones. The MLX-20L and MLX-28D telephones may or may not be connected to a Direct Station Selector (DSS). Additionally, various auxiliary equipment is supported which may require Multi-Function Modules (MFMs) or other adapters for installation.

---

## Installing Multi-Function Modules

The Multi-Function Module (MFM) is an optional adapter that provides a modular jack connection to MLX telephones for the two classes of auxiliary equipment listed below:

## Installation and Maintenance

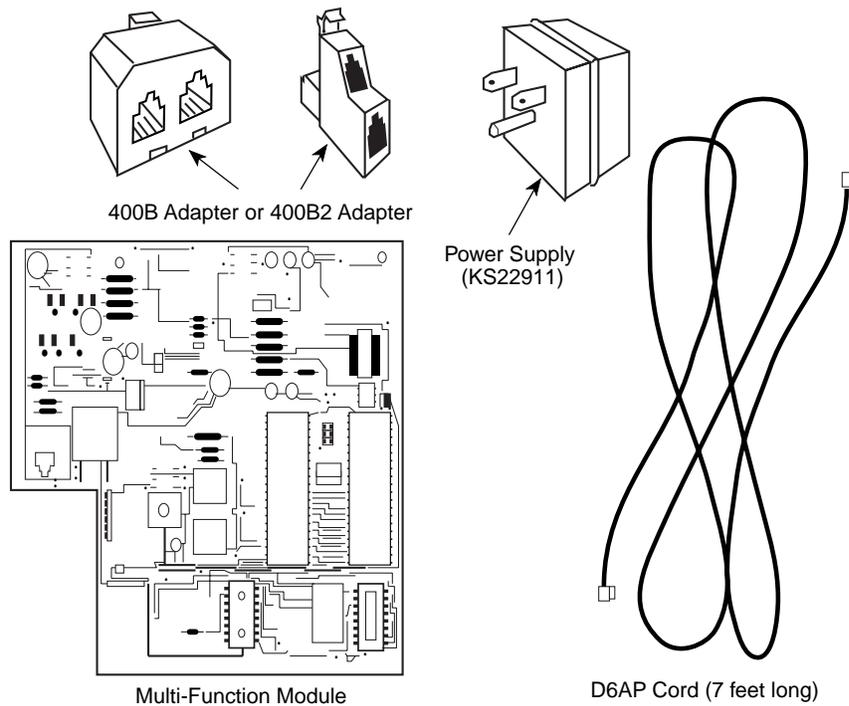
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- Tip/Ring (T/R) devices such as single-line telephones, fax machines, modems, and credit card verification terminals. Once connected, the MLX telephone and auxiliary equipment work independently of each other. This means both can send or receive calls at the same time. The MFM is the only T/R adapter you can use with MLX telephones.
- Supplemental alerts such as bells, chimes, horns, and strobes. These alerts notify people in noisy areas of incoming calls.

## Considerations

Review the following items before you begin the procedure.

- If you install an MFM, do so *before* you assemble the MLX telephone.
- You *must* connect the KS 22911 power supply to an electrical outlet within 50 feet (15 m) of cord length of the MLX telephone.
- If you connect an MFM and two DSSs to a telephone, you *must* install a 406743419 power unit.
- If a wall jack is more than 7 feet (213 cm) from an MLX telephone, you must use a longer D8W cord.
- The MFM uses one of the two channels when it is active. This means that when auxiliary equipment, such as a fax machine, and the MLX telephone are in use at the same time, Voice Announce to Busy is not possible. (Voice Announce to Busy is a feature that allows users to be paged on the speakerphone even if they are on a call.)
- The MFM has two jumper blocks that are factory-set for T/R operation. The MFM is packaged with the following items, shown in Figure 3-4:
  - KS22911 power supply
  - 400B or 400B2 adapter
  - D6AP cord



**Figure 3-4. Multi-Function Module Packing List**

**RISK OF ELECTRICAL SHOCK: Follow all warnings and cautions.**

**⚠ WARNING:**

*Only a qualified technician should install, repair, or set options for an MFM.*

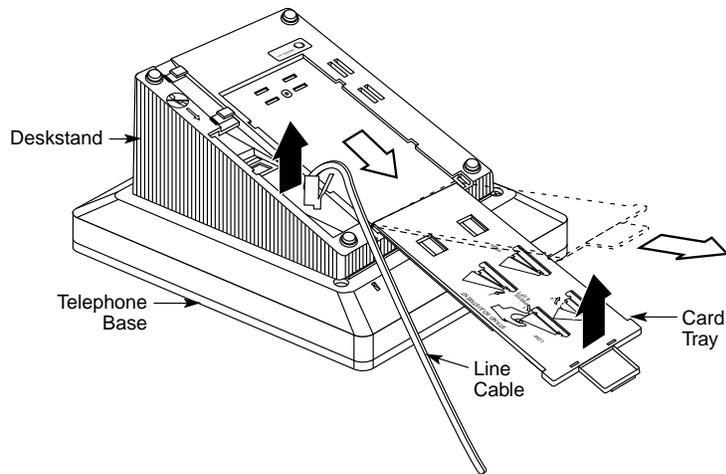
*Do not touch the circuitry on the MFM. Touching the circuitry may result in component damage from electrostatic discharge.*

*Before installing an MFM, disconnect all trunk and/or power cords that are attached to the MLX telephone. This is to ensure that no hazardous voltages are present during installation. Ringing voltage from the MFM attached to the MLX telephone can cause electrical shock if adjustments are made while the cords are connected.*

To install or replace an MFM and change its pin settings, follow these steps:

**NOTE** ▶ If you are installing or replacing an MFM in a wall-mounted MLX-5, MLX-5D, MLX-10, MLX-10D, MLX-10DP, or an MLX-16DP telephone, start at Step 3.

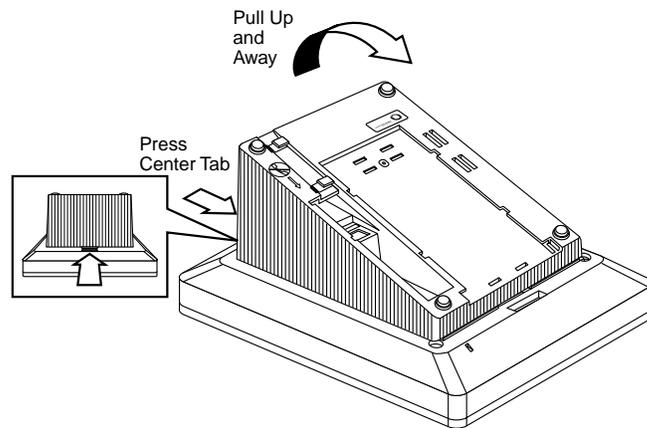
1. Place the telephone face down on a flat surface; remove the user card tray and line cable from the bottom of the deskstand. See Figure 3-5.
- 



**Figure 3-5. Removing the User Card Tray and Line Cable**

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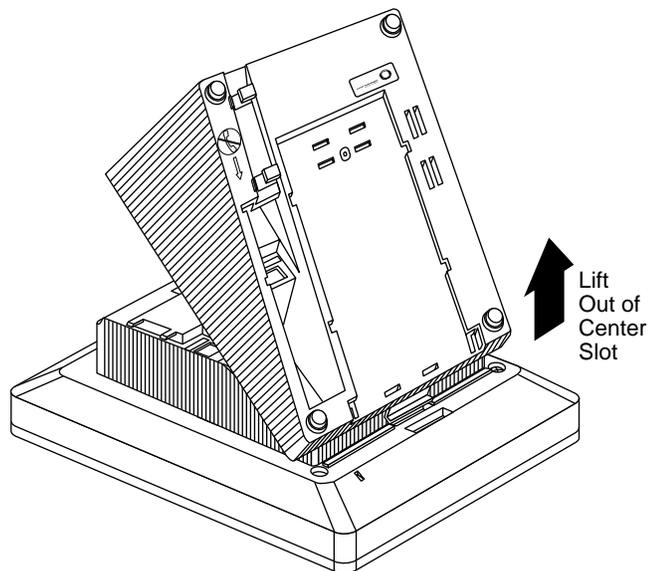
2. Release and remove the deskstand from the telephone. See Figure 3-6.
    - a. Press on the top rear center of the deskstand to release the tab.
    - b. Pull the deskstand up toward you and swing away from the telephone.
- 



**Figure 3-6. Releasing the Deskstand**

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- c. Lift the deskstand out of the locating slot in the telephone base and place to one side. See Figure 3-7.
- 



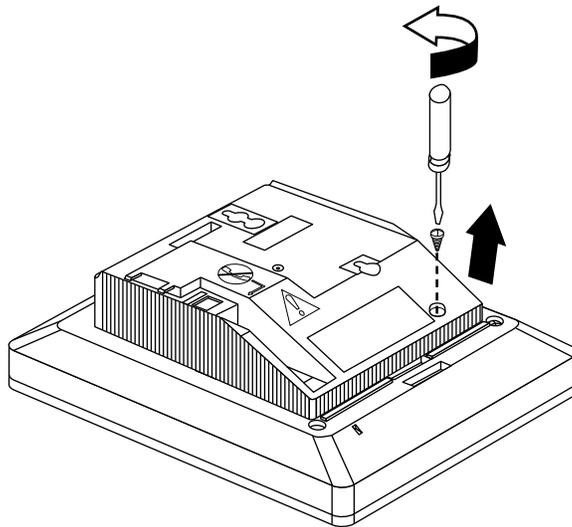
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**Figure 3-7. Removing the Deskstand**

## Installation and Maintenance

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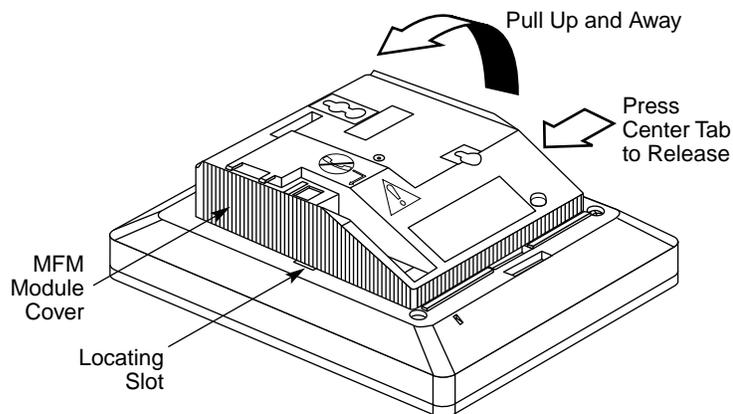
3. Release and remove the module cover.
  - a. Use a screwdriver to remove the screw in the lower right-hand corner of the module cover. See Figure 3-8.



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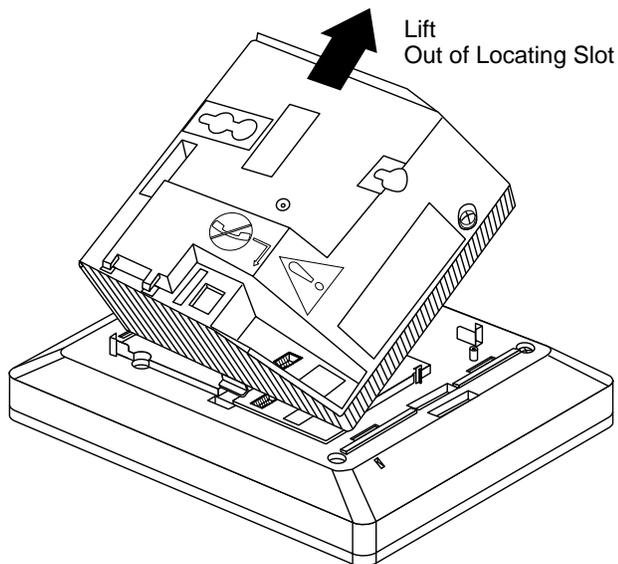
**Figure 3-8. Releasing the Module Cover Screw**

- b. Press the center of the right side of the module cover with one hand to release the locking tab. See Figure 3-9.



**Figure 3-9. Releasing the Module Cover**

- c. Swing open the module cover to release it from the left side locating slot.
- d. Lift the module cover out of locating slot and set aside. See Figure 3-10.

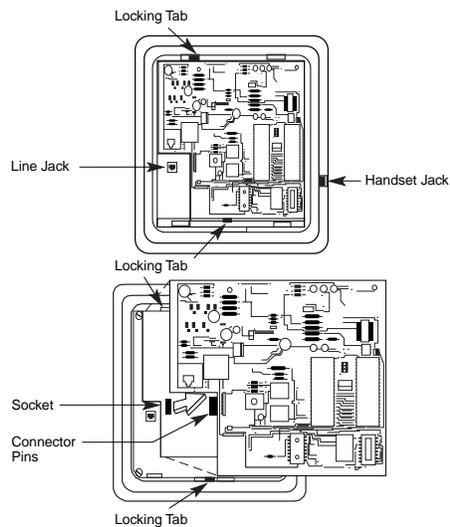


**Figure 3-10. Removing the Module Cover**

## Installation and Maintenance

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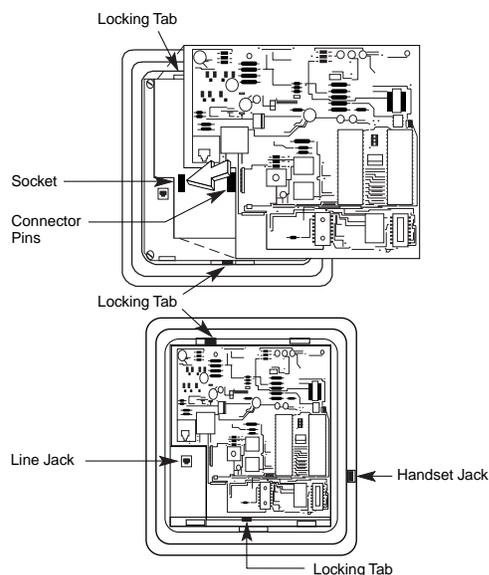
4. To install a new MFM, go to Step 5. To reset jumpers on an existing MFM, go to Step 6. To remove an existing MFM, continue (see Figure 3-11).
    - a. Disconnect any cords attached to the phone and note the connections so that you can reconnect the cords to the appropriate jacks later.
    - b. Locate the MFM locking tabs on the top and bottom of the telephone base; then spread the tabs apart to release the MFM.
    - c. Grasp the MFM by the edges, and pull it up to free the connector pins. *Do not touch the connector pins.*
    - d. Set the MFM aside on a clean surface.
- 



**Figure 3-11. Removing an MFM Module**

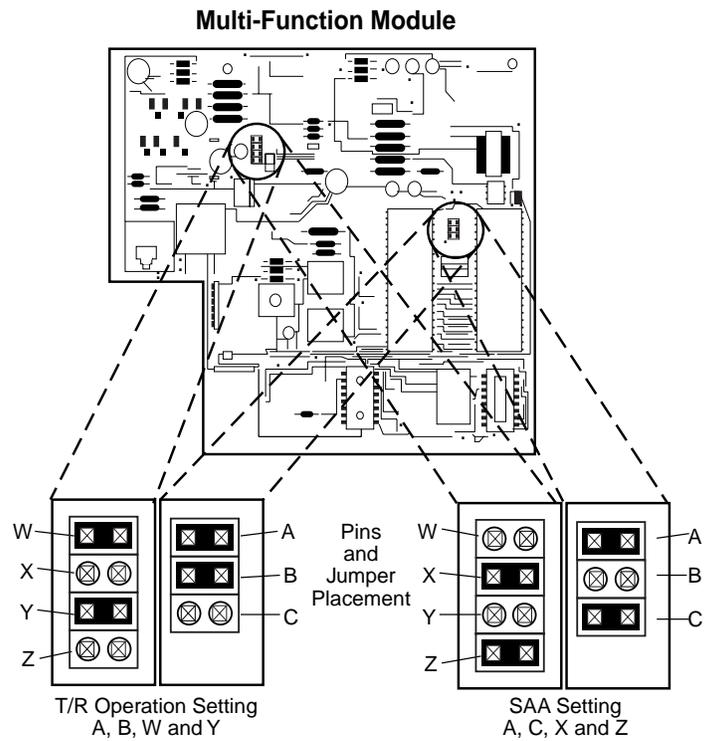
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5. Install the new MFM. See Figure 3-12.
  - a. Hold the MFM circuit board by the edges with the long connector pins facing the socket. Take care not to touch the connector pins.
  - a. Lower the MFM to insert the pins into the socket in the telephone base.
  - a. Press firmly on the MFM board to snap the locking tabs into place. *The connector pins and tabs must be secure.*



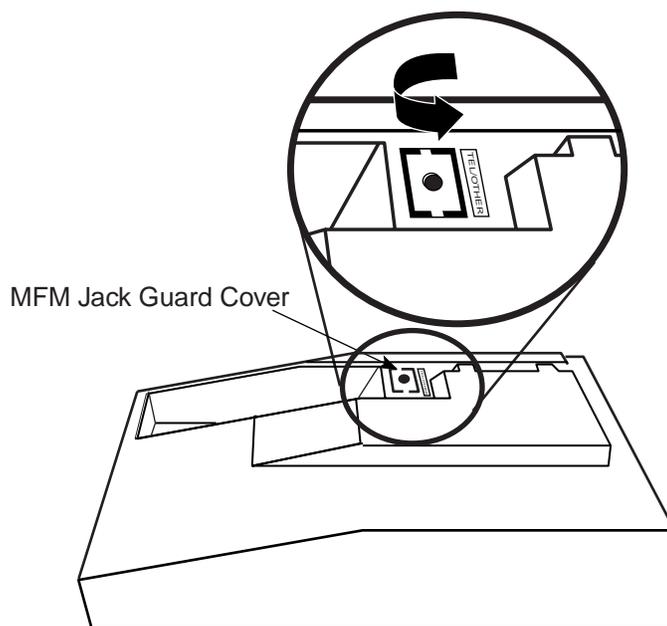
**Figure 3-12. Installing an MFM Module**

6. Set or adjust the MFM jumpers for either a T/R device or a supplemental alert device. See Figure 3-13.
  - a. Pull the four connectors off the MFM module.
  - b. Place the connectors over the appropriate pins for the required operation and push down to secure into place.



**Figure 3-13. Setting and Adjusting the MFM Jumpers**

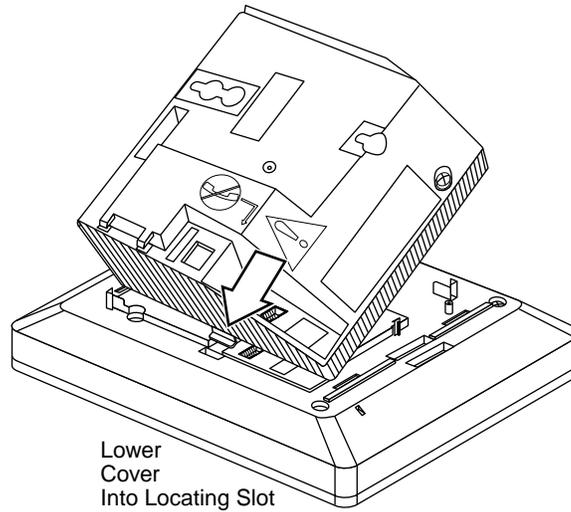
7. If the module cover has a square jack guard that protects the TEL/OTHER jack area, grasp and twist the guard to remove it (see Figure 3-14). Save the jack guard if you are wall-mounting an MLX-5, MLX-5D, MLX-10, MLX-10D, or MLX-16DP telephone.
- 



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**Figure 3-14. Removing the Jack Guard**

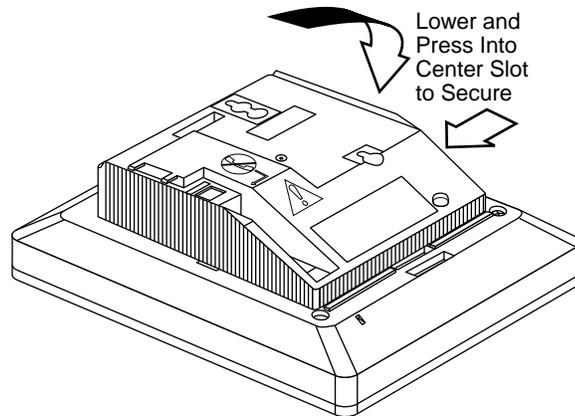
8. To replace the module cover:
  - a. Place the locking tab on the module cover into the slot on the left side of the telephone (see Figure 3-15).



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**Figure 3-15. Placing the Module Cover into the Locating Slot**

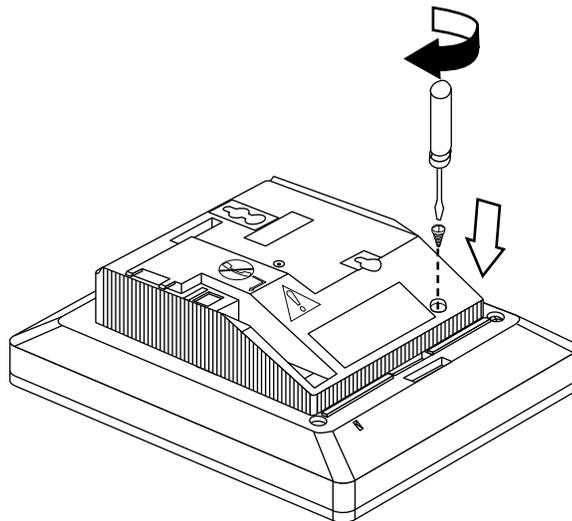
- b. Lower the cover to the right and press firmly into the center slot to lock the tab in place. *The tab must be secure* (see Figure 3-16).



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**Figure 3-16. Lowering and Locking the Module Cover**

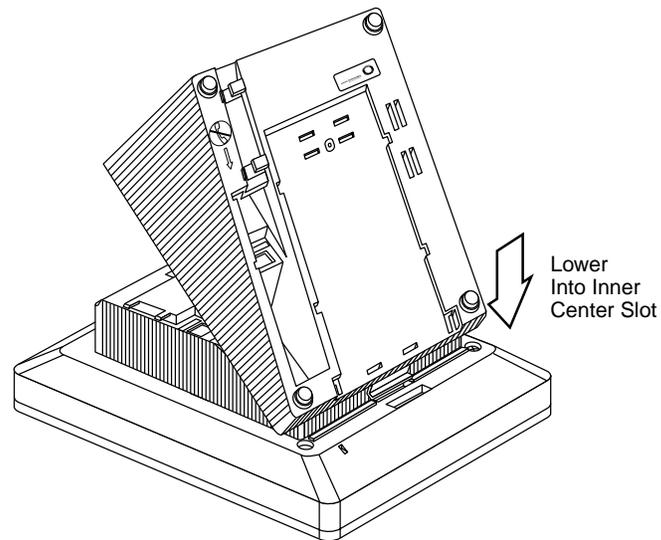
- c. Replace and tighten the module cover screw that you removed in Step 3 (see Figure 3-17).



---

**Figure 3-17. Replacing and Tightening the Module Cover Screw**

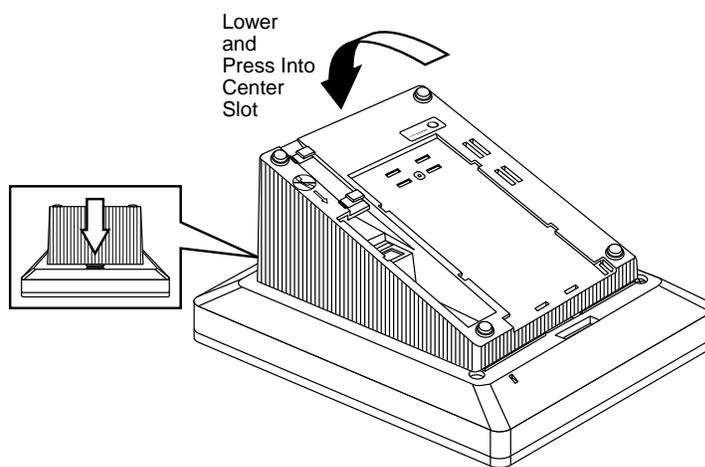
9. Replace the deskstand. If you are wall-mounting an MLX-5, MLX-5D, MLX-10, MLX 10D, MLX-10DP, or MLX-16DP telephone, go to Step 11; otherwise, continue with Step 9a.
  - a. Place the tab on the narrow edge of the deskstand, into the locating slot on the telephone base (see Figure 3-18).



---

**Figure 3-18. Replacing the Deskstand**

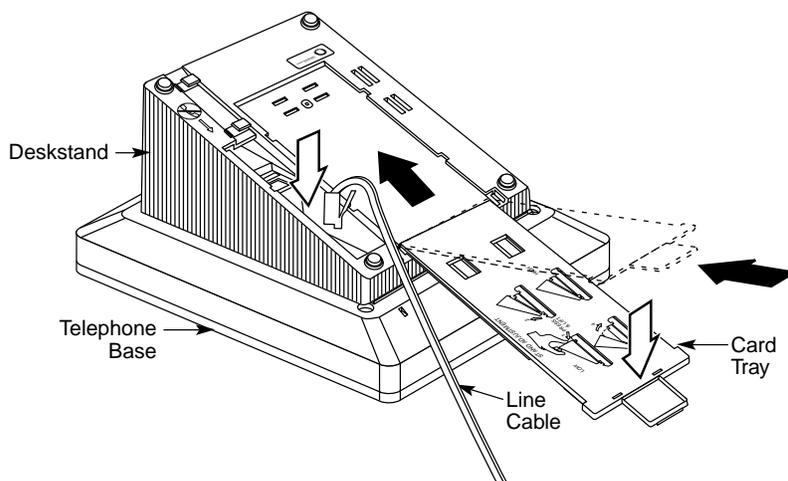
- b. Lower the deskstand and lock into place (see Figure 3-19).



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**Figure 3-19. Lowering the Deskstand and Locking into Place**

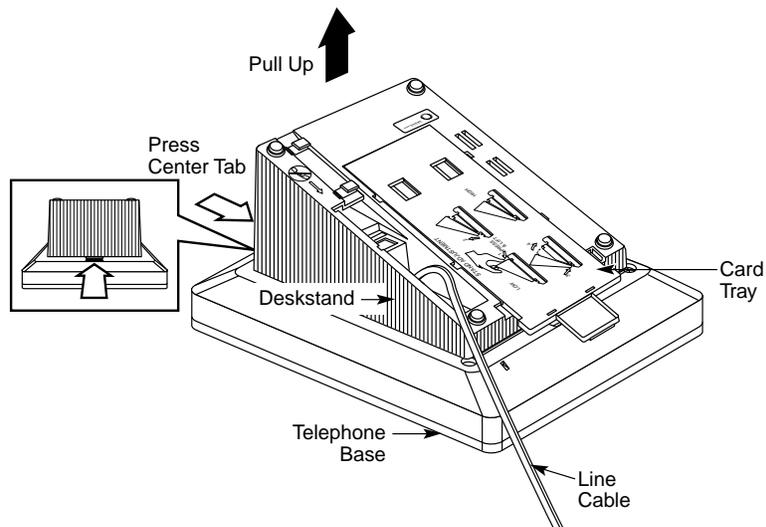
10. Replace the user card tray and line cable. See Figure 3-20.
  - a. Insert the user card tray at an angle; then lower and slide into the deskstand.
  - b. Replace the line cable into the line jack in the deskstand.



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**Figure 3-20. Replacing the User Card Tray and Line Cable**

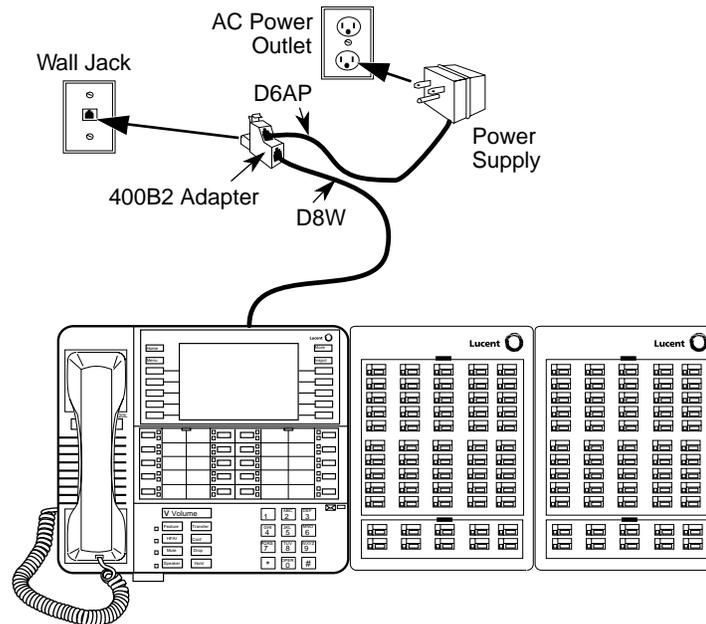
11. Adjust the deskstand height. See Figure 3-21.
    - a. To change the deskstand's height from low to high, press the top rear center of the deskstand to release the tab.
    - b. Pull the deskstand up and insert the tab into the slot in the module cover.
    - c. To readjust the stand, see the instructions on the bottom of the card tray.
- 



---

**Figure 3-21. Adjusting the Deskstand Height**

12. Power up the telephone. See Figure 3-22.
  - a. Plug the D8W cord from the telephone into the 8-conductor (large) modular jack of the 400B or 400B2 adapter.



**Figure 3-22. Powering Up the Telephone after Installing the MFM**

- b. Connect one end of the D6AP cord to the 2-conductor (small) modular jack on the 400B or 400B2 adapter, and plug the other end into the modular jack of the 406943837 power supply. *The total length of the cords connecting the power supply to the MLX telephone must be less than or equal to 50 feet (15 m).*

**CAUTION:**

*Do not plug the D6AP cord into the 8-conductor (large) modular jack on the 400B or 400B2 adapter; doing so can cause electrical damage to the control unit and to the telephone.*

- c. Plug the power supply into a 117 V AC outlet that is not controlled by a wall switch.
  - d. Insert the plug end of the 400B or 400B2 adapter into the wall jack.
13. Test the MFM for T/R operation. (See “Testing MLX Telephones with MFMs” in Chapter 4.)
  14. Attach the auxiliary equipment to the MFM. See “Installing Auxiliary Equipment.”

## Installing Auxiliary Equipment to an MLX Telephone

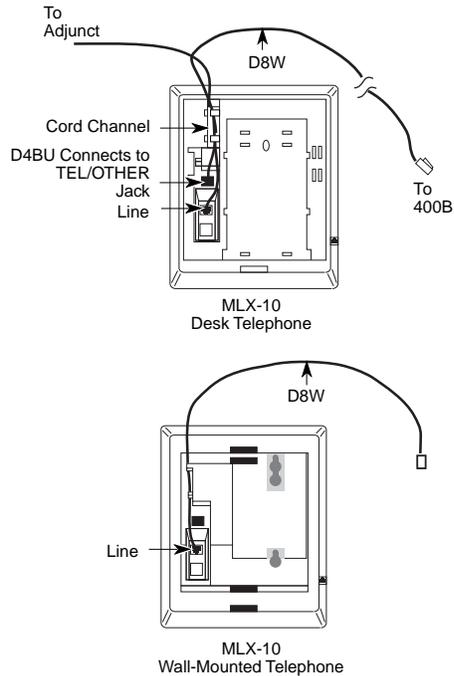
This section provides general instructions for connecting most auxiliary equipment.

**NOTE** ► If you need to connect the auxiliary equipment differently from the instructions on the system forms, record each jack and auxiliary equipment change on the appropriate system numbering form. See the *System Planning* guide.

1. Connect one end of the cord packaged with the auxiliary equipment (usually a D4BU cord) to the auxiliary equipment. See the documentation packaged with the auxiliary equipment for instructions.
2. Check the system form for the auxiliary equipment you want to connect. Then refer to the appropriate step below.
  - To connect auxiliary equipment to an MLX telephone, go to Step 3.
  - To connect auxiliary equipment to a single-line telephone, go to Step 4.
  - To connect auxiliary equipment to a 016 (T/R) module, go to Step 5.

When you connect auxiliary equipment to MLX telephones, make sure you route the auxiliary equipment and D8W telephone cords through the cord channel.

3. Insert the other end of the auxiliary equipment cord into the TEL/OTHER jack on the back of the MLX telephone. Go to Step 6. See Figure 3-23.



**Figure 3-23. Routing the Cord(s) on an MLX Telephone**

4. To connect auxiliary equipment to a single-line telephone:
  - a. Connect a 26A2 bridging adapter to the telephone.
  - b. Connect the cord from the auxiliary equipment to the bridging adapter.
  - c. Reconnect the cord from the control unit to the bridging adapter.
  - d. Go to Step 6.
5. Insert the other end of the auxiliary equipment cord directly into the port for the logical ID on the 016 (T/R) module as indicated on the system form. Go to Step 6.
6. Test the auxiliary equipment by dialing its associated extension.

## Installing Direct Station Selectors on an MLX Telephone

The Direct Station Selector (DSS) is an optional piece of telephone equipment. You can connect up to two DSSs to an MLX-28D or MLX-20L telephone that is programmed as an operator console.

### Considerations

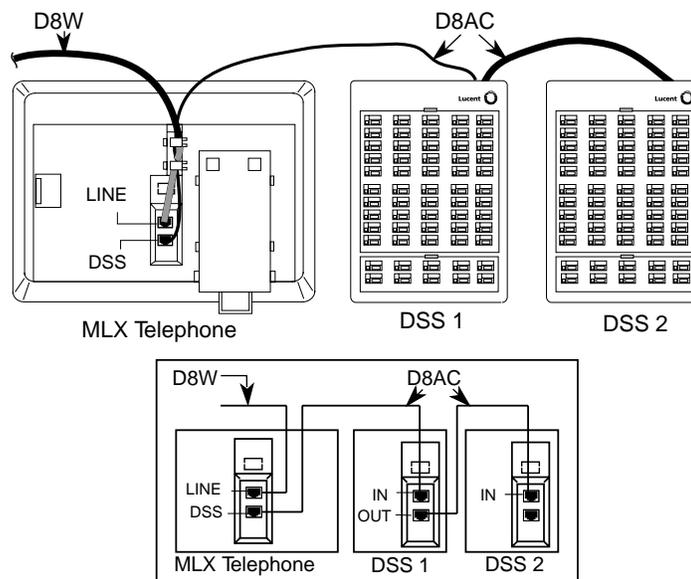
Review the following items before you begin the installation procedure.

- Connect the DSSs before you assemble the MLX telephones.
- Auxiliary power is required under the following circumstances:
  - An MLX telephone with an MFM and two DSSs requires a 406743419 power unit.
  - An MLX telephone without an MFM, but with two DSSs, requires a 406943837 power unit, 400B adapter, and the D6AP cord provided with the MFM.
  - An MLX telephone with one DSS and an MFM requires a 406943837 power unit, 400B adapter, and the D6AP cord provided with the MFM.
  - If one carrier has three or more MLX telephones, each with a DSS attached, use a 406943837 power unit, 400B adapter, and D6AP cord for each MLX telephone and DSS after the first two.
- The total length of cords between the KS22911-L2 or 406743419 power supply and the MLX telephone must not be more than 50 feet (15 m).
- Do not replace the 2-foot (61-cm) D8AC cord (packaged with the DSS) with a longer cord. Improper operation may result.
- Connect each KS22911-L2 power supply to an AC outlet that is not controlled by a wall switch.

To connect a DSS, follow the steps below. If you are connecting two DSSs to the telephone, unpack the second DSS before you start.

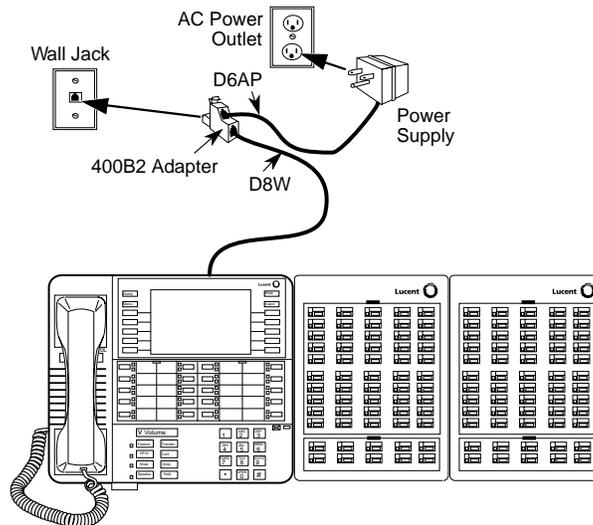
1. Adjust the angle of the DSS.
  - The DSS is packed fully assembled with the deskstand in the low position. If you prefer the low position, go to Step 2.
  - To adjust the angle of the DSS to the high position:
    - a. Place the DSS face down on a flat surface.
    - b. Press on the top rear center of the stand to release the tab; then pull the stand toward you and away from the DSS.
    - c. Insert the tab at the bottom of the stand into the other slot.
    - d. Lower the stand and press the tab at the top into the corresponding slot on the DSS.
2. Install the D8AC cord on the DSS.
  - a. Plug one end of the D8AC cord into the IN jack on the DSS.
  - b. Route the D8AC cord through the cord channel on the left side of the DSS.

- c. If you are installing only one DSS, go to Step 4. If you are installing two DSSs, repeat Steps 1 and 2 for the second DSS; then go to Step 3.
3. Wire the two DSSs. See Figure 3-24.
  - a. Place the two DSSs side by side and face down.
  - b. Route the D8AC cord from the IN jack on the second DSS (DSS2) through the cord channel on the first DSS (DSS1).
  - c. Plug this D8AC cord into the OUT jack on DSS1.



**Figure 3-24. Connecting One or More DSSs**

4. Wire the telephone to the DSS unit(s). See Figure 3-25.
  - a. Remove the handset from the telephone, then place the telephone face down on a flat surface to the right of the upside-down DSS unit(s).
  - b. Plug the D8AC cord from the IN jack on the DSS1 into the DSS jack on the telephone; then route the cord through the cord channel.
  - c. Plug the D8W line cord into the LINE jack on the MLX telephone. The D8AC and D8W cords share the cord channel on the telephone.



**Figure 3-25. Wiring for Auxiliary Power**

5. Turn the telephone and the DSS unit(s) face up with the telephone now to the left of the DSS unit(s). See Figure 3-25.
6. Insert one end of the coiled H4DU handset cord into the handset and the other end into the jack on the side of the telephone.
7. If auxiliary power is not required, plug the D8W cord into the wall jack and then go to Step 9.
8. If auxiliary power is required, refer to the following steps and Figure 3-25. The combined total length of the D6AP and D8W cords you use must not be more than 50 feet (15 m).
  - a. Plug the D8W cord from the telephone into the 8-conductor modular jack of the 400B or 400B2 adapter.
  - b. Connect one end of the D6AP cord to the 2-conductor (small) modular jack on the 400B or 400B2 adapter, and plug the other end of the D6AP cord into the modular jack of the 406943837 or 406743419 power supply.

**⚠ CAUTION:**

*Do not plug the D6AP cord into the 8-conductor (large) modular jack of the 400B or 400B2 adapter. Doing so can cause electrical damage to the control unit and to the telephone.*

- c. Insert the plug end of the 400B or 400B2 adapter into the wall jack.
  - d. Plug the power supply into a 117 V AC outlet.
9. Label the DSS designation cards.
  - a. Pull the tab at the top of the large plastic cover and rotate the cover towards you.
  - b. Remove the cover and the large designation card.

- c. Write or type the button assignments on the card. (For DSS1, use the side that is labeled 00–49; for DSS2, use the side labeled 50–99.)
- d. The button assignments on the designation card should be by dial plan extension number, not by logical ID port number.
- e. Replace the card and the plastic cover; make sure the coated side of the cover is facing up.
- f. Repeat this step to remove the small plastic cover and to label the small designation card.

**NOTE** ► If the MLX telephone attached to the DSS is unplugged from the control unit and then plugged in again, the display on the telephone may disappear. Press the Home button to bring back the display.

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## Assembling MLX Telephones

You must assemble an MLX telephone before connecting it to the control unit.

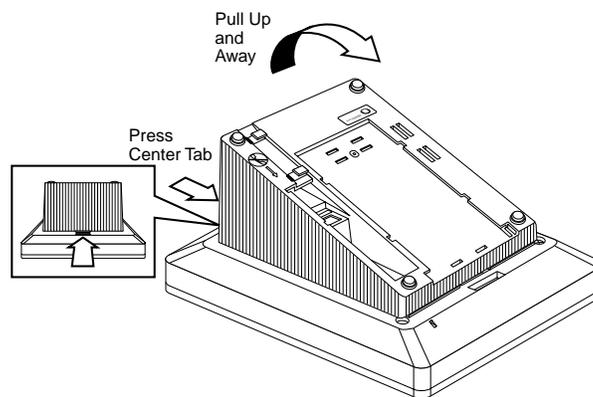
### Considerations

Review the following items before you begin the procedure:

- MLX telephones are packed with the deskstand in the low position. You can use the deskstand as is, raise it to a higher angle, or remove it. To adjust or remove the stand, see Step 1 of the following instructions. (The diagram on the bottom of the user card tray also shows how to adjust the stand.)
- You cannot wall-mount MLX-20L and MLX-28D telephones.
- If you wish to wall-mount an MLX-5, MLX-5D, MLX-10, MLX-10D, MLX-10DP, or MLX-16 DP telephone, you must remove the deskstand first. (Wall-mounting an MLX-5D, MLX-10D, MLX-10DP, or MLX-16DP telephone can make the display hard to read.)
- A 630B Phonemount (not included) is also required to mount an MLX-5, MLX-5D, MLX-10, MLX-10D, MLX-10DP, or MLX-16DP telephone on the wall.
- To connect auxiliary equipment (such as an alert, modem, or fax machine) to an MLX telephone, the telephone must have an MFM installed in it. If you have not already done so, see “Installing Multi-Function Modules” on page 3-9.

To assemble an MLX telephone, follow the steps below.

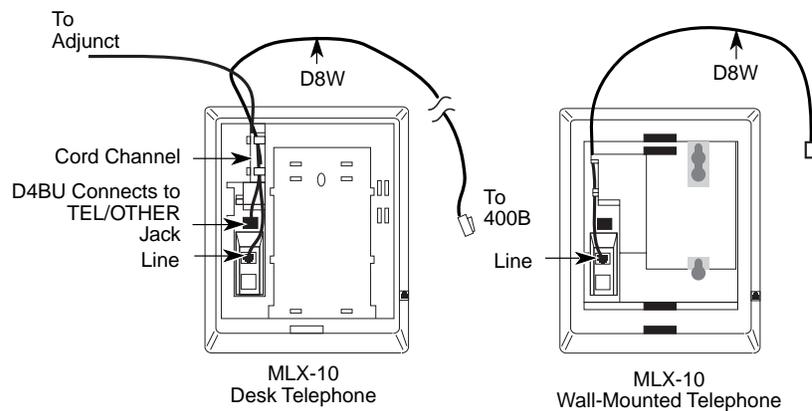
1. Remove or adjust the deskstand. See Figure 3-26.
  - If you want to leave the deskstand in the low position, go to Step 2.
  - If you want to adjust the angle of the deskstand, or remove it in order to wall-mount the telephone:
    - a. Place the telephone face down on a flat surface.
    - b. Press on the top rear center of the deskstand to release the tab; then pull it up towards you.
    - c. Insert the tab into the slot in the module cover to adjust the height.
    - d. To remove the deskstand, continue to pull it up and away from the telephone.
    - e. Release the deskstand from the front slot.



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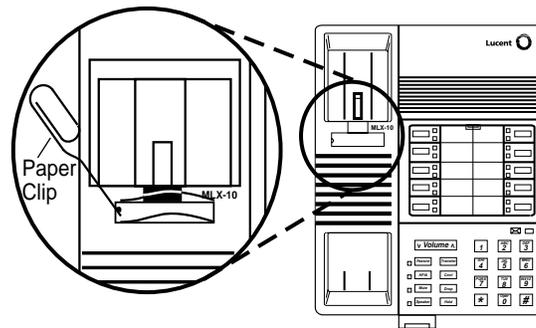
**Figure 3-26. Adjusting or Removing the Deskstand**

2. Connect the line cords. See Figure 3-27.
  - a. Plug one end of the D8W cord into the LINE jack on the bottom of the phone.
  - b. Route the D8W cord through the cord channel on the back of the telephone.
  - c. If the telephone is for desktop use, turn it face up and plug the D8W cord into the wall jack.
  - d. Insert the other end of the coiled H4DU handset cord into the jack on the side of the telephone.



**Figure 3-27. Connecting the Line Cords**

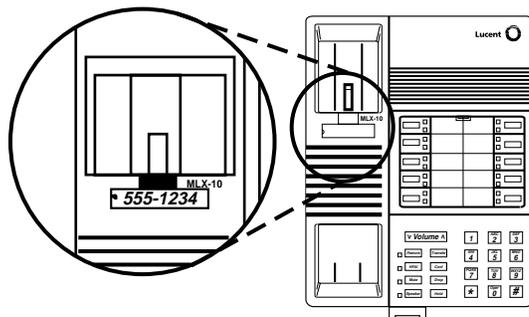
3. Connect the handset by inserting one end of the coiled H4DU handset cord into the handset.
4. Label the extension identification card.
  - a. Insert a straightened paper clip into the hole on the side of the plastic cover while holding your finger on the opposite edge; use the paper clip to push and lift the cover. See Figure 3-28.



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**Figure 3-28. Removing the Extension Label**

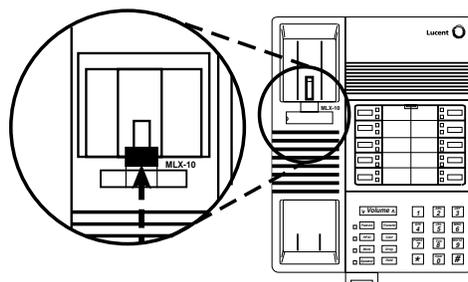
- b. Type or write the assigned extension number on the card. See Figure 3-29.



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**Figure 3-29. Labeling the Extension**

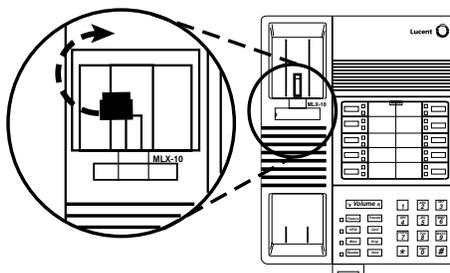
- c. If you are wall-mounting an MLX-10, MLX-10D, or MLX-10DP telephone, go to Step 5. If you are assembling a desk telephone, go to Step 6.
- 5. Prepare the handset holder for wall-mounting.
  - a. Remove the handset holder by pushing it up and pulling it out. See Figure 3-30.



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**Figure 3-30. Removing the Handset Holder**

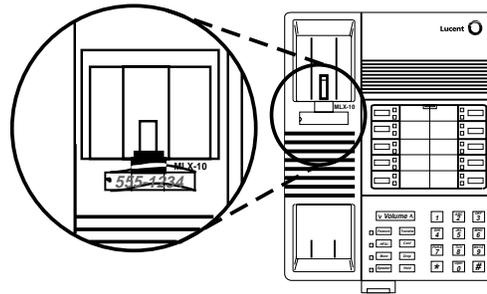
- b. Rotate the handset holder 180 degrees and replace it in its slot. See Figure 3-31.
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**Figure 3-31. Rotating the Handset Holder**

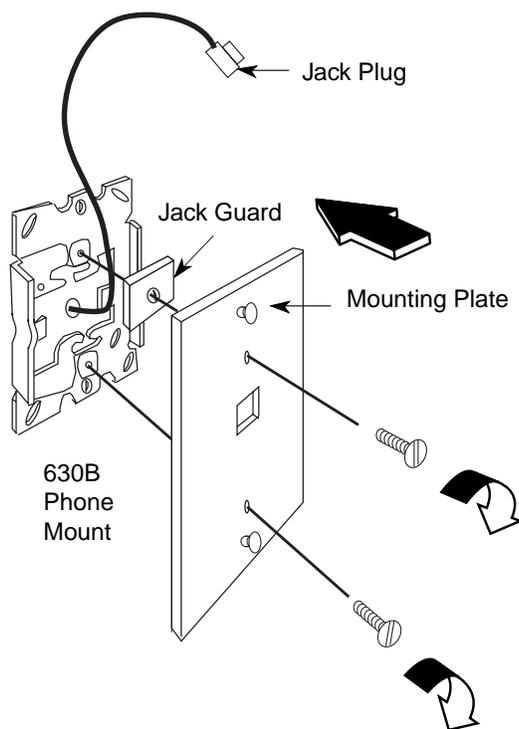
- 6. Replace the extension label and plastic cover.
  - a. Insert one end into the slot and snap the other end into place. See Figure 3-32.
  - b. If you are mounting an MLX-5, MLX-5D, MLX-10, MLX-10D, MLX-10DP, or MLX-16DP wall telephone, go to Step 7. If you are assembling a desk telephone, go to Step 8.



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**Figure 3-32. Replacing the Extension Label**

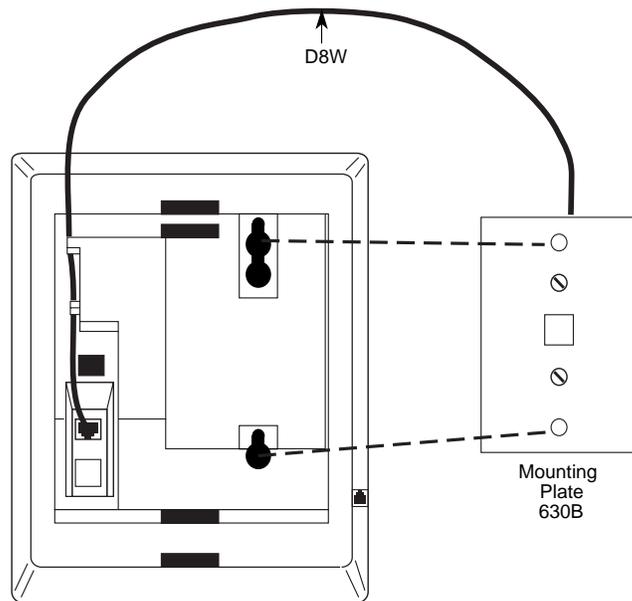
7. Wall mounting an MLX-5, MLX-5D, MLX-10, MLX-10DP, MLX-10D, or MLX-16DP telephone.
  - a. Turn over the telephone and remove the jack guard from the TEL/OTHER jack area; set the telephone aside.
  - b. Unpack the 630B Phonemount and remove the modular jack from the backplate.
  - c. Route the D8W cord (or DIW cable) through the hole in the backplate and have it exit at the top of the backplate; leave 10 inches (25 cm) of cord to connect the telephone. See Figure 3-33.
  - d. Attach the backplate to the wall; see the instructions provided with the 630B Phonemount.
  - e. Insert the two short screws provided with the Phonemount into the mounting plate. Be sure to thread the upper screw through the jack guard. See Figure 3-33.



---

**Figure 3-33. Mounting the Backplate**

- f. Plug the free end of the cord into the LINE jack on the back of the telephone. Route the cord through the cord channel above the jack. See Figure 3-34.
- g. Position the telephone on the mounting plate studs and then slide the telephone down to lock it in place. To remove the telephone, slide it up and off.



---

**Figure 3-34. Routing the Cord Through the Backplate**

8. Label the button assignment card.
  - a. Pull the tab at the top of the plastic cover toward you.
  - b. Type or write the button assignments on the card.
  - c. Insert the card and replace the plastic cover. Be sure the textured side of the cover is facing you.
9. Adjust the contrast on the telephone's display.
  - For an MLX-20L telephone, slide the lever on the top of the telephone.
  - For an MLX-5D, MLX-10D, MLX 10DP, MLX-16DP, or MLX-28D telephone, press the Menu button and select Cntrst; follow the display prompts.

## Connecting Telephones to the Control Unit

The way you connect telephones to the control unit depends on the number of telephones you are connecting. For 24 telephones or less, use a direct connection. For 25 telephones or more, use cross-connect fields.

For building cross-connect fields, use one of the following wiring kits:

- **Interconnect Wire.** This complete wiring kit contains 110 jack-panel blocks, a template, wiring troughs, D-rings, and D8W cords.
- **Systemax.** This complete wiring kit contains 110 termination blocks with modular jacks, a 110A field-termination block, a template, wiring troughs, D-rings, and patch cords.

---

## Considerations

Review the following items before you begin the procedure:

- If the way you connect the telephones differs from the instructions on the system forms, record each jack and telephone change on Form 2a, System Numbering: Extension Jacks.
- If you use staples to attach the cords to walls or baseboards, make sure you do not pierce the cords.
- If a 4400-Series or MLX telephone is in a different building from the control unit, and is *within 1000 feet (305 m) of the control unit*, connect the telephone to the control unit, using two In-Range Out-of-Building (IROB) protectors.

*Make sure you use the correct IROB protector each specific type of telephone (4400-Series and MLX telephones).*

See the documentation packaged with the IROB protector for complete installation instructions.

- If a single-line telephone is 1000 feet (305 m) or further from the control unit, connect the telephone to the control unit using an Off-Premises Range Extender (OPRE).

See the documentation packaged with the OPRE for complete installation instructions.

 **CAUTION:**

*Take extreme care to make sure that you connect 4400-Series telephones only to the 024 TDL module and MLX telephones only to MLX modules; a mismatch could damage the ports and cause them to stop functioning.*

*Incorrect wiring can result in users not being able to place outgoing calls. Make sure you use the proper cord. For all LS modules:*

- *Use a D2R cable from an RJ11 jack.*
- *Do not use the Brand-Rex Quad cable from an E66 block.*

*If you cannot avoid using the Brand-Rex Quad cable, reverse the tip and ring leads at the E66 block to correct the mismatch.*

- *To avoid introducing power supply noise into system wiring, allow at least 3 inches (7.62 cm) of clearance between the basic carrier's power supply and any wiring or termination hardware located to the left of the control unit.*

 **WARNING:**

*National and local building codes specify the type of cable required for telecommunication wiring. For example, indoor wiring (DIW cable) cannot be used inside or on top of air plenums or ducts, along hot pipes, or across walkways.*

*Consult your local ordinances and regulations for proper cable selection.*

## Installing Music-On-Hold and Magic On Hold

You can connect a Music-On-Hold device to an LS line/trunk jack programmed for Music-On-Hold. The system supports one such connection, either Magic On Hold or a customer-owned music source. The external music coupler (PEC 61398) uses an 8-ohm music source and two attenuation controls for setting the music level.

**NOTE** ► PagePac Plus equipment can be used with a loudspeaker system to provide music. Or it can provide paging without a music coupler.

If the equipment uses rebroadcasted music or other copyrighted materials, the customer is required to obtain a copyright release and may also require 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). To bypass the release and license requirement, the customer can purchase a Magic On Hold system from Lucent Technologies, which does not require such a license.

Figure 3-35 and Figure 3-36 show different background music configurations with single-zone and multizone paging.

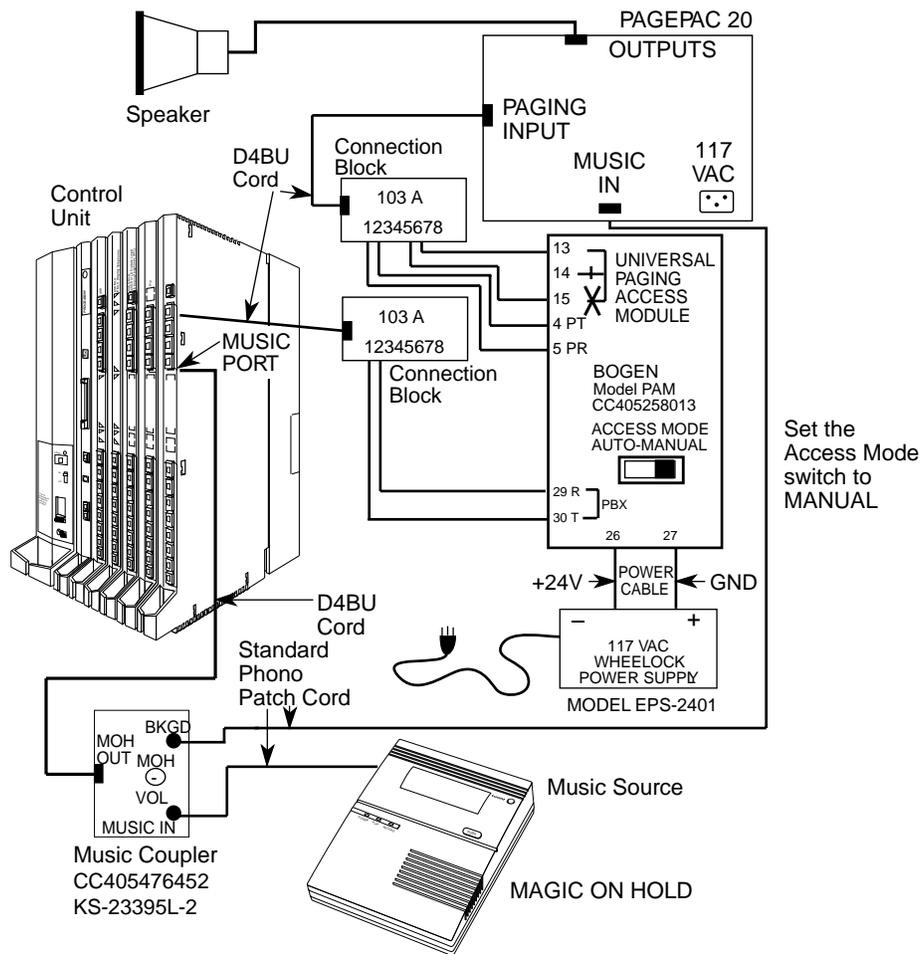
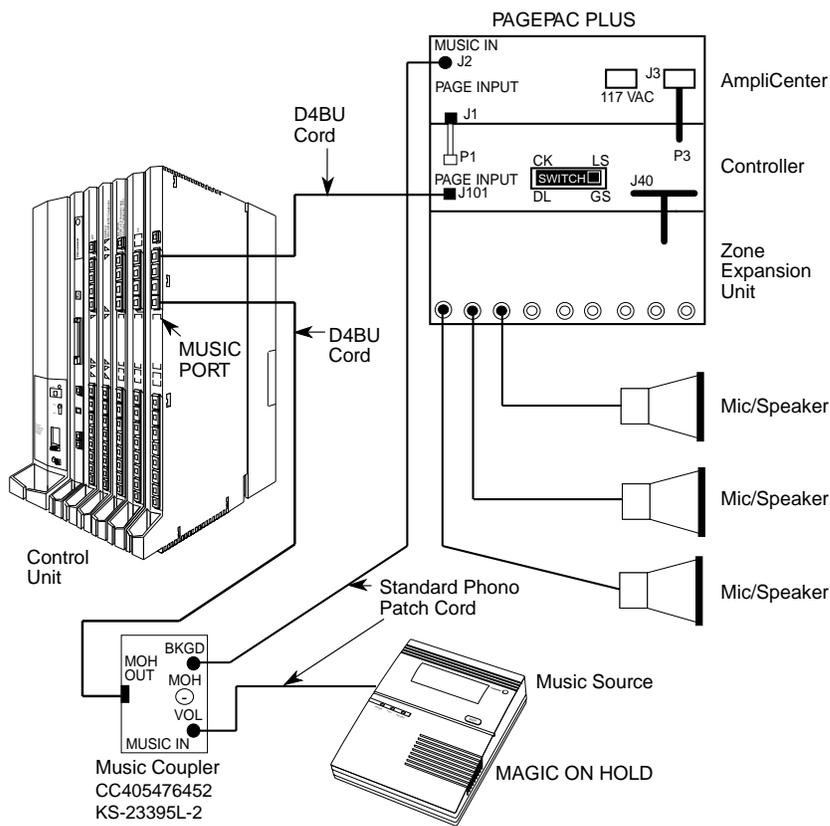


Figure 3-35. Single-Zone Paging with Background Music and Magic On Hold



**Figure 3-36. Multizone Paging with Background Music, Magic On Hold, and Bidirectional Paging (Talk-Back)**

## Connecting a Printer to the Control Unit

Before you connect a printer to the control unit for the printing of Station Message Detail Recording (SMDR) reports, determine the distance from the control unit to the printer. Follow the appropriate procedure below according to that distance.

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### Connecting a Printer Within 50 Feet (15.2 m)

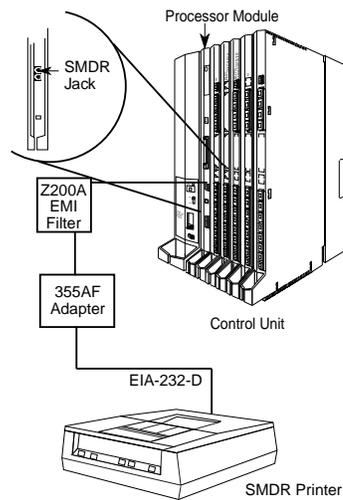
If the printer is within 50 feet (15.2 m) of the control unit and is connected to the same 117 V AC branch as the control unit, use this procedure to connect a printer to the control unit.

You need the following hardware for this procedure:

- Z200A EMI filter
- Adapter for the connector on the interface cable
  - 355A for a male connector
  - 355AF for a female connector

To connect a printer within 50 feet (15.2 m), follow the steps below. Refer to Figure 3-37.

1. Plug the short end of a Z200A EMI cord into the SMDR jack on the control unit.
2. Plug the other end of the Z200A EMI cord into a 355AF or 355A adapter.
3. Plug the female end of the adapter into either the 25-pin male connector on the printer's interface cable or the serial port on the printer.
4. Set the appropriate printer options for SMDR. See "Setting Printer Options and DIP Switches" on "Setting Printer Options and DIP Switches" on page 3-49 for instructions.



**Figure 3-37. Connecting a Printer Within 50 feet (15.2 m)**

### Connecting a Printer 50 Feet (15.2 m) or More Away

Use this procedure to connect a printer to the control unit if the following conditions apply:

- The printer is 50 feet (15.2 m) or more from the control unit.
- The printer is not grounded to the same AC outlet as the control unit. The printer is not grounded to an outlet that is on the same 117 V AC branch as the control unit and that is 50 feet (15.2 m) or closer to the control unit.

**NOTE** ► If you are installing the printer in a different room than the control unit, make sure that both locations have working wall outlets and wall jacks, and that the building wiring has been connected so that the wall jacks in each location communicate with each other.

You need the following hardware for this procedure:

- Z200A EMI filter
- Adapter for the interface cable connector
  - 355A for the male connector
  - 355AF for the female connector
  - 400B2 power adapter
- Z3A2 ADUs
- BR1A-4P adapter or 102 connecting block or 103 connecting block

## Installation and Maintenance

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- 8-position wall jacks
- EIA crossover cable
- ADU crossover cable
- 2012D transformer
- 248B adapter
- D8W cords
- D6AP power cord
- EIA-232-D cable
- 4-pair plug-ended cable

To connect a printer 50 feet (15.2 m) or further away from the control unit, follow these steps (see Figure 3-38):

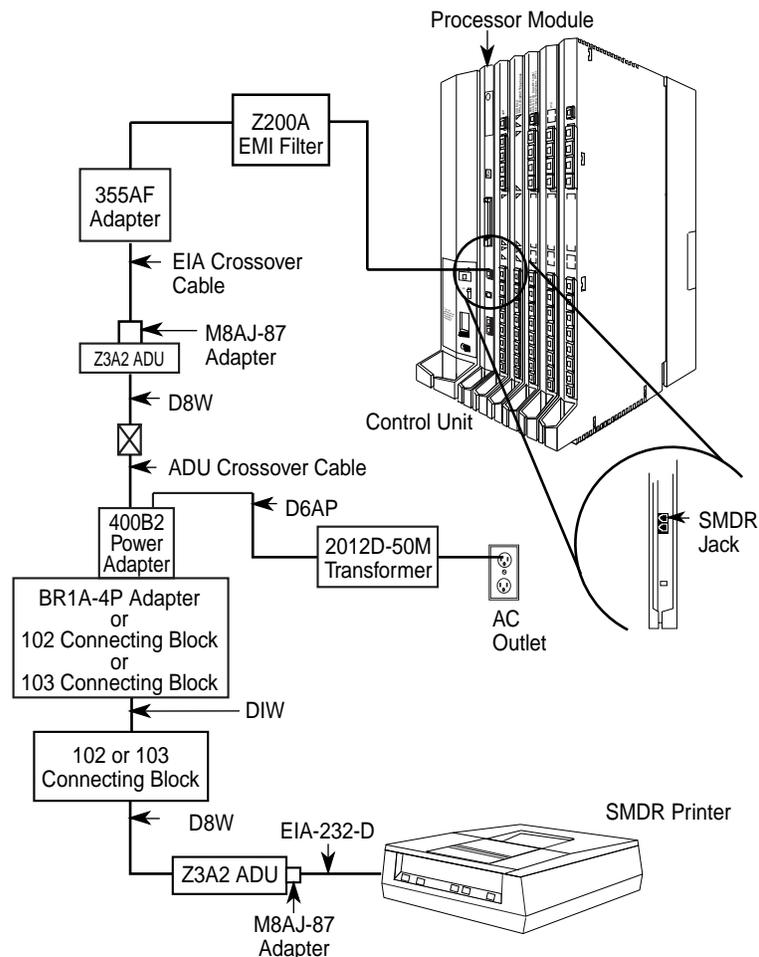
1. Plug the short end of a Z200A EMI cord into the SMDR jack on the control unit.
2. Plug the other end of the Z200A EMI cord into a 355AF adapter.
3. Plug the female end of the 355AF adapter into one end of an EIA crossover cable.
4. Plug the other end of the EIA cable into the 25-pin male connector of the Z3A2 ADU.



### **CAUTION:**

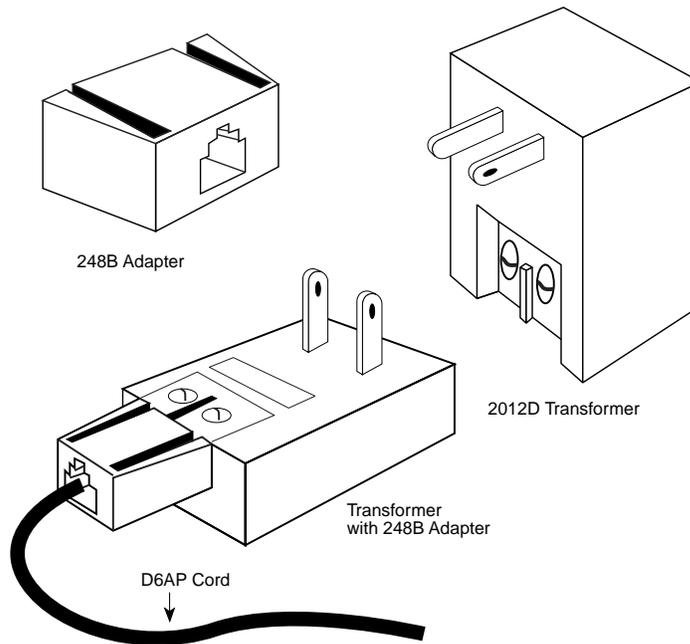
*If the printer is in a building outside the main building (control unit location), you must install an ADU and an additional protector in each building. The ADUs and protectors provide both the control unit and the printer with additional protection against lightning, inadvertent contact with power lines, and power currents induced by nearby power lines. See the installation notes packaged with the ADU for more information.*

5. Plug one end of a D8W cord into the WALL jack on the Z3A2 ADU.
6. Plug the other end of the D8W cord into an ADU crossover cable.
7. Plug the other end of the ADU crossover cable into one of the jacks on a 400B2 power adapter.
8. Plug one end of a D6AP cord into the other jack of the 400B2 adapter.



**Figure 3-38. Connecting a Printer More Than 50 feet (15.2 m) Away**

9. Plug the other end of the D6AP cord into the 2012D-50M transformer. If you are working with a 248B adapter and 2012D transformer instead of a 2012D-50M transformer, plug the D6AP cord into the jack on the 248B adapter, and then connect the spade-tip wires on the 248B adapter to the screws on a 2012D transformer. See Figure 3-39.



**Figure 3-39. Connecting the 248B Adapter and the 2012D Transformer**

10. Plug the 400B2 adapter into a wall jack, BR1 A-4P adapter, 102 connecting block, or 103 connecting block.
11. Complete the 400B2 connection.
  - If the 400B2 is plugged into a wall jack, make sure that building wiring has been set up so that the wall jack for the control unit can communicate with the wall jack for the printer.
  - If the 400B2 is plugged into a BR1A-4P adapter, 102 connecting block, or 103 connecting block, use 4-pair plug-ended cable to connect the BR1A-4P adapter (or connecting block) to the wall jack for the printer.
12. On the printer side, plug one end of a D8W cord into the wall jack and the other end into the WALL jack on the Z3A2 ADU.
13. Plug one end of an EIA-232-D cable into the 25-pin male connector on the Z3A2 ADU and the other end into the serial port on the printer.
14. Plug the 2012D-50M (or 2012D) transformer into a wall outlet.
15. Set the appropriate printer options for SMDR. See “Setting Printer Options and DIP Switches” on page 3-49 for instructions.

## Setting Printer Options and DIP Switches

If the customer has a Lucent Technologies 572, Lucent Technologies 475/476, or Lucent Technologies Applications printer, use this section to set up printer options. If another type of serial printer is being used, review these setup options for guidance and consult the manual for the printer. Use the information below to determine the correct printer setting for the printer:

- For the 572 printer, set the options on the printer according to Table 3-1. (See the user's guide supplied with the printer for more information.)
- For the 475/476 printer, set the DIP switches on the printer according to Table 3-2 on page 3-50. (See the user's guide supplied with the printer for more information.)
- For the Applications printer, set all the DIP switches on the printer to off. (See the user's guide supplied with the printer for more information.)

**Table 3-1. Lucent Technologies 572 Printer Options**

No.	Function	Menu	Status
01	FORM LENGTH	09	11
02	LPI	01	6
03	CPI	01	10
04	LQ or NLQ	01	LQ
05	BUZZER	01	ON
06	FONT	01	BUILT-"IN"
07	RESOLUTION	01	144
11	BUFFER	02	ON-"LINE"
13	PW ON MODE	01	ON-"LINE"
14	DIRECTION	01	BI-DIR. 1
15	BUFFER FULL	02	LF + CR
16	P.E.	01	ACTIVE
17	AUTO CR	01	CR + LF
18	ZERO	01	0
22	AUTO LF	01	CR ONLY
31	1" SKIP	01	OFF
32	CHAR. SET (G0, GL)	02	USA
33	CHAR. SET (G1, GR)	01	UK
34	CHAR. SET (G2)	03	GE
35	CHAR. SET (G3)	0	"LINE" DRAWING
81	OFF- "LINE" STATE	01	ALL RECEIVE
82	DSR	02	OFF
83	RTS TIMING	01	RTS
84	CD	02	OFF
85	CTS	02	OFF

**Table 3-1. Lucent Technologies 572 Printer Options—Continued**

No.	Function	Menu	Status
91	OVER RUN	02	256
92	DATA BIT	02	8
93	PROTOCOL	03	XON/XOFF <sup>1</sup>
94	STOP BIT	01	2
95	PARITY	01	NON
96	BPS	04	1200

<sup>1</sup> This is the default status, but the system cannot read the character sent by the printer.

**Table 3-2. Lucent Technologies 475/476 Printer DIP Switch Settings <sup>1</sup>**

Switch 1	Switch 2	Switch 21
DIP 1-Open	DIP 1-Open	DIP 1-Open
DIP 2-Closed	DIP 2-Open	DIP 2-Open
DIP 3-Open	DIP 3-Open	DIP 3-Open
DIP 4-Open	DIP 4-Open	DIP 4-Closed
DIP 5-Closed	DIP 5-Open	DIP 5-Open
DIP 6-Closed	DIP 6-Open	DIP 6-Open
DIP 7-Closed	DIP 7-Closed	DIP 7-Open
DIP 8-Open	DIP 8-Open	DIP 8-Closed
Switch 22	Switch 23	Switch 24
DIP 1-Open	DIP 1-Closed	DIP 1-Open
DIP 2-Closed	DIP 2-Open	DIP 2-Closed
DIP 3-Closed	DIP 3-Open	DIP 3-Closed
DIP 4-Open	DIP 4-Open	DIP 4-Open
	DIP 5-Closed	DIP 5-Open
	DIP 6-Open	DIP 6-Closed
		DIP 7-Open
		DIP 8-Closed

<sup>1</sup> Open = off; Closed = on

## Connecting a PC to the Control Unit

See *System Programming* for instructions about connecting a personal computer to the control unit.

# Connecting the Control Unit to the Network Interface

# 4



## Contents

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# Connecting the Control Unit to the Network Interface

# 4

The way you connect the control unit to the network interface depends on the type of network interface that is installed. While there are many ways you can do this, the methods discussed in this chapter are usually best.

## CAUTION:

*The local telephone company is responsible for providing appropriate protection for central office trunks. Do not connect the central office trunks until you are certain that they are properly protected. See “Central Office Trunk Protection” on page 2-11 for details.*

*To avoid coupling power supply noise onto system wiring, allow at least 3 inches (7.62 cm) of clearance between the basic carrier’s power supply and any wiring or termination hardware located to the left of the control unit.*

*If the network interface is greater than 25 feet (7.62 m) from the control unit, connect the control unit to the network interface, using an Off-Premises Range Extender (OPRE). See the documentation packaged with the OPRE for complete installation instructions.*

*If you use staples to attach the cords to walls or baseboards, make sure you do not pierce the cords.*

*National and local building codes specify the type of cable required for telecommunications wiring. For example, you cannot use indoor wiring (DIW) cable inside or on top of air plenums or ducts, along hot pipes, or across walkways. Consult your local ordinances and regulations for proper cable selection.*

## Wiring

The local telephone company should have installed the network interface (the central office trunks) already. Before you install the system, verify that the network interface is the proper type and that it is within 25 feet (7.6 m) of the control unit. If the network interface is more than 25 feet (7.6 m) from the control unit, make sure you have an OPRE.

The adapter you need to connect the central office trunks to the control unit depends on the type of network interface installed, as shown in Table 4-1.

**Table 4-1. Network Interfaces**

---

Network Interface	Description	Adapter
RJ11	Connects one outside ground-start (GS), loop-start (LS), or Direct Inward Dial (DID) trunk to one modular jack.	
RJ14	Connects two outside trunks to one modular jack (GS, LS, or DID).	2-line adapter (267C-type)
RJ21X	50-pin connector connects 25 110AB1 jack-panel block to outside trunks (GS, LS or DID).	110AB1 jack-panel block
RJ2GX	50-pin connector for up to eight tie trunks.	356A for eight or fewer tie trunks; 259A for one tie trunk

---

**NOTE** ► The E1 cable has a modular jack at one end and a BNC connector at the other. If the BNC connector is not appropriate for the network interface provided by the central office, cut the BNC connector end of the cable and set up a twisted-pair connection, using the transmit-and-receive pairs.

On the modular jack, the transmit pair is associated with pins 4 and 5 (the green and red wires). The receive pair is associated with pins 1 and 2 (the grey and brown wires).

After installing the adapter, label each jack that connects a central office trunk to the control unit with the trunk's number. Use the list provided by the local telephone company.

**NOTE** ► If you need to connect the trunk cords differently from the instructions on the system forms, record each change on Form 2c, System Numbering: Line/Trunk Jacks.

In most installations, the network interface is connected through a cross-connect field to the control unit. However, for systems with fewer than 24 extensions, you can connect the trunk wires directly to the control unit.

When constructing wiring fields between the network interface and the control unit, you must order hardware as individual parts. Do not use Interconnect Wiring or Systimax wiring kits.

---

## RJ21X Interface

The RJ21X network interface has a female 50-pin (25-pair) amphenol connector, as shown in Figure 4-1.

To connect the RJ21X interface to the control unit, you must build a wiring field between the RJ21X interface and the control unit using a 66-type block (RJ21). This field converts the female amphenol connector to sets of four 1-pair modular jacks.

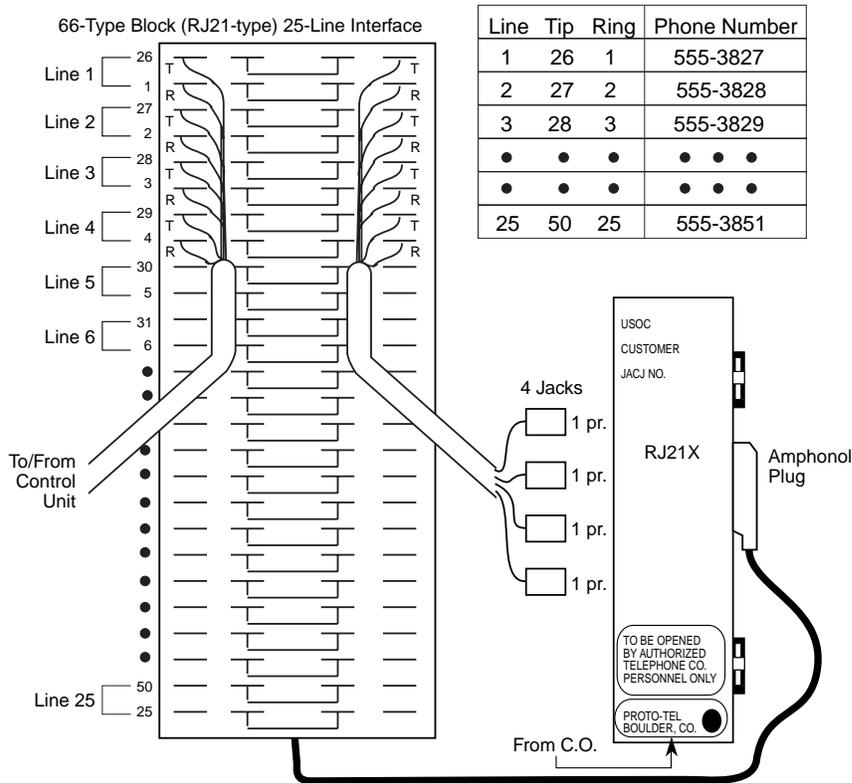
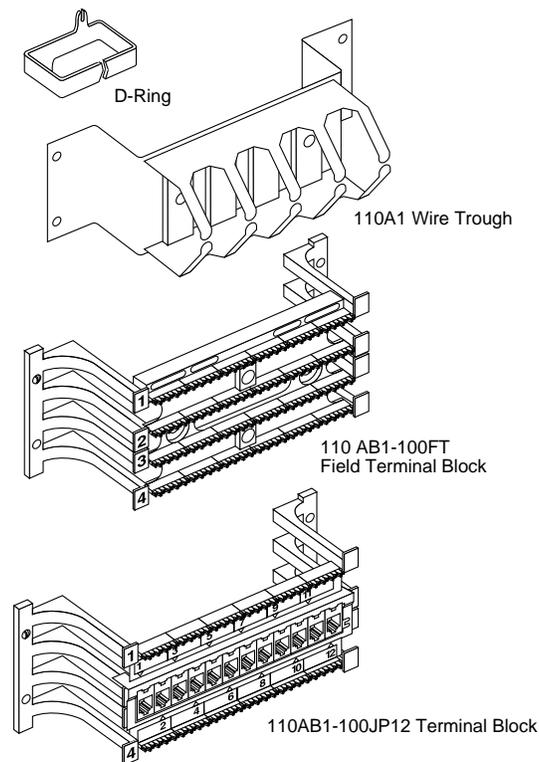


Figure 4-1. RJ21X Network Interface Connector

### Building the Wiring Field

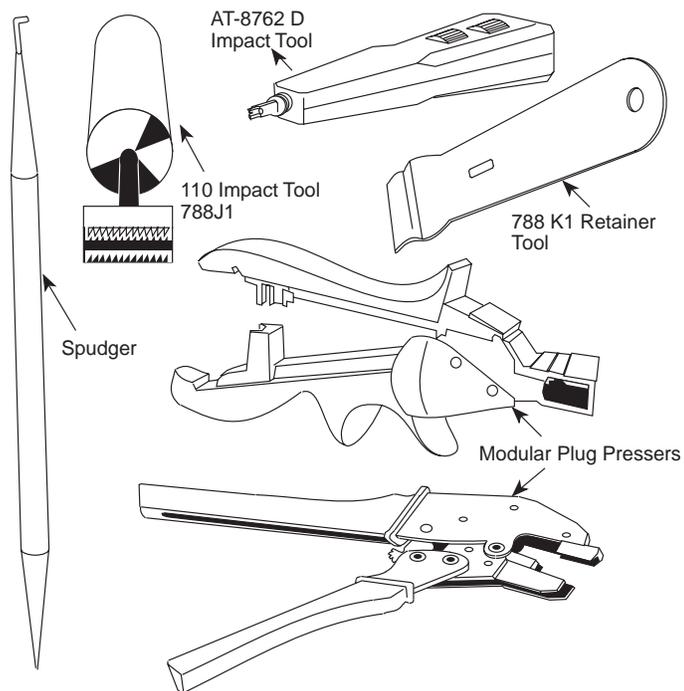
Build the wiring field between the network interface and the control unit by using 110AB1-100JP12 termination blocks with modular jacks and associated hardware. Figure 4-2 shows the hardware you need, including 110AB1-100JP12 termination blocks with modular jacks, 110A1 wire troughs, D-rings, and D2R cords.



**Figure 4-2. RJ21X Wiring Field Hardware**

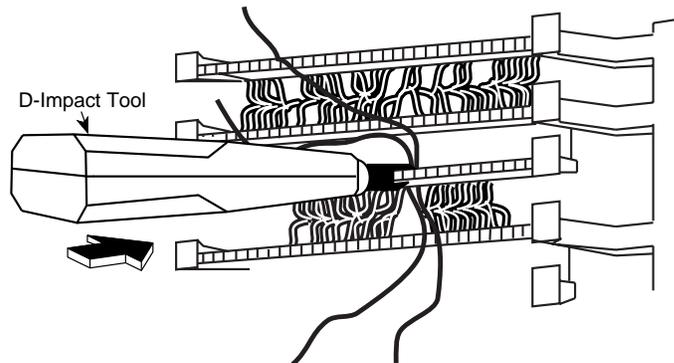
To connect the RJ21X network interface to the control unit, follow the steps below. Figure 4-3 shows the tools you need.

1. For each piece of hardware, drill two diagonally opposite holes into the backboard, allowing for a 1/16-inch (1.6 mm) space between each piece of hardware.
2. Mount the wire troughs and the termination blocks. There is a wire trough above and below each termination block.
3. If necessary, repeat Steps 1 and 2 for a second column.
4. Run the 25-pair amphenol cable on the RJ21X interface to the termination blocks. If more length is needed, use an A25D male-connector, single-ended, 25-pair, nonplenum cable.
5. Mount the D-rings to properly dress the wires, as needed.
6. Cut off the amphenol connector nearest to the cross-connect field and strip the wires for each of the 25 pairs.



**Figure 4-3. RJ21X Wiring Field Tools**

7. Punch down the 25-pair wires to the termination block.
  - a. Route the wires through the fanning slots on the termination block.
  - b. Insert the conductors into the designated 110 connecting blocks already on the termination block.
  - c. Use the D-impact tool to seat the conductors. See Figure 4-4.
  - d. Remove any insulation fragments with a spudger.



**Figure 4-4. Using the D-Impact Tool to Seat the Conductors**

8. Test the central office trunks for proper connection. See “Testing Trunks” on page 4-9 for instructions.
9. Label the network interface jacks, control unit module jacks, termination blocks, and D2R cords. See “Labeling Trunks” on page 4-10 for instructions.
10. For each trunk, plug one end of a D2R cord into the designated jack on the termination block and the other end into the line/trunk jack on the proper control unit module.

**NOTE** ► The modular jacks on the termination block are 8-wire jacks. The D2R cords, which are 6-wire, also plug into the 8-wire jacks.

**CAUTION:**

*Do not plug a 4400-Series telephone, an MLX telephone, or anything else that should be plugged into an extension jack into this wiring field: doing so will busy-out the trunk.*

---

## RJ11 and RJ14 Interfaces

RJ11 and RJ14 interfaces are connected to the control unit similarly. However, note the following differences:

- RJ11 connects one central office trunk per jack.
- RJ14 connects two trunks per jack.

Plug a 267C-type adapter into each RJ14 jack. You need D2R cords for RJ11 jacks. See Figure 4-5.

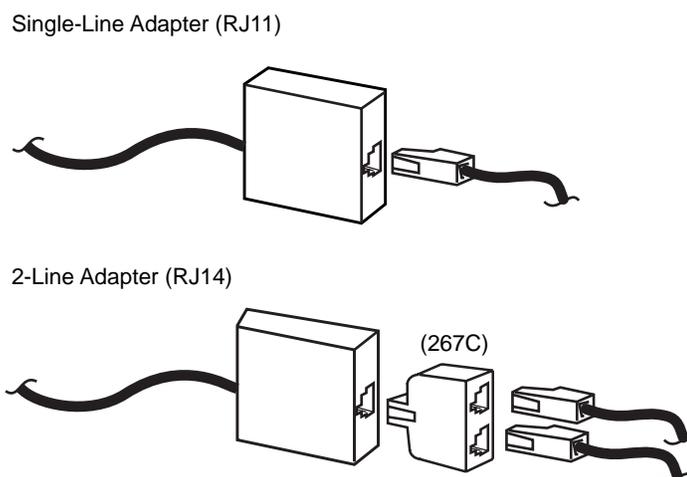


Figure 4-5. RJ11 and RJ14 Interfaces



**CAUTION:**

*Incorrect wiring can damage the ports and cause them to stop functioning. Make sure you use the proper cords. For all GS/LS modules, do the following:*

- Use a D2R cable from an RJ11.
- Do not use the Brand-Rex Quad cable from an E66 block.
- If you cannot avoid using the Brand-Rex Quad cable, reverse the tip and ring leads at the E66 block to correct the mismatch.

To connect the RJ11 and RJ14 network interfaces to the control unit, follow the steps below:

1. Test the central office trunks for proper connection. See “Testing Trunks” on page 4-9 for instructions.
2. Label the network interface jacks, the control unit module jacks, and the D2R cords properly. See “Labeling Trunks” on page 4-10 for instructions.
3. Plug one end of a D2R cord into the jack at the network interface and the other end into the appropriate line/trunk jack on the control unit.
4. Dress the wires properly.

## RJ2GX Interface

The RJ2GX is a 25-pair amphenol interface that connects up to 8 tie trunks. Construct the cross-connect field in the same way you did for the RJ21X interface.

RJ21X and RJ2GX interfaces do not require separate termination blocks. If there is room on the termination block for the trunk wires, you can punch down both the RJ21X and the RJ2GX on the same 110AB1-100JP12 block. Leave any unused wires unterminated.



### **CAUTION:**

*Be careful not to connect tie trunks to LS or DID ports. Since all the jacks on the termination block are 8-wire jacks, it is possible to interchange tie trunk wires with LS or DID wires accidentally.*

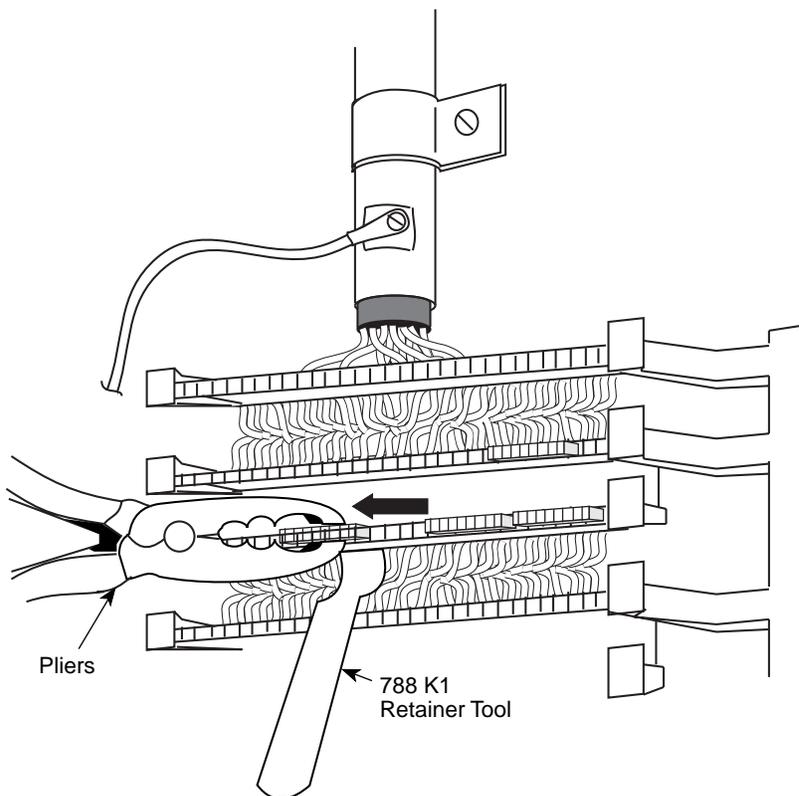
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## Removing Damaged Connecting Blocks

In some cases, a connecting block becomes damaged and must be removed.

To remove a damaged connecting block, follow the steps below (see Figure 4-6):

1. Remove the wires or the patch cord from the connecting block.
  - If you have Interconnect Wiring, use long-nosed pliers to remove the telephone wires, and tag the wires with tape to identify their positions.
  - If you have Systimax wiring, pull off the patch cord.
2. Place a 788K1 retainer tool against the conductor pairs beneath the connecting block to be removed.
3. Use pliers to grip the connecting block in the center.
4. Move the block gently up and down and pull it out.
5. If a conductor wire is accidentally pulled from a block, pull it with the long-nosed pliers to get some slack. Use your fingers to lay the conductor wire back in its slot in the index strip, and then reseat it with the D-impact tool.
6. Seat the new connecting block by using the 788J1 impact tool.
7. Replace the telephone wire onto the connecting block.
  - If you have Interconnect Wiring, remove the tag from the telephone wires and use the D-impact tool to reseat the wires.
  - If you have Systimax wiring, attach the patch cord to the connecting block.



---

**Figure 4-6. Removing the Connecting Block**

## Testing Trunks

Before you connect the central office trunks to the control unit, verify that there is dial tone and that you can dial out on every trunk. DID trunks can be tested only through the control unit. Do not test DID trunks at this time.

**⚠ CAUTION:**

*Do not use 4400-Series telephones or MLX telephones for testing. They do not work for these tests and can be damaged if you use them for this purpose.*

## Testing Loop-Start Trunks

To perform this test, you need a single-line telephone or an installer's test telephone (craft set). If you are installing rotary-dial trunks, use a rotary telephone to perform this test.

To test loop-start trunks, follow the steps below:

1. Plug the single-line telephone or the craft set into each central office line/trunk jack (either at the network interface or at the cross-connect field) and listen for dial tone.
2. If you find a central office trunk that does not have dial tone, check for a bad adapter or loose connection. If adapters and wiring are in working order but you still do not hear a dial tone, notify the Lucent Technologies Service Center acting as the customer's agent.
3. When you hear a dial tone, dial a known telephone number to verify dialing. After the central office completes the connection, check that you have good two-way transmission.
4. If you cannot dial out on any of the trunks, notify the Lucent Technologies Service Center acting as the customer's agent. It is the customer's responsibility (or that of the customer's agent) to report service outages to the local telephone company.

## Labeling Trunks

You can have up to 80 central office line/trunk jacks on the system. This procedure describes how to label each D2R or D8W cord, network interface jack, and control unit module jack.

To label trunks, follow the steps below:

1. Review System Form 2c, System Numbering: Line/Trunk Jacks to determine each central office trunk assignment on the control unit.
2. Place a green cord label at each end of every D2R or D8W cord. (These labels are packaged with the basic carrier.) The green label indicates the number of the central office line/trunk jack to which the cord is connected.
3. Label the jacks on the termination blocks.
4. Leave a copy of System Form 2c in a secure place near the control unit.



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When you have finished installation, you are ready to initialize and test the system as described in this chapter.

## Initializing the System

To initialize the system, use one of the following methods:

- Restore from a MERLIN MAGIX™ Release 1.0i system programming disk or Translation memory card.
- Use the system programming forms and the *System Programming* guide.

**NOTE** ► On initial installations, make sure you perform a System Erase (frigid start), as described in Chapter 6, “Maintenance and Troubleshooting,” either immediately before you restore from a disk or memory card or before you program the system. Failure to perform the System Erase (frigid start) can result in incorrect programming.

---

## Restoring from the Translation Memory Card

If you received the MERLIN MAGIX Release 1.0i Translation memory card, follow the steps below to initialize the system:

1. Perform a System Erase (frigid start).  
See Chapter 6, “Maintenance and Troubleshooting,” for detailed instructions.  
Console Procedure: Menu: Maintenance→Slot→Dial or Type 00→Enter→Demand Test→System Erase (Line 5, left button) twice→Yes
2. Use the programming console and the translation memory card to perform the Restore procedure. See *System Programming* for instructions.

## Restoring from the System Programming Disk

If you received the MERLIN MAGIX Release 1.0i system programming disk, follow the steps below to initialize the system:

1. Perform a System Erase (frigid start).  
See Chapter 6, "Maintenance and Troubleshooting," for detailed instructions.  
Console Procedure: Menu: Maintenance → Slot → Dial or Type 00 → Enter → Demand Test → System Erase (Line 5, left button) twice → Yes
1. Use WinSPM and the system programming disk to perform the Restore procedure.  
See *System Programming* for instructions.

**NOTE** ► You must restore the system by using either the system programming (or backup) disk or the memory card whenever a frigid start (System Erase) occurs.

## Setting the Time and Date

If the Control Unit Diagram indicates that you should set the time and date, do so before you test the system.

Follow this procedure:

Menu: SysProg → System → Date → Drop → Dial current date → Enter

See *System Programming* if you need additional instructions.

## Testing the System

Once you have initialized the system, it is ready for system acceptance testing. Perform the basic tests below to test telephones, trunks, and features.

If any equipment is not working properly, see Chapter 6, "Maintenance and Troubleshooting," for troubleshooting instructions.

---

## Testing 4400-Series Telephones

Use the following steps to check if the LEDs, ringer, buttons, switchhook, or display are working.

1. Pick up the handset.
2. When you hear the dial tone, press \*00 (the feature access code).

The telephone enters test mode. For some tests, this means the LEDs turn on; for others, it means the telephone starts ringing.

- This test connects a test tone to the B-channel and sends a repeated ring burst to the telephone.
- On 4400, 4400D, and 4406D+ Telephones, and telephones with a DSS attached, all LEDs light and the telephone rings throughout the test.
- On 4412D+, 4424D+, and 4424LD+ telephones, the left-most column of feature buttons that have associated LEDs light and the telephone rings periodically. To switch to another column of feature buttons that have associated LEDs, press a feature button in the column you want to select.

3. Press each line/feature button (two LEDs each).

The first press turns the red and green LEDs off. Subsequent presses should toggle the red and green LEDs on and off.

4. Press each fixed feature button that has an LED (Mute and Speaker).

Each LED should toggle on and off.

**NOTE** ► Mute and Speaker LEDs may not toggle consistently because they are managed by the control unit and the telephone.

5. Press each fixed-feature button or line/feature button that does not have an LED, and each dialpad button.

When you press each one of these buttons, the Message LED should toggle on and off.

**NOTE** ► For 4412D+ telephones, pressing a fixed-feature button or line/feature button turns the current column of LEDs off (if lit), and toggles the Message Waiting Light (MWL) on and off.

6. Press the fixed-feature buttons and dialpad buttons in the order shown below to turn on all the LEDs.
  - a. Redial
  - b. Conference
  - c. Transfer
  - d. Hold
  - e. Dial 123456789\*0#

The LEDs should toggle on and off.

7. If the 4400-Series telephone does not have a display, hang up the telephone to end the test. If it does have a display, continue to the next step.
8. To test a 4400-Series telephone display, press each display button.  
Each button name should display in the upper-left corner.
9. If any of these tests fail, replace the telephone.

---

## Testing MLX Telephones

This switch-based software test verifies that the LEDs, ringer, buttons, switchhook, and B-channel operation for MLX telephones are working correctly. You cannot run this test when the telephone is in programming, forced-idle, or maintenance mode. When an MLX telephone is in test mode, the system considers it busy and therefore not available for use.

If you hang up during any of these procedures, test mode ends automatically.

Keep the following in mind when using the speakerphone:

- If the Mute button is pressed before the Speaker button, the Mute LED cannot be turned off; it winks.
- The Mute and Speaker LEDs remain steady during test mode.
- The pressing of the Mute button is processed within the telephone.
- When the telephone test is originated from the Speaker button, every second press of the Mute button causes the Mute LED to flash off momentarily. Also, both the Mute and Speaker LEDs may occasionally remain on after disconnecting with the Speaker button.
- Press the fixed-feature buttons repeatedly to toggle the LEDs on and off.

To test the basic features of an MLX telephone, follow the steps below:

1. Pick up the handset of the telephone you are testing and push an ICOM button in Key or Behind Switch mode or an SA button in Hybrid/PBX mode.
2. When you hear dial tone, dial \*00 to activate test mode.  
You should hear a steady test tone over the handset and a ring burst over the speaker. The telephone's red and green LEDs should be on.
3. To test the line buttons, press any line button with two LEDs (red and green).  
The diagnostic tone should stop, and the LEDs for that button should go off.
4. Press the same line button repeatedly to toggle between the green and red LEDs. For a QCC, the display should show the name of the feature programmed on the button.
5. To test a fixed-feature button with one LED, press the button.  
The Feature and HFAI LEDs should turn off. The first press of the Speaker button should turn off the Mute LED. The second press of the Speaker button should turn off the Speaker LED.

- 
6. To test the red Message light, press a fixed-feature button without an LED (such as Transfer, Conf, or Drop) or any dialpad button.  
The Message light should turn off.
  7. Hang up the handset to leave test mode.

---

## Testing MLX Display Telephones

While the MLX display telephone is in test mode, follow the steps below to test the display buttons:

1. Press each fixed display button (Home, Menu, Inspct, and More).  
The display should spell out these button labels.
2. Press the unlabeled display buttons.  
The display should indicate `Display Button n`, where *n* is the number of the display button, 1 through 4.

---

## Testing MLX Telephones with MFMs

You should test MLX telephones with MFMs for proper channel operation and test the MFM circuitry for the TTR, the ring generator, and the Message light.

To test an MLX telephone with an MFM installed and configured as a T/R adapter, follow the steps below:

1. Connect a working 2500-type single-line telephone with a Message light to the MFM adapter (the 2500 telephone also must have a mechanical ringer).
2. Pick up the handset and listen for dial tone. Dial \*09.  
You should hear another dial tone.
3. Press any button.  
This deactivates the test tone.
4. Dial 123456789\*0#. Press the switchhook quickly.  
You should hear a confirmation tone.
5. Hang up.  
The control unit should send a ring burst and the Message light on the 2500 telephone should turn on.
6. Turn off the Message light. Dial the appropriate feature code.

## Testing Telephones for Dial Tone

To test for dial tone, follow the steps below:

1. Press an ICOM or SA button (depending on the mode of operation).  
The red LED next to this button should go on.
2. Press the Speaker button.  
The green LED next to the ICOM or SA button should turn on; you should hear a dial tone, and the green LED next to the Speaker button should turn on.
3. Press the Speaker or ICOM or SA button again to disconnect intercom.  
The green LEDs next to ICOM or SA and Speaker buttons should turn off and the dial tone should stop. The red LED remains on in some cases.

---

## Testing Telephones for Outside Dial Tone

To test for outside line dial tone, follow the steps below:

1. Without lifting the handset, press one of the outside line buttons.  
The red LED next to this button should turn on.
2. Pick up the handset or press the Speaker button.  
The green LED next to the line button should turn on and you should hear a dial tone.
3. Hang up and repeat Steps 1 and 2 for each line button on the telephone.

---

## Testing Single-Line Telephones

To test the basic operation of single-line telephones, follow the steps below:

1. Pick up the handset and wait for dial tone.
2. Dial the extension number of another working telephone.  
You should hear ringback on your telephone and ringing at the called telephone.
3. At the called telephone, have someone pick up the handset; verify that you have good two-way communication.
4. At both telephones, hang up.

---

## Testing Loop-Start Trunks

To test the LS outgoing and incoming trunks at a telephone, follow the steps below:

1. Dial \*03 followed by the trunk ID number (01 through 80).

You should hear dial tone for a working trunk, a reorder tone for a DID trunk or an invalid trunk number, or a busy tone if the trunk is in use.

**NOTE** ► Dialing \*03 on a single-line telephone works only if the telephone has a Touch-Tone dialpad and the trunk accepts Touch-Tone dialing.

2. Repeat Step 1 for all outgoing trunks.
3. Dial an incoming trunk on the system.
4. Have someone answer the call at another telephone; verify that you have good two-way communication.
5. Repeat Steps 3 and 4 for all incoming trunks.
6. Hang up to exit test mode.

---

## Testing DID and Incoming DIOD Trunks

To test DID and incoming DIOD trunks, follow the steps below:

1. Have someone at the central office check all DID/DIOD trunks, or have someone call from the outside to check each DID/DIOD trunk.
2. When the first trunk rings, answer it.
3. Instruct the caller to put the call on hold or put down the handset while making the next call.
4. When the next trunk rings, put the previous call on hold and repeat this procedure until all DID/DIOD trunks have been connected successfully.
5. When all trunks are connected with good communication, disconnect each call and have the caller do the same.

## Testing Tie Trunks

Before you test tie trunks, make sure that the tie trunks for the system are connected and properly programmed. Have someone at the far end ready to place and receive calls throughout the testing procedures listed below.

The tie trunk testing procedures in this section are as follows:

- Automatic-start two-way (both incoming and outgoing)
- Automatic-start incoming only
- Automatic-start outgoing only
- Dial-repeating two-way (both incoming and outgoing)
- Dial-repeating incoming only
- Dial-repeating outgoing only

**NOTE** ► Dial-repeating tie trunks are also called *wink-*, *immediate-*, and *delay-*type tie trunks. These terms are used in system programming to describe the type of signaling used on the trunk.

### Testing Two-Way Automatic-Start Tie Trunks

For two-way automatic-start tie trunks, perform both the incoming and outgoing automatic-start tie trunk tests.

Before testing outgoing or two-way automatic-start tie trunks, have someone ready to take your call at the receiving telephone.

### Testing Incoming Automatic-Start Tie Trunks

Perform this test for automatic-start tie trunks that are two-way or incoming only. If you are testing two-way automatic-start tie trunks, perform the outgoing test as well.

To test incoming automatic-start tie-trunks, follow the steps below:

1. At the far-end tie-trunk site, have someone pick up the handset and dial a tie trunk assigned to a button on your telephone.  
Your telephone should ring and the LEDs next to the tie-trunk button should respond as follows: the red LED should turn on and the green LED should flash.
2. Pick up your handset and verify that you have good two-way communication.  
The green LED should change from flashing to steady.
3. At both telephones, hang up.  
The green LED should turn off, the red LED should turn off, and another red LED may turn on.
4. Repeat Steps 1 through 3 for all incoming and two-way automatic-start tie trunks.

## Testing the System

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## Testing Outgoing Automatic-Start Tie Trunks

Perform this test for automatic-start tie trunks that are two-way or outgoing only. If you are testing two-way automatic-start tie trunks, perform the incoming test as well.

To test outgoing automatic-start tie trunks, follow the steps below:

1. At any telephone that has access to an automatic-start tie trunk, press the first tie-trunk button.  
The red LED next to the tie-trunk button just pressed turns on.
2. Pick up the handset. (In Hybrid/PBX systems with pooled tie trunks, press an SA button and dial the pool dial-out code.)  
The green LED next to the selected button turns on and you hear ringing.
3. When the person answers, verify that you have good two-way communication and hang up.  
The green LED should turn off, the red LED should turn off, and another red LED may turn on.
4. Repeat Steps 1 through 3 for each outgoing and two-way automatic-start tie trunk.

## Testing Two-Way Dial-Repeating Tie Trunks

For two-way dial-repeating tie trunks, perform both the incoming and outgoing dial-repeating tie trunk tests.

## Testing Incoming Dial-Repeating Tie Trunks

Perform this test for dial-repeating tie trunks that are two-way or incoming only. If you are testing two-way dial-repeating tie trunks, perform the outgoing test as well.

To test incoming dial-repeating tie trunks, follow the steps below:

1. Have the person at the far end place a dial-repeating call to your telephone by dialing the proper tie-trunk number.  
Your telephone rings and the green LED next to ICOM (or SA for Hybrid/PBX systems) flashes.
2. Pick up the handset.  
The red LED next to the ringing button turns on and the green LED changes from flashing to steady.
3. Verify that you have good two-way communication and hang up.  
The green LED should turn off, the red LED should turn off, and another red LED may turn on.
4. Repeat Steps 1 through 3 for each incoming or two-way dial-repeating tie trunk.

## Testing Outgoing Dial-Repeating Tie Trunks

Perform this test for dial-repeating tie trunks that are two-way or outgoing only. If you are testing dial-repeating two-way tie trunks, perform the incoming test as well.

To test outgoing dial-repeating tie trunks, follow the steps below:

1. At any telephone that has access to a dial-repeating tie trunk, press the first tie-trunk button.  
The red LED next to the pressed tie-trunk button lights.
2. Pick up the handset. (In Hybrid/PBX systems with pooled tie trunks, press an SA button and dial the pool dial-out code.)  
The green LED next to the selected button lights.
3. Dial the tie-trunk number of the extension where someone is waiting for your call.  
You should hear ringing.
4. When the person answers, verify that you have good two-way communication, then hang up.  
The green LED should turn off, the red LED should turn off, and another red LED may turn on.
5. Repeat Steps 1 through 4 for each outgoing or two-way dial-repeating tie trunk.

---

## Testing Selected System Features

This section provides procedures to test the following system features:

**Automatic Route Selection (ARS).** For Hybrid/PBX mode only. Use the same test for Idle Line Preference, a similar feature used in Key mode only. Use the same test for Station Message Detail Recording (SMDR), as explained in the test procedure. Refer to Planning Forms 3e, 3f, and 3g for ARS information.

**Group Calling.** Use the same test for the Listed Directory Number (the QCC queue), which is for Hybrid/PBX only. Use the same test for Group Paging. Refer to Planning Form 7d for Group Calling information.

**Coverage.** Refer to Planning Form 7c for Group Coverage information.

If any feature does not work properly, check system programming. You can run these tests easily from a 4400-Series or MLX telephone.

## ARS and SMDR Tests

If ARS patterns have been programmed, you can test routing by placing toll calls and checking the trunk indicated on the SMDR printout. Check the report to see which line/trunk the system selected for an outgoing call.

---

The length of each toll call must be equal to or greater than the minimum SMDR recording time. Otherwise, SMDR does not recognize the attempt as a call. To determine the minimum SMDR recording time, check with the customer's System Manager (the factory setting is 40 seconds).

To verify ARS patterns, follow the steps below:

1. In Hybrid/PBX mode, determine which toll numbers to call by examining the System Manager's ARS patterns.
2. At any multiline telephone, pick up the handset and dial the ARS access code and one of the toll numbers. Make sure the call is completed before hanging up.
3. Repeat Step 2 for additional toll numbers.
4. At the SMDR printer, verify that the call was made on the correct trunk group and check the number of seconds before the call is reported on the SMDR printout. If there are errors, check system programming.

### **Group Calling Test**

To test Group Calling features, follow the steps below:

1. Make sure that each group member is logged into the group.  
To log in, each member dials #44.
2. At any telephone, pick up the handset and dial the trunk that is programmed to ring for a particular Calling Group.
3. At the ringing telephone, have someone pick up the handset and verify that you have good two-way communication.
4. Repeat Steps 2 and 3 for each Calling Group.
5. Make additional calls to check each member of each Calling Group.
6. At any telephone, pick up the handset and dial the group extension number.
7. Test the Calling Group delay announcement (if provided) for each group.
  - a. Make the group busy or have all members log out of the group (by dialing #\*44 at each group extension).
  - b. Repeat Step 2.
  - c. After listening to the delay announcement, hang up.
  - d. Repeat these steps for each group.
8. At the ringing telephone, have someone pick up the handset and verify that you have good two-way communication.

### **System Speed Dial Test**

To test System Speed Dial numbers, follow the steps below:

1. Find out which numbers have been programmed for System Speed Dial. See the System Manager or use Form 10b as a reference for System Speed Dial numbers.

## Installation and Maintenance

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2. From the test telephone, pick up the handset and dial a System Speed Dial code. Verify that you have good two-way communication and that the correct party was reached.

### Coverage Test

To verify that coverage is in effect, follow the steps below:

1. Have someone call the covered telephone.
  2. Count the number of rings at the covered telephone before the covering telephone starts ringing. This should be the same as the programmed number of rings.
  3. Pick up the handset at the covering telephone and verify that you have good two-way communication.
  4. Hang up the handset at the covering telephone.
  5. Check both Individual and Group Coverage.
- 

### Testing the DSS

At each Direct Station Selector (DSS), check that all lights are operational. Then use the DSS to call a telephone in the system. Test the Page buttons on the DSS.

---

### Testing Night Service

To test the Night Service feature on the system operator console, follow the steps below:

1. At the system operator console, press the Night Service button. If Night Service with Outward Restriction is programmed, you must also enter the password. (You can also activate Night Service on a DLC by pressing the Feature button and dialing 39.)  
The Night Service LED turns on.
2. Pick up the handset and press a button for an outside trunk.
3. Dial the outside number that reaches an operator console that is programmed to receive Night Service coverage.
4. Verify that the telephones assigned to the Night Service group are ringing.
5. Have someone pick up the handset at a telephone in the Night Service group. Verify that you have good two-way communication.
6. At both telephones, hang up.
7. Repeat Steps 2 through 6 for each operator console that is programmed to receive Night Service coverage.
8. Test telephones that are programmed for Night Service with Outward Restriction.
  - a. Pick up a handset on a restricted telephone and verify that outside calls are not allowed.
  - b. Using the password, make an outside call.

### Testing the System

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- c. Hang up the handset.
  - d. Press the Recall button and dial the password. (On an MLX telephone without a programmed Recall button, press the Feature button, and dial 775 and the password before picking up the handset.)
  - e. Pick up the handset and make an outside call.
  - f. Verify that you have good two-way communication and hang up.
9. At the operator console, press the Night Service button again. If you used a password in Step 1, enter the password again. Verify that the Night Service LED turns off.

---

## Testing Music-On-Hold

To verify that music is provided to outside callers placed on hold, follow the steps below. Inside callers do not hear Music-On-Hold.

1. Pick up the handset at the test telephone.
2. Dial the central office trunk access code and the system's published directory number; or, if you are using a DID trunk, dial any extension.
3. At the destination extension, answer the incoming call.
4. At the destination extension, press the Hold button.  
The line button's green LED should flash.
5. Verify that music is heard at the destination extension and adjust the volume as required.
6. Hang up.

**NOTE** ► If the customer uses equipment that rebroadcasts music or other copyrighted materials, the customer 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 the customer can purchase a Magic On Hold system, which does not require that you obtain such a license, from Lucent Technologies.

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## Testing the Power Failure Transfer Jacks

To test a power failure transfer (PFT) jack for proper operation, you must assign the outside line numbers to the module's line/trunk jacks and the trunks must be operational.

To test PFT jacks, follow the steps below:

1. Plug a Touch-Tone or rotary dial telephone into a PFT jack.
2. Note the outside line number assigned to the lowest line/trunk jack on the module and be sure that the outside trunk is connected to the system.

3. Turn off power to the control unit. Follow the procedure in “Replacing a Module in a Carrier” on page 2-29.
4. Dial an outside number—make sure someone can answer the call.
5. After the call is answered, and you have verified that you have good two-way communication, give the person the telephone number assigned to the outside line bridged by the PFT jack to which you are connected. This is the number noted in Step 2.
6. Have that person call the number after you hang up.  
Your telephone should ring after the caller completes dialing the number.
7. Answer the telephone and verify that you have good two-way communication. Hang up.
8. Repeat Steps 1, 2, and 4 through 10 to test all PFT jacks.
9. Turn the power back on. Follow the procedure in “Powering Up the System” on page 2-31.

---

### Testing Touch-Tone Receivers

The 016 ETR and 016 (T/R) modules each provide four Touch-Tone receivers (TTRs). The 008 OPT and 800 DID modules each provide two TTRs. The 024 TDL module provides eight TTRs.

To test TTRs, follow the steps below:

1. Pick up the handset of a Touch-Tone single-line telephone that is connected to 016 (T/R) or 008 OPT module.
2. Dial \*04 and the 2-digit number (starting with 01) of the TTR that you want to test.  
You should hear a busy tone if the receiver is in use, or a reorder tone if you misdialed or addressed a receiver not in your system.
3. If you hear reorder tone, try again. If you hear dial tone after one to three seconds of silence, proceed with this test.
4. Dial 123456789\*0#.  
You should hear a dual-tone multifrequency (DTMF) signal as each button is pressed. When you finish dialing, you should hear a 3-beep confirmation tone.
5. Repeat the test for each TTR.



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## Overview

The purpose of maintenance is to detect, report, and clear problems quickly with minimum disruption of service. To do this, the system isolates troubles to a single replaceable module whenever possible.

To isolate problems, the control unit (CU) runs automatic diagnostic, auditing, and monitoring tests. Errors found by the automatic tests go into error logs. In addition, you can run demand tests by using a 4424LD+ Telephone, an MLX-20L telephone, or a PC with Windows® System Programming and Maintenance (WinSPM) software. See Chapter 2 of System Programming for details on using the WinSPM software for Maintenance activities.

**NOTE** ► If maintenance is being done by a local PC device, the System Programming Console (4424LD+ Telephone or MLX-20L telephone) can continue normal call processing and station programming operations. However, if you attempt to access maintenance tasks with the System Programming Console while a local PC is performing the same maintenance operations, you are denied access to the task and notified with a beep.

Notification of trouble comes from users who report problems or from alarms generated by the system when it detects serious errors. Alarms can appear as an LED on an operator console and as a status display on the maintenance terminal.

Error records and alarms may be retired either automatically or manually. After a trouble or error has been cleared, the system retests the previously faulty area within a variable time interval. When the error is no longer detected, the error message and the alarm, if applicable, are retired. Maintenance personnel can retire error records and alarms either on-site or from a remote location (using a PC and WinSPM software).

**NOTE** ► Using existing practices, record each station jack connection and each station change on the “System Technician’s Run Sheet.”

## Equipment

To access the maintenance program on-site, you need a System Programming Console (4424LD+ or MLX-20L) or a PC with WinSPM software. In addition, you should have the following tools:

- EIA breakout box
- Digital voltmeter
- 110/66-type punchdown tool
- Dracon TS21 or equivalent Touch-Tone test telephone
- Assorted flathead screwdrivers
- Assorted Phillips-head screwdrivers
- Long-nosed pliers
- Regular pliers
- Wrist grounding strap
- Laptop PC with MS-DOS 3.3 or higher and SPM software
- Troubleshooting guide
- Any replacement parts that you may need

Remote Access to the maintenance program requires a PC with WinSPM software.

### CAUTION:

*The system contains components that can be severely damaged by electrostatic discharge (ESD). To minimize the possibility of damage due to ESD, it is recommended that you properly ground yourself using the wrist grounding strap whenever you are working on the control unit.*

## Maintenance Elements

This section describes the following important elements of the system's maintenance:

- Error logs
- Alarms
- Restarts
- System status displays
- Automatic tests
- Demand tests

---

## Error Logs

Errors occur because of hardware malfunctions, recurring program logic inconsistencies (PLIs), or system restarts. Whenever an error occurs, it is entered into an error log.

Errors are classified as one of three types: major, minor, or warning, and are recorded in one of the following tables within the error log that is stored in battery backed-up RAM:

- **Permanent System Alarms**—contains a list of the major system errors. Major errors are generally steady in nature and cause a degradation of service that requires immediate action. An example of a major alarm would be a ROM checksum failure.
- **Transient System Errors**—contains a list of the minor system errors. Minor errors are generally intermittent in nature and cause a reduced level of service that may require action, but the system continues to process most calls normally. An example of a minor alarm would be a trunk or station out of service.
- **Last 30 System Errors**—contains a list of warning errors. Warning errors cause no noticeable degradation of service. Some central office trunk errors are examples of warning errors.

All errors are initially entered into the thirty most recent error table. Each error in this table includes the Error Code, Slot, Port, and date and time information. The Error Logger checks the error against a list to determine if the error needs to be recorded in the alarm table. Only errors which qualify for transient or permanent status are entered into the alarm table. Each error has a threshold count that, when exceeded, escalates an error from transient to permanent. To be automatically cleared, each type of error must be trouble-free for a set time period.

---

## Alarms

A permanent error causes an alarm which may cause an external alarm device to be activated (if such a device is installed and administered) and/or light a red LED next to a line or feature button (on a system operator console or other designated telephone) programmed for alarm notification. The alarm device and/or LED stays on until the error is cleared.

Alarms can be cleared:

- Automatically by the system when the error condition no longer exists
- Manually (via the maintenance menus)
  - by replacing a module
  - by clearing an error log entry via the Drop button on the System Programming Console (4424LD+ Telephone or MLX-20L telephone) telephone or via ALT-P on a PC with WinSPM software

### Restarts

Depending on the severity and duration of a problem, it may be necessary to restart the system either by a warm start, cold start, or frigid start. Certain errors can cause the system to automatically restart; cold starts and frigid starts can be initiated by the maintenance technician.

#### Frigid Start

In a frigid start, all calls are dropped, the system configuration information is erased and reset to the factory default, and the alarm tables are cleared. All system memory must be reinitialized, including customer translations. The entire system must be rebooted. When you select a frigid start from the maintenance terminal, a warning is issued stating that system translation information will be erased, and an option is provided to either continue or cancel the operation.

**NOTE** ► After a frigid start, the default printer is the PC printer, not the SMDR printer. If you want printouts on-site from the SMDR printer, make sure you change the print options from WinSPM.

#### Cold Start

Unless the system is connected to an Uninterruptable Power Supply (UPS) a power interrupt of more than one second causes a cold start. All calls are dropped, but customer translations are retained.

**NOTE** ► A cold start does not blank out the screen on an MLX-28D telephone until the end of the cold start.

A cold start can cause stations with the Extension Status feature to lose their Toll Restriction.

#### Warm Start

Warm starts occur automatically and are not initiated by a menu selection. Loss of power for less than 250 ms causes a power transfer to the internal battery backup and causes a warm start. Stable calls are not dropped, but calls in the process of being established may be. Call processing resumes from the point where new and stable calls are handled.

**NOTE** ► Power interruptions of less than 100 ms generally are not noticed by the system. Warm starts can cause a telephone to ring without having an associated call. To stop the ringing, place a new call to the telephone. Every restart causes an error log entry, and each type of restart has its own error code.

---

## System Status Displays

The System Status screen displays simulated LEDs for all modules in the control unit, except the power supply module. The only modules in the control unit that have physical LEDs are the power supply, processor, and 100E.

The simulated LEDs are R (red), Y (yellow), and G (green). R indicates an alarm or standby state; when a module enters a normal state, the R LED goes off. When a call is in progress on a module, the Y LED is on. The word “on” or “off” appears after the R, Y, or G.

---

## Automatic Tests

The system automatically runs tests to:

- monitor the status of equipment.
- audit operations consistency.
- detect hardware malfunctions.

The tests check hardware and software that are in service but do not disrupt normal service. Any errors detected are registered in the error logs. Errors are corrected automatically whenever possible. When automatic error correction is not possible, errors remain in the error logs until manually corrected.

---

## Demand Tests

Demand diagnostic tests for the line/trunk and extension modules are selected and scheduled by using the menu screens. Demand tests accomplish the following:

- Increase the effectiveness of on-site troubleshooting and repair
- Verify complaints of malfunctioning equipment

**NOTE** ► For some modules, the demand test does not test the shared memory.

When a demand test fails, the module being tested either was not busied-out or is faulty and may have to be replaced.

## Installation and Maintenance

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To run demand tests, the processor module, the power supply module, and the System Programming Console (4424 LD+ Telephone or MLX-20L telephone) or PC must be working.

**NOTE** ► You cannot run a demand test on the module to which the System Programming Console is attached (024 TDL for the 4424LD+ Telephone or 008 MLX or 016 MLX module for the MLX-20L telephone). However, you can run a demand test on this module from the PC with WinSPM software.

To run a demand test, you must take the equipment out of service. You can choose “Busy-Out” or “Reset” to do this, but “Busy-Out” is preferred since:

- Busy-Out removes lines and stations as they become idle but does not disrupt calls in progress.
- Reset drops all calls in progress and removes equipment from service.

Once the equipment is out of service, you can select demand tests. After testing is finished, choose “Restore” from the menu to cancel “Busy-Out” or “Reset.”

**NOTE** ► A cold start or a warm start does not restore equipment that has been busied-out or reset.

## On-Site Maintenance

You can do on-site maintenance with a System Programming Console (4424LD+ Telephone or MLX-20L telephone) or a PC with WinSPM software. The System Programming Console must be connected to the first jack on the first 024 TDL module if you are using a 4424 LD+ Telephone, or to the first jack on the first 008 MLX module or 016 MLX module if you are using an MLX-20L telephone. The first jack on the first TDL or MLX module is factory set as the system programming jack and as an operator position. When you program for the first time, you can change the system programming jack to any one of the first five jacks on the first 024 TDL module or on the first 008 MLX module or 016 MLX module. This allows you to program without interfering with the operator’s call handling. Only one jack at a time can be used for system programming or maintenance.

The PC plugs into the RS-232 system programming/maintenance port on the Processor module. Refer to Chapter 2 of System Programming for instructions on how to connect the PC to the Processor module.

---

## Remote Maintenance

By using a PC with WinSPM software, maintenance personnel can remotely access the maintenance program. This Remote Access is provided by a built-in 1200-bps modem in the processor module.

**NOTE** ► Line noise can distort the WinSPM screen. When this happens, the remote administrator should hang up and redial.

Once in the maintenance program, the remote administrator can use the menu screens as the on-site technician does to check error logs, check system status, and even cause restarts.

The remote administrator can access the maintenance program by:

- dialing the listed directory number for the customer's system. Usually this rings at the system operator's console, and the operator transfers the call to the system programming/maintenance (SPM) port. The remote administrator then enters the password. (When remote system programming is taking place, any local system programming is blocked.)
- directly dialing the SPM port by using the Remote Access feature. The administrator enters an access barrier code and the password to connect to the SPM port.

**NOTE** ► The on-site system technician can also call the SPM port by using either method above. However, it is recommended that the technician connect the laptop PC directly to the RS-232 port on the processor module.

---

## Security

Certain security measures guard against unauthorized Remote Access. A barrier code can be used for access to the built-in modem. In addition to the barrier code, the WinSPM software has password validation.

**CAUTION:**

*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.*

The following menu selections must be used with care. To eliminate any selection mishaps, you must confirm or cancel them.

- Busy-Out
- Reset
- Restore
- Poke
- System Erase

## Maintenance Strategy

The goal of maintenance is to isolate the trouble to one or more replaceable units and to replace the faulty units as quickly as possible. To help isolate the fault, check equipment in the following order:

1. Telephones, adjuncts, and station wiring
2. Line/trunk and station modules
3. Processor module
4. Power supply module
5. Carrier backplane
6. Central office connections (network interface)

**NOTE** ► Traffic problems can result from having more than 64 Personal Lines or pool buttons on the system. If you have traffic problems, check this first.

Use the maintenance program as follows:

1. Check the error logs.
2. If the error logs indicate trouble in the processor module, correct that problem first since it may be causing trouble in the line/trunk and extension modules.
3. Run demand tests on the line/trunk and extension modules to further isolate the trouble.
4. If replacing the faulty equipment does not solve the problem, use the screen menus to find the hardware vintage, the software vintage, and the ROM ID of the modules.
5. Escalate the problem.

## Using the Maintenance Screens

Using the maintenance screens involves selecting items on menus. The menu selections are identical whether you are using a System Programming Console (4424LD+ Telephone or MLX-20L telephone) or a PC with WinSPM software.

The only difference is that the function keys on the computer keyboard simulate the display buttons on the telephone.

In the following procedures, a representation of the menu screen is shown with the actions to take. To enter maintenance programming, press the button for "Menu" and then the button for "Maintenance." The following Main menu appears:

```

Maintenance:
Make a selection
System
Slot
Port
Exit

```

**NOTE** ► On the maintenance screens, the power supply modules are not shown and the processor module is numbered "00."

---

## System Screens

System screens are used for getting information; you cannot alter anything with system screens.

## Checking Error Logs

Error logs show you what errors have occurred in the system. Follow the steps below to check the error logs.

### Display Error Log Procedure

Console Procedure Menu: Maintenance→System→Error Log→Last 30 or Permanent or Transient

PC Procedure: **F6** → **F1** → **F2** → **F1** or **F2** or **F3**

**NOTE** ► The most recent alarm message stays on the System Error Log screen until it is replaced by another one.

Once you have reviewed the error logs, you should print the error information. This helps you determine whether your work has resolved each problem. (Refer to the summary below or System Programming for additional information about printing.)

### Print Error Log Procedure

Console Procedure Menu: System Programming→Exit→More→Print→More→More→Error Log

PC Procedure: **F1** → **F5** → **PgUp** → **F3** → **PgUp** → **PgUp** → **F6**

### System Status

The power supply, processor, and 100E modules are the only modules that have LEDs. The System Status screen displays simulated LEDs for the processor and for each of these modules, but not for the power supply.

#### Summary

Console Procedure Menu: Maintenance→System→Status

PC Procedure: **F6** → **F1** → **F1**

The screen appears with simulated LEDs for each module for red, yellow, and green. Press the > or More button to display more modules, up to 17. If a slot is empty, R, Y, and G appear, but not on or off.

Immediately following R, Y, or G is its status (for example BBB), which can be On, Off, or No status (an empty slot in the control unit):

**Red LED**—When the red LED is on, the module is not in service because it is in standby mode, is being tested, or is in an alarm condition. When a module resumes normal operations, the red LED turns off.

**Yellow LED**—When the yellow LED is on, it usually means that at least one call is in progress on that module. This is usually true for modules with trunks. When this is the status, you must reset the board if you want to terminate any calls in progress rather than waiting for them to terminate during a Busy-Out.

**Green LED**—The green LED is usually off. It may be on during power up or when an Internal Loopback or CSU Loopback Test is running.

#### Sample LED Display (Slot 4)

If a call is in progress on a module that is in a working or normal state, the System Status display for that module appears as:

Roff Yon Goff.

If a slot is empty, R, Y, and G appear without indicating a status.

### System Inventory

System Inventory shows the hardware vintage, software vintage, and ROM ID for each module in the control unit.

#### System Inventory Procedure

Console Procedure Menu: Maintenance→System→Inventory→More or >

PC Procedure: **F6** → **F1** → **F3** → **PgUp**

The processor module inventory information appears. Press More or > to show the inventory information for the other modules.

The inventory information for the first line/ trunk and station module appears. Press More or > to show information for the next module.

---

## Slot Screens

With Slot screens, you can check the status of the module in a particular slot or perform maintenance activities such as demand tests or restore.

**NOTE** ► On the maintenance screens, the power supply modules are not represented and the processor module is numbered “00.”

## Slot Status

Slot Status provides the following information for a module in a particular slot:

- LED status
- Errors (yes or no)
- Mode (initialization, standby, test, or normal)
- Alarms (yes or no)
- Maintenance busy (yes or no)

### Slot Status Procedure

Console Procedure Menu: Maintenance→Slot→Dial the slot no.→Enter→Status

PC Procedure: **F6** → **F2** → Type the slot no. → **F10** → **F1**

For all MLX modules, BChLoopback is also displayed as an option on this screen. For 100E modules, CSU-lpbk, Error Events, and Clock are also displayed as options after you select Status. For the MFC06 module, MFC Tone is displayed as an option after you select Status.

## Demand Tests

By running a demand test, you can check the performance of a module in a slot. However, before running a demand test, review the following:

- System Components
- Test Notes
- Persistent Module Problems
- Busy-Out and Reset

- Restore

### System Components

Before running a module test, make sure the following system components are working:

- Power supply
- Processor module. Back up the system programming onto a floppy disk. See Chapter 2 of System Programming for procedures. To back up onto a memory card, use existing procedures.

Before running a demand test, busy-out or reset the modules. Busy-Out is the best method, but it does not work if any line or extension is on a stable call. See “Demand Tests” on page 6-5 for more information about these features.

Maintenance Terminal (4424LD+ Telephone, MLX-20L telephone, or PC with WinSPM). To run tests on the TDL module connected to the 4424LD+ Telephone used as the System Programming Console or the MLX module connected to the MLX-20L telephone used as the System Programming Console, you must run the test from the PC, not from the System Programming Console.

Once you finish testing a module, you must restore it. Restoring a module terminates the Busy-out or Reset condition.

### Test Notes

For each test, note the following points:

- When beginning the board controller test or the internal loopback module test, choose to run it once or repetitively.
- You can interrupt any module test by selecting Exit (F5) on the PC).
- A module test can fail for one of the following reasons:
  - The module being tested was not busied-out. Exit the test, busy-out the module, and try again.
  - The error messages indicate that the module is faulty.

If errors indicate that the module is faulty, record them on the module repair tag immediately after running the test.

### Persistent Module Problems

If any of the module tests fail and replacing the module does not clear the trouble, either several modules may be faulty, or the connector on the carrier may be faulty.

### Busy-Out and Reset

Before running any module test, be sure to busy-out or reset the module.

Busy-out discontinues service from the module being tested to each line and extension only as they become idle. Busy-out is the preferred method, because it does not disrupt calls in progress.

Reset discontinues service to all lines and extensions on the module instantly.

- In-progress calls are dropped if all of the calling parties on the call originate and terminate on the module being reset.
- If a call is using a line or extension on the module being Reset and another line and/or extension is involved in the call, the call on the module being reset is put on hold. In this case, the module can be removed and replaced. However, a demand test cannot be performed, because the module is not busied-out.

Check the status of the reset module before performing a demand test.

In the following procedure, Busy-Out is shown, but choosing Reset works the same way.

### Busy-Out Procedure

Console Procedure Menu: Maintenance→Slot→Dial the slot no.→Enter→Busy-Out→Yes

PC Procedure: →→Type the slot no.→→→

After you select Busy-Out, a screen appears that allows you to either confirm your selection or cancel and return to the previous screen.

When busy-out is successfully completed, you see Busy-Out Complete on the screen. If busy-out is not successfully completed, the message displayed is Busy-Out FAILED.

Once all calls are terminated, the busy-out completes in less than 1 second. If calls in progress take too long, ask the callers to hang up.

### Restore

Once you complete module testing, restore it to terminate the Busy-Out or Reset condition. The Restore procedure generally takes less than one second.

### Restore Procedure

Console Procedure Menu: Maintenance→Slot→Dial the slot no.→Enter→Restore→Yes

PC Procedure: →→Type the slot no.→→→

## Internal Loopback Test

This test checks communication between the processor and the module being tested. This test can be run on any module. The 100E module has two digital switch elements (DSEs); both DSEs are tested.

It takes approximately 1.5 minutes to run each test. The 100E module takes approximately 3 minutes because each module has two DSEs.

Busy-Out, Reset Busy-out, or reset the module being tested prior to beginning the test. See “Busy-Out and Reset,” on page 6-12, for additional information.

You can interrupt the test (both `Test Once` and `Repetitive`) by selecting `Exit` (F5) on the PC).

### Internal Loopback Test Procedure

Console Procedure Menu: `Maintenance`→`Slot`→`Dial the slot no.`→`Enter`→`DemandTest`→`IntLoopback`→`Test Once` or `TestRepetitive`

PC Procedure: (F6)→(F2)→Type the slot no.→(F10)→(F6)→(F3)→(F2) or (F3)

If the test is successful, the module ports are free from error. Continue with the next module test, or restore the module if you are through testing.

If the test fails, find the error message in Table 6-1, and proceed as indicated.

**Table 6-1. Internal Loopback Test Error Messages**

Error Messages	Corrective Action
Slot is not busied-out	Exit the test, busy-out the slot, and try again.
Slot empty or not valid	Exit the test and try again; be sure to type the correct slot number. Do not indicate an empty slot or the processor (00).
FMWR not in Standby Mode	Exit the test and try again; if this error persists, record the errors on the repair tag and replace the module being tested.
Test running too long	Exit the test and try again; if this error persists, record the errors on the repair tag and replace the module being tested.
Not in TEST/STANDBY mode	Exit the test and try again; if this error persists, record the errors on the repair tag and replace the module being tested.
Any other error	Record the errors on the repair tag and replace the module.

**NOTE** ► Be sure to check the second screen if testing a 100E module.

---

## Board Controller Test

This procedure tests the module's internal functions, such as ROM, RAM, the timer, dual-port RAM, and so on. This test can be run on all modules except the processor. The test generally takes less than 1 second to perform.

### Board Controller Test Procedure

Console Procedure Menu: Maintenance → Slot → Dial the slot no. → Enter → Demand Test → BoardCntrlr → Test Once or Repetitive

PC Procedure: [F6] → [F2] → Type the slot no. → [F10] → [F6] → [F3] → [F2] or [F3]

You can interrupt the test (Test Once or Repetitive) by selecting Exit ([F5] on the PC).

If the test completes successfully, the module's board controller is functioning properly. Continue with the next module test or restore the module if you are finished testing. If the test fails, find the error message in Table 6-2 and proceed as indicated.

**Table 6-2. Board Controller Test Error Messages**

Error Message	Corrective Action
Slot is not busied-out	Exit the test, busy-out the slot, and try again.
Slot empty or not valid	Exit the test and try again; be sure to type the correct slot number. Do not indicate an empty slot or the processor (00).
FMWR not in Standby Mode	Exit the test and try again; if this error persists, record the errors on the repair tag and replace the module being tested.
Test running too long	Exit the test and try again; if this error persists, record the errors on the repair tag and replace the module being tested.
Not in TEST/STANDBY mode	Exit the test and try again; if this error persists, record the errors on the repair tag and replace the module being tested.
Any other error	Record the errors on the repair tag and replace the module.

## 100E Module Selections

The 100E modules have the following unique selections: Error Events, Clock, and E1-lpbk (loopback) selection. Each of these is selected from the 100E Slot screen.

### 100E Module Error Events

This procedure allows you to check for 100E module errors. The screen shows the errors that have accumulated during the current or previous hour. If you have any questions about interpreting these errors, contact your technical support organization.

#### Error Events Procedure

Console Procedure Menu: Maintenance→Slot→Dial the slot no.→Enter→Error Events→Current hr. or Previous hr.

PC Procedure: [F6]→[F2]→Type the slot no.→[F10]→[F8]→[F1] or [F2]

### 100E Module Clock Status

If you have not been trained to perform E1 maintenance, contact your technical support organization for instructions on using this procedure.

#### Summary

Console Procedure Menu: Maintenance→Slot→Dial the slot no.→Enter→Clock→Exit

PC Procedure: [F6]→[F2]→Type the slot no.→[F10]→[F9]→[F5]

### 100E Module E1 Loopback Test

This test verifies that specific communication paths on the 100E modules are operational. This test can be run only on 100E modules and generally takes 2 minutes.

Before you select “E1-lpbk” from the 100E Slot screen, you must do the following:

1. Plug a loopback cable into the jack on the 100E module.  
This causes the E1 signal to loop around at the signal jack.
2. Using the maintenance screens, busy-out the 100E module (see “Busy-Out and Reset” on page 6-12).

#### Summary

Console Procedure Menu: Maintenance→Slot→Dial the slot no.→Enter→E1-lpbk

PC Procedure: [F6]→[F2]→Type the slot no.→[F10]→[F4]

---

## MFC06 Module MFC Tone Test

This test verifies the functionality of the hardware associated with the MF tone generation and detection. In essence, this test is a digital loopback test that checks whether the DSP hardware used for MFC tone detection and generation can talk to the TDM bus without bit errors. This test can be run only on MFC06 modules and generally takes approximately 2 minutes.

Before you select MFC Tone from the 100E Slot screen, busy-out the 100E module (see “Busy-Out and Reset” on page 6-12).

### MFC Tone Procedure

Console Procedure Menu: Maintenance→Slot→Dial the slot no.→Enter→MFC Tone

PC Procedure: **F6**→**F2**→Type the slot no.→**F10**→**F4**

If the test is successful, the message `MFC Tone Test Passed` is shown on the screen. If the test fails, the message `MFC Tone Test Failed` appears, followed by additional information indicating which of the six channels failed the test.

---

## Port Screens

You perform the following procedures from the maintenance terminal. By selecting `Port` from the Maintenance screen, you can check the maintenance-busy status and other information for individual trunks and extensions, as well as information for RS-232 ports, modems, and MFC channels.

Once you determine the maintenance-busy status, you may also be interested in the following other features on the Port menu:

- Resetting EIA-232 ports and modems
- Busying-out and restoring trunks and extensions

### Checking Line/Trunk Maintenance-Busy Status

Console Procedure Menu: Maintenance→Port→Line/Trunk→Dial the dial plan no.→Enter→Status

PC Procedure: **F6**→**F3**→**F1**→Type the dial plan no.→**F10**→**F1**

### Checking Station Maintenance-Busy Status

Console Procedure Menu: Maintenance→Port→Station→Dial the dial plan no.→Enter→Status

PC Procedure: [F6] → [F3] → [F2] → Type the dial plan no. → [F10] → [F1]

### Checking MFC Channel Maintenance-Busy Status

Console Procedure Menu: Maintenance → Port → MFC-Channel → Dial the slot (01-17) and port number ((01-06) → Enter → Status

PC Procedure: [F6] → [F3] → [F6] → Type the slot (01-17) and port number ((01-06) → [F10] → [F1]

### Busy Out a Line/Trunk

Console Procedure Menu: Maintenance → Port → Line/Trunk → Dial the dial plan no. → Enter → Busy Out

PC Procedure: [F6] → [F3] → [F1] → Type the dial plan no. → [F10] → [F2]

### Busy Out a Station

Console Procedure Menu: Maintenance → Port → Station → Dial the dial plan no. → Enter → Busy Out

PC Procedure: [F6] → [F3] → [F2] → Type the dial plan no. → [F10] → [F2]

### Busy Out a MFC Channel

Console Procedure Menu: Maintenance → Port → MFC-Channel → Dial the slot (01-17) and port number ((01-06) → Enter → Busy Out

PC Procedure: [F6] → [F3] → [F6] → Type the slot (01-17) and port number ((01-06) → [F10] → [F2]

### Restore a Line/Trunk

Console Procedure Menu: Maintenance → Port → Line/Trunk → Dial the dial plan no. → Enter → Restore

PC Procedure: [F6] → [F3] → [F1] → Type the dial plan no. → [F10] → [F3]

### Busy Out a Station

Console Procedure Menu: Maintenance → Port → Station → Dial the dial plan no. → Enter → Restore

PC Procedure: [F6] → [F3] → [F2] → Type the dial plan no. → [F10] → [F3]

---

## Busy Out a MFC Channel

Console Procedure Menu: Maintenance→Port→MFC-Channel→Dial the slot (01-17) and port number ((01-06)→Enter→Restore

PC Procedure: [F6]→[F3]→[F6]→Type the slot (01-17) and port number ((01-06)→[F10]→[F3]

## Resetting an RS-232 Port

The ADMIN (SPM) port is RS-232 Port 1, and the SMDR port is RS-232 Port 2.

Console Procedure Menu: Maintenance→Port→RS232 Port1 or RS232 Port2→Dial the dial plan no.→Enter→Reset→Yes

PC Procedure: [F6]→[F3]→[F3] or [F4]→Type the dial plan no.→[F10]→[F1]→[F3]

## Replacing Equipment

When an error has been isolated to one of the following pieces of equipment, you can replace the equipment:

- Telephones, adjuncts, and station wiring
- Line/trunk and station modules
- Processor module
- Power supply module
- Carrier

**NOTE** ► Record each station jack connection and each station change on the “System Technician's Run Sheet.”

---

## Replacing the Telephones and Auxiliary Equipment

Once a problem has been isolated to a telephone (or a group of telephones), various tests can be done to see if the telephone is working properly (see “Testing 4400-Series Telephones” on page 5-3 and “Testing MLX Telephones” on page 5-4). Check the telephone wire first. Also, swap a telephone you know is good with the one you think is faulty. These practical steps isolate the problem quickly.

## Fixing Telephone Problems

When a user complaint or a system test identifies the telephone as the problem area, the trouble can be in the telephone itself, in the mounting cord, or in the wiring between the CU and the telephone. Check the wiring and the mounting cord before checking the telephone.

**NOTE** ► If the wiring has been crushed or severed, the auxiliary power supply may be shorted.

### General Telephone and Wiring Troubles

#### Symptom:

Intermittent telephone trouble

#### Procedure:

1. Swap a known good telephone with the suspect telephone to determine if the problem is localized to the suspect telephone. If local power is provided, check the power supply.
2. If trouble disappears, the fault is with the suspect telephone. Replace it.
3. If the known good telephone does not work properly, the fault may be in the wiring and/or the line/trunk and extension module.
4. Check the other telephones connected to the same module. If they are working properly, the fault is probably in the wiring, or it may be a single-port failure on the line/trunk and extension module. Swap the wiring between the jack field and the telephone to see if it is a wiring problem. Fix the wiring problem.
5. If the other telephones connected to the same line/trunk and extension module are not working properly, the fault is probably in the line/trunk and extension module.
6. Check the circuit module translations from the maintenance terminal to ensure that the module has been properly translated.
7. Check the LEDs on the line/trunk and extension module.
8. Check the error log for relevant messages.
9. Replace the faulty line/trunk and extension module.

### Single-Line Telephone Problems

#### Symptom:

Many single-line telephones cannot dial correctly even though they are receiving calls.

#### Procedure:

Using a single-line telephone, test the Touch-Tone receivers (TTRs) as follows:

1. Pick up the handset and dial \*04 and the 2-digit number of the TTR to be tested.
  - If you hear a busy tone, the receiver is in use.

- 
- If you hear a reorder tone, you have misdialed or have reached an invalid TTR.
  - If you hear a dialtone, continue this test.
2. Dial the digits 123456789\*0#. 

You should hear a DTMF signal as each button is pressed. If the test is successful, you hear a dialtone within one to three seconds after you enter #.
  3. Repeat the test for each TTR.
  4. Replace the module containing the faulty TTR if this test fails.

**Symptom:**

User cannot make outside calls on Touch-Tone telephone.

**Procedure:**

Check the individual line/trunk for rotary-dial programming.

**Call Forward Problems****Symptom:**

Users are getting other people's calls.

**Procedure:**

Usually this problem results from someone unknowingly activating Call Forward. Cancel the forwarding of calls to the receiving telephone as follows:

- For multiline telephones
  1. Press the Feature button.
  2. Dial \*34\*.
- For single-line telephones and 4400/4400D Telephones
  1. Pick up the handset.
  2. Dial #\*34\*.
  3. Hang up.

## Replacing Modules

Power down the system before replacing modules. “Hot Swaps” are not recommended.

**NOTE** ► Whenever you power up a system after working on it, be sure that you power up all the carriers. If you do not turn on all the carriers, you may cause a cold-start. See “Powering Up the System” on page 2-31.

The module removed must be replaced with a module having the same type of circuit board, in other words, the same signature. If a module is replaced with another type of module, or if a module is added to the system without the system being powered down, a cold start occurs. If you move the first 024 TDL, 008 MLX, or 016 MLX module from its slot, you must renumber the modules by selecting Board Renumber from the System Programming menu.

This procedure is not the procedure for replacing the processor module.

Follow these steps to replace a line/trunk and extension module:

1. If possible, save all the translations to a floppy disk by using the backup function.

**NOTE** ► When the processor module fails, backup is usually impossible.

2. Label all line/trunk and extension cords (if they haven't been labeled already) and unplug them from the module.
3. Run a demand test by entering the test mode.
4. Power down the system by turning off:
  - a. the power supply module on the basic carrier.
  - b. the power supply module(s) on the expansion carrier(s).
5. Remove the module and inspect it for visible damage.
6. Insert the new module.
7. Restore power by turning on:
  - a. the power supply module(s) on the expansion carrier(s).
  - b. the power supply module on the basic carrier.

The system automatically cold starts.

8. Plug in the line/trunk and extension cords.
9. Attach a tag identifying any visible problems or failure symptoms, and any relevant error reports to the replaced module.

---

## Replacing the Processor Module

A failed processor module must be repaired immediately. Follow these steps to replace a failed processor module:

1. If possible, save all the translations to a floppy disk by using the backup function.

**NOTE** ► When the processor module fails, backup is usually impossible.

2. Power down the system by turning off:
  - a. the power supply module on the basic carrier.
  - b. the power supply module(s) on the expansion carrier(s).
3. Unplug the SMDR printer and/or system programming PC cords if present.
4. Remove the processor module.
5. Inspect the processor module for any visible problems.
6. Inspect the carrier backplane.
7. Install the new processor module.
8. Restore power by turning on:
  - a. the power supply module(s) on the expansion carrier(s).
  - b. the power supply module on the basic carrier.The system automatically cold starts.
9. Use the maintenance screens to select "System Erase" (frigid start).
10. Restore the system translations from the backup floppy disk.
11. Plug in the SMDR printer and/or administrative PC cords.
12. Attach a tag identifying any visible problems and any relevant error reports to the replaced processor module.

## Replacing the Power Supply Module

Failure of the power supply shuts down everything connected to the carrier.

If the power supply fails, check that the interlocking post in the power supply slot of the carrier has not broken off. Without this post, the power supply does not operate and the carrier must be replaced.

Follow these steps to replace the power supply module:

1. If possible, save the translations on a floppy disk by using the backup function.

**NOTE** ► If the power supply module on the basic carrier has failed, the system cannot save the translations to a disk.

2. Power down the system by turning off:
  - a. the power supply module on the basic carrier.
  - b. the power supply module(s) on the expansion carrier(s).
3. Unplug the system from the AC outlet.
4. Remove the power supply module and insert a new one.
5. Restore power by turning on:
  - a. the power supply module(s) on the expansion carrier(s).
  - b. the power supply module on the basic carrier.

The system automatically cold starts.

---

## Replacing the Carrier

Typical carrier problems include power supply failure, sudden failure of one or more line/trunk and extension modules, or system problems that cannot be isolated to a specific module.

Follow these steps to check carrier problems:

1. Visually inspect the pins on the carrier. (Bent or broken pins often cause carrier problems.) To do this, you may have to remove one or more line/trunk and station modules by using Busy-Out, Reset, and Restore.
2. If you find a problem with the carrier, you must replace it (but not the line/trunk and extension modules). Carriers cannot be repaired in the field.
3. Attach a tag to the faulty carrier that describes the problem.

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## Central Office Troubles

The automatic maintenance program takes the ports out of service when a line/trunk is malfunctioning. The line/trunk is periodically tested to put it back in service.

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### Maintenance-Busy

When a line/trunk cannot be seized for an incoming or outgoing call, the line/trunk is automatically put into a maintenance-busy state. When a line/trunk is in a maintenance-busy state, no outgoing calls can be placed on it. However, the line/trunk still receives incoming calls.

The system-wide Automatic Maintenance Busy feature (if enabled) applies to all trunks, except DID trunks, which cannot be used to make outgoing calls. In addition, there is a programmable DTD Maintenance Busy parameter that applies to any trunk with DTD enabled (including trunks in a pool). If the DTD Maintenance Busy parameter is set to "Yes" and the DTD time-out interval is exceeded four times on a trunk without an intervening dial tone being detected, the trunk is marked as "unavailable for DTD." Trunks busied out because dial tone was not detected remain busied out until manually restored to service.

While the line/trunk is in a maintenance-busy state, the software periodically runs tests to try to seize the line/trunk. If the seizure is unsuccessful, the line/trunk stays in a maintenance-busy state. If the seizure is successful, the line/trunk is placed back in service. If a test is running when an incoming call is received on the line/trunk, the test is dropped and the call is processed.

- NOTE** ► No more than 50 percent of lines/trunks in a pool can be maintenance busy at one time. The only exceptions are:
- n User-imposed maintenance busy (for example, module replacement)
  - n Module maintenance busy (for example, a loss-of-service alarm in the 100E module)
  - n No external release at the far end of the line

A permanent error is entered when more than 50 percent of the lines/trunks in a pool are maintenance busy. When the maintenance-busy level falls below 50 percent, the permanent error is automatically removed.

- NOTE** ► Make sure that no modules are in a maintenance-busy state during a backup procedure (see the *System Programming* guide). Any module in a maintenance-busy state will be recorded as such on the translations disk.

### Conditions Causing a Maintenance-Busy State

The following conditions cause a maintenance-busy state:

- Loop-Start Line/Trunk
  - No loop currently exists when the LS line/trunk is seized.

A transient error is reported. After four occurrences, the port enters a maintenance-busy state and the error becomes permanent.

- Tie Trunk

- A seizure of an outgoing tie trunk fails.

A transient error is reported. After four unsuccessful seizure attempts, the port is marked maintenance busy and the error becomes permanent.

- The far-end station fails to disconnect.

A transient error is reported. After two occurrences, the port is marked maintenance-busy and the error becomes permanent.

**NOTE** ► The test is not run on auto-out tie trunks.

### Maintenance-Busy Programming

You can select automatic maintenance busy as a system programming option. If you do, there is also a menu selection to include tie trunks.

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### Manual Correction of Line/Trunk Problems

If the system cannot seize a line/trunk even after repeated attempts, you may have to replace the module. To identify the line/trunk problem, first check for a dial tone at the CU. If you do not hear a dial tone, check the error logs and make a line/trunk test call.

It is sometimes difficult for the customer to detect line/trunk troubles. If a line/trunk is down, an error is recorded in the error log and the line/trunk is taken out of service. If an incoming-only line/trunk is down, however, the only sign of trouble is customer complaints that incoming calls are not being received.

Check the error log for line/trunk-related error messages. Also check the wiring and the system parameters (for example, Touch-Tone/rotary/MFC, Toll Restriction, and disconnect time interval). Seize the line/trunk.

### Outgoing Line/Trunk Problems

**Symptom:**

Outgoing lines/trunks cannot be seized.

**Procedure:**

1. At the network interface, check for a dial tone from the central office. If a dial tone is not present, notify the customer.
2. Pick up the handset at a test station to get a system dial tone.

3. For a Hybrid/PBX system, dial \*03.

**NOTE** ► Dialing \*03 on a single-line telephone works only if the line/trunk accepts Touch-Tone dialing. After you dial \*03 on a single-line telephone, you may have to wait for a “click” before dialing the line/trunk number.

4. Dial the 2-digit line/trunk number of the line/trunk to be tested (01 to 80).
5. Listen for a dial tone. If a dial tone is not present, use a test set to isolate the fault to the line/trunk and extension module where the line/trunk terminates or to the location in the line/trunk access equipment.
6. If a dial tone is present, dial a working outside number. Verify that the call is complete.  
If the line/trunk is busy, you hear a busy tone. You hear a reorder tone if a wrong line/trunk type (such as DID) or an invalid line/trunk number was dialed.
7. If the module continues to malfunction, replace it.

### Incoming Line/Trunk Problems

#### Symptom:

Incoming lines/trunks do not work properly.

#### Procedure:

1. Place an incoming call through the troubled line/trunk.
2. For an LS line/trunk, connect a single-line telephone to the line/trunk at the network interface. Listen for ringing. Pick up the handset and check for dialtone. Dial an outside number and verify that you have good two-way transmission.
3. At the maintenance terminal, check the line/trunk translations to be sure this line/trunk has been properly translated.
4. If the module continues to malfunction, replace it.

#### Line/Trunk Error Summary

Table 6-3 shows the line/trunk errors reported when a transient or permanent error is registered by the system. These errors are also recorded for E1 ports.

**NOTE** ► In some cases, errors occur not because a single port fails, but because the entire E1 link fails. If the entire E1 link fails, the periodic E1 board-level maintenance monitoring functions perform the testing and activate alarming.

**Table 6-3. Line/Trunk Errors**

Error	Line/Trunk
No loop current	LS lines/trunks
No external release on far-end disconnect	DID and tie lines/trunks
On-hook before ready to receive digits; trunk with delay-dial or wink-start	DID and tie trunks
On-hook before wink; trunk with delay-dial or wink-start	DID and tie trunks
Stuck ringing	LS lines/trunks
Wink too short for valid signal	Tie trunks

## The 100E System Modules—E1 Maintenance

The system provides the following automatic maintenance activities on an ongoing basis:

**NOTE** ► E1 maintenance pertains to 100E modules.

- **Initialization**—The system ensures that all E1 ports are properly initialized and placed into service. It also resolves the conflicts of different service levels (for example, between the individual ports or for the initialization of the ports to support features).
- **Error detection and handling**—The system detects errors and takes the facility out of service, if appropriate. It attempts to restore the facility and put it back into service.
- **Error recording**—The system records all errors and outages in the error logs.
- **Audits and updates**—The system checks the state of the E1 facilities through audits, status checks, and error logging.
- **Maintaining the synchronization plan**—The system maintains proper synchronization to the loop clock and switches to the local clock when the loop clock is not available (for example, during a loss of signal or a blue alarm). When the loop clock source is restored, the system switches back to the loop clock.

## Troubleshooting

Table 6-4 below is a quick reference for maintenance problems and possible solutions.

**Table 6-4. Error Codes**

Error Code	Description	Action
0001	TIMEOUT COLD START : System programming is okay.	No action required; however, if problem persists, troubleshoot the processor.
0002	POWER UP WARM START : System programming is okay.	No action required; however, if problem persists, troubleshoot the processor.
0003	SOFTWARE COLD START : System programming is okay.	If problem persists, troubleshoot the processor.
0004	SOFTWARE WARM START : System programming is okay.	If problem persists, troubleshoot the processor.
0005	Reset - DIAGNOSTIC SWITCH :	
0006	INCOMPLETE COLD START : System was cold-started while a restart was in progress.	If problem persists, troubleshoot the processor.
0007	SANITY TIMEOUT RESET : Faulty software, module, carrier, or processor sanity timer.	Troubleshoot module and or processor.
0008	MAX RESET COUNT EXCEEDED : System was cold-started (System Reset) because too many warm starts occurred. System programming is okay.	If problem persists, troubleshoot the processor.
000A	POWER UP COLD START : A RAM failure was detected in the processor. System programming is okay.	If problem persists, troubleshoot the processor.
000B	CARD INSERTED/REMOVED :	No action required.
000C	SLOT STREAM CNT EXCEEDED : Slot has generated excessive interrupts or the system was powered down incorrectly. For example, Carrier 2 was powered down before Carrier 1. If errors exist because of the improper power-down, no action is required.	If problem persists, troubleshoot the module.
000D	FMWR NOT IN STANDBY MODE : Module firmware is not in standby mode.	If problem persists, troubleshoot the module.
000E	COMMAND BUFFER FULL :	If problem persists, troubleshoot the processor and module.

Table 6-4. Error Codes—Continued

Error Code	Description	Action
000F	TASK RUNNING TOO LONG :	No action required; however, if problem persists, troubleshoot the processor.
0009	FRIGID START : System was restarted and initialized to default programming. This error is also logged after a System Erase.	If the processor was removed while in use, the system may perform a frigid start due to loss of system programming. Restore system as described in <i>System Programming</i> .
0010	INVALID SLOT INTERRUPT : Cannot determine module responsible for generating the interrupt or the system was powered down incorrectly. For example, Carrier 2 was powered down before Carrier 1. If errors exist because of the improper power-down, no action is required.	Troubleshoot modules and replace if necessary. If the problem persists, troubleshoot the processor.
0011	STACK OVERFLOW : Processor problem.	Troubleshoot the processor.
0012	INVALID RESET FLAG : Processor problem.	Troubleshoot the processor.
0013	DUART STREAMING INT : Processor problem or the system was powered down incorrectly. For example, Carrier 2 was powered down before Carrier 1. If errors exist because of the improper power-down, no action is required.	Troubleshoot the processor.
0014	PROCESSOR ERR INTERRUPT : Processor problem.	Troubleshoot the processor.
0015	MODULE MISMATCH : Physical and logical type mismatch. Module inserted into wrong slot.	Change system programming to reflect the proper module or install the proper module.
0016	POWER UP COLD START : A module dual port RAM failure was detected. System programming is okay.	If problem persists, troubleshoot the module for the slot indicated.
0017	REAL TIME CLOCK FAULT : Date and/or Time incorrect or unreadable.	If this problem persists, replace the processor module.
0018	RTC COLD START : This error is not displayed.	

Table 6-4. Error Codes—Continued

Error Code	Description	Action
0019	RESET TIME & DATE : The system performs a cold start because the real time clock chip is not working correctly.	If this problem persists, replace the processor module.
00DE	MERLIN Messaging System software was upgraded.	No action required.
0401	ABK CARD NOT INSERTED : A PCMCIA memory card for Translation is not inserted.	Insert a Translation card or a card that has not been formatted.
0402	ABK INCORRECT CARD TYPE : A PCMCIA card other than a Translation card is inserted.	Remove the current card and insert a Translation card or a card that has not been formatted.
0403	ABK CARD WRITE-PROTECTED : The Translation card has the write protection switch on.	Flip the write protection switch on the card to off (non-write protect mode/position). If this problem persists, try another card, then replace the processor module if the problem remains.
0C01	NO I-VMS PORT IN SERV : This error indicates that the VMS machine may be down.	No action required.
0C02	DID INTERDIGIT TIMEOUT : May be noisy line or central office problem.	No action required. If problem persists, troubleshoot the DID line and inform the central office if necessary.
0C03	ALL TTRs UNAVAILABLE : The system needed to use a TTR but one was not available for any and all reasons including: in use, not physically present, and out of service.	Check count and first and last occurrences to determine if error occurs too frequently. If so, check to see if you can add TTRs to the system. If you have the prompt out of queue active, you may want to shorten the delay announcement message length. If you have the prompt out of queue feature and secondary announcement(s) active, you may want to increase the interval between the announcements. If you reprogram the delay announcement unit, recheck it to verify that the problem no longer exists. Check to see if you can add TTRs to the system.

**Table 6-4. Error Codes—Continued**

<b>Error Code</b>	<b>Description</b>	<b>Action</b>
0C04	MWL FAC TIMEOUT Two consecutive messages to update Message Waiting lights have been sent across the private network on the same tandem trunk and have not been acknowledged. When this happens three times, the error becomes permanent. The alarm remains in the log until a message for the facility is acknowledged or five days pass.	Check the error log for additional error codes. If the error log contains errors indicating problems with the 100D module, troubleshoot the 100D module using instructions in Chapter 4 of this guide. If the error log also contains errors indicating problems with the 400EM module, troubleshoot the 400EM module using instructions in Chapter 4 of this guide. If the 100D and/or the 400EM modules are functioning properly, troubleshoot the trunks using instructions in Chapter 5 of this guide.
0C05	MWL DELIVERY DELAY A message to update non-local Message Waiting lights has exceeded the time period for delivery. A transient alarm occurs after one minute, and a permanent alarm occurs after 15 minutes. The alarm remains in the error log until a message is delivered or five days pass.	Check the error log for additional error codes. Troubleshoot the trunks by using instructions in this chapter of this guide. Check that the system receiving the message has enough TTRs to handle the volume of calls. Check the error logs on the sending system and then on the receiving system—more facilities may be needed.
1C01	POOL M-BUSY EXCEEDS 50% : More than half the trunks in the pool are busy.	Troubleshoot trunk.
1C02	DPR TEST NOT COMPLETED	Slot did not complete initializing.
1C03	FW UPGRADE ATTEMPT :	No action required.
1C04	FW UPGRADE COMPLETE :	No action required.
1C05	INVALID FMW 29 DETECTED : Incompatibility problem. The specified video system or data device is connected to an 008 MLX with firmware vintage 0x29.	Replace the 008 module with one of another firmware vintage and retire this permanent alarm manually.
0404	ABK EXTENSION BUSY : An extension is in program, administration, or maintenance mode.	Wait until the extension changes mode. Make sure the programming device (WinSPM or the console) is not in programming mode when automatic backup is scheduled to occur.
0405	ABK FAULTY CARD : Unknown cause of a bad card.	Reset card and retry. If the problem remains, try another card. If the problem still remains, replace the processor module.

Table 6-4. Error Codes—Continued

Error Code	Description	Action
1C06	BAD BOARDS IN SYSTEM: At least one incompatibility problem of type HER 0x1c05 detected. Turns on CPU red LED.	Replace the 008 module with one of another firmware vintage and retire this permanent alarm manually.
3001	ALARM TABLE FULL: The error logs are full, and no more errors can be added to them. Turns on the processor LED.	Correct indicated errors, and then remove entries from the transient system error log to free up space. If problem persists, cold-start the system before continuing with troubleshooting. Sys Program→System→Restart
4401	USER REQUESTED SYS ERASE: This error is logged after a System Erase. If the System Erase is successful, this error is removed immediately.	If this error remains in the transient log, do the System Erase again. If problem persists, troubleshoot the processor.
4402	USER REQST UPGRD/INSTALL: This is just a record of the event.	No action required.
4C01	POOL EMPTY: The system needed to use a trunk in a pool but no trunks were physically present in the pool, that is, all of the boards were removed from the system. See first argument number on the screen for pool index (1–11).	Check that the pool has a trunk assigned to it. If a trunk is assigned and the problem persists, replace the boards.
4C02	POOL BUSY: The system needed to use a trunk in a pool. Trunks are physically present; however, non are idle and available for use, therefore they must be in use or out of service. See first argument number on the screen for pool index (1–11).	Check the count and first and last occurrences. If occurring too frequently, determine if facilities can be added or moved to this pool.
4C03	POOL BUSY &/OR OOS: The system needed to use a trunk in a pool. Trunks are physically present, some may be busy but some are idle. However, the idle trunks are not in service. See first argument number on the screen for pool index (1–11).	Restore if out of service.

Table 6-4. Error Codes—Continued

Error Code	Description	Action
5802	BOARD RENUMBER : A Board Renumber occurred.	If the system is functioning properly, remove the error from the Transient Error Log. If the system is not functioning properly, check the Transient Error Log to verify that a Board Renumber took place. Compare the system's previous configuration to the one after the Board Renumbering to determine if logical IDs shifted.
7401	TRK UPLINK MESSAGE ERROR : Communication problems between processor and modules. Unrecognized message from module to processor.	Test the trunk with a single-line telephone. If the problem is not in the trunk, replace the module with one that is known to be working. If the problem is gone when using the known good module, replace the module and restart.
7402	LOOP CONTROL BIT NOT SET : No loop current on an outgoing call. If this error occurs four times consecutively, and if Automatic Maintenance-Busy is enabled and the 50% maintenance-busy limit has not been exceeded, the trunk is busied-out automatically.	Test the trunk with a single-line telephone. If the problem is not in the trunk, replace the module with one that is known to be working. If the problem is gone when using the known good module, replace the module and restart.
7403	NO LOOP CURRENT : Communication problems between the module and central office. No loop current. If this error occurs four times consecutively, and if Automatic Maintenance-Busy is enabled and the 50% maintenance-busy limit has not been exceeded, the trunk is busied-out automatically.	Test the trunk with a single-line telephone. If the problem is not in the trunk, replace the module with one that is known to be working. If the problem is gone when using the known good module, replace the module and restart.
7404	STUCK RINGING : Communication problems between the module and central office. If this error occurs twice consecutively, the trunk is busied-out automatically, whether or not Automatic Maintenance-Busy is enabled.	Test the trunk with a single-line telephone. If the problem is not in the trunk, replace the module with one that is known to be working. If the problem is gone when using the known good module, replace the module and restart.

Table 6-4. Error Codes—Continued

Error Code	Description	Action
7801	NOT IN NORMAL OP MODE : Module not in normal operation mode. Reported in background module check. The MERLIN Messaging System reset at 2:00 a.m. or the MERLIN Messaging System was upgraded.	Reset the board. If problem persists, troubleshoot the module. Maintenance→Slot→Slot Number→Reset If MERLIN Messaging System software was upgraded, no action is required.
7802	SANITY INT NOT GENERATED : Only applies to modules that have extension jacks. Or MERLIN Messaging System software was upgraded.	Reset the board. If problem persists, troubleshoot the module. If MERLIN Messaging System software was upgraded, no action is required.
7803	NO PORT BOARDS AVAILABLE : This error is reported when modules are not present.	No action required. Delete this entry from the transient log.
7804	INVALID SANITY RESPONSE : This error occurs when a sanity test gets invalid responses. Applies only to modules that have extension jacks. Or MERLIN Messaging System software was upgraded.	Reset the board. If problem persists, troubleshoot the module. If MERLIN Messaging System software was upgraded, no action is required.
7805	INVALID SLOT NUMBER : Rarely occurs. Software could not process an event detection because the slot number was invalid.	No action required; however, if problem persists, restart the system.
7806	NOT IN STANDBY MODE : Reported during cold start or background check.	Reset the board. If problem persists, troubleshoot the module.
7807	SELF TEST NOT COMPLETED : Reported during cold start.	Reset the board. If problem persists, troubleshoot the module.
7808	TEST RESULT REGISTER BAD : A module error or processor error resulted while running test.	Reset the board. If problem persists, troubleshoot the module.
7809	TEST STATUS REGISTER BAD : A module error or processor error resulted while running test.	Reset the board. If problem persists, troubleshoot the module.
780A	DPR TEST NOT COMPLETED : Reported during cold start.	If problem persists, troubleshoot the module.
780C	RAM TEST FAILURE : Memory failed the RAM test. Turns on the processor LED.	If problem persists, replace the processor.

**Table 6-4. Error Codes—Continued**

<b>Error Code</b>	<b>Description</b>	<b>Action</b>
780D	UPPER ROM FAILURE : Memory failed the ROM test. Turns on the processor LED.	If problem persists, replace the processor.
780E	LOWER ROM FAILURE : Memory failed the ROM test. Turns on the processor LED.	If problem persists, replace the processor.
8001	UNEXPECTED ETR MESSAGE : An unsupported ETR telephone is connected to a module; or an ETR telephone is faulty; or a 016 ETR module is faulty; or the software is showing the message in error.	If a single user complains, check the ETR telephone. If many users connected to the same 016 ETR module complain, troubleshoot the module and replace if needed. If no users are complaining, clear the error from the log.
8401	MISCELLANEOUS ERROR : Currently not reported.	No action required.
8402	WINK TOO SHORT : Outbound dialing problems on tie trunks. For a tie trunk with delay dial or wink start, the wink from the far end of the network interface is less than the minimum 100 ms. The tie trunk remains waiting for a valid signal.	Troubleshoot the far end of the network interface to see if it is working and translated properly. Troubleshoot for faulty cable. Replace the module.
8403	NO EXTERNAL RELEASE : Communication problems between the module and central office. Far end has not disconnected within four minutes. If this error occurs twice consecutively, the trunk is busied-out automatically, whether or not Automatic Maintenance-Busy is enabled.	Troubleshoot the far end of the network interface to see if it is working and translated properly. Troubleshoot for faulty cable.
8404	ON HOOK BEFORE WINK : Outbound dialing problems on tie trunks. For a tie trunk with delay dial or wink start, the far end of the network interface went on-hook before the handshake was completed.	If problem persists, troubleshoot the tie trunk configuration. Troubleshoot the far end to see if it is working and translated properly. Troubleshoot for faulty cable. Replace the module.
8405	ON HOOK BEFORE READY : Outbound dialing problems on tie trunks. For a tie trunk with delay dial or wink start, the far end of the network interface went on-hook before the guard time elapsed.	Troubleshoot the far end of the network interface to see if it is working and translated properly. Troubleshoot for wink start and faulty cable. Troubleshoot the far end of the private network. Replace the module.

Table 6-4. Error Codes—Continued

Error Code	Description	Action
8406	INTERDIGIT TOO SHORT : Inbound dialing problems on tie and DID trunks.	Troubleshoot the far end of the network interface to see if it is working and translated properly. Troubleshoot for faulty cable. Replace the module.
8407	BAD UPDATE : Communication problems occurred between the processor and the modules. Module may need to be replaced.	Turn the processor off and then on. Repeat system programming procedure. If problem persists, escalate to your technical support organization.
8408	ROTARY RATE > 12PPS : Inbound dialing problems on tie and DID trunks.	Troubleshoot the far end of the network interface to see if it is working and translated properly. Troubleshoot for faulty cable. Replace the module.
8409	ROTARY RATE < 8PPS : Inbound dialing problems on tie and DID trunks.	Troubleshoot the far end of the network interface to see if it is working and translated properly. Troubleshoot for faulty cable. Replace the module.
840A	BAD DOWNLINK MESSAGE : Communication problems occurred between the processor and the modules. The module received an unrecognized message from the processor.	Turn the processor off and then on. Repeat system programming procedure. If the problem persists, replace the module.
840B	NO LOOP CURRENT : Communication problems between the module and the central office. No loop current. If this error occurs four times consecutively, and if Automatic Maintenance-Busy is enabled and the 50% maintenance-busy limit has not been exceeded, the trunk is busied-out automatically.	Replace the module with a similar module and test. If the problem is resolved, replace the bad module. If the problem persists, reinstall the old module and test the trunk.
840C	STUCK RINGING : Communication problems between the module and central office. If this error occurs four times consecutively, and if Automatic Maintenance-Busy is enabled and the 50% maintenance-busy limit has not been exceeded, the trunk is busied-out automatically.	Replace the module with a similar module and test. If the problem is resolved, replace the bad module. If the problem persists, reinstall the old module and test the trunk.

Table 6-4. Error Codes—Continued

Error Code	Description	Action
840D	INCORRECT FIRMWARE STATE : If this error occurs four times consecutively, and if Automatic Maintenance-Busy is enabled and the 50% maintenance-busy limit has not been exceeded, the trunk is busied-out automatically.	Turn power off for at least 1 second and then turn it on. Repeat system programming procedure. If problem persists, replace the module.
840E	UPLINK MESSAGE ERROR : Communication problems between the processor and the module. The module received an unrecognized message from the processor.	Turn the processor off and then on. Repeat system programming procedure. If the problem persists, replace the module.
840F	LOST IDLE MESSAGE ERROR :	
8C01	SLOTS NOT EQUAL : The module that occupies the indicated slot does not match the slot information contained in the PC or PCMCIA card backup file.	Troubleshoot the slot descriptions in your backup file against the actual system modules that occupy those slots. After the mismatch is corrected, repeat the restore operation.
9801	MCARD WRITE ERROR : Write to the memory card is not succeeding or is too slow.	Reset the card and try again. If the problem persists, replace the card and try again. If the problem still persists, replace the processor.
9802	MCARD ERASE ERROR : Erasure of the memory card is not succeeding or is too slow.	Reset the card and try again. If the problem persists, replace the card and try again. If the problem still persists, replace the processor.
9803	MCARD 12-VOLT ERROR : The memory card voltage is incorrect.	Reset the card and try again. If the problem persists, replace the card and try again. If the problem still persists, replace the processor.
9C01	NW REJECTS SPID : Service on the link has been lost.	Check the programmed SPID for correctness. If it is incorrect, modify the programming; otherwise, contact the central office to correct the problem.
9C03	LINK ESTABLISHMENT FAIL : Service on the link has been lost.	Check that the line is securely connected to the port and that the LEDs on the board show proper operation. If the card appears to be working properly, make sure the central office has activated the line.
9C04	NW NOT RESPOND TO SETUP : Service on the link has been lost.	The private network is not responding to the MERLIN LEGEND messages. Contact the central office to correct the problem.

Table 6-4. Error Codes—Continued

Error Code	Description	Action
9C05	NW NOT RESPOND TO RELEASE : Service on the link has been lost.	The private network is not responding to the MERLIN LEGEND messages. Contact the central office to correct the problem.
9C07	ENDPOINT UNINIT (L2/L3) : Service on the link is uninitialized.	The link is in the process of initializing. If this error remains logged for more than a half hour, try re-plugging the DSL. If the problem persists, contact the central office to correct the problem.
9C08	PROTOCOL ERROR : Service on the line may be affected.	The private network has indicated that a protocol error has occurred. Verify the line provisioning by running the NI-BRI Provisioning Test or through other means. If the provisioning is correct, contact your technical support organization.
A401	CTI LINK BROADCAST RESET : Occurs during a broadcast reset. The Red LED on the CPU will not turn on, but the Red LED for the slot <i>will</i> turn on.	If several of these occur: Check that the system is in Hybrid/PBX mode. Validate the wiring and the connections. Press the Restart Button (see "Restart" on page 4–119). Call the TSO's Telephony Services Maintenance Group (800 242-2121) for the procedures to unload and reload the PBX driver.
A801	CTI LINK HIDDEN RESET : Occurs during a hidden reset.	If several of these occur, and the client application has "slow" response time: Validate the wiring and the connections. Press the Restart Button (see the procedure "Restart" on page 4–119). Call the TSO's Telephony Services Maintenance Group (800 242-2121) for the procedures to unload and reload the PBX driver.



**Lucent Technologies**  
Bell Labs Innovations



**MERLIN MAGIX™**  
**Integrated System**  
**Release 1.0i**

System Programming

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## Notice

Every effort has been made to ensure that the information in this guide is complete and accurate at the time of printing. Information, however, is subject to change. See Appendix A, "Customer Support Information," in *Feature Reference* for important information.

## Your Responsibility for Your System's Security

Toll fraud is the unauthorized use of your telecommunications system by an unauthorized party—for example, persons other than your company's employees, agents, subcontractors, or persons working on your company's behalf. Note that there may be a risk of toll fraud associated with your telecommunications system, and, if toll fraud occurs, it can result in substantial additional charges for your telecommunications services.

You and your System Manager are responsible for the security of your system, such as programming and configuring your equipment to prevent unauthorized use. The System Manager is also responsible for reading all installation, instruction, and system administration documents provided with this product in order to fully understand the features that can introduce risk of toll fraud and the steps that can be taken to reduce that risk. Lucent Technologies does not warrant that this product is immune from or will prevent unauthorized use of common-carrier telecommunication services or facilities accessed through or connected to it. Lucent Technologies will not be responsible for any charges that result from such unauthorized use. For important information regarding your system and toll fraud, see Appendix A, "Customer Support Information," in *System Programming*.

## Federal Communications Commission Statement

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 their own expense. For further FCC information, see Appendix A, "Customer Support Information," in *Feature Reference*.

## Year 2000 Compliance

The MERLIN MAGIX Integrated System is certified to be Year 2000 compliant. Additional information on this certification, and other issues regarding Year 2000 compliance, is available online at <http://www.lucent.com/enterprise/sig/yr2000>.

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### **Support Telephone Number**

If you need assistance when installing, programming, or using your system contact your support organization or your Lucent Technologies authorized dealer.

### **Lucent Technologies Corporate Security**

Whether or not immediate support is required, all toll fraud incidents involving Lucent Technologies products or services *should be reported*. Contact your support organization or your Lucent Technologies authorized dealer to report toll fraud incidents or for instructions on obtaining consultation on security issues, investigation support, referral to law enforcement agencies, and educational programs.

### **Lucent Technologies Fraud Intervention**

If you *suspect you are being victimized* by toll fraud and you need technical support or assistance, contact your support organization or your Lucent Technologies authorized dealer.

### **Warranty**

Lucent Technologies provides a limited warranty on this product. Refer to "Limited Warranty and Limitation of Liability" in Appendix A, "Customer Support Information," of *Feature Reference*.

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# System Programming

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## IMPORTANT SAFETY INSTRUCTIONS



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.

To reduce the risk of fire, electrical shock, and injury to persons, follow these basic safety precautions when installing telephone equipment:

- 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 a telephone jack 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 Lucent Technologies-manufactured MERLIN MAGIX Integrated System circuit modules, carrier assemblies, and power units in the MERLIN MAGIX Integrated System control unit.
  - Use only Lucent Technologies-recommended/approved MERLIN MAGIX Integrated System accessories.
  - If equipment connected to the TDL telephone modules (412 LS-ID-TDL and 024 TDL), the MLX telephone modules (008 MLX, 408 GS/LS-MLX, 408 GS/LS-ID-MLX, and 016 MLX), or the ETR telephone module (016 ETR) 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 electrical shock.
  - The MERLIN MAGIX Integrated System is equipped with a 3-wire grounding-type plug with 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 MAGIX Integrated 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 electrical shock. Never spill liquid of any kind on this product.
-

## System Programming

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- Unplug the product from the wall outlet before cleaning. Use a damp cloth for cleaning. Do not use cleaners or aerosol cleaners.
- Auxiliary equipment includes answering machines, alerts, modems, and fax machines. To connect one of these devices, you must first have a Multi-Function Module (MFM).
- Do not operate telephones if chemical gas leakage is suspected in the area. Use telephones located in some other safe area to report the trouble.



### **WARNING:**

- To eliminate the risk of personal injury due to electrical shock, DO NOT attempt to install or remove an MFM from your MLX telephone. Opening or removing the module cover of your telephone may expose you to dangerous voltages.
- ONLY an authorized technician or dealer representative shall install, set options, or repair an MFM.

**SAVE THESE INSTRUCTIONS**

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# Customer Support Information



## Support Telephone Numbers

If you need assistance installing, programming, or using your system, contact your support organization or your Lucent Technologies authorized dealer.

## 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.

## Security

As a customer of new telecommunications equipment, you should be aware of the significant and growing problem of theft of long distance services by third parties, known commonly as "toll fraud." It is particularly important that you understand and take appropriate steps to deal with this crime because, under applicable tariffs, you will be responsible for payment of associated toll charges. Lucent Technologies can not be responsible for such charges and will not make any allowance or give any credit resulting from toll fraud.

Toll fraud can occur despite the preventive efforts of network providers and equipment manufacturers. Toll fraud is a potential risk for every customer with telecommunications equipment having one or more of the following features: (1) Remote Access, (2) Automated Attendant, (3) voice mail, (4) remote administration and maintenance, and (5) call forwarding (remote). This is not a product or design defect, but a risk associated with equipment having one or more of the features described above. If your new telecommunications equipment possesses any of these features, please consult the relative portion of your documentation for further details and specific procedures to reduce the risk of toll fraud or contact your Lucent Technologies representative for further details. The Remote Access feature must be properly administered to help reduce the risk of unauthorized use. It is your responsibility to take the appropriate steps to implement the feature

properly, evaluate and administer the various restriction levels, and protect and carefully distribute access codes.

To reduce the risk of unauthorized access to your MERLIN MAGIX Integrated System, you should observe the following procedures:

- Use a nonpublished Remote Access telephone number.
- Assign passwords, barrier, or access codes randomly to users on a need-to-know basis, keeping a log of ALL authorized users and assigning one code to each person.
- Ensure that Remote Access users are aware of their responsibility to keep the telephone number and any access codes secure.
- Use random sequence access codes. These are less easily broken.
- Deactivate all unassigned access codes promptly.
- When possible, restrict the off-network capability of callers via use of Call Restrictions and Disallowed Lists.
- When possible, block off-hours calling.
- Frequently monitor system call detail reports for quicker detection of any unauthorized or abnormal calling patterns.

## Physical Security, Social Engineering, and General Security Measures

Criminals called hackers may attempt to gain unauthorized access to your communications system and voice messaging system in order to use the system features. Hackers often attempt to trick employees into providing them with access to a network facility (line/trunk) or a network operator. This is referred to as social engineering. Hackers may pose as telephone company employees and employees of Lucent Technologies or your authorized dealer. Hackers will go through a company's trash to find directories, dialing instructions, and other information that will enable them to break into the system. The more knowledgeable they appear to be about the employee names, departments, telephone numbers, and the internal procedures of your company, the more likely it is that they will be able to trick an employee into helping them.

**Preventive Measures.** Take the following preventive measures to limit the risk of unauthorized access by hackers:

- Provide good physical security for the room containing the communications equipment and the room with administrative tools, records, and System Manager information. These areas should be locked when not attended.
- Provide a secure trash disposal for all sensitive information, including telephone directories, call accounting records, or anything that may supply information about your communications system. This trash should be shredded.
- Educate employees that hackers may try to trick them into providing them with dial tone or dialing a number for them. All reports of trouble, requests for moving extensions, or any other administrative details associated with the MERLIN MAGIX Integrated System should be

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handled by one person (the System Manager) or within a specified department. Anyone claiming to be a telephone company representative should be referred to this person or department.

- No one outside of Lucent Technologies needs to use the MERLIN MAGIX Integrated System to test facilities (lines/trunks). If a caller identifies themselves as a Lucent Technologies employee, the System Manager should ask for a telephone number where the caller can be reached. The System Manager should be able to recognize the number as a Lucent Technologies telephone number. Before connecting the caller to the administrative port of the MERLIN MAGIX Integrated System, the System Manager should feel comfortable that a good reason to do so exists. In any event, it is not advisable to give anyone access to network facilities or operators, or to dial a number at the request of the caller.

## Limited Warranty and Limitation of Liability

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### Limited Warranty

LUCENT TECHNOLOGIES AND ITS AFFILIATES MAKE NO WARRANTIES, EXPRESS OR IMPLIED, ABOUT OR RELATING TO YOUR MERLIN MAGIX INTEGRATED SYSTEM AND SPECIFICALLY DISCLAIM ANY WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

You should check with the reseller from whom you purchased your system to determine if it offers a limited warranty.

## **Limitation Of Liability**

EXCEPT FOR PERSONAL INJURY, DIRECT DAMAGES TO TANGIBLE PERSONAL PROPERTY PROXIMATELY CAUSED BY LUCENT TECHNOLOGIES, AND LIABILITY OTHERWISE EXPRESSLY ASSUMED IN A WRITTEN AGREEMENT SIGNED BY AN AUTHORIZED REPRESENTATIVE OF AT&T, THE LIABILITY OF LUCENT TECHNOLOGIES, ITS AFFILIATES, SUPPLIERS AND AUTHORIZED RESELLERS FOR ANY CLAIMS, LOSSES, DAMAGES OR EXPENSES FROM ANY CAUSE WHATSOEVER (INCLUDING ACTS OR OMISSIONS OF THIRD PARTIES) REGARDLESS OF THE FORM OF ACTION, WHETHER IN CONTRACT, TORT OR OTHERWISE, SHALL NOT EXCEED AN AMOUNT EQUAL TO THE LESSER OF THE DIRECT DAMAGES PROVEN OR THE PURCHASE PRICE OF THE SYSTEM. IN NO EVENT SHALL LUCENT TECHNOLOGIES OR ITS AFFILIATES, SUPPLIERS OR AUTHORIZED RESELLERS BE LIABLE FOR INCIDENTAL, RELIANCE, CONSEQUENTIAL, OR ANY OTHER INDIRECT LOSS OR DAMAGE (INCLUDING, BUT NOT LIMITED TO, LOST PROFITS OR REVENUES AND LOSSES ARISING OUT OF UNAUTHORIZED USE (OR CHARGES FOR SUCH USE) OF COMMON CARRIER TELECOMMUNICATIONS SERVICES OR FACILITIES ACCESSED THROUGH OR CONNECTED TO THE MERLIN MAGIX INTEGRATED SYSTEM) INCURRED IN CONNECTION WITH YOUR SYSTEM. THIS LIMITATION OF LIABILITY SHALL SURVIVE FAILURE OF AN EXCLUSIVE REMEDY.

# About This Book



The power and versatility of the MERLIN MAGIX™ Integrated System is due in part to its many options and features. These options and features have been recorded on system planning forms and initially programmed at the time of installation. Changes in use patterns, the addition of new equipment, or a change in operating mode may necessitate additional system programming.

This book provides information about programming the features and auxiliary equipment on the MERLIN MAGIX system.

## Ordering Information

If you wish to order copies of manuals, replacement parts, accessories, or other equipment that is compatible with the system, contact your Lucent Technologies representative.

## 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, property damage, or loss of data if the hazard is not avoided.*





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This chapter presents the information you need to master before you begin the programming procedures covered in Chapter 3, “Programming Procedures.” It covers the following subjects:

- An introduction to system programming basics
- How to use the system programming console
- How the programming screens and keys work
- How to interpret and use the programming procedures
- How to enter and exit system programming
- Which system components require idle states for programming

## Introduction to System Programming

The MERLIN MAGIX™ Integrated System offers easy-to-use, menu-driven software for system programming. After your system is installed, use this software to accommodate your company’s changing needs for such enhancements and modifications as upgraded lines, additional modules, and new extension programming.

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### Planning Forms

Before you begin to program or modify your system, you should familiarize yourself with the system planning forms. Initially, system planning forms are used to plan your system and program your system during installation. After installation, they remain a source for all programming information on your system database. The information ranges from the system time and date to specific equipment configurations and feature programming.

Each planning form is either required or optional:

- Required forms are necessary to program the system.
- Optional forms are needed only if the System Manager included the features or options shown on the forms.

Before you begin to program or modify your system, review the Control Unit Diagram on system planning Form 1 to identify the module types installed in the system’s control unit. Use this information to program or modify lines and trunks and assign or reassign lines to extensions.

Check the physical control unit to verify that the modules are placed in the slots identified on the diagram. Correct the diagram on Form 1 if there are any discrepancies.

Before you make any changes to your system, be sure to do the following:

- Mark any system modifications or changes on the appropriate planning form. Keep your planning forms up-to-date.
- Check the *Feature Reference* for possible feature interactions.
- Program the system or the system component during the appropriate idle state. See “Idle States” on page 1-20.

---

## Types of Programming

The three types of programming available for the system are:

- **System Programming.** This type of programming enables the System Manager to program features that affect all or most system users, and requires one of the following:
  - A system programming console which is a 4424LD+ or MLX-20L telephone connected to one of the first five jacks of the first TDL or MLX module in the control unit.
  - A PC with Windows System Programming and Maintenance (WinSPM) software. WinSPM provides two interfaces for system programming—Quick Access and Standard SPM Mode. Quick Access provides a graphical user interface (GUI) for those tasks most commonly performed by the System Manager (for example, add or delete members of groups, perform system inventories, create reports, program multiple systems, make station labels appear on display telephones, and more). Pictorial representations of system components, such as modules and their vintages, and the creation of 4400-Series or MLX telephone button labels, are available with WinSPM.

The Standard SPM Mode interface provides an emulation display of the system programming console. It allows basic SPM programming of the MERLIN MAGIX system and supports SPM programming for options not included in the GUI.

The PC should be connected to the lower port (labeled ADMIN) on the processor module. A PC with a modem can perform system programming remotely through the public network, or by connecting to a tip/ring extension jack (016 (T/R) or 008 OPT module) on the system. A built-in modem in the processor allows the PC and the system to communicate.

- **Extension Programming.** This type of programming enables individual extension users and system operators (except for Queued Call Console operators) to change their extension features to meet individual needs. For details about extension programming, see the appropriate user and operator guides.
- **Centralized Telephone Programming.** This type of programming enables the System Manager to program any feature that can be programmed by individual extension users or system operators. Some features can be programmed only in centralized telephone programming. Centralized telephone programming can be done on the programming console or on a PC with the WinSPM software.

## System Programming Console

The system programming console is a 4424LD+ or MLX-20L telephone connected to the system programming jack. When you begin system programming on a new system for the first time, the console must be connected to the first jack on the first 024 TDL module if you are using a 4424LD+ Telephone, or to the first jack on the first 008 MLX module or 016 MLX module if you are using an MLX-20L telephone. The first jack on the first TDL or MLX module is factory-set as the system programming jack and as an operator position. When you program for the first time, you can change the system programming jack to any one of the first five jacks on the first 024 TDL module, or on the first 008 MLX module or 016 MLX module. This allows you to program without interfering with the operator's call handling.

You can also have one or two Direct Station Selectors (DSSs) connected to the system programming console. Each DSS adds 50 extension buttons to the console, which facilitates assigning features to extensions. The DSS for the 4424LD+ console is the DSS 4450.

A 4424LD+ Telephone is shown in Figure 1-1. An MLX-20L telephone is shown in Figure 1-2.

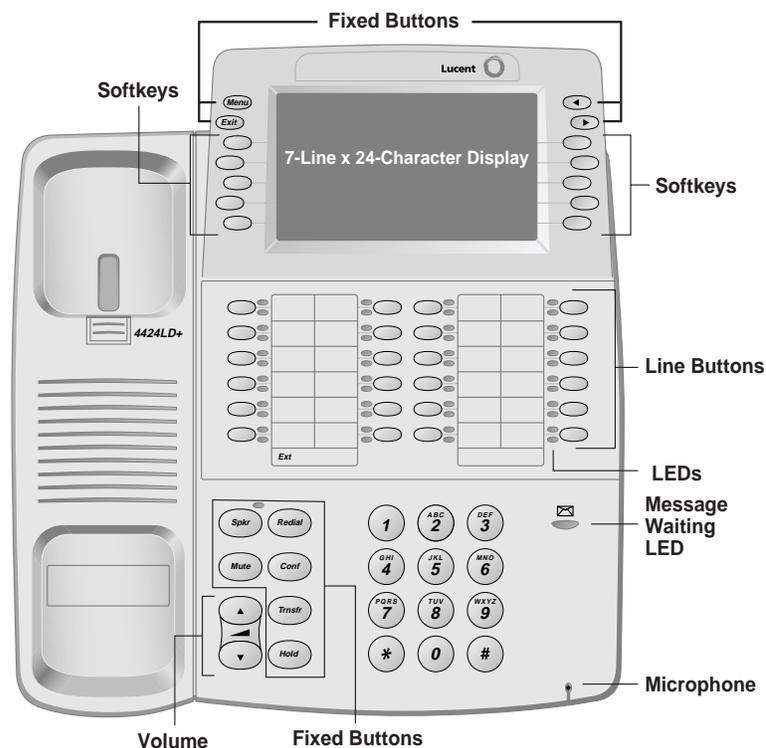


Figure 1-1. 4424LD+ Telephone

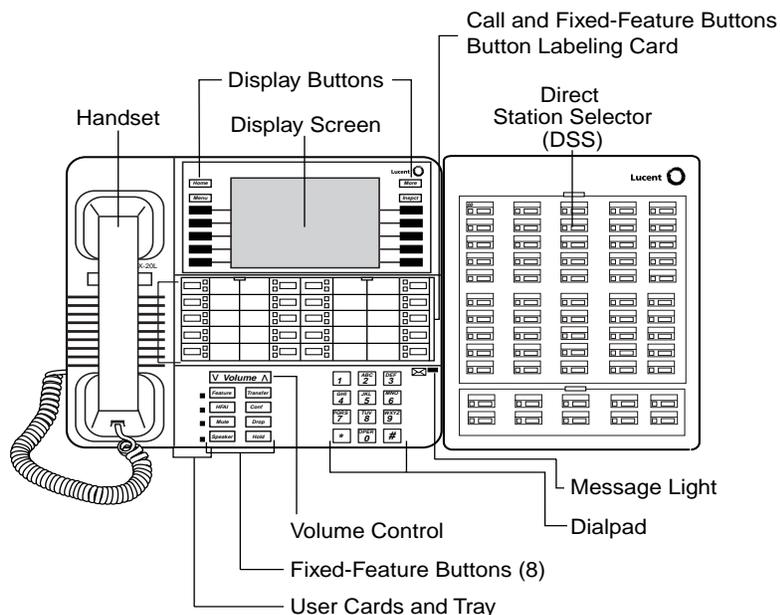


Figure 1-2. MLX-20L Telephone

## Console Components

Table 1-1 describes the components that make up the 4424LD+ or MLX-20L Console. Refer to Figure 1-1 and Figure 1-2 for the location of the components. Table 1-2 describes the components that make up the DSS.

Table 1-1. 4424LD+ and MLX-20L Console Components

Component	Function
Desk Stand (not shown)	An adjustable stand on the console and the DSS allows a 20- or 30-degree viewing angle (optional on the 4424LD+ Telephone).
Button Labeling Cards	Cards labeled with the number or feature assigned to each line button.
Contrast Control (not shown)	A sliding control at the top of the console, used to brighten or dim the display screen.

**Table 1-1. 4424LD+ and MLX-20L Console Components—Continued**

<b>Component</b>	<b>Function</b>
Fixed Feature Buttons	<p>4424LD+ Telephone fixed display buttons for most-used features:</p> <p>Spkr (Speaker) for turning the speakerphone on and off.</p> <p>Mute for turning the speakerphone's microphone and, if applicable, the headset's microphone on and off.</p> <p>Trnsfr (Transfer) for sending a call to another telephone.</p> <p>Conf for adding a line or extension to a conference call.</p> <p>Redial for redialing the last number dialed from the telephone.</p> <p>Hold for putting a call on hold.</p> <p>MLX-20L telephone fixed display buttons for most-used features:</p> <p>Feature for viewing the Feature screen and selecting features.</p> <p>HFAI (Hands-Free Answer on Intercom) for answering voice-announced calls without the handset.</p> <p>Mute for turning the speakerphone's microphone on and off.</p> <p>Speaker for talking on a call through the speakerphone without lifting the handset.</p> <p>Transfer for sending a call to another telephone.</p> <p>Conf for adding a line or extension to a conference call.</p> <p>Drop for disconnecting an extension or line from a conference call.</p> <p>Hold for putting a call on hold.</p>
Dialpad	Number pad for dialing telephone numbers.
Direct Station Selector (DSS) (not shown)	A device that adds extension buttons and other buttons to the console. See Table 1-2.
Display Buttons	Four fixed display buttons and 10 unlabeled buttons used to view the different screens and select names, features, and options from the display screen. See "Console Buttons" on page 1-7.
Display Screen	Screen with a 7-line by 24-character display area that shows call information, features, prompts, date, and time.
Handset	The hand-held part of the console you pick up, talk into, and listen from.
LEDs	(Light-Emitting Diodes) The lights on the console that assist in checking feature status.
Line Buttons	Buttons to make and receive calls; unlabeled buttons are programmable for one-step feature use. The 4424LD+ has 24 line buttons, and the MLX-20L has 20 line buttons.
Message Light	A red light that signals a waiting message.

**Table 1-1. 4424LD+ and MLX-20L Console Components—Continued**

Component	Function
User Cards and Tray (MLX-20 only)	A slide-out drawer with erasable cards for noting telephone numbers and feature codes.
Volume Control	A button for adjusting the volume of speaker, handset, headset, and ringer.

**Table 1-2. Direct Station Selector (DSS) Components**

Component	Function
Covers	Removable plastic covers to protect the designation cards. The top cover protects the 50 DSS button labels. The lower cover fits over the fixed buttons.
DSS Designation Cards	Cards for labeling the extension or feature assigned to each button.
DSS Buttons	Fifty buttons used for one-touch dialing of co-workers' extensions to make or transfer calls. DSS buttons are also used to page co-workers over speakerphones, to park calls, and to handle outside calls.
Fixed Buttons	<p>Ten additional buttons, including Message Status, Direct Voice Mail (MLX DSS only), and three Page buttons. The five remaining buttons on the first DSS are not used. If a second DSS is connected to the console, the 10 buttons at the bottom of the second DSS are not used.</p> <p>Fixed Message Status button used with fixed Page buttons to see which telephones have Message Lights on.</p> <p>Fixed Page Buttons are three buttons used to select the pages of extensions that the 50 DSS buttons represent.</p>
LEDs (Light-Emitting Diodes)	The lights that assist in checking feature status.

## Console Buttons

Use the 14 buttons located on either side of the 4424LD+ or MLX-20L console display area for system programming. These buttons are arranged in two columns of seven buttons, as shown in Figure 1-3 and Figure 1-4. On the 4424LD+ console, three of the four fixed display buttons have different labels than those on the MLX-20L console, although the same functionality is provided (see the following section, “Fixed Display Buttons”).

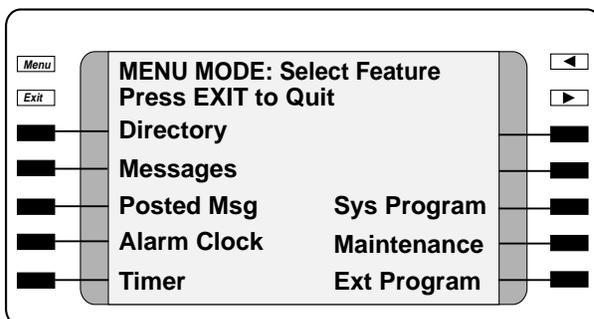


Figure 1-3. 4424LD+ Display Buttons and Main Menu

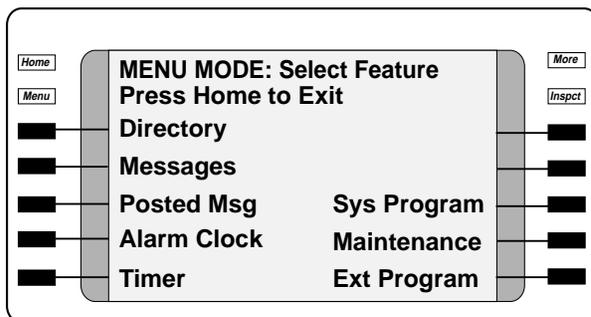


Figure 1-4. MLX-20L Display Buttons and Main Menu

## Fixed Display Buttons

The top two buttons in each column have the same labels and functions regardless of the screen display. This type of button is called a fixed display button. Table 1-3 describes the functions of the fixed display buttons for the 4424LD+ and MLX-20L consoles.

**Table 1-3. Fixed Display Buttons**

MLX-20L Buttons	4424LD+ Buttons	Function
Home	Exit	Return to normal call handling mode after you finish programming.
Menu	Menu	Display the Main menu shown in Figure 1-3.
More		Display more items when a menu is continued on more than one screen, indicated by an angle bracket (>) on the upper right of the screen.
Inspct		(Inspect) View a list of lines or extensions on which a feature is programmed or the settings for a feature. On the 4424LD+ console, an Inspect button must be programmed (programming code *778).
		Return to the previous screen; indicated by an angle bracket (<) on the upper right of the screen. The MLX-20L does not have an equivalent button.

## Unlabeled Display Buttons

Use the five unlabeled display buttons on each side of the screen to select commands, options, or items on the screen. The functions of these buttons vary, based on the option you select.

If you are using WinSPM for system programming, the simulated 4424LD+ or MLX-20L console screen on your PC screen shows the function keys that correspond to the console screen selections. For example, to save an entry, you select `Enter` on the console or click `[F10]` in the emulation display on your PC. See Chapter 2, “Programming with WinSPM,” for details about using function keys and additional information about WinSPM.

## Console Overlay

The programmable line buttons are on the main part of the console. There are 24 line buttons on the 4424 LD+; however, the four buttons on the top row are not used during system programming.

The MLX-20 console has 20 line buttons, but you can use the console overlay to program up to 28 line buttons on any extension through centralized telephone programming. Select Page 1 to access line buttons 1 through 20 and Page 2 to access line buttons 21 to 34. The top line of numbers next to each line button on the console overlay represents line buttons. See Figure 1-5 and Figure 1-6 that follow.

When labels or filenames are entered, the letters A through F are displayed on the console screen. Additional letters can be entered by using line buttons 1 through 20 to represent letters G through Z. These letters are also displayed on the top line of the console overlay.

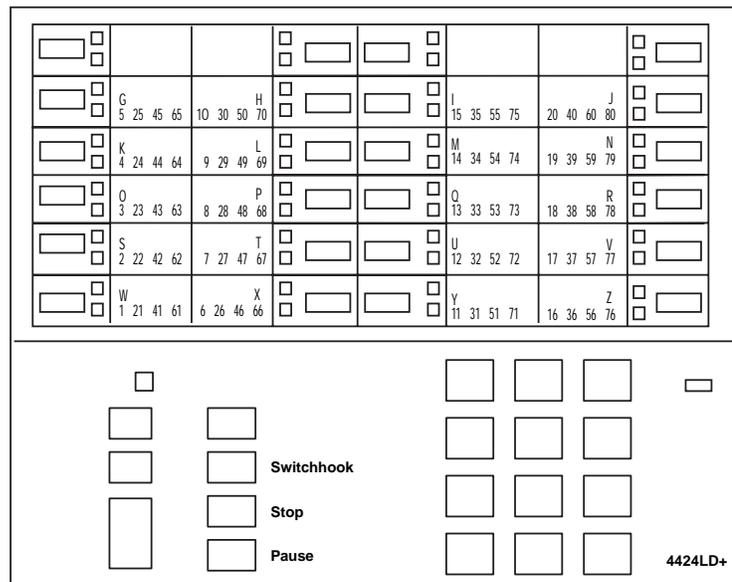


Figure 1-5. 4424LD+ System Programming Console Overlay

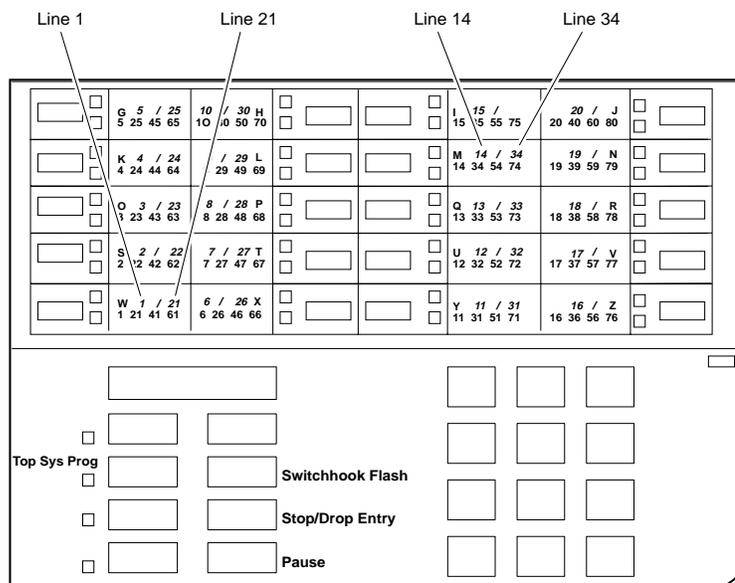
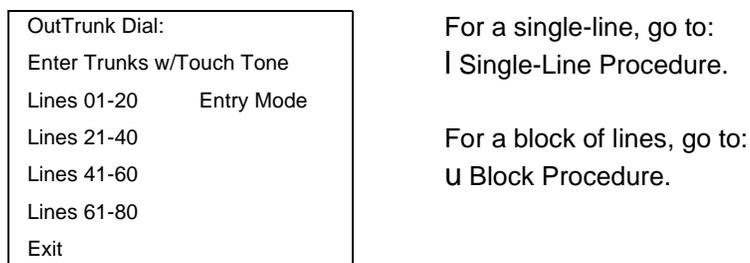


Figure 1-6. MLX-20L System Programming Console Overlay

The *Top Sys Prog* labeled function shown on the console overlay in Figure 1-6 does not appear on the 4424LD+ console overlay. The 4424LD+ does not provide a fixed HFAI (Hands Free Answer on Intercom) button for this feature; however, the HFAI feature can be programmed onto a line button on the 4424LD+ Telephone and then used for system programming.

When programming lines/trunks, you can select a block of 20 lines/trunks, as shown in Figure 1-7, and toggle the green or red LED associated with each line button on the console to program each line/trunk. The bottom line of numbers next to each line button on the console overlay represents the twenty lines/trunks associated with each line button (see Figure 1-6).



**Figure 1-7. Selecting a Block of Lines/Trunks**

---

## Console and DSS Lights

The red and green lights (LEDs) next to each of the 20 line buttons on the 4424LD+ and MLX-20L console, show the status of the line/trunk options. LEDs on the DSS show the status of features programmed on extensions.

### Console Lights

The green and red LEDs next to each button on the console display the status of the line/trunk option that is being programmed. For example, when you select Pools from the Lines Trunks menu, the red LED is off if the selected line is not in a pool or on if the line is in a pool.

### DSS Lights

The lights on the DSS (if one is attached to the console) show the status of features being programmed on the extensions. When you select a feature from a menu, the red LED next to the DSS button is on, off, or flashing, depending on whether the feature is already programmed on the corresponding extension. For example, when you select Toll Restrict from the Restrictions menu, the red LED next to the DSS button lights for each toll restricted extension.

---

## Programming Procedures

The programming procedures provide step-by-step instructions for programming the system. This section details how to make the best use of the programming procedures.

---

### Procedure Organization

The programming procedures in Chapter 3, “Programming Procedures,” are organized into logical groups. The programming procedures associated with a specific aspect of the system are grouped together under one heading. For example, to assign network services for E1, you would go to the section titled “E1 Facilities” and then locate the network services procedure. For quick reference, see “Menu Hierarchy” in Appendix A.

---

### Procedure Contents

Each procedure begins with a general description of the feature, followed by a summary of programming information that includes the items listed below:

Programmable by	Indicates who has permission to use the procedure.
Mode	Specifies which system mode supports the procedure: Key or Hybrid/PBX or a combination.
Idle condition	Specifies the idle state required before the procedure can be performed.
Planning form	Indicates the planning forms that provide information for the procedure.
Factory setting	Shows the factory settings, if any, for equipment or features affected by the procedure.
Valid entries	Specifies the characters, numbers, or values accepted during data entry.
Inspect	Specifies whether or not the feature status can be verified using the Inspect feature.
Copy option	Indicates whether or not the feature can be copied to another system component once it has been programmed.
Console Procedure	Provides a summary of the procedure steps using the system console.
PC Procedure	Provides a summary of the procedure steps using WinSPM.

## Programming Screens

There are three types of system programming screens:

- **Information Screens.** To view what is currently programmed on the system.
- **Menu selection screens.** To select options from a menu.
- **Data entry screens.** To enter values or to identify a specific extension or line/trunk you want to program.

Figure 1-8 shows a sample information screen. When you select *Sys Program* from the Main menu screen (shown in Figure 1-3 on page 1-7), the screen shown in Figure 1-8 appears with system setup information.

---

System Set-up Review and Exit Size: xxxx Type: xxxx Operator: xxxx xxxx xxxx xxxx xxxx xxxx Back
--

Your system information appears in place of the x's.

---

**Figure 1-8. Information Screen**

You cannot make changes on an information screen. Select *Back* (or click **F5** in the PC emulation display) to continue to the next screen in the procedure.

Figure 1-9 shows a sample menu selection screen.

---

System Programming: > Make a Selection System            Extensions SysRenumbr    Options Operator        Tables LinesTrunks   AuxEquip Back            NightSrvce
--

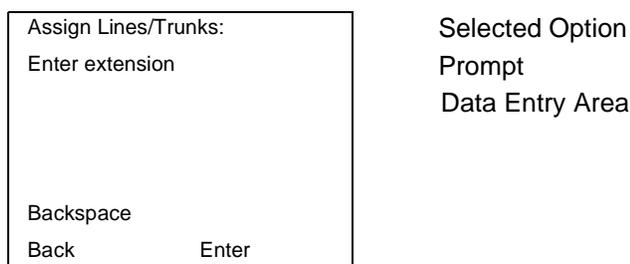
Screen title and More indicator (>)  
Prompt  
Options List

---

**Figure 1-9. Menu Selection Screen**

A menu selection screen prompts you to select one of the available options. The screen title is the first line on all screens. The second line contains a system prompt or instruction. The remaining lines of text vary, based on the selected option.

An angle bracket (>) appears in the upper right corner of menu selection screens that have additional option screens. Press **►** or More (or click **PgUp** in the PC emulation display) to see the additional screens; continue to press or click these buttons to move through the screens and return to the original screen. Figure 1-10 shows a sample data entry screen.



**Figure 1-10. Data Entry Screen**

A data entry screen prompts you to enter specific data or to make specific choices. Data to be entered are displayed with *n*'s in the text. When *n*'s appear on the data entry screen, they indicate data currently programmed for the feature. An exception is the slot/port number, which is displayed as *sspp* to distinguish the 2-digit slot number from the 2-digit port number. Slot is the slot number in the carrier and port is the port number on the module.

**NOTE** ► The slot/port numbering for adjunct ports on MLX modules begins at 21. The slot/port numbering for adjunct ports on TDL modules begins at 25. For example, on an MLX module in slot 1 of the carrier, to access adjunct port 710, you would enter 0121 as the slot/port number (01 indicates slot 1 on the carrier), while, on a TDL module in slot 1 of the carrier, to access adjunct port 710, you would enter 0125.

Many screens show data entered on a previous screen, such as an extension or trunk number. Within the programming procedures, this type of variable information is shown with *x*'s.

When information to be entered varies in the number of digits required (for example, a telephone number that can range from 7 to 20 digits), the data may be displayed as an uppercase *x* or *N*.

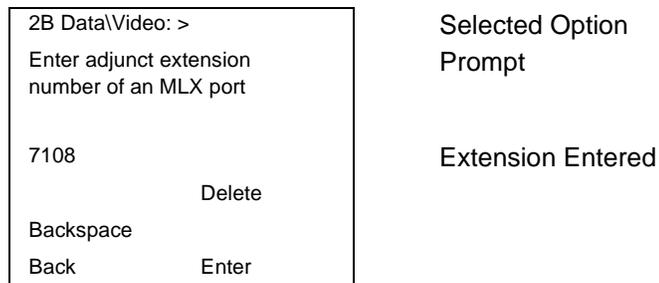
Data entry screens may also contain menu selections. Instead of entering data from the dialpad, you select options on the screen, such as *Yes* or *No*, to enable or disable a feature. To select this type of option, press either the unlabeled display button next to the option name, or the function key that corresponds to the option name. Then your selection is highlighted. To program or save the highlighted selection, press the unlabeled display button next to **Enter** (or click **F10** in the PC emulation display).

## Verifying Data Entry

You can use the Inspect feature to view the entries you save.

The Inspect button is fixed on an MLX-20L. To use the Inspect feature on a 4424LD+ Telephone, you must program a line button with the Inspect feature (refer to the *Feature Reference* for programming the Inspect button).

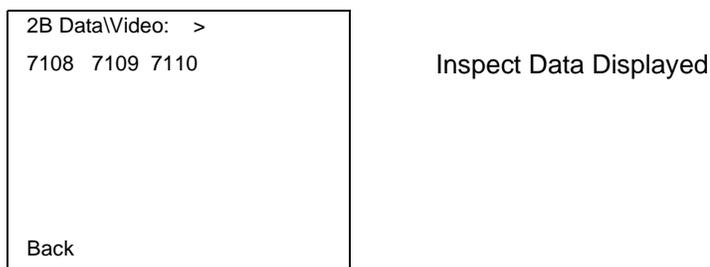
An example of how to use the Inspect feature begins with Figure 1-11. The figure shows a data entry screen with the adjunct extension number of an MLX port.



---

**Figure 1-11. Inspect Example**

After you enter and save 7108, you can enter and save another extension; the extensions you enter appear one at a time on the screen as you enter and save them. However, if you press the Inspect button (**PgDn** in the PC emulation display), all extension numbers that you have programmed in this data entry screen appear. For example, if you entered 7108, 7109, and 7110, when you press the Inspect button, all the extension numbers appear as shown in the sample Inspect screen in Figure 1-12.



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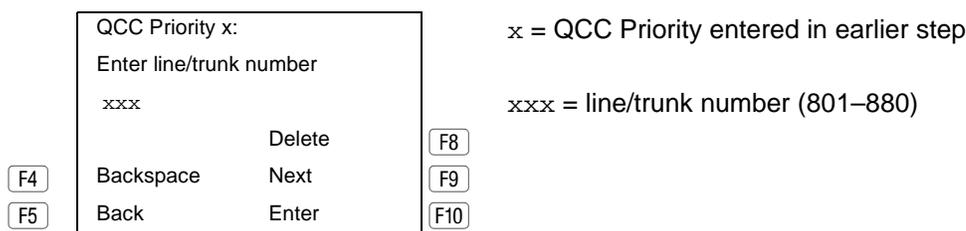
**Figure 1-12. Sample Inspect Screen**

Whenever you want to return to the previous screen, select **Back** (**F5** in the PC emulation display).

The Inspect feature also allows you to check a value that has already been programmed for a feature. This is helpful when you are changing or modifying features. You can also use it when you program sequential extensions or lines to verify the last number programmed. See the *Feature Reference* for details about the Inspect feature.

## Saving Entries and Moving among Screens

At the bottom of each screen, one or more screen keys may appear representing functions that allow you to change your entry, save your entry, or return to a previous screen. Various combinations of these screen keys appear on each programming screen. Figure 1-13 shows the QCC Priority screen with a typical display of screen keys.



**Figure 1-13. Screen Keys**

The PC keys that correspond to the screen key selections are shown here for quick reference. These PC keys do not appear on the console display screen. Table 1-4 contains details on the use of the screen keys.

**Table 1-4. Screen Keys**

Display	PC Key	Function
BackSpace	F4 or ← Bksp	<b>Change your entry.</b> Select Backspace (click F4 or ← Bksp) in the PC emulation display) to correct your entry. Each time you select Backspace or click F4, the screen cursor moves backward to erase one character at a time.
Enter	F10 or Enter ↵	<b>Save your entry.</b> Typically, you select Enter (click F10 or Enter ↵) in the PC emulation display) to complete a procedure and save the information. Occasionally, you must select Exit (click F5) in the PC emulation display) and return to a previous screen after you use Enter. If the entry is not valid, the system may beep and/or display an error message and does not save the entry.
Delete	F8	<b>Delete a current entry.</b> Select Delete (click F8) in the PC emulation display).

Table 1-4. Screen Keys—Continued

Display	PC Key	Function
Next	F9	<b>Program sequentially numbered items.</b> If you are programming a group of sequentially numbered extensions, lines, or trunks, you may optionally select <code>Next</code> (click F9 in the PC emulation display). This saves your entry and automatically provides the number of the next extension or trunk in the sequence. Typically, you remain at the same screen until you select <code>Next</code> . In a few cases, you may return to an earlier screen in the procedure.
Back	F5	<b>Return to the previous screen.</b> Select <code>Back</code> (click F5 in the PC emulation display) when you complete a procedure, to move up one screen in the menu hierarchy. (Appendix A provides a reference to the entire System Programming menu hierarchy.)  <b>Exit a screen without changes.</b> In most cases, you select <code>Back</code> (click F5 in the PC emulation display) to exit from a screen without making any changes. Exceptions are noted as part of a procedure.  <b>Complete a procedure.</b> <i>In a few cases</i> , you return to the System Programming menu when you select <code>Back</code> . In most cases, you return to an intermediate step within the procedure. You can then select one of the options shown on the screen and continue programming, or you can continue to use <code>Back</code> until you return to the System Programming menu.

## Using Enter

Pressing `Enter` to save your entry produces one of the following results:

- The next screen in the procedure appears.
- The screen does not change and you can enter another extension or line/trunk. In most of these cases, `Delete` is also an option. `Enter` is used either to assign the extension to a group or to assign a feature to the extension. `Delete` is used to remove the extension from a group or to remove the feature from the extension.
- The procedure is complete and you return to a previous screen.

## Using Next

When you program a feature that applies to a sequence of extensions, lines/trunks, or groups, the screen key `Next` appears on the console display. `Next` (F9 in the PC emulation display) permits you to save your current entry and display the next number in the sequence. You can continue to press `Next` until you finish programming the entire sequence. When the last number in the

sequence displays on the screen, press `Enter` (`F10` in the PC emulation display) to save the final entry and move to the next step of the procedure. Procedures that allow the use of `Next` return you to the correct screen to continue programming.

---

## System Programming Hierarchy

For a complete listing of the options available under each of the System Programming Main menu options displayed on the system programming console, see the fold-out in Appendix A.

## Access to System Programming from the 4424LD+ or MLX-20L or Console

Follow the steps below to begin system programming. All of the procedures in Chapter 3, "Programming Procedures" begin at the System Programming menu shown in Step 3 of the following procedure.

For information about accessing system programming through a PC with WinSPM, see Chapter 2, "Programming with WinSPM."

1. Press menu to display the Main menu.

MENU MODE: Select Feature	
Press HOME to Exit	
Directory	
Messages	
Posted Msg	Sys Program
Alarm Clock	Maintenance
Timer	Ext Program

2. Select `System Programming`. The System Set-Up screen appears.

System Set-up:	
Review and Exit	
Type: xxxx	
Mode: xxxx	
Operator:       xxxx xxxx	
xxxx xxxx       xxxx xxxx	
Back	

**NOTE** ► `Ext Program` does not appear on this screen if the programming console is a QCC.

On the System Set-up screen, system information appears in place of the x's.

Type = Voice/Data

Mode = Key, Hybrid/PBX,

or Behind Switch

Operator = Position extension numbers

3. Select **Back**. The System Programming menu appears.

System Programming: >	
Make a selection	
System	Extensions
SysRenumbr	Options
Operator	Tables
Lines/Trunks	AuxEquip
Back	NightSrvce

Press the button next to your selection.

## System Programming Menu

Figure 1-14 shows the two screens that make up the System Programming menu.

System Programming: >	System Programming: >
Make a Selection	Make a Selection
System Extensions	Labeling Language
SysRenumbr Options	Data
Operator Tables	Print
Lines/Trunks AuxEquip	Cntr-Prg
Back NightSrvce	Back

**Figure 1-14. System Programming Menu Screens**

Table 1-5 describes the options.

**Table 1-5. System Programming Menu Options**

Option	Description
System	Set system operating conditions.
SysRenumbr	Select the system numbering plan and/or reassign extension numbers with 1- to 4-digit numbers that are more appropriate or convenient for your company.
Operator	Assign or remove operator positions, and program operator features (such as Operator Hold Timer or QCC options).
LinesTrunks	Program line/trunk options.
Extensions	Program extension features (such as line assignments).
Options	Program system-wide features (such as Transfer Return).

**Table 1-5. System Programming Menu Options—Continued**

Option	Description
Tables	Program features that require entering information in a table (such as Allowed Lists and Disallowed Lists).
AuxEquip	Program auxiliary equipment connected to the system (such as loudspeaker paging and fax).
NightSrvce	Program Night Service features.
Labeling	Program the labels shown on display telephones (such as Posted Messages and entries in the System Directory).
Data	Specify extensions that need voice and data capability.
Print	Print system programming reports (such as system configuration and extension assignments).
Cntr-Prog	Perform centralized telephone programming (assign features to specific buttons on telephones).
Language	Select the language for: the system, 4400-Series or MLX display telephones, SMDR reports, and print reports.

### Exiting System Programming

Use the information in Table 1-6 to return to the System Programming menu, the Main menu (Menu Mode screen), or the Home screen from within a programming screen.

**Table 1-6. Exiting System Programming**

To return to...	On the console, press...	On the PC display, click...
Previous menu	Back	F5
Main menu	Menu	End
Normal Call-Handling	MLX-20L Console: Home 4424LD+ Console: Exit	Home Exit

## Idle States

Some programming procedures can be started only when the entire system, or some part of it, such as a trunk or an extension, is idle (not in use). Some procedures require that a trunk or extension be idle only at the instant of programming. Lengthy procedures require the system, trunk, or extension to remain idle until programming is completed. These procedures wait for the system, trunk, or extension to become idle and then prevent the initiation of any new calls. This condition is called forced idle.

**NOTE** ► If a procedure requires an idle condition, do the programming outside of normal business hours.

For complete information, refer to “Idle States” in Chapter 2.



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## Overview

The Windows System Programming and Maintenance (WinSPM) software package offers an alternate method of programming the MERLIN MAGIX Integrated System by using a PC. This method frees the system programming console for other uses and also provides the following additional functions:

- Backing up system programming information
- Restoring system programming information from a backup
- Printing, viewing, and storing reports
- Programming the system remotely
- Programming in surrogate mode
- Creating button labels
- Storing print report data and/or user annotation notes using Notepad Editor

WinSPM provides two modes for programming your MERLIN MAGIX Integrated System:

- **Quick Access Mode.** A graphical user interface (GUI) for those tasks most commonly performed by the System Manager—for example, adding or deleting members of groups, performing system inventories, creating reports, programming multiple systems, making station labels shown on display telephones, and more.
- **Standard SPM Mode.** Provides an emulation display of the system programming console. It allows basic SPM programming of the MERLIN MAGIX system and supports SPM programming for options not included in Quick Access mode.

WinSPM is available on CD-ROM and floppy disks. You can use the WinSPM software directly from the floppy disks or CD-ROM on your PC. If your PC has a hard disk, however, you should install WinSPM from either the floppy disks or CD-ROM onto the hard disk.

This guide describes the use of WinSPM in Standard SPM Mode. If you are using Quick Access, refer to the documentation and online help provided with the WinSPM application for additional information.

## System Requirements

WinSPM is designed to function with:

- Windows 95, Windows 98, or Windows NT Release 4.0 or higher
- IBM-compatible Personal Computer with a Pentium 100 or higher (Pentium II or higher recommended)
- 40 MB or more of available space on the hard drive
- 32 MB of RAM (64 MB recommended)
- 1 COM Port
- Modem with auto baud capabilities (PEC 2569-839 recommended), with specific drivers loaded
- Video Card that supports at least 256 colors (65536 or more recommended)

**NOTE** ► From the Display Properties window on your Windows desktop, be sure to select Small Fonts for the Font Size option. See “Font Size Settings” under “Desktop Setup,” later in this chapter.

Depending on how you connect the PC to the control unit, you also need the following items:

- Direct local connection if the PC is within 50 feet of the control unit:
  - Either a 355AF modular adapter (if there is a male connector on the interface cable) or a 355A modular adapter (if there is a female connector on the interface cable)
  - A four-pair modular cord (D8W)
- Direct local connection if the PC is more than 50 feet from the control unit:
  - 355AF adapter
  - EIA crossover cable
  - Two Z3A2 Asynchronous Data Units (ADUs)
  - ADU crossover cable
  - 400B2 power adapter
  - 2012D transformer
  - BR1A-4P adapter and either a 102 connecting block or 103 connecting block
  - 248B adapter
  - Eight-position wall jacks
  - Four-pair plug-ended cable
  - D8W cords
  - D6AP power cord
  - EIA-232-D cables
- Internal or External connection:
  - Modem that supports 1200- or 2400-bps connections
  - Modem cable

In addition, a parallel printer is useful for reports. The PC needs a parallel port for the connection.

**NOTE** ► WinSPM uses Interrupt 4 and I/O address 3F8 for COM1. It uses Interrupt 3 and I/O address 2F8 for COM2.

## Installing the WinSPM Software

The WinSPM software can be installed from either CD-ROM or floppy disks.

---

### CD-ROM

1. Insert the CD-ROM into your CD-ROM drive.
  2. From the Start menu, select Run.
  3. When prompted for the file or folder you want to open, type D:\setup.exe. (If your CD-ROM drive is set up as a different drive letter, replace D as necessary.)
  4. Installation creates a program group named "Lucent Solutions." This group contains a folder titled "WinSPM," which contains an icon titled "WinSPM." Clicking on this icon starts the WinSPM application.
- 

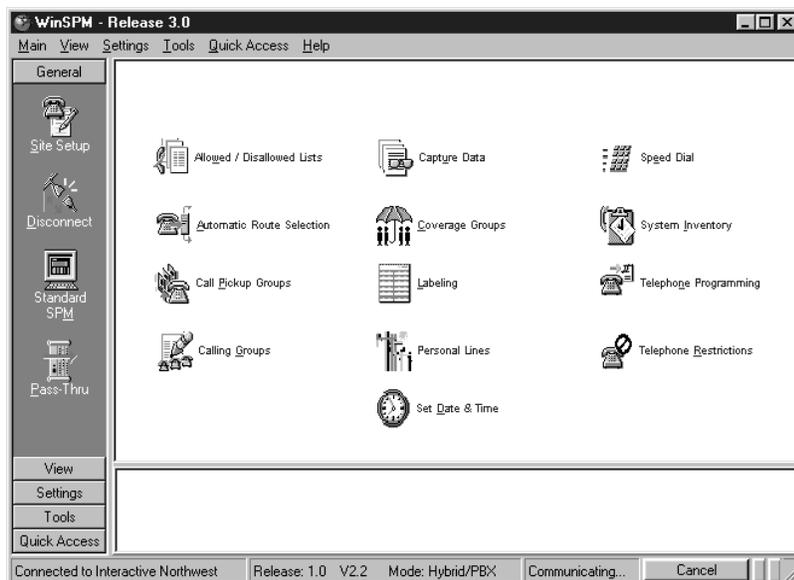
### Floppy Disks

Before installing or running WinSPM, it is recommended that you make a backup copy (see your operating system guide) of the WinSPM disk. Store the original in a safe place. Use the backup copy to run the installation program.

1. Insert diskette number 1 into your 3.5" floppy disk drive.
2. From the Start Menu, click Run.
3. When prompted for the file or folder you want to open, type A:\setup.exe.
4. Insert additional diskettes when prompted to do so.

## Getting Started

Upon installation of the WinSPM software, the following initial screen appears:



**Figure 2-1. WinSPM Main Screen**

The First Time User Wizard assists you through the following four steps:

1. Set up your desktop:
  - Font Size Settings
  - Modem Definition
  - Setting the Start Bar “Auto Hide” Property/Changing the Screen Resolution
2. Define your Password.
3. Set up your site:
  - Direct Connection
  - Internal Connection
  - External Connection
  - Manual Connection
4. Connect to the MERLIN MAGIX Integrated System:
  - Direct Connection
  - Internal Connection
  - External Connection

## Desktop Setup

### Font Size Settings

At present, WinSPM does not support large fonts. Some fonts may be virtually unusable if Large Fonts is selected on the settings tab of the Display Properties window. To correct this setting:

1. Anywhere on your desktop, right-click and select Properties on the pop-up menu. The Display Properties window appears.
2. Click the Settings tab.
3. In the Font Size field, select Small Fonts from the drop-down list box.
4. Click Apply.
5. To close the window, click OK.

### Modem Definition

If you are using a modem to connect to a MERLIN MAGIX Integrated System, and you have set the Maximum Speed to above 2400 bps, the modem in the MERLIN MAGIX Integrated System may time-out before your modem has enough time to step down to 2400 bps and establish communications. For this reason, it is suggested that you use a modem definition with a Maximum Speed of 2400 bps. You can create a new modem definition while retaining your original, higher speed definition if you choose.

#### Modifying an Existing Modem Definition

If your system is dedicated for connection with WinSPM to the MERLIN MAGIX Integrated System for programming and the modem on that system will *not* be used for any other purpose, do the following:

1. From the desktop, click Start.
2. Go to Settings and choose Control Panel.
3. Double-click the Modems icon. A list of modems configured in the system is displayed.
4. Highlight the name of the modem that is used to connect to the MERLIN MAGIX Integrated System and click the Properties button.
5. On the General tab, change the value in the drop-down list under Maximum Speed to 2400.

6. Verify the following settings:

**Connection Preferences**

Data Bits: 8

Parity: None

Stop Bits: 1

Wait for dial tone before dialing.

**Advanced**

Use Flow Control

Hardware (RTS/CTS)

7. To save the new settings, click OK.
8. To close the Modem Properties dialog box, click Close.
9. From the Control Panel, click File, then choose Exit to close the Control Panel and return to the Windows desktop.

**Adding a New Modem Definition**

If the system you are using is *not* dedicated for connection with WinSPM to the MERLIN MAGIX Integrated System for programming and the modem on that system can be used for other purposes, do the following:

1. From the Windows desktop, click Start.
2. Go to Settings and choose Control Panel.
3. Double-click the Modem icon. A list of modems configured in the system is displayed.
4. Take note of the name of the modem that is currently being used in the system to make connection to the MERLIN MAGIX Integrated System.
5. Press the Add button. The Install New Modem Wizard appears.
6. Select the "Don't detect my modem" check box and click Next.
7. Highlight the name of the modem manufacturer for your modem.
8. Highlight the name of your modem in the Models list and click Next.
9. Select the COM port that corresponds to the COM port used by your modem and click Next.
10. Once your modem is set up successfully, click Finish to complete the operation. The new modem now appears in the list of modems on the Modem Properties form (usually with the same name as the modem identified in Step 4) with a #2 after it.
11. Highlight the name of the new modem and click Properties.
12. On the General tab, change the value in the drop-down list under Maximum Speed to 2400.

13. Verify the following settings:

**Connection Preferences**

Data Bits: 8

Parity: None

Stop Bits: 1

Wait for dialtone before dialing.

**Advanced**

Use Flow Control

Hardware (RTS/CTS)

14. To save the new settings, click OK.
15. To close the Modem Properties dialog box, click Close.
16. From the Control Panel, click File, then choose Exit to leave the Control Panel and return to the Windows desktop.

**NOTE** ► Be sure to always select the new modem from the list presented during connection to WinSPM.

## Setting the Start Bar “Auto Hide” Property/Changing the Screen Resolution

Some WinSPM screens may be difficult to use in 640x480 resolution because they use the full height of the screen. For this reason, you must either turn “Autohide” on for the Taskbar or increase your screen resolution settings. If you cannot see the OK button at the bottom of the screen, perform one of the following procedures.

### Setting the Start Bar “Auto hide” Property

1. Right click an area of the Taskbar that is not a button. By default, the Taskbar is located at the bottom of the screen.
2. Select “Properties” from the pop-up menu.
3. On the Taskbar Properties dialog box, make sure that the “Auto hide” check box is selected.
4. Click Apply, then click OK. The Taskbar disappears. To bring up the Taskbar, simply move your mouse to the edge of the screen where it was previously displayed.
5. You should now be able to see the OK button. Simply click it to continue your first-time execution of WinSPM.

### Changing the Screen Resolution

1. On the Taskbar, click Start.
2. Select Settings, then Control Panel.
3. Click the Display icon.

4. When the “Display Properties” dialog box appears, click the Settings tab.
5. Move the Desktop Area slider so that the resolution setting is higher than 640 x 480.
6. Click Apply.
7. You should now be able to see the OK button. Simply click it to continue your first-time execution of WinSPM.

---

## Defining Your Password

There are two passwords in WinSPM:

- **Application Password.** There is an application-level password that serves as a security measure for accessing the WinSPM software itself. You are prompted to enter this password during the application login. Any characters that can be entered with the keyboard are acceptable. An asterisk displays for each password character entered. Since the actual password characters are not displayed, you are prompted to reenter your password for confirmation.
- **System Password.** A password is always required to establish a modem connection with the MERLIN MAGIX Integrated System. You can perform remote system programming only if you enter the correct password. (See “Password” on page 2-37 for details on establishing your system password.)

### SECURITY ALERT:

- *The password characters do not appear on the screen as you type them.*
- *Use a minimum of five characters.*
- *Passwords should consist of a random, non-repetitive, hard-to-guess sequence of characters.*

---

## Setting Up a Site

To use the WinSPM software, your PC must be connected to the MERLIN MAGIX Integrated System directly via a serial port on your PC; otherwise you must connect to the MERLIN MAGIX system’s internal modem using your PC’s modem.

Once you install WinSPM on your PC, the First-Time User Wizard guides you through setting up your application password and using the Site Setup option to create “sites” that correspond to the MERLIN MAGIX Integrated System that you are responsible for programming. Each site can be labeled with as much information as you need to differentiate one site from another.

When you set up a site, you must first determine how your PC will connect to the MERLIN MAGIX Integrated System you want to program. A site can have multiple connection types set up. There are four connection types available (*setup instructions for each type are provided on pages 2-9 through 2-12*):

- **Direct Connection.** A serial port on your PC is connected directly to the MERLIN MAGIX system programming jack—the lower modular RS-232 jack on the processor module.
- **Internal Connection.** You are using a modem (either connected to or built into your PC) that is connected to the MERLIN MAGIX Integrated System (for example, via a 016 T/R module) to access the MERLIN MAGIX internal modem.
- **External Connection.** You are using a modem (either connected to or built into your PC) and using a dial-up connection to access the MERLIN MAGIX internal modem. The External Connection type requires use of the Remote Access feature to allow you to connect to the MERLIN MAGIX programming port without manual intervention.
- **Manual Connection.** You are using a modem (either connected to or built into your PC) and using a dial-up connection to access the MERLIN MAGIX internal modem. The Manual Connection is used when you must reach the MERLIN MAGIX programming port by placing a call to the site and the person who answers transfers your call to the programming port.

## Direct Connection

To set up a site for a Direct Connection, do the following:

1. From the Site Setup screen, click Add. The cursor moves to the Site Name field.
2. Type in the Site Name you wish to use and press the TAB key. Site Names are limited to 30 characters. You may only use characters that are acceptable for file names in the Windows environment.
3. Complete the following fields to help differentiate this site from any other site(s) you may want to add. These fields are not required; therefore, you may fill in as many or as few as you determine necessary:
  - Address
  - City
  - State
  - Postal Code
  - Country
  - Contact
  - Telephone
  - Notes
4. Click the Direct tab.
5. Select the Enabled check box. A check mark appears in the box and the COM Port drop-down list box is no longer grayed out.
6. Click the arrow located on the right-hand side of the COM Port drop-down list box to get a list of the available COM ports on your PC. Click once on the number that corresponds to the COM port on your PC that is connected to the MERLIN MAGIX administration port.
7. Set the COM port speed to 2400 (most instances).
8. If you want to add another site, click Add and begin on Step 2 in the process for the appropriate connection type for the next site.

9. When you finish adding sites, click OK.

- NOTES** ► ■ If you have multiple modems installed in your system, after clicking OK, you may be prompted to select the modem you want to connect with.
- Clicking Cancel from the Connection Selection screen causes you to return to either the Main screen or the First-Time User Wizard, depending on from where the screen was started.

### Internal Connection

To set up a site for an Internal Connection, do the following:

1. From the Site Setup screen, click Add. The cursor moves to the Site Name field.
2. Type in the Site Name you wish to use and press the Tab key. Site Names are limited to 30 characters. You may only use characters that are acceptable for file names in the Windows environment.
3. Complete the following fields to help differentiate this site from any other site(s) that you may want to add. These fields are not required; therefore, you may fill in as many or as few as you determine necessary:
  - Address
  - City
  - State
  - Postal Code
  - Country
  - Contact
  - Telephone
  - Notes
4. Click the Internal tab.
5. Select the Enabled check box. A check mark appears in the box and the Dial String dialog box is no longer grayed out.
6. Be sure that the Dial String check box displays \*10.
7. If you want to add another site, click Add and begin on Step 2 in the process for the appropriate connection type for the next site.
8. When you finish adding sites, click OK.

- NOTES** ► ■ If you have multiple modems installed in your system, after clicking OK, you may be prompted to select the modem you want to connect with.
- Clicking CANCEL from the Connection Selection screen causes you to return to either the Main screen or the First-Time User Wizard, depending on from where the screen was started.

## External Connection

To set up a site for an External Connection, do the following:

1. From the Site Setup screen, click Add. The cursor moves to the Site Name field.
2. Type in the Site Name you wish to use and press the Tab key. Site Names are limited to 30 characters. You may use only characters that are acceptable for filenames in the Windows environment.
3. Complete the following fields to help differentiate this site from any other site(s) that you may want to add. These fields are not required; therefore, you may fill in as many or as few as you determine necessary:
  - Address
  - City
  - State
  - Postal Code
  - Country
  - Contact
  - Telephone
  - Notes
4. Click the External tab.
5. Select the Enabled check box. A check mark appears in the box and the Dial String dialog box is no longer grayed out.
6. Edit the contents of the Dial String dialog box for the exact dial string the modem will need to dial to access the remote MERLIN MAGIX administration port. The dial string must include the Remote Access line, the barrier code (if required), and the dial code for the MERLIN MAGIX admin port (\*10). Use commas to create necessary pauses in the dial string.

**Example:** You are connecting to a remote MERLIN MAGIX Integrated System via a modem through the Remote Access line 800 555-9999. The Remote Access line is set up with barrier code 1234 for access to the remote dial tone. The site from which you are dialing requires you to dial 9 to get an outside line. Using commas for pauses in the dial string, the dial string would be 918005559999,,,,,1234,\*10.
7. If you want to add another site, click Add and begin on Step 2 in the process for the appropriate connection type for the next site.
8. When you finish adding sites, click OK.

- NOTES** ►
- If you have multiple modems installed in your system, after clicking OK, you may be prompted to select the modem you want to connect with.
  - Clicking CANCEL from the Connection Selection screen causes you to return to either the Main screen or the First-Time User Wizard, depending on from where the screen was started.

## Manual Connection

To set up a site for a Manual Connection, do the following:

1. From the Site Setup screen, click Add. The cursor moves to the Site Name field.
2. Type in the Site Name you wish to use and press the Tab key. Site Names are limited to 30 characters. You may use only characters that are acceptable for filenames in the Windows environment.
3. Complete the following fields to help you differentiate this site from any other site(s) that you may want to add. These fields are not required; therefore, you may fill in as many or as few as you determine necessary:
  - Address
  - City
  - State
  - Postal Code
  - Country
  - Contact
  - Telephone
  - Notes
4. Click the Manual tab.
5. Click the Enabled check box. A check mark appears in the box and the Dial String dialog box is no longer grayed out.
6. When you try to connect using the Manual Connection type, WinSPM displays a dialog box with an OK button. Place a voice call to the system on a regular line and ask the operator to transfer you to the MERLIN MAGIX admin port by dialing \*10. When you hear the modem answer tone, click OK to complete the connection and then hang up the handset.
7. If you want to add another site, click Add and begin on Step 2 in the process for the appropriate connection type for the next site.
8. When you finish adding sites, click OK.

- NOTES** ►
- If you have multiple modems installed in your system, after clicking OK, you may be prompted to select the modem you want to connect with.
  - Clicking CANCEL from the Connection Selection screen causes you to return to either the Main screen or the First-Time User Wizard, depending on from where the screen was started.
  - While setting up a Manual Connection, you will also be prompted to set the Maximum Speed for connection. It is recommended that you select 2400.

---

## Connecting to a MERLIN MAGIX Integrated System

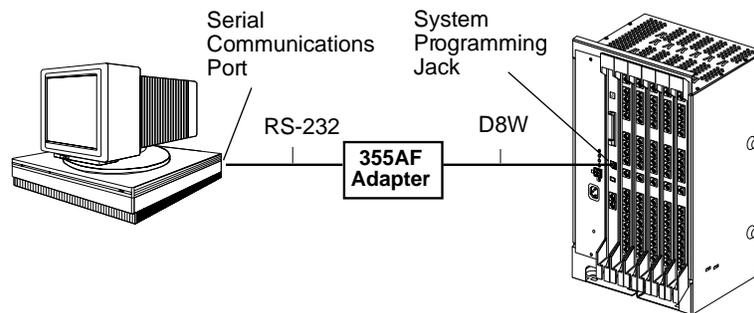
### Direct Local Connection

For a direct local connection, you must connect the PC to the system programming jack. This is the lower modular RS-232 jack on the processor module, as shown in Figure 2-2. (The upper jack is reserved for the SMDR printer.)

To connect a PC more than 50 feet from the control unit, see Figure 2-3.

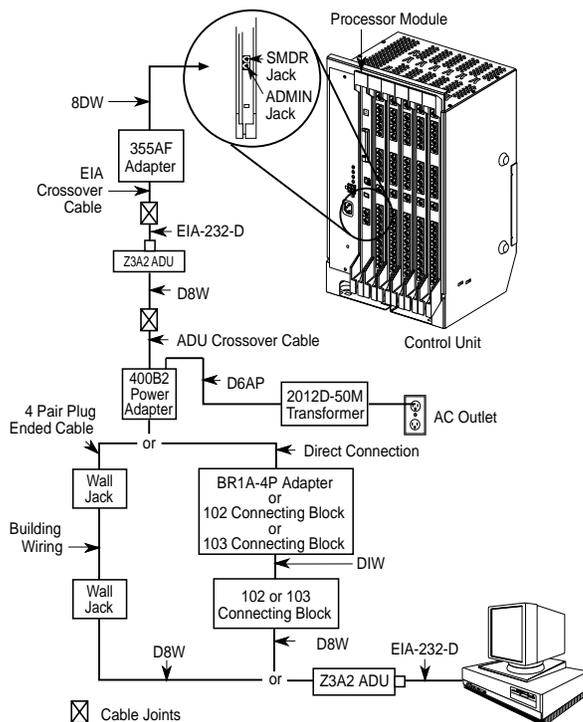
For direct local connections, the system supports speeds of 1,200 and 2,400 bps.

**NOTE** ▶ You must use a direct local connection to program in Surrogate mode.



---

**Figure 2-2. Direct Connection**

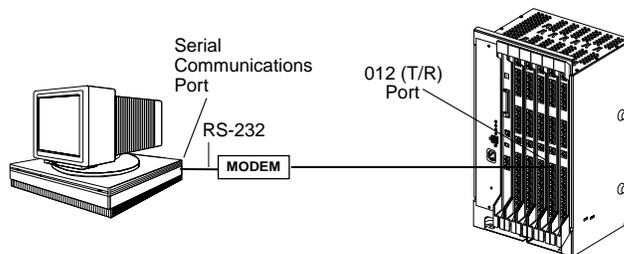


**Figure 2-3. Direct Connection, PC More Than 50 Feet Away**

### Internal Connection

For an internal connection, you must use a modem (either connected to, or built into, the PC) to access the internal modem in the control unit. Connect the modem to a T/R jack on a 016 (T/R) module, as shown in Figure 2-4.

The internal modem operates at speeds of 1200 and 2400 bps.

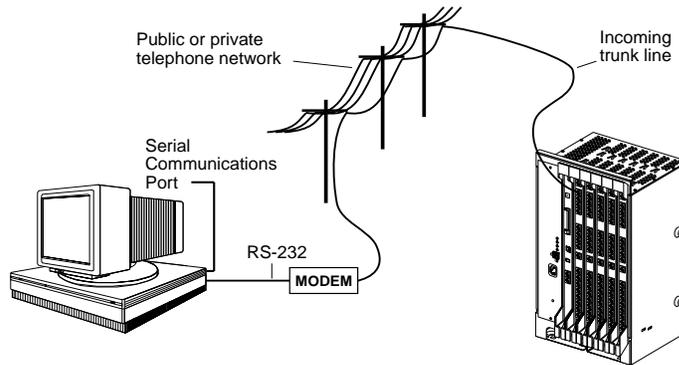


**Figure 2-4. Internal Connection**

## External Connection

For an external connection, you must use a modem (either connected to, or built into, the PC) to access the internal modem in the control unit. You must also use a dial-up connection, as shown in Figure 2-5.

The internal modem operates at speeds of 1200 and 2400 bps.

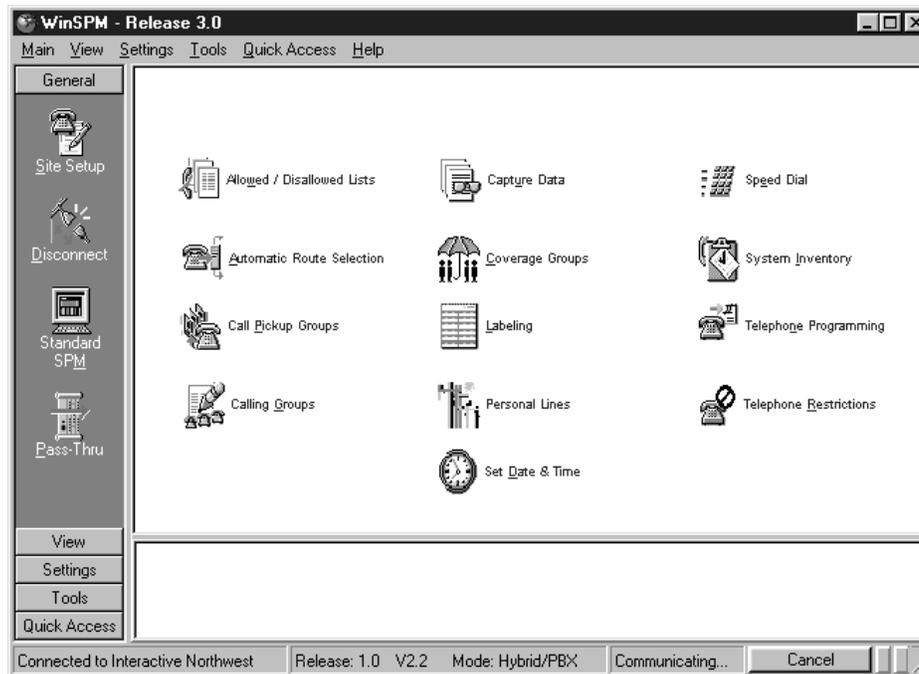


---

**Figure 2-5. External Connection**

## WinSPM Main Screen

When you connect your PC to the MERLIN MAGIX Integrated System and start the WinSPM application, the WinSPM Main screen shown in Figure 2-6 appears.



**Figure 2-6. WinSPM Main Screen**

The Main screen icons shown on the left-hand toolbar provide the following functionalities:

- **Site Setup.** Launches the Site Setup screen which depicts all of the sites defined in the WinSPM application. Used to set up a new site or modify an existing site.
- **Disconnect.** Disconnects you from a MERLIN MAGIX Integrated System once a connection has been established.
- **Standard SPM.** Launches the Standard SPM Mode.
- **Pass-Thru.** This icon is not used with MERLIN MAGIX R1.0i systems.
- **View.** Enables you to access the Log Viewer and browse notes and reports.
- **Settings.** Enables you to define password, options, and TAPT settings.
- **Tools.** Enables you to access the backup, restore, and convert features.
- **Quick Access.** Enables you to access many common features including: Allowed/Disallowed Lists, Automatic Route Selection, Call Pickup Groups, Calling Groups, Capture Data, Coverage Groups, Labeling, Personal Lines, Set Date & Time, Speed Dial, System Inventory, Telephone Programming, and Telephone Restrictions.

---

## Using Quick Access

The Quick Access interface allows you to complete common tasks in an extremely user-friendly manner. The Quick Access window (see Figure 2-6) displays a series of large graphic buttons representing each of the following supported Quick Access tasks:

- Allowed/Disallowed Lists
- Automatic Route Selection
- Call Pickup Groups
- Calling Groups
- Capture Data
- Coverage Groups
- Labeling
- Personal Lines
- Set Date and Time
- Speed Dials
- System Inventory
- Telephone Programming
- Telephone Restrictions

**NOTE** ► For additional information on programming your MERLIN MAGIX Integrated Systems in Quick Access mode, refer to the documentation and online help provided with the WinSPM application. For information on programming your MERLIN MAGIX Integrated System in Standard SPM Mode, see page 2-26.

Descriptions of each of the Quick Access tasks are provided in the following sections.

---

### Allowed/Disallowed Lists

Used in conjunction with Calling Restrictions (Outward and Toll), an Allowed List is a list of numbers that the caller is allowed to dial, despite restrictions. For example, an Allowed List assigned to an outward-restricted extension can allow calls to specific local numbers, such as (911) or toll numbers. For toll-restricted extensions, an assigned Allowed List can allow calls to specific area codes and/or exchanges needed for daily tasks.

A Disallowed List is a list of local or toll numbers that the extension user is not allowed to dial, even if the extension is otherwise unrestricted. Disallowed Lists can be used as an alternative to or in conjunction with Calling Restrictions.

Both Allowed Lists and Disallowed Lists are assigned to individual extensions. Disallowed Lists can also be used in conjunction with Remote Access to restrict calls made through the system from remote locations. In this case, Disallowed Lists can be assigned either to specific Remote Access barrier codes or (if barrier codes are not used) to specific types of lines/trunks (all Tie/Direct Inward Dialing (DID) and all non-Tie/non-DID trunks). For more information, refer to “Allowed Lists,” on page 132, and “Disallowed Lists,” on page 133.

## Automatic Route Selection (ARS)

ARS allows outgoing calls to be dynamically routed over selected facilities after dialing an ARS access code. This enables the system to select the least expensive route for each call. ARS is available only in Hybrid/PBX mode.

Programmable lists, called tables, indicate the desired routes (line/trunk facilities) for specified area codes and/or exchanges. There is a different ARS table for each type of call (local, toll, special number, and so on). The tables are chosen according to the telephone number digits that are dialed by a user. Each ARS table has a particular pool to which it routes calls. For more information, refer to “Pickup Groups,” on page 102.

---

## Call Pickup Groups

An extension that is a member of a Call Pickup Group can program a button on the telephone or dial a feature code to pick up a call ringing on the telephone of any other member extension in that group. There is a limit of 30 groups with 15 extensions per group. An extension may be a member of only one Pickup Group. For more information, refer to “Automatic Route Selection,” on page 146.

Call Pickup Groups contain the following:

- **Available Extensions.** The list of extensions in the system. Double-click or use the right-arrow button to move extensions into the Selected Extension.
  - **Selected Extensions.** The list of extensions that are members of the Call Pickup Group that is selected with the tabs. Double-click or use the right-arrow button to remove extensions to the Available Extensions. Note that this list is limited to 15 extensions per group.
  - **Group Number.** Select the Call Pickup Group to display its members in the Selected Extensions list box.
- 

## Calling Group

This feature is used to define the extensions that are members of a Calling Group, and to assign the lines/trunks pools that you want to ring directly into this Calling Group.

From the Calling Group Quick Access screen, you pick the Calling Group you wish to modify by highlighting it. There are seven tabs that can be modified for each Calling Group. These are: General, Primary Delay, Overflow, Queue, Members, Lines & Pools, and Coverage.

- **General:**
  - **Group Type.** Choose from the drop-down list box.
  - **Hunt Type.** Allows you to specify whether the Hunt Type is circular, linear, or most available. Choose from the drop-down list box.

- 
- **Secondary Delay Announcement.** Select from the drop-down list box the extension to be used as a secondary delay announcement.
  - **Delay Interval.** Select an interval from 0-900 seconds for the secondary delay.
  - **Delay Announce Repeat.** Select Yes or No if you wish the secondary delay.
  - **Message Waiting Receiver Extension.** Select the extension at which you wish to light a message waiting light if the group is covered by a voice mail box.
  - **Primary Delay:**
    - Select the extensions you want to provide primary delay announcements for the chosen Calling Group.
  - **Overflow:**
    - **Overflow Coverage Calling Group Number or QCC LDN extension.** From the drop-down list box, choose a Calling Group or the QCC queue that you want to provide overflow coverage for this Calling Group.
    - **Overflow Threshold (Calls).** Choose the number of calls (1-99) that are allowed to stay “queued” in this Calling Group before “overflowing.”
    - **Overflow Threshold Time (seconds).** Choose the number of seconds (0-900) the oldest waiting call must wait before overflowing.
    - **Prompt-Based Overflow.** Choose Yes or No to allow or disallow a waiting caller the ability to press the pound (#) key on their telephone to initiate overflow.
  - **Queue:**
    - **Calls In Queue Alarm Thresholds (seconds).** For each choice, choose the flash rate interval. For example:
      - If the number of waiting calls is fewer than the value programmed for Threshold 1 or drops below that level, the LED is unlit.
      - If the number of waiting calls is greater than or equal to the Threshold 1 value, but less than the Threshold 2 value, the LED flashes.
      - If the number of waiting calls is greater than or equal to the Threshold 2 value, but fewer than the value for Threshold 3, the LED winks.
      - If the number of waiting calls is greater than or equal to the highest value, Threshold 3, the LED lights steadily.

An external alert only signals when the number of calls in the queue is greater than or equal to the programmed Threshold 3 value.
    - **External Alert for calls in Queue Alarm.** Choose the adjunct extension associated with the external alert device. There are two choices:
      - An LED on any 4400-Series or MLX telephones can be associated with a Calls-in-Queue Alarm button.
      - An external alert on an MLX telephone using a Multi-Function Module set for Supplemental Alert Adapter operation and programmed as the alert.
    - **Queue Control.** Choose the number of calls (0-99) allowed to back up in queue before sending a network busy signal.
  - **Members:**

- Choose extensions from the list to place them into the selected Calling Group. Note that only the extensions for the tip/ring ports associated with a voice messaging system may be in VMI Calling Groups; there is a system maximum of 20 VMI Calling Groups, and any one Calling Group may have a maximum of 20 members. An extension may be a member of only one Calling Group.

---

## Capture Data

This feature allows you to read from the MERLIN MAGIX system in one large batch. This is useful if you are setting up the MERLIN MAGIX system for the first time or if you are making significant changes. Capture Data reads all of the data needed for each selected Quick Access form.

- **Task Selection.** Check the items that you want to read from the MERLIN MAGIX system. Some of the items are for the whole Quick Access form, some are broken down into the individual tabs that appear on the Quick Access forms. As you check/uncheck items, the estimated number of minutes for completion changes to give you a “best guess” as to how long the reading will take.
- **Baseline Values.** These values help calculate the estimated number of minutes for completion. Some of these values will be changed to the correct values if the data has been retrieved. Other values need to be entered manually. These values are not retained after the Capture Data form is closed.

---

## Coverage Groups

This feature is used to assign or remove an extension from a Coverage Group. A Coverage Group is a group of senders. Group Coverage is an arrangement where calls from a group of senders are redirected to one or more receivers. For more information, refer to “Group Coverage Member Assignments,” on page 104.

Coverage Groups include the following:

- **Available Extensions.** The list of extensions in the system. Double-click or use the right-arrow to move extensions into the Selected Extensions.
- **Selected Extensions.** The list of extensions that are members of the Coverage Group that is selected with the tabs. Double-click or use the right-arrow to remove extensions to the Available Extensions.
- **Group Number.** Select the Calling Group Number to display its members in the Selected Extensions list box.

## Labeling

This feature allows you to edit the various system labels. System Speed Dial changes are performed separately. A simple dialog box containing the following fields is available.

- **Label Type.** A group of options including: System Directory, Extensions, Adjuncts, Lines and Trunks, Posted Messages, and Group Calling. Select the type for which you want to edit labels.
- **Entry Number.** This field prompt changes to reflect the option you selected for Label Types. Use this field to select the extension number, line, trunk, posted message, or Calling Group that you want to change.
- **Name.** Text for this label. Different label types are limited to different string lengths – for example, extensions and Calling Groups are limited to 7 characters.

**NOTE** ► All labels are always printed in capital letters, exactly as they appear on the MERLIN MAGIX display telephones.

---

## Personal Lines

This feature allows you to add lines and pools to buttons on a telephone.

**NOTE** ► By default, each added line or pool is programmed on available successive buttons starting with the lowest button on the telephone, and overwrites any programming that may already exist on these buttons.



### CAUTION:

*After you click the Apply button, you will be able to see where the lines and pools were placed on the telephone. Keep in mind that adding a line that is a member of a pool results in a pool being assigned to the button on the telephone. You cannot assign the same line or pool to more than one button on the telephone twice. Also remember that lines and pools are added on the buttons immediately following the System Access buttons and overwrites any other feature programmed to those buttons.*

---

## Set Date and Time

This feature sets the current time and date on the MERLIN MAGIX Integrated System. The dialog box contains the following:

- The PC's date and time.
- The MERLIN MAGIX system date and time, which can be edited and applied back to the MERLIN MAGIX system.

## System Programming

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- A Synchronize button that gives you the ability to set the MERLIN MAGIX system date and time to match the PC's.
- An OK button that applies any changes you made to the MERLIN MAGIX system date and time.

---

## Speed Dial

This feature allows you to modify System Speed Dial entries. It consists of a simple display grid containing the following:

- **Speed Dial Code.** A number field defining the system speed dial code (in the range of 600 to 729).
- **Company/Name.** A description of the directory entry.
- **Number.** The number to dial.
- **Display Number.** Select Yes to display the Name when dialing; select No to display the number being dialed.

Use the following buttons to edit the System Speed Dial entries:

- **Add.** Adds a new entry.
- **Modify.** Modifies an existing entry.
- **Delete.** Removes an existing entry.

---

## System Inventory

This feature offers a report on the MERLIN MAGIX Integrated System hardware configuration. Starting with the processor (installed in slot zero), it obtains the characteristics of the hardware components available in each slot in the MERLIN MAGIX system carrier.

By default, the Hardware Inventory screen lists the Board Type, Hardware Vintage, Firmware Vintage, and Application Vintage of each available control unit module (scroll down for more). To quickly obtain the specifications of a given module, click the module's image. To obtain a total report, click the corresponding Print button.

Use the Print button to view the printed report on the screen (Print Preview). You can either print a paper copy of the report or save the report to a file.

## Telephone Programming

Telephone programming allows the centralized programming of a subscriber's telephone. When you select this feature, a window is displayed containing the following elements:

- A list of extensions, labels (if read), and logical IDs. To sort this list, click the arrow on the header bar for the column you want to sort by.
- Notes window. Use this window to create or edit annotations.
- OK button. Highlight the extension you wish to program and click OK. (Double-click the extension to go to the next screen.)
- Print button. Use this button to print the list of extensions, labels, and LIDs.
- Cancel button. Use this button to cancel and return to the previous menu.
- Help button. Use this button to display Help information.

---

## Telephone Restrictions

This feature is used to configure Calling Restrictions for an extension. Calling Restrictions include extension restrictions, Automatic Route Selection (ARS) restriction level, and Forced Account Entry. This feature is also used to assign Allowed Lists and Disallowed Lists to an extension.

This feature includes the following:

- **Authorization Code.** Enter a unique 2 to 11-digit Access code for this extension. (Optional)
- **Restriction Level.** Select Unrestricted, Outward Restrict, or Toll Restrict.
- **Facility Restriction Levels.** Select ARS restriction level (0-6).
- **Delayed Call Forwarding Rings.** Select the number of rings (0-9) before a call is forwarded using the Forward or Follow Me Feature.
- **Allow Trunk-to-Trunk Transfers.** If checked, the extension user must enter an account code before making an outside call.
- **Remote Call Forwarding.** Allows the extension user to forward all calls to an outside telephone number.
- **Pool Dial-Out Codes.** The list of trunk pools that the extension user is allowed to use to make outside calls. A list box appears, plus two buttons (>>> and <<<). To add pools, highlight the pool dial-out code in the Available box and then click the >>> button. To remove pools, highlight one or more in the Selected list box and then click the <<< button.
- **Allowed Lists.** Use to assign one or more Assigned Lists to the extension. Use the Allowed List tab to view the current extensions in that list. Use the 'Is User' check box to add/remove the selected extension from the lists. Allowed List defines area codes and exchange prefixes that this extension user is allowed to dial when making an outside call.

- **Disallowed Lists.** Use to assign one or more Unassigned Lists to the extension. Use the allowed list tab to view the current extensions in that list. Use the 'Is User' check box to add/remove the selected extension from the lists. Disallowed List defines area codes and exchange prefixes that this extension user is *not* allowed to dial when making an outside call.
- **Show Number List.** If checked, the Allowed or Disallowed List is read from the MERLIN MAGIX system and displayed for the currently selected Allowed/Disallowed List.

- NOTES** ▶
- The Standard SPM Mode Interface must be used to define Night Service Coverage.
  - Automatic Route Selection (ARS) allows outgoing calls to be dynamically routed over selected facilities after dialing an ARS access code (usually 9). This enables the MERLIN MAGIX Integrated System to select the least expensive route for each call based on the area code and prefix that the extension user dials.

## WinSPM Help

To access the WinSPM Help screens, perform one of the following:

- Press **F1**.
- Press **Alt+H**.
- Click the Help button (when available).

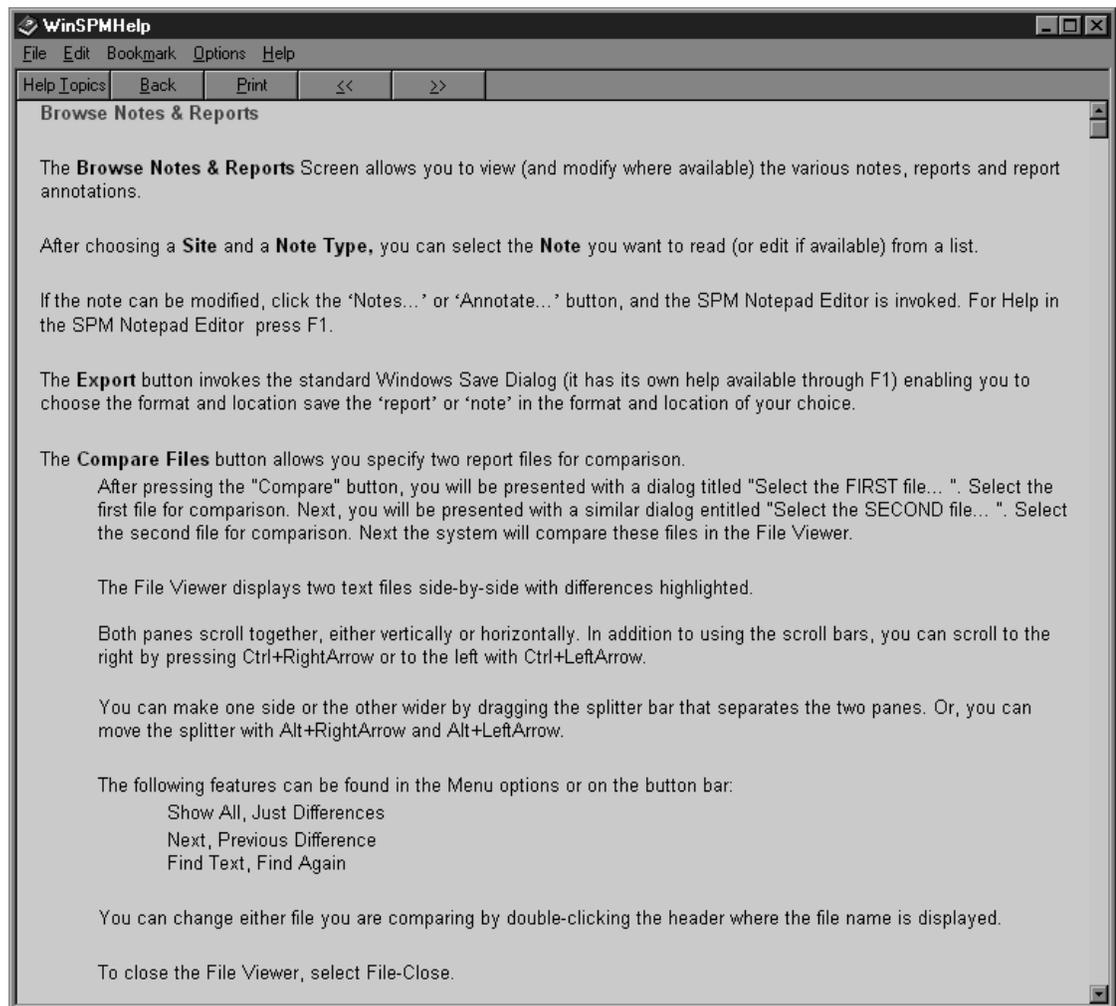


Figure 2-7. Sample WinSPM Help Screen

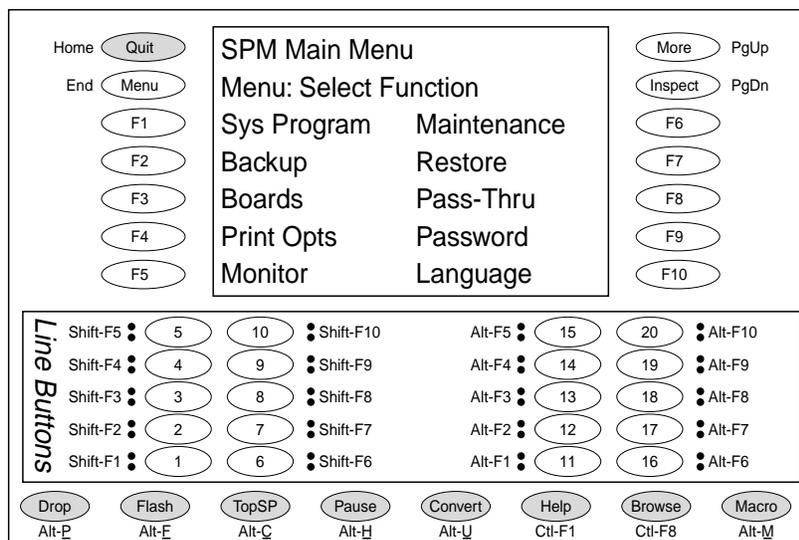
## Using Standard SPM Mode

This section describes how to use the Standard SPM Mode screens.

**NOTE** If you are using Quick Access, Backup and Restore can be selected from the Main menu. The System Inventory option in the Quick Access mode provides a graphical representation of your system inventory, which includes all modules and versions. All of the options listed above are available in the Standard SPM Mode. For additional information on using Quick Access, refer to the documentation and online Help provided with WinSPM.

### SPM Screens

Standard SPM Mode screens simulate the system programming console. Each Standard SPM Mode screen includes a 7-line by 24-character console simulation window that corresponds to the display area of the MLX-20L or 4424LD+ telephone. To the right and left of this console simulation window are columns that list the keys corresponding to similarly located buttons on the MLX-20L or 4424LD+ telephone. Figure 2-8 illustrates the Standard SPM Mode display screen.



**Figure 2-8. Standard SPM Mode Display**

[F1] through [F5] and [F6] through [F10] display on either side of the console simulation screen. They represent the function keys to use when you select screen options. When a screen contains several choices, click the function key identified by the label next to your choice. (If you were programming on the console, you would press the telephone button next to your choice.)

Below the console simulation window are 20 simulated line buttons. The 20 line buttons can be selected by clicking on the appropriate button. By clicking **PgDn** (the Inspect feature), you can determine the status of each line and the features programmed on each line according to the letter that appears next to the line number.

The labels along the bottom of the screen correspond to buttons on the 4424LD+ or MLX-20L telephone. Table 2-1 describes the function of PC keys in WinSPM.

**Table 2-1. Function of PC Keys in WinSPM**

PC Key	MLX-20L	4424LD+	WinSPM Function
<b>Home</b>	Home	Exit	Quit. Exit from WinSPM when you finish with system programming. If you are using a modem, the call is disconnected.
<b>End</b>	Menu	Menu	Return to the WinSPM Main menu.
<b>PgUp</b>	More	>	Display more menu items (when there is another screen and the > symbol appears next to the key).
<b>PgDn</b>	Inspt (MLX-20L only)		Display the current information that has been programmed for a feature or button. <i>(There is no fixed Inspt button on the 4424LD+ console. This button must be programmed onto a feature key on the 4424LD+ console.)</i>
<b>Alt+P</b>	Drop	Drop	Enter a stop in a speed-dialing sequence. This combination also deletes an entry in a field on any screen, except the one in which you are entering a speed-dialing sequence.
<b>Alt+F</b>	Conf	Conf	Flash. Enter a switchhook flash in a speed-dialing sequence.
<b>Alt+C</b>	n/a	n/a	TopSP. Return to the top of the System Programming menu.
<b>Pause</b>	Hold	Hold	Pause. Enter a pause in a speed-dialing sequence.
<b>Alt+N</b>	n/a	n/a	Toggle modem speed between 1200 and 2400 bps.
<b>Ctrl+F1</b>	n/a	n/a	Help. Display a Help screen about WinSPM operations.
<b>Ctrl+F5</b>	n/a	n/a	Reset. Reset the communications port. For example, if the information on the screen is garbled, try exiting from and then re-entering the screen. If the screen remains garbled, use <b>Ctrl+F5</b> to clear the screen and return to the WinSPM Welcome screen. Note that using <b>Ctrl+F5</b> drops the modem connection.

**Table 2-1. Function of PC Keys in WinSPM—Continued**

PC Key	MLX-20L	4424LD+	WinSPM Function
	n/a	n/a	Browse. View print reports saved with Print Opts.
	Enter	Enter	The  key on your PC can be used instead of  when <code>Enter</code> appears as a choice in the console simulation window.
	Backspace	Backspace	The  key on your PC can be used instead of  (Backspace) when <code>Backspace</code> appears as a choice in the console simulation window.
	Delete	Delete	The  key on your PC can be used instead of  (Delete) when <code>Delete</code> appears as a choice in the console simulation window.
	n/a	n/a	The up, down, left, and right arrow keys can be used to highlight selections in a menu and to select the 20 line buttons below the console simulation window.

## Basic System Management Procedures

This section demonstrates how to complete the following procedures using WinSPM operating in Standard Mode or the WinSPM menu:

- Backup
- Boards
- Browse
- Language
- Maintenance
- Monitor
- Pass-Thru
- Password
- Print Options
- Restore
- System Programming

Table 2-2 gives a brief description of each procedure.

**Table 2-2. Management Procedures**

Option	Function
Sys Program	To program the system.
Backup <sup>1</sup>	To make a backup copy of your system programming and store it on a floppy disk or on hard disk.
Boards <sup>1</sup>	To show which modules (port boards) are in each slot of the control unit and allows you to assign boards to slots.
Print Opts <sup>1</sup>	To direct reports to printer or to the PC for storage on a floppy disk or on hard disk.
Monitor	Restricted to use by your technical support organization.
Maintenance	Restricted to use by your technical support organization and qualified technicians.
Restore <sup>1</sup>	To restore your system programming from floppy disk or from hard disk.
Pass-Thru	Not used with MERLIN MAGIX Integrated System Release 1.0i.
Password	To change the password for remote entry into the system.
Language	To select a language (U.S. English, Canadian French, Latin American Spanish, or Brazilian Portuguese) for the console simulation window on the PC. (There is also a Language option available on the System Programming menu that allows you to set the System Language.)

<sup>1</sup> WinSPM option only. Not available on the system programming console. To be used only by qualified service personnel.

## Backup

The Backup procedure is used by qualified service personnel to create a file of system programming information either in a specified directory (on the hard drive of the PC) or on a floppy disk.

**NOTE** ► Back up your system programming information on a regular basis. A current backup file allows you to quickly and easily restore your system, if the need arises.

## Considerations

Review the following items before you begin the backup procedure:

- The system does not have to be idle during backup; however, extension programming is blocked.
- Any objects that are in a maintenance-busy state are stored in that state. When you restore system programming, these objects are busied out, even if they have since been released from the maintenance-busy state.
- If you plan to store your backup file on a floppy disk, format a DOS disk.
- Uncompressed backup files are 100,000 to 210,000 bytes in size; compressed files are about 70,000 to 85,000 bytes.
- Maintenance data (error logs and other data used by qualified service technicians) is not saved in the backup file.

To perform the backup procedure, follow the steps below:

### Standard SPM

**F2** → Select GOTO FLOPPY or GOTO HARD DISK → **Enter** →  
Specify default filename or Make new file name → **Enter** → **C** to  
continue or **Esc** to abort → **Esc** to abort or **Enter** to return to the  
Standard SPM Main menu

### WinSPM

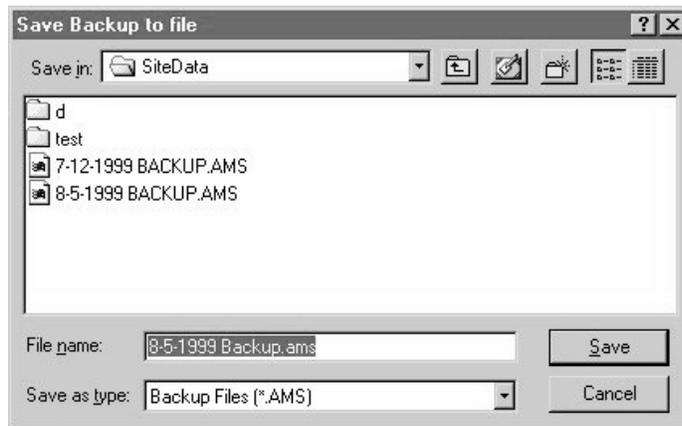
1. From the WinSPM Main window Outlook bar, select **Tools**.
2. From the Outlook bar, click the **Backup** icon.

*A selection dialog box displays.*



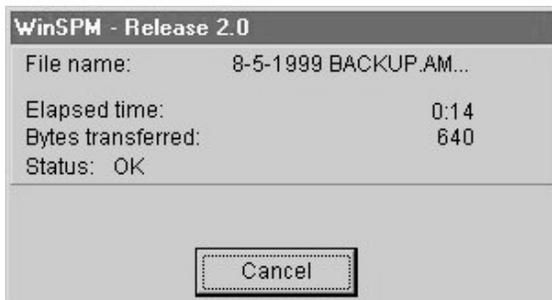
3. Select the File option.
4. Click **Ok**.

The Save dialog box displays.



5. Enter the name and location of the file to be saved.
6. Click **Save**.

The progress dialog box displays.



7. Click **Cancel** to exit.

---

## Boards

The Boards option allows qualified service personnel to add a board to the next available slot. The system must be idle to use this option. This option is not available from the system programming console.

The Boards option is also available in Surrogate mode. In Surrogate mode, you can assign trunk and extension modules (boards) to slots, even though the boards have not actually been installed. This type of board is referred to as a “phantom” or “null” board.

You cannot use the Boards option to change an actual board type. All boards assigned with the Boards option, including phantom boards, are cleared (unassigned) if you perform a board renumber (`System→Board Renum`).

- You must assign phantom boards to higher slot numbers than those you assign to any real boards. If you assign a phantom board to a lower slot number than a real board, the control unit does not recognize the real board or boards that follow the phantom board.
- If you remove a board but do not replace it, and then perform a board renumber, the control unit will not recognize any boards that follow the empty slot. You must reseal all of the boards to fill the empty slot before you perform the board renumber.

The Inspect function (**PgDn**) lets you see which modules have been assigned to slots on the control unit. Note that both phantom boards and real boards display if you use the Inspect feature. Table 2-3 shows the type of boards that you can select. To see only real board assignments, you must print the System Information report: `System→More→Print→SysSet-up`.

**Table 2-3. Board Types**

Board Type	Description
024TDL	24 digital extension jacks with 8 Touch-Tone Receivers
016MLX	16 MLX extension jacks (32 endpoints); upgradable with PCMCIA card
008MLX	8 MLX extension jacks (16 endpoints)
016ETR	16 ETR extension jacks with 4 Touch-Tone Receivers
016TRR	16 tip/ring extension jacks with 4 Touch-Tone Receivers
MsgOPT	008 OPT - 8 tip/ring extension jacks with 2 Touch-Tone Receivers or MERLIN Messaging - 7 internal tip/ring extension jacks with 2 Touch-Tone Receivers; MERLIN Messaging System resides on this module
100E	32 channels ("virtual" lines/trunks); upgradable with PCMCIA card
800DID	8 DID line jacks
800LTD	8 loop-start line jacks with dial tone detection and Call Progress Tone detection.
	<b>Reviewers: What is the designation here?</b>
MFC06	6 Multifrequency Compelled Register Signaling generators/receivers

Follow the steps below to assign modules:

1. At the Standard SPM Mode Main menu, click **F3** to select **Boards**.

SPM Main Menu	
Menu: Select Function	
Sys Program	Maintenance
Backup	Restore
<b>Boards</b>	Pass-Thru
Print Opts	Password
Monitor	Language

2. Click the function key that corresponds to the module you want to select.

Boards:	>
Make a selection	
412LUP	016ETR
024UPO	016TTR
016MLX	MsgOPT
008MLX	100D
Back	800BRI

3. If the module you want to assign is not shown on the first screen of the Boards menu, click **PgUp** to display the next menu screen.

Boards:	
Make a selection	
408GLM	400E&M
100R	
800DID	
800LID	
Back	

4. Type the control unit slot number (01 through 17) in which the module is to be installed.

module name	
Enter slot numbers	
(01-17)	
	Delete
Backspace	Next
Back	Enter

module name = option selected in Step 2

5. Assign or remove the module from the slot entered in the previous Step.

module name	
Enter slot numbers (01–17)	
nn	
	Delete
Backspace	Next
Back	Enter

module name = option selected in Step 2

nn = slot entered in Step 5 (second digit will not display).

- To remove the module type from the specified slot number, click **F8** (Delete). The Boards menu reappears.
  - To assign the module type to the specified slot number and assign that same module type to another slot, click **F9** (Next).
  - To assign the module type to the specified slot number and assign a different module type to another slot, click **F10** (Enter).
  - To terminate the procedure and assign a different module, click **F5** (Back) and repeat Steps 2 through 4.
  - To view types of modules assigned to all slots, click **PgDn** (Inspect).
6. To save your entry, click **F5** (Back).  
The programming session terminates and the system restarts.

---

## Browse

The Browse option allows you to browse through reports and notes saved in WinSPM.

### Standard SPM

**Ctrl**+**F8** → Select hard disk or floppy → **F10** → Select a Report → **F10** → **Esc** to Exit

To view the next page of a report, click **PgDn**.

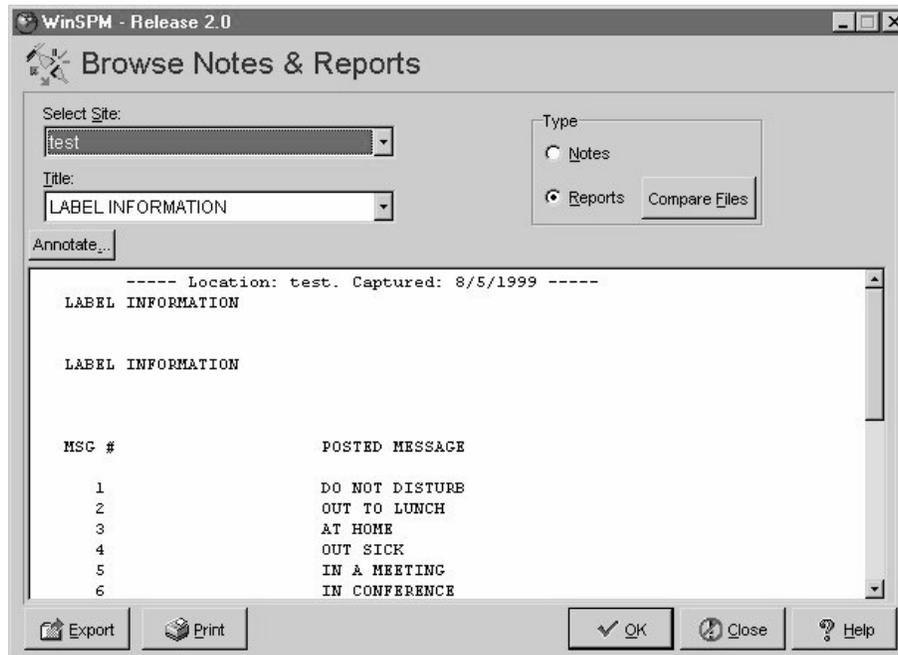
To view the previous page of a report, click **PgUp**.

To return to the beginning of a report, click **Home**.

### WinSPM

1. From the WinSPM Main window Outlook bar, select **View**.
2. From the Outlook bar, click the **Browse Notes & Reports** icon.

The Browse Notes & Reports dialog box displays.

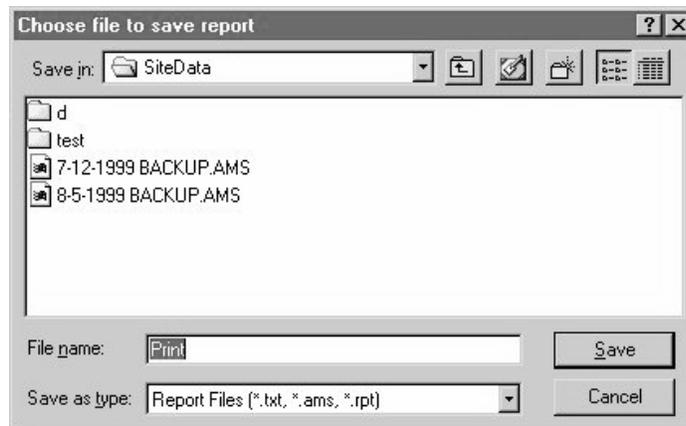


3. From the Type field, select whether you want to view reports or notes.
4. From the drop-down list, select the report/notes you want to view.
5. Click **Print** to print the report to your default printer.

or

Click **Export**.

The Save dialog box displays.



6. Enter the name and location of the file to be saved.
7. Click **Save**.
8. Click **Close** to exit the Browse Notes and Reports dialog box.

## Language

A Language attribute in WinSPM specifies whether WinSPM menus, pop-up windows, and other messages are presented in U.S. English, Canadian French, Latin American Spanish, and Brazilian Portuguese. A Second Language selection option affects messages from the control unit to WinSPM, and controls the display on the console simulation window for the duration of the session. These two language options operate independently of each other.

The following discussion refers to the console window language.

### Console Window Language

By default, the language used in the console simulation window is the language specified in the `ams.cfg` file; however, you can select a different language for this window for the duration of the current session.

To select a different language for the current session, follow the steps below:

1. At the Standard SPM Mode Main menu, click **F10** to select `Language`.

SPM Main Menu	
Menu: Select Function	
Sys Program	Maintenance
Backup	Restore
Boards	Pass-Thru
Print Opts	Password
Monitor	<b>Language</b>

2. Click the function key that corresponds to your language selection.

Display Language
Make a Selection:
English
French
Spanish
Portuguese
Back

The Display Language screen reappears with the language you selected.

3. Click **F5** (`Back`) to return to the Standard SPM Mode Main menu or select another language.

---

## Maintenance

**CAUTION:**

*This option is for use by qualified technicians only. Maintenance procedures are provided in the documentation for qualified technicians.*

**CAUTION:**

*This is a password-protected option and is for use by your technical support organization only.*

---

## Pass-Thru

The Pass-Thru option is not used with MERLIN MAGIX Integrated System Release 1.0i.

---

## Password

The Password option is used by qualified service personnel to change the modem connection password. A password is always required to establish a connection with the built-in modem. The password always consists of seven characters. You can perform remote system programming only if you enter the password correctly. A default password is set at the factory. You must obtain this password from your system consultant (SC).

To change the modem connection password, follow the steps below:

1. At the Standard SPM Mode Main menu, click **F9** to select `password`.

SPM Main Menu	
Menu: Select Function	
Sys Program	Maintenance
Backup	Restore
Boards	Pass-Thru
Print Opts	<b>Password</b>
Monitor	Language

2. Type the old (current) password. Do *not* press **Enter** ↵.

Password:  
Enter Old Password

If you type the old password incorrectly, the bottom of the screen displays the message, **Not Equal**. Repeat Step 2.

If you fail to enter the password correctly after three attempts, the bottom of the screen displays the message **Old Password in Use**, and the procedure terminates. Press **Enter** ↵ to return to the Standard SPM Mode Main menu.

3. Type the new password (any seven characters). Do *not* press **Enter** ↵.

Password  
Enter New Password



**SECURITY ALERT:**

- *The password does not appear on the screen as you type it.*
- *Always use the longest length password allowed on the system.*
- *Passwords should consist of a random, non-repetitive, hard-to-guess sequence of characters.*

4. Type the new password again. Do not press **Enter** ↵.

Password  
Enter New Password again

New Password in use

5. To return to the Standard SPM Mode Main menu, click **F5** (Back).

## Print Options

The `Print Opts` option allows qualified service personnel to direct the output of system programming reports either to the PC (where you can save them, browse through them, or print them with the system programming `Print` option) or to the SMDR printer.

To direct the output of the system programming reports, follow the steps below:

1. At the Standard SPM Mode Main menu, click `F4` to select `Print Opts`.

SPM Main Menu	
Menu: Select Function	
Sys Program	Maintenance
Backup	Restore
Boards	Pass-Thru
<b>Print Opts</b>	Password
Monitor	Language

2. Select the target device for the reports.

Printer Options
Make a selection
SMDR Port
PC Port
Back

3. To return to the Standard SPM Mode Main menu, click `F5` (`Back`).

## SMDR Port Output

See “Printing System Reports,” on page 3-163, for more information about the print procedure using the system console and the SMDR port.

## PC Port Output

See “Printing Reports,” on page 2-45, for more information about the print procedure using WinSPM and the PC port.

### Restore

The Restore option allows qualified service personnel to load system programming from either a disk or from the hard disk into the processor module memory.

This procedure is used either to program a new system if a disk was created through surrogate mode programming, or to restore information (using a backup disk) lost through system failure. It is also part of the upgrade procedure.

### Considerations

Review the following items before you begin the restore procedure:

- The system will be forced idle during a restore procedure.
- You must have a backup file containing system programming before you use this procedure. See “Management Procedures” on page 2-29.
- Features that were not programmed when the backup file was created are reset to factory settings.
- The data restored reflects the number of extensions and lines available on the system at the time the backup was created. The remaining extensions and lines are set to the factory settings that are initialized during a Restart (cold start).
- Restore is terminated under the following conditions:
  - If fewer boards are listed on the backup disk than on the control unit.
  - If any real board is out of sequence with the boards listed on the backup disk.
  - If phantom boards are not listed last.
  - If the operating mode of the system being restored is Hybrid/PBX, but the control unit processor module has been modified to operate only in Key mode.
- A successful restore is followed automatically by a Restart (cold start).

#### **WARNING:**

*An unsuccessful or terminated restore results in a System Erase (frigid start). All calls are dropped. The system configuration is erased. All system programming is lost and the system returns to the factory settings. If the restore is being done remotely, the connection is dropped immediately. If this happens, attempt to reconnect to the control unit and immediately perform another restore. If this is not successful, programming must be restored on site.*

#### **Standard SPM**

**F7** → Select Restore → Select hard disk or floppy → **F10** →  
Select a file → **Enter** → **Ctrl F5** to abort → **Enter**

#### **WinSPM**

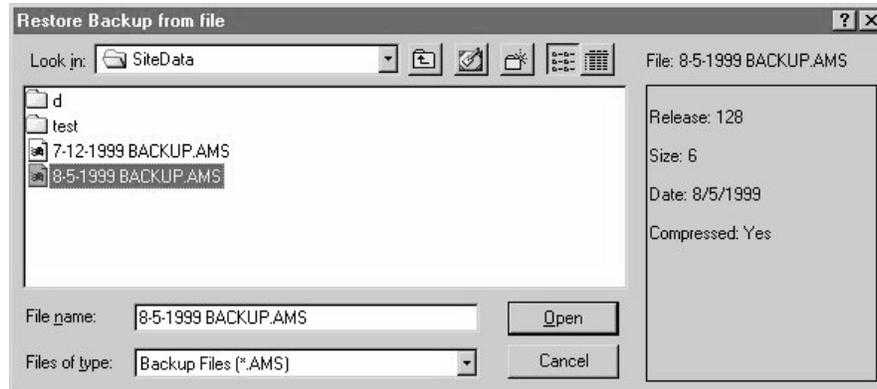
1. From the WinSPM Main window Outlook bar, select **Tools**.
2. From the Outlook bar, click the **Restore** icon.

A selection dialog box displays.



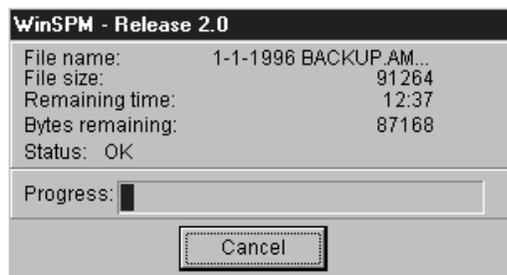
3. Select the File option.
4. Click **Ok**.

The Restore dialog box displays.



5. Enter the name and location of the file to be restored.
6. Click **Open**.

The progress dialog box displays.



7. Click **Cancel** to exit.

## System Programming

A primary function of WinSPM is to provide a method for programming the system. The *Sys Program* option gives you access to all of the system programming features available from the system programming console.

---

### Basic Programming Information

To begin programming, you must perform one of the following to display the System Programming menu on the MLX-20L or 4424LD+ console, or on the PC:

On the console:                   Menu→Sys Program →Back  
On the PC:                        Type *spm* →**Enter** →Press any key→**F1**→**F5**

In most cases, you can click **F5** (Back) to exit from a screen without making any changes. Exceptions to this are noted as part of a procedure. When you complete a procedure and click **F5** (Back), you usually move up one screen in the menu hierarchy. Occasionally, when you click **F5** (Back), you return to the previous screen. In a few cases, clicking **F5** (Back) brings you back to the System Programming menu, where you can select another option to program or exit from system programming.

To complete a procedure and save the information you have programmed, click **F10** (Enter).

If you are programming a group of sequentially numbered extensions or trunks, you may have the option of clicking **F8** (Next). This saves your entry and automatically provides the number of the next extension or trunk in the sequence, thus saving you a couple of steps. If Next displays on the screen, you can use it with the current option.

In most cases, you will be at an intermediate step in the procedure you have just completed. At that point, you can select one of the options shown on the screen and continue programming, or you can click **F5** (Back) again. This usually takes you back to the System Programming menu. If not, you again can continue programming on the current screen or click **F5** (Back) again.

---

### Idle States

A few of the programming procedures can be started only when the entire system or some part of it, such as a trunk or an extension, is idle (not in use). Some procedures require that the trunk or extension be idle only at the instant of programming. Other procedures, which take longer, require the system, trunk, or extension to be forced to remain idle until programming is completed. These procedures wait for the system, trunk, or extension to become idle and then prevent the initiation of any new calls. This condition is called forced idle.

**NOTE** ► If a procedure requires an idle condition, perform the programming outside of normal business hours.

If a procedure requires that the system be in an idle state and the system is busy when you begin, the screen shown below displays.

```
System Busy  Pls Wait

Dial Code:  nnnn
Slot/Port:  ss/pp

Exit
```

The screen changes to the appropriate programming screen when the system is no longer busy.

### System Forced Idle

When the entire system is forced idle, no calls can be made or received. The procedures listed below can be performed only when the entire system (every line and every extension) is idle:

- Select system mode
- Identify system operator positions
- Renumber boards
- Renumber system
- Restore system programming information
- Identify the Music-On-Hold jack

When the system is forced idle, the following occurs: multiline telephone users hear a reminder tone that indicates the telephone cannot be used; display telephone users see the message `Wait: System Busy`; single-line telephone users do not hear a dial tone.

### Line or Trunk Idle

Since these procedures require the line or trunk to be idle only at the instant of programming, the line or trunk is not forced idle. The following procedures can be performed only when the line or trunk being programmed is idle:

- Identify loudspeaker paging line jack
- Assign trunks to pools
- Specify incoming or outgoing DID/DIOD- or tie-trunk type
- Specify tie-trunk direction
- Specify tie-trunk E&M signal

**Reviewers: Should these tie-trunk bullets be removed since Release 1.0i does not support the 400EM module?**

## Extension Forced Idle

When an extension is forced idle, no calls can be made or received on that extension. The following procedures can be performed only when the extension being programmed is idle:

- Assign call restrictions
- Assign pool dial-out restrictions
- Copy extension assignments
- Assign lines, trunks, or pools to extensions
- Assign labels to a personal directory
- Use centralized telephone programming

When the extension is forced idle, the following occurs: multiline telephone users hear a reminder tone that indicates the telephone cannot be used; display telephone users see the message `Wait: System Busy`; single-line telephone users do not hear a dial tone.

## Forced Idle Reminder Tone

The forced idle reminder tone is a high-low “door-telephone” tone → 400 ms of 667 Hz tone followed by 400 ms of 571 Hz tone. The tone is provided under the following circumstances:

- At the extension, to remind the user that the system or the extension is in the forced idle state.
- At the programming console or at a PC running WinSPM, to remind the System Manager that the system (or at least one extension) is in the forced idle state because of administrative activity.

Forced idle reminder tones occur every 20 seconds. You can adjust the volume of these tones with the volume control on the system console or PC.

---

## 100E 100R Module Idle

The following procedures can be performed only when the 100E module is idle:

- Specify board type
- Specify frame format
- Specify board signaling format
- Specify board suppression format
- Specify board facility compensation

## Accessing System Programming

Follow the steps below to access system programming.

1. At the Standard SPM Mode Main menu, click **F1** to select *Sys Program*.

SPM Main Menu	
Menu: Select Function	
<b>Sys Program</b>	Maintenance
Backup	Restore
Boards	Pass-Thru
Print Opts	Password
Monitor	Language

2. Click the function key next to the option you want.

System Programming: >		System Programming: >	
Make a selection		Make a selection	
<b>F1</b>	System Extensions	<b>F6</b>	Labeling Language
<b>F2</b>	SysRenumbr Options	<b>F7</b>	Data
<b>F3</b>	Operator Tables	<b>F8</b>	Print
<b>F4</b>	LinesTrunks AuxEquip	<b>F9</b>	Cntr-Prg
<b>F5</b>	Back NightSrvce	<b>F10</b>	Exit

3. If the option you want does not appear on the first screen of the System Programming menu, click **PgUp** to display the second screen of the menu.

## Printing Reports

Use the following procedure to print system reports using WinSPM at the PC. The WinSPM Print Opts must be set to PC Port. See "Print Options" on page 2-39 for details about setting the printer output port.

1. At the second page of the System Programming menu, click **F3** to select *Print*.

System Programming: >
Make a selection
Labeling
Data
<b>Print</b>
Cntr-Prg
Back

2. Click the function key that corresponds to the report to be printed.

```
Print (English):  >
Make a selection
All              Trunk Info
SysSet-up       T1 Info
Dial Plan       Pri Info
Labels          RmoteAccess
Back            Oper Info
```

3. Use one of the methods shown after this procedure to print the report or reports.

```
Please enter file name
to store print
(default is print.ams)

Press Esc to Abort.
```

```
LPT1:
GOTOFLOPPY
MAKE NEW FILE PRINT.AMS
```

4. View the print status screen.

```
Print in Progress ...

Back
```

To interrupt printing and return to the Standard SPM Mode Main menu, press **F5**.

## Print Hard Copy

To print a hardcopy of the report, use the arrow keys to highlight **LPT1:** and press **Enter**.

## Print to Hard Disk

To print the reports to the hard disk if the print file does not exist, use the arrow keys to highlight **MAKE NEW FILE** and press **Enter**.

- To save to the default print filename (print.ams), press **Enter**.
- To save to the filename of your choice, type [filename] and press **Enter**.

To print the reports to the hard disk if the print file already exists, use the arrow keys to highlight the filename and press **Enter**.

---

## Print to Floppy Disk

Use the arrow keys to highlight `GOTO FLOPPY:` and press `[Enter↵]`. Use one of the methods shown below.

- To print the reports to a floppy disk if the print file does not exist, use the arrow keys to highlight `MAKE NEW FILE` and press `[Enter↵]`.
  - To save to the default print filename (`print.ams`), press `[Enter↵]`.
  - To save to the filename of your choice, type `[filename]` and press `[Enter↵]`.
- To print the reports to a floppy disk if the print file already exists, use the arrow keys to highlight the filename and press `[Enter↵]`.

## Surrogate Mode Programming

Surrogate mode allows qualified service personnel to perform system programming at an offsite service location. The actual system hardware does not have to be installed — the programmer needs a power supply, carrier, processor, and a direct connection from the PC to the processor module. By following a customer's set of completed planning forms, the system can be programmed as if the appropriate modules, trunks, telephones, and other communications equipment have been installed. When system programming is completed, a system backup is performed to save the information on disk. This backup disk is then taken to the new installation site and used with the Restore option to provide complete system programming for a new system.





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## Overview

This chapter contains all of the procedures required for programming each of the features and options that is available for the MERLIN MAGIX Integrated System.

Each of the procedures begins at the System Programming menu. Use one of the methods shown below to display the System Programming menu.

- At the console: Menu→Sys Program→Back
- At a PC with WinSPM using Standard SPM Mode, do the following:
  1. On your desktop, double-click the WinSPM icon. (Depending on options selected during installation, you might select WinSPM from your Start Menu or Lucent Solutions folder.)
  2. Enter your user name and password, then click OK. *The WinSPM main screen appears.*
  3. On the toolbar on the left side of the WinSPM main screen, click the Connect button. *The Connection Selection screen appears.*
  4. From the Connection Selection screen, click the site name for the site you want to connect to.
  5. Click the Connection Type for the session, then click OK.
  6. On the toolbar on the left side of the WinSPM main screen, click the Standard SPM icon. *The system programming console appears in the emulation window.*
  7. Click **F1**, then **F5**.

Before you begin any of the procedures in this chapter, you should read and understand all of the information presented in Chapter 1, "Programming Basics."

## Basic System Operating Conditions

The procedures in this section are all related to the system, rather than to the operation of telephones, operator positions, lines, or trunks. These are operating conditions that must be set only once—when the system is new or when you reset the factory settings.

**NOTE** ► You must reset the system time when Daylight Savings Time begins and ends.

This section contains the following programming procedures:

- System Restart
- System Programming Position Assignment
- System Language
- Board Renumbering
- Mode of Operation
- Automatic Maintenance Busy
- System Date
- System Time
- Rotary Break Timer
- Special Numbers Table
- Digits Prepended to Special Numbers
- Match Delay Timer

---

### System Restart



**CAUTION:**

*This procedure is to be performed by qualified support personnel only.*

Use this procedure to perform a System Restart (cold start). All calls are dropped when you perform this procedure. Existing system programming is saved. Telephones with the Extension Status feature may lose Toll Restrictions as a result of a System Restart.

#### Summary: System Restart

<b>Programmable by</b>	Qualified support personnel
<b>Mode</b>	All
<b>Idle Condition</b>	Not required
<b>Planning Form</b>	Not applicable



<b>Factory Setting</b>	None
<b>Valid Entries</b>	None
<b>Inspect</b>	No
<b>Copy Option</b>	No
<b>Console Procedure</b>	System→Restart→Yes
<b>PC Procedure</b>	<span style="border: 1px solid black; padding: 2px;">F1</span> → <span style="border: 1px solid black; padding: 2px;">F1</span> → <span style="border: 1px solid black; padding: 2px;">F1</span>

---

## System Programming Position Assignment

Use this procedure to reassign the extension used for system programming. This extension should not be the same extension used for the operator position. The system programming position can be reassigned only to one of the first five extension jacks on the first TDL Module if you are using a 4424LD+ telephone, or the first MLX Module if you are using a MLX-20L telephone. Only one system programming console is allowed per system.

If you are programming on the 4424LD+ or MLX-20L console, be aware of the following:

- The console must be connected to the extension currently assigned for system programming.
- As soon as you change the system programming extension, the system programming session is terminated. To proceed with system programming, you must connect the system programming console to the newly assigned extension and enter system programming again.

### Summary: System Programming Position Assignment

<b>Programmable by</b>	System Manager
<b>Mode</b>	All
<b>Idle Condition</b>	Not required
<b>Planning Form</b>	1, System Planning
<b>Factory Setting</b>	First extension jack on the first TDL module if you are using a 4424LD+ telephone, or the MLX module if you are using a MLX-20L telephone (also set as an operator position)
<b>Valid Entries</b>	Extension number of one of the first five extension jacks on the first TDL or MLX module
<b>Inspect</b>	No
<b>Copy Option</b>	No
<b>Console Procedure</b>	System→SProg Port→Drop→Dial ext. no.→ Enter→Back
<b>PC Procedure</b>	<span style="border: 1px solid black; padding: 2px;">F1</span> → <span style="border: 1px solid black; padding: 2px;">F2</span> → <span style="border: 1px solid black; padding: 2px;">Alt</span> + <span style="border: 1px solid black; padding: 2px;">P</span> → Type ext. no. → <span style="border: 1px solid black; padding: 2px;">F10</span> → <span style="border: 1px solid black; padding: 2px;">F5</span>

## System Language

Your system offers you a choice of four languages (U.S. English, Canadian French, Latin American Spanish, and Brazilian Portuguese) for the following options:

- **System Language.** For system programming.
- **Station Message Detail Recording (SMDR) Reports.** See “SMDR Language” on page 3-123.
- **Print Reports.** See “Report Language” on page 3-159.
- **Extensions.** See “Optional Extension Features” on page 3-75.

Use this procedure to set the system language. See the sections listed above to set a different language for SMDR reports and print reports, as well as for 4400-Series or MLX display telephones.

### Summary: System Language

<b>Programmable by</b>	System Manager
<b>Mode</b>	All
<b>Idle Condition</b>	Not required
<b>Planning Form</b>	1, System Planning
<b>Factory Setting</b>	U.S. English
<b>Valid Entries</b>	U.S. English, Canadian French, Latin American Spanish, Brazilian Portuguese
<b>Inspect</b>	No
<b>Copy Option</b>	No
<b>Console Procedure</b>	More→Language→SystemLang→Yes→ Select a language (English, French, Spanish or Portuguese)→Enter
<b>PC Procedure</b>	PgUp→F6→F1→F3→Select a language (English, French, Spanish, or Portuguese)→F10

---

## Board Renumbering



### CAUTION:

*This procedure is to be performed by qualified support personnel only.*

Use this procedure to renumber boards that have already been installed. This procedure restarts the system (system programming is not lost). Note that this is not the same procedure used with the Boards option, which is available to qualified service personnel with WinSPM only.

Board Renumbering is a system programming procedure that is required only when an existing module is replaced by a different type of module. When a Board Renumbering is performed, the system reassigns the logical ID numbers to the extension and line ports sequentially from left to right in the control unit and from bottom to top of each module.

### Summary: Board Renumbering

<b>Programmable by</b>	Qualified support personnel only
<b>Mode</b>	All
<b>Idle Condition</b>	System idle
<b>Planning Form</b>	Not applicable
<b>Factory Setting</b>	None
<b>Valid Entries</b>	Not applicable
<b>Inspect</b>	Not applicable
<b>Copy Option</b>	Not applicable
<b>Console Procedure</b>	System→Board Renum→Yes
<b>PC Procedure</b>	F1 → F4 → F2

---

## Mode of Operation

The system mode—Key, or Hybrid/PBX—determines how the system operates and directly affects the following operations:

- How lines and/or trunks are provided to users
- Types of operator consoles allowed
- Features available

Changing this option causes a system restart and terminates the programming session. You must enter system programming again to program other features.

- NOTES** ▶
- The Behind Switch mode of operation is shown on the Select Mode screen but is not supported in MERLIN MAGIX Integrated System Release 1.0i.
  - The Hybrid/PBX option is not available if the control unit processor module has been modified to operate in Permanent Key mode only. See the *Feature Reference* for more information.

The following options cannot be programmed for Key systems:

- Automatic Route Selection (ARS)
- Pools
- Queued Call Consoles (QCCs) and associated features

## System Programming

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- Direct Inward Dialing (DID) or Direct Inward or Direct Outward Dialing (DIOD) Trunks
- System Access buttons

### Summary: Mode of Operation

<b>Programmable by</b>	System Manager
<b>Mode</b>	All
<b>Idle Condition</b>	System idle
<b>Planning Form</b>	1, System Planning
<b>Factory Setting</b>	Hybrid/PBX
<b>Valid Entries</b>	Key, Hybrid/PBX
<b>Inspect</b>	No
<b>Copy Option</b>	No
<b>Console Procedure</b>	System→Mode→Select mode (Key or Hybrid/PBX)→Enter
<b>PC Procedure</b>	F1→F3→Select mode (Key or Hybrid/PBX)→F10

---

## Automatic Maintenance Busy

Automatic Maintenance Busy allows the system to take a malfunctioning trunk out of service for outgoing calls (incoming calls are never blocked). This prevents faulty outside facilities from causing disruptions in outgoing calling patterns.

For optimal performance, enable Automatic Maintenance Busy for Hybrid/PBX systems with pooled trunks.

**NOTE** ► No more than half of the trunks in a trunk pool are allowed to be placed in the Maintenance Busy state at one time, unless the central office has failed to disconnect a trunk (which prevents anyone from using that trunk) or an entire trunk module is manually taken out of use (a Maintenance-Busy state deliberately caused by the user).

### Summary: Automatic Maintenance Busy

<b>Programmable by</b>	System Manager
<b>Mode</b>	All
<b>Idle Condition</b>	Not required
<b>Planning Form</b>	1, System Planning
<b>Factory Setting</b>	Disabled
<b>Valid Entries</b>	Enabled, Disabled
<b>Inspect</b>	No

---

## Basic System Operating Conditions



<b>Copy Option</b>	No
<b>Console Procedure</b>	<p>To disable Automatic Maintenance Busy: System→MaintenBusy→Disable→Enter→Back</p> <p>To enable Automatic Maintenance Busy excluding tie trunks: System→MaintenBusy→Enable→Enter→Back</p> <p>To enable/disable with tie trunks: System→MaintenBusy→Enable→Enter→Enable Or Disable→Enter→Back</p>
<b>PC Procedure</b>	<p>To disable Automatic Maintenance Busy: F1 → F6 → F2 → F10 → F5</p> <p>To enable Automatic Maintenance Busy excluding tie trunks: F1 → F6 → F1 → F10 → F5</p> <p>To enable/disable with tie trunks: F1 → F6 → F1 → F10 → Enable Or Disable → F10 → F5</p>

## Set System Date

The System Date feature allows you to set the month, day, and year that appear on 4400-Series and MLX display telephones as well as on Station Message Detail Recording (SMDR) reports.

**NOTE** ► If you plan to use the SMDR feature, make sure the current date is set.

### Summary: Set System Date

<b>Programmable by</b>	System Manager
<b>Mode</b>	All
<b>Idle Condition</b>	Not required
<b>Planning Form</b>	1, System Planning
<b>Factory Setting</b>	01-01-00
<b>Valid Entries</b>	Month: 01 to 12 Day: 01 to 31 Year: 00 to 99
<b>Inspect</b>	No
<b>Copy Option</b>	No
<b>Console Procedure</b>	System→Date→Drop→Dial current date (Month: 01–12; Day: 01–31; Year: 00–99)→Enter→Back

**PC Procedure**

**F1** → **F7** → **Alt + P** → Type current date (Month: 01–12;  
Day: 01–31; Year: 00–99) → **F10** → **F5**

## Set System Time

- NOTES** ▶
- The System Time feature allows you to set the time that appears on 4400-Series, MLX, and ETR display telephones and on SMDR reports.
  - If you are planning to use the SMDR feature, make sure the system time is set accurately. If you change the system time while the system is in Night Service mode, Night Service is deactivated and must be manually reactivated. If you have installed applications such as MERLIN Messaging or Intuity AUDIX, you may need to set the time in the applications software whenever you reset the system time.

### Summary: Set System Time

<b>Programmable by</b>	System Manager
<b>Mode</b>	All
<b>Idle Condition</b>	Not Required
<b>Planning Form</b>	1, System Planning
<b>Factory Setting</b>	0000
<b>Valid Entries</b>	0000 to 2359
<b>Inspect</b>	No
<b>Copy Option</b>	No
<b>Console Procedure</b>	System → Time → Drop → Dial current time (0000–2359) → Enter → Back
<b>PC Procedure</b>	<b>F1</b> → <b>F8</b> → <b>Alt + P</b> → Type current time (0000–2359) → <b>F10</b> → <b>F5</b>

## Rotary Break Timer

The Rotary Break Timer increases the compatibility between the MERLIN MAGIX system and the local exchange by improving the timing signaling when digits are outpulsed over analog loop-start central office lines connected to an 800 LS/CPTD module. This module supports up to eight loop-start lines and provides Dial Tone Detection and Call Progress Tone Detection.

**NOTE** ▶ See for information on programming the digital E1 Rotary Break Timer.

The MERLIN MAGIX system uses the Rotary Break Timer value to calculate automatically the Make Timer value (Make Timer value = 100 – Break Timer value).

**Summary: Rotary Break Timer**

<b>Programmable by</b>	System Manager
<b>Mode</b>	All
<b>Idle Condition</b>	Not required
<b>Factory Setting</b>	60 ms
<b>Valid Entries</b>	60-80 ms in 5 ms increments
<b>Inspect</b>	No
<b>Copy Option</b>	No
<b>Console Procedure</b>	System→CO Interface→Break Timer→Drop→Dial duration for Rotary Break Timer (50-80 ms in increments of 5 seconds)→Enter→Back→Back
<b>PC Procedure</b>	[F1]→[F10]→[F1]→[Alt]+[P]→Type duration for Rotary Break Timer (50-80 ms in increments of 5 seconds)→[F10]→[F5]→[F5]

**Special Numbers Table**

The Special Numbers Table is a programmable table of telephone numbers that is separate from ARS and can be accessed in the Key and Hybrid/PBX mode. These “special numbers” include emergency numbers, directory assistance, and repair service numbers. Because these special numbers vary in different countries, the table of special numbers is fully programmable. (Release 1.0 of the MERLIN MAGIX system contained a fixed Special Numbers Table as part of the Automatic Route Selection feature.)

The facility restriction level (FRL) of the Special Numbers Table is fixed at 0, thereby allowing all users to dial any number programmed in this table. Use Disallowed Lists to deny access to certain non-emergency numbers (for example, directory assistance) contained in this table. Give users unrestricted toll access so they may dial emergency numbers that begin with “1” or “0.”

The Special Numbers Table may consist of 1 to 20 entries, with 1 to 6 digits per entry.

**Summary: Special Numbers Table**

<b>Programmable by</b>	System Manager
<b>Mode</b>	All
<b>Idle Condition</b>	Not required
<b>Factory Setting</b>	Not Applicable
<b>Valid Entries</b>	Not Applicable
<b>Inspect</b>	Yes
<b>Copy Option</b>	No

**Console Procedure** System→Tables→Spec1Numbers→Table Input→Dial entry number (1-20)→Enter→Drop→Dial 6-digit special number→Enter→Back→Back

**PC Procedure** [F1]→[F8]→[F8]→[F1]→[F5]→Type entry number (1-20)→[F10]→[Alt]+[P]→Type 6-digit special number→[F10]→[F5]→[F5]

## Special Numbers Other Digits

Use this procedure to specify other (extra) digits that the system must dial before it dials out a number in the Special Numbers Table.

A maximum of 20 digits can be added in any combination of the digits 0 through 9.

Special characters such as switchhook flash, Stop, and # cannot be included as extra digits. Pause is allowed in every position but the first.

### Summary: Special Numbers Other Digits

<b>Programmable by</b>	System Manager
<b>Mode</b>	All
<b>Idle Condition</b>	Not required
<b>Factory Setting</b>	0
<b>Valid Entries</b>	Up to 20 digits (any combination of 0 to 9)
<b>Inspect</b>	No
<b>Copy Option</b>	No
<b>Console Procedure</b>	System→Tables→Spec1Numbers→Other Digit→Drop→Dial digits to be added (up to 20 digits; any combination of 0-9)→Enter→Back→Back
<b>PC Procedure</b>	[F1]→[F8]→[F8]→[F2]→[Alt]+[P]→Type digits to be added (up to 20 digits; any combination of 0-9)→[F10]→[F5]→[F5]

## Match Delay Timer

To provide faster connection to special numbers dialed, Release 1.0i of the MERLIN MAGIX system contains a Match Delay Timer. The Match Delay Timer resets the inter-digit timer to the value of the Match Delay Timer when a match is found between digits already dialed and numbers in the Special Numbers Table. For example, the standard emergency number in Mexico is 060. As soon as someone dials 060 and a match is made between the dialed number and the number in the Special Numbers Table, the Match Delay Timer cuts through so that the digits can be sent quickly to the central office, instead of waiting for the inter-digit timer's delay.

Set the value for the Match Delay Timer to be less than the value for the Inter-Digit Timer.

Consider the parameters for your specific central office when you program the Match Delay Timer.

The Match Delay Timer value ranges from 1 to 90 seconds.

### Summary: Match Delay Timer

<b>Programmable by</b>	System Manager
<b>Mode</b>	All
<b>Idle Condition</b>	Not required
<b>Factory Setting</b>	5 seconds
<b>Valid Entries</b>	1 to 90 seconds
<b>Inspect</b>	No
<b>Copy Option</b>	No
<b>Console Procedure</b>	System→Tables→Spec1Numbers→Match Delay→Drop→ Dial number of seconds for Match Delay Timer (1-90)→Enter→ Back→Back
<b>PC Procedure</b>	[F1]→[F8]→[F8]→[F2]→[Alt]+[P]→Type number of seconds for Match Delay Timer (1-90)→[F10]→[F5]→[F5]

## System Renumbering

The procedures in this section are used to assign the 2-digit, 3-digit, and Set-Up-Space numbering plans for the local MERLIN MAGIX Integrated System.

Do not attempt to assign a numbering plan without Planning Forms 2a, System Numbering: Extension Jacks; 2b, System Numbering: Digital Adjuncts; and 2d, System Numbering: Special Renumbers. Form 6a, Optional Operator Features, is needed to assign a DSS Page button. This section contains the following programming procedures:

- Select System Numbering Plan
- Single Renumbering
- Block Renumbering
- Direct Station Selector (DSS) Page Button Assignment

For the local system, you then select only one of the numbering plans (2-digit numbering, 3-digit numbering, or Set-Up-Space numbering). In addition, you may need to perform single and/or block renumbering. You do not need to assign DSS Page buttons unless the system programming console or one of the operator positions is connected to a DSS. No matter which procedures you need to perform, assign the numbering plan first, then do single and/or block renumbering, and finally, assign DSS Page buttons (if necessary).

Use the single renumbering procedure whenever the extension numbers you are changing *from* or *to* are *not sequential*.

## System Programming

Block renumbering is quicker, but you can use block renumbering only when the extension numbers you are changing *from and to are sequential*.

When trunk or extension modules are removed from the control unit, the remaining modules must be rearranged so that no empty slots remain. The system does not acknowledge any modules installed after an empty slot; therefore, if the system is renumbered, extensions are not assigned to extension jacks after the empty slots.

**NOTE** ▶ Figure 3-1, Figure 3-2, and Figure 3-3 show the factory settings in the gray spaces. Extensions can be renumbered to any number shown in the white spaces.

0	Operator Console (not flexible) 0				
1	Extensions 10–19				
2	Extensions 20–29				
3	Extensions 30–39				
4	Extensions 40–49				
5	Extensions 50–59				
6	Extensions 60–66	Extra Extensions 6700–6842	6843–6849	Extra 4400-Series Adjuncts/ MFMs/ Terminal Adapters 6850–6992	6993–6999
7	Main Pool 70	Adjuncts 710–766	767–769	Calling Groups 770–791,7920–7929	Paging Groups 793–799
8	800 <sup>1</sup>	Lines/Trunks 801–880	Park 881–888	889 <sup>2</sup>	Pools 890–899
9	ARS Access (Hybrid/PBX mode)/Idle Line Access 9				

1 LDN (QCC Queue)

2 Remote Access

**Figure 3-1. 2-Digit Numbering**

0	Operator Console (not flexible) 0				
1	Extensions 100–199				
2	Extensions 200–299				
3	4400-Series/MLX Adjuncts 300–399				
4	4400-Series/MLX Adjuncts 400–499				
5	500–599				
6	600–699				
7	Main Pool 70	71–76	Calling Groups 770–791, 7920–7929		Paging Groups 793–799
8	800 <sup>1</sup>	Lines/Trunks 801–880	Park 881–888	889 <sup>2</sup>	Pools 890–899
9	ARS Access (Hybrid/PBX mode)/Idle Line Access 9				

1 LDN (QCC Queue)

2 Remote Access

**Figure 3-2. 3-Digit Numbering**

0	Operator Console (not flexible) 0					
1	100–199					
2	200–299					
3	300–399					
4	400–499					
5	500–599					
6	600–699					
7	Main Pool 70	Extensions 7100–7299	4400-Series/ MLX Adjuncts 7300–7499	7500–7699	Calling Groups 770–791, 7920–7929	Paging Groups 793–799
8	800 <sup>1</sup>	Lines/Trunks 801–880		Park 881–888	889 <sup>2</sup>	Pools 890–899
9	ARS Access (Hybrid/PBX mode)/Idle Line Access 9					

1 LDN (QCC Queue)

2 Remote Access

**Figure 3-3. Set-Up-Space Numbering**

## Select System Numbering Plan

### **WARNING:**

*To avoid possible loss of system programming information, renumber the system before you program the rest of the options described in this chapter.*

The three available local system numbering plans listed below appear on System Planning Form 2a.

- **Two-Digit.** This plan is for systems with fewer than 50 extensions and no plans to exceed that number in the foreseeable future. Each of the first 58 extension jacks is assigned a 2-digit extension number, beginning with 10 and ending with 67. Any remaining extensions are assigned 4-digit numbers, starting with 6700 and ending with 6842.
- **Three-Digit.** This plan is for systems with 50 or more extensions or plans to grow to that number in the foreseeable future. All extensions are assigned a 3-digit number, starting with 100 and ending with 299.
- **Set-Up-Space.** This plan is for systems with a need to customize extension numbers or use extension numbers of varying lengths (one to four digits). All extensions are assigned 4-digit numbers in the 7000 range. Extension numbers 1000–6999 are also available for use when you renumber.

In all three local numbering plans, the system assigns 3-digit extension numbers to pools (Hybrid/PBX only), Calling Groups, Paging Groups, Remote Access codes, the Listed Directory Number, park codes, and Idle Line Access (Key only). In addition, the system assigns 9 for Automatic Route Selection (Hybrid/PBX only) and Idle Line Access (Key only). Zero (0) represents a special extension number—actually a fixed dial code—for the primary operator or QCC queue. Any extension number except 0 can be renumbered.

Extension numbers can be composed of any combination of digits; however, no number can begin with 0. Trunk numbers (801–880) are considered to be extensions and can be renumbered.

The system does not provide a message to indicate a successful renumber when either the 2-digit or 3-digit numbering plan is selected. For the Set-Up-Space numbering plan, the system provides a message indicating that all extensions are in the 7000 range.

### **CAUTION:**

*Select **Back** on the console, or click **F5** on the PC display, when you have finished selecting the numbering plan. If you press **Exit** (4424LD+ console) or **Home** (MLX-20L console), extensions may remain in the forced idle condition (indicated when the LED next to each DSS button is on). To restore extensions to their normal operating state, restart the system.*

**Summary: Select System Numbering Plan**

<b>Programmable by</b>	System Manager
<b>Mode</b>	All
<b>Idle Condition</b>	System idle
<b>Planning Form</b>	2a, System Numbering: Extension Jacks
<b>Factory Setting</b>	2-Digit
<b>Valid Entries</b>	2-Digit, 3-Digit, SetUp-Space
<b>Inspect</b>	No
<b>Copy Option</b>	No
<b>Console Procedure</b>	SysRenumber→Default Numbering→ Select numbering plan (2-Digit, 3-Digit, SetUp-Space)→Back→Back
<b>PC Procedure</b>	<input type="button" value="F2"/> → <input type="button" value="F1"/> → Select numbering plan (2-Digit, 3-Digit, SetUp-Space) → <input type="button" value="F5"/> → <input type="button" value="F5"/>

**Single Renumbering**

Use this procedure to assign a specified extension number to a telephone, accessory, line, pool (Hybrid/PBX only), Calling Group, Paging Group, or Listed Directory Number. Single renumbering is also used for Remote Access, Park, Idle Line Access (Key only), and Automatic Route Selection (Hybrid/PBX only).

** CAUTION:**

*Select Back on the console, or click  on the PC display, after renumbering extensions. If you press Exit (4424LD+ console) or Home (MLX-20L console), extensions may remain in the forced idle condition (indicated when the LED next to each DSS button is on). To restore extensions to their normal operating state, restart the system.*

When required, this procedure should be performed immediately following the selection of a system numbering plan.

**Summary: Single Renumbering**

<b>Programmable by</b>	System Manager
<b>Mode</b>	All
<b>Idle Condition</b>	System idle
<b>Planning Form</b>	2a, System Numbering: Extension Jacks 2b, System Numbering: Digital Adjuncts 2d, System Numbering: Special Renumbers
<b>Factory Setting</b>	Not applicable
<b>Valid Entries</b>	Old and new extension numbers

<b>Inspect</b>	Yes
<b>Copy Option</b>	No
<b>Console Procedure</b>	SysRenumber→Single→Select item→Dial old ext. no.→Enter→Dial new ext. no.→Enter→Back→Back
<b>PC Procedure</b>	<b>F2</b> → <b>F2</b> →Select item→Type old ext. no.→ <b>F10</b> →Type new ext. no.→ <b>F10</b> → <b>F5</b> → <b>F5</b>

---

## Block Renumbering

Use this procedure to assign extension numbers to a group of extensions, accessories, or lines. Both the original numbers and the numbers they are being changed to must be sequentially numbered.

When required, this procedure should be performed immediately following the selection of a system numbering plan.



### CAUTION:

Select Back on the console, or click **F5** on the PC display, when you have finished renumbering extensions. If you press Exit (4424LD+ console) or Home (MLX-20L console), extensions may remain in the forced idle condition (indicated when the LED next to each DSS button is on). To restore extensions to their normal operating state, restart the system.

### Summary: Block Renumbering

<b>Programmable by</b>	System Manager
<b>Mode</b>	All
<b>Idle Condition</b>	System idle
<b>Planning Form</b>	2a, System Numbering: Extension Jacks 2b, System Numbering: Digital Adjuncts 2d, System Numbering: Special Renumbers
<b>Factory Setting</b>	Not applicable
<b>Valid Entries</b>	Old and new extension numbers
<b>Inspect</b>	Yes
<b>Copy Option</b>	Yes
<b>Console Procedure</b>	SysRenumber→Block→Select type of group→Dial no. of first group member→Enter→Dial no. of last group member→Enter→Dial new beginning no.→Enter→Back→Back→Back
<b>PC Procedure</b>	<b>F2</b> → <b>F3</b> →Select type of group→Type no. of first group member→ <b>F10</b> →Type no. of last group member → <b>F10</b> →Type new beginning no.→ <b>F10</b> → <b>F5</b> → <b>F5</b> → <b>F5</b>

## Direct Station Selector (DSS) Page Buttons

Use this procedure to set the three Page buttons on the DSS to correspond to the system numbering plan. This procedure assigns extension numbers to DSS buttons. The procedure is the same for MLX DSS and DSS 4450 when used with 4424LD+ and 4424D+ telephones. You cannot program individual buttons on a DSS; this is the only method for programming DSS buttons.

Page button assignment should be sequential. If only one DSS is attached, each Page button assignment sets the console for a range of 50 extension numbers: Page 1: 0 to 49; Page 2: 50 to 99; Page 3: 100 to 149.

If two DSSs are attached, each Page button assignment sets the console for a range of 100 extension numbers. If two DSSs are attached to the console, change the factory setting so that the difference between extension numbers assigned to the range is at least 100. For example, assign Page 1 to begin with extension 10, Page 2 to begin with extension 110, and Page 3 to begin with extension 210.

Operator Park Zone codes must be included in the extension number range specified for one of the Page buttons.



### CAUTION:

Select *Back* on the console, or click **F5** on the PC display, when you have finished this procedure. If you press *Exit* (4424LD+ console) or *Home* (MLX-20L console), extensions may remain in the forced idle condition (the LED next to each DSS button is on), and the system may have to be restarted.

### Summary: Assign Direct Station Selector Page Buttons

<b>Programmable by</b>	System Manager
<b>Mode</b>	All
<b>Idle Condition</b>	Not required
<b>Planning Form</b>	Form 6a, Optional Operator Features
<b>Factory Setting</b>	Page 1=0; Page 2=50; Page 3=100
<b>Valid Entries</b>	1, 2, 3
<b>Inspect</b>	Yes
<b>Copy Option</b>	No
<b>Console Procedure</b>	SysRenumber→Single→More→DSS Buttons→ Dial page no. (1-3)→Enter→Dial first ext. no.→ Enter→Back→ Back
<b>PC Procedure</b>	<b>F2</b> → <b>F2</b> →PgUp→ <b>F1</b> →Type page no. (1-3)→ <b>F10</b> → Type first ext. no.→ <b>F10</b> → <b>F5</b> → <b>F5</b>

## System Operator Positions

A system operator position, for a Queued Call Console (QCC) operator or a Direct-Line Console (DLC) operator, should be programmed before you program lines or trunks.

Use the following procedures to add an operator position or change an existing operator position.

The QCC operator position is available only for Hybrid/PBX systems. The DLC operator position is available in any mode and must be programmed if you have Call Management Systems connected to any operator extension jacks.

Table 3-1 shows the maximum number of operator positions allowed for any one system.

**Table 3-1. Maximum Number of Operator Positions**

Position Type	Type of Telephone	Maximum Positions
QCC	4424LD+	4
	MLX-20L	
DLC	4424D+	8
	4424LD+	
	MLX-20L	
	MLX-28D	
Total QCC + DLC		8

Any combination of operator positions can be assigned as long as no more than four operator positions are QCCs and the total number of operator positions does not exceed eight.

If you want to designate a new operator position and the system already has the maximum number of operator positions, you must change an existing operator position to a nonoperator position before you designate a new operator position.

**NOTE** ► When you change an extension to an operator position, or vice versa, the system returns the port (extension jack) type of that extension to the factory setting. You must reprogram lines and any features for that telephone or console. You may also need to change any attached accessory equipment and optional features.

---

## Primary Operator Positions

The primary operator position is the extension to which your call is directed when 0 is dialed on a System Access button. The first extension jack on the first TDL or MLX module in your system is assigned as the primary operator position. If your system has QCC operator positions, this position must be changed from the factory setting (DLC) to a QCC operator position. (The primary operator extension cannot be changed from the first extension on the first TDL or MLX module.)

---

## QCC System Operator Positions

This procedure applies to Hybrid/PBX systems only. Note that both QCC and DLC operator positions can be assigned with this procedure, although its primary purpose is to assign QCC operator positions.

QCC operators serve as central answering positions for all incoming calls. Incoming calls are held in the QCC queue and are directed to each QCC operator in a prioritized sequence. The calls are received one at a time, regardless of the number of incoming calls to the system.

Additional QCC operator positions can be assigned only to the first and fifth extension jacks of the 008 MLX module. You can also assign QCC operator positions to the first, fifth, thirteenth, and seventeenth extension jacks of the 024 TDL modules or to the first, fifth, ninth, and thirteenth extension jacks of the 016 MLX modules. A maximum of four QCC operator positions can be assigned. Use this procedure to specify QCC operator positions that serve as central answering positions for all incoming calls.

**NOTE** ► If you want to add or remove QCC operator positions, the following conditions apply:

- If other QCC positions remain in your system, the primary QCC operator position cannot be removed.
- When QCC operator positions are added, the primary QCC operator position should be the first one added.
- If QCC operator positions are being removed, the primary QCC operator position must be the last one removed.

### Summary: QCC Operator Positions

<b>Programmable by</b>	System Manager
<b>Mode</b>	All
<b>Idle Condition</b>	System idle
<b>Planning Form</b>	2a, System Numbering: Extension Jacks
<b>Factory Setting</b>	Type: DLC

<b>Valid Entries</b>	First or fifth extension jack on the 008 MLX module (maximum: two per module; four QCCs per system). First, fifth, thirteenth, or seventeenth extension jack on an 024 TDL module. First, fifth, ninth, or thirteenth extension jack on an 016 MLX module.
<b>Inspect</b>	Yes
<b>Copy Option</b>	No
<b>Console Procedure</b>	Operator→Positions→Queued Call→Dial ext. no.→Enter or Delete→Store All
<b>PC Procedure</b>	F3 → F1 → F2 → Type ext. no. → F10 or F8 → F3

---

## DLC Operator Positions

DLC operator positions can be assigned to the first and fifth extension jacks on the first 008 MLX module with extension jacks. You also can assign DLC operator positions to the first, fifth, thirteenth, or seventeenth extension jacks on the 024 TDL module or to the first, fifth, ninth, and thirteenth extensions jacks on the 016 MLX modules. A maximum of eight DLC operator positions can be assigned. Any combination of operator positions can be assigned as long as there are no more than four QCC operator positions and no more than a total of eight operator positions.

Use this procedure to specify extensions that serve as central answering positions for all incoming calls or as Calling Group supervisor extensions. (You do not need to use this procedure in a Key system unless you have more than one DLC position.) For a new system, remove the factory-set DLC operator position assignment for any telephone not used as an operator position.

Lines and trunks are assigned to individual buttons.

### Summary: Identify or Remove DLC Operator Positions

<b>Programmable by</b>	System Manager
<b>Mode</b>	All
<b>Idle Condition</b>	System idle
<b>Planning Form</b>	2a, System Numbering: Extension Jacks
<b>Factory Setting</b>	Type: DLC
<b>Valid Entries</b>	First or fifth extension jack on the 008 MLX module (maximum: two per module; eight DLCs per system). First, fifth, thirteenth, or seventeenth extension jack on an 024 TDL module First, fifth, ninth, or thirteenth extension jack on the 016 MLX module.
<b>Inspect</b>	Yes
<b>Copy Option</b>	No



**Console Procedure**    Operator→Positions→Direct Line→Dial ext. no.→  
Enter or Delete→Store All

**PC Procedure**        F3 → F1 → F1 → Type ext. no. → F10 or F8 → F3

## Lines and Trunks

The procedures in this section are used to assign optional features to individual lines and trunks. The following optional features can be assigned:

- Outmode Signaling for Loop-Start Trunks
- Rotary Trunk Digit Transfer
- Disconnect Signaling Reliability
- Toll Type
- Hold Disconnect Interval
- Ring Disconnect Timer
- Dial Tone Detection Options
- Glare Guard
- Principal User for Personal Line
- QCC Queue Priority
- QCC Operator to Receive Calls
- Incoming Call Line Identification Delay
- Trunks to Pools Assignment

The Copy Options feature (described at the end of this section) allows you to copy several optional features from an idle trunk. This option eliminates the need to individually enter each feature.

A slot is the physical location of the individual module on the control unit. There is a maximum of 17 slots, which are numbered as follows:

- Basic carrier: slots 1 through 5
- First expansion carrier: slots 6 through 11
- Second expansion carrier: slots 12 through 17

A port is a line or trunk jack on the module. Individual modules support different numbers of ports. On any module, port 1 is the lowest physical jack position.

---

## Outmode Signaling for Loop-Start Trunks

Use this procedure to identify either touch-tone signaling or rotary-dial signaling for outgoing calls placed by using the specified loop-start trunk.

**NOTE** ► Since the factory setting is Touch-Tone, this procedure is not required if your system has only Touch-Tone lines/trunks.

### Summary: Outmode Signaling for Loop-Start Trunks

<b>Programmable by</b>	System Manager
<b>Mode</b>	Loop-Start: All
<b>Idle Condition</b>	Not required
<b>Planning Form</b>	2c, System Numbering: Line/Trunk Jacks
<b>Factory Setting</b>	Touch-Tone
<b>Valid Entries</b>	Touch-Tone, Rotary
<b>Inspect</b>	No
<b>Copy Option</b>	Yes
<b>Console Procedure</b>	<p>To program a single-line/trunk:            LinesTrunks→TT/LS Disc→Outmode→Select entry mode            (Touch-Tone or rotary)→Dial no. of line/trunk→Enter or Delete→            Back→Back→Back</p> <p>To program a block of lines/trunks:            LinesTrunks→TT/LS Disc→OutMode→Select block of lines/            trunks→Toggle LED On/Off→Enter or Delete→Back→Back→            Back</p>
<b>PC Procedure</b>	<p>To program a single-line/trunk:            F4 → F3 → F1 → F6 (Touch-Tone or rotary) → Type no. of the line/            trunk → F10 or F8 → F5 → F5 → F5</p> <p>To program a block of lines/trunks:            F4 → F3 → F1 → Select block of lines/trunks → Toggle letter G On/            Off → F10 or F8 → F5 → F5 → F5</p>

---

## Rotary Trunk Digit Transfer

Use this procedure to designate whether dialed digits on rotary-dial lines/trunks are sent one by one as they are dialed (no delay), or are stored and sent when dialing is completed (delay). Contact your service provider for more information about the appropriate setting.

**Summary: Rotary Trunk Digit Transfer**

<b>Programmable by</b>	System Manager
<b>Mode</b>	All
<b>Idle Condition</b>	Not required
<b>Planning Form</b>	Form 8a, System Features
<b>Factory Setting</b>	No Delay
<b>Valid Entries</b>	Delay, No Delay
<b>Inspect</b>	No
<b>Copy Option</b>	No
<b>Console Procedure</b>	Options→More→Rotary→Select option (Delay or No Delay)→ Enter→Back
<b>PC Procedure</b>	[F7]→[PgUp]→[F4]→Select option (Delay or No Delay)→[F10]→[F5]

---

**Ringling Frequency**

Use this procedure to program the ringing frequency on an 016 (T/R) module. Contact your service provider for more information about the appropriate setting.

**Summary: Ringling Frequency**

<b>Programmable by</b>	System Manager
<b>Mode</b>	All
<b>Idle Condition</b>	Not required
<b>Planning Form</b>	Form 8a, System Features
<b>Factory Setting</b>	20 Hz
<b>Valid Entries</b>	20 Hz, 25 Hz
<b>Inspect</b>	No
<b>Copy Option</b>	No
<b>Console Procedure</b>	Options→More→Ringling Freq→Dial slot no. (1-17)→ Select 20Hz or 25Hz→Enter→Back
<b>PC Procedure</b>	[F7]→[PgUp]→[F8]→Type slot no. (1-17)→Select 20Hz or 25Hz→ [F10]→[F5]

---

**Second Dial Tone Timer**

Use this procedure to program the second dial tone timer. The second dial tone timer sets a delay in providing a dial tone after a star code is dialed to obtain special services from the central office.

See the *Feature Reference* for information about programming the second dial tone timer to prevent toll fraud.

### Summary: Second Dial Tone Timer

<b>Programmable by</b>	System Manager
<b>Mode</b>	All
<b>Idle Condition</b>	Not required
<b>Planning Form</b>	8a, System Features
<b>Factory Setting</b>	0 ms
<b>Valid Entries</b>	0–5,000 ms, in increments of 200 ms
<b>Inspect</b>	No
<b>Copy Option</b>	No
<b>Console Procedure</b>	Options→More→SecDT→Drop→Dial second dial tone timer value (0–5000 ms, in increments of 200 ms)→Enter→Back
<b>PC Procedure</b>	<input type="text" value="F7"/> → <input type="text" value="PgUp"/> → <input type="text" value="F9"/> → <input type="text" value="Alt"/> + <input type="text" value="P"/> →Type second dial tone timer value (0–5000 ms, in increments of 200 ms)→ <input type="text" value="F10"/> → <input type="text" value="F5"/>

---

## Disconnect Signaling Reliability

Use this procedure to classify the disconnect signal sent by the central office on loop-start trunks as one of the following:

- **Reliable.** Signal sent within a short time.
- **Unreliable.** Signal may not be provided.



### SECURITY ALERT:

*Toll fraud can occur if you have loop-start trunks with unreliable disconnect. In this situation, if someone calls you and you hang up, the central office could send dial tone before the caller hangs up, allowing the caller to place another call as if it originated at your company.*

The setting selected applies to all trunks in the system because trunks cannot be programmed individually. The reliable/unreliable setting does not apply to loop-start trunks emulated on a T1 facility. If you specify a reliable disconnect for trunks programmed with a short hold disconnect interval (see “Hold Disconnect Interval” on page 3-26), active calls, as well as trunks on hold, may be disconnected. For more information about reliable and unreliable disconnect and its implications, see the *Feature Reference*.

**NOTE** ► Certain features (Remote Call Forwarding and Transfer to outside numbers) and applications (MERLIN Messaging System, Octel 100, and Intuity AUDIX) are not recommended with loop-start trunks. See “Hold Disconnect Interval” on page 3-26.

**Summary: Disconnect Signaling Reliability**

<b>Programmable by</b>	System Manager
<b>Mode</b>	All
<b>Idle Condition</b>	Not required
<b>Planning Form</b>	2c, System Numbering: Line/Trunk Jacks
<b>Factory Setting</b>	Unreliable
<b>Valid Entries</b>	Unreliable, Reliable
<b>Inspect</b>	No
<b>Copy Option</b>	No
<b>Console Procedure</b>	LinesTrunks→TT/LS Disc→LS Disconnect→ Select Yes Or No→Enter→Back→Back
<b>PC Procedure</b>	F4 → F3 → F2 → Select Yes or No → F10 → F5 → F5

**Toll Type**

Use this procedure to specify whether users have to dial a toll prefix (1 or 0) before dialing an area code and telephone number. (Your local telephone company should verify toll prefix requirements for each line/trunk.)

This setting is used by the system to classify calls as local or long distance, so that appropriate Toll Restrictions can be applied.

**NOTE** ► This option applies only to loop-start trunks; it does not apply to tie trunks or DID trunks.

**Summary: Toll Type**

<b>Programmable by</b>	System Manager
<b>Mode</b>	All
<b>Idle Condition</b>	Not required
<b>Planning Form</b>	2c, System Numbering: Line/Trunk Jacks
<b>Factory Setting</b>	Toll prefix required
<b>Valid Entries</b>	Required, Not required
<b>Inspect</b>	No
<b>Copy Option</b>	Yes
<b>Console Procedure</b>	To program a single-line/trunk: LinesTrunks→Toll Type→Select entry mode→ Dial no. of the line/trunk→Enter or Delete→Back→Back→Back

**PC Procedure**

To program a block of lines/trunks:  
 LinesTrunks→Toll Type→Select block of lines/trunks→  
 Toggle LED On/Off→Enter or Delete→Back→Back→Back

To program a single-line/trunk:  
 F4 → F10 → F6 → Type no. of the line/trunk → F10 or F8 →  
 F5 → F5 → F5

To program a block of lines/trunks:  
 F4 → F10 → Select block of lines/trunk → Toggle letter G → On/Off →  
 Select Enter or Delete → F5 → F5 → F5

## Hold Disconnect Interval

Use this procedure to specify the number of milliseconds before a loop-start line/trunk is released when a caller on hold hangs up and abandons the call. This can be specified as either a long interval (450 ms) or a short interval (50 ms). The hold disconnect interval applies to loop-start trunks; it does not apply to emulated loop-start trunks (E1 facility).

- NOTES** ▶
- If the disconnect interval is longer than the telephone company setting, the line is not released when a caller on hold hangs up.
  - Do not program a short interval unless the local telephone company's central office is the crossbar type.
  - Do not program a reliable disconnect for lines/trunks with a short hold disconnect interval. This can cause active calls as well as lines/trunks on hold to be disconnected. See "Disconnect Signaling Reliability" on page 3-24.

For more information on Hold Interval Disconnect and Reliable and Unreliable Disconnect, see the *Feature Reference*.

### Summary: Hold Disconnect Interval

<b>Programmable by</b>	System Manager
<b>Mode</b>	All
<b>Idle Condition</b>	Not required
<b>Planning Form</b>	2c, System Numbering: Line/Trunk Jacks
<b>Factory Setting</b>	Long interval (450 ms)
<b>Valid Entries</b>	Long interval, Short interval
<b>Inspect</b>	No
<b>Copy Option</b>	No
<b>Console Procedure</b>	To program a single-line/trunk: LinesTrunks→More→HoldDiscnct→Select entry mode→ Dial no. of the line/trunk→Enter→Back→Back



**PC Procedure**

To program a block of lines/trunks:

LinesTrunks→More→HoldDiscnct→Select block of lines/  
trunks→Toggle LED On/Off→Enter→Back→Back

To program a single-line/trunk:

F4 → PgUp → F1 → F6 → Type no. of the line/trunk →  
F10 → F5 → F5

To program a block of lines/trunks:

F4 → PgUp → F1 → Select block of lines/trunks →  
Toggle letter G On/Off → F10 → F5 → F5

## Ring Disconnect Timer

Use this procedure to activate and set the amount of time in seconds for a system-wide time interval for calls on trunks that do not have Reliable Disconnect. The Ring Disconnect Timer is applied only to those calls that are using a facility that has its Reliable Disconnect parameter set to “no.”

The Ring Disconnect Timer begins for each call that is ringing at an extension where no internal user is active (off-hook, speakerphone, delay announcement) on the call. Also, it starts only after all other system actions have taken place (such as all coverage paths or the Transfer Return interval). The Ring Disconnect Timer stops every time the call is answered at a MERLIN MAGIX extension.

The Ring Disconnect Timer can be set in the range of 50 to 300 seconds in 5-second increments. The factory setting is 50 seconds.

### Summary: Hold Disconnect Interval

<b>Programmable by</b>	System Manager
<b>Mode</b>	All
<b>Idle Condition</b>	Not required
<b>Factory Setting</b>	Activation: On Ring Disconnect Timer duration: 50 seconds
<b>Valid Entries</b>	Activation: On or Off Ring Disconnect Timer duration: 50 to 300 seconds in 5-second intervals
<b>Inspect</b>	No
<b>Copy Option</b>	No
<b>Console Procedure</b>	To turn the Ring Disconnect Timer on or off: Options→More→Ring Disc→Activation→Select On or Off→Enter→Back→Back→Back→Back

**PC Procedure**

To set the Ring Disconnect Timer duration:  
Options→More→Ring Disc→Timer→Dial number of seconds  
for Ring Disconnect Timer (50-300 in increments of 5 seconds)→  
Enter→Back→Back→Back

To turn the Ring Disconnect Timer on or off:  
F7 → PgUp → F4 → F1 → F1 or F2 → F10 → F5 → F5 → F5 → F5

To set the Ring Disconnect Timer duration:  
F7 → PgUp → F4 → F2 → Type number of seconds for Ring  
Disconnect Timer (50-300 in increments of 5 seconds)→  
F10 → F5 → F5 → F5

---

## Dial Tone Detection

Dial Tone Detection prevents the MERLIN MAGIX system from dialing out digits to the public network central office before the public network central office provides dial tone. Users of trunks with Dial Tone Detection enabled always hear internal dial tone, but the digits they dial are held by the system until it detects a dial tone from the public network central office. Dial Tone Detection enables users to go off-hook, hear internal dial tone, dial an external number, and stay off-hook and wait for the system to dial the number when the public network central office provides dial tone.

You can specify the following Dial Tone Detection options:

- Whether the Dial Tone Detection feature is activated for the entire system (Yes or No). The factory setting is No.
- If you activate Dial Tone Detection for the entire system, you can specify which loop-start trunks connected to an 800 LS/CPTD module require Dial Tone Detection. The factory setting is no Dial Tone Detection on any trunks.
- Dial codes that require a second dial tone (for example, long distance calls). The list of numbers should not contain ambiguous entries. The system does provide an error beep or error message is you enter an ambiguous entry.
- The number of calls waiting for dial tone that can be placed on hold for each extension. The factory setting is one call per extension.

**NOTE** ▶ Single-line telephones (tip/ring), 4400, and 4400D telephones can have a maximum of one call waiting for Dial Tone Detection. If you set the number to more than one, the system ignores the setting and allows a maximum of one.

- The length of time that the system waits for dial tone from the public network central office before timing out. The default is 240 seconds. After time-out, the system does not dial the number to the public network central office.

- What the system does after the time-out interval is exceeded. The system can either disconnect the call (Reorder Tone—Disconnect setting) or connect the caller to the public network central office (Cut-through setting). The factory setting is Reorder Tone-Disconnect, and the trunk is disconnected from the public network central office when the user hangs up or after a 15-second timeout.
- Whether a trunk with Dial Tone Detection activated is automatically busied out if the time-out interval is exceeded four consecutive times

**Summary: Dial Tone Detection**

<b>Programmable by</b>	System Manager
<b>Mode</b>	All
<b>Idle Condition</b>	Not required
<b>Factory Setting</b>	Activation: No Loop-start trunks requiring Dial Tone Detection: None Dial codes requiring second dial tone: None Limit of Dial Tone Detection calls on hold: One call per extension Dial Tone Detection Timeout Interval: 240 seconds After timeout action: Reorder tone-disconnect Dial Tone Detection Maintenance Busy: Disable
<b>Valid Entries</b>	Activation: Yes or No Loop-start trunks requiring Dial Tone Detection: Required, not required Dial codes requiring second dial tone: 1 to 10 entries, with 1 to 10 digits per entry Limit of Dial Tone Detection calls on hold: 0-80 Dial Tone Detection Timeout Interval: 1 to 2000 seconds After timeout action: Cut-through or Reorder tone-disconnect Dial Tone Detection Maintenance Busy: Enable or Disable
<b>Inspect</b>	Loop-start trunks requiring Dial Tone Detection: Yes Dial codes requiring second dial tone: Yes All other options: No
<b>Copy Option</b>	All options: No
<b>Console Procedure</b>	To activate or deactivate Dial Tone Detection system-wide: LinesTrunks→More→More→DialTone Det→Activation→ Select Yes or No→Enter→Back→Back→Back→Back  To program Dial Tone Detection for a single-line/trunk: LinesTrunks→More→More→DialTone Det→Lines/ Trunks→Select entry mode→ Dial no. of the line/trunk→ Enter→Back→Back→Back→Back  To program Dial Tone Detection for a block of lines/trunks: LinesTrunks→More→More→DialTone Det→Lines/ Trunks→Select block of lines/trunks→Toggle LED On/ Off→Enter→Back→Back→Back→Back

To set the Dial Tone Detection Timeout Interval:

LinesTrunks→More→More→DialTone Det→Time-out→  
Drop→Dial interval (1-2000 seconds)→Enter→Back→Back→  
Back→Back

To set the system action after time-out:

LinesTrunks→More→More→DialTone Det→AfterTimeOut  
→Select Cut-through or ReorderTone - Disconnect→  
Enter→Back→Back→Back→Back

To program dial codes requiring second dial tone:

LinesTrunks→More→More→DialTone Det→Second  
DT→Dial entry number (1-10)→Enter→Dial digits of dial code  
requiring second dial tone (0-9, maximum of 10)→  
Enter→Back→Back→Back→Back

To program limit of Dial Tone Detection calls on hold for extensions:

LinesTrunks→More→More→DialTone Det→DT on  
Hold→Dial extension number→Enter→Drop→Dial number of  
calls waiting Busy Tone Detection that can be put on hold for this  
extension (1-80)→Enter→Back→Back→Back→Back

To enable or disable Dial Tone Detection Maintenance Busy:

LinesTrunks→More→More→DialTone Det→  
MaintenBusy→Select Enable or Disable→Enter→  
Back→Back→Back→Back

## PC Procedure

To activate or deactivate Dial Tone Detection system-wide:

F4 →PgUp →PgUp →F2 →F1 →F1 or F2 →F10 →F5 →F5 →  
F5 →F5

To program Dial Tone Detection for a single-line/trunk:

F4 →PgUp →PgUp →F2 →F2 →F6 →Type no. of the line/trunk→  
F10 →F5 →F5 →F5 →F5

To program Dial Tone Detection for a block of lines/trunks:

F4 →PgUp →PgUp →F2 →F2 →Select block of lines/trunks→  
Toggle letter G On/Off→F10 →F5 →F5 →F5 →F5

To set the Dial Tone Detection Timeout Interval:

F4 →PgUp →PgUp →F2 →F3 →Alt +P →Type interval (1-2000  
seconds)→F10 →F5 →F5 →F5 →F5

To set the system action after time-out:

F4 →PgUp →PgUp →F2 →F4 →F1 or F2 →F10 →F5 →F5 →  
F5 →F5

To program dial codes requiring second dial tone:

F4 →PgUp →PgUp →F2 →F6 →F6 →Type entry number (1-20)→  
F10 →Type digits of dial code requiring second dial tone (0-9,  
maximum of 10)→F10 →F5 →F5 →F5 →F5

To program limit of Dial Tone Detection calls on hold for extensions:

F4 → PgUp → PgUp → F2 → F7 → Type extension number →  
 F10 → Alt + P → Type number of calls waiting Busy Tone Detection  
 that can be put on hold for this extension (1-80) → F10 → F5 → F5 →  
 F5 → F5

To enable or disable Dial Tone Detection Maintenance Busy:

F4 → PgUp → PgUp → F2 → F8 → F1 or F2 → F10 → F5 → F5 →  
 F5 → F5

## Glare Guard

The Glare Guard feature helps reduce the occurrence of glare. Glare occurs when a user goes off-hook (such as picking up the handset of the telephone) to make an outgoing call and is connected to an incoming call instead of receiving dial tone to place a call. This incoming call arrives at the user's telephone without ringing. Glare is caused by the public network central office and the user accessing the same trunk at the same time.

Use this procedure to set the Glare Guard Duration Timer, which is programmed on a system-wide basis and applies to all 800 LS/CPTD modules. The Glare Guard Duration Timer ranges from 0 to 25500 milliseconds (ms). The factory setting is 1500 ms.

**NOTE** ► Glare Guard does not apply to E1 facilities that are programmed to emulate loop-start trunks.

### Summary: Glare Guard

<b>Programmable by</b>	System Manager
<b>Mode</b>	All
<b>Idle Condition</b>	Not required
<b>Factory Setting</b>	1500 milliseconds (ms)
<b>Valid Entries</b>	0 to 25500 milliseconds (ms) in 100-ms increments
<b>Inspect</b>	No
<b>Copy Option</b>	No
<b>Console Procedure</b>	LinesTrunks → More → More → Glare Guard → Drop → Dial duration of Glare Guard Timer (0-25500 ms in increments of 100 ms) → Enter → Back → Back
<b>PC Procedure</b>	F4 → PgUp → PgUp → F4 → Alt + P → Type duration of Glare Guard Timer (0-25500 ms in increments of 100 ms) → F10 → F5 → F5

---

## Busy Tone Detection

Busy Tone Detection is a built-in feature on the 800 LS/CPTD module. Busy Tone Detection allows the MERLIN MAGIX system to automatically recognize an in-band busy signal from the public network central office as a disconnect signal. When the busy signal is received, the MERLIN MAGIX system releases the analog loop-start trunk. The feature can be set to On or Off for each loop-start trunk connected to the 800 LS/CPTD module. The default is On for all available ports on the module.

The Busy Tone Detection feature is activated when the MERLIN MAGIX user finishes dialing an outside number or when a MERLIN MAGIX system user answers an incoming call. The feature operates as follows:

You can program the following parameters for the Busy Tone Detection feature to ensure that the MERLIN MAGIX system can recognize the busy tone as a signal to disconnect the call:

- Assign or remove Busy Tone Detection to each trunk on the 800 LS/CPTD module
- Specify the cadence of the busy tone
- Specify the level (intensity) of the busy tone
- Set the duration of the Busy Tone Detection Threshold Timer

---

Table 3-2 shows the busy tone characteristics for the three MERLIN MAGIX R1.0i countries.

**Table 3-2. Busy Tone Characteristics**

Country	Frequency (in Hz)	Intensity (in dB)	Cadence (in ms)
Argentina	450 (+/-5%)	-5 to 0	On 250, Off 250 ms
Brazil	425 (+/-5%)	-20 to -5	On 250, Off 250 (+/- 10%)
Mexico	425 (+/-25)	-10 (+/-5)	On 250, Off 250

**Summary: Busy Tone Detection**

<b>Programmable by</b>	System Manager
<b>Mode</b>	All
<b>Idle Condition</b>	Not required
<b>Factory Setting</b>	Cadence: On duration: 250 ms; Off duration: 250 ms Level: Medium (-6 dB) Busy Tone Detection Timer: 0 seconds
<b>Valid Entries</b>	Cadence: On duration: 100 ms–1000 ms in 10-ms increments Off duration: 100 ms–1000 ms in 10-ms increments Level: High (0 dB), Medium (-6 dB), Low (-10 dB), Very Low (-12.5 dB) Busy Tone Detection Timer: 0–60 seconds in 1 second increments
<b>Inspect</b>	No
<b>Copy Option</b>	No
<b>Console Procedure</b>	<p>To program Busy Tone Detection for a single-line/trunk:            LinesTrunks→More→More→Busy Tone Det→BTD Trunk            Status/Change→Select entry mode→ Dial no. of the line/trunk→            Enter→Back→Back→Back→Back</p> <p>To program Busy Tone Detection for a block of lines/trunks:            LinesTrunks→More→More→Busy Tone Det→BTD Trunk            Status/Change→Select block of lines/trunks→Toggle LED On/            Off→Enter→Back→Back→Back→Back</p> <p>To specify cadence of the busy tone            LinesTrunks→More→More→Busy Tone Det→BTD            Feature→Cadence→Select cadence (on duration or off            duration)→Drop→Dial new duration (100-1000 ms in increments of            10 ms)→ Enter→Back→Back→Back→Back</p> <p>To specify level (intensity) of the busy tone            LinesTrunks→More→More→Busy Tone Det→BTD            Feature→Level→Select level (High, Medium, Low, or Very            Low)→ Enter→Back→Back→Back→Back</p> <p>To program Busy Tone Detection Threshold Timer            LinesTrunks→More→More→Busy Tone Det→BTD            Feature→BTD Threshold Timer→Drop→Dial new duration (1-            60 seconds in increments of 1 second)→ Enter→Back→Back→            Back→Back</p>
<b>PC Procedure</b>	<p>To program Dial Tone Detection for a single-line/trunk:            F4 →PgUp →PgUp →F6 →F2 →F6 →Type no. of the line/trunk→            F10 →F5 →F5 →F5 →F5</p> <p>To program Dial Tone Detection for a block of lines/trunks:            F4 →PgUp →PgUp →F6 →F2 →Select block of lines/trunks→            Toggle letter G On/Off→F10 →F5 →F5 →F5 →F5</p>

To specify cadence of the busy tone:

**F4** → **PgUp** → **PgUp** → **F6** → **F1** → **F1** → Select cadence (on duration or off duration) → **Alt** + **P** → Type new duration (100-1000 ms in increments of 10 ms) → **F10** → **F5** → **F5** → **F5** → **F5**

To specify level (intensity) of the busy tone:

**F4** → **PgUp** → **PgUp** → **F6** → **F1** → **F2** → Select level (High, Medium, Low, or Very Low) → **F10** → **F5** → **F5** → **F5** → **F5**

To program Busy Tone Detection Threshold Timer:

**F4** → **PgUp** → **PgUp** → **F6** → **F1** → **F3** → **Alt** + **P** → Type new duration (1-60 seconds in increments of 1 second) → **F10** → **F5** → **F5** → **F5** → **F5**

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### Principal User for Personal Line

Use this procedure to assign or remove one telephone as principal user for a Personal Line. When a telephone with Remote Call Forwarding activated is assigned as principal user, calls received on the Personal Line are forwarded to an outside telephone number. In addition, calls received on that line are sent to that telephone's individual and/or Group Coverage receivers unless the Personal Line button is set to No Ring.

The principal user assignment must be removed before the trunk can be removed from a button on the telephone.

When no principal user is assigned for a Personal Line, calls received on the Personal Line are not forwarded to outside telephone numbers; calls received on the Personal Line follow the coverage patterns for all users who share the line.

### Summary: Principal User for Personal Line

<b>Programmable by</b>	System Manager
<b>Mode</b>	All
<b>Idle Condition</b>	Not required
<b>Planning Form</b>	4l, Extension Copy: Multiline 4400-Series Telephone Template 4m, Multiline 4400-Series Telephone 4d, MLX Telephone 4e, MFM Adjunct: MLX telephone 4f, Tip/Ring Equipment 5b, Direct Line Console 5c, MFM Adjunct: DLC
<b>Factory Setting</b>	No principal user
<b>Valid Entries</b>	Not applicable
<b>Inspect</b>	No
<b>Copy Option</b>	No

<b>Console Procedure</b>	LinesTrunks→More→PrncipalUsr→Dial line/trunk no.→Enter→Dial ext. no.→Enter or Delete→Back→Back
<b>PC Procedure</b>	<b>F4</b> →PgUp→ <b>F2</b> →Type line/trunk no.→ <b>F10</b> →Type ext. no.→Select Enter or Delete→ <b>F5</b> → <b>F5</b>

---

## QCC Queue Priority Level

Use this procedure to assign QCC queue priority level values (1 to 7) to each loop-start and automatic-in tie trunk in your system. The value assigned determines the order in which calls are sent to the QCC operator positions. Call priority 1 is the highest priority, and 7 is the lowest priority.

**NOTE** ► This procedure applies to Hybrid/PBX mode only in a system that includes QCC operator positions.

### Summary: QCC Queue Priority Level

<b>Programmable by</b>	System Manager
<b>Mode</b>	Hybrid/PBX
<b>Idle Condition</b>	Not required
<b>Planning Form</b>	2c, System Numbering: Line/Trunk Jacks
<b>Factory Setting</b>	4
<b>Valid Entries</b>	1 to 7
<b>Inspect</b>	Yes
<b>Copy Option</b>	No
<b>Console Procedure</b>	To program a single-line/trunk: LinesTrunks→More→QCC Prior→Dial priority level (1–7)→Enter→Select entry mode→Dial trunk no.→Enter→Back→Back  To program a block of lines/trunks: LinesTrunks→More→QCC Prior→Dial priority level (1–7)→Enter→Select block of lines→Toggle LED On/Off→Enter→Back→Back
<b>PC Procedure</b>	To program a single-line/trunk: <b>F4</b> →PgUp→ <b>F3</b> →Type priority level (1–7)→Select entry mode→Type trunk no.→ <b>F10</b> → <b>F5</b> → <b>F5</b>  To program a block of lines/trunks: <b>F4</b> →PgUp→ <b>F3</b> →Type priority level (1–7)→ <b>F10</b> →Select block of lines→Toggle letter G On/Off→ <b>F10</b> → <b>F5</b> → <b>F5</b>

## QCC Operator to Receive Calls

Use this procedure to specify whether or not incoming calls on each line/trunk ring into the QCC queue and to identify the QCC system operator positions that receive incoming calls on each line/trunk.

- NOTES** ▶
- This procedure applies to Hybrid/PBX mode only in a system that includes QCC operator positions.
  - Each loop-start, or automatic-in tie trunk programmed to ring into the QCC queue can be associated with one or more QCC operator positions.
  - If a trunk assigned to ring into the QCC queue is also used for shared Remote Access, see “Remote Access Features” on page 3-133 for instructions. You must assign Remote Access before you assign a QCC system operator to receive calls. See “QCC Operator to Receive Call Types” on page 3-95 for more information.
  - Do not change the factory setting of No QCC Operator Assigned to Receive Calls for trunks dedicated to incoming calls for Calling Groups, trunks used as Personal Lines, DID trunks, unequipped DS1 trunks, or dial-in tie trunks.

### Summary: QCC Operator to Receive Calls

<b>Programmable by</b>	System Manager
<b>Mode</b>	Hybrid/PBX
<b>Idle Condition</b>	Not required
<b>Planning Form</b>	2c, System Numbering: Line/Trunk Jacks
<b>Factory Setting</b>	No QCC operator is assigned to receive calls.
<b>Valid Entries</b>	Extension number of first or fifth extension jack
<b>Inspect</b>	Yes
<b>Copy Option</b>	No
<b>Console Procedure</b>	To program a single-line/trunk: LinesTrunks→More→QCC Oper→Dial ext. no.→Enter→ Select entry mode→Dial line/trunk no.→Enter→Back→Back  To program a block of lines/trunks: LinesTrunks→More→QCC Oper→Dial ext. no.→Enter→ Select block of lines/trunks→Toggle LED On/Off→Enter→Back→ Back



**PC Procedure**

To program a single-line/trunk:

**F4** → **PgUp** → **F4** → Type ext. no. → **F10** → **F6** → Type line/trunk no. → **F10** → **F5** → **F5**

To program a block of lines/trunks:

**F4** → **PgUp** → **F4** → Type ext. no. → **F10** →  
 Select block of lines/trunks → Toggle letter **G** On/Off → **F10** → **F5** →  
**F5**

---

**Clock Synchronization**

Use this procedure to specify the primary, secondary, and tertiary clock source. See the *Feature Reference* for more information about the appropriate setting. If the clock is taken from a 100E module, you can also specify whether the clock is synchronized to the outside endpoint (loop) or to the clock reference source (local).

**NOTE** ► This procedure is necessary only if your system includes more than one 100E module.

**Summary: Clock Synchronization**

<b>Programmable by</b>	System Manager
<b>Mode</b>	All
<b>Idle Condition</b>	Not required
<b>Factory Setting</b>	Primary clock: the first 100E module in the control unit carrier
<b>Valid Entries</b>	Primary, Secondary, Tertiary, Loop/Local
<b>Inspect</b>	No
<b>Copy Option</b>	No
<b>Console Procedure</b>	LinesTrunks → More → ClockSync → Primary → Dial slot no. (1-17) → Enter → Dial port no. or select source of synchronization → Enter → Secondary → Dial slot no. (1-17) → Enter → Dial port no. or select source of synchronization → Enter → Tertiary → Dial slot no. (1-17) → Enter → Dial port no. or select source of synchronization → Enter → Back → Back
<b>PC Procedure</b>	<b>F4</b> → <b>PgUp</b> → <b>F7</b> → <b>F1</b> → Type slot no. (1-17) → <b>F10</b> → Type port no. or select source of synchronization → <b>F10</b> → <b>F2</b> → Type slot no. (1-17) → <b>F10</b> → Type port no. or select source of synchronization → <b>F10</b> → <b>F3</b> → Type slot no. (1-17) → <b>F10</b> → Type port no. or select source of synchronization → <b>F10</b> → <b>F5</b> → <b>F5</b>

## Trunks to Pools Assignment

Use this procedure to create trunk pools (groups of outside lines/trunks connected to the system). Trunk pools are used to specify preferred routes for Automatic Route Selection (ARS). In addition, trunk pools enable users to select a line/trunk by dialing a pool dial-out code or by pressing a single button on the telephone. (A separate button for each line/trunk is not needed.) Each pool should contain trunks of the same type (for example, loop-start or DIOD trunks). A maximum of 11 trunk pools is allowed. A trunk can be assigned to only one pool.

Do not mix different service areas of WATS (Wide Area Telecommunications Service) trunks or FX (Foreign Exchange) lines to different cities. Do not include both incoming-only and outgoing-only lines/trunks in the same pool.

If you want to reassign a line/trunk to a different pool, you must remove it from the current pool before you assign it to the new pool. Once you assign a line/trunk to a pool, it can be assigned to a button only on a direct-line console operator position; individual lines intended for personal use on telephones other than the DLC console should not be assigned to pools.

DID trunks cannot be grouped in pools. Loop-start trunks are automatically placed in pools and must be removed manually if used for paging loudspeakers, Music-On-Hold, or maintenance alarms.

Dial-in tie trunks should not be grouped in pools if you intend to assign Pool buttons on telephones.

If you are using Automatic Route Selection, the main pool (factory-set dial-out code 70) must contain loop-start trunks.

The system provides an error tone when a line/trunk is in use, or if a loudspeaker paging system, Music-On-Hold, or maintenance alarm is already assigned; however, the system does not indicate the reason for the error tone.

**NOTE** ► This procedure applies to Hybrid/PBX mode only.

### Summary: Trunks to Pools Assignment

<b>Programmable by</b>	System Manager
<b>Mode</b>	Hybrid/PBX
<b>Idle Condition</b>	Trunk idle
<b>Planning Form</b>	2c, System Numbering: Line/Trunk Jacks
<b>Factory Setting</b>	All loop-start trunks are assigned to the main trunk pool (factory-set extension number 70); all tie trunks are assigned to the trunk pool with the factory-set extension number 891.
<b>Valid Entries</b>	Line numbers
<b>Inspect</b>	Yes



<b>Copy Option</b>	Yes
<b>Console Procedure</b>	<p>To program a single-line/trunk:            LinesTrunks→Pools→Dial pool dial-out code→Select entry mode→Dial no. of the line/trunk→Enter→Back→Back</p> <p>To program a block of lines/trunks:            LinesTrunks→Pools→Dial pool dial-out code→Select block of lines/trunks→Toggle LED On/Off→Enter→Back→Back</p>
<b>PC Procedure</b>	<p>To program a single-line/trunk:            F4 → F9 → Type pool dial-out code → F10 → F6 → Type no. of the line/trunk → F10 → F5 → F5</p> <p>To program a block of lines/trunks:            F4 → F9 → Type pool dial-out code → F10 → Select block of lines/trunks → Toggle letter R On/Off → F10 → F5 → F5</p>

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## Copy Options for Lines/Trunks

Use this procedure to copy options assigned to loop-start trunks, tie trunks, DIOD, or DID trunks. Note that many of these options apply to Hybrid/PBX systems only. The following information is copied for each line/trunk type:

- Loop-Start Trunks (including those emulated on E1 facilities). Toll type, signaling type, and trunk pool assignment (Hybrid/PBX only).
- Tie Trunks. Direction, tie trunk type, E&M signal, dial mode, dial tone, answer supervision time, disconnect time, and trunk pool assignment (Hybrid/PBX only).
- DIOD and DID Trunks (Hybrid/PBX only). Block assignment and disconnect time.

To find out whether there is an optional feature assigned that you would like to copy, use Inspect from the system programming console, or click [PgDn](#) in the console emulation display on the PC.

- NOTES** ▶
- You can copy options to a block of lines/trunks only if they are all of the same type (loop-start, Tie, DIOD, or DID). If you attempt to copy assignments and there is a mismatch in line/trunk type, information is copied to that point only. You receive no error message.
  - If you are copying options to a block of lines/trunks, they must be sequentially numbered.
  - If the block you are copying to includes an invalid line/trunk type, the copying process stops at the invalid type. Only the lines/trunks that were copied to before the invalid type was found are copied successfully.
  - If you are copying assignments to a block of lines/trunks and one of the lines or trunks is in use, you see the message *Trunk Busy - Pls wait* on your display. The copying for the rest of the lines/trunks in the block is delayed until the busy line/trunk becomes idle. If you exit without waiting for the copying to complete, the copying done up to that point is not cancelled.
  - The Inspect feature must be programmed on a line button on the 4424LD+ telephone and is a fixed button on the MLX-20L telephone.

### Summary: Copy Options for Lines/Trunks

<b>Programmable by</b>	System Manager
<b>Mode</b>	All (but note differences)
<b>Idle Condition</b>	Not required
<b>Planning Form</b>	2c, System Numbering: Line/Trunk Jacks 3c, Incoming Trunks: TIE 3d, Incoming Trunks: DID
<b>Factory Setting</b>	Not applicable
<b>Valid Entries</b>	Not applicable
<b>Inspect</b>	No
<b>Copy Option</b>	Not applicable
<b>Console Procedure</b>	To copy individual lines/trunks: LinesTrunks→Copy→Single→Dial copy-from trunk no.→ Enter→Dial copy-to trunk no.→Enter→Back→Back→Back  To copy blocks of lines/trunks: LinesTrunks→Copy→Block→Dial copy-from trunk no.→ Enter→Dial first copy-to trunk no. in block→Enter→ Dial last copy-to trunk no. in block→Enter→Back→Back→Back

**PC Procedure**

To copy individual lines/trunks:

F4 → F7 → F1 → Type copy to trunk no. → F10 →  
 Type copy-from trunk no. → F10 → F5 → F5 → F5

To copy blocks of lines/trunks:

F4 → F7 → F2 → Type copy-from trunk no. →  
 Type first copy-to trunk no. in block → F10 → F5 →  
 Type last copy-to trunk no. in block → F10 → F5 → F5 → F5

**E1 Facilities**

Use the procedures in this section to program the following options for E1 facilities connected to a 100E module:

- Type of E1 facility
  - Loop start
  - TIE
  - Direct Inward Dial (DID)
  - Direct Inward/Outward Dial (DIOD)
- Line Code (Suppression)

**Type of E1 Facility**

Use this procedure to specify the type of channel emulation for the E1 channels on a 100E module. The system supports the following types of trunk emulation in any combination:

- Loop start
- TIE
- Direct Inward Dial (DID)
- Direct Inward/Outward Dial (DIOD)

If the type of channel emulation is tie trunk, you must specify whether the lines/trunks are TIE-PBX, Toll, or Switched 56 Data service. The valid settings are as follows:

- **TIE-PBX.** Select when emulated tie trunks are used to connect to another system (such as PBX or Centrex). The transmit/receive gain is set to 0/4.
- **Toll.** Select when emulated tie trunks are used for network services. Note that unused channels must be specified as unequipped. The transmit/receive gain is set to 0/6.

**Summary: Type of E1 Facility**

<b>Programmable by</b>	System Manager
<b>Mode</b>	All
<b>Idle Condition</b>	100E module idle

<b>Factory Setting</b>	Unequipped
<b>Valid Entries</b>	Loop Start, TIE, DID, DIOD, All Loop, All TIE, All DID, All DIO, Unequipped, All Unequipped
<b>Inspect</b>	Yes
<b>Copy Option</b>	No
<b>Console Procedure</b>	<p>To select All Loop, All DID, or All DIOD:            LinesTrunks→Modules→Dial slot no. (1-17)→Enter→Type→Select type of emulation→Enter→Back→Back→Back</p> <p>To select All Unequip:            LinesTrunks→Modules→Dial slot no. (1-17)→Enter→Type→More→All Unequip→Enter→Enter→Back→Back→Back</p> <p>To select Loop Start, DID or DIOD for individual channels:            LinesTrunks→Modules→Dial slot no. (1-17)→Enter→Type→Select type of emulation→Enter→Dial channel no. (2-32; channels 1 and 17 are reserved for signaling)→Enter or Delete→Back→Back→Back→Back</p> <p>To select All TIE:            LinesTrunks→Modules→Dial slot no. (1-17)→Enter→Type→All TIE→Enter→TIE-PBX or Toll→Enter→Back→Back→Back→Back</p> <p>To select TIE for individual channels:            LinesTrunks→Modules→Dial slot no. (1-17)→Enter→Type→TIE→Enter→TIE-PBX or Toll→Enter→Dial channel no. (1-32; channels 1-17 are reserved for signaling)→Enter or Delete→Back→Back→Back→Back</p>
<b>PC Procedure</b>	<p>To select All Loop, All DID or All DIOD:            [F4] → [F1] → Type slot no. (1-17) → [F10] → [F1] → Select type of emulation → [F10] → [F5] → [F5] → [F5]</p> <p>To select All Unequip:            [F4] → [F1] → Type slot no. (1-17) → [F10] → [F1] → PgUp → [F6] → [F10] → [F5] → [F5] → [F5]</p> <p>To select Loop Start, DID or DIOD for individual channels:            [F4] → [F1] → Type slot no. (1-17) → [F10] → [F1] → Select type of emulation → [F10] → Type channel number (1-32; channels 1-17 are reserved for signaling) → [F10] or [F8] → [F5] → [F5] → [F5] → [F5]</p> <p>To select All TIE:            [F4] → [F1] → Type slot no. (1-17) → [F10] → [F7] → [F1] or [F2] → [F10] → [F5] → [F5] → [F5] → [F5]</p> <p>To select TIE for individual channels:            [F4] → [F1] → Type slot no. (1-17) → [F10] → [F1] → [F1] → [F1] or [F2] → [F10] → Type channel no. (1-32; channels 1-17 are reserved for signaling) → [F10] or [F8] → [F5] → [F5] → [F5] → [F5]</p>

## Line Code Suppression

Use this procedure to specify the type of line coding suppression mechanism for the 100E module as Alternate Mark Inversion (AMI) or Alternate Mark Inversion with High Density Bipolar of Order 3 (HDB3). Your selection must match the suppression at the far end of the DS1 facility.

### Summary: Zero Code Suppression

<b>Programmable by</b>	System Manager
<b>Mode</b>	All
<b>Idle Condition</b>	100E module idle
<b>Factory Setting</b>	HDB3
<b>Valid Entries</b>	AMI or HDB3
<b>Inspect</b>	No
<b>Copy Option</b>	No
<b>Console Procedure</b>	LinesTrunks→Module→Dial slot no. (1–17)→ Enter→ Suppression→AMI Or HDB3→ Enter→Back→Back
<b>PC Procedure</b>	<span>F4</span> → <span>F1</span> → Type slot no. (1–17) → <span>F10</span> → <span>F2</span> → <span>F1</span> or <span>F2</span> → <span>F10</span> → <span>F5</span> → <span>F5</span>

## Channel Associated Signaling

Use these procedures to program the following Channel Associated Signaling options for E1 facilities:

- Select a country code
  - 1=Mexico (default)
  - 2=Argentina
  - 3=Brazil

**NOTE** ► Setting the country code automatically sets the values for the following options and it is usually not necessary to change the settings.

- Line Signaling Timing
- MFC Dialing (See MFC Register Signaling)
- Pulse Dialing
- Tariff Pulse Meter
- Encoding

## Country Code

Use this procedure select a specific channel associated signaling protocol by selecting the country code that most closely matches your country.

### Summary: Country Code

<b>Programmable by</b>	System Manager
<b>Mode</b>	All
<b>Idle Condition</b>	100E module idle
<b>Factory Setting</b>	1 - Mexico
<b>Valid Entries</b>	1 = Mexico, 2 = Argentina, or 3 = Brazil
<b>Inspect</b>	No
<b>Copy Option</b>	No
<b>Console Procedure</b>	LinesTrunks→More→More→R2/CaS Signl→CountryCode→ Dial a country code (1 = Mexico, 2 = Argentina, or 3 = Brazil)→ Enter→Back→Back→Back→Back
<b>PC Procedure</b>	<b>F4</b> → <b>PgUp</b> → <b>PgUp</b> → <b>F3</b> → <b>F1</b> → Type a country code (1 = Mexico, 2 = Argentina, or 3 = Brazil) → <b>F10</b> → <b>F5</b> → <b>F5</b> → <b>F5</b>

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## Line Signaling Timing

Use this procedure set the following line signaling timers:

- out seize
- clear forward
- clear back
- disconnect guard
- answer validation
- dialing delay

### Summary: Line Signaling Timing

<b>Programmable by</b>	System Manager
<b>Mode</b>	All
<b>Idle Condition</b>	100E module idle
<b>Factory Setting</b>	Values defined by country code chosen; if a specific country code is not chosen, the factory settings are as follows: Out Seize: 200 ms Clear Forward: 220 ms



	Clear Back: 250 ms Disconnect Guard: 500 ms Answer Timeout: 20 ms Dialing Delay: 0 ms
<b>Valid Entries</b>	Out Seize: 0 ms to 10000 ms in increments of 100 ms Clear Forward: 20 ms to 1000 ms in increments of 20 ms Clear Back: 20 ms to 1000 ms in increments of 20 Disconnect Guard: 0 ms to 2000 ms in increments of 50 Answer Timeout: 20 ms to 500 ms in increments of 10 Dialing Delay: 0 ms to 1000 ms in increments of 100
<b>Inspect</b>	No
<b>Copy Option</b>	No
<b>Console Procedure</b>	LinesTrunks→More→More→R2/CaS Signl→ Timing→Select the timer you want to change→Drop→Dial the new setting for the timer (see valid entries above for each timer)→Enter→ Back→Back→Back→Back
<b>PC Procedure</b>	[F4]→[PgUp]→[PgUp]→[F3]→[F2]→Select the timer you want to change→[Alt]+[P]→Type the new setting for the timer (see valid entries above for each timer)→[F10]→[F5]→[F5]→[F5]→[F5]

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## Pulse Dialing

Use this procedure to set the following pulse dialing parameters:

- Pulse dialing bit - used for selecting the bit used for pulse dialing
- Break timer - used for the make/break ratio of pulse dialing

### Summary: Pulse Dialing

<b>Programmable by</b>	System Manager
<b>Mode</b>	All
<b>Idle Condition</b>	100E module idle
<b>Factory Setting</b>	Values defined by country code chosen; if a specific country code is not chosen, the factory settings are set as follows: Pulse Dialing Bit: Bit B Break Timer: 60 ms
<b>Valid Entries</b>	Bit A, Bit B, Bit C Break Timer: 50 ms to 80 ms in increments of 10 ms
<b>Inspect</b>	No
<b>Copy Option</b>	No

**Console Procedure** To set the Pulse Dialing Bit:  
 LinesTrunks→More→More→R2/CaS Signl→  
 Pulse Dial→Dialing Bit→Select Bit A, Bit B or Bit C→  
 Enter→Back→Back→Back→Back

To set the Break Timer:  
 LinesTrunks→More→More→R2/CaS Signl→  
 Pulse Dial→Break Timer→Drop→Dial the duration of the  
 Break Timer (50-80 ms in increments of 10 ms→  
 Enter→Back→Back→Back→Back

**PC Procedure**

To set the Pulse Dialing Bit:  
 F4 → PgUp → PgUp → F3 → F4 → F1 → F1 or F2 → F10  
 → F5 → F5 → F5 → F5

To set the Break Timer:  
 F4 → PgUp → PgUp → F3 → F4 → F2 → Alt + P → Type the duration  
 of the Break Timer (50-80 ms in increments of 10 ms → F10  
 → F5 → F5 → F5 → F5

**Tariff Pulse Meter**

Use this procedure to activate tariff pulse metering on E1 trunks and set the following Tariff Pulse Meter parameters:

- Tariff Pulse Meter activation
- meter bit
- minimum pulse
- minimum pause

**Summary: Tariff Pulse Meter**

<b>Programmable by</b>	System Manager
<b>Mode</b>	All
<b>Idle Condition</b>	100E module idle
<b>Factory Setting</b>	Values defined by country code chosen; if a specific country code is not chosen, the factory settings are as follows: Activation: Off Meter Bit: Bit B Minimum Pulse Duration: 100 ms Minimum Pause Duration: 40 ms
<b>Valid Entries</b>	Activation: On or Off Meter Bit: Bit A, Bit B or Bit C Minimum Pulse Duration: 20 ms to 1000 ms in increments of 10 ms Minimum Pause Duration: 20 ms to 1000 ms in increments of 10 ms
<b>Inspect</b>	No



**Copy Option** No

**Console Procedure** To turn Tariff Pulse Metering on or off:  
 LinesTrunks→More→More→R2/CaS Signl→  
 Tariff Pulse→On/Off→Select On or Off→  
 Enter→Back→Back→Back→Back

To select the Meter Bit:  
 LinesTrunks→More→More→R2/CaS Signl→  
 Tariff Pulse→Meter Bit→Select Bit A, Bit B or Bit  
 C→Enter→Back→Back→Back→Back

To set the Minimum Pulse Duration:  
 LinesTrunks→More→More→R2/CaS Signl→  
 Tariff Pulse→Min Pulse→Drop→Dial the Minimum Pulse  
 Duration (200-1000 ms in increments of 10 ms) →Enter→Back  
 →Back→Back→Back

To set the Minimum Pause Duration:  
 LinesTrunks→More→More→R2/CaS Signl→  
 Tariff Pulse→Min Pause→Drop→Dial the Minimum Pause  
 Duration (20-1000 ms in increments of 10 ms) →Enter→Back  
 →Back→Back→Back

**PC Procedure**

To turn Tariff Pulse Metering on or off:  
 [F4] → [PgUp] → [PgUp] → [F3] → [F7] → [F1] → [F1] or [F2] → [F10]  
 → [F5] → [F5] → [F5] → [F5]

To select the Meter Bit:  
 [F4] → [PgUp] → [PgUp] → [F3] → [F7] → [F2] → [F1], [F2] or [F3] → [F10]  
 → [F5] → [F5] → [F5] → [F5]

To set the Minimum Pulse Duration:  
 [F4] → [PgUp] → [PgUp] → [F3] → [F7] → [F3] → [Alt] + [P] → Type the Minimum  
 Pulse Duration (200-1000 ms in increments of 10 ms) → [F10]  
 → [F5] → [F5] → [F5] → [F5]

To set the Minimum Pause Duration:  
 [F4] → [PgUp] → [PgUp] → [F3] → [F7] → [F4] → [Alt] + [P] → Type the Minimum  
 Pulse Duration (20-1000 ms in increments of 10 ms) → [F10]  
 → [F5] → [F5] → [F5] → [F5]

---

## Encoding

Use this procedure to specify the encoding algorithm that the system uses to interface with the public-switched telephone network. Most countries expect the A-law.

**NOTE** ► if A-law is selected, the information selected and received to and from the network will be in A-law and then a conversion is done to Mu-law since the system backplane works in Mu-law.

**Summary: Encoding**

<b>Programmable by</b>	System Manager
<b>Mode</b>	All
<b>Idle Condition</b>	100E module idle
<b>Factory Setting</b>	Values defined by country code chosen; if a specific country code is not chosen, the factory setting is A-law
<b>Valid Entries</b>	Mu-law or A-law
<b>Inspect</b>	No
<b>Copy Option</b>	No
<b>Console Procedure</b>	LinesTrunks→More→More→R2/CaS Signl→Encoding→Select Mu-law or A-law→Enter→Back→Back→Back
<b>PC Procedure</b>	<input type="button" value="F4"/> → <input type="button" value="PgUp"/> → <input type="button" value="PgUp"/> → <input type="button" value="F3"/> → <input type="button" value="F6"/> → <input type="button" value="F1"/> or <input type="button" value="F2"/> → <input type="button" value="F10"/> → <input type="button" value="F5"/> → <input type="button" value="F5"/> → <input type="button" value="F5"/>

## MultiFrequency Compelled (MFC) Register Signaling

Use these procedures to program the following MultiFrequency Compelled (MFC) Register Signaling options for E1 facilities:

- Signals
- Send Signals
- Expect Digit
- Number to Send

Use this procedure to map forward and backward signals to their meanings.

**Summary: Signals**

<b>Programmable by</b>	System Manager
<b>Mode</b>	All
<b>Idle Condition</b>	100E module idle
<b>Factory Setting</b>	Values defined by country code chosen; if a specific country code is not chosen, the factory setting is the settings required for operation in Mexico; see <i>Feature Reference</i> for details.
<b>Valid Entries</b>	Group I, Group III, Group A, or Group B
<b>Inspect</b>	No
<b>Copy Option</b>	No



**Console Procedure** LinesTrunks→More→More→R2/CaS Signl→MFC Dialing→Signals→Dial the signal number you want to set→Drop→Enter→Select the appropriate meaning for the signal→Enter→Back→Back→Back→Back

**PC Procedure** [F4]→[PgUp]→[PgUp]→[F3]→[F2]→[F1]→Type the signal number you want to set→[Alt]+[P]→[F10]→Select the appropriate meaning for the signal→[F10]→[F5]→[F5]→[F5]→[F5]

- Specify the number of digits the system expects for incoming TIE calls using MFC Dialing.

**NOTE**▶ The number of digits the system expects for incoming DID calls is specified during DID trunks programming.

## Send Signals

Use this procedure to specify what signal the system sends in certain points of the dialing protocol. You can set the following signals:

- End of Number
- II Response
- End of Address
- Group A Congestion
- Ringing
- Busy
- Reorder 1
- Reorder 2
- Reorder 3
- End of ANI

The settings are not normally changed. Check with your representative before changing the settings.

### Summary: Send Signals

<b>Programmable by</b>	System Manager
<b>Mode</b>	All
<b>Idle Condition</b>	100E module idle
<b>Factory Setting</b>	Values defined by country code chosen; if a specific country code is not chosen, the factory setting is the settings required for operation in Mexico; see <i>Feature Reference</i> for details. These settings are not normally changed.
<b>Valid Entries</b>	See <i>Feature Reference</i>

<b>Inspect</b>	No
<b>Copy Option</b>	No
<b>Console Procedure</b>	LinesTrunks→More→More→R2/CaS Signl→ MFC Dialing→Send Signals→Select the send signal you want to change→Drop→Dial the new setting→Enter→Back→Back →Back→Back
<b>PC Procedure</b>	<b>F4</b> → <b>PgUp</b> → <b>PgUp</b> → <b>F3</b> → <b>F2</b> → <b>F2</b> → Select the send signal you want to change → <b>Alt + P</b> → Type the new setting → <b>F10</b> → <b>F5</b> → <b>F5</b> → <b>F5</b> → <b>F5</b>

---

## Expected Digits

Enables you to specify the number of digits the system expects for incoming TIE calls using MFC Dialing.

**NOTE** ► Expected digits for DID trunks are set under DID programming.

### Summary: Expected Digits

<b>Programmable by</b>	System Manager
<b>Mode</b>	All
<b>Idle Condition</b>	100E module idle
<b>Factory Setting</b>	Values defined by country code chosen; if a specific country code is not chosen, the factory setting is the settings required for operation in Mexico.
<b>Valid Entries</b>	1-4
<b>Inspect</b>	No
<b>Copy Option</b>	No
<b>Console Procedure</b>	LinesTrunks→More→More→R2/CaS Signl→ MFC Dialing→ExpectDigit→Drop→Dial the number of digits to expect (1-4)→Enter→Back→Back→Back→Back
<b>PC Procedure</b>	<b>F4</b> → <b>PgUp</b> → <b>PgUp</b> → <b>F3</b> → <b>F2</b> → <b>F3</b> → <b>Alt + P</b> → Type the number of digits to expect (1-4) → <b>F10</b> → <b>F5</b> → <b>F5</b> → <b>F5</b> → <b>F5</b>

## Number to Send

Use this procedure to specify which number the system sends in response to a “send ANI” request. You can specify the system to send one of the following numbers:

- Extension Only
- Extension and Base (only one base telephone number is permitted per system)
- Line Telephone Number

### Summary: Number to Send

<b>Programmable by</b>	System Manager
<b>Mode</b>	All
<b>Idle Condition</b>	100E module idle
<b>Factory Setting</b>	Extension Only
<b>Valid Entries</b>	Extension Only, Extension and Base, or Line Telephone number
<b>Inspect</b>	No
<b>Copy Option</b>	No
<b>Console Procedure</b>	<p>To specify Extension Only:                      LinesTrunks→More→More→R2/CaS Signl→                      MFC Dialing→NumberToSend→Extension                      Only→Enter→Back→Back→Back→Back</p> <p>To specify Extension and Base:                      LinesTrunks→More→More→R2/CaS Signl→                      MFC Dialing→NumberToSend→Extension and                      Base→Drop→Dial the base telephone number (maximum 12                      digits)→Enter→Back→Back→Back→Back</p> <p>To specify Line Telephone Number:                      LinesTrunks→More→More→R2/CaS Signl→                      MFC Dialing→NumberToSend→Line Telephone                      Number→Enter→Dial the line number (1-80)→Enter→Drop→                      Dial the telephone number to send on outgoing calls (maximum 12                      digits)→Enter→Back→Back→Back→Back</p>
<b>PC Procedure</b>	<p>To specify Extension Only:                      [F4] → [PgUp] → [PgUp] → [F3] → [F2] → [F4] → [F1] → [F10] → [F5] → [F5] → [F5] → [F5]</p> <p>To specify Extension and Base:                      [F4] → [PgUp] → [PgUp] → [F3] → [F2] → [F4] → [F2] → [Alt] + [P] → Type the                      base telephone number (maximum 12 digits) → [F10] → [F5] → [F5] → [F5] → [F5]</p>

To specify Extension and Base:

[F4] → [PgUp] → [PgUp] → [F3] → [F2] → [F4] → [F3] → [F10] → Dial the line number (1-80) → [F10] → [Alt + P] → Type the telephone number to send on outgoing calls (maximum 12 digits) → [F10] → [F5] → [F5] → [F5] → [F5]

## Tie Trunks

**Reviewers: Is this section still valid since Release 1.0i does not support the 400EM module? Does this procedure apply to the emulated tie trunks for the 100E module?**

This section covers programming procedures for the following tie trunk options:

- Direction
- Tie Trunk Seizure Type
- E&M Signal
- Dial Mode
- Tie Trunk Dial Tone
- Tie Trunk Answer Supervision Time
- Disconnect Time

---

### Direction

Use this procedure to specify whether tie trunks operate in a one- or two-way direction. For one-way tie trunks, you must also specify whether the direction is out or in.

#### Summary: Direction

<b>Programmable by</b>	System Manager
<b>Mode</b>	All
<b>Idle Condition</b>	Tie trunk idle
<b>Planning Form</b>	3c, Incoming Trunks: Tie
<b>Factory Setting</b>	Two-way
<b>Valid Entries</b>	Two-way, Outgoing, Incoming
<b>Inspect</b>	No
<b>Copy Option</b>	Yes
<b>Console Procedure</b>	LinesTrunks → TIE Lines → Direction → Dial trunk no. → Enter → Specify direction (Two-way, Outgoing, or Incoming) → Enter → Back → Back



**PC Procedure**      **F4** → **F2** → **F1** → Type trunk no. → **F10** →  
Specify direction (Two-way, Outgoing, or Incoming) → **F10** → **F5** → **F5**

## Tie Trunk Seizure Type

Use this procedure to specify whether the seizure type of incoming or outgoing tie trunk is wink, delay, immediate, automatic, R2/CaS Automatic, or R2/CaS Dial.

### Summary: Tie Trunk Seizure Type

<b>Programmable by</b>	System Manager
<b>Mode</b>	All
<b>Idle Condition</b>	Tie trunk idle
<b>Planning Form</b>	3c, Incoming Trunks: Tie
<b>Factory Setting</b>	R2/CaS Automatic
<b>Valid Entries</b>	Wink, Delay, Immediate, Automatic, R2/CaS Automatic, or R2/CaS Dial
<b>Inspect</b>	No
<b>Copy Option</b>	Yes
<b>Console Procedure</b>	LinesTrunks → TIE Lines → Intype or Outtype → Dial trunk no. → Enter → Specify seizure type (Wink, Delay, Immediate, Automatic, R2/CaS Automatic, or R2/CaS Dial) → Enter → Back → Back
<b>PC Procedure</b>	<b>F4</b> → <b>F2</b> → <b>F2</b> or <b>F3</b> → Type trunk no. → <b>F10</b> → Specify seizure type (Wink, Delay, Immediate, Automatic R2/CaS Automatic, or R2/CaS Dial) → <b>F10</b> → <b>F5</b> → <b>F5</b>

## E&M Signal

Use this procedure to specify the type of tie trunk signal, as follows:

- **E&M Mode:**
  - **1S, Type 1 Standard.** Tie trunks that are connected through the local telephone company.
  - **1C, Type 1 Compatible.** Tie trunks that are connected directly to a system that uses 1S signaling.
- **Simplex Mode:**
  - **5, Type 5 Simplex.** Tie trunks that are connected to a system using Type 5 signaling.

**Summary: E&M Signal**

<b>Programmable by</b>	System Manager
<b>Mode</b>	All
<b>Idle Condition</b>	Tie trunk idle
<b>Planning Form</b>	3c, Incoming Trunks: Tie
<b>Factory Setting</b>	1S
<b>Valid Entries</b>	1S, 1C, 5
<b>Inspect</b>	No
<b>Copy Option</b>	Yes
<b>Console Procedure</b>	LinesTrunks→TIE Lines→E&M Signal→Dial trunk no.→Enter→Specify signaling type (1S, 1C, or 5)→Enter→Back→Back
<b>PC Procedure</b>	[F4]→[F2]→[F4]→Type trunk no.→[F10]→Specify signaling type (1S, 1C, or 5)→[F10]→[F5]→[F5]

---

**Dial Mode**

Use this procedure to specify whether an incoming or outgoing tie trunk is Touch-Tone, Rotary, or MFC.

Touch-Tone cannot be programmed for incoming immediate signaling tie trunks. Users of Touch-Tone single-line telephones cannot make calls by using individual trunks programmed for rotary operation. The Touch-Tone signals generated from the telephone while the user is dialing are transmitted to the central office at the same time the rotary signals are sent to the system. The central office receives both signals and cannot process the call.

**Summary: Dial Mode**

<b>Programmable by</b>	System Manager
<b>Mode</b>	All
<b>Idle Condition</b>	Not required
<b>Planning Form</b>	3c, Incoming Trunks: Tie
<b>Factory Setting</b>	MFC
<b>Valid Entries</b>	Rotary, Touch-Tone, MFC
<b>Inspect</b>	Yes
<b>Copy Option</b>	Yes



**Console Procedure** To program a single-line/trunk:  
 LinesTrunks→TIE Lines→Inmode or Outmode→  
 Entry Mode→Dial line/trunk no.→ Enter or Delete→Back→  
 Back→Back

To program a block of lines/trunks:  
 LinesTrunks→TIE Lines→Inmode or Outmode→  
 Select block of lines→Toggle LED On/Off→Back→Back→Back

**PC Procedure** To program a single-line/trunk:  
 F4 → F2 → F6 or F7 → F6 → Type line/trunk no. → F10 or F8 →  
 F5 → F5 → F5

To program a block of lines/trunks:  
 F4 → F2 → F6 or F7 → Select block of lines →  
 Toggle letter G On/Off → F5 → F5 → F5

---

## Tie Trunk Dial Tone

Use this procedure to specify whether the system provides dial tone for people calling in on a tie trunk. The settings are remote (system provides dial tone) and local (system does not provide dial tone).

### Summary: Tie Trunk Dial Tone

<b>Programmable by</b>	System Manager
<b>Mode</b>	All
<b>Idle Condition</b>	Not required
<b>Planning Form</b>	3c, Incoming Trunks: Tie
<b>Factory Setting</b>	Remote
<b>Valid Entries</b>	Remote, Local
<b>Inspect</b>	Yes
<b>Copy Option</b>	Yes
<b>Console Procedure</b>	To program a single-line/trunk: LinesTrunks→TIE Lines→Dialtone→Entry Mode→ Dial trunk no.→Enter or Delete→Back→Back→Back  To program a block of lines/trunks: LinesTrunks→TIE Lines→Dialtone→ Select block of lines/trunks→Toggle LED On/Off→Back→ Back→Back

**PC Procedure**

To program a single-line/trunk:

F4 → F2 → F8 → F6 → Type trunk no. → F10 or F8 → F5 → F5

To program a block of lines/trunks:

F4 → F2 → F8 → Select block of lines → Toggle letter G On/Off →

F5 → F5 → F5

---

## Tie Trunk Answer Supervision Time

Use this procedure to specify the tie trunk answer supervision time in milliseconds. This is the time limit for the called system to respond.

### Summary: Tie Trunk Answer Supervision Time

<b>Programmable by</b>	System Manager
<b>Mode</b>	All
<b>Idle Condition</b>	Not required
<b>Planning Form</b>	3c, Incoming Trunks: Tie
<b>Factory Setting</b>	300 ms
<b>Valid Entries</b>	20 to 4,800 ms, in increments of 20 ms
<b>Inspect</b>	No
<b>Copy Option</b>	Yes
<b>Console Procedure</b>	LinesTrunks → TIE Lines → AnsSupvr → Dial trunk no. → Enter → Drop → Dial no. of ms (20–4,800) → Enter → Back → Back
<b>PC Procedure</b>	F4 → F2 → F9 → Type trunk no. → F10 → Alt + P → Type no. of ms (20–4,800) → F10 → F5 → F5

---

## Disconnect Time

Use this procedure to specify the tie trunk disconnect time limit in milliseconds.

### Summary: Disconnect Time

<b>Programmable by</b>	System Manager
<b>Mode</b>	All
<b>Idle Condition</b>	Not required
<b>Planning Form</b>	3c, Incoming Trunks: Tie
<b>Factory Setting</b>	300 ms
<b>Valid Entries</b>	140 to 2,400 ms

<b>Inspect</b>	No
<b>Copy Option</b>	Yes
<b>Console Procedure</b>	LinesTrunks→TIE Lines→Disconnect→Dial trunk no.→Enter→Drop→Dial no. of ms (140–2,400)→Enter→Back→Back
<b>PC Procedure</b>	<b>F4</b> → <b>F2</b> → <b>F10</b> →Type trunk no.→ <b>F10</b> → <b>Alt</b> + <b>P</b> →Type no. of ms (140–2,400)→ <b>F10</b> → <b>F5</b> → <b>F5</b>

## DID/DIOD Trunks

This section covers programming DID/DIOD trunks and includes procedures for the following:

- Block Assignment
- DID/DIOD Trunk Type
- Disconnect Time
- Expected Digits
- Delete Digits
- Add Digits
- Signaling
- Invalid Destination

**NOTE** ► These procedures apply to Hybrid/PBX mode only.

---

### Block Assignment

Use this procedure to assign each DID/DIOD trunk connected to the system to Block 1, 2, 3, or 4.

#### Summary: Block Assignment

<b>Programmable by</b>	System Manager
<b>Mode</b>	Hybrid/PBX
<b>Idle Condition</b>	Not required
<b>Planning Form</b>	3d, Incoming Trunks: DID
<b>Factory Setting</b>	Block 1
<b>Valid Entries</b>	Block 1, Block 2, Block 3, Block 4
<b>Inspect</b>	Yes
<b>Copy Option</b>	Yes

<b>Console Procedure</b>	<p>To program a single-line/trunk:            LinesTrunks→DID/DIOD→Block→Dial trunk block no. (1-4)→            Enter→Entry Mode→Type the line/trunk no.→            Enter or Delete→Back→Back→Back</p> <p>To program a block of lines/trunks:            LinesTrunks→DID/DIOD→Block→Dial trunk block no. (1-4)→            Enter→Select trunk lines→Toggle LED On/Off→Enter→Back→            Back→Back</p>
<b>PC Procedure</b>	<p>To program a single-line/trunk:            [F4]→[F4]→[F1]→Type trunk block no. (1-4)→[F10]→            Type the line/trunk no.→[F10] or [F8]→[F5]→[F5]→[F5]</p> <p>To program a block of lines/trunks:            [F4]→[F4]→[F1]→Type trunk block no.(1-4)→[F10]→            Select trunk lines→Toggle letter G On/Off→[F10]→[F5]→[F5]→[F5]</p>

---

## DID Trunk Type

Use this procedure to specify the DID/DIOD trunk type as either immediate-start or wink-start. Wink-start is more reliable if the local telephone company supports it.

### Summary: DID Trunk Type

<b>Programmable by</b>	System Manager
<b>Mode</b>	Hybrid/PBX
<b>Idle Condition</b>	DID/DIOD trunk idle
<b>Planning Form</b>	3d, Incoming Trunks: DID/DIOD
<b>Factory Setting</b>	Wink-start
<b>Valid Entries</b>	Immediate-start, Wink-start
<b>Inspect</b>	No
<b>Copy Option</b>	No
<b>Console Procedure</b>	LinesTrunks→DID/DIOD→Type→Dial trunk block no.→Enter→ Immed Or Wink→Enter→Back→Back
<b>PC Procedure</b>	[F4]→[F4]→[F2]→Type trunk block no.→[F10]→Select Immed or Wink→[F10]→[F5]→[F5]

---

## Disconnect Time

Use this procedure to specify the DID/DIOD trunk disconnect time limit in milliseconds.

### Summary: Disconnect Time

<b>Programmable by</b>	System Manager
<b>Mode</b>	Hybrid/PBX
<b>Idle Condition</b>	Not required
<b>Planning Form</b>	3d, Incoming Trunks: DID
<b>Factory Setting</b>	500 ms
<b>Valid Entries</b>	10 to 2,400 ms, in increments of 10 ms
<b>Inspect</b>	No
<b>Copy Option</b>	Yes
<b>Console Procedure</b>	LinesTrunks→DID/DIOD→Disconnect→Dial trunk no.→ Enter→Drop→Dial no. of ms (10-2,400)→ Enter→Back→Back
<b>PC Procedure</b>	<b>F4</b> → <b>F4</b> → <b>F3</b> →Type trunk no.→ <b>F10</b> → <b>Alt</b> + <b>P</b> → Type no. of ms (10-2,400)→ <b>F10</b> → <b>F5</b> → <b>F5</b>

---

## Expected Digits

Use this procedure to tell the system how many digits are sent by the local telephone company.

### Summary: Expected Digits

<b>Programmable by</b>	System Manager
<b>Mode</b>	Hybrid/PBX
<b>Idle Condition</b>	Not required
<b>Planning Form</b>	3d, Incoming Trunks: DID
<b>Factory Setting</b>	3 digits
<b>Valid Entries</b>	1 to 4 digits
<b>Inspect</b>	No
<b>Copy Option</b>	No
<b>Console Procedure</b>	LinesTrunks→DID/DIOD→ExpectDigit→Dial trunk block no. (1 or 2)→Enter→Drop→Dial no. of digits (1-4)→Enter→ Back→Back
<b>PC Procedure</b>	<b>F4</b> → <b>F4</b> → <b>F4</b> →Type trunk block no. (1 or 2)→ <b>F10</b> → <b>Alt</b> + <b>P</b> → Type no. of digits (1-4) <b>F10</b> → <b>F5</b> → <b>F5</b>

---

## Delete Digits

Use this procedure to specify the number of leading digits to be deleted from the digits sent by the local telephone company. Use this procedure when the number of digits sent by the telephone company is greater than the number in the system numbering plan.

### Summary: Delete Digits

<b>Programmable by</b>	System Manager
<b>Mode</b>	Hybrid/PBX
<b>Idle Condition</b>	Not required
<b>Planning Form</b>	3d, Incoming Trunks: DID
<b>Factory Setting</b>	0 digits
<b>Valid Entries</b>	0 to 4 digits
<b>Inspect</b>	No
<b>Copy Option</b>	No
<b>Console Procedure</b>	LinesTrunks→DID/DIOD→DeleteDigit→Dial trunk block no. (1 or 2)→Enter→Drop→Dial no. of digits (0-4)→Enter→Back→Back
<b>PC Procedure</b>	<b>F4</b> → <b>F4</b> → <b>F6</b> →Type trunk block no. (1 or 2)→ <b>F10</b> → <b>Alt</b> + <b>P</b> →Type no. of digits (0-4)→ <b>F10</b> → <b>F5</b> → <b>F5</b>

---

## Add Digits

Use this procedure to specify the number of leading digits that must be added to the digits sent by the local telephone company. Use this procedure when the number of digits sent by the telephone company is fewer than the number in the system numbering plan.

### Summary: Add Digits

<b>Programmable by</b>	System Manager
<b>Mode</b>	Hybrid/PBX
<b>Idle Condition</b>	Not required
<b>Planning Form</b>	3d, Incoming Trunks: DID/DIOD
<b>Factory Setting</b>	0
<b>Valid Entries</b>	1 to 9999
<b>Inspect</b>	No
<b>Copy Option</b>	No



- Console Procedure**    LinesTrunks→DID/DIOD→Add Digits→Dial trunk block no. (1 or 2)→Enter→Drop→Dial added digits (1-9999)→Enter→Back→Back
- PC Procedure**        F4 → F4 → F7 →Type trunk block no. (1 or 2)→F10 →Alt +P →Type added digits (1-9999)→F10 →F5 →F5

## Signaling

Use this procedure to specify whether the type of dialing signal from the local telephone company is touch-tone, rotary or MFC. Touch-Tone dial mode cannot be programmed for immediate-start DID/DIOD trunks.

Touch-Tone single-line telephone users cannot make calls by using individual trunks programmed for rotary operation. The Touch-Tone signals generated from the telephone while dialing are transmitted to the central office at the same time the rotary signals are sent to the system. The central office receives both signals and cannot process the call.

### Summary: Signaling

- |                          |  |
|--------------------------|--|
| <b>Programmable by</b>   | System Manager   |
| <b>Mode</b>              | Hybrid/PBX   |
| <b>Idle Condition</b>    | Not Required   |
| <b>Planning Form</b>     | 3d, Incoming Trunks: DID/DIOD  |
| <b>Factory Setting</b>   | Rotary   |
| <b>Valid Entries</b>     | Rotary, Touch-Tone, MFC  |
| <b>Inspect</b>           | No   |
| <b>Copy Option</b>       | No   |
| <b>Console Procedure</b> | LinesTrunks→DID/DIOD→Signaling→Dial trunk block no.→Enter→Rotary, TouchTone or MFC→Enter→Back→Back |
| <b>PC Procedure</b>      | F4 → F4 → F8 →Type trunk block no.→F10 →F1 F2 or F3 →F10 →F5 →F5                                   |

## Invalid Destination

Use this procedure to specify where to direct outside calls (received on DID/DIOD trunks) for unassigned extension numbers. Calls can be either directed to a backup position (normally the primary system operator) or given a fast busy signal. See “QCC Operator to Receive Call Types” on page 3-95 for information on assigning a backup position.

### Summary: Invalid Destination

<b>Programmable by</b>	System Manager
<b>Mode</b>	Hybrid/PBX
<b>Idle Condition</b>	Not required
<b>Planning Form</b>	3d, incoming Trunks: DID
<b>Factory Setting</b>	Backup (calls are sent to the primary system operator)
<b>Valid Entries</b>	Send to Backup Extension, Return Fast Busy
<b>Inspect</b>	No
<b>Copy Option</b>	No
<b>Console Procedure</b>	LinesTrunks→DID→InvalidDstn→Select Send to Backup Extension Or Return Fast Busy→Enter→Back→Back
<b>PC Procedure</b>	[F4]→[F4]→[F9]→Select Send to Backup Extension Or Return Fast Busy→[F10]→[F5]→[F5]

## Extensions

This section contains the following procedures:

- Assigning outside lines or trunks to the buttons on a telephone (including lines and trunks used for loudspeaker paging)
- Copying line button assignments from one extension to either an individual extension or a block of extensions
- Assigning the following buttons on telephones (for Hybrid/PBX systems only):
  - System Access or Intercom Voice
  - System Access or Intercom Ring
  - System Access or Intercom Originate Only
  - Shared System or Intercom Access
- Programming rotary signaling on tip/ring ports

---

## Assign Trunks or Pools to Extensions

Use this procedure to assign outside lines/trunks (connected to the control unit) to specific buttons on each telephone. The lines/trunks assigned to a button on a telephone are called Personal Lines.

This procedure is used only to change or add Personal Lines, Loudspeaker Paging, or Pool buttons (Hybrid/PBX only) to telephones. See “Assign Intercom or System Access Buttons” on page 3-66 to add or change Intercom (ICOM) or System Access (SA) buttons.

Individual lines/trunks can be assigned to a maximum of 64 extensions. Individual pools can be assigned as a Pool button on a maximum of 64 extensions.

The following lines/trunks cannot be assigned to a button on a telephone:

- Lines/trunks used for Music-On-Hold
- Lines/trunks used for maintenance alarms

**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 or Broadcast Music Incorporated). Magic On Hold requires no such license and can be purchased from Lucent Technologies.

Pool buttons cannot be assigned to or removed from extensions unless the pool has trunks assigned. If all trunks are to be removed from a pool, all Pool button assignments must first be removed from extensions. Another way of handling this situation is to program another trunk into the pool and then remove the Pool button assignments from the extensions.

- **Hybrid/PBX only.** Individual lines/trunks assigned to a pool can be assigned to a button only on a DLC operator position. If one of the lines/trunks in a pool is assigned to a button on a non-DLC telephone, the result is a Pool button assignment.
- **Key only.** The system assigns the first eight line numbers to buttons on multiline telephones whether or not an outside line is physically connected. If a line is not connected, the button assignment must be removed so the user can assign a feature to the button.
- **For the Transtalk 9031 wireless multiline telephone.** The system assigns the first eight lines connected to the control unit even though the telephone has fewer than eight buttons available. Remove the extra lines in system programming so that the appropriate number of lines is assigned to buttons on these telephones.

Lines and trunks are assigned to buttons in the order in which you press each line button on the system programming console or keyboard. Existing line assignments can be rearranged by removing all current assignments and then pressing the line buttons on the console or keyboard in the order in which they should appear on the buttons. For information on the order of the programmed buttons, refer to the button numbers on the applicable planning form for each telephone.

If you want to reserve some blank buttons for features between line buttons, a line must be assigned as a placeholder for each blank button. After all lines are assigned, remove the lines used as placeholders on the buttons reserved for features.

### Summary: Assign Trunks or Pools to Extensions

<b>Programmable by</b>	System Manager
<b>Mode</b>	All, but note differences in factory settings.
<b>Idle Condition</b>	Extension idle
<b>Planning Form</b>	4l, Extension Copy: Multiline 4400-Series Telephone Template 4m, Multiline 4400-Series Telephone 4d, MLX Telephone 4e, MFM Adjunct: MLX Telephone 4f, Tip/Ring Equipment 4h, ETR Telephone 5b, Direct-Line Console (DLC) 5c, MFM Adjunct: DLC
<b>Factory Setting</b>	<p><b>Key Mode.</b> An Intercom Ring (ICOM Ring) button, an Intercom Voice (ICOM Voice) button, and the first eight lines connected to the control unit are assigned to all multiline 4400-Series telephones, ETR, and MLX telephones (excluding operator positions), and MFMs connected to MLX telephones. Two ICOM Ring buttons are assigned to 4400, 4400D, and single-line telephones; no outside lines are assigned.</p> <p><b>Behind Switch Mode.</b> Not supported in MERLIN MAGIX Integrated System Release 1.0i.</p> <p><b>Hybrid/PBX Mode.</b> System Access Ring (SA Ring), System Access Voice (SA Voice), and System Access Originate Only (SA Orig Only) buttons are assigned to all multiline 4400-Series telephones, ETR, and MLX telephones (excluding operator positions). Five Call buttons are assigned to QCC operator positions. Two SA Ring buttons and one SA Orig Only button are assigned to 4400, 4400D, and single-line telephones. No Personal Line or Pool buttons are assigned.</p>
<b>Valid Entries</b>	Extension numbers
<b>Inspect</b>	Yes
<b>Copy Option</b>	Yes
<b>Console Procedure</b>	<p>To program a single-line/trunk: Extensions→Lines/Trunks→Dial ext. no.→Enter→Entry Mode→Dial line/trunk no.→Enter→Back→Back</p> <p>To program a block of lines/trunks: Extensions→Lines/Trunks→Dial ext. no.→Enter→Select trunk range→Toggle LED On/Off→Enter→Back→Back</p>
<b>PC Procedure</b>	<p>To program a single-line/trunk: F6 → F1 → Type ext. no. → F10 → F6 → Type line/trunk no. → F10 → F5 → F5</p>

To program a block of lines/trunks: →F6 →F1 →Type ext. no. →  
 F10 →Select trunk range →Toggle letter G On/Off →F10 →F5 →F5

## Copy Line/Trunk Assignments

Use this procedure to copy outside line/trunk button assignments, pool dial-out code restrictions (Hybrid/PBX only), and (for operator positions only) Night Service information from one extension to another extension or block of extensions with identical requirements.

If you are copying assignments to a block of extensions and one of the extensions in the block is in use, the display shows the *Station Busy - Pls Wait* message. Copying for the rest of the extensions in the block is delayed until the busy extension becomes idle. The number of the busy extension is not shown. If a DSS is attached, the LED associated with the busy extension is on. If you exit instead of waiting for the busy extension to become idle, copying for the rest of the extensions is cancelled; however, the assignments that have already been copied are not cancelled.

If you are copying assignments from an operator position to a block of extensions that includes both operator and non-operator extensions, the information is copied to only the operator positions; the non-operator positions are not affected. Similarly, if you are copying assignments from a non-operator position to a block of extensions that includes both operator and non-operator extensions, the information is copied to only the non-operator positions; the operator positions are not affected. The system does not provide an error tone to signal that the copy did not work for all of the extensions in the block.

### Summary: Copy Line/Trunk Assignments

<b>Programmable by</b>	System Manager
<b>Mode</b>	All
<b>Idle Condition</b>	Extension idle
<b>Planning Form</b>	4l, Extension Copy: Multiline 4400-Series telephone Template 4c, Extension Copy: MLX Telephone Template 4g, Extension Copy: ETR Telephone Template
<b>Factory Setting</b>	Not applicable
<b>Valid Entries</b>	Not applicable
<b>Inspect</b>	Yes: lines/pools assigned to an extension.
<b>Copy Option</b>	Not applicable
<b>Console Procedure</b>	To copy to a single extension: Extensions → Line Copy → Single → Dial copy from ext. no. → Enter → Dial copy to ext. no. → Enter → Back → Back  To copy to a block of extensions: Extensions → Line Copy → Block → Dial copy from ext. no. → Enter → Dial ext. no. of first extension in block → Enter → Dial ext. no of last extension in block → Enter → Back → Back

**PC Procedure**

To copy to a single extension:

F6 → F2 → F1 → Type copy from ext. no. → F10 →  
Type copy to ext. no. → F10 → F5 → F5

To copy to a block of extensions:

F6 → F2 → F2 → Type copy from ext. no. → F10 →  
Type ext. no. of first extension in block → F10 →  
Type ext. no. of last extension in block → F10 → F5 → F5

---

## Assign Intercom or System Access Buttons

Use this procedure to assign or change the assignments for Intercom (ICOM) buttons used to make and receive inside calls. This includes the following types of ICOM buttons:

- Ring
- Voice
- Originate Only (Ring or Voice)

In Hybrid/PBX mode only, use this procedure to assign or change assignments for System Access (SA) buttons used to make or receive inside and outside calls. This procedure includes the following types of System Access buttons:

- Ring
- Voice
- Originate Only (Ring or Voice)
- Shared (Ring or Voice)

- NOTES** ▶
- You cannot change the factory setting for Call buttons assigned to QCC operator positions, and you cannot assign Ring, Voice, Originate Only, or Shared buttons to QCC operator positions. However, the Call 5 (Ring/Voice) button on a QCC can be programmed for Voice Announce. See “Voice Announce” on page 3-100
  - System Access or Intercom buttons can be assigned to only the first 10 buttons on a multiline telephone. This allows for a combination of up to 10 SA or ICOM buttons for each telephone (excluding QCC operator positions).
  - You can remove SA or ICOM buttons, but at least one must remain on the extension.

Although you can make selections from the screen (with the `ListFeature` option) to assign Ring and Voice buttons, the following procedure provides the programming codes to perform these functions. Using the codes speeds the button assignment process.

- NOTES** ▶
- When 4400, 4400D, and single-line sets are programmed with only one SA or ICOM button, the Transfer, Conference and Drop features are disabled. Other features that require a second dial tone, such as Account Code/Number Entry, After Call Work States, Call Pickup, Call Waiting, and Privacy, are also affected. For more information, see the *Feature Reference*.
  - Each System Access Ring or Voice on an individual telephone can be assigned as a Shared System Access (SSA) button on up to 16 other extensions.
  - Shared SA buttons cannot be assigned to 4400, 4400D, and single-line telephones or other tip/ring equipment connected to an 016 (T/R) or 008 OPT module. Shared SA buttons can be assigned to a tip/ring or external alert device connected to an MFM in an MLX telephone. Shared SA buttons cannot be assigned when the corresponding SA button is on a 4400, 4400D, and single-line telephone.
  - Each System Access Ring or Voice on an individual extension can be assigned as a SSA button on up to 27 other extensions
  - SA and ICOM buttons are centrally programmed and cannot be programmed by individual extension users.

### Summary: Assign Intercom or System Access Buttons

<b>Programmable by</b>	System Manager
<b>Mode</b>	All, but note differences in factory settings
<b>Idle Condition</b>	Extension idle
<b>Planning Form</b>	4m, Multiline 4400-Series Telephone 4d, MLX Telephone 4e, MFM Adjuncts: MLX Telephone 4f, Tip/Ring Equipment 4h, ETR Telephone 5b, Direct-Line Console (DLC) 5c, MFM Adjunct (DLC)
<b>Factory Setting</b>	<p><b>Key Mode.</b> An Intercom Ring (ICOM Ring) button, an Intercom Voice (ICOM Voice) button, and the first eight lines connected to the system are assigned to all multiline 4400-Series and MLX telephones, excluding operator positions. Two ICOM Ring buttons are assigned to 4400 and 4400D Telephones and to tip/ring equipment connected to an 016 (T/R) module or to an 016 ETR port when the port is programmed for T/R operation. An ICOM Ring and an Intercom Originate Only (ICOM Orig Only) button are assigned to tip/ring equipment connected by an MFM. No outside lines are assigned.</p> <p><b>Behind Switch Mode.</b> Not supported with MERLIN MAGIX Integrated System Release 1.0i.</p> <p><b>All Modes.</b> System Access Ring (Hybrid/PBX mode) or Intercom Ring (Key and Behind Switch modes), System Access Voice (Hybrid/PBX mode) or Intercom Voice (Key and Behind Switch modes), and the first 18 through 29 lines connected to the control unit are assigned</p>

to all DLC operator positions. The number of lines assigned depends on the type of telephone used as a DLC operator position. Refer to the appropriate telephone planning form for details.

<b>Valid Entries</b>	Not applicable.
<b>Inspect</b>	Yes: specific button options.
<b>Copy Option</b>	Yes. (You can copy additional SA buttons to another extension, but you cannot overwrite SA buttons that are already assigned.)
<b>Console Procedure</b>	<p>To program an extension:  More→Cntr-Prg→Program Ext→Dial ext. no.→Enter→Start→Select button→Dial feature code (*16 or *18)→Enter→(repeat from beginning to program another button)→Back→Back</p> <p>To copy extension programming:  More→Cntr-Prg→Copy ext→Dial copy from ext. no.→Enter→Dial copy to ext. no.→Enter→Back→Back</p>
<b>PC Procedure</b>	<p>To program an extension:  PgUp→F4→F1→Type ext. no.→F10→F10→Select button→Type feature code (*16 or *18)→F10→(repeat from beginning to program another button)→F5→F5</p> <p>To copy extension programming:  PgUp→F4→F2→Type copy from ext. no.→F10→Type copy to ext. no.→F10→F5→F5</p>

Although you can make selections from the screen (with the `ListFeature` option) to assign Ring and Voice buttons, using programming codes to perform these functions speeds the button assignment process.

Table 3-3 provides the programming codes for assigning Ring and Voice buttons. You can handle errors in data entry as follows:

- If you enter a code incorrectly while programming, the display shows the `Programming Error` message and the red LED next to the button flashes. If this happens, press the button again and repeat the procedure.
- If you make a mistake and program the wrong feature on a button, press the button, select `Delete` (F1) on the PC display), and press the button again.

**Table 3-3. Programming Codes for Assigning Buttons**

To...	On the console...	On the PC...
Assign SA or ICOM Ring button	Dial *16	Type *16
Assign SA or ICOM Voice button	Dial *16, press button being programmed again, and dial *19	Type *16, press ▾ + function key for button being programmed again, and type *19
Assign SA or ICOM Originate Only Ring button	Dial *18	Type *18

**Table 3-3. Programming Codes for Assigning Buttons—Continued**

To...	On the console...	On the PC...
Assign SA or ICOM Originate Only Voice button	Dial *18, press button being programmed again, and dial *19	Type *18, press v + function key for button being programmed again, and type *19
Assign SA button	Dial *17, press the extension number of principal telephone [nnnn] then press the button number being shared [nn]	Type *17, press the extension number of principal telephone [nnnn] then press the button number of specific button being shared [nn]
Change current assignment for SA or ICOM Voice, Originate Only or Shared SA buttons from Voice to Ring	Dial **19	Type **19

## Rotary Signaling on Tip/Ring Ports

Use this procedure to enable or disable rotary signaling on tip/ring ports. You can program any tip/ring port on an individual basis. The factory setting is that rotary signaling is disabled.

Whenever the system receives a rotary digit on a port, it determines if the port is programmed as rotary-enabled. If the port is rotary-enabled, the system processes the digit. If the port is not rotary-enabled, the digit is rejected. Touch-Tone digits are always accepted by the port, regardless whether it is rotary-enabled or not.

### Summary: Rotary Signaling on Tip/Ring Ports

<b>Programmable by</b>	System Manager
<b>Mode</b>	All
<b>Idle Condition</b>	System idle
<b>Planning Form</b>	4f, Tip/Ring Equipment
<b>Factory Setting</b>	Touch-Tone
<b>Valid Entries</b>	Extension numbers for rotary dial telephones
<b>Inspect</b>	Yes
<b>Copy Option</b>	No
<b>Console Procedure</b>	Extensions→▶ or More→▶ or More→RotaryEnabl→ Type rotary ext. no.→Enter→Back→Back

**PC Procedure**

F6 → PgUp → F7 → Type rotary ext. no. → F10 → F5 → F5

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## Tip/Ring Functionality on 016 ETR Modules

Tip/ring functionality for ports on a 016 ETR module is not supported in MERLIN MAGIX Release 1.0i.

## Auxiliary Equipment

The procedures in this section describe the steps needed to perform the following:

- Identify the line/trunk jacks used for Music-On-Hold, loudspeaker paging, and maintenance alarms.
- Identify the extension jacks used for fax
- Specify parameters for the MERLIN Messaging System, Octel 100 Messaging, and Intuity AUDIX.

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## Music-On-Hold

Use this procedure to identify the line/trunk jack reserved for connection of a music source, such as a radio, tape player, or stereo system.

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)]. Magic On Hold requires no such license and can be purchased from your Lucent Technologies dealer.

Only one Music-On-Hold line/trunk jack is allowed per system.

You cannot assign the line/trunk identified for Music-On-Hold to a line/trunk pool. If the line/trunk is currently assigned to a pool, you must remove it before you program this option.

You cannot assign the line/trunk identified for use with Music-On-Hold to a button on any extension or as a Remote Access trunk, and you cannot use the line/trunk jack identified for Music-On-Hold for a loudspeaker paging system or maintenance alarm.

### Summary: Music-On-Hold

<b>Programmable by</b>	System Manager
<b>Mode</b>	All, but in Hybrid/PBX mode the line/trunk designated for Music-On-Hold cannot be assigned to a line/trunk pool.
<b>Idle Condition</b>	System idle

<b>Planning Form</b>	2c, System Numbering: Line/Trunk Jacks
<b>Factory Setting</b>	Not Applicable
<b>Valid Entries</b>	Line/trunk number
<b>Inspect</b>	No
<b>Copy Option</b>	No
<b>Console Procedure</b>	AuxEquip→MusicOnHold→Dial line/trunk no.→Enter→Back
<b>PC Procedure</b>	<input type="text" value="F9"/> → <input type="text" value="F1"/> →Type line/trunk no.→ <input type="text" value="F10"/> → <input type="text" value="F5"/>

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## Loudspeaker Paging

Use this procedure to identify the line/trunk jack reserved for connection of loudspeaker paging equipment.

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 ASCAP or BMI). Magic On Hold requires no such license and can be purchased from your Lucent Technologies dealer.

A maximum of three single-zone or multizone loudspeaker paging systems can be connected to the system.

You cannot assign the line/trunk identified for loudspeaker paging equipment to a line/trunk pool. If the line/trunk is currently assigned to a pool, you must remove it before you program this option.

You cannot assign the line/trunk identified for loudspeaker paging equipment as a Remote Access line/trunk, and you cannot use its jack for Music-On-Hold or maintenance alarm.

### Summary: Loudspeaker Paging

<b>Programmable by</b>	System Manager
<b>Mode</b>	All, but in Hybrid/PBX mode the line/trunk designated for loudspeaker paging cannot be assigned to a line/trunk pool.
<b>Idle Condition</b>	Line/trunk idle
<b>Planning Form</b>	2c, System Numbering: Line/Trunk Jacks
<b>Factory Setting</b>	Not Applicable
<b>Valid Entries</b>	Line/trunk numbers
<b>Inspect</b>	Yes
<b>Copy Option</b>	No
<b>Console Procedure</b>	AuxEquip→Ldspkr Pg→Dial line/trunk no.→Enter→Back
<b>PC Procedure</b>	<input type="text" value="F9"/> → <input type="text" value="F2"/> →Type line/trunk no.→ <input type="text" value="F10"/> → <input type="text" value="F5"/>

## Fax Machines

Use this procedure to add a fax machine by assigning the extension jack used to connect the fax machine. To remove a fax machine and free the extension jack for another use, you must remove the extension jack assignment.

In addition, you can specify the extensions to receive a message-waiting indication (MWI) when a fax transmission is received, and specify the length of time before the system registers that a fax has arrived and sends the message-waiting indication.

A maximum of 16 fax machines can have the Fax Message Waiting feature. Additional fax machines (more than 16) can be installed, but these machines cannot have this feature.

You can specify up to four telephones to receive the message-waiting indication when a fax transmission is received. Note that fax machines can only send and not receive message-waiting indications.

### Summary: Fax Machines

<b>Programmable by</b>	System Manager
<b>Mode</b>	All
<b>Idle Condition</b>	Not required
<b>Planning Form</b>	4m, Multiline 4400-Series Telephone 4d, MLX Telephone 4e, MFM Adjunct: MLX Telephone 4f, Tip/Ring Equipment 4h, ETR Telephone 4j, MLS Telephone 5b, Direct-Line Console (DLC) 5c, MFM Adjunct: DLC
<b>Factory Setting</b>	10 seconds
<b>Valid Entries</b>	0 to 30 seconds
<b>Inspect</b>	Yes
<b>Copy Option</b>	No
<b>Console Procedure</b>	To program an extension for a fax machine: AuxEquip→Fax→Extension→Dial ext. no.→Enter→Back  To have a message waiting light for a fax machine: Fax→Extension→Dial ext. no.→Enter→Back→ Msg Waiting→Dial fax machine ext. no.→Enter→ Dial MWI ext. no.→Enter→Threshold→Drop→ Dial no. of seconds (0-30)→Enter→ Back→Back



**PC Procedure**

To program an extension for a fax machine:

[F9] → [F3] → [F1] → Type ext. no. → [F10] → [F5]

To have a message waiting light for a fax machine:

[F3] → [F1] → Type ext. no. → [F10] → [F5] → [F2] →

Type fax machine ext. no. → [F10] → Type MWI ext. no. → [F10] → [F3] →

[Alt]+[P] → Type no. of seconds (0-30) → [F10] → [F5] → [F5]

## Maintenance Alarms

Use this procedure to identify the line/trunk jack that connects an external alerting device that sounds or flashes when major maintenance problems occur.

You cannot assign the line/trunk identified for the maintenance alarm to a button on any telephone or as a Remote Access trunk, and you cannot use its line/trunk jack to connect a loudspeaker paging system or Music-On-Hold.

### Summary: Maintenance Alarms

<b>Programmable by</b>	System Manager
<b>Mode</b>	All, but in Hybrid/PBX mode, the line/trunk designated for the maintenance alarm cannot be assigned to a line/trunk pool.
<b>Idle Condition</b>	System idle
<b>Planning Form</b>	2c, System Numbering: Line/Trunk Jacks
<b>Factory Setting</b>	Not Applicable
<b>Valid Entries</b>	Line/trunk number
<b>Inspect</b>	No
<b>Copy Option</b>	No
<b>Console Procedure</b>	AuxEquip → MaintAlarms → Dial line/trunk no. → Enter → Back → Back
<b>PC Procedure</b>	[F9] → [F4] → Type line/trunk no. → [F10] → [F5] → [F5]

## Voice Messaging System and Automated Attendant

Use this procedure to specify the Touch-Tone duration and the interval between digits in codes sent between a voice messaging system and the MERLIN MAGIX system. The Touch-Tone duration and interval between digit assignment must be the same as those programmed on the voice messaging system.

In addition, this procedure can be used to specify the number of rings before a call transferred to a local extension by the voice messaging system is sent to the backup position for both integrated and generic VMI ports. The number of rings cannot be programmed for individual voice messaging

systems; the single setting applies for all. Use the Group Type procedure in “Optional Group Features” on page 3-101 to assign VMI ports as either integrated or generic.

**Summary: Voice Messaging System and Automated Attendant**

<b>Programmable by</b>	System Manager
<b>Mode</b>	All
<b>Idle Condition</b>	Not required
<b>Planning Form</b>	See forms packaged with application
<b>Factory Setting</b>	Touch-Tone duration: 100 ms Interval between digits: 50 ms Number of rings before transfer sent to backup: 4
<b>Valid Entries</b>	Touch-Tone duration: 50 to 200 ms, in increments of 25 ms Interval between digits: 50 to 200 ms, in increments of 25 ms Number of rings before transfer sent to backup: 0 to 9
<b>Inspect</b>	No
<b>Copy Option</b>	No
<b>Console Procedure</b>	AuxEquip→VMS/AA→TransferRtn→Drop→ Dial no. of rings (0-9)→Enter→TT Duration→Drop→ Dial no. of ms (50-200 ms, in increments of 25 ms)→Enter→ TT Interval→Drop→Dial no. of ms (50-200 ms, in increments of 25 ms)→Enter→ Back→Back
<b>PC Procedure</b>	<b>F9</b> → <b>F6</b> → <b>F1</b> → <b>Alt</b> + <b>P</b> → Type no. of rings(0-9) → <b>F10</b> → <b>F2</b> → <b>Alt</b> + <b>P</b> → Type no. of ms (50-200 ms, in increments of 25 ms) → <b>F10</b> → <b>F3</b> → <b>Alt</b> + <b>P</b> → Type no. of ms (50-200 ms, in increments of 25 ms) → <b>F10</b> → <b>F5</b> → <b>F5</b>

## Optional Extension Features

The summaries in this section detail the steps in programming the following optional features:

- Extension Language
- Pool Dial-Out Code
- Calling Restrictions
- Copy Calling Restrictions
- ARS Restriction Level for Extensions
- Forced Account Code Entry
- Microphone Operation
- Authorization Codes
- Remote Call Forwarding
- Delayed Call Forwarding
- Trunk-to-Trunk Transfer
- Primary Cover Ring Delay
- Secondary Cover Ring Delay
- Group Coverage Ring Delay
- Hotline (single-line telephone only)
- Display Preference
- Service Observing

---

### Extension Language

Use this procedure to change the language for 4400-Series, ETR, and MLX display telephones.

#### Summary: Extension Language

<b>Programmable by</b>	Users and System Manager
<b>Mode</b>	All
<b>Idle Condition</b>	Not required
<b>Planning Form</b>	4d, MLX Telephone 4h, ETR Telephone 4k, 4400/4400D Telephone 5b, Direct-Line Console (DLC) Data Form 1b, ISDN Terminal Adapter Data Workstation
<b>Factory Setting</b>	U.S. English

<b>Valid Entries</b>	U.S. English, Canadian French, Latin American Spanish, Brazilian Portuguese
<b>Inspect</b>	No
<b>Copy Option</b>	No
<b>Console Procedure</b>	<p>To program a single extension:  ▶ or More → Language → Extensions → Single → Dial ext. no. → Enter → Select a language (U.S. English, Canadian French, Latin American Spanish, Brazilian Portuguese) → Enter → Back → Back</p> <p>To program a block of extensions:  ▶ or More → Language → Extensions → Block → Dial starting ext. no. → Enter → Dial ending ext. no. → Enter → Select a language (U.S. English, Canadian French, Latin American Spanish, Brazilian Portuguese) → Enter → Back → Back</p>
<b>PC Procedure</b>	<p>To program a single extension:  PgUp → F6 → F2 → F1 → Type ext. no. → F10 → Select a language (U.S. English, Canadian French, Latin American Spanish, Brazilian Portuguese) → F10 → F5 → F5</p> <p>To program a block of extensions:  PgUp → F6 → F2 → F2 → Type starting ext. no. → F10 → Type ending ext. no. → Select a language (U.S. English, Canadian French, Latin American Spanish, Brazilian Portuguese) → F10 → F5 → F5</p>

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## Pool Dial-Out Code

Use this procedure to allow or restrict dialing pool dial-out codes and placing calls on specific line/trunk pools. The factory settings restrict all extensions from dialing any line/trunk pool dial-out code.

**NOTE** ▶ The factory settings allow all extensions to dial any line/trunk pool dial-out code. Entering a pool dial-out code and then deleting that code restricts the user from using the pool associated with the entered code.

### Summary: Pool Dial-Out Code

<b>Programmable by</b>	System Manager
<b>Mode</b>	Hybrid/PBX
<b>Idle Condition</b>	Extension idle
<b>Planning Form</b>	4m, Multiline 4400-Series Telephone 4k, 4400/4400D Telephone 4d, MLX Telephone 4e, MFM Adjunct: MLX Telephone 4f, Tip/Ring Equipment



	4h, ETR Telephone 5b, Direct-Line Console (DLC) 5c, MFM Adjunct (DLC) 5d, Queued Call Console (QCC)
<b>Factory Setting</b>	Main pool: 70; All other pools: 890 to 899. All telephones are restricted from dialing any pool dial-out code.
<b>Valid Entries</b>	Pool numbers
<b>Inspect</b>	Yes
<b>Copy Option</b>	No
<b>Console Procedure</b>	Extensions→Dial OutCd→Dial ext. no.→Enter→ Dial pool dial-out code→Enter→Back→Back
<b>PC Procedure</b>	<input type="button" value="F6"/> → <input type="button" value="F3"/> → Type ext. no. → <input type="button" value="F10"/> → Type pool dial-out code → <input type="button" value="F10"/> → <input type="button" value="F5"/> → <input type="button" value="F5"/>

---

## Calling Restrictions

Use this procedure to change individual extension calling restrictions to one of the following:

- Unrestricted
- Restricted from making all outgoing calls
- Restricted from making toll calls



### SECURITY ALERT:

*Toll fraud can occur if extensions are not properly restricted.*

## Summary: Calling Restrictions

<b>Programmable by</b>	System Manager
<b>Mode</b>	All
<b>Idle Condition</b>	Extension idle
<b>Planning Form</b>	4m, Multiline 4400-Series Telephone 4k, 4400/4400D Telephone 4d, MLX Telephone 4e, MFM Adjunct: MLX Telephone 4f, Tip/Ring Equipment 4h, ETR Telephone 5b, Direct-Line Console (DLC) 5c, MFM Adjunct: DLC 5d, Queued Call Console (QCC)
<b>Factory Setting</b>	Unrestricted
<b>Valid Entries</b>	Unrestricted, Outward Restricted, Toll Restricted

<b>Inspect</b>	No
<b>Copy Option</b>	Yes
<b>Console Procedure</b>	Extensions→Restriction→Dial ext. no.→Enter→ Select restriction (Unrestricted, Outward restricted, or Toll Restricted)→Enter→Back
<b>PC Procedure</b>	<b>F6</b> → <b>F4</b> →Type ext. no.→ <b>F10</b> →Select restriction (Unrestricted, Outward restricted, or Toll Restricted)→ <b>F10</b> → <b>F5</b>

---

## Copy Calling Restrictions

Use this procedure to copy calling restrictions, Allowed Lists, and Disallowed Lists. Feature assignment must be completed for the “copy from” extension. These features can then be copied to an individual extension or block of extensions with identical calling restriction requirements.

If you are copying restrictions to a block of extensions and one of the extensions in the block is in use, the display shows the *Station Busy - Pls Wait* message. Copying for the rest of the extensions in the block is delayed until the busy extension becomes idle. The number of the busy extension is not shown. If a DSS is attached, the LED associated with the busy extension is on. If you exit instead of waiting for the busy extension to become idle, copying for the rest of the extensions in the block is cancelled; however, the restrictions that have already been copied are not cancelled.

If you are copying restrictions to a block of extensions, they must be sequentially numbered.

The extensions you are copying to and from can be both operator and nonoperator positions.

**NOTE** ► Dial-out code restrictions are not copied.

### Summary: Copy Calling Restrictions

<b>Programmable by</b>	System Manager
<b>Mode</b>	All
<b>Idle Condition</b>	“Copy to” extension or extensions idle
<b>Planning Form</b>	4m, Multiline 4400-Series Telephone 4k, 4400/4400D Telephone 4d, MLX Telephone 4e, MFM Adjunct: MLX Telephone 4h, ETR Telephone 5b, Direct-Line Console (DLC) 5c, MFM Adjunct: DLC 5d, Queued Call Console (QCC)
<b>Factory Setting</b>	Not applicable



<b>Valid Entries</b>	Not applicable
<b>Inspect</b>	No
<b>Copy Option</b>	Not applicable
<b>Console Procedure</b>	<p>To copy to a single extension:          Extensions→RestrctCopy→Single→Dial copy from          ext. no.→Enter→Dial copy to ext. no.→Enter→Back→          Back→Back</p> <p>To copy to a block of extensions:          Extensions→RestrctCopy→Block→Dial copy from ext. no.→          Enter→Dial first no. in copy to block→Enter→          Dial last no. in copy to block→Enter→Back→Back→Back</p>
<b>PC Procedure</b>	<p>To copy to a single extension:          F6 → F6 → F1 → Type copy from ext. no. → F10 →          Type copy to ext. no. → F10 → F5 → F5 → F5</p> <p>To copy to a block of extensions:          F6 → F6 → F2 → Type copy from ext. no. → F10 →          Type first copy no. in copy to block → F10 → F5 → F5 → F5</p>

---

## ARS Restriction Level for Extensions

Use this procedure to assign an ARS restriction level to an extension. Outgoing calls can be made only to routes that have a Facility Restriction Level (FRL) lower than or equal to that of the extension for which the call is being made. Only outgoing calls are affected; users can receive inside, local, and toll calls on restricted telephones and can join any type of call in progress.

The restriction level assigned to extensions is opposite to the FRL assigned to routes, where 0 is the most and 6 is the least restrictive.

### Summary: Assigning ARS Restriction Level For an Extension

<b>Programmable by</b>	System Manager
<b>Mode</b>	Hybrid/PBX only
<b>Idle Condition</b>	Not required
<b>Planning Form</b>	4m, Multiline 4400-Series Telephone 4k, 4400/4400D Telephone 4d, MLX Telephone 4e, MFM Adjunct: MLX Telephone 4f, Tip/Ring Equipment 4h, ETR Telephone 5b, Direct-Line Console (DLC) 5c, MFM Adjunct: DLC 6g, Call Restriction Assignments and Lists

<b>Factory Setting</b>	3
<b>Valid Entries</b>	0–6 (0 is most restrictive and 6 is least restrictive)
<b>Inspect</b>	No
<b>Copy Option</b>	No
<b>Console Procedure</b>	Extensions→▶ or More→ARS Restrict→Dial ext. no.→Enter→Drop→Dial restriction level (0–6)→Enter→Back
<b>PC Procedure</b>	F6→PgUp→F6→Type ext. no.→F10→Alt + P→Type restriction level (0–6)→F10→F5

---

## Forced Account Code Entry

Use this procedure to assign or remove Forced Account Code Entry. When this feature is programmed on individual extensions, the user must enter a 1- to 16-digit account code before making an outside call.

### Summary: Forced Account Code Entry

<b>Programmable by</b>	System Manager
<b>Mode</b>	All
<b>Idle Condition</b>	Not required
<b>Planning Form</b>	4m, Multiline 4400-Series Telephone 4k, 4400/4400D Telephone 4d, MLX Telephone 4e, MFM Adjunct: MLX Telephone 4f, Tip/Ring Equipment 4h, ETR Telephone 5b, Direct-Line Console (DLC) 5c, MFM Adjunct: DLC 5d, Queued Call Console (QCC)
<b>Factory Setting</b>	Not assigned
<b>Valid Entries</b>	Assigned, not assigned
<b>Inspect</b>	Yes
<b>Copy Option</b>	No
<b>Console Procedure</b>	Extensions→Account→Toggle LED On/Off or dial ext. no.→Enter→Back→Back
<b>PC Procedure</b>	F6→F7→Toggle letter R On/Off or type ext. no.→F10→F5→F5

---

## Microphone Operation

Use this procedure to enable or disable microphones on MLX telephones (except QCC operator positions). When the microphone is disabled, users cannot use the speakerphone to conduct conversations.

**NOTE** ► The microphone cannot be disabled on MLX telephones used as QCC operator positions.

### Summary: Microphone Operation

<b>Programmable by</b>	System Manager
<b>Mode</b>	All
<b>Idle Condition</b>	Not required
<b>Planning Form</b>	4d, MLX Telephone 5b, Direct-Line Console (DLC)
<b>Factory Setting</b>	Enabled
<b>Valid Entries</b>	Enabled, Disabled
<b>Inspect</b>	Yes
<b>Copy Option</b>	No
<b>Console Procedure</b>	Extensions→  or More→Mic Disable→ Toggle LED On/Off or dial ext. no.→Enter→Back→Back
<b>PC Procedure</b>	 →  →  → Toggle letter R On/Off or type ext. no. →  →  → 

---

## Authorization Codes

The Authorization Code feature allows you to pick up someone else's telephone, enter your authorization code, and complete a call with the restrictions that apply to your own telephone (home extension). This includes Toll Restrictions, Outward Restricted, FRL, Allowed Lists, Disallowed Lists, Forced Account Code Entry (FACE), Night Service Exclusion List, and Dial Access to Pools.

**NOTE** ► A user can activate Call Forwarding and Remote Call Forwarding by entering his or her home extension authorization code while at any telephone in the system; this is useful when activating Call Forwarding or Remote Call Forwarding at phantom stations. It is also useful when a single-line telephone extension needs a PAUSE character in the Remote Call Forwarding digit string.

## System Programming

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Use this procedure to assign or remove an authorization code to an extension. The authorization code can range from 2 to 11 characters (0 – 9, \*) and must be unique for each extension. An authorization code cannot begin with an “\*.”

If you are assigning authorization codes for a group of sequential extensions, begin programming the lowest extension number to take advantage of the `Next` screen key (see “Standard Procedures”).

### Summary: Authorization Codes

<b>Programmable by</b>	System Manager
<b>Mode</b>	All
<b>Idle Condition</b>	Not required
<b>Planning Form</b>	6h, Authorization Codes
<b>Factory Setting</b>	Not assigned
<b>Valid Entries</b>	2–11 characters (0–9, *)
<b>Inspect</b>	Yes
<b>Copy Option</b>	No
<b>Console Procedure</b>	Extensions→ or More→Auth Code→Dial ext. no.→Enter→Dial authorization code (2–11 digits, 0–9, *)→Enter→Back→Back
<b>PC Procedure</b>	→→→Type ext. no.→→Type authorization code (2–11 digits, 0–9, *)→→→

---

## Remote Call Forwarding

Use this procedure to allow or disallow the Remote Call Forwarding capability, which permits users to forward calls to an outside number. Remote Call Forwarding must be enabled in order for an extension user to activate Centrex Transfer via Remote Call Forwarding.

If an extension with Remote Call Forwarding has one or more Personal Lines assigned, that extension can be assigned as the principal user, and calls received on that line are forwarded to outside numbers. See “Principal User for Personal Line” on page 3-34.

- NOTES** ▶
- This feature is not recommended with loop-start lines with unreliable disconnect. See “Disconnect Signaling Reliability” on page 3-24.
  - Ensure that the number of rings for Remote Call Forwarding is less than the Coverage Delay or the call will not forward.
  - Use the Forwarding feature.

### Summary: Remote Call Forwarding

<b>Programmable by</b>	System Manager
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## Optional Extension Features

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<b>Mode</b>	All
<b>Idle Condition</b>	Not required
<b>Planning Form</b>	4m, Multiline 4400-Series Telephone 4k, 4400/4400D Telephone 4d, MLX Telephone 4e, MFM Adjunct: MLX Telephone 4f, Tip/Ring Equipment 4h, ETR Telephone 5b, Direct-Line Console (DLC) 5c, MFM Adjunct: DLC 5d, Queued Call Console (QCC)
<b>Factory Setting</b>	Disallowed
<b>Valid Entries</b>	Disallowed, allowed
<b>Inspect</b>	Yes
<b>Copy Option</b>	No
<b>Console Procedure</b>	Extensions→▶ or More→Remote Frwd→ Toggle LED On/Off or dial ext. no.→Enter→Back→Back
<b>PC Procedure</b>	F6→PgUp→F8→Toggle letter R On/Off or type ext. no.→F10→ F5→F5

---

## Delayed Call Forwarding

Delayed Call Forwarding allows a user to answer or screen a call arriving at an extension before the call is forwarded through Call Forwarding, Remote Call Forwarding, or Follow Me. The forwarding delay is the number of rings before the call is forwarded. This delay can range from 0 to 9 rings. If the forwarding delay is set to 0, the call is forwarded immediately.

**NOTE**▶ When Do Not Disturb is activated at an extension, it overrides Delayed Call Forwarding and the call is forwarded immediately.

Use this procedure to assign or remove Delayed Call Forwarding from an extension. If you are assigning Delayed Call Forwarding to a group of sequential extensions, begin by programming the lowest extension number to take advantage of the **Next** screen key (see “Standard Procedures”).

### Summary: Delayed Call Forwarding

<b>Programmable by</b>	System Manager
<b>Mode</b>	All
<b>Idle Condition</b>	Not required
<b>Planning Form</b>	4m, Multiline 4400-Series Telephone 4d, MLX Telephone 4e, MFM Adjunct: MLX Telephone

	4f, Tip/Ring Equipment 4h, ETR Telephone 5b, Direct-Line Console (DLC) 5c, MFM Adjunct: DLC 5d, Queued Call Console (QCC)
<b>Factory Setting</b>	0 rings
<b>Valid Entries</b>	0–9 rings
<b>Inspect</b>	Yes
<b>Copy Option</b>	No
<b>Console Procedure</b>	Extensions→ or More→Delay Frwd→Dial ext. no.→Enter→Drop→Dial no. of delay rings (0–9)→Enter→Back→Back
<b>PC Procedure</b>	→→→Type ext. no.→→+→Type no. of delay rings (0–9)→→→

---

## Trunk-to-Trunk Transfer

Use this procedure to enable or disable trunk-to-trunk transfer at an extension. When trunk-to-trunk transfer is disabled, users cannot transfer an outside call to an outside line.

### Summary: Trunk-to-Trunk Transfer

<b>Programmable by</b>	System Manager
<b>Mode</b>	All
<b>Idle Condition</b>	Not required
<b>Planning Form</b>	4m, Multiline 4400-Series Telephone 4k, 4400/4400D Telephone 4d, MLX Telephone 4e, MFM Adjunct: MLX Telephone 4f, Tip/Ring Equipment 4h, ETR Telephone 5b, Direct-Line Console (DLC) 5c, MFM Adjunct: DLC 5d, Queued Call Console (QCC)
<b>Factory Setting</b>	Disabled
<b>Valid Entries</b>	Enabled, Disabled
<b>Inspect</b>	Yes
<b>Copy Option</b>	No
<b>Console Procedure</b>	Extensions→ or More→ or More→TrkTransfer→Toggle LED On/Off or dial ext. no.→Enter→Back→Back
<b>PC Procedure</b>	→→→→Toggle letter R On/Off or type ext. no.→→→

---

## Primary Cover Ring Delay

Use this procedure to specify the following:

- The delay before a Primary Cover button, programmed for Delay Ring, begins to ring audibly.
- The delay, in addition to the Group Coverage Ring Delay, before sending calls to Group Coverage when the sender has Primary or Secondary Coverage and any receiver is available.

The Primary Cover Ring Delay is programmed for each sender's extension.

### Summary: Primary Cover Ring Delay

<b>Programmable by</b>	System Manager
<b>Mode</b>	All
<b>Idle Condition</b>	Not required
<b>Planning Form</b>	4m, Multiline 4400-Series Telephone 4k, 4400/4400D Telephone 4d, MLX Telephone 4e, MFM Adjunct: MLX Telephone 4f, Tip/Ring Equipment 4h, ETR Telephone 5b, Direct-Line Console (DLC) 5c, MFM Adjunct: DLC
<b>Factory Setting</b>	2 rings
<b>Valid Entries</b>	1–6 rings
<b>Inspect</b>	No
<b>Copy Option</b>	No
<b>Console Procedure</b>	Extensions→▶ or More→▶ or More→Cover Delay→ Primary→Dial sender's extension→Enter→Dial no. of rings (1–6)→Enter→Back
<b>PC Procedure</b>	F6 →PgUp →PgUp →F2 →F1 →Type sender's extension→F10 → Type no. of rings (1–6)→F10 →F5

---

## Secondary Cover Ring Delay

Use this procedure to specify the delay, in addition to the fixed Secondary Coverage Delay Interval (two rings), before a Secondary Cover button programmed for Delay Ring begins to ring audibly.

The Secondary Cover Ring Delay is programmed for each sender's extension.

### Summary: Secondary Cover Ring Delay

<b>Programmable by</b>	System Manager
<b>Mode</b>	All
<b>Idle Condition</b>	Not required
<b>Planning Form</b>	4m, Multiline 4400-Series Telephone 4k, 4400/4400D Telephone 4d, MLX Telephone 4e, MFM Adjunct: MLX Telephone 4f, Tip/Ring Equipment 4h, ETR Telephone 5b, Direct-Line Console (DLC) 5c, MFM Adjunct: DLC
<b>Factory Setting</b>	2 rings
<b>Valid Entries</b>	1–6 rings
<b>Inspect</b>	No
<b>Copy Option</b>	No
<b>Console Procedure</b>	Extensions→▶ or More→▶ or More→Cover Delay→ Secondary→Dial sender's extension→Enter→Dial no. of rings (1-6)→Enter→Back→Back
<b>PC Procedure</b>	F6→PgUp→PgUp→F2→F2→Type sender's extension→F10→ Type no. of rings (1-6)→F10→F5→F5

---

### Group Coverage Ring Delay

Use this procedure to specify the following:

- The number of rings before sending calls to Group Coverage when the sender does not have Primary or Secondary Coverage or the receivers are not available, and the Group Coverage receiver is either a Calling Group only or the QCC queue only (no Group Cover buttons on multiline telephones)
- The number of rings, in addition to the Primary Cover Ring delay, before sending calls to Group Coverage when the sender has Primary or Secondary Coverage and the receivers are available

The Group Coverage Ring Delay is programmed for each sender's extension.

### Summary: Group Coverage Ring Delay

<b>Programmable by</b>	System Manager
<b>Mode</b>	All
<b>Idle Condition</b>	Not required



<b>Planning Form</b>	4m, Multiline 4400-Series Telephone 4k, 4400/4400D Telephone 4d, MLX Telephone 4e, MFM Adjunct: MLX Telephone 4f, Tip/Ring Equipment 4h, ETR Telephone 5b, Direct-Line Console (DLC) 5c, MFM Adjunct: DLC
<b>Factory Setting</b>	3 rings
<b>Valid Entries</b>	1–9 rings
<b>Inspect</b>	No
<b>Copy Option</b>	No
<b>Console Procedure</b>	Extensions→▶ or More→▶ or More→Cover Delay→ Group→Dial sender's extension→Enter→Dial no. of rings (1–9)→Enter→Back→Back
<b>PC Procedure</b>	F6 →PgUp →PgUp →F2 →F3 →Type sender's extension→F10 → Type no. of rings (1–9)→F10 →F5 →F5

---

## HotLine

Use this procedure to enable or disable the HotLine feature on a tip/ring single-line telephone or device.

### Summary: HotLine

<b>Programmable by</b>	System Manager
<b>Mode</b>	All
<b>Idle Condition</b>	Not required
<b>Planning Form</b>	4f, Tip/Ring Equipment
<b>Factory Setting</b>	Disabled
<b>Valid Entries</b>	Yes, No
<b>Inspect</b>	No
<b>Copy Option</b>	No
<b>Console Procedure</b>	Extensions→▶ or More→▶ or More→HotLine→ Enter HotLine extension→Enter→Back→Back
<b>PC Procedure</b>	F6 →PgUp →PgUp →F3 →Type HotLine extension→F10 →F5 → F5

## Display Preference

Use this procedure to specify display preferences for incoming inside calls.

### Summary: Display Preference

<b>Programmable by</b>	System Manager
<b>Mode</b>	Hybrid/PBX
<b>Idle Condition</b>	Not required
<b>Factory Setting</b>	Calling Number
<b>Valid Entries</b>	Calling Name, Calling Number, Both
<b>Inspect</b>	No
<b>Copy Option</b>	Yes
<b>Console Procedure</b>	Extensions→▶ or More→▶ or More→DisplayPref→ Dial extension no.→Enter→Select display option (Calling Name, Calling Number, or Both)→Enter→Back→Back
<b>PC Procedure</b>	F6→PgUp→PgUp→F4→Type extension no.→F10→ Select display option (Calling Name, Calling Number, or Both)→ F10→F5→F5

---

## Service Observing

Use this procedure to configure up to 16 Service Observing groups on a system. Each Service Observing group consists of one Service Observer and a list of the stations (up to the system maximum of 200) that the observer is allowed to monitor. A warning tone is programmed on a per group basis to provide an audible indication that a station is being observed.

**NOTE**▶ Service Observing may be subject to federal, state, or local laws, rules, or regulations or require the consent of one or both of the call parties. You must check in your jurisdiction and comply with all applicable laws, rules, and regulations before using this feature. Failure to comply may result in severe penalties.

**Summary: Service Observing**

<b>Programmable by</b>	System Manager
<b>Mode</b>	All
<b>Idle Condition</b>	Not required
<b>Planning Form</b>	4d, MLX Telephone 4m, Multiline 4400-Series Telephone 5b, Direct-Line Console (DLC) 11, Service Observing: Group Assignment
<b>Factory Setting</b>	Warning: Yes
<b>Valid Entries</b>	Warning: Yes, No
<b>Inspect</b>	Yes
<b>Copy Option</b>	No
<b>Console Procedure</b>	<p>To assign a Service Observer to a Service Observing group: Extensions→▶ or More→▶ or More→ServiceObs→ Observer→Dial group no. (1-32)→Enter→Dial ext. no. of Service Observer→Enter or Delete→Back→Back</p> <p>To enable or disable Warning Tone on a per group basis: Extensions→▶ or More→▶ or More→ServiceObs→ Warning→Dial group no. (1-32)→Enter→Yes or No→ Enter→Back→Back</p> <p>To assign a member extension to a Service Observing group: Extensions→▶ or More→▶ or More→ServiceObs→ Members→Dial group no. (1-32)→Enter→Dial ext. no.→ Enter or Delete→Back→Back→Back</p>
<b>PC Procedure</b>	<p>To assign a Service Observer to a Service Observing group: F6→PgUp→PgUp→F6→F1→Type group no. (1-32)→F10→ Type ext. no. of Service Observer→F10 or F8→F5→F5</p> <p>To enable or disable Warning Tone on a per group basis: F6→PgUp→PgUp→F6→F2→Type group no. (1-32)→F10→ F2 or F3→F10→F5→F5</p> <p>To assign a member extension to a Service Observing group: F6→PgUp→PgUp→F6→F3→Type group no. (1-32)→F10→ Type ext. no.→F10 or F8→F5→F5→F5</p>

## Optional Operator Features

The summaries in this section affect feature programming for both DLC and QCC operator positions and include the following:

- Operator Hold Timer
- DLC Operator Automatic Hold

QCC operator features are covered in the next section.

### Operator Hold Timer

Use this procedure to set the length of the operator hold timer for all DLCs and QCCs. If the system operator does not pick up the call within the time programmed, an abbreviated ring reminds the operator that a call is being held.

This option cannot be programmed for individual operator positions.

#### Summary: Operator Hold Timer

<b>Programmable by</b>	System Manager
<b>Mode</b>	All
<b>Idle Condition</b>	Not required
<b>Planning Form</b>	6a, Optional Operator Features
<b>Factory Setting</b>	60 seconds
<b>Valid Entries</b>	10 to 255 seconds
<b>Inspect</b>	No
<b>Copy Option</b>	No
<b>Console Procedure</b>	Operator→Hold Timer→Drop→Dial no. of seconds (10-255)→ Enter→Back
<b>PC Procedure</b>	<span style="border: 1px solid black; padding: 2px;">F3</span> → <span style="border: 1px solid black; padding: 2px;">F3</span> → <span style="border: 1px solid black; padding: 2px;">Alt</span> + <span style="border: 1px solid black; padding: 2px;">P</span> → Type no. of seconds(10-255) → <span style="border: 1px solid black; padding: 2px;">F10</span> → <span style="border: 1px solid black; padding: 2px;">F5</span>

## DLC Operator Automatic Hold

Use this procedure to enable or disable the DLC Operator Automatic Hold feature for DLC operator positions. When this feature is enabled, it prevents accidental call disconnection.

### Summary: DLC Operator Automatic Hold

<b>Programmable by</b>	System Manager
<b>Mode</b>	All
<b>Idle Condition</b>	Not required
<b>Planning Form</b>	6a, Optional Operator Features
<b>Factory Setting</b>	Disabled
<b>Valid Entries</b>	Disabled, Enabled
<b>Inspect</b>	No
<b>Copy Option</b>	No
<b>Console Procedure</b>	Operator→DLC Hold→Automatic Hold Enable or Automatic Hold Disable→Enter→Back
<b>PC Procedure</b>	F3 → F4 → F1 or F2 → F10 → F5

## QCC Optional Features

This section contains programming summaries for the following options for QCC operator positions:

- Hold Return
- Automatic Hold or Release
- Queue over Threshold
- Elevate Priority
- Calls-in-Queue Alert
- QCC Operator to Receive Call Types
- Call Type Queue Priority Level
- Message Center Operation
- Automatic or Manual Extended (Directed) Call Completion
- Return Ring
- Position Busy Backup

- Voice Announce

**NOTE** ▶ These options are available in Hybrid/PBX mode only.

---

## Hold Return

Use this procedure to determine whether calls on hold are returned to the QCC queue or remain on hold, on the QCC operator console, after the hold timer has expired twice. After the hold timer expires the first time, the operator hears an abbreviated ring as a call-on-hold reminder. If another call is received at the same time that the hold timer expires, 10 seconds are added to the programmed operator hold timer interval for the first call. If the QCC operator does not pick up a call by the time the hold timer expires twice, the call can be programmed to either remain on hold or return to the QCC queue.

This option cannot be programmed for individual QCC operator positions. The single setting applies to all QCC operator positions.

### Summary: Hold Return

<b>Programmable by</b>	System Manager
<b>Mode</b>	Hybrid/PBX
<b>Idle Condition</b>	Not required
<b>Planning Form</b>	6a, Optional Operator Features
<b>Factory Setting</b>	Calls remain on hold
<b>Valid Entries</b>	Remain on hold, Return to QCC queue
<b>Inspect</b>	No
<b>Copy Option</b>	No
<b>Console Procedure</b>	Operator→Queued Call→Hold Rtrn→Select Return to Queue OR Remain on Hold→Enter→Back→Back
<b>PC Procedure</b>	F3→F2→F1→Select Return to Queue OR Remain on Hold→F10→F5→F5

## Automatic Hold or Release

Use this procedure to specify whether a call in progress (on a Call button) is automatically put on hold (Automatic Hold) or disconnected (Automatic Release) when the operator presses another button.

This option cannot be programmed for individual QCC operator positions. The single setting applies to all QCC operator positions.

### Summary: Automatic Hold or Release

<b>Programmable by</b>	System Manager
<b>Mode</b>	All
<b>Idle Condition</b>	Not required
<b>Planning Form</b>	6a, Optional Operator Features
<b>Factory Setting</b>	Automatic Release
<b>Valid Entries</b>	Auto Hold, Auto Release
<b>Inspect</b>	No
<b>Copy Option</b>	No
<b>Console Procedure</b>	Operator→Queued Call→HoldRelease→Select Auto Hold Or Auto Release→Enter→Back→Back
<b>PC Procedure</b>	<input type="button" value="F3"/> → <input type="button" value="F2"/> → <input type="button" value="F2"/> → Select Auto Hold Or Auto Release → <input type="button" value="F10"/> → <input type="button" value="F5"/> → <input type="button" value="F5"/>

---

## Queue over Threshold

Use this procedure to specify the maximum number of calls (threshold) in the QCC queue before system operators are notified with a tone that the threshold has been reached or exceeded. If the threshold is set to 0, operators are not notified.

### Summary: Queue over Threshold

<b>Programmable by</b>	System Manager
<b>Mode</b>	Hybrid/PBX
<b>Idle Condition</b>	Not required
<b>Planning Form</b>	6a, Optional Operator Features
<b>Factory Setting</b>	0
<b>Valid Entries</b>	0 to 99
<b>Inspect</b>	No

<b>Copy Option</b>	No
<b>Console Procedure</b>	Operator→Queued Call→Threshold→Drop→ Dial no. of calls (0-99)→Enter→Back→Back
<b>PC Procedure</b>	<span>F3</span> → <span>F2</span> → <span>F3</span> → <span>Alt</span> + <span>P</span> → Type no. of calls(0-99) → <span>F10</span> → <span>F5</span> → <span>F5</span>

---

## Elevate Priority

Use this procedure to specify the length of time before calls waiting in the QCC queue are automatically reprioritized to a higher level. If priority is set to 0, calls are not prioritized.

### Summary: Elevate Priority

<b>Programmable by</b>	System Manager
<b>Mode</b>	Hybrid/PBX
<b>Idle Condition</b>	Not required
<b>Planning Form</b>	Form 6a, Optional Operator Features
<b>Factory Setting</b>	0 seconds
<b>Valid Entries</b>	0 and 5 to 30 seconds
<b>Inspect</b>	No
<b>Copy Option</b>	No
<b>Console Procedure</b>	Operator→QueuedCall→ElevatePrior→Drop→Dial no. of seconds (0 and 5-30)→ Enter→Back→Back
<b>PC Procedure</b>	<span>F3</span> → <span>F2</span> → <span>F4</span> → <span>Alt</span> + <span>P</span> → Type no. of seconds (0 and 5-30) → <span>F10</span> → <span>F5</span> → <span>F5</span>

---

## Calls-In-Queue Alert

Use this procedure to specify whether each QCC operator is notified (with a single beep) when a new call enters the QCC queue.

### Summary: Calls-In-Queue Alert

<b>Programmable by</b>	System Manager
<b>Mode</b>	Hybrid/PBX
<b>Idle Condition</b>	Not required
<b>Planning Form</b>	6a, Optional Operator Features
<b>Factory Setting</b>	Disable
<b>Valid Entries</b>	Enable, Disable
<b>Inspect</b>	Yes
<b>Copy Option</b>	No
<b>Console Procedure</b>	Operator→Queued Call→InQue Alert→Dial ext. no.→ Enter→Select InQue Alert Enable or InQue Alert Disable→ Enter→Back→Back
<b>PC Procedure</b>	<b>F3</b> → <b>F2</b> → <b>F6</b> →Type ext. no.→ <b>F10</b> →Select InQue Alert Enable or InQue Alert Disable→ <b>F10</b> → <b>F5</b> → <b>F5</b>

---

## QCC Operator to Receive Call Types

Use this procedure to specify which QCC operators receive the following types of calls:

- Dial 0 calls (internal calls to the system operator)
- DID calls to invalid destinations (unassigned extension numbers)
- Calls to the Listed Directory Number (extension for the QCC queue)
- Calls programmed to return to the QCC queue (returning from directing, camped-on, held calls, and operator parked calls)
- Group Coverage calls
- Forward/Follow Me calls

The QCC queue can be a receiver for the maximum number of coverage groups (30).

- NOTES** ▶
- If you want a QCC operator position to operate as a message center (receiving returning parked and directed calls, Group Coverage calls, and calls to unassigned DID numbers), program the Message Center option before you assign the operator to receive call types.
  - This procedure does not include use of the menu options Follow/Frwd or QCC Ext. These two options are used to assign queue priorities and are not associated with individual QCC operators. See “Call Type Queue Priority Level” on page 3-97.
  - This procedure does not include programming the operator position to receive calls on individual lines or trunks.
  - Programming an operator position to receive DID calls to invalid destinations does not cause the calls to ring into the QCC queue unless you program such calls to be sent to a backup extension. When no operator is assigned to receive the call types, the call does not ring into the QCC queue, and the caller hears an error tone.
  - If a trunk assigned to ring into the QCC queue is to be assigned shared Remote Access, assign that trunk Remote Access before performing this procedure. See “Remote Access Features” on page 3-133.

**Summary: QCC Operator to Receive Call Types**

<b>Programmable by</b>	System Manager
<b>Mode</b>	Hybrid/PBX
<b>Idle Condition</b>	Not required
<b>Planning Form</b>	6a, Optional Operator Features
<b>Factory Setting</b>	QCC operator receives the following calls: Dial 0 Unassigned DID Listed Directory Number Returning
<b>Valid Entries</b>	Not applicable
<b>Inspect</b>	Yes
<b>Copy Option</b>	No
<b>Console Procedure</b>	Operator→Queued Call→Call Types→Select a call type→Operator→Dial coverage group no.→Enter→Dial ext. no.→Enter→Back→Back→Back→Back→Back
<b>PC Procedure</b>	[F3]→[F2]→[F7]→Select a call type→[F2]→Type coverage group no.→[F10]→Type ext. no.→[F10]→[F5]→[F5]→[F5]→[F5]→[F5]

## Call Type Queue Priority Level

Use this procedure to assign a priority value (1 to 7) that determines the order in which calls programmed to ring into the QCC queue are sent to QCC system operator positions. A value of 1 is the highest priority. The QCC queue priority level is assigned for the following types of calls:

- Dial 0 calls (internal calls to the system operator)
- DID calls to invalid destinations (unassigned extension numbers)
- Calls to the Listed Directory Number (extension for the QCC queue)
- Calls programmed to return to the QCC queue (returning from extending, camped-on, held calls, and operator parked calls)
- Group Coverage calls
- Calls signed in (Follow) or forwarded to the system operator
- Calls to a system operator extension number

This procedure does not include programming the QCC queue priority level for individual lines or trunks to ring into the queue. See “QCC Queue Priority Level” on page 3-35.

### Summary: Call Type Queue Priority Level

<b>Programmable by</b>	System Manager
<b>Mode</b>	Hybrid/PBX
<b>Idle Condition</b>	Not required
<b>Planning Form</b>	6a, Optional Operator Features
<b>Factory Setting</b>	4
<b>Valid Entries</b>	1 to 7
<b>Inspect</b>	No
<b>Copy Option</b>	No
<b>Console Procedure</b>	Operator→Queued Call→Call Types→Select call type→Priority→Dial group coverage number (1-30)→Enter→Drop→Dial priority level (1-7)→Enter→Back→Back→Back→Back
<b>PC Procedure</b>	[F3]→[F2]→[F7]→Select call type→[F1]→Type Group Coverage number (1-30)→[F10]→[Alt]+[P]→Type priority level (1-7)→[F10]→[F5]→[F5]→[F5]→[F5]

## Message Center Operation

Use this procedure to designate one or more QCC operator positions to operate as a message center. The following options are automatically set for the message center position:

- Incoming calls are not directed to this position
- Returning calls are directed to this position (return from extending and operator parked calls)
- All group coverage calls are directed to this position
- All DID calls to invalid destinations are directed to this position

Designating message center operation does not change any call type option programming, except that the call types mentioned above are added to the calls received at the QCC Message Center.

### Summary: Message Center Operation

<b>Programmable by</b>	System Manager
<b>Mode</b>	Hybrid/PBX
<b>Idle Condition</b>	Not required
<b>Planning Form</b>	6a, Optional Operator Features
<b>Factory Setting</b>	Not applicable
<b>Valid Entries</b>	QCC extension numbers
<b>Inspect</b>	Yes
<b>Copy Option</b>	No
<b>Console Procedure</b>	Operator→Queued Call→Msg Center→Dial ext. no.→ Enter→Back→Back→Back
<b>PC Procedure</b>	<b>F3</b> → <b>F2</b> → <b>F8</b> →Type ext. no.→ <b>F5</b> → <b>F5</b> → <b>F5</b>

---

## Extended (Directed) Call Completion

Use this procedure to specify one of the two basic options shown below for QCC operator positions with a DSS only:

- Automatic Completion. Allows one-touch call transfer—that is, calls are transferred by touching only an extension button on the DSS. The operator does not have to press the release button.
- Manual Completion. QCC operators must press the release button to direct a call using a DSS.

This option cannot be programmed for individual QCC operator positions. The setting applies to all QCC operator positions.

**Summary: Extended (Directed) Call Completion**

<b>Programmable by</b>	System Manager
<b>Mode</b>	Hybrid/PBX
<b>Idle Condition</b>	Not required
<b>Planning Form</b>	6a, Optional Operator Features
<b>Factory Setting</b>	Automatic Extended Completion
<b>Valid Entries</b>	Automatic, Manual
<b>Inspect</b>	No
<b>Copy Option</b>	No
<b>Console Procedure</b>	Operator→Queued Call→ExtndComplt→Select Automatic Complete Or Manual Complete→Enter→Back→Back
<b>PC Procedure</b>	F3→F2→F9→Select Automatic Complete Or Manual Complete→F10→F5→F5

**Return Ring**

Use this procedure to specify the number of rings before an unanswered directed call is returned to the QCC queue or QCC Message Center position.

This option cannot be programmed for individual QCC operator positions. The setting applies to all QCC operator positions.

**NOTE** ► If you want unanswered calls to proceed to voice mail, lengthen the return ring setting.

**Summary: Return Ring**

<b>Programmable by</b>	System Manager
<b>Mode</b>	Hybrid/PBX
<b>Idle Condition</b>	Not required
<b>Planning Form</b>	6a, Optional Operator Features
<b>Factory Setting</b>	4 rings
<b>Valid Entries</b>	1 to 15 rings
<b>Inspect</b>	No
<b>Copy Option</b>	No
<b>Console Procedure</b>	Operator→Queued Call→Return Ring→Drop→Dial no. of rings (1-15)→Enter→Back→Back

**PC Procedure**

F3 → F2 → F10 → Alt + P → Type no. of rings (1-15) → F10 →  
 F5 → F5

## Position Busy Backup

Use this procedure to designate or remove the Calling Group to provide the backup position for the QCC queue. The specified Calling Group receives incoming calls when all QCC operator positions are in position-busy mode.

Position Busy Backup is programmed for the QCC queue rather than for individual QCC operator positions. The Calling Group designated as the QCC queue backup serves as the backup for the Remote Access feature and as backup when the QCC is being used as the system programming console.

Only one Position Busy Backup can be programmed per system.

### Summary: Position Busy Backup

<b>Programmable by</b>	System Manager
<b>Mode</b>	Hybrid/PBX
<b>Idle Condition</b>	Not required
<b>Planning Form</b>	6a, Optional Operator Features
<b>Factory Setting</b>	No backup
<b>Valid Entries</b>	Calling Group number
<b>Inspect</b>	No
<b>Copy Option</b>	No
<b>Console Procedure</b>	Operator → Queued Call → [▶] or More → QCC Backup → Drop → Dial ext. number → Select Enter or Delete → Back → Back
<b>PC Procedure</b>	F3 → F2 → PgUp → F1 → Alt + P → Type ext. number → Select Enter or Delete → F5 → F5

## Voice Announce

Use this procedure to enable or disable Voice Announce for the QCC.

When Voice Announce is enabled, every QCC in the system has one Voice Announce Call button, the Call 5 (Ring/Voice) button. All Intercom calls that originate from a QCC Call 5 (Ring/Voice) button are delivered as Voice Announce calls.

When Voice Announce is disabled, all Intercom calls originating at the QCC Call buttons are Intercom Ringing calls.

**Summary: Voice Announce**

<b>Programmable by</b>	System Manager
<b>Mode</b>	Hybrid/PBX
<b>Idle Condition</b>	Not required
<b>Planning Form</b>	6a, Optional Operator Features
<b>Factory Setting</b>	Disabled
<b>Valid Entries</b>	Disabled, Enabled
<b>Inspect</b>	No
<b>Copy Option</b>	No
<b>Console Procedure</b>	Operator→Queued Call→▶ or More→Voice Annc→Select Enabled Or Disabled→Enter→Back→Back
<b>PC Procedure</b>	F3→F2→PgUp→F2→Select Enabled or Disabled→F10→ F5→F5

**Optional Group Features**

This section contains programming summaries for the following optional features:

- Pickup Groups
- Group Paging
- Group Coverage Member Assignments
- Group Calling Member Assignments
- Group Calling Line/Trunk or Pool Assignments
- Priority Call Queuing for Group Calling

**Pickup Groups**

Use this procedure to assign or remove an extension from a call pickup group. A pickup group consists of telephone users who can answer each other's calls either by pressing a button or by dialing a code.

- NOTES** ▶
- A maximum of 30 pickup groups, with a maximum of 15 extensions per group, is allowed.
  - An extension can belong to only one group.
  - Before reassigning an extension to a new group, you must remove it from its current group.

**Summary: Pickup Groups**

<b>Programmable by</b>	System Manager
<b>Mode</b>	All
<b>Idle Condition</b>	Not required
<b>Planning Form</b>	7a, Pickup Groups
<b>Factory Setting</b>	Not applicable
<b>Valid Entries</b>	Pickup group number, extension number
<b>Inspect</b>	Yes
<b>Copy Option</b>	No
<b>Console Procedure</b>	Extensions→Call Pickup→Dial pickup group no.→Enter→Dial ext. no.→Enter→Enter→ Back→Back
<b>PC Procedure</b>	<input type="text" value="F6"/> → <input type="text" value="F9"/> → Type pickup group no. → <input type="text" value="F10"/> → Type ext. no. → <input type="text" value="F10"/> → <input type="text" value="F5"/> → <input type="text" value="F5"/>

**Group Paging**

Use this procedure to assign or remove an extension from a Paging Group. A Paging Group consists of telephone users who hear common announcements over the telephone speakerphone. Only multiline 4400-Series, ETR, and MLX telephones with speakerphones can be members of a Paging Group.

A maximum of six Paging Groups with a maximum of 10 extensions per group is allowed. A seventh Paging Group, called the Page All group, is not limited and includes all telephones connected to the system. Extensions cannot be added to or removed from the Page All group.

To reassign an extension to a new Paging Group, just assign it; the extension is automatically removed from its old Paging Group.

**Summary: Group Paging**

<b>Programmable by</b>	System Manager
<b>Mode</b>	All
<b>Idle Condition</b>	Not required
<b>Planning Form</b>	7b, Group Paging
<b>Factory Setting</b>	Not applicable
<b>Valid Entries</b>	Extension number
<b>Inspect</b>	Yes
<b>Copy Option</b>	No



**Console Procedure** Extensions → or More → Group Page → Dial Paging  
Group no. → Enter → Dial ext. no. → Enter → Back → Back

**PC Procedure** → → → Type Paging Group no. → → Type ext. no. →  
 → →

## Group Coverage Member Assignments

Use this procedure to assign or remove an extension from a coverage group. A coverage group is a group of senders. Coverage is an arrangement in which calls from a group of senders are redirected to one or more receivers.

**NOTE** ■ This procedure assigns senders. Before you begin, make certain that the receivers for the coverage group are also programmed. Receivers can be assigned through individual or centralized telephone programming.

A maximum of 30 coverage groups are allowed, each with an unlimited number of members. Up to eight receivers can be assigned per coverage group.

An extension can be a sender in only one group; it can be a receiver for more than one coverage group. A Calling Group can be assigned as a receiver for a coverage group (see “Group Coverage Receiver” on page 3-109). In Hybrid/PBX mode only, the QCC queue can be a receiver for up to 30 coverage groups. See “QCC Operator to Receive Calls” on page 3-36.

If the sender’s extension has one or more Personal Lines assigned, the sender can be assigned as the principal user so that calls received on the Personal Line are sent to receivers programmed for Individual or Group Coverage. See “Principal User for Personal Line” on page 3-34.

To reassign an extension to a new coverage group, just make the assignment; the extension is automatically removed from its old group.

### Summary: Group Coverage Member Assignments

<b>Programmable by</b>	System Manager
<b>Mode</b>	All
<b>Idle Condition</b>	Not required
<b>Planning Form</b>	7c, Group Coverage
<b>Factory Setting</b>	Not applicable
<b>Valid Entries</b>	Extension numbers
<b>Inspect</b>	Yes
<b>Copy Option</b>	No
<b>Console Procedure</b>	Extensions →  or More → Group Cover → Dial group no. (1-30) → Enter → Dial ext. no. → Enter → Back → Back

**PC Procedure**

F6 → PgUp → F3 → Type group no. (1-30) → F10 → Type ext. no. →  
 F10 → 5 → F5

## Group Calling Member Assignments

Use this procedure to assign or remove an extension to or from a Calling Group. A Calling Group is used to direct calls to a group of people who all handle the same type of call. A single extension number is assigned to the group and is used by both inside and outside callers to reach the group.

To reassign an extension to a new Calling Group, you must remove it from its old group before programming the new assignment.

- NOTES**
- If a linear hunting pattern is indicated on the back of the system planning form (6d), be sure to assign extensions to the group in the exact order that they are shown on the form. The system searches for an available member in the order in which you assign the extensions to the group.
  - A maximum of 32 Calling Groups with a maximum of 20 extensions per group is allowed.
  - An extension can belong to only one Calling Group. A QCC cannot be a member of a Calling Group. A delay announcement device should not be programmed as a Calling Group member.
  - The extension status feature must be set to the Calling Group or CMS mode before you assign members to the group. See “Extension Status” on page 3-123.

### Summary: Group Calling Member Assignments

<b>Programmable by</b>	System Manager
<b>Mode</b>	All
<b>Idle Condition</b>	Not required
<b>Planning Form</b>	7c, Group Coverage
<b>Factory Setting</b>	Not applicable
<b>Valid Entries</b>	Extension numbers
<b>Inspect</b>	Yes
<b>Copy Option</b>	No
<b>Console Procedure</b>	Extensions → [▶] or More → Grp Calling → Members → Dial Calling Group ext. no. → Enter → Dial ext. no. → Enter → Back → Back → Back
<b>PC Procedure</b>	F6 → PgUp → F4 → F9 → Type Calling Group ext. no. → F10 → Type ext. no. → F10 → F5 → F5 → F5

---

## Group Calling Line/Trunk or Pool Assignments

Use this procedure to assign or remove lines, trunks, or pools (Hybrid/PBX only) that ring directly into a Calling Group.

Incoming calls on each line/trunk or pool can be directed to only one Calling Group.

To reassign a line/trunk or pool to a new Calling Group, you must remove it from its old group before making the new assignment.

### Summary: Group Calling Line/Trunk or Pool Assignments

<b>Programmable by</b>	System Manager
<b>Mode</b>	All
<b>Idle Condition</b>	Not required
<b>Planning Form</b>	7d, Group Calling
<b>Factory Setting</b>	Not applicable
<b>Valid Entries</b>	Line, trunk, or pool number
<b>Inspect</b>	Yes
<b>Copy Option</b>	No
<b>Console Procedure</b>	Extensions→  or More→Grp Calling→Line/Pool→Dial Calling Group ext. no.→Enter→Dial line/trunk no.→Enter→Back→Back→Back
<b>PC Procedure</b>	 →  →  →  →Type Calling Group ext. no.→  →Type line/trunk no.→  →  →  → 

---

## Priority Call Queuing

Use this procedure to establish a supportive relationship between Calling Groups. Calls that arrive in one Calling Group (a home group) can be processed by another Calling Group (a support group) when no one from the first Calling Group is available to answer the call.

A Calling Group can be assigned a priority level between 1 (highest priority) and 32 (lowest priority) and then designated as a support group for a home group. There can be only one support group per home group. Each support group can support up to 31 home groups.

**Summary: Priority Call Queuing**

<b>Programmable by</b>	System Manager
<b>Mode</b>	All
<b>Idle Condition</b>	Not Required
<b>Planning Form</b>	7d, Group Calling
<b>Factory Setting</b>	16
<b>Valid Entries</b>	Priority Level (1 to 32)
<b>Inspect</b>	Yes
<b>Copy Option</b>	No
<b>Console Procedure</b>	Extensions→▶ or More→Grp Calling→▶ or More→Priority→Enter extension number of group→Enter→Enter Group Priority (1-32)→(To program the next group, select Next)→Enter→Back→Support→Enter extension number of group→Enter→Enter Support Group→(To program the next group, select Next)→Enter→Back→Back→Back
<b>PC Procedure</b>	[F6]→PgUp→[F4]→PgUp→[F3]→Type extension number of group→[F10]→Type Group Priority (1-32)→(To program the next group, press [F9])→[F10]→[F5]→[F4]→Type extension number of group→[F10]→Type support group→(To program the next group, press [F9])→[F10]→[F5]→[F5]→[F5]

**Optional Group Calling Features**

This section includes programming summaries for the following optional group calling features:

- Hunt Type
- Group Calling Delay Announcements
- Group Calling Announcement Interval
- Group Calling Repeat Announcement
- Group Coverage Receiver
- Group Calling Overflow and Thresholds
- Group Calling Message-Waiting Indicator
- Group Calling Calls-in-Queue Alarm Threshold
- Group Calling External Alert for Calls-in-Queue Alarm
- Group Type
- Queue Control

**Hunt Type**

Use this procedure to assign one of the following hunt-type patterns to Calling Groups:

- **Circular Hunting Pattern.** The system distributes calls to group members by hunting in a circular pattern for the first available extension after the one that received the last call to the group.
- **Linear Hunting Pattern.** The system searches for an available group member in the order in which the extensions were assigned to the Calling Group.
- **Most Idle Hunting Pattern.** The system searches for the available member that is “most idle.” This distribution scheme can be more equitable than the circular hunting pattern.

### Summary: Hunt Type

<b>Programmable by</b>	System Manager
<b>Mode</b>	All
<b>Idle Condition</b>	Not required
<b>Planning Form</b>	7d, Group Calling
<b>Factory Setting</b>	Circular hunting pattern
<b>Valid Entries</b>	Circular, Linear, Most Idle
<b>Inspect</b>	No
<b>Copy Option</b>	No
<b>Console Procedure</b>	Extensions→▶ or More→Grp Calling→Hunt Type→Dial Calling Group ext. no.→Enter→Circular, Linear, or Most Idle→Enter→Back→Back→Back
<b>PC Procedure</b>	F6→PgUp→F4→F1→Type Calling Group ext. no.→F10→F1 or F2 or F3→F10→F5→F5→F5

### Group Calling Delay Announcements

Use this procedure to designate the announcement devices used to play messages to callers while they are waiting in the queue.

Two announcement devices can be designated for each Calling Group; however, more than one Calling Group can use the same announcement device. The extensions to which the delay announcement devices are connected should not be programmed as a Calling Group member.

If the extension jack or MFM was previously programmed as a regular extension, you must remove all line/trunk button assignments before you designate the extension jack as a delay announcement device.

### Summary: Group Calling Delay Announcement

<b>Programmable by</b>	System Manager
<b>Mode</b>	All

<b>Idle Condition</b>	Not required
<b>Planning Form</b>	7d, Group Calling
<b>Factory Setting</b>	No delay announcement devices are assigned
<b>Valid Entries</b>	Primary Announcement, Secondary Announcement
<b>Inspect</b>	No
<b>Copy Option</b>	No
<b>Console Procedure</b>	Extensions→▶ or More→Grp Calling→DelayAnnce→ Dial Calling Group ext. no.→Enter→ Select Primary Announcement or Secondary Announcement→ Enter extension number of announcement device→Enter→Back→ Back→Back
<b>PC Procedure</b>	F6→PgUp→F4→F2→Type Calling Group ext. no.→F10→ Select Primary Announcement or Secondary Announcement→ Enter ext. no. of announcement device→F10→F5→F5

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## Group Calling Announcement Interval

Use this procedure to set the delay before the secondary announcement is played and/or repeated.

### Summary: Group Calling Announcement Interval

<b>Programmable by</b>	System Manager
<b>Mode</b>	All
<b>Idle Condition</b>	Not required
<b>Planning Form</b>	7d, Group Calling
<b>Factory Setting</b>	0 (disabled)
<b>Valid Entries</b>	0-900 seconds
<b>Inspect</b>	No
<b>Copy Option</b>	No
<b>Console Procedure</b>	Extensions→▶ or More→Grp Calling→DelayAnnce→ Dial Calling Group ext. no.→Announcement Interval→ Enter the Announcement Interval (0-900)→Enter→Back→Back
<b>PC Procedure</b>	F6→PgUp→F4→F2→Type Calling Group ext. no.→F3→ Type the Announcement Interval (0-900)→F10→F5→F5

---

## Group Calling Repeat Announcement

Use this procedure to set the secondary announcement to repeat after the Announcement Interval.

### Summary: Group Calling Repeat Announcement

<b>Programmable by</b>	System Manager
<b>Mode</b>	All
<b>Idle Condition</b>	Not required
<b>Planning Form</b>	7d, Group Calling
<b>Factory Setting</b>	No repeat
<b>Valid Entries</b>	Yes, No
<b>Inspect</b>	No
<b>Copy Option</b>	No
<b>Console Procedure</b>	Extensions →  or More → Grp Calling → DelayAnnce → Dial Calling Group ext. no. → Enter → Repeat Announcement → Select Yes or No → Enter → Back → Back
<b>PC Procedure</b>	 →  →  →  →  → Type Calling Group ext. no. → Select Yes or No →  →  → 

Although you can make selections from the screen (with the `ListFeature` option) to assign Ring and Voice buttons, the following procedure provides the programming codes to perform these functions. Using the codes speeds the button assignment process.

## Group Coverage Receiver

Use this procedure to assign or remove a Calling Group as a receiver for a coverage group.

Calling Group member assignments must be made before you assign the group as a receiver for a coverage group.

### Summary: Group Coverage Receiver

<b>Programmable by</b>	System Manager
<b>Mode</b>	All
<b>Idle Condition</b>	Not required
<b>Planning Form</b>	7c, Group Coverage
<b>Factory Setting</b>	Not applicable
<b>Valid Entries</b>	Group numbers
<b>Inspect</b>	Yes
<b>Copy Option</b>	No

- Console Procedure**    Extensions→▶ or More→Grp Calling→Grp Coverage→  
Dial Calling Group ext. no.→Enter→Dial coverage group no.→  
Enter→Back→Back→Back
- PC Procedure**            F6 →PgUp →F4 →F3 →Type Calling Group ext. no.→F10 →  
Type coverage group no.→F10 →F5 →F5 →F5

## Group Calling Overflow and Thresholds

Use this procedure to designate either another Calling Group or the QCC queue (Hybrid/PBX only) to receive overflow calls. This procedure also specifies Overflow Threshold and methods.

Call overflow occurs in one of the three following ways:

- The number of calls waiting in the queue for a Calling Group is equal to or greater than the programmed threshold (Overflow Threshold).
- The time that a call has spent in the queue exceeds the programmed timeout value (Overflow Threshold Time).
- A caller responds to a voice prompt by pressing the # key to indicate that his or her call should be handled as an overflow call. For example, a delay announcement may specify that a caller can press # to leave a message with voice mail or an operator.

If the Overflow Threshold Time is set to 0 seconds (factory setting), then overflow by time is turned off. Prompt-based overflow distribution can coexist with either or both of the other methods. Overflow distribution based on the number of calls in the queue or the time spent in the queue takes precedence over calls that go to overflow because of the caller's prompt.

Overflow coverage can be provided only by Calling Groups or the QCC queue (Hybrid/PBX only), not by individual extensions.

A Calling Group or the QCC queue (Hybrid/PBX only) can provide overflow coverage for more than one Calling Group; however, the particular group whose calls go to an available member in the overflow Calling Group is unpredictable.

The factory-set extension number for the QCC Listed Directory Number is 800.

### Summary: Group Calling Overflow and Thresholds

<b>Programmable by</b>	System Manager
<b>Mode</b>	All
<b>Idle Condition</b>	Not required
<b>Planning Form</b>	7d, Group Calling
<b>Factory Setting</b>	Overflow coverage: none Threshold: 1 call Timeout: 0 sec Prompt-based overflow: Disabled

<b>Valid Entries</b>	Overflow coverage: Backup extension number Threshold: 1 to 99 calls Timeout: 0 to 900 seconds Prompt-based overflow: Enabled, Disabled
<b>Inspect</b>	No
<b>Copy Option</b>	No
<b>Console Procedure</b>	Extensions→  or More→Grp Calling→Overflow→Dial Calling Group ext. no.→Enter→Dial overflow ext. no.→Enter→Number Based Overflow→Drop→Dial no. of calls (1-99)→Enter→Time Based Overflow→Drop→Dial no. of seconds(0-900)→Enter→Prompt Based Overflow→Select Yes or No→Enter→Back→Back→Back
<b>PC Procedure</b>	 →PgUp→  →  →Type Calling Group ext. no.→  →Type overflow ext. no.→  →  →Alt+P→Type no. of calls(1-99)→  →  →Alt+P→Type no. of seconds(0-900)→  →  →Select Yes or No→  →  →  → 

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## Group Calling Message-Waiting Indicator

Use this procedure to designate the extension to receive message-waiting indications (MWIs) for the Calling Group.

Only one extension can be designated as a message-waiting receiver for each Calling Group; however, more than one Calling Group can use the same message-waiting receiver. The extension assigned as a message-waiting receiver does not have to be a member of the Calling Group.

Message-waiting indications cannot be sent to the extension assigned to the group unless this option is programmed. The message-waiting receiver cannot distinguish between messages left for the Calling Group and personal messages.

### Summary: Group Calling Message-Waiting Indicator

<b>Programmable by</b>	System Manager
<b>Mode</b>	All
<b>Idle Condition</b>	Not required
<b>Planning Form</b>	7d, Group Calling
<b>Factory Setting</b>	No message-waiting receiver assigned
<b>Valid Entries</b>	Extension number
<b>Inspect</b>	No
<b>Copy Option</b>	No
<b>Console Procedure</b>	Extensions →  or More → Grp Calling → Message → Dial Calling Group ext. no. → Enter → Dial ext. no. for MWI receiver → Enter → Back → Back
<b>PC Procedure</b>	 →  →  →  → Type Calling Group ext. no. →  → Type ext. no. for MWI receiver →  →  → 

---

### Group Calling Calls-In-Queue Alarm Thresholds

Use this procedure to specify the number of unanswered calls that wait in the Calling Group queue before group members are notified with either an external alert (an external alert is turned on when the third threshold is met) or a light on the telephone. Group members are notified when the number of calls waiting in the queue is equal to or greater than the programmed thresholds as follows:

- First Threshold, flashing light
- Second Threshold, winking light
- Third Threshold, solid light

**NOTE** ► To configure only one threshold, set all thresholds to the same number. The LED states are off and on. To configure only two thresholds, set two of the thresholds to be the same number.

### Summary: Group Calling Calls-In-Queue Alarm Thresholds

<b>Programmable by</b>	System Manager
<b>Mode</b>	All
<b>Idle Condition</b>	Not required
<b>Planning Form</b>	7d, Group Calling
<b>Factory Settings</b>	1 call, for all Thresholds

<b>Valid Entries</b>	1 to 99
<b>Inspect</b>	No
<b>Copy Option</b>	No
<b>Console Procedure</b>	Extensions→▶ or More→Grp Calling→Queue Alarm→Dial Calling Group ext. no.→Enter→Select Alarm Threshold 1 or Alarm Threshold 2 or Alarm Threshold 3→Drop→Dial no. of calls (1-99)→Enter→Back→Back
<b>PC Procedure</b>	F6→PgUp→F4→F6→Type Calling Group ext. no.→F10→Alt+P→Select Alarm Threshold 1 or Alarm Threshold 2 or Alarm Threshold 3→Type no. of calls (1-99)→F10→F5→F5

### Group Calling External Alert for Calls-In-Queue Alarm

Use this procedure to designate the external alert device used to notify Calling Group members when the number of calls in the queue reaches the programmed Threshold 3.

Only one external alert device can be designated for each Calling Group. Since the external alert signal is continuous, it is recommended that only light-type external alert devices be designated for the Calls-in-Queue alarm.

#### Summary: Group Calling External Alert for Calls-In-Queue Alarm

<b>Programmable by</b>	System Manager
<b>Mode</b>	All
<b>Idle Condition</b>	Not required
<b>Planning Form</b>	7d, Group Calling
<b>Factory Setting</b>	Not applicable
<b>Valid Entries</b>	Extension number
<b>Inspect</b>	No
<b>Copy Option</b>	No
<b>Console Procedure</b>	Extensions→▶ or More→Grp Calling→Xtnl Alert→Dial Calling Group ext. no.→Enter→Drop→Dial ext. no. for alert→Enter→Back→Back
<b>PC Procedure</b>	F6→PgUp→F4→F7→Type Calling Group ext. no.→F10→Alt+P→Type ext. no. for alert→F10→F5→F5

## Group Type

Use this procedure to determine whether or not the system automatically logs in members of a Calling Group after a power failure. This setting also determines the type of voice messaging interface when the Calling Group is used to connect voice messaging or Automated Attendant applications. The settings are listed below.

- **Automatic Log Out.** Used for Calling Groups to specify that the system does not automatically log in Calling Group members after a power failure. Calling Group members must manually log themselves into the group.
- **Automatic Log In.** Used for Calling Groups that consist of fax machines or data workstations (also called data hunt groups) to specify that the system automatically logs in Calling Group members after a power failure. This setting can also be used for Calling Groups consisting of telephones.
- **Integrated VMI.** Used when a voice messaging system that requires special signaling for integrated operation (for example, MERLIN Messaging, Intuity AUDIX, or IS III) is connected to one or more extension jacks assigned to a Calling Group. The system automatically logs in the group members after a power failure.
- **Generic VMI.** Used when a voice messaging system that does not need special signaling is connected to one or more extension jacks assigned to a Calling Group. The system automatically logs in the group members after a power failure.

**NOTE** ► Any port programmed as a VMI port is programmed with:

- Outward restriction on
- A factory set FRL of 0 (the most restrictive)
- A factory set Disallowed List (List 7) that includes the numbers frequently associated with fraud

If the System Manager changes a VMI port to non-VMI port, the restrictions are not turned off. To remove restrictions, the System Manager must change them through system programming.

### Summary: Group Type

<b>Programmable by</b>	System Manager
<b>Mode</b>	All
<b>Idle Condition</b>	Not required
<b>Planning Form</b>	7d, Group Calling
<b>Factory Setting</b>	Automatic Log Out
<b>Valid Entries</b>	Automatic login, Automatic logout, Integrated VMI, Generic VMI
<b>Inspect</b>	No
<b>Copy Option</b>	No



**Console Procedure**    Extensions→▶ or More→Grp Calling→More→ Group Type→Dial Calling Group ext. no.→Enter→Specify login type (Auto login, Auto logout, Integrated VMI, or Generic VMI)→ Enter→ Back→Back→Back

**PC Procedure**            F6 →PgUp →F4 →PgUp →F1 →Type Calling Group ext. no.→ F10→Specify login type (Auto login, Auto logout, Integrated VMI, or Generic VMI)→F10→F5→F5→F5

## Queue Control

The System Manager can control the maximum number of calls allowed in the primary Calling Group queue for calls that arrive on the following types of facilities:

- DID (Direct Inward Dialing), DIOD (Direct Inward and Outward Dialing), and dial-in TIE
- All calls transferred from a VMI (voice messaging interface) port
- Internal calls to the Calling Group
- Internal calls to the Calling Group through the QCC Position-Busy backup (PBB)
- Intrasystem calls to the Calling Group

When the number of the calls in queue reaches the programmed maximum, subsequent callers receive a busy signal.

Remote-access calls to a Calling Group, coverage calls directed to a Calling Group, and all outside/central office calls are not eligible for queue control.

Queue control does not apply to calls received directly on any of the following facilities:

- Loop-start lines
- Auto-in tie trunks
- E1 facilities emulating loop-start lines/trunks

When a call arrives on one of the above facilities, it is added to the Calling Group queue, even if that queue has reached or exceeded the programmed maximum number of calls. For example, if the maximum number of Calling Group calls is set to 40, and 40 calls have come in, subsequent callers on eligible facilities hear the busy tone. Calls that come in on a loop-start line, however, are added to the queue.

### Summary: Queue Control

<b>Programmable by</b>	System Manager
<b>Mode</b>	All
<b>Idle Condition</b>	Not required
<b>Planning Form</b>	7d, Group Calling
<b>Factory Setting</b>	99 calls

## System Programming

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<b>Valid Entries</b>	0–99 (0 indicates no calls are queued)
<b>Inspect</b>	No
<b>Copy Option</b>	No
<b>Console Procedure</b>	Extensions→  or More→Grp Calling→More→Queue Ctrl→Dial Calling Group ext. no.→Enter→ Dial no. of calls allowed in queue (0–99)→Enter→Back→ Back→Back
<b>PC Procedure</b>	 →  →  →  →  →Type Calling Group ext. no.→  →Type no. of calls allowed in queue (0–99)→  →  →  → 

## System Features

This section contains programming summaries for the optional system features that affect all or most system users and includes the following:

- Transfer Return Time
- One-Touch Transfer/Hold
- Transfer Audible
- Type of Transfer
- Camp-On Return Time
- Call Park Return Time
- Delay Ring Interval
- Automatic Callback Interval
- Extension Status
- SMDR Language
- SMDR Call Report Format
- SMDR Call Length
- SMDR Calls Recorded on Call Report
- SMDR Account Code Format
- SMDR Talk Time
- SMDR UDP Calls Recorded on Call Report
- Inside Dial Tone
- Reminder Service Cancel
- Redirect Outside Calls to Unassigned Extension Numbers
- Host System Dial Codes for Behind Switch Mode
- Recall Timer
- Interdigit Timers
- Allowed Lists
- Assign Allowed Lists to Extensions
- Disallowed Lists
- Assign Disallowed Lists to Extensions

## Transfer Return Time

Use this procedure to specify the number of times the telephone rings before a call transferred to another inside telephone is returned to the originator. A setting of 0 means that transferred calls are never returned to the originator.

**NOTE** ► The transfer return time should not be set to 0 in a system with single-line telephones.

### Summary: Transfer Return Time

<b>Programmable by</b>	System Manager
<b>Mode</b>	All
<b>Idle Condition</b>	Not required
<b>Planning Form</b>	8a, System Features
<b>Factory Setting</b>	4 rings
<b>Valid Entries</b>	0 to 9 rings
<b>Inspect</b>	No
<b>Copy Option</b>	No
<b>Console Procedure</b>	Options→Transfer→Return Time→Drop→ Dial no. of rings (0–9)→Enter→Back→Back
<b>PC Procedure</b>	<span>F7</span> → <span>F1</span> → <span>F1</span> → <span>Alt</span> + <span>P</span> →Type no. of rings (0– 9)→ <span>F10</span> → <span>F5</span> → <span>F5</span>

---

## One-Touch Transfer/One-Touch Hold

Use this procedure to assign either the One-Touch Transfer or One-Touch Hold feature.

One-Touch Transfer allows users to initiate transfers to another extension by pressing an Auto Dial or DSS button for that extension. If the One-Touch Transfer feature is assigned, you must also specify whether the transfer completion is manual (the user has to press another button to complete the transfer) or automatic (the transfer is completed automatically).

**NOTE** ► The One-Touch Transfer feature is not available on single-line telephones.

One-Touch Hold applies to incoming central office calls only. When the user presses an Auto Dial or DSS button to initiate a transfer, the outside caller is put on hold. The system automatically selects an intercom facility and dials the transfer destination. There is no transfer return function with this method. Consequently, if the transfer destination does not answer or is busy, the user who initiates the transfer must notify the outside caller, or the outside caller will remain on hold.

### Summary: One-Touch Transfer/Hold

<b>Programmable by</b>	System Manager
<b>Mode</b>	All
<b>Idle Condition</b>	Not required
<b>Planning Form</b>	8a, System Features
<b>Factory Setting</b>	One-Touch Transfer, automatic completion
<b>Valid Entries</b>	Transfer, Hold
<b>Inspect</b>	No
<b>Copy Option</b>	No
<b>Console Procedure</b>	<p>To program One-Touch Transfer:  Options→Transfer→One Touch→Transfer→  Enter→Select Manual or Automatic→Enter→Back→Back</p> <p>To program One-Touch Hold:  Options→Transfer→One Touch→Hold→Enter→Back→  Back</p>
<b>PC Procedure</b>	<p>To program One-Touch Transfer:  [F7] → [F1] → [F2] → [F1] → [F10] → Select Manual or Automatic →  [F10] → [F5] → [F5]</p> <p>To program One-Touch Hold:  [F7] → [F1] → [F2] → [F2] → [F10] → [F5] → [F5]</p>

## Transfer Audible

Use this procedure to specify whether an outside caller hears ringing (also called ringback) or Music-On-Hold while being transferred. Inside callers always hear ringback during a transfer.

- NOTES** ►
- 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 or Broadcast Music Incorporated). Magic On Hold requires no such license and can be purchased from Lucent Technologies.
  - When extensions are programmed to use the Centrex Transfer via Remote Call Forwarding feature, do not program Music-On-Hold as the transfer audible. If Music-On-Hold is programmed in this case, a caller being transferred hears a click, three seconds of Music-On-Hold, a second click, silence for about 10 seconds, then ringback or a busy tone from the central office. This can confuse callers, who may then hang up.

### Summary: Transfer Audible

<b>Programmable by</b>	System Manager
<b>Mode</b>	All
<b>Idle Condition</b>	Not required
<b>Planning Form</b>	8a, System Features
<b>Factory Setting</b>	Music-On-Hold
<b>Valid Entries</b>	Music-On-Hold, Ringback
<b>Inspect</b>	No
<b>Copy Option</b>	No
<b>Console Procedure</b>	Options→Transfer→Audible→Select Music-On-Hold or Ringback→Enter→Back→Back
<b>PC Procedure</b>	F7 → F1 → F3 → Select Music-On-Hold or Ringback → F10 → F5 → F5

---

## Type of Transfer

Use this procedure to specify whether the system automatically selects an Intercom or System Access Ring or Voice button when the Transfer button or an Auto Dial or DSS button (for One-Touch Transfer) is pressed.

**Summary: Type of Transfer**

<b>Programmable by</b>	System Manager
<b>Mode</b>	All
<b>Idle Condition</b>	Not required
<b>Planning Form</b>	8a, System Features
<b>Factory Setting</b>	Ring button (Intercom or System Access) is automatically selected
<b>Valid Entries</b>	Voice Announce, Ring
<b>Inspect</b>	No
<b>Copy Option</b>	No
<b>Console Procedure</b>	Options→Transfer→Type→Select Voice Announce or Ring→Enter→Back→Back
<b>PC Procedure</b>	[F7]→[F1]→[F4]→Select Voice Announce or Ring→ [F10]→[F5]→[F5]

---

**Camp-On Return Time**

Use this procedure to specify the number of seconds before a camped-on call (a call transferred to a busy telephone with the Camp-On feature) is returned to the originator.

**Summary Camp-On Return Time:**

<b>Programmable by</b>	System Manager
<b>Mode</b>	All
<b>Idle Condition</b>	Not required
<b>Planning Form</b>	6f, System Features
<b>Factory Setting</b>	90 seconds
<b>Valid Entries</b>	30 to 300 seconds, in 10-second increments
<b>Inspect</b>	No
<b>Copy Option</b>	No
<b>Console Procedure</b>	Options→CampOn→Drop→Dial no. of seconds (30–300)→Enter→Back
<b>PC Procedure</b>	[F7]→[F2]→[Alt]+[P]→Type no. of seconds (30–300)→[F10]→[F5]

## Call Park Return Time

Use this procedure to specify the number of seconds before a call put on hold with the Park feature is returned to the originator.

### Summary: Call Park Return Time

<b>Programmable by</b>	System Manager
<b>Mode</b>	All
<b>Idle Condition</b>	Not required
<b>Planning Form</b>	8a, System Features
<b>Factory Setting</b>	180 seconds
<b>Valid Entries</b>	30 to 300 seconds, in 10-second increments
<b>Inspect</b>	No
<b>Copy Option</b>	No
<b>Console Procedure</b>	Options→CallParkRtn→Drop→Dial no. of seconds (30–300)→Enter→Back
<b>PC Procedure</b>	<b>F7</b> → <b>F3</b> → <b>Alt</b> + <b>P</b> → Type no. of seconds (30–300) → <b>F5</b> → <b>F5</b>

---

## Automatic Callback Interval

Use this procedure to specify the number of times the telephone rings at the originator's telephone before the system cancels a Callback request.

### Summary: Automatic Callback Interval

<b>Programmable by</b>	System Manager
<b>Mode</b>	All
<b>Idle Condition</b>	Not required
<b>Planning Form</b>	8a, System Features
<b>Factory Setting</b>	3 rings
<b>Valid Entries</b>	1 to 6 rings
<b>Inspect</b>	No
<b>Copy Option</b>	No
<b>Console Procedure</b>	Options→Callback→Drop→Dial no. of rings (1–6)→Enter→Back
<b>PC Procedure</b>	<b>F7</b> → <b>F6</b> → <b>Alt</b> + <b>P</b> → Type no. of rings (1–6) → <b>F10</b> → <b>F5</b>

## Extension Status

Use this procedure to specify whether the Extension Status (ES) feature is used in Hotel mode or Group Calling Supervisor mode.

The calling mode affects the meaning of the LEDs and the use of Auto Dial or DSS buttons when the DLC operator position is in Extension Status mode.

In Hotel mode, telephones are restricted from making calls in Extension Status states 1 and 2 (ES1 and ES2). In Group Calling Supervisor mode, ES states reflect member or agent status without restricting the telephones. In the Group Calling Supervisor mode, the Extension Status feature is used by the agents to log in and out, and by the supervisor to see agent status.

### Summary: Extension Status

<b>Programmable by</b>	System Manager
<b>Mode</b>	All
<b>Idle Condition</b>	Not required
<b>Planning Form</b>	8a, System Features
<b>Factory Setting</b>	Group Calling Supervisor
<b>Valid Entries</b>	Group Calling Supervisor, Hotel mode
<b>Inspect</b>	No
<b>Copy Option</b>	No
<b>Console Procedure</b>	Options→Ext Status→Select Hotel or GrpCallSupv→ Enter→Back
<b>PC Procedure</b>	[F7]→[F7]→Select Hotel or GrpCallSupv→[F10]→[F5]

## SMDR Language

Use this procedure to change the language of the SMDR reports. The report language is initially set to the same as that set for the system language. See “System Language” on page 3-4.

### Summary: SMDR Language

<b>Programmable by</b>	System Manager
<b>Mode</b>	All
<b>Idle Condition</b>	Not required
<b>Planning Form</b>	1, System Planning
<b>Factory Setting</b>	U.S. English (matches System Language setting)

<b>Valid Entries</b>	U.S. English, Canadian French, Latin American Spanish, Brazilian Portuguese
<b>Inspect</b>	No
<b>Copy Option</b>	No
<b>Console Procedure</b>	More→Language→SMDR→Select language (U.S. English, Canadian French, Latin American Spanish, Brazilian Portuguese)→Enter→Back
<b>PC Procedure</b>	PgUp→F6→F3→Select language (U.S. English, Canadian French, Latin American Spanish, Brazilian Portuguese)→F10→F5

---

### SMDR Call Report Format

Use this procedure to specify whether the SMDR call reports are printed in Basic format or ISDN format. In ISDN format, Automatic Number Identification appears in the Calling Number field in place of IN (which appears in the Basic report format). The call recording type for these calls is I in ISDN format and C in Basic format.

ISDN format should be used only in conjunction with ANI or Caller ID service subscription.

#### Summary: SMDR Call Report Format

<b>Programmable by</b>	System Manager
<b>Mode</b>	All
<b>Idle Condition</b>	Not required
<b>Planning Form</b>	8a, System Features
<b>Factory Setting</b>	Basic format
<b>Valid Entries</b>	Basic, ISDN
<b>Inspect</b>	No
<b>Copy Option</b>	No
<b>Console Procedure</b>	Options→SMDR→Format→Select Basic SMDR or ISDN SMDR→Enter→Back→Back
<b>PC Procedure</b>	F7→F8→F1→Select Basic SMDR or ISDN SMDR→F10→F5→F5

---

## SMDR Call Length

Use this procedure to set the minimum time length of a call before it is recorded on SMDR call reports.

- NOTES** ■ The outbound call of a Centrex Transfer via Remote Call Forwarding call will not be recorded unless the minimum time length is set to zero (0). The inbound Centrex call to the Principle User who has Centrex Transfer via Remote Call Forwarding will also not be recorded unless the minimum time length is 0.

### Summary: SMDR Call Length

<b>Programmable by</b>	System Manager
<b>Mode</b>	All
<b>Idle Condition</b>	Not required
<b>Planning Form</b>	8a, System Features
<b>Factory Setting</b>	40 seconds
<b>Valid Entries</b>	0 to 255 seconds
<b>Inspect</b>	No
<b>Copy Option</b>	No
<b>Console Procedure</b>	Options→SMDR→Call Length→Drop→Dial no. of seconds (0–255)→Enter→Back→Back
<b>PC Procedure</b>	[F7]→[F8]→[F2]→[Alt]+[P]→Type no. of seconds (0–255)→[F10]→[F5]→[F5]

---

## SMDR Calls Recorded on Call Report

Use this procedure to specify whether SMDR information should be recorded for both incoming and outgoing calls or for outgoing calls only.

### Summary: SMDR Calls Recorded on Call Report

<b>Programmable by</b>	System Manager
<b>Mode</b>	All
<b>Idle Condition</b>	Not required
<b>Planning Form</b>	8a, System Features
<b>Factory Setting</b>	Incoming and outgoing
<b>Valid Entries</b>	In/Out, Out Only

<b>Inspect</b>	No
<b>Copy Option</b>	No
<b>Console Procedure</b>	Options→SMDR→Call Report→Select In/Out or Out Only→Enter→Back→Back
<b>PC Procedure</b>	F7→F8→F3→Select In/Out or Out Only→F10→F5→F5

---

## SMDR Account Code Format

For calls made using an authorization code, SMDR can be programmed to have either the “home extension” or the actual authorization codes recorded in the Account Code field if no Account Code is entered. Account Code overrides the Authorization Code entry in the SMDR record when both features are used.

### Summary: SMDR Account Code Format

<b>Programmable by</b>	System Manager
<b>Mode</b>	All
<b>Idle Condition</b>	Not required
<b>Planning Form</b>	6h, Authorization Codes
<b>Factory Setting</b>	Home Extension Number
<b>Valid Entries</b>	Home Extension Number, Authorization Code
<b>Inspect</b>	No
<b>Copy Option</b>	No
<b>Console Procedure</b>	Options→SMDR→Auth Code→Select Home Extension Number or Authorization Code→Enter→Back→Back
<b>PC Procedure</b>	F7→F8→F6→Select Home Extension Number or Authorization Code→F10→F5→F5

---

## SMDR Talk Time

The Talk field was added to the SMDR call record. The Talk field is designed for the MERLIN MAGIX Reporter application that is used to capture detailed information on incoming and outgoing voice and data calls with a special emphasis on Calling Groups. The Talk field contains the talk-time duration—the amount of time (59:59 maximum) that a Calling Group agent spends on an incoming call, including any actions that the agent takes while handling the call.

If your system includes an MERLIN MAGIX Reporter, the Talk Time option must be enabled. All other configurations must have the Talk Time option disabled.

**Summary: SMDR Talk Time**

<b>Programmable by</b>	System Manager
<b>Mode</b>	All
<b>Idle Condition</b>	Not required
<b>Planning Form</b>	8a, System Features
<b>Factory Setting</b>	Disabled
<b>Valid Entries</b>	Enable, Disable
<b>Inspect</b>	No
<b>Copy Option</b>	No
<b>Console Procedure</b>	Options→SMDR→Talk Time→Select Enable or Disable→Enter→Back→Back
<b>PC Procedure</b>	F7→F8→F7→Select Enable or Disable→F10→F5→F5

**Inside Dial Tone**

Use this procedure to set the inside (system) dial tone to be either different from, or the same as the outside line/trunk dial tone.

**NOTE** ► The inside dial tone must be the same as the outside dial tone when the internal dial tone is not recognized by software applications or modems.

**Summary: Inside Dial Tone**

<b>Programmable by</b>	System Manager
<b>Mode</b>	All
<b>Idle Condition</b>	Not required
<b>Planning Form</b>	8a, System Features
<b>Factory Setting</b>	Inside dial tone is different from outside dial tone
<b>Valid Entries</b>	Inside, Outside
<b>Inspect</b>	No
<b>Copy Option</b>	No
<b>Console Procedure</b>	Options→InsideDial→Select Inside or Outside→Enter→Back
<b>PC Procedure</b>	F7→F9→Select Inside or Outside→F10→F5

## Reminder Service Cancel

Use this procedure to set the time of day when all programmed Reminder Service calls are automatically cancelled.

To deactivate Reminder Service Cancel, erase the currently programmed time and do not enter a new time.

### Summary: Reminder Service Cancel

<b>Programmable by</b>	System Manager
<b>Mode</b>	All
<b>Idle Condition</b>	Not required
<b>Planning Form</b>	8a, System Features
<b>Factory Setting</b>	Not applicable
<b>Valid Entries</b>	0000 to 2359
<b>Inspect</b>	No
<b>Copy Option</b>	No
<b>Console Procedure</b>	To deactivate Reminder Service Cancel: Options→Reminder Srv→Drop→Enter→Back  To set Reminder Service Cancel time: Options→Reminder Srv→Drop→Dial time (0000–2359)→ Enter→Back
<b>PC Procedure</b>	To deactivate Reminder Service Cancel: F7 → F10 → Alt + P → F10 → F5  To set Reminder Service Cancel time: F7 → F10 → Alt + P → Type time (0000–2359) → F10 → F5

---

## Redirect Outside Calls to Unassigned Extension Numbers

Use this procedure to specify the extension number to receive redirected calls. Redirected calls include calls made to unassigned numbers by Remote Access users, by users on DID trunks (Hybrid/PBX only), or by users on dial-in tie trunks. Calls can be redirected to the following locations:

- QCC queue (Hybrid/PBX only)
- Another extension number
- A Calling Group

This setting does not affect calls received on DID trunks if you have specified that calls to unassigned DID extensions are to receive a fast busy signal. See “Invalid Destination” on page 3-61

### Summary: Redirect Outside Calls to Unassigned Extension Numbers

<b>Programmable by</b>	System Manager
<b>Mode</b>	All
<b>Idle Condition</b>	Not required
<b>Planning Form</b>	8a, System Features
<b>Factory Setting</b>	Extension number of primary operator
<b>Valid Entries</b>	QCC queue extension number, other extension number
<b>Inspect</b>	No
<b>Copy Option</b>	No
<b>Console Procedure</b>	To select QCC queue: Options→More→Unassigned→QCC Queue→Enter→Back  To select extension or Calling Group: Options→More→Unassigned→Select Extension or Grp Calling→Enter→Dial ext. no. or group no.→Enter→Back
<b>PC Procedure</b>	To select QCC queue: F7 → PgUp → F1 → F1 → F10 → F5  To select extension or Calling Group: F7 → PgUp → F1 → Select Extension or Grp Calling → Type ext. no. or group no. → F10 → F5

## Recall Timer

Use this procedure to designate the length of the timed flash that is sent when Recall is used to disconnect a call and get a new dial tone without hanging up. Both the interval of the timed flash and the way Recall works depend on the type of telephone and system operating mode.

The recall timer should be reset if multiline telephone users experience either of the following problems:

- Nothing happens when the user presses the Recall button on an outside call. This indicates that the interval is too short and should be increased to 650 milliseconds or one second.
- In a system operating in Behind Switch mode, the call is disconnected when the user presses the Recall button on an outside call. This indicates that the interval is too long and should be decreased to 350 milliseconds.

### Summary: Recall Timer

<b>Programmable by</b>	System Manager
<b>Mode</b>	All
<b>Idle Condition</b>	Not required
<b>Planning Form</b>	8a, System Features
<b>Factory Setting</b>	450 ms
<b>Valid Entries</b>	350 ms, 450 ms, 650 ms, 1 second
<b>Inspect</b>	No
<b>Copy Option</b>	No
<b>Console Procedure</b>	Options→More→RecallTimer→Select time (350 ms, 450 ms, 650 ms, or 1 second)→Enter→Back
<b>PC Procedure</b>	[F7]→[PgUp]→[F3]→Select time (350 ms, 450 ms, 650 ms, or 1 second)→[F10]→[F5]

---

## Interdigit Timers

Programming for interdigit timers is reserved for Lucent Technologies technical support personnel or authorized dealers.

Interdigit timers are used by the MERLIN MAGIX Integrated System to determine when a user originating an outside call has completed dialing the digits. The information is necessary to allow the system to perform subsequent operations. You should not change the factory settings for interdigit timers unless instructed to do so by Lucent Technologies technical support or by an authorized dealer.

---

## Allowed Lists

Use this procedure to establish Allowed Lists. These lists are telephone numbers that can be dialed from specified telephones, regardless of any calling restrictions assigned to the telephones.

A maximum of eight lists (numbered 0 through 7) with a maximum of 10 numbers each (numbered 0 through 9) are allowed. Each allowed number can be no more than six digits (an area code plus an exchange) or six digits with a leading 1, where required.

If you program 0 as the first digit of a list entry, any Toll Restriction assigned to the extension is removed for calls that can be placed by a toll operator.

Special characters (such as Pause) are not permitted in Allowed List entries.

### Summary: Allowed Lists

<b>Programmable by</b>	System Manager
<b>Mode</b>	All
<b>Idle Condition</b>	Not required
<b>Planning Form</b>	6g, Call Restriction Assignments and Lists
<b>Factory Setting</b>	Not applicable
<b>Valid Entries</b>	Area code/exchange (1- to 6-digits with leading 1, if necessary)
<b>Inspect</b>	No
<b>Copy Option</b>	No
<b>Console Procedure</b>	Tables→AllowList→Dial list no. (0–7) and entry no. (0–9)→ Enter→Drop→Dial no.→Enter→Back
<b>PC Procedure</b>	<span>F8</span> → <span>F1</span> →Type list no. (0–7) and entry no. (0–9)→ <span>F10</span> → <span>Alt+P</span> →Type no.→ <span>F10</span> → <span>F5</span>

---

## Assign Allowed Lists to Extensions

Use this procedure to assign individual extensions access to established Allowed Lists. More than one Allowed List can be assigned to an extension.

### Summary: Assign Allowed Lists to Extensions

<b>Programmable by</b>	System Manager
<b>Mode</b>	All
<b>Idle Condition</b>	Not required
<b>Planning Form</b>	6g, Call Restriction Assignments and Lists

<b>Factory Setting</b>	Not applicable
<b>Valid Entries</b>	0 to 7
<b>Inspect</b>	Yes
<b>Copy Option</b>	Yes
<b>Console Procedure</b>	Tables→AllowTo→Dial list no. (0-7)→Enter→Dial ext. no.→Enter→Back→Back
<b>PC Procedure</b>	<span style="border: 1px solid black; padding: 2px;">F8</span> → <span style="border: 1px solid black; padding: 2px;">F2</span> → Type list no. (0-7) → <span style="border: 1px solid black; padding: 2px;">F10</span> → Type ext. no. → <span style="border: 1px solid black; padding: 2px;">F10</span> → <span style="border: 1px solid black; padding: 2px;">F5</span> → <span style="border: 1px solid black; padding: 2px;">F5</span>

---

## Disallowed Lists

Use this procedure to establish Disallowed Lists. These lists are telephone numbers that cannot be dialed from specified extensions (including unrestricted extensions).

A maximum of eight lists (numbered 0 through 7) with 10 entries each (numbered 0 through 9) is allowed. Each number can have a maximum of 11 digits, including wildcards. The Pause character (entered by pressing the Hold button) is used to designate a wildcard character—for example, to indicate that calls to a given exchange are restricted in every area code.



### SECURITY ALERT:

*Create a Disallowed List or use the pre-prepared Disallowed List number 7 to disallow dialing 0, 11, 10, 1700, 1809, 1900, and 976 or 1(wildcard)976. Lucent Technologies recommends that you add any other numbers in your country that should be restricted. Assign all voice mail port extensions to this Disallowed List. Lucent Technologies recommends assigning Disallowed List number 7. This is an added layer of security in case outward restriction is inadvertently removed. (Voice messaging ports are assigned, 3 by default, to Disallowed List number 7.)*

### Summary: Disallowed Lists

<b>Programmable by</b>	System Manager
<b>Mode</b>	All
<b>Idle Condition</b>	Not required
<b>Planning Form</b>	6g, Call Restriction Assignments and Lists
<b>Factory Setting</b>	List #7, containing the following: 0, 10, 11, 1809, 1700, 1900, 976, 1ppp976 (p = wildcard), *
<b>Valid Entries</b>	1- to 11-digits (including wildcards)
<b>Inspect</b>	No
<b>Copy Option</b>	No
<b>Console Procedure</b>	Tables→Disallow→Dial list no.(0-7) and entry no. (0-9)→Enter→Drop→Dial no.→Enter→Back



**PC Procedure**      **F8** → **F3** → Type list no. (0–7) and entry no. (0–9) → **F10** → **Alt** + **P** →  
 Type no. → **F10** → **F5**

## Assign Disallowed Lists to Extensions

Use this procedure to assign established Disallowed Lists to individual extensions. Each restricted extension can be assigned to more than one list.

### Summary: Assign Disallowed Lists to Extensions

<b>Programmable by</b>	System Manager
<b>Mode</b>	All
<b>Idle Condition</b>	Not required
<b>Planning Form</b>	6g, Call Restriction Assignments and Lists
<b>Factory Setting</b>	Not applicable
<b>Valid Entries</b>	0 to 7
<b>Inspect</b>	Yes
<b>Copy Option</b>	Yes
<b>Console Procedure</b>	Tables → DisallowTo → Dial list no. (0–7) → Enter → Dial ext. no. → Enter → Back → Back
<b>PC Procedure</b>	<b>F8</b> → <b>F4</b> → Type list no. (0–7) → <b>F10</b> → Type ext. no. → <b>F10</b> → <b>F5</b> → <b>F5</b>

## Remote Access Features

This section covers the following Remote Access features:

- Remote Access Trunk Assignment
- Remote Access Automatic Callback
- Remote Access without Barrier Codes
- Remote Access Barrier Codes
- Remote Access with Barrier Codes

### SECURITY ALERT:

*As a customer of a new system, you should be aware that telephone fraud has become an increasingly prevalent problem. It 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, or breaking into someone else's telephone equipment*

*physically or electronically. In certain instances, unauthorized individuals make connections to the public switched network through the use of Remote Access features.*

*The Remote Access feature of your system, if you choose to use 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 acknowledgment signaling the user to key in his or her barrier code, which is selected and programmed by the System Manager. After the barrier code is accepted, the system returns dial tone to the user. If you do not program specific 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 helps the customer, through proper administration, to minimize the ability of unauthorized persons to gain access to the network. Most commonly, telephone 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 program the various restriction levels, and protect 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 when 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. Lucent Technologies 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 system, follow these basic rules:*

- *Use a nonpublished Remote Access number.*
- *Assign barrier 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 barrier codes, which are less likely to be broken.*
- *Deactivate all unassigned codes promptly.*
- *Ensure that Remote Access users are aware of their responsibility to keep the telephone number and any barrier codes secure.*
- *When possible, restrict the off-network capability of off-premises callers using the Calling 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.*
- *Always use the longest length password allowed on the system.*
- *Passwords should consist of a random, non-repetitive, hard-to-guess sequence of digits.*

## Remote Access Trunk Assignment

Use this procedure to assign or remove the trunks used for Remote Access. You can also use this procedure to specify whether the Remote Access feature is dedicated (always used for Remote Access) or shared (used for Remote Access only when Night Service is activated).

Trunks used for dedicated Remote Access must not be assigned to ring into a Calling Group or the QCC queue (Hybrid/PBX mode only).

In Hybrid/PBX mode, if a trunk assigned to ring into the QCC queue is also used for shared Remote Access, perform the procedure below before you attempt the procedure “QCC Operator to Receive Calls” on page 3-36.

**NOTE** ► A loop-start line must be programmed for Reliable Disconnect if it is to be used for Remote Access (See “Disconnect Signaling Reliability” on page 3-24).

### Summary: Remote Access Trunk Assignment

<b>Programmable by</b>	System Manager
<b>Mode</b>	All
<b>Idle Condition</b>	Not required
<b>Planning Form</b>	3a, Incoming Trunks: Remote Access
<b>Factory Setting</b>	Remote Access is not assigned
<b>Valid Entries</b>	Dedicated, Shared, No Remote
<b>Inspect</b>	Yes
<b>Copy Option</b>	No
<b>Console Procedure</b>	LinesTrunks→RemoteAccss→LinesTrunks→ Dial line/trunk no.→Enter→specify how trunk is used (Dedicated, Shared, No Remote)→Enter→Back→Back
<b>PC Procedure</b>	[F4]→[F8]→[F1]→Type line/trunk no.→[F10]→ specify how trunk is used (Dedicated, Shared, No Remote)→[F10]→ [F5]→[F5]

## Remote Access Automatic Callback

Use this procedure either to allow Remote Access users to use the Automatic Callback feature to request busy lines/trunks or pools or to prevent use of the Automatic Callback feature.

**NOTE** ► This feature applies to Hybrid/PBX mode only.

**Summary: Remote Access Automatic Callback**

<b>Programmable by</b>	System Manager
<b>Mode</b>	Hybrid/PBX
<b>Idle Condition</b>	Not required
<b>Planning Form</b>	3a, Incoming Trunks: Remote Access
<b>Factory Setting</b>	Disable
<b>Valid Entries</b>	Disable, Enable
<b>Inspect</b>	No
<b>Copy Option</b>	No
<b>Console Procedure</b>	LinesTrunks→RemoteAccss→AutoQueuing→Select Enable Or Disable→Enter→Back→Back
<b>PC Procedure</b>	[F4]→[F8]→[F6]→Select Enable or Disable→[F10]→[F5]→[F5]

**Remote Access without Barrier Codes**

Use this procedure to change the class of restriction for one of the following:

- All non-tie lines/trunks
- All tie trunks and DID/DIOD trunks with Remote Access
- DID/DIOD Remote Access code



**SECURITY ALERT:**

*Your system will be highly susceptible to toll fraud if you activate the Remote Access feature without barrier codes.*

**NOTE** ► If barrier code requirements have been established for Remote Access users, use “Remote Access with Barrier Codes” on page 3-140; do *not* use this procedure.

The class of restriction assigned may be one of the following:

- **Restriction.** Determines whether Remote Access users can make local and/or toll calls and includes the following settings:
  - Unrestricted
  - Toll Restricted
  - Outward Restricted
- **ARS Facility Restriction Level** (Hybrid/PBX only). Allows or disallows use of outgoing trunks by assigning a facility restriction level from 0 through 6. The FRL ranges from 0 (most restrictive) to 6 (least restrictive). The FRL value assigned here is the opposite of the FRL value assigned to the ARS route, where a value of 0 is the least restrictive and a value of 6 is the most restrictive.

- **Allowed Lists Assignment.** Assigns Allowed Lists and is used when Remote Access users are restricted from making local or toll calls.
- **Disallowed Lists Assignment.** Assigns Disallowed Lists and is used when Remote Access users are not restricted from making local or toll calls.

A maximum of eight Allowed or Disallowed Lists can be assigned to lines/trunks.

Class of restriction settings are assigned either to all non-tie trunks or to all tie trunks and DID/DIOD trunks. They cannot be assigned to each trunk on an individual basis.

### Summary: Remote Access without Barrier Codes

<b>Programmable by</b>	System Manager
<b>Mode</b>	All
<b>Idle Condition</b>	Not required
<b>Planning Form</b>	3a, Incoming Trunks: Remote Access
<b>Factory Setting</b>	Call restriction: Outward restricted ARS restriction level: 3
<b>Valid Entries</b>	Unrestricted, Toll Restricted, Outward Restricted; 0 to 6
<b>Inspect</b>	No
<b>Copy Option</b>	No
<b>Console Procedure</b>	<p>To change calling restrictions:                      LinesTrunks→RemoteAccss→Select Non-TIE or TIE Lines→Restriction→Select restriction→Enter→Back→Back→Back→Back</p> <p>To change ARS Facility Restriction Level:                      LinesTrunks→RemoteAccss→Select Non-TIE or TIE Lines→ARS Restrict→Drop→Dial FRL value→Enter→Back→Back→Back→Back</p> <p>To assign/remove Allowed Lists:                      LinesTrunks→RemoteAccss→Select Non-TIE or TIE Lines→Allow List→Dial list no.→Enter→Back→Back→Back→Back</p> <p>To assign/remove Disallowed Lists:                      LinesTrunks→RemoteAccss→Select Non-TIE or TIE Lines→DisallowLst→Dial list no.→Enter→Back→Back→Back→Back</p>
<b>PC Procedure</b>	<p>To change calling restrictions:                      [F4]→[F8]→Select Non-TIE or TIE Lines→[F2]→Select restriction→[F10]→[F5]→[F5]→[F5]→[F5]</p> <p>To change ARS Facility Restriction Level:                      [F4]→[F8]→Select Non-TIE or TIE Lines→[F3]→[Alt]+[P]→Type FRL value→[F10]→[F5]→[F5]→[F5]→[F5]</p>

To assign/remove Allowed Lists:

F4 → F8 → Select Non-TIE or TIE Lines → F4 → Type list no. →  
F5 → F5 → F5 → F5

To assign/remove Disallowed Lists:

F4 → F8 → Select Non-TIE or TIE Lines → F6 → Type list no. →  
F10 → F5 → F5 → F5 → F5

---

## Remote Access Barrier Codes

Use this procedure to establish or remove barrier code requirements, as well as to establish or remove the barrier codes themselves.

Barrier codes are security passwords that restrict users from making unauthorized Remote Access calls on tie and non-tie lines and trunks. Callers are allowed three attempts per call to enter the correct Remote Access barrier code. If the caller enters an incorrect barrier code or times out during code entry, the caller hears the retry tone. The caller can erase an entered code by dialing \*\* (two asterisks). Code erasure is counted as one of the three permitted attempts. After three unsuccessful attempts, the caller hears a reorder tone and the call is disconnected. If this happens, the SMDR contains sixteen 0s in the Account Code field to flag the three failed attempts.

A maximum of 16 barrier codes are allowed for all lines/trunks. Each of the 16 barrier codes may be programmed with its own class of restriction (COR).

The system-wide barrier code length can range from a minimum of 4 characters to a maximum of 11 characters. The factory setting length is 7. If you enter a length that is less than 4 or greater than 11, the entry is erased and the previous entry displays on the screen. When the barrier code length is changed, all barrier codes are erased and must be reassigned. If the barrier code length is changed and barrier codes are not reassigned, users can dial into Remote Access trunks and enter a barrier code, but are denied access into the Remote Access trunks no matter what code is entered.

### SECURITY ALERT:

*Always use the longest length barrier code allowed on the system. The code should consist of a random, non-repetitive, hard-to-guess sequence of digits.*

The time and date of the most recent change made to the system-wide barrier code length is shown during the system programming procedure, as well as on the Remote Access DISA Information report. The SMDR record for incoming Remote Access trunks includes the barrier code IDs established in this procedure.

Use numbers 0 through 9 and the asterisk (\*) to enter the barrier codes. The codes cannot start with an asterisk and cannot contain two consecutive asterisks. (The use of two consecutive asterisks is reserved for users to erase an incorrect barrier code entry.)

See “Remote Access without Barrier Codes” on page 3-136 to allow or deny use of system features for each barrier code assigned.

**Summary: Remote Access Barrier Codes**

<b>Programmable by</b>	System Manager
<b>Mode</b>	All
<b>Idle Condition</b>	Not required
<b>Planning Form</b>	3a, Incoming Trunks: Remote Access
<b>Factory Setting</b>	No barrier codes are established
<b>Valid Entries</b>	Not applicable
<b>Inspect</b>	No
<b>Copy Option</b>	No
<b>Console Procedure</b>	<p>To establish or remove code requirements:  LinesTrunks→RemoteAccss→Select Non-TIE or TIE Lines→BarrierCode→Specify whether barrier codes are required→Enter→Back→Back→Back</p> <p>To change barrier code length:  LinesTrunks→RemoteAccss→BarrierCode→Code Info→Code Length→Drop→Dial code length→Enter→Yes→Back→Back→Back</p> <p>To change barrier code:  LinesTrunks→RemoteAccss→BarrierCode→Code Info→Code Entry→Dial code ID→Enter→Drop→Dial code→Enter→Back→Back→Back</p>
<b>PC Procedure</b>	<p>To establish or remove code requirements:  [F4]→[F8]→Select Non-TIE or TIE Lines→[F1]→Specify whether barrier codes are required→[F10]→[F5]→[F5]→[F5]</p> <p>To change barrier code length:  [F4]→[F8]→[F4]→[F2]→[F1]→[Alt]+[P]→Type code length→[F10]→[F2]→[F5]→[F5]→[F5]</p> <p>To change barrier code:  [F4]→[F8]→[F4]→[F2]→[F2]→Type Code ID→[F10]→[Alt]+[P]→Dial code length→[F10]→[F5]→[F5]→[F5]</p>

## Remote Access with Barrier Codes

Use this procedure to change the class of restriction for individual Remote Access barrier codes. The class of restriction assigned to each barrier code allows or denies the use of the following system features:

- **Restriction.** Determines whether Remote Access users can make local and/or toll calls, and includes the following settings:
  - Unrestricted
  - Toll Restricted
  - Outward Restricted
- **ARS Facility Restriction Level** (Hybrid/PBX only). Allows or restricts use of outgoing trunks by assigning a facility restriction level (FRL) from 0 through 6. The FRL ranges from 0 (most restrictive) to 6 (least restrictive). The FRL value assigned here is the opposite of the FRL value assigned to the ARS route, where a value of 0 is the least restrictive and a value of 6 is the most restrictive.
- **Allowed Lists Assignment.** Assigns Allowed Lists and is used when Remote Access users are restricted from making local or toll calls.
- **Disallowed Lists Assignment.** Assigns Disallowed Lists and is used when Remote Access users are not restricted from making local or toll calls.

A maximum of eight Allowed or Disallowed Lists can be assigned to each barrier code. Class of restriction settings apply to individual barrier codes.

**NOTE** ► If barrier code requirements have not been established or have been removed for Remote Access users, do not use this procedure. See “Remote Access without Barrier Codes” on page 3-136.

### Summary: Remote Access with Barrier Codes

<b>Programmable by</b>	System Manager
<b>Mode</b>	All
<b>Idle Condition</b>	Not required
<b>Planning Form</b>	3a, Incoming Trunks: Remote Access
<b>Factory Setting</b>	Calling restrictions: Barrier Code: outward restricted All other barrier codes: unrestricted ARS restriction level: 3
<b>Valid Entries</b>	Unrestricted, Toll Restricted, Outward Restricted; 0 to 6
<b>Inspect</b>	No
<b>Copy Option</b>	No



- Console Procedure**    LinesTrunks→RemoteAccss→BarrierCode→  
Restriction→Dial barrier code no.→Enter→Select restriction→  
Enter→ARS Restrict→Dial barrier code no.→Enter→Drop→  
Dial FRL value→Enter→Select Allow List or Disallow List→  
Dial barrier code no. (1–16)→Enter→Dial list no.→Enter→  
Back→Back→Back→Back
- PC Procedure**        [F4]→[F8]→[F4]→[F3]→Type barrier code no.→[F10]→  
Select restriction→[F10]→[F4]→Type barrier code no. (1–16)→  
[F10]→[Alt]+[P]→Type FRL value→[F10]→Select Allow List or  
Disallow List→Dial barrier code no.→[F10]→[F5]→[F5]→[F5]→  
[F5]

## Call Progress Tones

Call Progress Tones are those specific tones (at a particular frequency and cadence) that are sent to the public network central office and/or to the outside party or MERLIN MAGIX user (depending upon who initiates the call) by the MERLIN MAGIX system.

The following call progress tones can be programmed:

- **Outside Dialtone**—what the user expects to hear when originating an outside call through the public network central office.
- **Inside Dialtone**—what the MERLIN MAGIX user expects to hear when originating an inside call to a MERLIN MAGIX extension.
- **Ringback**—what the user expects to hear if a call is routed successfully to an endpoint (such as a telephone extension or QCC queue).
- **DID/TIE Ringback**—what the user expects to hear if a call is routed successfully to an endpoint using DID/TIE facilities.
- **Reorder**—(also known as fast-busy or congestion tone) what the user expects to hear when dialing is correct but resources may not be available (for example, facilities in a pool).
- **Number Unobtainable**—what the user expects to hear when using DID or TIE lines and dialing an invalid destination.
- **Busy**—what the user expects to hear when dialing is correct but the destination has no resources (such as System Access buttons) to answer the call.
- **Intercept**—what the MERLIN MAGIX user expects to hear when dialing an invalid endpoint.

Each of the above programmable call progress tones can consist of up to five individual steps, with each step consisting of up to three elements.

**Summary: Call Progress Tones**

<b>Programmable by</b>	System Manager
<b>Mode</b>	All
<b>Idle Condition</b>	Not required
<b>Factory Setting</b>	<i>Outside Dial Tone:</i> 1. Continuous, 350/440 Hz <i>Inside Dial Tone:</i> 1. Continuous, 350/1050/1750 Hz <i>Ringback:</i> 1. On, 440/480 Hz, 1000 ms 2. Off, No Tone, 3000 ms 3. Go back 2 <i>DID/TIE Ringback:</i> 1. On, 440/480 Hz, 1000 ms 2. Off, No Tone, 3000 ms 3. Go back 2 <i>Reorder:</i> 1. On, 480/620 Hz, 250 ms 2. Off, No Tone, 250 ms 3. Go back 2 <i>Number Unobtainable:</i> 1. On, 480/620 Hz, 250 ms 2. Off, No Tone, 250 ms 3. Go back 2 <i>Busy:</i> 1. On, 480/620 Hz, 500 ms 2. Off, No Tone, 500 ms 3. Go back 2 <i>Intercept:</i> 1. On, 440 Hz, 250 ms 2. On, 620 Hz, 250 ms 3. Go back 2



<b>Valid Entries</b>	Action: On, Off, Continuous, No action, Go back 2, Go back 3, Go back 4 Frequency: 440 Hz, 620 Hz, 350/440 Hz, 440/480 Hz, 480/620 Hz, 350/1050/1750 Hz, No Tone Duration: 25 to 6375 ms in 25-ms increments
<b>Inspect</b>	Yes
<b>Copy Option</b>	No

Tables 3-4 and 3-5 provide information on valid options for current action settings and valid next actions that are used in the following procedures.

**Table 3-4. Valid Selections for Further Programming**

Current Action	Action	Frequency	Duration
Continuous	X	X	
On	X	X	X
Off	X		X
Go Back 2	X		
Go Back 3	X		
Go Back 4	X		
No Action	X		

**Table 3-5. Valid Next Actions**

Action	Continuous	On	Off	Go Back 2	Go Back 3	Go Back 4	No Action
Continuous							X
On	X	X	X	X	X	X	
Off	X	X		X	X	X	
Go Back 2							X
Go Back 3							X
Go Back 4							X
No Action							X



**Console Procedure** Options→More→More→Call Tones→Select the tone you want to program (the tone you selected appears at the top of each screen in the procedure)→Dial step no. (1-5)→Enter→Action→Select action (refer to Table 3-4 and Table 3-5 for valid entries)→Frequency→Select frequency value (refer to Table 3-4 and Table 3-5 for valid entries)→Enter→Duration→Select duration (refer to Table 3-4 and Table 3-5 for valid entries)→Enter→Back→Back→Back→Back→Back→Back

**PC Procedure** [F7]→[PgUp]→[PgUp]→[F9]→Select the tone you want to program (the tone you selected appears at the top of each screen in the procedure)→Type step no. (1-5)→[F10]→[F1]→Select action (refer to Table 3-4 and Table 3-5 for valid entries)→[F10]→Select frequency value (refer to Table 3-4 and Table 3-5 for valid entries)→[F10]→[F3]→Select duration (refer to Table 3-4 and Table 3-5 for valid entries)→[F10]→[F5]→[F5]→[F5]→[F5]

## Automatic Route Selection

This section contains programming procedures for the following Automatic Route Selection (ARS) features:

- 1 + 7-Digit Dialing Requirements
- ARS Tables
- Start and Stop Times for Subpatterns
- Pool Routing
- Facility Restriction Level (FRL)
- Digit Absorption
- Other Digits
- Dial 0 Table
- Voice and/or Data Routing

**NOTE** ► ARS applies to Hybrid/PBX mode only.

---

## 1 + 7-Digit Dialing Requirements

Use this procedure for calls placed within the same (home) area code as the system. The procedure allows you to specify whether or not the local telephone company requires a 1 to precede the 7-digit number. The two available settings are:

- **Within Area Code.** Requires that a 1 plus a 7-digit number must be dialed; the system checks the 1 plus 7-digit tables for routing.
- **Not within Area Code.** Does not require that a 1 precede the 7-digit number (the system does this automatically).

### Summary: 1 + 7-Digit Dialing Requirements

<b>Programmable by</b>	System Manager
<b>Mode</b>	Hybrid/PBX
<b>Idle Condition</b>	Not required
<b>Planning Form</b>	3f, Automatic Route Selection Tables
<b>Factory Setting</b>	Not within area code
<b>Valid Entries</b>	Not within area code, Within area code
<b>Inspect</b>	No
<b>Copy Option</b>	No
<b>Console Procedure</b>	Tables→ARS→ARS 1+7Dial→Select Within Area Code or Not within Area Code→Enter→Back→Back
<b>PC Procedure</b>	<input type="button" value="F8"/> → <input type="button" value="F6"/> → <input type="button" value="F1"/> →Select Within Area Code or Not within Area Code→ <input type="button" value="F10"/> → <input type="button" value="F5"/> → <input type="button" value="F5"/>

---

## ARS Tables

Use this procedure for the following tasks:

- To specify type of table (6-digit, area code, exchange, or 1 plus 7-digit number)
- To add or change area codes to be included in each table
- To add or change exchanges to be included in each table

A maximum of 16 tables can be established, numbered 1 through 16. Each table can have a maximum of 100 entries, numbered 1 through 100. Tables 17 and 18, the Default Toll and Default Local tables respectively, cannot be changed.

The first entry in a 6-digit table must be the area code. Subsequent entries consist of exchanges within that area code.

Area code tables can contain only area codes.

Exchange and 1 plus 7-digit tables can contain only exchanges.

The wildcard character (Pause) cannot be used to enter area codes or exchanges in ARS tables.

### Summary: ARS Tables

<b>Programmable by</b>	System Manager
<b>Mode</b>	Hybrid/PBX
<b>Idle Condition</b>	Not required
<b>Planning Form</b>	3f, Automatic Route Selection Tables
<b>Factory Setting</b>	Not applicable
<b>Valid Entries</b>	Not applicable
<b>Inspect</b>	Yes
<b>Copy Option</b>	No
<b>Console Procedure</b>	Tables→ARS→ARS Input→Dial table no.→Enter→Specify table type→Enter→Dial entry no.→Enter→Drop→Dial no.→Enter→Back→Back
<b>PC Procedure</b>	<b>F8</b> → <b>F6</b> → <b>F2</b> →Type table no.→ <b>F10</b> →Select table type→ <b>F10</b> →Type entry no.→ <b>F10</b> → <b>Alt</b> + <b>P</b> →Type no.→ <b>F10</b> → <b>F5</b> → <b>F5</b>

---

### Start and Stop Times for Subpatterns

Use this procedure to specify the time of day that calls are routed using Subpattern B routing information.

Subpatterns are used to provide two different routing patterns according to the time of day. This allows you to take advantage of lower rates that may apply to some or all lines, or to change restrictions on some facilities during off hours.

The stop time for Subpattern B is the start time for Subpattern A.

Enter the time in 4-digit, 24-hour notation, using leading zeros as necessary.

### Summary: Start and Stop Times for Subpatterns

<b>Programmable by</b>	System Manager
<b>Mode</b>	Hybrid/PBX
<b>Idle Condition</b>	Not required
<b>Planning Form</b>	3f, Automatic Route Selection Tables 3g, Automatic Route Selection Default and Special Numbers Tables



<b>Factory Setting</b>	No time is specified, thus all calls are routed according to Subpattern A.
<b>Valid Entries</b>	0000 to 2359
<b>Inspect</b>	No
<b>Copy Option</b>	No
<b>Console Procedure</b>	Tables→ARS→Sub B Start→Dial table no.→Enter→Drop→Dial start time (0000–2359)→Enter→Sub B Stop→Dial table no.→Enter→Drop→Dial stop time→Enter→Back→Back
<b>PC Procedure</b>	[F8]→[F6]→[F8]→Type table no.→[F10]→[Alt]+[P]→Type start time (0000–2359)→[F10]→[F8]→Type table no.→[F10]→[Alt]+[P]→Type stop time→[F10]→[F5]→[F5]

---

## Pool Routing

Use this procedure to identify the trunk pools on which to route calls to area codes and/or exchanges included in ARS tables.

A maximum of six routes (numbered 1 through 6) can be specified for each subpattern. Pool routing is programmed for Tables 1 through 16. Tables 17 and 18, the Default Toll and Default Local tables respectively, are factory set to the main pool and can be changed.

### Summary: Pool Routing

<b>Programmable by</b>	System Manager
<b>Mode</b>	Hybrid/PBX
<b>Idle Condition</b>	Not required
<b>Planning Form</b>	3f, Automatic Route Selection Tables 3g, Automatic Route Selection Default and Special Numbers Tables
<b>Factory Setting</b>	Not applicable
<b>Valid Entries</b>	Not applicable
<b>Inspect</b>	No
<b>Copy Option</b>	No
<b>Console Procedure</b>	Tables→ARS→Sub A Pools or Sub B Pool→Dial table no. and pool route no.→Enter→Dial pool dial-out code→Enter→Back→Back
<b>PC Procedure</b>	[F8]→[F6]→[F3] or [F10]→Type table no. and pool route no.→[F10]→Type pool dial-out code→[F10]→[F5]→[F5]

## Facility Restriction Level

Use this procedure to assign a Facility Restriction Level (FRL) to each route. The FRL ranges from 0 (least restrictive) to 6 (most restrictive) and is used to restrict user access to the route. The FRL assigned to extensions and Remote Access users is the opposite of the FRL assigned to routes, where 0 is the most restrictive and 6 is the least restrictive.

**NOTE** ► Pool routes must be programmed before you assign Facility Restriction Levels.

Facility Restriction Levels are assigned to Tables 1 through 18. Tables 17 and 18, the Default Toll and Default Local tables respectively, cannot be changed.

### Summary: Facility Restriction Level

<b>Programmable by</b>	System Manager
<b>Mode</b>	Hybrid/PBX
<b>Idle Condition</b>	Not required
<b>Planning Form</b>	3f, Automatic Route Selection Tables 3g, Automatic Route Selection Default and Special Numbers Tables
<b>Factory Setting</b>	3 (Table 18, the Default Local table has a factory setting of 2)
<b>Valid Entries</b>	0 to 6
<b>Inspect</b>	No
<b>Copy Option</b>	No
<b>Console Procedure</b>	Tables→ARS→Sub A FRL  or More and Sub B FRL→ Dial table no. (1–18) and pool route no. (1–6)→Enter→ Dial restriction level (0–6)→Enter→Back→Back
<b>PC Procedure</b>	 →  →  or  and  →Type table no. (1–18) and pool route no. (1–6)→  →Type restriction level (0–6)→  →  → 

---

## Digit Absorption

Use this procedure to specify how many of the digits dialed (0 through 11) by the caller should be absorbed (not sent to the telephone company's central office) by the system when a call is made on an identified route.

Entries of 1 through 11 indicate that the system should not send the specified number of digits, starting with the first digit dialed by the user after the dial-out code.

Digit absorption is assigned to Tables 1 through 18.

**Summary: Digit Absorption**

<b>Programmable by</b>	System Manager
<b>Mode</b>	Hybrid/PBX
<b>Idle Condition</b>	Not required
<b>Planning Form</b>	3f, Automatic Route Selection Tables
<b>Factory Setting</b>	0
<b>Valid Entries</b>	0 to 11
<b>Inspect</b>	No
<b>Copy Option</b>	No
<b>Console Procedure</b>	Tables→ARS→SubA Absorb or  or More and SubB Absorb→Dial table no. (1–18) and pool route no. (1–6)→Enter→Drop→Dial no. of digits to absorb (0–11)→Enter→Back→Back
<b>PC Procedure</b>	 →  →  or  and  →Type table no. (1–18) and pool route no. (1–6)→  →  +  →Type no. of digits to absorb (0–11)→  →  → 

**Other Digits**

Use this procedure to specify other (extra) digits that must be added by the system to the beginning of the number dialed by the caller when calls are placed on an identified route.

A maximum of 20 digits can be added in any combination of the digits 0 through 9.

Special characters such as switchhook flash, Stop, and # cannot be included as extra digits. Pause is allowed in every position but the first.

Other digits are assigned to Tables 1 through 18.

**Summary: Other Digits**

<b>Programmable by</b>	System Manager
<b>Mode</b>	Hybrid/PBX
<b>Idle Condition</b>	Not required
<b>Planning Form</b>	3f, Automatic Route Selection Tables
<b>Factory Setting</b>	0
<b>Valid Entries</b>	Up to 20 digits (any combination of 0 to 9)
<b>Inspect</b>	No
<b>Copy Option</b>	No

**Console Procedure** Tables→ARS→Sub A Digit or **►** or More and Sub B Digit→Dial table no. (1–18) and pool route no. (1–6)→Enter→Drop→Dial digits to be added (up to 20 digits; any combination of 0–9)→Enter→Back→Back

**PC Procedure** **F8**→**F6**→**F7** or **PgUp** and **F3**→Type table no. (1–18) and pool route no. (1–6)→**F10**→**Alt**+**P**→ Type digits to be added (up to 20 digits; any combination of 0–9)→**F10**→**F5**→**F5**

## Dial 0 Table

Use this procedure to specify pool routing, FRL, and Other Digits for the Dial 0 table.

Only one route can be specified. The Subpattern B route cannot be specified for this table, and digit absorption cannot be specified.

### Summary: Dial 0 Table

<b>Programmable by</b>	System Manager
<b>Mode</b>	Hybrid/PBX
<b>Idle Condition</b>	Not required
<b>Planning Form</b>	3g, Automatic Route Selection Default and Special Numbers Tables
<b>Factory Setting</b>	3
<b>Valid Entries</b>	0 to 6
<b>Inspect</b>	No
<b>Copy Option</b>	No
<b>Console Procedure</b>	Tables→ARS→ <b>►</b> or More→Dial 0→Select ARS Pool or ARS FRL (0–6) or ARS Digits→Dial value→Enter→Back→Back→Back
<b>PC Procedure</b>	<b>F8</b> → <b>F6</b> → <b>PgUp</b> → <b>F6</b> →Select ARS Pool or ARS FRL (0–6) or ARS Digits→Type value→ <b>F10</b> → <b>F5</b> → <b>F5</b> → <b>F5</b>

---

## Voice and/or Data Routing

Use this procedure to route voice, data, or voice and data. The voice/data specification is not supported with MERLIN MAGIX Release 1.0i.

### Summary: Voice and/or Data Routing

<b>Programmable by</b>	System Manager
<b>Mode</b>	Hybrid/PBX
<b>Idle Condition</b>	Not required
<b>Planning Form</b>	3g, Automatic Route Selection Default and Special Numbers Tables
<b>Factory Setting</b>	Voice
<b>Valid Entries</b>	Voice Only, Data Only, Voice/Data
<b>Inspect</b>	No
<b>Copy Option</b>	No
<b>Console Procedure</b>	Tables→ARS→▶ or More→Sub A Data or Sub B Data→Dial table no. and route no.→Enter→Select capability (Voice Only, Data Only, or Voice/Data)→Enter→Back→Back
<b>PC Procedure</b>	[F8]→[F6]→PgUp→[F7] or [F8]→Type table no. and route no.→[F10]→Select capability (Voice Only, Data Only, or Voice/Data)→[F10]→[F5]→[F5]

## Night Service

The procedures in this section cover how to program the following optional Night Service features:

- Night Service Group Assignment
- Night Service with Outward Restriction
- Night Service with Time Set
- Night Service with Coverage Control

---

### Night Service Group Assignment

Use this procedure to assign extensions and Calling Groups to a Night Service group for coverage after hours.

A maximum of eight Night Service groups can be assigned (no more than one for each operator position assigned). Any number of extensions can be assigned to a Night Service group, and an extension can belong to more than one group.

A Calling Group can also be assigned to a Night Service group.

This option allows the System Manager to assign outside lines to Night Service groups in addition to extensions and Calling Groups for coverage after hours.

Any number of outside lines can be assigned to a Night Service group. Each outside line can belong to more than one group.

### Summary: Night Service Group Assignment

<b>Programmable by</b>	System Manager
<b>Mode</b>	All
<b>Idle Condition</b>	Not required
<b>Planning Form</b>	9a, Night Service: Group Assignment
<b>Factory Setting</b>	Not applicable
<b>Valid Entries</b>	Not applicable
<b>Inspect</b>	Yes (extensions only)
<b>Copy Option</b>	No
<b>Console Procedure</b>	<p>To assign a Calling Group to a Night Service group: NightSrvce→GroupAssign→Calling Group→Dial ext. no. of Night Service operator→Enter→Dial Calling Group no.→Enter→Back→Back</p> <p>To assign an extension to a Night Service group: NightSrvce→GroupAssign→Extensions→Dial ext. no. of Night Service operator→Enter→Dial no. of extension→Enter→Back→Back</p> <p>To assign an outside line to a Night Service group: NightSrvce→GroupAssign→Lines→Dial ext. no. of Night Service operator→Enter→Dial outside line number (801–880)→Enter→Back→Back</p>
<b>PC Procedure</b>	<p>To assign a Calling Group to a Night Service group: F10→F1→F2→Type ext. no. of Night Service operator→F10→Type Calling Group no.→F10→F5→F5</p> <p>To assign an extension to a Night Service group: F10→F1→F1→Type ext. no. of Night Service operator→F10→Type no. of extension→F10→F5→F5</p> <p>To assign an outside line to a Night Service group: F10→F1→F3→Type ext. no. of Night Service operator→F10→Type outside line number (801–880)→F10→F5→F5</p>

## Night Service with Outward Restriction

Use this procedure to prevent unauthorized use of telephones after hours. This feature requires the user to enter a password to make a call when Night Service is activated, unless one of the lists below applies. It also requires an operator to enter a password in order to activate Night Service manually.

To remove the password requirement, follow the procedure below and delete the current password (press the Drop button).

This procedure is also used to establish the following lists:

- **Emergency Allowed List.** A list of telephone numbers that can be dialed without a password.
- **Exclusion List.** A list of extensions that are exempt from password requirements.

A maximum of 10 telephone numbers can be included on the Emergency Allowed List, each number with a maximum of 12 digits.

Extensions included in the Exclusion List keep normal call restrictions (if any are assigned); however, they are not protected in any other way from unauthorized use after hours.

### Summary: Night Service with Outward Restriction

<b>Programmable by</b>	System Manager
<b>Mode</b>	All
<b>Idle Condition</b>	Not required
<b>Planning Form</b>	9b, Night Service: Outward Restrictions
<b>Factory Setting</b>	No password
<b>Valid Entries</b>	Four digits (any combination of 0 to 9)
<b>Inspect</b>	Yes (Exclusion List)
<b>Copy Option</b>	No
<b>Console Procedure</b>	NightSrvce→OutRestrict→Drop→Dial password (4 digits; 0–9)→Enter→Emergency→Dial item no.→Enter→Drop→Dial telephone no.→Enter→ExcludeList→Dial ext. no.→Enter→Back→Back
<b>PC Procedure</b>	<b>F10</b> → <b>F2</b> → <b>Alt</b> + <b>P</b> →Type password (4 digits; 0–9)→ <b>F10</b> → <b>F3</b> →Type item no.→ <b>F10</b> → <b>Alt</b> + <b>P</b> →Type telephone no.→ <b>F10</b> → <b>F4</b> →Type ext. no.→ <b>F10</b> → <b>F5</b> → <b>F5</b>

## Night Service with Time Set

Use this procedure to specify the time of day and the days of the week when Night Service is to be activated and deactivated.

Enter the time of day as four digits, using 24-hour notation. Enter the day of the week as a single digit (0 to 6), with 0 being Sunday. If you enter an invalid number, the system truncates the number.

If you change the system time while Night Service is active, Night Service is deactivated automatically and you must manually reactivate it.

Operators can override the timer and turn Night Service on and off manually. This feature can be deactivated when out-of-the-ordinary situations occur (for example, a midweek holiday).

If system programming information is being loaded into memory from a backup diskette, the current day of the week must be reset.

Night Service can be turned off by using the following procedure:

NightSrvce→Day of Week→Dial 9→Enter→Back

### Summary: Night Service with Time Set

<b>Programmable by</b>	System Manager
<b>Mode</b>	All
<b>Idle Condition</b>	Not required
<b>Planning Form</b>	9c, Night Service: Time Set
<b>Factory Setting</b>	Not applicable
<b>Valid Entries</b>	Day: 0 to 6; Time: 0000 to 2359
<b>Inspect</b>	No
<b>Copy Option</b>	No
<b>Console Procedure</b>	To add or change start/stop time: NightSrvce→Start→Drop→Dial start day (0–6) and time (0000–2359)→Enter→Stop→Drop→Dial stop day and time→Enter→Back  To activate/deactivate: NightSrvce→Time Control→Off or On→Enter→Back
<b>PC Procedure</b>	To add or change start/stop time: F10 → F6 → Alt + P → Type start day (0–6) and time (0000–2359) → F10 → F7 → Alt + P → Type stop day (0–6) and time (0000–2359) → F10 → F5  To activate/deactivate: F10 → F8 → F1 or F2 → F10 → F5

## Night Service with Coverage Control

Use this procedure to enable or disable the Night Service Coverage Control option to automatically control the status of programmed Coverage VMS Off buttons.

When the Coverage Control option is enabled, a transition into Night Service (either by pressing a Night Service button or automatically by the Time Set option) automatically deactivates the VMS Coverage Off buttons (LED is off) and allows outside calls to go to VMS Coverage at night. When the system is taken out of Night Service (either by pressing a Night Service button or automatically by the Time Set option), programmed VMS Coverage Off buttons are activated (LED is on) and outside calls are prevented from going to VMS Coverage during the day.

When the Coverage Control option is disabled, Night Service status has no effect on programmed VMS Coverage Off buttons.

### Summary: Night Service with Coverage Control

<b>Programmable by</b>	System Manager
<b>Mode</b>	All
<b>Idle Condition</b>	Not required
<b>Planning Form</b>	9c, Night Service: Options
<b>Factory Setting</b>	Disabled
<b>Valid Entries</b>	Enable or Disable
<b>Inspect</b>	No
<b>Copy Option</b>	No
<b>Console Procedure</b>	NightSrvce→CoverContrl→Select Enable or Disable→Enter→Back
<b>PC Procedure</b>	F10→F9→Select Enable or Disable→F10→F5

## Labeling

The procedures in this section cover how to add or change labels for the following:

- Extension Directory
- Lines or Trunks
- Posted Message
- Group Calling
- System Speed Dial Directory

Programming on the system programming console:

## System Programming

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Use the buttons next to the display to specify the letters A through I and punctuation. Use the line/feature buttons to specify additional alphanumeric characters for labels. Use the template provided with the 4424LD+ or MLX-20L telephone to see which line buttons correspond to which alphanumeric characters.

Programming with WinSPM:

- Use the PC keyboard for labels. All letters appear on the screen in uppercase.

**NOTE** ► See the *4424LD+ User's Guide* or the *MLX-20L User's Guide* for instructions on creating or editing a personal directory.

---

## Extension Directory

Use this procedure to establish alphanumeric system labels for display telephone users to identify the person calling or leaving a message. This procedure is also used to program the Extension Directory feature for the 4412D+, 4424D+, and 4424LD+ Telephones and for the MLX telephones.

**NOTE** ► A label can have a maximum of seven characters.

### Summary: Extension Directory

<b>Programmable by</b>	System Manager
<b>Mode</b>	All
<b>Idle Condition</b>	Not required
<b>Planning Form</b>	2a, System Numbering: Extension Jacks
<b>Factory Setting</b>	Not applicable
<b>Valid Entries</b>	Not applicable
<b>Inspect</b>	No Copy Option No
<b>Console Procedure</b>	► or More → Labeling → Directory → Extension → Dial ext. no. → Enter → Drop → Enter label → Enter → Back → Back → Back
<b>PC Procedure</b>	PgUp → F1 → F1 → F2 → Type ext. no. → F10 → Alt + P → Type label → F6 → F5 → F5 → F5

---

## Lines or Trunks

Use this procedure to establish alphanumeric system labels for display telephone users to identify the line or trunk being used.

### Summary: Lines or Trunks

<b>Programmable by</b>	System Manager
<b>Mode</b>	All
<b>Idle Condition</b>	Not required
<b>Planning Form</b>	2c, System Numbering: Line/Trunk Jacks
<b>Factory Setting</b>	Not applicable
<b>Valid Entries</b>	Not applicable
<b>Inspect</b>	No
<b>Copy Option</b>	No
<b>Console Procedure</b>	▶ or More→Labeling→LinesTrunks→Dial line/trunk no.→Enter→Drop→Enter label→Enter→Back→Back
<b>PC Procedure</b>	PgUp→F1→F2→Type line/trunk no.→F10→Alt+P→Type label→F6→F5→F5

---

## Posted Message

Use this procedure to add or change existing posted messages. The posted messages allow callers with display telephones to know why the called extension does not answer.

Each posted message can have a maximum of 16 characters. Messages 2 through 20 can be changed through programming. Message 1, Do Not Disturb, cannot be changed.

### Summary: Posted Messages

<b>Programmable by</b>	System Manager
<b>Mode</b>	All
<b>Idle Condition</b>	Not required
<b>Planning Form</b>	8a, Label Form: Posted Message
<b>Factory Setting</b>	First 10 messages
<b>Valid Entries</b>	1 to 20
<b>Inspect</b>	No
<b>Copy Option</b>	No

<b>Console Procedure</b>	<b>[▶]</b> or More → Labeling → PostMessage → Dial message no. (1–20) → Enter → Drop → Enter message → Enter → Back → Back
<b>PC Procedure</b>	<b>[PgUp]</b> → <b>[F1]</b> → <b>[F3]</b> → Type message no. (1–20) → <b>[F10]</b> → <b>[Alt]</b> + <b>[P]</b> → Type message → <b>[F6]</b> → <b>[F5]</b> → <b>[F5]</b>

---

## Group Calling

Use this procedure to establish alphanumeric system labels for display telephone users to identify Calling Groups.

A label can have a maximum of seven characters.

### Summary: Group Calling

<b>Programmable by</b>	System Manager
<b>Mode</b>	All
<b>Idle Condition</b>	Not required
<b>Planning Form</b>	6e, Group Calling
<b>Factory Setting</b>	Not applicable
<b>Valid Entries</b>	Not applicable
<b>Inspect</b>	No
<b>Copy Option</b>	No
<b>Console Procedure</b>	<b>[▶]</b> or More → Labeling → Grp Calling → Dial Calling Group ext. no. → Enter → Drop → Enter label → Enter → Back → Back
<b>PC Procedure</b>	<b>[PgUp]</b> → <b>[F1]</b> → <b>[F4]</b> → Type Calling Group ext. no. → <b>[F10]</b> → <b>[Alt]</b> + <b>[P]</b> → Type label → <b>[F6]</b> → <b>[F5]</b> → <b>[F5]</b>

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## System Speed Dial Directory

Use this procedure to establish System Speed Dial numbers for all system users. You can also use this procedure to enter the alphanumeric labels shown on display telephones (for the System Directory feature of the MLX telephone).

A total of 130 System Speed Dial numbers can be entered, with a maximum of 11 characters per label.

Speed dial code assignments are 600 through 729.

**Summary: System Speed Dial Directory**

<b>Programmable by</b>	System Manager
<b>Mode</b>	All
<b>Idle Condition</b>	Not required
<b>Planning Form</b>	8b, System Speed Dial
<b>Factory Setting</b>	Not applicable
<b>Valid Entries</b>	600 to 729
<b>Inspect</b>	No
<b>Copy Option</b>	No
<b>Console Procedure</b>	<p>▶ or More → Labeling → Directory → System → Dial dial code no. (600–729) → Enter → Drop → Enter label → Enter → Backspace → Dial telephone no. (up to 20 digits and special characters) → Enter → Yes or No → Enter → Back → Back → Back</p>
<b>PC Procedure</b>	<p>PgUp → F1 → F1 → F1 → Type dial code no. (600–729) → F10 → Alt+P → Type label → F6 → F2 → Type telephone no. (up to 20 digits and special characters) → F6 → F1 or F2 → F6 → F5 → F5 → F5</p>

**Print Reports**

Use the procedures in this section to change the language for system reports and to print the system reports.

**Report Language**

Use this procedure to change the language of the system reports. Unless you change the report language, reports are printed in the language chosen as the system language.

**Summary: Report Language**

<b>Programmable by</b>	System Manager
<b>Mode</b>	All
<b>Idle Condition</b>	Not required
<b>Planning Form</b>	1, System Planning
<b>Factory Setting</b>	U.S. English
<b>Valid Entries</b>	U.S. English, Canadian French, Latin American Spanish, or Brazilian Portuguese
<b>Inspect</b>	No

<b>Copy Option</b>	No
<b>Console Procedure</b>	<b>►</b> or More→Language→Printer→Select English or French or Spanish or Portuguese→Enter→Back
<b>PC Procedure</b>	PgUp→F6→F4→Select English or French or Spanish or Portuguese→F10→F5

---

## Printing System Reports

The system can be used to print a variety of reports. You can print individual reports or use the All option to print the entire set of available reports, including all report sections and options.

Use this procedure to print the reports listed below. With the exception of Trunk Information, the dash lists under the bullets show the sections of each report that automatically print when the report option is selected.

- All
  - Each report
  - All report options
- System Set Up
- System Dial Plan
  - Pools
  - Telephone Paging Zones
  - Direct Group Calling
  - Lines/Trunks
  - Stations (Extensions)
- Label Information
  - Telephone Personal Directory
  - Message Numbers and Posted Messages
- Trunk Information<sup>1</sup>
  - TIE
  - DID
  - Loop
  - General
- E1 Information

---

<sup>1</sup> Trunk option must be specified

- Remote Access
  - General Options
  - Non-TIE Restrictions
  - TIE Restrictions
  - Barrier Code Restrictions
- Operator Information
  - Position
  - General Options
  - DSS Options
  - QCC Operators
  - Operator Information
- Allowed Lists
- Allowed Lists Assigned to Extensions
- Disallowed Lists
- Disallowed Lists Assigned to Extensions
- Automatic Route Selection
- Tables
- Extension Directory
- System Directory
- Group Page
- Extension Information
- Group Coverage
- Group Calling
- Night Service
- Call Pickup Groups
- Error Logs
- Authorization Codes
- BRI Information Report
- Non-Local Dial Plan
- Service Observing Groups

**NOTE** ► If you select the All option, keep in mind that the reports take from 30 minutes to 6 hours to print depending on the size of the system. You may want to schedule use of the printer during off-peak hours.

If you select a report for which there is no information, the report header still prints.

Print reports if you cannot back up your system programming information.

Do not print reports if your system must handle more than 100 calls per hour.

If you are printing from the console, your printer must be connected to the SMDR port. If you are programming on a PC with WinSPM, you have the following choices:

- Print reports on the SMDR printer (if available)
- Print reports on the PC printer
- Save reports (on hard disk or floppy)
- View reports (browse)

See Chapter 2, "Programming with WinSPM," for details.

### Summary: Printing System Reports

<b>Programmable by</b>	System Manager
<b>Mode</b>	All
<b>Idle Condition</b>	Not required
<b>Planning Form</b>	Not applicable
<b>Factory Setting</b>	Not applicable
<b>Valid Entries</b>	Any saved report
<b>Inspect</b>	No
<b>Copy Option</b>	No
<b>Console Procedure</b>	To print trunk information: ▶ or More→Print→Trunk Info→Select trunk type→Back  To print extension information: ▶ or More→Print→More→Ext Info→Dial extension no.→ Enter→Back  To print all other reports: ▶ or More→Print→Select report→Back
<b>PC Procedure</b>	To print trunk information: PgUp→F3→F6→Select trunk type→F5  To print extension information: PgUp→F3→PgUp→F10→Type extension no.→F10→F5  To print all other reports: PgUp→F3→Select report→F5  To save report on disk: PgUp→F3→Select report→F10→Select GOTO FLOPPY→F10  To view report: Ctrl+F8

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## Memory Card

A PCMCIA (Personal Computer Memory Card International Association) interface slot is present on the processor module. The slot is a standard interface through which information can be added to or obtained from the system using a memory card. The PCMCIA interface slot accepts one memory card at a time.

This section covers the following memory card functions:

- Memory Card Formatting
- Backup
- Automatic Backup
- Restore

---

## Card Types

The types of memory cards are described below. The card type is identified by a preprinted, color-coded label.

- **Upgrade Card.** This card is used for MERLIN MAGIX Integrated System software upgrades. The upgrade can be performed by the System Manager using the memory card and the Maintenance option on the SPM Main menu. See *Maintenance and Troubleshooting* for information about this feature.

This card is identified by an orange label with black lettering.

- **Translation Card.** The backup and restore procedures previously available to System Managers through SPM (using the PC and floppy disks) can now be performed using the memory card and the new Backup/Restore option on the System menu. A new automatic backup feature permits you to set the system to perform automatic backups to the memory card on a daily or weekly basis. See “Backup” on page 3-168 and “Restore” on page 3-173 for more information.

This card is identified by a white label with black lettering.

- **Forced Installation.** For use by qualified service technicians only, this card is used when the system software has been corrupted and a re-installation must be done at the customer site. The use of the card for forced installation is reserved for emergency situations in which the system software on the processor module has been damaged.

This card is identified by an orange label with black lettering. In addition, black stripes are present on the card to distinguish it from an upgrade card.

Figure 3-4 shows a sample Translation card.

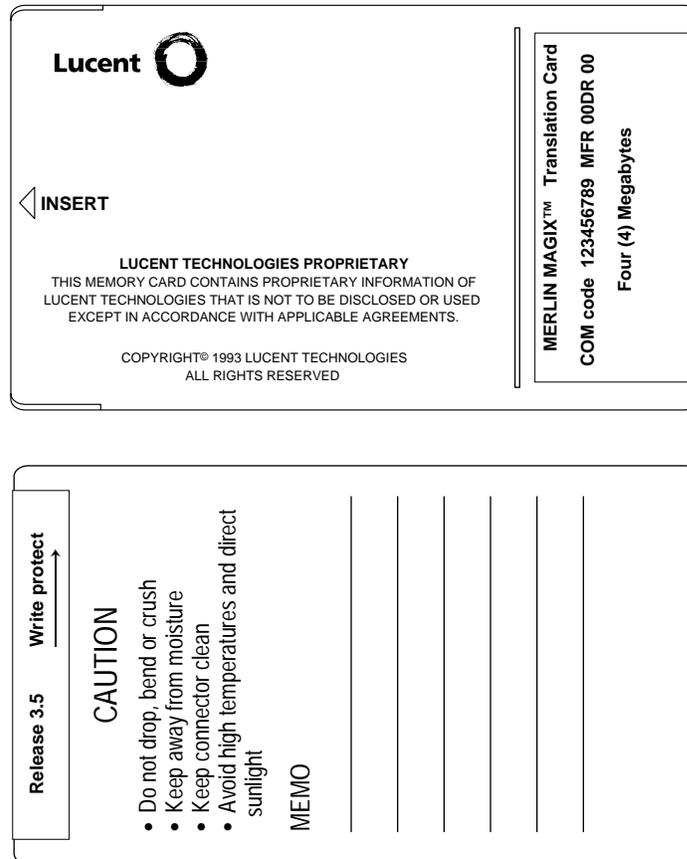


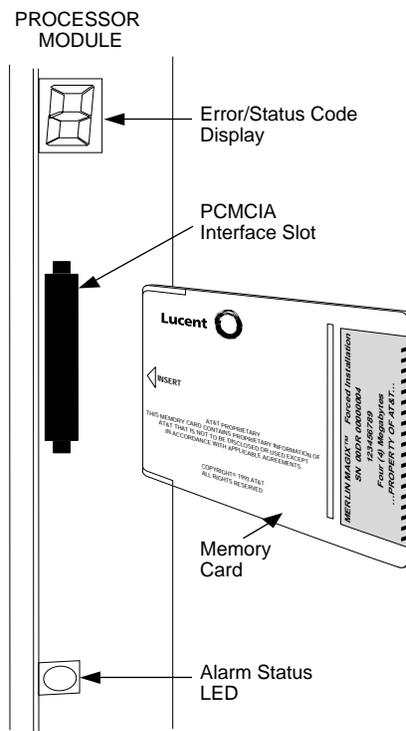
Figure 3-4. PCMCIA Memory Card

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## Inserting the Card

To insert the card, hold the card with the Lucent logo facing up and the arrow pointing toward the slot. See Figure 3-5 for the proper way to insert the memory card into the slot on the processor module.

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**Figure 3-5. Inserting the Memory Card**

## Memory Card Formatting

The memory card may have to be formatted before you begin any manual or automatic backup procedures. This section details the screens and messages that appear during the format procedure.

 **CAUTION:**

*Formatting overwrites previous data on the memory card. Make certain that there is no important information on the card before you begin formatting.*

### Unformatted Card

Memory Card Backup:  
Inserted Memory Card is  
not the correct type.  
Do you want it formatted?  
Yes  
No  
Back

If you begin a backup procedure with an unformatted or incorrectly formatted card, the above screen appears.

The inserted memory card is not the correct type. You have the option of formatting the memory card as a translation memory card or repeating the backup procedure with a different memory card.

- NOTES** ►
- Only 4 MB Series I or Series II PCMCIA memory cards may be formatted, except those already formatted as translation cards.
  - If a memory card cannot be formatted, a message appears on screen. These messages are noted in the procedures as appropriate.
  - A memory card may need to be formatted if it is intended for use as a translation card but is currently blank or contains data other than MERLIN MAGIX Integrated System backup files.

## Format Warning

Format Memory Card:  
 All data on card will be  
 DELETED.  
 Do you want to continue?  
 Yes  
 No  
 Back

This screen appears if you respond to the system prompt to format the memory card.

Select **Yes** (or click **F3**) to begin the memory card format. Table 3-6 lists the screen messages that may appear while formatting is in progress.

**Table 3-6. Memory Card Formatting Messages**

Message	What it Means
Formatting Memory Card	The format is in progress.
Formatting of Memory Card Completed	The format was successful and has completed.
Memory Card cannot be formatted	The memory card cannot be formatted. Remove the card and repeat the procedure with another card.
Formatting of Memory Card FAILED	The format was unsuccessful. Remove the card and repeat the procedure with another card.
Missing Card or Card Not Inserted Correctly	Verify that the card is inserted correctly and repeat the procedure.

If Exit (on the 4424LD+ Telephone), Home (on the MLX-20L telephone) or Menu (on both telephones) is pressed during a format procedure, the format is terminated. The data on the memory card may be lost. See Chapter 1, “Programming Basics,” for details about these keys.

## Backup

Use this procedure to make a copy of your customized system data. You should create a backup at least three times during system installation (so that programmed information is not lost) and once after each system upgrade, service technician visit, or major system reconfiguration.

The Inspect feature (Inspct or **PgDn**) is available to view the attributes of the backup files on the memory card prior to initiating the backup procedure. The attributes included on the Inspect screen are the filename, the time and date of the file creation/update, the location of the system programming port, and information about the system software release from which the backup was made.

The list of backup files contains three manual backup filenames and two automatic backup filenames. The factory set names of the manual backup files are BACK1.\*\*\*\*, BACK2.\*\*\*\*, and BACK3.\*\*\*\*. When you select one of the backup filenames, the system automatically replaces the \* in the filename with the current month and day (mddd). For example, BACK1.0116 would appear if you selected BACK1.\*\*\*\* and performed the backup procedure on January 16. You can rename any of the three files during the backup procedure. The automatic backup filenames are AUTO.BACK1 and AUTO.BACK2. You cannot change the names of these files.

If you enter a filename that currently exists, the message *File already exists* appears. You must enter another filename.

While the backup is in progress, you cannot access system programming functions, your Personal Directory, or alarm clock functions (any programmed alarms are temporarily deactivated). You may terminate the backup procedure at any point prior to receiving confirmation of a successful backup.

If any type of programming is taking place at another extension when you begin the backup procedure, the backup is cancelled and the number of the first busy extension appears on the screen. Attempt the backup procedure again when the busy extension becomes idle.

If the system is turned off during a backup procedure, the backup is terminated. The system performs a System Reset (cold start), after which you may repeat the backup procedure.

If Exit (on the 4424LD+ Telephone), Home (on the MLX-20L telephone) or Menu (on both telephones) is pressed during a backup procedure, the backup is terminated. This may result in the deletion of an old backup file. See Chapter 1, "Programming Basics," for details about these keys.

**NOTE** ► If the system performs a System Erase (frigid start), all programming is set to the factory-set values. If a previous backup file is available, perform a restore. If not, the system must be reprogrammed. See "Restore" on page 3-173 for information about the system restore procedure. Also see "Backup Messages" on page 3-171 for information about errors that may occur during the backup procedure.

**Summary: Backup**

<b>Programmable by</b>	System Manager
<b>Mode</b>	All
<b>Idle Condition</b>	Not required (No extensions are allowed to be in programming mode except system programming console)
<b>Planning Form</b>	1, System Planning
<b>Factory Setting</b>	Not applicable
<b>Valid Entries</b>	1- to 11-character filename
<b>Inspect</b>	Yes
<b>Copy Option</b>	No
<b>Console Procedure</b>	Insert memory card→System→Back/Restore→Backup→ Select backup file→Dial the new backup filename→Enter→Yes→ Back→Back→Back
<b>PC Procedure</b>	Insert memory card→ <b>F1</b> → <b>F9</b> → <b>F1</b> →Select backup file→ Type the new backup filename→ <b>F6</b> → <b>F1</b> → <b>F5</b> → <b>F5</b> → <b>F5</b>

**Automatic Backup**

To preserve the most recent copy of your customized system data, you can program the system to automatically backup programming information onto the translation memory card. Automatic backups may be set for daily or weekly operation. If automatic backup is activated, the time may be set for daily backup (factory setting is 2:00 am) or the time and day may be set for weekly backup (factory setting is 2:00 am Sunday).

The system places the automatic backup into one of two designated files: AUTO.BACK1 and AUTO.BACK2. If both files are empty, the system places the backup in AUTO.BACK1. If both files already contain backups, the system selects the older of the two files and overwrites it. The system performs this file "toggle" each time it performs an automatic backup.

While the backup is in progress, you cannot access system programming functions, your Personal Directory, or alarm clock functions (any programmed alarms are temporarily deactivated).

If any type of programming is taking place at an extension during the automatic backup procedure, the backup is cancelled. The system does not re-attempt the backup.

If an automatic backup fails for any reason (including a system-busy condition), all of the programmed alarm buttons on system operator consoles light and the information is recorded in both the permanent error log and the last 10 error logs. The system does not re-attempt the backup.

Also see “Backup Messages” on page 3-171 for information about errors that may occur during the automatic backup procedure.

**NOTE** ► If an automatic backup fails for any reason (except when the failure results because the memory card is write-protected), the automatic backup feature is turned off. Follow the procedure below to reprogram automatic backups.

### Summary: Automatic Backup

<b>Programmable by</b>	System Manager
<b>Mode</b>	All
<b>Idle Condition</b>	Not required (No extensions are allowed to be in programming mode, including the system programming console)
<b>Planning Form</b>	1, System Planning
<b>Factory Setting</b>	Weekly backup: Sunday at 2:00 am (if daily backup is selected, time is factory set for 2:00 am)
<b>Valid Entries</b>	Daily: hhmm (00 to 23; 00 to 59) Weekly: dhhmm (0 to 6; 00 to 23; 00 to 59)
<b>Inspect</b>	No
<b>Copy Option</b>	No
<b>Console Procedure</b>	To program daily backup: Insert memory card → System → Back/Restore → Auto Backup → Daily → Drop → Dial time (00–23; 00–59) → Enter → Back → Back  To program weekly backup: Insert memory card → System → Back/Restore → Auto Backup → Weekly → Drop → Dial day and time (0–6; 00–23; 00–59) → Enter → Back → Back
<b>PC Procedure</b>	To program daily backup: Insert memory card → <b>F1</b> → <b>F9</b> → <b>F2</b> → <b>F2</b> → <b>Alt</b> + <b>P</b> → Type time (00–23; 00–59) → <b>F10</b> → <b>F5</b> → <b>F5</b>  To program weekly backup: Insert memory card → <b>F1</b> → <b>F9</b> → <b>F2</b> → <b>F3</b> → <b>Alt</b> + <b>P</b> → Type day and time (0–6; 00–23; 00–59) → <b>F10</b> → <b>F5</b> → <b>F5</b>

---

## Backup Messages

During manual or automatic backup procedures, additional screens may appear to alert you to problems with the translation memory card, the backup file, or the backup procedure. This section contains displays of each screen and information about what to do if the screen appears.

**NOTE** ► The screens shown in this section are from the manual backup procedure; however, the screens that may appear in both the manual and automatic backup procedures are similar. The screens in both procedures differ only in the appearance of the first line. On the automatic backup screens, Auto Memory Card Backup replaces Memory Card Backup shown on the screens below.

### Backup Cancelled

If the system detects an error, either on the Memory Card or with the backup file, or if you terminate the backup, this screen appears.

```
Backup x:
BACKUP IS CANCELLED.
File has been DELETED.

Back
```

x = backup filename

The backup file being created is deleted and the backup is terminated. You must repeat the backup procedure.

### Card Removed While Backup Is in Progress

The Memory Card is not inserted or is inserted incorrectly while a backup is in progress. The backup file that was being created is deleted and the backup is terminated. You must reinsert the Memory Card and repeat the backup procedure.

```
Backup x:
BACKUP IS CANCELLED.
Verify that Memory Card
has been inserted
correctly.
File has been DELETED.

Back
```

x = backup filename

### Card Missing or Card Not Inserted Correctly

The Memory Card is either not inserted or is inserted incorrectly. The backup is terminated. You must reinsert the Memory Card and repeat the backup procedure. This screen may also appear if the wrong type of Memory Card is inserted and a backup or automatic backup is requested within one minute of insertion. Verify that the card is a translation Memory Card.

Memory Card Backup:  
Verify that Memory Card  
has been inserted  
correctly.

Back

### Card Is Write-Protected

The Memory Card is write-protected. You must remove the Memory Card, flip the write-protect tab, reinsert the Memory Card, and repeat the backup procedure.

Memory Card Backup:  
Memory Card is Write-  
Protected.  
Reset Write-Protect Tab  
on Memory Card.

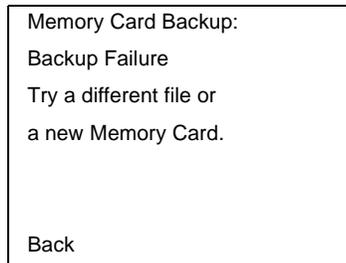
Back

 **CAUTION:**

*The Memory Card may be write-protected to avoid the accidental erasure of the backup files. Make certain this is not the case before you change the Write-Protect Tab.*

## Card Failure

If the card is damaged, repeat the backup with a different card. If a backup is in progress and fails, the system makes two additional attempts at the backup. At the start of each attempt, a message appears with the percentage of the backup that is completed. If the backup fails after three attempts, the screen shown below appears. Repeat the backup procedure using a different file and/or Memory Card.



---

## Restore

Use this procedure to restore system conditions that were backed up onto a translation memory card. The information in a backup file on the translation card is copied to the system.

The restore procedure is necessary under the following conditions:

- System RAM is corrupt.
- A previously stored set of system conditions is preferred over the current set.
- Processor module is replaced.
- After a System Erase (frigid start) has been performed.
- System software has been reinstalled.

The Inspect feature (Inspct or **PgDn**) is available to view the attributes of the backup files on the memory card prior to initiating the restore procedure. The attributes included on the Inspect screen are the filename, the time and day of the file creation/update, the location of the system programming port, and information about the system software release from which the backup was made.

If any type of programming is taking place at another extension when you begin the restore procedure, the restore is cancelled and the number of the first busy extension appears on the screen. Repeat the restore procedure when the busy extension becomes idle.

If a line is busy (incoming call or active call) when you begin the restore procedure, the restore is cancelled and the number of the first active line appears on the screen. Repeat the restore procedure when the line becomes idle.

Also see "Restore Messages" on page 3-174 for information about errors that may occur during the restore procedure.

### Summary: Restore

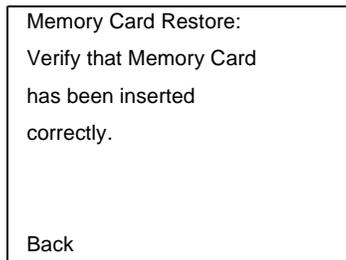
<b>Programmable by</b>	System Manager
<b>Mode</b>	All
<b>Idle Condition</b>	System Forced Idle
<b>Planning Form</b>	Not applicable
<b>Factory Setting</b>	Not applicable
<b>Valid Entries</b>	Not applicable
<b>Inspect</b>	Yes
<b>Copy Option</b>	No
<b>Console Procedure</b>	Insert memory card→System→Back/Restore→Restore→ Select restore file→Yes
<b>PC Procedure</b>	Insert memory card→ <b>F1</b> → <b>F9</b> → <b>F5</b> →Select restore file→ <b>F3</b>

---

### Restore Messages

During the restore procedure, additional screens may appear to alert you to problems with the translation Memory Card, the backup file or the restore procedure. This section contains displays of each screen and information about what to do if the screen appears.

#### Card Missing or Card Not Inserted Correctly



The Memory Card is either not inserted or inserted incorrectly. The restore is aborted. You must reinsert the card and repeat the restore procedure. This screen may also appear if the wrong type of Memory Card is inserted and a restore is requested within one minute of insertion. Verify that the card is a translation Memory Card.

### Card Removed after Confirmation

Memory Card Restore:  
 RESTORE IS CANCELLED.  
 System is DOWN.

The Memory Card was removed from the PCMCIA interface slot while the restore was in progress. The restore is aborted and the system performs a System Erase (frigid start). You must reinsert the Memory Card and repeat the restore procedure.

### Wrong System Programming Port

Restore n:  
 Change Sys Programming  
 Port to Extension xxxx  
 before Restoring.  
  
 Back

n = filename selected  
 xxxx = system programming port  
 extension

The system programming port is not set to the same system programming port as that set in the backup file. The restore is aborted. Use the Inspect feature to view the port of the file on the card. Change the system programming port to match the port shown on the card (see “System Programming Position Assignment” on page 3-3) and repeat the restore procedure.

### Release Mismatch

Restore n:  
 File is Not Compatible  
 for Release X.Y  
 Restore Cancelled.  
 Conversion Required.  
  
 Back

n = filename selected  
 X.Y = release number

This screen only appears if the releases are not compatible.

### Card Failure Before Confirmation

Memory Card Restore:  
Restore Failure.  
Try a different file  
or a new Memory Card.  
  
Back

If the restore fails because the card is damaged, repeat the restore procedure using a different file and/or Memory Card.

### Card Failure after Confirmation

Restore n:  
Restore Failure  
RESTORE IS CANCELLED.  
  
System is DOWN.

n = filename selected

If the restore fails because the card is damaged, the system performs a System Erase (frigid start). Repeat the restore procedure using a different file and/or Memory Card.

### Wrong Type of Card

Memory Card Restore:  
Inserted Memory Card is  
not the correct type.  
Remove and insert MERLIN  
MAGIX Backup/Restore  
Card.  
Back

The inserted card does not match the card option selected from the System menu. Remove the card and repeat the restore procedure with the correct type of card. See “Card Types” on page 3-163 for information about the card labels.



## Overview

The system programming menu hierarchy details the sequence of menu screens that appear when you select the system programming options. The choice of an option on the first menu screen leads to either a second menu screen or a data-entry screen. A second menu screen may lead to still another menu screen, and so on, up to six screens, as shown on the following pages.

You can use the Inspect feature in system programming to display the telephone or line/trunk numbers that are programmed with a specific feature. Inspect is helpful either when you must assign a feature to many lines/trunks or extensions and you do not have a Direct Station Selector (DSS) attached to the system programming console, or when you are programming using a PC with the WinSPM program.

Inspect can be used with the menu options on the following pages that have an asterisk (\*) next to them. To use Inspect in system programming, choose an eligible option, and press one of the following:

- Programmed Inspect button (4400-Series telephones)
- Fixed Inspect button (MLX telephones)
- PgDn



**System Programming**

System	SysRenumbr	Operator	LinesTrunks	Extensions	Options	Tables	AuxEquip	NightSrvc	Labeling	Data	Print	Cntr-Prg	Language		
<b>Restart</b>	<b>Default Numbering</b>	<b>Positions</b>	<b>Modules</b>	<b>R2/CaS Signl</b>	<b>RemoteAccess</b>	<b>LinesTrunks</b>	<b>Transfer</b>	<b>AllowList</b>	<b>MusicOnHold</b>	<b>Group Assign</b>	<b>Directory</b>	<b>Voice/Data*</b>	<b>All</b>	<b>System Lang</b>	
<b>SProg Port</b>	2-Digit	Direct Line*	(E1)	Country Code	LinesTrunks*	<b>Line Copy</b>	Return Time	<b>AllowTo</b>	<b>Ldspkr Pg*</b>	Extensions*	System	<b>2B Data</b>	<b>SysSet-up</b>	English	
<b>Mode</b>	3-Digit	Queued Call*	- Type	Timing	- Dedicated	Single	One Touch	<b>Disallow</b>	<b>Fax</b>	Calling Grp	Extension		<b>Dial Plan</b>	French	
Key	SetUp Space		- Loop	Pulse Dial	- Shared	Block	- Transfer	<b>DisallowTo</b>	Extension*	Lines	Personal		<b>Non-Local UDP Labels</b>	Spanish	
Hybrid/PBX	<b>Single</b>	Hold Rtn	- DID*	- Dialing Bit	- No Remote	<b>Dial OutCd</b>	- Manual	<b>ARS</b>	Msg Waiting*	CoverContrl	<b>LinesTrunks</b>		<b>Trunk Info</b>	Portuguese	
BehindSwtch	Lines*	- Return to Queue	- DIOD*	- Break Timer	Non-TIE	<b>Restriction</b>	- Automatic	ARS1+7Dial	Threshold	<b>OutRestrict</b>	<b>PostMessage</b>		TIE	<b>Extensions</b>	
<b>Board Renum</b>	Extensions*	- Remain On Hold	- TIE	Tariff Pulse	- BarrierCode	Unrestricted	- Hold	- Within Area Code	<b>MaintAlarms</b>	<b>Emergency</b>	<b>Grp Calling</b>		DID	Single	
<b>MaintainBusy</b>	Pools*	HoldRelease	- Unequipped	- On/Off	- BarrierCode	Outward Restrict	- MusicOnHold	- Not Within	VMS/AA	<b>ExcludeList*</b>			Loop/Ground	- English	
Enable	Group Page*	- Auto Hold	- All Loop	- On	- Required	Toll Restrict	- Ringback	Area Code	TransferRtn	<b>Start*</b>			General	- French	
- Auto Busy Tie	GrpCalling*	- Auto Release	- All DID	- Off	- BarrierCode		- Ringback Type	ARS Input	TT Duration	<b>Stop*</b>			S56 Data	- Portuguese	
Trunks	Adjuncts*	Threshold	- All DIOD	- Meter Bit	- Not Required	<b>RestrctCopy</b>	- Voice Announce	- 6-Digit	TT Interval	<b>Time Control</b>			T1 Info	Block	
- Enable	Park*	ElvatePrior	- All TIE	- Bit A	- Restriction	Single	- Ring	- Area Code	<b>CTI Link</b>	- On			<b>PRI Info</b>	- English	
- Disable	ARS DialOut	InQue Alert*	- All Unequip	- Bit B	- Unrestricted	Block		- Exchange		- Off			<b>RmoteAccess</b>	- French	
Disable	RemoteAccs	- InQue Alert Enable	- All DIOD	- Bit C	- Outward Restrict	<b>Account*</b>	<b>CampOn</b>	- 1+7		<b>Cover Contrl</b>			<b>Oper Info</b>	- Portuguese	
<b>Date</b>	DSS Buttons*	- InQue Alert Disable	- Suppression	- Min Pulse	- Toll Restrict	<b>BIS/HFAI*</b>	<b>CallParkRtn</b>						<b>AllowList</b>	<b>AllowListTo</b>	<b>SMDR</b>
<b>Time</b>	ListDirctNo	Call Types	- AMI	- Min Pause	- ARS Restrict	<b>Call PickUp*</b>	<b>Delay Ring</b>						<b>AllowListLst</b>	<b>DisallowLst</b>	English
<b>Break Timer</b>	<b>Block</b>	- Dial 0	- HDB3	Encoding	- Allow List*	<b>VoiceSignl*</b>	<b>Callback</b>						<b>DisallowLst</b>	<b>DisallowTo</b>	French
<b>Back/Restore</b>	Lines	- Priority	- Clock Sync	- Mu-law	- Disallow Lst*	<b>Ext Status*</b>	<b>Callback</b>						<b>ARS</b>	<b>ARS</b>	Spanish
Backup	Extensions	- Operator*	- Priority	- A-law	TIE Lines	<b>Group Page*</b>	<b>Ext Status</b>						<b>Ext Direct</b>	<b>Ext Direct</b>	Portuguese
Restore	Adjuncts	- Follow/Frwd	- Primary	MFC Dialing	- BarrierCode	<b>Grp Cover*</b>	Hotel						<b>Sys Direct</b>	<b>Sys Direct</b>	<b>Printer</b>
Auto Backup	<b>NonLocal UDP</b>	- UnassignDID	- Secondary	- Send Signals	- Required	Hunt Type	GrpCall/CMS						<b>Group page</b>	<b>Group page</b>	English
- Off		- Priority	- Tertiary	- ExpectDigit	- BarrierCode	- Circular	<b>SMDR</b>						<b>Ext Info</b>	<b>Ext Info</b>	French
- Daily		- Operator*	- None	- Send Signals	- Not Required	- Linear	Format						<b>Grp coverage</b>	<b>Grp coverage</b>	Spanish
- Weekly		- ListedNumbr	- Source	- NumberToSend	- Restriction	- Most Idle	- Basic SMDR						<b>Grp Calling</b>	<b>Grp Calling</b>	Portuguese
<b>Tables</b>		- Priority	- Loop	- Extension Only	- Outward Restrict	DelayAnnce	- ISDN SMDR						<b>Night Service</b>	<b>Night Service</b>	
SpeciNumbers		- Operator*	- Local	- Extension and Base	- Toll Restrict	Call Length	Call Report						<b>Call Pickup</b>	<b>Call Pickup</b>	
- Table Input		- Foreign	- Activation	- Line Telephone Number	- ARS Restrct	Call Report	- In/Out						<b>Error Log</b>	<b>Error Log</b>	
- Other Digit		- GrpCoverage	- Active	Copy	- Allow List*	DelayAnnce	- Out Only						<b>Auth Code</b>	<b>Auth Code</b>	
- Match Delay		- Priority	- Not Active	Single	- DisallowLst*	Call Report	Auth Code						<b>BRI Info</b>	<b>BRI Info</b>	
		- Operator*	- Channel/Unit	Block	BarrierCode	Queue Alarm	- Home Extension Number						<b>Non-Local UDP</b>	<b>Non-Local UDP</b>	
		- Foreign	- Exchange	Pools	- SProg/Maint	Queue Alarm	- Authorization Code						<b>ServiceObs</b>	<b>ServiceObs</b>	
		- GrpCoverage	- Special Access	<b>Toll Type</b>	- Code Info	Alarm Threshold 1	Interval								
		- Priority		<b>HoldDiscnct</b>	- Code Length	Alarm Threshold 2	- Repeat								
		- Operator*		<b>DialTone Det</b>	- Code Entry	Alarm Threshold 3	Announcement								
		- Foreign		Activation	- Restriction	Xtnl Alert	Announcement								
		- InQue Alert Enable		Lines/Trunks	- Outward Restrict	Overflow	Announcement								
		- InQue Alert Disable		Time-out	- Toll Restrict	Number Based	Announcement								
		- Complete		AfterTimeOut	- ARS Restrct	Time Based	Announcement								
		- Manual		Second DT	- Allow List*	Prompt Based	Announcement								
		- Complete		DT on Hold	- DisallowLst*	Members*	Announcement								
		- Return Ring		MaintenBusy	AutoQueueing	Line/Pool*	Announcement								
		- QCC Backup		<b>Glare Guard</b>	- Enable	Group Type	Announcement								
		- Voice Annc		<b>Busy Tone Det</b>	- Disable	- Auto Login	Announcement								
		<b>Hold Timer</b>		BTD Trunk Status/Change		- Auto Logout	Announcement								
		<b>DLC Hold</b>		BTD Feature		- Integ VMI	Announcement								
		Auto Hold Enable		- Cadence		- Generic VMI	Announcement								
		Auto Hold Disable		- Level		Queue Control	Announcement								
				- BTD Threshold Timer		Priority	Announcement								
				<b>PrincipalUsr</b>		Support	Announcement								
				<b>QCC Prior</b>		<b>ARS Restrct</b>	Announcement								
				<b>QCC Oper</b>		<b>Mic Disable*</b>	Announcement								
				<b>LS-ID Delay</b>		<b>Remote Frwd*</b>	Announcement								
				<b>ClockSync</b>		<b>Auth Code</b>	Announcement								
				Primary		<b>Delay Frwd</b>	Announcement								
				- Loop		<b>TrkTransfer</b>	Announcement								
				- Local		<b>Cover Delay</b>	Announcement								
				Secondary		Primary	Announcement								
				Tertiary		Secondary	Announcement								
				- Loop		<b>HotLine</b>	Announcement								
				- Local		<b>DisplayPref</b>	Announcement								
				- Immed		Calling Name	Announcement								
				- Auto		Calling Num	Announcement								
				E&M Signal		Both	Announcement								
				- Type 1S		<b>ServiceObs</b>	Announcement								
				- Type 1C		Observer	Announcement								
				- Type 5		Warning	Announcement								
				Inmode		- Yes	Announcement								
				Outmode		- No	Announcement								
				Dialtone		Members	Announcement								
				AnsSupvr		<b>Rotary Enable</b>	Announcement								
				Disconnect		<b>ETR</b>	Announcement								
				TT/LS Disc			Announcement								
				OutMode			Announcement								
				LS Disconnect			Announcement								
				- Yes			Announcement								
				- No			Announcement								
				<b>DID/DIOD</b>			Announcement								
				Block			Announcement								
				Type			Announcement								
				- Immed			Announcement								
				- Wink			Announcement								
				Disconnect			Announcement								
				ExpectDigit			Announcement								
				DeleteDigit			Announcement								
				Add Digits			Announcement								
				Signaling			Announcement								
				- Rotary			Announcement								
				- Touch Tone			Announcement								
				InvalDstn			Announcement								
				- Send to Backup			Announcement								
				Extension			Announcement								
				- Return Fast Busy			Announcement								
				<b>PRI</b>			Announcement								

Please insert this Menu Hierarchy page in Appendix A of this manual.

\* The inspect feature can be used with this menu option. Press Inspect or PgDn.

The Inspect feature can be used in entry mode with this menu option. Press Inspect or PgDn while in entry mode.

This feature is not supported in Release 1.0i of the MERLIN MAGIX system.