



# **MERLIN MAGIX™ Integrated System**

Maintenance and Troubleshooting  
Release 2.0 and Earlier

555-720-140  
Comcode 108873564  
Issue 1  
January 2001

## 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.

## Avaya Web Page

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## Preventing Toll Fraud

Toll Fraud is the unauthorized use of your telecommunications system by an unauthorized party (for example, a person who is not a corporate employee, agent, subcontractor, or working on your company's behalf). Be aware that there is a risk of toll fraud associated with your system and that, if toll fraud occurs, it can result in substantial additional charges for your telecommunications services.

## Avaya Fraud Intervention

If you suspect that you are being victimized by toll fraud and you need technical assistance or support, call the Avaya Customer Care Center at **1 800 628-2888**.

## Providing Telecommunications Security

Telecommunications security of voice, data, and/or video communications is the prevention of any type of intrusion to, that is, either unauthorized or malicious access to or use of, your company's telecommunications equipment by some party.

Your company's "telecommunications equipment" includes both this Avaya product and any other voice/data/video equipment that could be accessed via this Avaya product (that is, "networked equipment").

An "outside party" is anyone who is not a corporate employee, agent, subcontractor, or working on your company's behalf. Whereas, a "malicious party" is anyone, including someone who may be otherwise authorized, who accesses your telecommunications equipment with either malicious or mischievous intent.

Such intrusions may be either to/through synchronous (time multiplexed and/or circuit-based) or asynchronous (character-, message-, or packet-based) equipment or interfaces for reasons of:

- Utilization (of capabilities special to the accessed equipment)
- Theft (such as, of intellectual property, financial assets, or toll-facility access)
- Eavesdropping (privacy invasions to humans)
- Mischief (troubling, but apparently innocuous, tampering)
- Harm (such as harmful tampering, data loss or alteration, regardless of motive or intent).

Be aware that there may be a risk of unauthorized or malicious intrusions associated with your system and/or its networked equipment. Also realize that, if such an intrusion should occur, it could result in a variety of losses to your company, including, but not limited to, human/data privacy, intellectual property, material assets, financial resources, labor costs, and/or legal costs.

### **Your Responsibility for Your Company's Telecommunications Security**

The final responsibility for securing both this system and its networked equipment rests with you - an Avaya customer's system administrator, your telecommunications peers, and your managers. Base the fulfillment of your responsibility on acquired knowledge and resources from a variety of sources, including, but not limited to:

- Installation documents
- System administration documents
- Security documents
- Hardware-/software-based security tools
- Shared information between you and your peers
- Telecommunications security experts

To prevent intrusions to your telecommunications equipment, you and your peers should carefully program and configure your:

- Avaya provided telecommunications system and their interfaces
- Avaya provided software applications, as well as their underlying hardware/software platforms and interfaces
- Any other equipment networked to your Avaya products

### **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*.

### **Canadian Department of Communications (DOC) Interference Information**

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

Le Présent Appareil Numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de la classe A prescrites dans le règlement sur le brouillage radioélectrique édicté par le ministère des Communications du Canada.

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**Order:** Document No. 555-720-140  
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Issue 1, January, 2001

For more information about Avaya documents, refer to the section entitled "Related Documents" in "About This Guide" in *Feature Reference*.

## Support Telephone Number

In the continental U.S., Avaya provides a toll free customer helpline 24 hours a day. Call the Avaya Customer Care Center at **1 800 628-2888** or your Avaya authorized dealer if you need assistance when installing, programming, or using your system. Outside the continental U.S., contact your local Avaya authorized representative.

## Warranty

Avaya provides a limited warranty on this product. Refer to "Limited Warranty and Limitation of Liability" in "Customer Support Information" in *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.

When installing telephone equipment, always follow basic safety precautions to reduce the risk of fire, electrical shock, and injury to person, including:

- Read and understand all instructions.
- Follow all warnings and instructions marked on or packed with the product.
- Never install telephone wiring during a lightning storm.
- Never install 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 Avaya Inc.-manufactured MERLIN MAGIX Integrated System circuit modules, carrier assemblies, and power units in the MERLIN MAGIX Integrated System control unit.
- Use only Avaya Inc.-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.
- 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



# Maintenance and Troubleshooting

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## About This Guide

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The MERLIN MAGIX Integrated System is an advanced digital switching system that integrates voice and data communications features. Voice features include traditional telephone features, such as Transfer and Hold, and advanced features, such as Group Coverage, Direct Voice Mail, and Tandem Switching. Data features allow both voice and data to be transmitted over the same system wiring.

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## Intended Audience

This book provides detailed information about system features, extension features, and system applications of the MERLIN MAGIX Integrated System. It is intended as a reference for anyone needing such information, including support personnel, sales representatives, System Managers, and account executives. It is also intended for technicians who are responsible for system installation, maintenance, and troubleshooting.

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## How to Use This Guide

This guide has been designed to provide optimal assistance to you in completing the planning forms—for example:

1. Since some chapters and/or sections apply to one or another of the configurations (Key or Behind Switch, Hybrid/PBX, or data communications), these sections are clearly marked—for example, “Hybrid/PBX Only.” Also, you are alerted to proceed to the next appropriate section, or to skip chapters or sections that do not apply to your particular system. Proceed through this guide as appropriate.
2. A list of forms or information that will be needed for particular procedures appears at the beginning of each chapter and section.
3. Where appropriate, examples of completed forms are included so you can confirm what you have done.

Since this guide assumes that you are familiar with the system, detailed information about equipment, features, and programming are not included. Refer to the following documentation for additional information:

- *System Programming* gives procedural instructions for programming system features.
- User and operator guides give procedural instructions for programming and using telephone features.

[“Related Documents,”](#) later in this section, provides a complete list of system documentation, together with ordering information.

**In the USA only**, Avaya provides a toll free customer Helpline 24 hours a day. Call the Helpline at 1 800 628-2888 (consultation charges may apply), or contact your Avaya representative if you need assistance when installing, programming, or using your system.

**Outside the USA**, if you need assistance when installing, programming, or using your system, contact your Avaya authorized representative.

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## Terms and Conventions Used

The terms described here are used in preference to other, equally acceptable terms for describing communications systems.

### Lines, Trunks, and Facilities

*Facility* is a general term that designates a communications path between a telephone system and the telephone company central office. Technically, a *trunk* connects a switch to a switch—for example, the MERLIN MAGIX Integrated System to the central office. Technically, a *line* is a loop-start facility or a communications path that does not connect switches—for example, an intercom line or a Centrex line. In actual usage, however, the terms *line* and *trunk* are often applied interchangeably. In this guide, we use *line/trunk* and *lines/trunks* to refer to facilities in general. Specifically, we refer to *digital facilities*. We also use specific terms such as *Personal Line*, *ground-start trunk*, *Direct Inward Dialing (DID) trunk*, and so on. When you talk to personnel at your local telephone company central office, ask them which terms they use for the specific facilities they connect to your system.

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Some older terms have been replaced with newer terms, as follows:

Old Term	New Term
trunk module	line/trunk module
trunk jack	line/trunk jack
station	extension
station jack	extension jack
analog data station	modem data workstation
digital data station	terminal adapter workstation
7500B data station	ISDN terminal adapter data workstation
digital voice and analog data station	MLX voice and modem data workstation
analog data-only station	modem data-only workstation
digital data-only station	terminal adapter data-only workstation
7500B data-only station	ISDN terminal adapter data-only workstation
digital voice and digital data station	MLX voice and terminal adapter workstation
MLX voice and 7500B data station	MLX voice and ISDN terminal adapter data workstation

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## Typographical Conventions

Certain type fonts and styles act as visual cues to help you rapidly understand the information presented:

Convention	Example
Italics or bold indicates emphasis.	It is <i>very</i> important that you follow these steps.  WARNING: Do <b>not</b> remove modules from the carrier without following proper procedures.
Italics also sets off special terms.	The part of the headset that fits over one or both ears is called a <i>headpiece</i> .
Plain constant-width type indicates text that appears on the telephone display or PC screen, as well as characters you dial at the telephone or type at the PC.	Choose <code>Ext Prog</code> from the display screen. To activate Call Waiting, dial <code>*11</code> .

## Product Safety Advisories

Throughout these documents, hazardous situations are indicated by an exclamation point inside a triangle and 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 could cause minor personal injury or property damage if the hazard is not avoided.*

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## Security

Certain features of the system can be protected by passwords to prevent unauthorized users from abusing the system. You should assign passwords wherever possible and limit distribution of such passwords to three or fewer people.

Nondisplaying authorization codes and telephone numbers provide another layer of security. For more information, see Appendix A, “*Customer Support Information in the Feature Reference.*”

Throughout this guide, toll fraud security hazards are indicated by an exclamation point inside a triangle and the words *SECURITY ALERT*.

 **SECURITY ALERT:**

*Security Alert indicates the presence of a toll fraud security hazard. Toll fraud is the unauthorized use of your telecommunications system, or use by an unauthorized party (e.g., persons other than your company’s employees, agents, subcontractors, or persons working on your company’s behalf). Be sure to read “Your Responsibility for Your Company’s Telecommunications Security” on the inside front cover of this guide and “Security of Your System: Preventing Toll Fraud” in Appendix A, in the “Customer Support Information” section of Feature Reference.*

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## Related Documents

The documents listed in the following table are part of the MERLIN MAGIX documentation set. Within the continental United States, contact the Avaya Publications Center by calling 1 800 457-1235.

Document No.	Title
<b>System Documents:</b>	
555-720-100	<i>Customer Documentation Package:</i> Consists of paper versions of the <i>System Manager's Quick Reference</i> and the <i>Feature Reference</i>
555-720-110	<i>Feature Reference</i>
555-720-112	<i>System Planning</i>
555-720-113	<i>System Planning Forms</i>
555-720-119	<i>System Manager's Quick Reference</i>
555-661-150	<i>Network Reference</i>
555-720-800	<i>Customer Reference CD-ROM:</i> Consists of the <i>System Manager's Quick Reference</i> , and the <i>Feature Reference</i>
<b>Telephone User Support:</b>	
555-710-123 (U.S. English)	<i>4400/4400D Telephone User's Guide</i>
555-710-123FRC (Canadian French)	<i>4400/4400D Telephone User's Guide</i>
555-710-127 (U.S. English)	<i>4406D+, 4412D+, 4424D+, and 4424LD+ Telephone User's Guide</i>
555-710-127FRC (Canadian French)	<i>4406D+, 4412D+, 4424D+, and 4424LD+ Telephone User's Guide</i>
555-660-122	<i>MLX Display Telephone User's Guide</i>
555-630-150	<i>MLX-5D, MLX-10D and MLX-10DP Display Telephone Tray Cards</i> (5 cards)
555-630-152	<i>MLX-28D and MLX-20L Telephone Tray Cards</i> (5 cards)
555-660-124	<i>MLX-5<sup>®</sup> and MLX-10<sup>®</sup> Nondisplay Telephone User's Guide</i>
555-630-151	<i>MLX-5 and MLX-10 Nondisplay Telephone Tray Cards</i> (6 cards)
555-630-155	<i>MLX-16DP Display Telephone Tray Cards</i> (5 cards)
555-670-151	<i>MLS and ETR Telephone Tray Cards</i>
555-670-152	<i>MLS and ETR Telephone Tray Cards</i> (16 cards)

<b>Document No.</b>	<b>Title</b>
555-660-126	<i>Single-Line Telephones User's Guide</i>
555-660-138	<i>MDC and MDW Telephones User's Guide</i>
<b>System Operator Support:</b>	
555-710-134	<i>Digital Direct Line Console Operator's Guide</i>
555-710-136	<i>Digital Queued Call Console Operator's Guide</i>
<b>Miscellaneous User Support:</b>	
555-661-130	<i>Calling Group Supervisor and Service Observer User Guide</i>
555-650-105	<i>Data and Video Reference</i>
555-661-140	<i>Installation, SPM, Maintenance and Troubleshooting</i>
555-720-140	<i>Installation, Programming Basics, Maintenance and Troubleshooting</i>
555-720-116	<i>Pocket Reference</i>
<b>Toll Fraud Security:</b>	
555-025-600	<i>BCS Products Security Handbook</i>

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## How to Comment on This Guide

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**MERLIN MAGIX™ Integrated System  
Maintenance and Troubleshooting  
Issue 1, January 2001  
555-710-140, Comcode 108873564**

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This section describes the equipment required for both on-site and remote programming maintenance; describes Automatic Tests, Alarms, System Restarts; provides direction on isolating the trouble; and discusses Centralized Voice Messaging.

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## Required Equipment

To perform maintenance, you need a maintenance console as well specific tools and some additional documentation, all of which are defined on the following pages.

### Maintenance Console

Whether you perform onsite or remote programming maintenance, you need a maintenance console:

- For onsite maintenance, you can use either a 4424LD+ or MLX-20L system programming console or a PC with the Windows System Programming and Maintenance (WinSPM) software.
- For remote maintenance, you must use a PC with WinSPM software.

Detailed information about the 4424LD+ or MLX-20L system programming console and WinSPM software is provided in *Programming Basics*.

### Tools and Documentation

In addition to the maintenance console, you need the following tools and documentation:

- Trouble report documentation
- NSAC contact name
- EIA breakout box
- Digital voltmeter (KS-20599 or equivalent)
- 110/66-type punchdown tool

- Dracon TS21 or equivalent touch-tone telephone for testing
- Assorted flathead and Phillips-head screwdrivers
- Long-nosed and regular pliers
- Wrist grounding strap
- Modular cord (D8W-87)
- Replacement parts recommended by NSAC (if necessary)
- Programming terminal, MS-DOS PC (Zenith Sport 184) and 355AF Adapter



**CAUTION:**

*Should you ever need to open a module and handle the circuit board, use the wrist strap to connect your wrist to a suitable ground first. Electrostatic discharge can destroy or severely damage the integrated circuits in the power supply, processor, and modules.*

---

## On-Site Programming Maintenance

You can perform onsite maintenance with a 4424LD+ or MLX-20L console or a PC running WinSPM software. Onsite programming maintenance is preferred over remote programming maintenance, if feasible, because remote programming overrides onsite programming, except when onsite backup or restore is in progress.

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

### Setting Up the 4424LD+ Programming Console

To be used for system programming a 4424LD+ telephone must be connected to the first jack on the leftmost (Slot 1) 024 TDL or 412 LS-ID-TDL module. For complete installation instructions, refer to “Connecting Telephones to 412 LS-ID-TDL and 024-TDL Modules” in *Installation*.

#### 4424LD+ Failure

If the 4424LD+ console does not work, follow the steps below.

1. Replace the 4424LD+ console with one that is known to be working (if available).
2. If the failure persists, or if a working 4424LD+ console is not available, connect the original 4424LD+ console directly into the appropriate TDL jack on the control unit using a cord that is known to be working.
3. If the trouble clears, replace the original cord.

4. If not, use the PC as your maintenance terminal and then troubleshoot the leftmost TDL module. See “[Module Problems](#)” on page 4-17 for instructions.

## Setting Up the MLX-20L Console

To be used for system programming an MLX-20L telephone must be connected to one of the first five jacks on the leftmost 008 MLX, 016 MLX, or 408 GS/LS-MLX module. For complete installation instructions, refer to “Connecting Telephones to the Control Unit” in *Installation*.

### MLX-20L Failure

If the MLX-20L console does not work, follow the steps below.

1. Replace the MLX-20L console with one that is known to be working (if available).
2. If the failure persists, or if a working MLX-20L console is not available, connect the original MLX-20L console directly into the appropriate MLX jack on the control unit using a cord that is known to be working.
3. If the trouble clears, replace the original D8W-87 cord.
4. If not, use the PC as your maintenance terminal and then troubleshoot the leftmost MLX module. See “[Module Problems](#)” on page 4-17 for instructions.

### Setting Up the PC

To use the Win SPM software for system programming or maintenance, your PC must be connected to the MERLIN MAGIX system directly via a serial port on your PC or you must connect to the MERLIN MAGIX internal modem using your PC’s modem. Refer to “Connecting a PC to the Control Unit for System Programming or Maintenance” in *Installation* for complete instructions.

---

## Remote Programming Maintenance

Remote maintenance allows you to support the system from an off-premises location. You can check error logs and system status, execute a trace on one or more facilities to verify call progression to isolate the source of a problem, and restart the system remotely. Remote programming maintenance is particularly useful for private networked switches (Hybrid/PBX mode only). Where systems are private networked and only one system has public switched networked trunks, you must use the Remote Access feature in order to access WinSPM on private networked systems.

To perform remote maintenance, you need a PC with WinSPM software, a tip/ring telephone, and a 1,200-bps or 2,400-bps modem. “Connecting a PC to the Control Unit for System Programming or Maintenance” in *Installation* for complete instructions for connecting the PC to the control unit from a remote location. Refer to “Setting Up a Site” in *Programming Basics* for instructions on setting up remote connection sites in WinSPM.

## Considerations

Review the following points before you begin remote maintenance procedures.

- Remote maintenance overrides onsite maintenance and programming, except when onsite backup or restore is in progress. Before you perform remote maintenance, notify the customer's system manager.
- You can perform remote maintenance and programming only from a DOS PC, not from the UNIX environment. If you are running SPM under IS III, you cannot perform remote maintenance.
- Line noise can cause the SPM screen to display unpredictable results. If this occurs, hang up and redial.
- Under applicable tariffs, the customer is responsible for any charges incurred through the remote use of system facilities. Precautions should be taken to prevent unauthorized use of the system's outside lines by remote callers, also called toll fraud. See Appendix A, "Customer Support Information," for more information about security.

---

## Preparation for Hardware Maintenance

If you are performing onsite hardware maintenance where you need to access hardware inside the carrier, for example remove a module, you must first remove the control unit housing, power down the system, and then disconnect AC power.

- See "Installing/Removing the Cover on the Carrier" in *Installation*.
- See "[Powering Down the System](#)" below.

## Powering Down the System

To power down the system, follow these steps:

 **CAUTION:**

*Follow these steps in the exact sequence.*

1. Turn off the power supply on the basic carrier.
2. Turn off the power supplies on the expansion carriers.
3. Unplug the system from the AC outlet.

## Using WinSPM

To perform remote maintenance procedures, you must use a PC with Windows System Programming and Maintenance (WinSPM) software. For information on setting up and using WinSPM, see *Programming Basics*.

## Conclusion of Hardware Maintenance

At the conclusion of hardware maintenance, replace the control unit housing as follows:

- See “Installing/Removing the Cover on the Carrier” in *Installation* for instructions for a metal carrier.
- See “[Installing the Control Unit Housing \(plastic\)](#)” below for instructions for a plastic carrier.

**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.

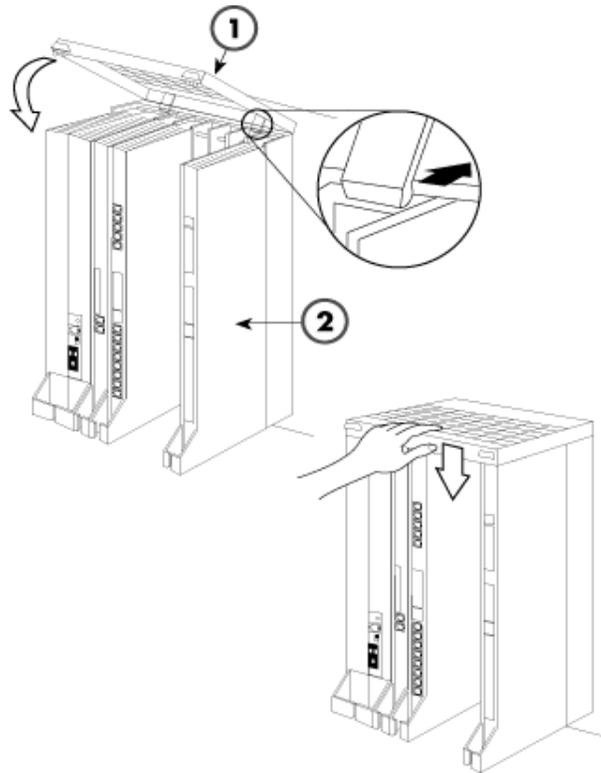
### Installing the Control Unit Housing (plastic)

After you have completed maintenance and troubleshooting, follow these steps to reinstall the control unit housing on a plastic carrier.

#### Installing the Top Cover

To install the top cover, refer to the illustration and follow these steps:

1. Be sure the cords have been pressed through the wire managers at the base of the modules.
2. Hold the top cover with the hooks facing you.
3. Engage the tabs at the rear of the top cover with the carrier.
4. Lower the top cover, so that the legs lock into the vents on the module.



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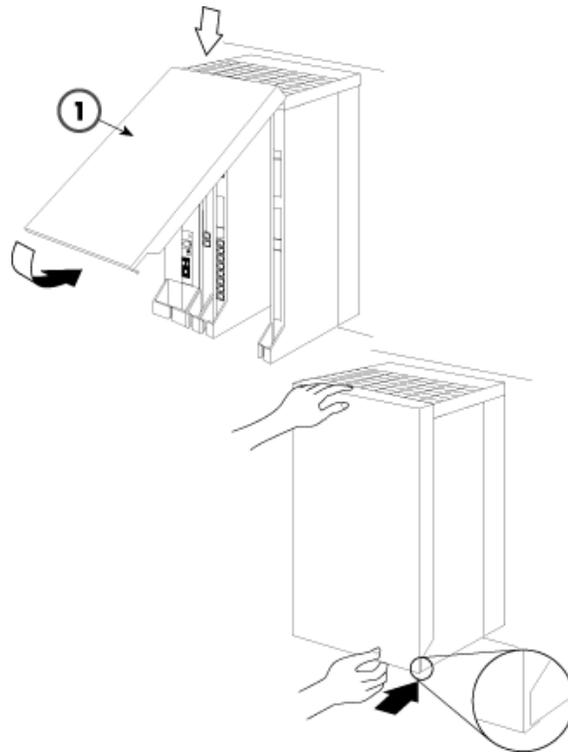
**Figure 1-1. Installing the Plastic Carrier Top Cover**

- 1 Top cover
- 2 "Empty module"

### Installing the Front Cover

To install the front cover, refer to the illustration and follow these steps:

1. Hook the top of the front cover onto the top cover.
2. Push down on the bottom of the front cover until it locks securely on the base of the wire manager on the modules.



**Figure 1-2. Installing the Plastic Carrier Front Cover**

## About Automatic Tests

The system performs ongoing maintenance automatically by running tests that do the following:

- Monitor the status of equipment
- Audit operations consistency
- Detect hardware malfunctions

Without disrupting normal service, the tests check hardware and software that are in service. The system registers any errors it detects in the error logs and, if possible, corrects them automatically.

## About Alarms

If the automatic tests indicate serious error conditions, the system generates an alarm. Depending on how the system is programmed, the system announces an alarm condition in one of the following ways:

- An LED for a line or feature button turns on at an operator console or other designated telephone.
- The red status LED on the processor module lights.
- The error code/status display on the processor module displays **F** if a frigid start, or **C** if a cold start, occurs. See [“About System Restarts”](#) on page 1-9 for more information.
- If a software installation or upgrade is taking place, a blinking character is displayed to indicate the status of the procedure. See [“PCMCIA Upgrade Card”](#) in *Installation* for more information.
- The status display indicates an alarm (on a 4424LD+ or MLX-20L console or on a PC running WinSPM) and can be viewed on the Error screen.
- A supplemental alert, bell, chime, or strobe, if installed, is activated.
- If an LED is programmed to indicate the alarm, the LED stays lit until the error is cleared.
- When the system indicates an alarm, check the permanent error log.

## Clearing Alarms

The system clears alarms automatically when the error condition no longer exists.

To clear an alarm manually, select **Drop** on the 4424LD+ or MLX-20L programming console. If you are using WinSPM in Standard SPM Mode on a PC, select **Drop** on the emulation display of the programming console. See [“Error Logs”](#) on page 2-1 for more information.

**NOTE** ► There is no fixed **Drop** button on the 4424LD+ console. The **Drop** button must be programmed onto a fixed feature key.

---

## About System Restarts

Depending on the severity and duration of a problem, you may need to restart the system manually. Some errors cause the system to restart automatically. Every restart causes an error log entry, and each type of restart has its own error code. A cold start (Restart) or frigid start (System Erase) also causes a **C** or **F** to appear on the error code/status display on the processor module.

There are three types of system restarts, all of which occur automatically:

- Warm start (you cannot select this from the Maintenance menu)
- Cold start (select `Restart` to do this manually)
- Frigid start (select `System Erase` to do this manually)

### Warm Start

A loss of power for less than 250 ms can cause a warm start. If this occurs, calls in progress are not dropped, but calls in the process of being connected may be dropped.

Power interruptions of less than 100 ms usually do not affect the system. Warm starts may cause telephones without incoming calls to ring.

### Cold Start (Restart)

If you need to restart the system, cold start (Restart) is recommended. Restart drops all calls but saves system programming.

**NOTE** ► Non-network systems continually update in the event of a cold start.

### Procedure

To perform a Cold Start (Restart) from the programming console or from WinSPM in Standard SPM mode, select:

Menu→Sys Program→Start→System→Restart→Yes

### Considerations

- A cold start (Restart) occurs automatically after a power interruption of more than one second.
- A cold start (Restart) does not blank out the screen on a 4424LD+ or MLX-20L console until the cold start is completed.
- A cold start (Restart) can cause extensions with the Extension Status feature to lose their toll restrictions.

- A cold start is performed to refresh the Message Waiting Lights on a local system and on all remote MERLIN MAGIX systems that use the local system's Voice Messaging System. If, after a cold start, any Message Waiting Lights on any of the systems are not refreshed, perform a manual update. See [“Centralized Voice Messaging”](#) on page 1-11 for more information.

## Frigid Start (System Erase)

### CAUTION:

- *All system programming is erased. When you perform a frigid start (System Erase), all calls are dropped, and the system configuration information is erased. All system memory must be reinitialized, including system programming. Then the entire system must be rebooted.*
- *Do not perform a Frigid Start unless you are installing a replacement processor or following instructions from your TSO.*

### Procedure

To perform a Frigid Start (System Erase) from the programming console or from WinSPM in Standard SPM mode, select:

Menu→Maintenance→Slot→Dial 00→Enter→Demand Test→System Erase (Line 5 of the display, left button)→System Erase (Line 5 of the display, left button)→Yes

### Considerations

- `System Erase` is not displayed on the 4424LD+ or MLX-20L status display to prevent processor memory from being accidentally changed. To select `System Erase`, press the left button on Line 5 of the display twice.
- After a System Erase, the default printer is the PC printer, not the Station Message Detail Recording (SMDR) printer. If you want onsite printouts from the SMDR printer, make sure you change the option. See “Print Opts” in *Programming Basics* for the procedure to change the printer option.

---

## Centralized Voice Messaging

Centralized Voice Messaging enables a single Voice Messaging System (VMS) to be used by other directly connected systems in a private network. When the Message Waiting Lights appear on the local system and on all remote MERLIN MAGIX systems that use the local system's VMS, the Messaging Waiting Lights may need to be updated. The lights are updated manually by using the maintenance screens.

### Updating the Message Waiting Lights

Consider a manual update of the Message Waiting Lights if:

- a processor is changed
- a VMS is changed on the hub system
- a cold start did not successfully refresh
- if deemed necessary by a qualified technician

**NOTE** ► Non-networked systems continually and automatically update in the event of a cold start.

You must clear all the Message Waiting Lights on the local MERLIN MAGIX system, and then refresh the Message Waiting Lights on extensions that use a specific VMS, including telephones on a private networked MERLIN MAGIX system (see the *Network Reference* for more information). Multiple refreshes across a private network, using tandem tie lines, can cause congestion and delayed refresh time, it is advisable to coordinate refresh operations in a private network to send only one refresh message.

### Clearing the Message Waiting Lights

Use this procedure to clear the Message Waiting Lights on the telephones on the local MERLIN MAGIX system.

#### Procedure

To perform this procedure from the programming console or from WinSPM in Standard SPM mode, select:

Menu→Maintenance→MW LP Update→Clear MWL→Back

After you select `Clear MWL`, a `Clear in Progress` message appears. When all the lights are cleared, a `Clear Complete` message appears. Wait until `Clear Complete` appears before exiting.

## Refreshing the Message Waiting Lights

Use this procedure to refresh the Message Waiting Lights on all telephones, including those across a private network that use the Voice Messaging System.

### Procedure

To perform this procedure from the programming console or from WinSPM in Standard SPM mode, select:

Menu→Maintenance→MW LP Update→Refresh MWL→Dial the VMI group extension number for the VMS→Enter→Back

**NOTE** ► Selecting Back does not stop the process; the process continues in the background.

---

## Checking Unit Loads

In the event of maintenance or equipment changes, recalculate the unit loads for each carrier where there is a different configuration. See “Calculating Unit Loads” in *Installation*.

Generally, if you can distribute the DID modules and telephone modules equally across the carriers, you prevent unnecessary drain on any one carrier.

---

## Isolating the Trouble

Trouble is typically reported to you either by a user, or when a system alarm turns on.

### If a User Reports a Problem

If a user reports a problem, gather enough information so that you can attempt to isolate the problem to one of the following areas:

- Telephone Problems (see “[Telephone Problems](#)” on page 3-1.)
- Control Unit Problems (see “[Control Unit Problems](#)” on page 4-1.)
- Central Office/Network Problems  
(see “[Central Office and Private Network Problems](#)” on page 5-1.)
- Private Network Problems (Hybrid/PBX mode) (see “[Central Office and Private Network Problems](#)” on page 5-1.)

---

## If a System Alarm Turns On

If a system alarm turns on, begin troubleshooting by checking the permanent errors in the error logs. See Error Logs for information on checking the error logs and interpreting error codes.

Error logs may indicate the source of the problem. Depending upon the types of errors, begin troubleshooting as directed in the following table.

**Table 1-1. Source of Problem—Section Reference**

---

If error log indicates a problem with...	See...
Power supply	<a href="#">“Power Supply Problems”</a> on page 4-2
Module	<a href="#">“Module Problems”</a> on page 4-17
Control Unit Carrier	<a href="#">“Carrier Problems”</a> on page 4-30
Trunks	<a href="#">“Central Office and Private Network Problems”</a> on page 5-1
Central Office	<a href="#">“Central Office and Private Network Problems”</a> on page 5-1

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## Overview

Troubleshooting relies on viewing the error logs and access log for maintenance and system programming. System Inventory is required if you need to escalate problems to the Avaya Technical Support Organization (TSO) or authorized dealer. This section describes the error logs and access logs and explains how to access the System Inventory screen.

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## Error Logs

When an error occurs, the system records it in the error logs, which are stored in battery backed-up RAM. These errors indicate problems that span the entire system, including the control unit, telephones, adjuncts, and network interface.

Transient errors are less serious than permanent errors. However, some transient errors can become permanent if they occur a certain number of times, as shown in the table on this page. The Threshold column indicates the number of occurrences at which a transient error becomes permanent.

**Table 2-1. Transient/Permanent Error Thresholds**

Error Code	Error Description	Transient/Permanent Threshold
0C04	MWL FAC TIMEOUT	3
0C05	MWL DELIVERY DELAY	15
7402	LOOP BIT CONTROL NOT SET	4
7403	NO LOOP CURRENT	4
7404	STUCK RINGING	2
8403	NO EXTERNAL RELEASE	2
840B	NO LOOP CURRENT	4

**Table 2-1. Transient/Permanent Error Thresholds—Continued**

Error Code	Error Description	Transient/Permanent Threshold
840C	STUCK RINGING	2
840D	INCORRECT FIRMWARE STATE	2
2E01	T1 ACC VIOL	10

## Checking the Error Logs

You can check the Last 99 errors, Permanent errors, or Transient errors. If you are responding to a system alarm, it is recommended that you check the Permanent errors first. Once you have reviewed the error logs, you should print the error information. This helps you determine whether your work has resolved each problem.

### Procedure to View Error Logs

To view the Error Logs from the programming console or from WinSPM in Standard SPM mode:

Menu→Maintenance→System→Error Log→Last 99 or Permanent or Transient→More or  (to page through the errors)→Drop (to delete an error log entry)

### Procedure to Print Error Logs

To print the Error Logs from the programming console or from WinSPM in Standard SPM mode

Menu→System Programming→Exit→More or →Print→More or →More or →Error Log

## About the Error Logs

The most recent alarm message stays on the Error Log screen until it is replaced by another. The screen does not update the most recent alarm while displayed; to see any updates, you need to exit the Error Log and then view it again.

You can delete an error log entry from a Permanent or Transient Error Log. You cannot delete an error log entry from the log showing the Last 99 Errors. Depending on which entry you delete, you might clear an alarm. See [“About Alarms”](#) on page 1-8 for additional information about alarms.

Regarding entries on the Error Log screen:

- Line 2 provides a brief description of the error code identified on Line 6.
- Line 3 indicates the slot and port where the error was detected.
- Line 5 indicates the error's last occurrence.

## Interpreting Error Codes

Following is a description of each error code and recommended action.

**Table 2-2. Error Codes**

Error Codes	Description	Action
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, e.g. carrier 2 was powered down before carrier 1. If errors exist because of the improper power-down, then 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.
000F	TASK RUNNING TOO LONG:	No action required; however, if problem persists, troubleshoot the processor.
00DE	MERLIN Messaging System software was upgraded.	If the MERLIN Messaging System software was upgraded, no action is required.
0001	TIMEOUT COLD START: System programming is okay.	No action required; however, if problem persists, troubleshoot the processor.

**Table 2-2. Error Codes—Continued**

<b>Error Codes</b>	<b>Description</b>	<b>Action</b>
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.
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 “Restore” on page 6-5, or in Appendix D, “Backing up with a Memory Card.”
0010	INVALID SLOT INTERRUPT: Cannot determine module responsible for generating the interrupt.  or  The system was powered down incorrectly, e.g. carrier 2 was powered down before carrier 1. If errors exist because of the improper power-down, then 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.

**Table 2-2. Error Codes—Continued**

<b>Error Codes</b>	<b>Description</b>	<b>Action</b>
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.	
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.
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.

**Table 2-2. Error Codes—Continued**

<b>Error Codes</b>	<b>Description</b>	<b>Action</b>
0C03	<p>ALL TTRs UNAVAILABLE:</p> <p>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.</p>	<p>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.</p> <p>If you have prompt out of queue active, you may want to shorten the delay announcement message length.</p> <p>If you have the prompt out of queue feature and secondary announcement(s) active, you may want to increase the interval between the announcements.</p> <p>If you reprogram the delay announcement unit, recheck it to verify that the problem no longer exists.</p> <p>Check to see if you can add TTRs to the system.</p>
0C04	<p>MWL FAC TIMEOUT:</p> <p>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.</p>	<p>Check the 100D module or the 400EM module for any other alarm indications. Replace the module as necessary. If the module is functioning properly, the problem may be with the outside lines; contact your local telephone company.</p>
0C05	<p>MWL DELIVERY DELAY:</p> <p>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.</p>	<p>Check the module and line used to send the message. 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 or TTRs may be needed.</p>
0401	<p>ABK CARD NOT INSERTED:</p> <p>A PCMCIA memory card for Translation is not inserted.</p>	<p>Insert a Translation card or a card that has not been formatted.</p>

Table 2-2. Error Codes—Continued

Error Codes	Description	Action
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.
0404	ABK EXTENSION BUSY: An extension is in program, administration, or maintenance mode.	Wait until the extension changes mode. Make sure the programming device (SPM 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.
0802	E911 OVERFLOW: One of the following has occurred: All lines assigned to E911 Partition or Adjunct are busy or bad. No lines are assigned to E911 Partition or Adjunct. No physical line is connected to the system, the network, or the E911 Adjunct.	Do the following: Make sure the proper number of trunks are assigned to E911 Partition or Adjunct. Assign lines to E911 Partitions or Adjunct. Check that ground-start or loop-start trunks are connected to the E911 Adjunct. Check the network interface connection. When the condition returns to normal, the external alarm turns off automatically. You must remove the entry from the permanent error log.
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 or 408 GS/LS MLX with firmware vintage 0x29.	Replace the 008 or 408 MLX board with one of another firmware vintage and retire this permanent alarm manually.

Table 2-2. Error Codes—Continued

Error Codes	Description	Action
1C06	BAD TTR: Touch Tone Receiver failed the internal Touch Tone Receiver Test and has been busied out.	If TTR passes the next test, the system automatically restores it.
1C07	>= 50% of TTRs failed: 50% or more TTRs failed and have been busied out.	Check the modules containing the TTRs. Try to manually restore some TTRs. If necessary, replace the modules.
1C08	BAD BOARDS IN SYSTEM: At least one incompatibility problem of type HER 0x1c05 detected. Turns on CPU red LED.	Replace the 008 or 408MLX board with one of another firmware vintage and retire this permanent alarm manually.
2C01	T1 ACCESS VIOLATION: T1 Services (Channels-Voice/Data) programmed incorrectly.	Check facility provisioning and reprogram channels appropriately for voice or data. If the problem persists, contact the NSAC.
2C02	BEARER CAPABILITY/ INCOMPATIBILITY: A 64 kbps clear-channel data call was routed to a facility that does not have sufficient bandwidth to handle the call.	Verify that the ARS or UDP routing tables route a data call to a DS1 facility. Check the DS1 Type administration item for the specified facility. If the programmed value is <i>T1</i> , the caller must initiate a 56 kbps call. Check the DS1 Suppression administration item for the specified facility. If the programmed value is <i>AMI-ZCS</i> , the caller must initiate a 56 kbps call.
0801, and 5801	CTI LINK DELETED: A board renumber or slot restore moved the CTI Link to an unacceptable port and the system has removed the link.	Check that the following are true: The system is in Hybrid/PBX mode. The link is on an 008 MLX or 408 MLX board. The MLX board firmware vintage is not 29. Board renumber has not moved the extension to an operator position. An MLX telephone is not connected to that port. Board renumber has not moved the MLX extension to the system programming port.

Table 2-2. Error Codes—Continued

Error Codes	Description	Action
0802	<p>E911 OVERFLOW</p> <p>One of the following has occurred:</p> <p>All lines assigned to E911 Partition or Adjunct are busy or bad.</p> <p>No lines are assigned to E911 Partition or Adjunct.</p> <p>No physical line is connected to the system, the network, or the E911 Adjunct.</p>	<p>Do the following:</p> <p>Make sure the proper number of trunks are assigned to E911 Partition or Adjunct.</p> <p>Assign lines to E911 Partitions or Adjunct.</p> <p>Check that ground-start or loop-start trunks are connected to the E911 Adjunct.</p> <p>Check the network interface connection.</p> <p>When the condition returns to normal, the external alarm turns off automatically. You must remove the entry from the permanent error log.</p>
3001	<p>ALARM TABLE FULL:</p> <p>The error logs are full, and no more errors can be added to them.</p> <p>Turns on the processor LED.</p>	<p>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.</p> <p>Sys Program→System→Restart</p>
4001	<p>E911 ADJUNCT OOS:</p> <p>The E911 Adjunct has detected an error condition (such as the disconnection of the trunk cable). This error condition has caused an E911 Adjunct alarm, and the trunks connected to the E911 Adjunct are in the Trunk Maintenance Busy state.</p>	<p>Check the E911 Adjunct to make sure it is in working condition. Check the cable connections to this unit.</p> <p>The alarm and Trunk Maintenance Busy state automatically clear when the E911 Adjunct returns to normal operation.</p>
4401	<p>USER REQUESTED SYS ERASE:</p> <p>This error is logged after a System Erase. If the System Erase is successful, this error is removed immediately.</p>	<p>If this error remains in the transient log, do the System Erase again. If problem persists, troubleshoot the processor.</p>
4402	<p>USER REQST UPGRD/INSTALL:</p> <p>This is just a record of the event.</p>	<p>No action required.</p>

**Table 2-2. Error Codes—Continued**

<b>Error Codes</b>	<b>Description</b>	<b>Action</b>
4C01	<p>POOL EMPTY :</p> <p>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).</p>	Check that the pool has a trunk assigned to it. If a trunk is assigned and the problem persists, replace the boards.
4C02	<p>POOL BUSY :</p> <p>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).</p>	Check the count and first and last occurrences. If occurring too frequently, determine if facilities can be added or moved to this pool.
4C03	<p>POOL BUSY &amp;/OR OOS :</p> <p>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).</p>	Restore if out of service.
5801	See error code 0801	
5802	<p>BOARD RENUMBERING :</p> <p>A board renumbering procedure has occurred.</p>	If 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. Then compare the system's previous configuration to the one after board renumbering to determine if the board renumber caused logical IDs to shift.
6C01	<p>DS1 LOSS OF SIGNAL ALARM :</p> <p>Service on the link has been lost.</p>	Usually no action is required. Troubleshoot the T1 trunk, channel service unit (CSU), and the cable between the CSU and the 100D module. If problem persists, escalate to your technical support organization.

Table 2-2. Error Codes—Continued

Error Codes	Description	Action
6C02	DS1 BLUE ALARM: All unframed ones signal being received. The link cannot be used for communication.	Blue alarms are generated by intermediate equipment, such as a CSU or DDM 1000/2000. The far end of the network interface may be out of service. Troubleshoot the T1 trunk, channel service unit (CSU), and the cable between the CSU and the 100D module. If problem persists, escalate to your technical support organization.
6C03	DS1 RED ALARM: Incoming signal does not have valid framing information. Service on the link has been lost.	Troubleshoot the T1 trunk. If problem persists, escalate to your technical support organization.
6C04	DS1 YELLOW ALARM: The far end of the network interface has lost frame synchronization. Service on the link has been lost.	Troubleshoot the T1 trunk. If problem persists, check the CSU and the DS1 configuration (the framing format). If problem persists, escalate to your technical support organization.
6C05	DS1 LOSS OF MULTIFRAME: Service on the link has been lost.	Troubleshoot the T1 trunk. If problem persists, escalate to your technical support organization.
6C06	DS1 REMOTE MULTIFRAME: The far end of the network interface is experiencing loss of multiframe. Service on the link has been lost.	Troubleshoot the T1 trunk. If problem persists, escalate to your technical support organization.
6C07	DS1 MAJOR ALARM: Average bit error rate exceeds 10E-3. Service on the link has been lost.	Troubleshoot the T1 trunk. If problem persists, escalate to your technical support organization. Maintenance→Slot→Error Events→Current hr
6C08	DS1 MINOR ALARM: Average bit error rate exceeds 10E-6.	Troubleshoot the T1 trunk. If problem persists, escalate to your technical support organization. Maintenance→Slot→Error Events→Current hr
6C09	DS1 MISFRAME ALARM: Misframe count reached 18.	Troubleshoot the T1 trunk. If problem persists, escalate to your technical support organization. Maintenance→Slot→Error Events→Current hr

**Table 2-2. Error Codes—Continued**

<b>Error Codes</b>	<b>Description</b>	<b>Action</b>
6C0A	DS1 SLIP ALARM: Slip count reached 88.	Troubleshoot the T1 trunk. If problem persists, escalate to your technical support organization.  Maintenance→Slot→Error Events→Current hr
6C0B	HARDWARE INOPERATIVE: Hardware is not operating properly. If this is the only 100D (DS1) or 800 CO-BRI module, or if this is the module designated to have the active clock, its TDM bus clock generator was not activated.	If problem persists, escalate to your technical support organization.
6C0C	BRI LOSS OF SYNC:	Usually no action is required. Troubleshoot the BRI trunk. If problem persists, contact your technical support organization.
6C0D	BRI NET DEACTIVATED:	Usually no action is required. The link should return to normal once the test is completed. If problem persists, contact your technical support organization.
6C0E	BRI NET INV 2B+D LB ACT:	Usually no action is required. The link should return to normal once the test is completed. If problem persists, contact your technical support organization.
6C0C	BRI LOSS OF SYNC:	Usually no action is required. Troubleshoot the BRI trunk. If problem persists, contact your technical support organization.
6C0D	BRI NET DEACTIVATED:	Usually no action is required. The link should return to normal once the test is completed. If problem persists, contact your technical support organization.
6C0E	BRI NET INV 2B+D LB ACT:	Usually no action is required. The link should return to normal once the test is completed. If problem persists, contact your technical support organization.
6C0F	BRI NET INV B1 LB ACT:	Usually no action is required. The link should return to normal once the test is completed. If problem persists, contact your technical support organization.

Table 2-2. Error Codes—Continued

Error Codes	Description	Action
6C10	BRI NET INV B2 LB ACT:	Usually no action is required. The link should return to normal once the test is completed. If problem persists, contact your technical support organization.
6C11	BRI NET INV IL LB ACT:	Usually no action is required. The link should return to normal once the test is completed. If problem persists, contact your technical support organization.
6C12	BRI NET INV QM LB ACT:	Usually no action is required. The link should return to normal once the test is completed. If problem persists, contact your technical support organization.
7002	PRI SVC STATE INCONSIST:	Troubleshoot the PRI trunk and report to service provider; otherwise, no action required. If problem persists, contact your technical support organization.
7003	PRI D-CHNL INOPERATIVE:	Troubleshoot the PRI trunk and report to service provider; otherwise, no action required. If problem persists, contact your technical support organization.
7004	PRI B-CHNL NOT RELEASED:	Troubleshoot the PRI trunk and report to service provider; otherwise, no action required. If problem persists, contact your technical support organization.
7005	PRI B-CH GROUP INCONSIST:	Troubleshoot the PRI trunk and report to service provider; otherwise, no action required. If problem persists, contact your technical support organization.
7006	PRI PROTOCOL MISMATCH: A mismatch in the protocol being supplied versus the protocol expected by MERLIN MAGIX.	Inform the service provider to change the administration for this circuit. After the service provider restarts the circuit, verify that all alarms for this slot are cleared.
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.

**Table 2-2. Error Codes—Continued**

Error Codes	Description	Action
7402	<p>LOOP CONTROL BIT NOT SET: No loop current on an outgoing call.</p> <p>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.</p>	<p>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.</p>
7403	<p>NO LOOP CURRENT: Communication problems between the module and central office.</p> <p>No loop current.</p> <p>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.</p>	<p>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.</p>
7404	<p>STUCK RINGING: Communication problems between the module and central office.</p> <p>If this error occurs twice consecutively, the trunk is busied-out automatically, whether or not Automatic Maintenance-Busy is enabled.</p>	<p>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.</p>
7801	<p>NOT IN NORMAL OP MODE: Module not in normal operation mode. Reported in background module check.</p> <p>or</p> <p>MERLIN Messaging System reset at 2:00 A.M or the MERLIN Messaging System software was upgraded.</p>	<p>Reset the board. If problem persists, troubleshoot the module.</p> <p>Maintenance→Slot→Slot Number→Reset</p> <p>If the MERLIN Messaging System software was upgraded, then no action is required.</p>

Table 2-2. Error Codes—Continued

Error Codes	Description	Action
7802	<p>SANITY INT NOT GENERATED:</p> <p>Only applies to modules that have extension jacks.</p> <p>or</p> <p>MERLIN Messaging System software was upgraded.</p>	<p>Reset the board. If problem persists, troubleshoot the module.</p> <p>If MERLIN Messaging System module was upgraded, no action is required.</p>
7803	<p>NO PORT BOARDS AVAILABLE:</p> <p>This error is reported when modules are not present.</p>	<p>No action required. Delete this entry from the transient log.</p>
7804	<p>INVALID SANITY RESPONSE:</p> <p>Sanity test receives invalid responses. Applies only to modules that have extension jacks.</p> <p>or</p> <p>MERLIN Messaging System software was upgraded.</p>	<p>Reset the board. If problem persists, troubleshoot the module.</p> <p>If MERLIN Messaging System module was upgraded, no action is required.</p>
7805	<p>INVALID SLOT NUMBER:</p> <p>Rarely occurs.</p> <p>Software could not process an event detection because the slot number was invalid.</p>	<p>No action required; however, if problem persists, restart the system.</p>
7806	<p>NOT IN STANDBY MODE:</p> <p>Reported during cold start or background check.</p>	<p>Reset the board. If problem persists, troubleshoot the module.</p>
7807	<p>SELF TEST NOT COMPLETED:</p> <p>Reported during cold start.</p>	<p>Reset the board. If problem persists, troubleshoot the module.</p>
7808	<p>TEST RESULT REGISTER BAD:</p> <p>A module error or processor error resulted while running test.</p>	<p>Reset the board. If problem persists, troubleshoot the module.</p>
7809	<p>TEST STATUS REGISTER BAD:</p> <p>A module error or processor error resulted while running test.</p>	<p>Reset the board. If problem persists, troubleshoot the module.</p>
780A	<p>DPR TEST NOT COMPLETED:</p> <p>Reported during cold start.</p>	<p>If problem persists, troubleshoot the module.</p>

**Table 2-2. Error Codes—Continued**

<b>Error Codes</b>	<b>Description</b>	<b>Action</b>
780C	RAM TEST FAILURE: Memory failed the RAM test. Turns on the processor LED.	If problem persists, replace the processor.
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: Can appear for any of the following reasons: -- An unsupported enhanced tip/ring telephone is connected to a module. -- An ETR or MLS telephone is faulty. -- An 016 ETR module is faulty. -- The software is showing the message in error.	If a single user complains that an ETR or MLS telephone is not working properly, check that the telephone is a supported model. If the telephone is a supported model, replace the faulty telephone. (Obviously, if the telephone is not a supported model, replace it with a telephone that is supported.)  If multiple ETR or MLS telephone users connected to the same ETR module complain that the telephones are not working properly, troubleshoot the module and replace it if necessary.  If no telephone users are complaining, clear the error from the error 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.

Table 2-2. Error Codes—Continued

Error Codes	Description	Action
8403	<p>NO EXTERNAL RELEASE:</p> <p>Communication problems between the module and central office. Far end has not disconnected within four minutes.</p> <p>If this error occurs twice consecutively, the trunk is busied-out automatically, whether or not Automatic Maintenance-Busy is enabled.</p>	Troubleshoot the far end of the network interface to see if it is working and translated properly. Troubleshoot for faulty cable.
8404	<p>ON HOOK BEFORE WINK:</p> <p>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.</p>	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	<p>ON HOOK BEFORE READY:</p> <p>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.</p>	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.
8406	<p>INTERDIGIT TOO SHORT:</p> <p>Inbound dialing problems on tie and DID trunks.</p>	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	<p>BAD UPDATE:</p> <p>Communication problems occurred between the processor and the modules. Module may need to be replaced.</p>	Turn the processor off and then on. Repeat system programming procedure. If problem persists, escalate to your technical support organization.
8408	<p>ROTARY RATE &gt; 12PPS:</p> <p>Inbound dialing problems on tie and DID trunks.</p>	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	<p>ROTARY RATE &lt; 8PPS:</p> <p>Inbound dialing problems on tie and DID trunks.</p>	Troubleshoot the far end of the network interface to see if it is working and translated properly. Troubleshoot for faulty cable. Replace the module.

**Table 2-2. Error Codes—Continued**

Error Codes	Description	Action
8411	<p>E911 NO OUTGOING SEIZURE:</p> <p>The system has tried to seize a trunk assigned either to E911 Partition or E911 Adjunct for a 911 call and cannot seize the trunk. The trunks assigned to the E911 Partition or to the E911 Adjunct go into a Trunk Maintenance Busy state.</p> <p>An E911 Partition trunk in a Trunk Maintenance Busy state can still be used to make and receive non-E911 calls.</p>	<p>For an E911 Partition trunk, any one of the following can occur:</p> <p>The trunk may automatically clear if the line is seized for an outgoing call.</p> <p>The trunk may be manually seized by dialing *03 and dialing some digits.</p> <p>The trunk may automatically clear if the line is used for an incoming call.</p> <p>The error message is dropped, and the trunk clears.</p> <p>For an E911 Adjunct trunk, do the following:</p> <p>Check the connections on the E911 Adjunct. If the situation is corrected, the TMB state ends during the system's TMB recovery.</p> <p>Manually drop the error message.</p> <p>Manually seize the trunk by dialing *03.</p> <p>If you manually seize the E911 Adjunct trunk, the adjunct may place a call to the E911 Service.</p>
840A	<p>BAD DOWNLINK MESSAGE:</p> <p>Communication problems occurred between the processor and the modules. The module received an unrecognized message from the processor.</p>	<p>Turn the processor off and then on. Repeat system programming procedure. If the problem persists, replace the module.</p>
840B	<p>NO LOOP CURRENT:</p> <p>Communication problems between the module and the central office. No loop current.</p> <p>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.</p>	<p>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.</p>

Table 2-2. Error Codes—Continued

Error Codes	Description	Action
840C	<p>STUCK RINGING:</p> <p>Communication problems between the module and central office.</p> <p>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.</p>	<p>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.</p>
840D	<p>INCORRECT FIRMWARE STATE:</p> <p>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.</p>	<p>Turn power off for at least 1 second and then turn it on. Repeat system programming procedure. If problem persists, replace the module.</p>
840E	<p>UPLINK MESSAGE ERROR:</p> <p>Communication problems between the processor and the module. The module received an unrecognized message from the processor.</p>	<p>Turn the processor off and then on. Repeat system programming procedure. If the problem persists, replace the module.</p>
840F	<p>LOST IDLE MESSAGE ERROR:</p>	
8C01	<p>SLOTS NOT EQUAL:</p> <p>The module that occupies the indicated slot does not match the slot information contained in the PC or PCMCIA card backup file.</p>	<p>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.</p>
9801	<p>MCARD WRITE ERROR:</p> <p>Write to the memory card is not succeeding or is too slow.</p>	<p>Reset the card and try again. If the problem persists, replace the card and try again. If the problem still persists, replace the processor.</p>
9802	<p>MCARD ERASE ERROR:</p> <p>Erasure of the memory card is not succeeding or is too slow.</p>	<p>Reset the card and try again. If the problem persists, replace the card and try again. If the problem still persists, replace the processor.</p>
9803	<p>MCARD 12-VOLT ERROR:</p> <p>The memory card voltage is incorrect.</p>	<p>Reset the card and try again. If the problem persists, replace the card and try again. If the problem still persists, replace the processor.</p>

**Table 2-2. Error Codes—Continued**

<b>Error Codes</b>	<b>Description</b>	<b>Action</b>
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 CO 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 MAGIX messages. Contact the central office to correct the problem.
9C05	NW NOT RESPOND TO RELEASE: Service on the link has been lost.	The private network is not responding to the MERLIN MAGIX 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.  Call the Avaya TSO 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 Restart.  Call the Avaya TSO for the procedures to unload and reload the PBX driver.

## Access Log

In addition to checking the error logs, checking the access log helps you troubleshoot. Each time maintenance or system programming is accessed, the event is recorded in an access log (up to the last 20 events). This information may be useful in determining whether one of those events caused an error detected shortly thereafter.

Each event is documented by the time and date of occurrence. The station button (*Sta*) column indicates whether the event occurred from a programming console (if so, the extension number is displayed) or from WinSPM (*SPMD* if direct; *SPMR* if remote). The SP/M column indicates whether the event originated from System Programming (*SP*) or Maintenance (*M*).

## Scanning the Access Log

The last 20 events are shown, beginning with the most recently accessed event. When you reach the end of the list, you hear a beep and all variable information is cleared from the screen. To return to the beginning of the list, select **Exit** and then select **Access Log** again.

### Procedure

To view the Access Log from the programming console or from WinSPM in Standard SPM mode, select:

Menu→Maintenance→System→Access Log→More or  (to page through the log)

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## System Inventory

If you need to contact the Avaya Technical Services Organization or authorized dealer, you may need to access the System Inventory screen in order to answer questions that may be asked. The System Inventory screen shows you the hardware vintage, software vintage, and ROM ID for each module in the control unit.

### Procedure

To view System Inventory from the programming console or from WinSPM in Standard SPM mode, select:

Menu→Maintenance→System→Inventory→More or  (to review information about the module in each subsequent slot)

The System Inventory screen for Slot 00 (the Processor module) is displayed first. When you reach the display for the last slot, pressing More redisplay Slot 00 information.

## About the System Inventory Screen

The System Inventory screen provides the following information:

- Line 2 on the System Inventory screen indicates the slot number.
- Line 3 indicates the board name.
- Line 4 indicates the hardware vintage which shows the revision level of the processor board's firmware.
- For slots other than Slot 00, line 5 indicates the firmware vintage which is the boot ROM release number for the board software, followed by the official software version number.
- For slots other than Slot 00, line 6 indicates the application vintage which is the revision levels of the ROM pairs on the processor board.

## Module Serial Numbers

Beginning in MERLIN MAGIX Release 1.5, serial numbers are provided on the System Inventory screen for the following modules:

- 024-TDL
- 100 DCD
- 100R INA
- 412 LS-ID-TDL
- MERLIN Messaging System

The module serial numbers for these modules also appear in the System Information Report.

A serial number indicates the year and month of manufacture, the location of manufacture, and a counter number that is unique to that module. The digits are arranged as follows:

- First two digits are the year manufactured.
- The next two letters show the place of manufacture.
- The next two digits are the month manufactured.
- The last six digits are the unique counter number.

For example, in the serial number 99DR11034567, "99" is the year, "DR" represents Denver, "11" indicates November, and "034567" is the unique counter.

## Bridge Modules

If the system includes a bridge module (an empty slot that has been programmed), the System Inventory screen does not recognize it. When replacing or adding modules, make sure bridge module slots remain empty, and that no modules are installed to their right.

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## Overview

This section provides a general telephone troubleshooting procedure as well as recommended troubleshooting procedures based on reported telephone problems. Also provided are 4400-Series telephone tests, MLX telephone tests, Touch Tone Receiver tests, and a review of system requirements for Touch Tone Receivers.

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## Fixing Telephone Problems

If a reported telephone problem matches any symptom described in the following table, refer to the corresponding procedure.

**Table 3-1. Source of Telephone Problem—Section Reference**

<b>If this symptom occurs...</b>	<b>See...</b>
No specific problem identified; telephone does not work.	<a href="#">“General Telephone Troubleshooting”</a> on page 3-2
Intermittent telephone problem.	<a href="#">“General Telephone and Wiring Problems”</a> on page 3-2
Telephone does not receive tones from the control unit.	<a href="#">“Voice Transmission Problems”</a> on page 3-3

## General Telephone Troubleshooting

Use this procedure as a general guideline for troubleshooting telephones.

1. Replace the telephone (or adjunct) with one that works properly.
1. If the problem persists, connect the telephone directly to the control unit, using a cord that works properly.
  - If this solves the problem, replace the original cord.
  - The power supply may be shorted or open. If the wiring has been crushed or severed, replace it.
    - a. Test the power supply for 48 VDC with a voltmeter or by reconnecting the telephone or adjunct.
    - b. If the test for 48 VDC fails, replace the circuit pack in the telephone or adjunct.



### CAUTION:

*A faulty circuit pack has the potential to damage the power supply, which can cause widespread damage throughout the system.*

2. If the problem persists, replace the mounting cord.
3. If the problem continues, proceed as described in the next sections.

If you change the jack assignment of any telephone, be sure to record the extension jack change on Form 2a, System Numbering: Extension Jacks, shown in Appendix B.

## General Telephone and Wiring Problems

If intermittent telephone trouble occurs, use the following steps as a guideline to check for general telephone and wiring problems.

**NOTE** ▶ Refer to “[Trunk Errors](#)” on page 5-1 if the reported problem is echo during conversations on T1 trunks with GS emulation connected to a toll office.

1. Check modular connections in the telephone for loose or broken connectors.
2. Check modular connections in the connecting blocks for loose or broken connectors.
3. Check modular connections in the control unit for loose or broken connectors.
4. Check transient errors in the error logs for any possible clues.
5. If local power is provided, check the power supply connectors and voltages.
6. Replace the telephone with a telephone that works to determine whether the problem is the telephone itself.
7. If trouble disappears, replace the problem telephone.

8. If the replacement telephone does not work properly, check the other telephones connected to the same module.
  - If these telephones work, the problem may be the wiring, or there may be a single-port failure on the module. Go to Step 12.
  - If these telephones do not work, the fault is probably in the module. Continue with Step 9.
9. Check the LEDs on the module.
10. If the module does not have LEDs, see [“Checking System and Slot Status”](#) on page 4-31 for more information.
11. Check the error log for relevant messages. See [“Error Logs”](#) on page 2-1.
12. Replace the faulty module.
13. Replace the wiring between the module jack field and the telephone to see if there is a wiring problem.

## Voice Transmission Problems

If the telephone does not receive tones, check the control unit and wiring with a telephone that works.

---

## Single-Line Telephone Problems

If more than one single-line telephone cannot dial correctly, even though they are receiving calls, use the steps below to test the Touch Tone Receivers (TTRs) for a single-line telephone.

1. Pick up the handset; then dial \*04 and the 2-digit number of the TTR you want to test.
  - If you hear a busy tone, the receiver is in use/off hook.
  - If you hear a reorder tone, you have misdialed or have reached an invalid TTR. Try again.
  - If you hear a dial tone, go to Step 2.
2. Dial **123456789\*0#**.

You should hear a dual-tone multi-frequency (DTMF) signal as you press each button. If the test is successful, you hear a three-beep confirmation tone one to three seconds after you press #.

3. Hang up and repeat Steps 1 and 2 for each TTR.
4. If this test fails, replace the module containing the faulty TTR.

If all TTRs fail this test, repeat the test, using a different telephone that works. If the tests are successful, replace the original telephone.

If users cannot make outside calls on a Touch Tone telephone, check the system programming for the individual trunk for rotary-dial programming.

## Call Forwarding Problems

Call Forwarding problems usually occur when someone activates Call Forwarding unintentionally, resulting in a user receiving other users' calls.

Cancel the Call Forwarding feature (for the receiving telephone):

- On multiline telephones, press the Feature button and dial **\*34\***.
- On single-line telephones, pick up the handset, dial **#\*34\***, and then hang up.

**NOTE** ► You can cancel Call Forwarding from the receiving telephone or from the forwarding telephone, providing that you know the number.

---

## 4400-Series Telephones Test

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, 4406D+, and telephones with a DSS attached, all LEDs light and the telephone rings throughout the test.
- On 4412D+, 4424D+, and 4424LD+, 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 will turn the current column of LEDs off (if lit), and toggle 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.

### **Attendant Position Programmed on a 4400-Series Telephone that Does Not Support Attendant Position**

If a port is administered as an attendant position, but the telephone in that port is one that is not supported as an attendant, the administration will be accepted as far as the administrator is concerned (no warnings, no beeps) but the message, `Invalid 44XX QCC` or `Invalid 44XX DLC` is displayed at that telephone (where XX represents one of the 4400-Series telephones). Once this message is displayed, the telephone is inoperative (no incoming or outgoing calls). If the telephone does not have a display, the telephone is dead and beeping.

Through system administration, remove the attendant position administration from the port.

## MLX Telephone Tests

If the LEDs, ringer, buttons, switchhook, or display appear not to be working, try the steps below.

1. Pick up the handset.
2. When you hear 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 phone starts ringing.

- This test connects a test tone to the B-channel and sends a repeated ring burst to the telephone.
- On an MLX telephone with a DSS attached, all LEDs light and the phone rings throughout the test.
- On an MLX display telephone, the display blanks out and is replaced with a grid of small dots.

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

The red and green LEDs should toggle on and off.

4. Press each fixed-feature button that has an LED (Feature, HFAI, 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 that does not have an LED (Transfer, Conf, Drop, and Hold) and each dialpad button.

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

6. Press the fixed-feature buttons and the dialpad buttons in the order shown below to turn on all the LEDs.

- a. Volume down
- b. Volume up
- c. Transfer
- d. Conf
- e. Drop
- f. Hold
- g. Dial **123456789\*0#**

The LEDs should toggle on and off.

7. If the MLX telephone does not have a display, hang up and go to Step 9; if it does, continue with the next step.
8. To test an MLX display, press each display button.

Each button name as shown in Table 3-2 should display in the upper-left corner.

**Table 3-2. MLX Telephone Display Buttons**

Button	Display
Home	HOME
Menu	MENU
More	MORE
Inspect	INSPECT
Each unlabeled display button	DISPLAY BUTTON nn; where nn is 1–10, depending on which button you press.

9. If any of these tests fail, replace the MLX telephone.
10. Test the Multi-Function Module (MFM) if present.
  - a. Connect a single-line telephone to the MFM.
  - b. Pick up the handset on the single-line telephone.
  - c. When you hear the system access or intercom dial tone, dial **\*09** from the single-line telephone.  
This connects the diagnostic test tone to the B-channel.
  - d. Dial **123456789\*0#**; wait for silence, and then quickly press the Recall button to perform a switchhook flash.  
You should hear a confirmation tone (three beeps).
  - e. Hang up.  
You should hear a ring burst, and the Message LED should turn on.
  - f. Dial **#54** to turn off the Message LED and resume normal operations.
11. If these tests fail, replace the MFM.

## Station Responding Test

Beginning in MERLIN MAGIX Release 1.5, you can run a Station Responding Test to check the connection between an extension and the system. When you select this test from the maintenance screen, the system sends a request to the telephone at that extension (station), asking for the telephone's classmark. You can request the Station Responding Test locally or remotely.

**NOTE** ► The Station Responding Test does not work for tip/ring devices because tip/ring devices do not have classmarks.

## Procedure

Menu→Maintenance→Port→Type station no.→Enter→Test

The system responds with one of four results:

- **Pass**—An identifiable classmark was received. This screen also indicates the name of the device that returns the classmark (“Profile”).
- **No Response**—No classmark was received. (Tip/ring devices respond this way.)
- **Invalid Response**—A classmark was received, but the system cannot identify it.
- **Intermittent Response**—A classmark was not consistently received.

---

## Touch Tone Receiver Problems

Touch Tone Receivers (TTRs) are required for:

- The voice messaging system; the number of TTRs depends on the number of ports used by the Voice Messaging System (VMS), as shown in TTRs Required by VMS/AA.

**NOTE** ► For MERLIN Messaging Systems of Release 2.5 or later, TTRs are not allocated for calls made from the MERLIN Messaging System module ports but are allocated for calls made to the MERLIN Messaging System module ports. To ensure correct operation, use the TTR requirements shown in System Requirements for TTRs.

- System requirements based on call volume and use of account codes, as shown in System Requirements for TTRs.
- Private networks using E&M, T1 tie, and tandem tie trunks.
- Primary and secondary delay announcement devices used with the Prompt-Based Overflow feature which allows callers to request overflow coverage while waiting in a calling group queue. See [Table 3-6, “TTRs Required for Primary Delay Announcement Devices When Using Prompt-Based Overflow,”](#) on page 10 and [Table 3-7, “TTRs Required for Secondary Delay Announcement Devices When Using Prompt-Based Overflow,”](#) on page 11.

**Table 3-3. Modules that Supply TTRs**

Module	No. of TTRs
008 OPT	2
012 (T/R)	2
016 (T/R)	4
016 ETR	4
024 TDL	8
400 GS/LS/TTR	4

**Table 3-3. Modules that Supply TTRs—Continued**

Module	No. of TTRs
412 LS-ID-TDL	4
800 DID	2
800 GS/LS	2
800 GS/LS-ID	2
MERLIN LEGEND Mail module	2
MERLIN Messaging System module	2

### System Requirements for Touch Tone Receivers

The tables on the following pages show the TTRs required by VMS/AA systems, general system requirements for TTRs, and TTRs required for Primary Delay Announcement Devices when using Prompt-Based Overflow.

**Table 3-4. TTRs Required by VMS/AA**

Number of VMS Ports	Number of TTRs Required
1	1
2	1
3	2
4	2
6	3
8	4
12 <sup>1</sup>	6 <sup>1</sup>
16	8
18	8

<sup>1</sup> If a 12-port MERLIN MAGIX Enhanced Customer Care Solution is used, 8 TTRs are required.

In the following table, the call volume per hour includes all calls originating from single-line telephones, calls on tie lines, incoming remote access and DID calls.

**Table 3-5. System Requirement for TTRs**

Calls/Hour	TTRs Required	
	No Account Codes Used	Account Codes Used
110	2	4
180	4	6
350	4	8
420	6	8
610	6	10
710	8	10

**Table 3-6. TTRs Required for Primary Delay Announcement Devices When Using Prompt-Based Overflow**

Number of Devices	Number of TTRs Required
1	1
2	2
3	3
4	4
5	4
6	5
7	5
8 or more	6

**Table 3-7. TTRs Required for Secondary Delay Announcement Devices When Using Prompt-Based Overflow**

Number of Devices	Number of TTRs Required
1	1
2	1
3	1
4	2
5	2
6	2
7	3
8	3
9	3
10 or more	4

### Private Network Considerations

You must consider the call traffic across a private network when estimating the number of required TTRs. This includes calls on analog tandem tie trunks and T1-emulated tandem tie trunks. In addition, if your private network includes Centralized Voice Messaging, you must consider the call traffic coming across the private network for the voice messaging system and the TTRs required for the updating of Message Waiting Lights. For this updating, a TTR is required at the sending end and the receiving end. If the systems in the private network are connected by PRI trunks, no additional TTRs are needed.

### Symptoms Indicating Need for More TTRs

The following symptoms indicate that the system needs more TTRs.

- Single-line telephone users do not get dial tone when they lift the handset to dial out.
- The voice messaging system fails to transfer calls.
- Calls fail to ring or go to coverage prematurely.
- Reorder tone on UDP/ARS calls using tandem tie trunks.
- Delay in MWL tie trunks when tie trunks are available.

## Calculating TTR Requirements

If symptoms indicate more TTRs are required, use the following steps to calculate the system requirements for TTRs.

1. Determine the number of TTRs required for the voice messaging system, if one is present. See Table 3-4, “[TTRs Required by VMS/AA](#),” on page 9.
2. Estimate the hourly call volume for calls originating from single-line telephones, incoming calls (including private network tandem tie trunks) on remote access and Direct Inward Dial (DID) lines, all calls on tie lines, and calls routed to the voice messaging system.
3. Determine the number of TTRs required by the system. See “[System Requirements for Touch Tone Receivers](#)” on page 3-9.
4. Use Column 2 if account codes are not being used.
5. Use Column 3 if account codes are being used.
6. Add the number of TTRs obtained in Steps 1 and 3. If the Group Calling Prompt-Based Overflow setting is not being used, go to Step 8.
7. If the Group Calling Prompt-Based Overflow setting is being used by calling groups, first add the number of TTRs needed for the primary delay announcement devices assigned to those calling groups, then add the number of TTRs needed for the secondary delay announcement devices assigned to those calling groups. See Table 3-6, “[TTRs Required for Primary Delay Announcement Devices When Using Prompt-Based Overflow](#),” on page 10 and Table 3-7, “[TTRs Required for Secondary Delay Announcement Devices When Using Prompt-Based Overflow](#),” on page 11.

**NOTE** ► If no announcement is used on a primary or secondary delay announcement device, no TTRs are needed.

8. Determine the number of TTRs already supplied. See Table 3-3, “[Modules that Supply TTRs](#),” on page 8.
9. Compare the total TTRs needed to the total TTRs already supplied to determine if additional TTRs are required.
10. Add a new module if more TTRs are needed.

## Touch Tone Receiver Test

The Touch-Tone Receiver Test runs as an audit on the system. It is not a demand test but runs continuously in the background as a maintenance check. This test checks every Touch Tone Receiver (TTR) in the system modules, including those in the MERLIN Messaging System.

If a TTR fails the test, a permanent error is logged and the TTR becomes maintenance busy. If 50% or more TTRs become maintenance busy at the same time, another permanent error is logged. See Error Codes 1C06 and 1C07 in Table 2-2 on page 2-3. The Touch Tone Receiver Test itself does not maintenance busy out 50% or more TTRs.

When a maintenance-busy TTR is retested and passes the test, it is automatically placed back into service

**NOTE** ► Release 1.0 of the MERLIN Messaging System resets itself at 3:00 a.m. every day. In MERLIN Messaging System Release 1.1 and later, you can change or disable the reset time. During the first 30 seconds of the messaging system's reset, its TTRs do not function. If the Touch Tone Receiver Test tests these TTRs at this time, it removes the TTRs when they fail. Unless you manually restore these TTRs, they will remain maintenance busied-out until the next audit.

You can manually place a TTR into a maintenance busy state. The TTR remains in the busy-out state until you manually restore it and place it back into service. You can manually restore a busied-out TTR regardless of whether the TTR was busied out by the TTR audit or manually busied out.

- NOTES** ►
- The Touch-Tone Receiver Test does not test touch-tone receivers that are manually placed into maintenance busy. Therefore, these TTRs cannot automatically be placed back into service. They must be manually restored.
  - The Touch-Tone Receiver Test does not test TTRs on busied-out slots.

Following are additional considerations for TTRs:

- When the system puts a slot in the Slot-Busy mode, the TTRs are unavailable as a system resource but they are not considered by the system to be in the Busy-Out mode.
- You can manually busy out a TTR on a slot in the Slot-Busy mode.
- You cannot manually restore a TTR on a slot in the Slot-Busy mode.
- A Warm Start restores service to all TTRs that were busied out by a TTR Audit. However, a Warm Start does not restore TTRs manually busied out.
- A Cold Start restores service to all TTRs that were busied out by a TTR Audit. However, a Cold Start does not restore TTRs manually busied out.
- A Frigid Start restores service to all TTRs that were busied out by a TTR Audit and will also restore TTRs manually busied out.
- When a slot is returned to service, the TTRs are available as system resources. This includes TTRs busied out by a TTR Audit and TTRs manually busied out.
- A Slot Reset restores service to all TTRs that were busied out by a TTR Audit. However, a Slot Reset does not restore TTRs manually busied out.
- The TTR test (\*04) fails if the TTR is in a slot in the Slot-Busy mode or if the TTR was busied

## **Procedures to View Status, Busy Out, or Restore TTRs**

Use these maintenance procedures to view the Status, Busy Out, or Restore TTRs.

### **Procedure to View TTR Status**

Menu→Maintenance→Port→TTR→Type TTR no.→Enter→Status

### **Procedure to Busy Out TTRs**

Menu→Maintenance→Port→TTR→Type TTR no.→Enter→Busy Out

### **Procedure to Restore TTRs**

Menu→Maintenance→Port→TTR→Type TTR no.→Enter→Restore

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## Overview

If you are able to isolate reported problems to the control unit, or if after troubleshooting and resolving telephone problems the system is still not working properly, you should troubleshoot the control unit.

Troubleshoot the control unit components in the following order:

- Power supply
- Processor
- Line/trunk and extension modules (hereafter referred to as modules)
- Carrier

 **WARNING:**

*Beware of hazardous voltages. Only qualified technicians should attempt to service the control unit. Follow all procedures carefully.*

---

## Backing Up System Programming

Before performing any procedure that requires powering down the system, save system programming in one of the following ways:

- Save the system programming to a floppy disk. See “Backup” in *Programming Basics* for detailed instructions.
- Save the system programming to a memory card. See Appendix D, “Backing up with a Memory Card” for detailed instructions. If automatic backups are performed, it may not be necessary to save system programming.

**NOTE** ► If the processor module is not functioning, it may not be possible to back up system programming.

## Power Supply Problems

If the power supply fails, all components connected to the carrier are automatically shut down. If you suspect power supply failure, check the following parts:

- Power supply LED
- For metal carriers, connectors on the Power Supply module and on the carrier
- For plastic carriers, Interlocking post (on the carrier, behind the power supply)
- For plastic carriers, ring generator, if present

### Checking the LED

If the power supply's LED is off, check the power switch. If it is off, turn on the power switch for each power supply in the control unit. *Start with the rightmost carrier and end with the basic carrier.* Watch for the responses below.

- The green power LED should light on *each* power supply.
- The red LED on the processor should turn on for 15 to 45 seconds and then turn off.
- All indicators on the 100D, 800 NI-BRI, and 400EM modules (if present) should turn on and then off. They remain off when the modules are idle.

If any of these responses do not occur or if the console operator reports any problems, continue with [“Checking the Connectors \(Metal Carrier\)”](#) on page 4-3 or [“Checking the Interlocking Post \(Plastic Carrier\)”](#) on page 4-3.

## Checking the Connectors (Metal Carrier)

If the power supply is not working, follow these steps to check the check the connectors on the Power Supply module and on the carrier:

### **WARNING:**

- *Never remove the power supply without first turning off the power switch and disconnecting the power cord from the AC outlet.*
- *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 See 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.*

### **CAUTION:**

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

1. Remove the power supply. See [“Removing the Power Supply Module \(Metal Carrier\)”](#) on page 4-8.
2. Check the connectors on the Power Supply module and on the carrier for damage such as bent pins.
3. If the connector on the carrier is damaged, replace the carrier; if the connector on the Power Supply module is damaged, replace the Power Supply module.
4. If the connectors are not damaged, reinstall the power supply. See [“Reinstalling the Power Supply Module \(Metal Carrier\)”](#) on page 4-10.

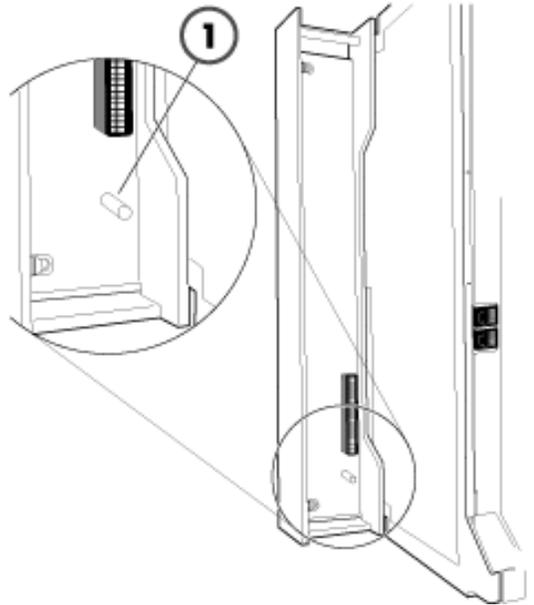
## Checking the Interlocking Post (Plastic Carrier)

If the power supply on a plastic carrier is not working, follow these steps to check the interlocking post.

1. Remove the power supply. See [“Removing the Power Supply Module \(Plastic Carrier\)”](#) on page 4-9.
2. Check the small, cylindrical interlocking post on the plastic carrier that locks into the power supply as shown in the illustration.

If the post is broken, replace the carrier.

3. If the interlocking post is not broken, reinstall the power supply. See Reinstalling the Power Supply.
- 



---

**Figure 4-1. Power Supply Interlocking Post on Plastic Carrier**

- 1 Interlocking Post

### Replacing the Ring Generator (Plastic Carrier)

If tip/ring devices (such as single-line telephones, fax machines, and answering machines) do not ring, and an older 012 module is installed, try the procedure below.

Current 012 modules contain built-in ring generators (apparatus code 517G13 (28) or higher letter). If tip/ring devices connected to a newer module do not ring, see [“Module Problems”](#) on page 4-18. For plastic carriers, see the following table to determine which 012 module is installed.

**NOTE** ► All 016 (T/R) modules contain built-in ring generators.

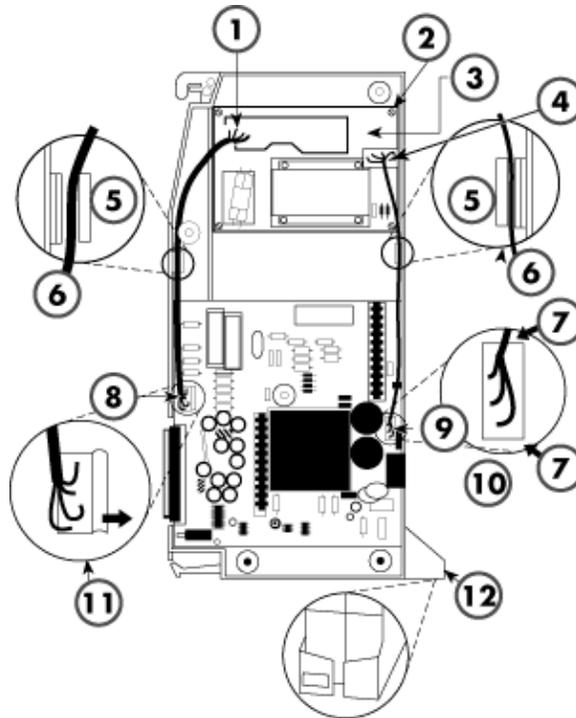
**Table 4-1. PEC and Apparatus Codes for 012 Modules in Plastic Carriers**

012 Module	PEC	App. Code
With Ring Generator	61494	517G13 (28) or higher letter
Basic Telephone (without ring generator)	61487	517E13 or 517F13 or lower letter

**WARNING:**

*Hazardous electrical voltages may be present if the following steps are not performed correctly.*

To replace the ring generator, follow these steps while referring to the illustration.



---

**Figure 4-2. Replacing a Ring Generator**

- 1 P2
- 2 Remove the four screws (one on each corner of the ring generator).
- 3 Ring Generator Unit
- 4 P1
- 5 Wire Clip
- 6 Step 4: Detach cable from wire clip.
- 7 Grip here
- 8 P202
- 9 P101
- 10 Step 6: Disconnect the P101 header (grip both sides and pull forcefully)
- 11 Step 5: Disconnect the P202 header (pry the clip away from the header and pull the header straight up.
- 12 Step 18: Wire manager: when finished, make sure the modification label “Equipped with 129B Freq Gen” is attached

Remove the power supply. See [“Removing the Power Supply Module \(Plastic Carrier\)”](#) on page 4-9.

1. Place the power supply on its left side and remove the five screws.
2. Carefully turn the power supply over on its right side and then remove the top of the power supply housing.
3. Detach the cables from the inside edge of the plastic housing by removing them from the clips.
4. Disconnect the 4-pin cable from the header labeled P202 on the left side of the power supply circuit board. You may need to pry back the clip to free the cable.
5. Disconnect the other cable from the header labeled P101 on the right side of the power supply circuit board. You need to grip this cable firmly and pull forcefully.
6. Remove the four screws from the ring generator, as shown in the illustration.
7. Remove the ring generator.
8. Position the replacement ring generator. Align the screw holes.

Make sure the P1 header on the ring generator is on the same side of the power supply housing as the P101 header on the circuit board.

9. Replace the four screws and fasten them to secure the ring generator.
10. Connect one end of the new ring generator’s cable with the 3-pin connectors to the header labeled P101 on the power supply circuit board.

This cable connector, as with all four of the cable connectors, is keyed so that you cannot attach it to the header if it is turned the wrong way.

11. Connect the other end of the cable to the header labeled P1 on the ring generator.

The cable headers, P1 and P101, should be on the same side of the housing, so that the cables are not crossing each other.

12. Connect one end of the new 4-pin cable to the header labeled P202 on the power supply circuit board.
13. Connect the other end of the cable to the header labeled P2 on the ring generator.
14. Attach the cables to the clips on the inside edge of the plastic housing.
15. Replace the top of the module housing.

Take time to ensure that the on/off faceplate on the front of the power supply housing is aligned and inside the top cover.

16. Carefully, taking time to make sure the on/off faceplate stays aligned, turn the module over and replace the five screws.
17. Verify that the modification label (Equipped with 129B Freq Gen) is attached to the front of the power supply. If not, attach the label supplied with the new ring generator.
18. Reinstall the power supply. See [“Reinstalling the Power Supply Module \(Plastic Carrier\)”](#) on page 4-11.

## Replacing the Power Supply

This section contains instructions for removing and re-installing the Power Supply module for both metal and plastic carriers.



### **WARNING:**

- *Never remove the power supply without first turning off the power switch and disconnecting the power cord from the AC outlet.*
- *Beware of hazardous voltages; whenever the carrier connections are exposed, use extreme caution; do not touch them directly or with any type of tool. Follow all procedures carefully.*
- *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. Failure to comply with this procedure can result in shock hazard and/or damage to the equipment.*



### **CAUTION:**

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

## Removing the Power Supply Module (Metal Carrier)

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

1. If possible, back up system programming on a floppy disk or memory card.
  - See “Backup” in *Programming Basics* for instructions on backing up to a floppy disk.
  - See Appendix D, “Backing up with a Memory Card” for instructions on backing up to a PCMCIA card.

**NOTE** ► If the basic carrier’s power supply fails, you cannot back up system programming.

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 power supply.
    - a. Unplug the AC power cord from the power supply.
    - b. Use a screw driver to remove the screw on the top of the module and the screw on the bottom of the module.
    - c. Using a screwdriver, pry the tab at the bottom front of the module.
    - d. 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.

### Removing the Power Supply Module (Plastic Carrier)

To remove the power supply module on a plastic carrier, follow these steps:

1. If possible, back up system programming on a floppy disk or memory card.
  - See “Backup” in *Programming Basics* for instructions on backing up to a floppy disk.
  - See Appendix D, “Backing up with a Memory Card” for instructions on backing up to a PCMCIA card.

**NOTE** ► If the basic carrier’s power supply fails, you cannot back up system programming.

2. Power down the system.
  - a. Turn off the power supply in the basic carrier.
  - b. Turn off the power supply in each expansion carrier.
  - c. Unplug the system from the AC outlet.
3. Remove the power supply.
  - a. Unplug the AC power cord from the power supply.
  - b. Remove the ground wire attached to the grounding screw on the front of the power supply module.
  - c. Remove the two ferrite cores, if present, from around the AC power cord and ground wire.
  - d. Remove the power supply module.

## Reinstalling the Power Supply Module (Metal Carrier)



### 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. Failure to comply with this procedure can result in shock hazard and/or damage to the equipment.*

Follow these steps to install the power supply module in the metal 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.

4. Power 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.*
- a. 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.
  - b. 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 400 E&M line/trunk modules (if present) turn on and then off. They remain off when the modules are idle.
5. If any of these conditions are not met, continue troubleshooting the system.

## Reinstalling the Power Supply Module (Plastic Carrier)

### **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. Failure to comply with this procedure can result in shock hazard and/or damage to the equipment.*

To reinstall the power supply module, follow these steps:

1. Insert a new power supply.
  - a. Reinstall the power supply module by hooking the top into the basic carrier and then swinging it down into place. Push the lower end firmly until the locking tab clicks.
  - b. Replace the ferrite cores around the AC power cord and ground wire and slide the ferrite cores between the wire manager and the power supply module.
  - c. Attach the ground wire to the grounding screw.
2. For each power supply, connect the AC power cord to the connector marked AC INPUT on the power supply.
3. Plug the other end of each AC power cord into the AC outlet.
4. Power up the system by turning on the following components in the order given.
  - a. Power supply on each expansion carrier
  - b. Power supply on the basic carrierThe system automatically cold starts.

### **CAUTION:**

- *Do not plug the power supply into the AC outlet until you are ready to turn power up the system*
- *Do not attach the power cord(s) to any building surfaces.*

## Processor Problems

If the error logs (or any aspect of troubleshooting) indicate that the processor is the problem, back up system programming, if possible, in one of these ways:

- Backup system programming to a floppy disk. See “Backup” in *Programming Basics* for detailed instructions.
- Backup system programming to a memory card. See Appendix D, “Backing up with a Memory Card” for detailed instructions.

Call the Avaya Technical Support Organization (TSO) for troubleshooting instructions.

- See “System Inventory” in *Programming Basics* for instructions on how to identify information about the processor that the TSO may ask you.
- If you are instructed to perform a System Erase, see “[Frigid Start \(System Erase\)](#)” on page 1-9. Do not perform this procedure unless you are instructed to do so.
- If you are instructed to replace the processor, see “[Replacing the Processor Module](#)” on page 4-17.

## Forced Installation/Upgrade of System Software



### CAUTION:

- *Forced installation should be performed only under emergency situations in which on-board system software has been corrupted.*
- *All existing system programming will be erased by this procedure.*

System software can be installed or upgraded through the PCMCIA interface slot on the processor module. Use this procedure when one of the following occurs:

- System software becomes corrupted
- Upgrade to a later release of system software

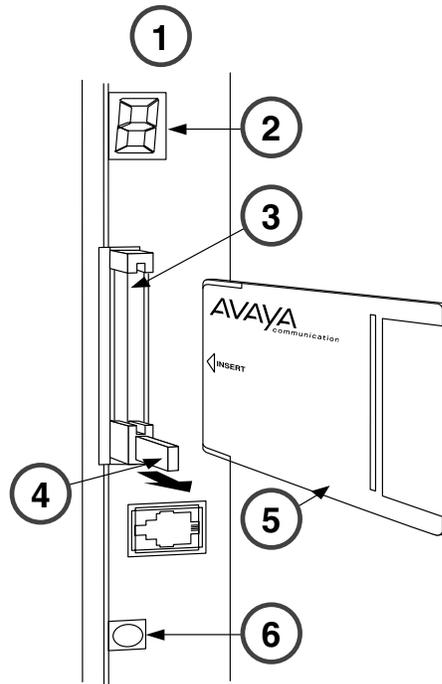
### Forced Installation Procedure

1. Backup system programming to a floppy disk or memory card.

See “Backup” in *Programming Basics* for instructions on performing a backup to floppy disk, or Appendix D, “Backing up with a Memory Card” to backup to a memory card.

**NOTE** ► If the processor or system software is not working, you may not be able to back up system programming. If the system has been programmed to perform automatic backups, use the latest backup file to restore programming.

2. Insert a Forced Installation or Upgrade Memory Card into the PCMCIA interface slot on the processor module as shown in Figure 3.



**Figure 4-3. Inserting a Memory Card**

- 1 Processor Module
- 2 Error/Status Code Display
- 3 PCMCIA Interface Slot
- 4 Push in to remove Memory Card
- 5 Memory Card
- 6 Alarm Status LED

3. Inserting a Memory Card

4. From the programming console or from WinSPM in Standard SPM mode, do the following:

Menu→Maintenance→System→Upgrd/Instll→Back→Back→Yes

**NOTE** ► If maintenance screens are unreliable or not available, power cycle the system by turning off the system and leaving it off for at least one second. Turn the system back on. The system boots from the memory card and automatically starts the installation software. Go to Step 6.

The error/status display on the processor module should show a flashing **L** during installation of system software. Upon successful completion, the system performs a frigid start (System Erase). While the frigid start is in progress, an **F** shows on the error/status display.

If the installation of system software was unsuccessful, an error code is displayed and the system may not function. See [“Error Conditions During Forced Installation”](#) on page 4-14.

5. Remove the memory card from the interface slot.
6. Verify that system software has been correctly installed and that the default system programming is present. Do this by confirming no error condition appears on the error/status display on the processor module.
7. Restore system programming.

After about 10 minutes, check to see if the RED alarm status LED is lit. If it is not, the installation was successful. If the LED is lit, check the error log for the following:

```
SYS software ROM failure
```

This indicates a ROM failure and unsuccessful installation.

If the forced installation was performed due to corrupted system software, it is possible that the backup of system programming might also be corrupted. Verify that the error condition that required a forced installation of software is not still present.

### **Error Conditions During Forced Installation**

The error/status codes on the processor module or the error/status messages on the maintenance console or PC inform you of problems during or after a forced installation. These error conditions occur only during or immediately after a forced installation. See the following topics:

- [Table 4-2, “Error/Status Codes Displayed on Processor Module During Forced Installation,”](#) on page 15
- [Table 4-3, “Error/Status Codes Displayed on Maintenance Console or PC During Forced Installation,”](#) on page 16
- [Table 4-4, “Error Conditions During Firmware Upgrade,”](#) on page 21

**Table 4-2. Error/Status Codes Displayed on Processor Module During Forced Installation**

<b>Error/Status Codes</b>	<b>Meaning</b>	<b>Action</b>
L	Upgrade is in progress	No action required.
U	Install is in progress	No action required.
2	Incorrect memory card type	Insert correct memory card and repeat forced installation procedure.
4	Memory card corrupted	Insert new memory card and repeat forced installation procedure.
3	Incorrectly inserted or missing memory card	Insert memory card correctly and repeat forced installation procedure.
7	Bad processor board	Check that memory card is inserted correctly and try installation again. If it fails again, replace the processor module.
9	Unknown	Try installation again with a new memory card. If it fails again, contact your technical support organization.

**NOTE** ► Certain conditions force the system to retry the forced installation. The dot on the error/status code display becomes lit at the start of the first retry. (Look carefully; the dot may be hard to see.)

**Table 4-3. Error/Status Codes Displayed on Maintenance Console or PC During Forced Installation**

Error/Status Message	Meaning	Action
Verify that Memory Card has been installed correctly.	Incorrectly inserted or missing memory card.	Insert the memory card correctly. Then select <b>Back</b> and begin the forced installation procedure again.
Memory Card is not the correct type. Remove and insert MERLIN MAGIX Upgrade or Installation Memory Card.	Memory card is wrong type.	Select <b>Back</b> and repeat the forced installation procedure with a new memory card. Forced installation can be performed successfully with an upgrade memory card only if the installation is performed through the maintenance screens.
Information on the Memory Card is corrupted. Please remove the Memory Card.	Memory Card is corrupted.	Select <b>Back</b> and repeat the forced installation procedure with a new memory card.
System Busy - Pls Wait  Dial Code:xxxx S/ P:ss/pp	The forced installation is attempted while a line/trunk or extension is busy.	When all lines/trunks or extensions are freed, the installation continues. Select <b>Back</b> to return to the System menu and cancel the installation. If system software is corrupted, system maintenance may not provide an accurate indication of busy lines/trunks or extensions. If this seems to be the case, verify that the listed extensions are truly not busy; then perform the installation by power-cycling the system.
Upgrade: MemCard Rel: 4.y Vnn.mm Current Rel: 4.y Vnn.mm Incompatible Releases	 <b>CAUTION:</b> If releases are incompatible, pressing the hidden key twice deletes existing programming. Before pressing the hidden key, make a backup of the system programming. Use WinSPM or a PCMCIA translation card.	See "Upgrading the System" in the Installation section of this guide for instructions on converting the system programming before upgrading to the new release.

## Other Error Conditions

The following error conditions may not be viewed on the processor module or on the maintenance console or PC.

- **Power Cycle During Installation.** The system automatically begins the installation procedure again. If the power source is unreliable, it is possible for the installation procedure to retry indefinitely. See *Power Supply Problems*.
- **Removal of Memory Card During Installation.** The system is in an indeterminate state. Reinitiate the forced installation by power-cycling the system after inserting the memory card.

## Replacing the Processor Module

A failed processor module must be replaced immediately. To replace the processor module, follow these steps:

1. Backup system programming to a floppy disk or memory card.  
See “Backup” in *Programming Basics* to backup to floppy disk, or Appendix D, “Backing up with a Memory Card” to backup to a memory card.
2. Power down the system.
  - a. Turn off the power supply on the basic carrier.
  - b. Turn off the power supply on each expansion carrier.
  - c. Unplug the auxiliary power units (if present) from the AC outlet.
3. Unplug the D8W cord(s) connecting the SMDR printer and/or system programming PC.
4. Remove the processor module.
5. Inspect the processor module for any visible problems.
6. Inspect the carrier.
7. Install the new processor module.
8. Power up the system.
  - a. Turn on the power supply on each expansion carrier.
  - b. Turn on the power supply on the basic carrier. The system automatically cold starts.
9. Perform a System Erase (frigid start). See “[Frigid Start \(System Erase\)](#)” on page 1-9.
10. Restore system programming using one of the following:
  - The backup floppy disk or original system programming disk. See “Using Standard SPM” in *Programming Basics* for instructions to restore system programming.
  - The backup memory card or original system programming memory card. See Restore in Appendix D, “Backing Up with a Memory Card,” for instructions.
11. Reconnect the D8W cord(s) connecting the SMDR printer and/or system programming PC.
12. Attach a tag to the old processor.  
Use the tag to identify any visible problems and relevant error reports.

## Module Problems

If you suspect that a module is faulty, do the following:

- **Run module tests.** Module tests identify the cause of module malfunctions. For complete instructions for tests, refer to Chapter 6, “Tests” in this guide. After each module test, record any errors on the repair tag that will be shipped with the faulty module. If the module is sent for repair, this helps repair personnel troubleshoot the cause of the malfunction.

A module on which you run tests cannot be used for service. Because your customer depends on this service, run module tests during off hours, if possible. If you cannot, minimize the time required for each module’s downtime whenever possible.

- **Replace module.** Replace the module with a module of the same type to determine whether the module is faulty. If the errors cease, the problem is solved.

Beginning in MERLIN MAGIX Release 1.5, serial numbers are provided for some modules. See Module Serial Numbers for more information.

## Replacing Modules

You can remove and insert line/trunk and extension modules (separately or at the same time) with the system power on without affecting normal call processing.

### CAUTION:

- *This section does not apply to the processor or power supply.*
- *Although the system is designed so that you can remove and replace modules without affecting call processing, partially inserting and removing a module can cause a cold start.*
- *Adding a 100D module or changing any of its DS1 parameters requires that the system be idle.*
- *When you replace a module, be sure to use the same module type. For example, do not put an 008 MLX module in place of a 400 GS/LS 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 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 Renumbering” in the Feature Reference] in the Basic System Programming section of this guide for information about board renumbering.*

To replace a module, follow these steps:

1. Busy-Out or Reset the module. Busy-Out is recommended.
2. Label all cords (if they are not labeled already) and then unplug them from the module.

For information about labeling trunk and cords, see “Labeling Trunks” in *Installation*. For instructions on checking poorly labeled wiring, see “[Checking Unlabeled Wiring](#)” on page 4-19.

3. Run a demand test by entering test mode.
4. Remove the module. See “Removing Modules” in *Installation* for instructions. Inspect the module for visible damage.
5. Install the new module. See “Installing Modules” in *Installation* for instructions.
6. Restore the module.
7. Connect the trunk and extension cords.
8. Attach a tag, error printout, or any information to the module that you removed to identify any visible problems, failure symptoms, or relevant error reports.

## Checking Unlabeled Wiring

If a label is missing or damaged, use a tone device and a telephone handset to match like wires.

You need the following tools:

- Tone device
- Telephone handset
- Telephone cord with an 8-pin modular plug
- 4-pair patch cord
- Diagonal pliers or wire strippers

To match like wires, follow the steps below.

1. Insert the telephone cord’s 8-pin plug into an outlet on the floor area.
2. Using diagonal pliers or wire strippers, cut off the end of the telephone cord to expose the pairs.
3. Choose a single pair and then untwist the wires.
4. Attach to each clip one wire from the pair you have chosen. The clips extend from the bottom of the tone device.
5. Turn on the switch on the outside of the tone device.
6. You hear a high-pitched, alternating signal.
7. Take the telephone handset and a 4-pair patch cord to the cross-connect field between the control unit and the telephone.
8. Go to the blue field on the cross-connect field and, starting at the top left corner, push the patch cord onto the first connecting block.
9. Using the diagonal pliers or wire strippers, cut off the other end of the patch cord and expose the pairs.  
  
Do not cut out too much of the cord, because you need the length to test the top rows of the cross-connect field.
10. Attach the handset’s clips, which extend from the base, to the exposed wires of the patch cord.

11. Set the switch on the side of the handset to MONITOR.
12. Listen to the handset for the tone device signal.
  - If you hear the signal, you have found the correct wires. Correctly label both the cross-connect field and the outlet.
  - If you do not hear the signal, remove the patch cord from the connecting block and push the patch cord down onto the connecting block to the right of the one just tested. Keep moving the patch cord to the next connector block on the right until you find the pairs that carry the tone device signal.

## Upgrading Module Firmware

The MERLIN MAGIX Integrated System allows upgrades or reinstallation of module firmware through the PCMCIA interface slot on the processor module. The interface slot is a standard interface through which information may be added to or retrieved from the system.

Circuit modules may use flash ROM to retain module firmware. Unlike traditional ROMs, flash ROM can be written and erased without being removed from the circuit module. The circuit modules that include this feature are the 016 (T/R), the 800 GS/LS-ID, and the 800 NI-BRI.

Firmware on these circuit modules can be upgraded or reinstalled with an Upgrade memory card. An upgrade is performed when a new release of firmware enhances a module's capabilities or corrects problems. Firmware can be reinstalled if the existing circuit module firmware has been corrupted. The label of PCMCIA card identifies the Application Vintage of firmware that is included on the card.

The label of the PCMCIA Upgrade card identifies the Application Vintage of firmware that is included on the card. Use this card to upgrade **only** the modules that this card identifies as having a new Application Vintage of firmware. Upgrading other modules may cause unexpected system operation.

**NOTE** ► You do not have to upgrade the system software to upgrade a module's firmware.

1. Insert the Upgrade Card into the PCMCIA slot on the processor module.
2. Select Maintenance from the System Programming Main Menu. (Menu > Maintenance >)
3. Select Slot.
4. Enter slot number of module that needs a firmware upgrade. You can upgrade only one module at a time.
5. Select Busyout and answer Yes to Do you want to continue?.  
When you see Busy-out Complete on the screen, select Exit.
6. Select Upgrade from the Maintenance Menu.

Validation of MemoryCard in Progress appears on the screen followed by  
Validation of MemoryCard Successfully Completed,

- Select `Exit`.
7. The current module and version is shown on the screen, followed by `Select one:` and the available versions for upgrade of this module.
  8. Select the version desired (you may have only one choice). The selection is highlighted.
  9. Press `Enter`, and select `Yes` when `Do you want to continue?` is displayed.
  10. In `Progress` and the percentage completed is displayed as the upgrade is loaded.
  11. When the upgrade is complete, the following appears:
    - Upgrade Successfully Completed.
    - Slot Busied Out.
    - Slot Restore Needed.
  12. Select `Exit`, and select `Restore` from the `Maintenance` menu, then select `Yes` when `Do you want to continue?` is displayed.
  13. Repeat steps 3 through 12 above for each module to be upgraded.

When Upgrade(s) are completed, verify the application version of the each module by selecting in `Maintenance > System > Inventory`, to assure the proper version.

**Table 4-4. Error Conditions During Firmware Upgrade**

Error Messages	Corrective Action
Memory card is in use by another feature	Select <code>Exit</code> and try again.
Verify that Memory Card has been inserted correctly	Insert the memory card correctly; then select <code>Exit</code> and begin the upgrade procedure again.
Information on the Memory Card is corrupted. Please remove the Memory Card.	Select <code>Exit</code> . Remove the memory card and repeat the upgrade procedure with a new memory card.
Module can not be upgraded.	This procedure can be run only on the 800 GS/LS-ID, 016 (T/R), or 800 NI-BRI modules or other modules. Select <code>Exit</code> and repeat the upgrade procedure, being careful to select the correct slot. If <code>upgrade canceled</code> or <code>upgrade incomplete</code> appears on the error screen, the circuit module may be unreliable or unusable until a successful upgrade is performed on it.
Module error	Select <code>Exit</code> and begin the upgrade procedure again.

**Table 4-4. Error Conditions During Firmware Upgrade—Continued**

Error Messages	Corrective Action
Memory Card file error	Select Exit. Make sure the memory card is inserted correctly and repeat the upgrade procedure.
Memory on module will not erase	The flash ROM fails to erase. Repeat the upgrade procedure. If the upgrade continues to fail after several attempts, replace the module.
Board Memory Programming failure	Repeat the upgrade procedure. If the upgrade continues to fail after several attempts, replace the module.

## 800 NI-BRI Module Problems

An 800 NI-BRI module requires running the NI-1 BRI Provisioning Test, in addition to the other module tests, under the following circumstances:

- The module has data endpoints that use the BRI lines.
- Voice Call manual testing of the module's BRI lines indicates problems.

The NI-1 BRI Provisioning Test supports the NI-1 BRI IOC Package "S" service configuration. Multiline-Hunt Group/Series Completion testing is included.

## 016 MLX Module Problems

Sometimes Ports 1 through 8 on an 016 MLX module work, but not Ports 9 through 16. A possible cause is that the processor module installed in the system is a CKE3 or earlier model.

Check the system inventory screens to determine if a CKE3 or earlier processor module is installed. If so, replace it with a CKE4 or later model.

## 100D Module Problems

The 100D module requires the Channel Service Unit (CSU) Loopback Test, in addition to the other module tests.

In addition to checking the error logs, the 100D module requires that you check the error events specific to the 100D module. See ["100D Module Error Events"](#) on page 4-23 for details.

## Private Networked Systems

The Channel Service Unit (CSU) or Data Service Unit (DSU) at either end of a PRI tandem trunk over which a call could be routed, may be programmed for T1 or robbed-bit signaling rather than PRI signaling. This will cause the MERLIN MAGIX to raise a channel inoperative alarm. Verify that any CSU on the DS1 circuit between the MERLIN MAGIX and the public switched telephone network (PSTN) is programmed for the same framing as is the DS1 slot on the MERLIN MAGIX. Also, verify that any CSU on the PRI circuit between the MERLIN MAGIX and the PSTN is programmed for PRI signaling and not for T1 or robbed-bit signaling.

**NOTE** ► If your existing MERLIN MAGIX system is now going to be used for a private network using tandem trunks, check the framing to be sure PRI signaling is supported.

## 100D Module Error Events

This procedure allows you to check for 100D module errors. If you have any questions about interpreting these errors, contact your technical support organization.

### Procedure

Menu→Maintenance→Slot→Dial the 2-digit slot no. (01–17)→Enter→Error Events→Current hr or Previous hr

The current hour always begins at ##:00 and ends at the last complete 15-minute interval. For example, if the current time is 09:46, selecting *Current hr* displays the errors that have accumulated between 09:00 and 09:45.

The screen below displays the errors that have accumulated during the previous hour.

Previous hr Slot xx:	
mm/dd/yy	hh:00-hh:mm
CurAlm <i>aaaa</i>	MaxAlm <i>aaaa</i>
MIS SLP ES	BS SEC FS
xxx xxx xxx xxx xxx xxx	
Back	

## 100D Module Clock Status

If you have not been trained to perform T1 maintenance, contact the TSO for instructions on using this procedure.

### Procedure

Menu→Maintenance→Slot→Dial the 2-digit slot no. (01–17)→Enter→Clock→Back

After selecting `CLock`, the following screen appears. Contact the TSO if you need assistance interpreting this information.

```
Clock Slot xx:
mm/dd/yy      hh:00-hh:mm
Admin as:
Active:
Synch source:
PPM: xxx
Back
```

## 100R INA and 100 DCD Module Problems

In addition to other module tests, both the 100R INA and 100 DCD modules require the following tests:

- [“Line Loopback Test”](#) on page 6-30
- [“Payload Loopback test”](#) on page 6-31
- [“Bit Error Rate Test \(BERT\)”](#) on page 6-31

In addition, the 100 DCD module requires the following tests:

- [“Data-Channel Loopback Test”](#) on page 6-32
- [“Data-Terminal Loopback Test”](#) on page 6-33
- [“Data-Port Local Loop Test”](#) on page 6-33

In addition to checking the error logs, the 100R INA and 100 DCD modules require that you check the error events specific to these modules. See [“100R INA and 100 DCD Module Error Events”](#) for details.

## 100R INA and 100 DCD Module Error Events

Four additional error events apply to the 100R INA and 100 DCD modules:

- [“24-Hour Total”](#) on page 4-25
- [“Current Event”](#) on page 4-26
- [“Interval Event”](#) on page 4-26
- [“Clear Error Events”](#) on page 4-26

From your system programming console, use the following sequence to access the 100R INA or 100 DCD module Error events screen (be sure to select the corresponding 100R INA or 100 DCD module slot number).

### Procedure

```
Menu→Maintenance→Slot→Slot#→Enter→Error Event
```

## 24-Hour Total

The 24-Hour Total error event reports cumulative error statistics spanning the past 24 hours. From your system programming console, use the following sequence to access the 100R INA or 100 DCD module 24-Hour Total screen (be sure to select the corresponding 100R INA or 100 DCD module slot number).

### Procedure

Menu→Maintenance→Slot→Slot#→Enter→Error Event→24 hr total

This screen functions similarly to the current screens on the 100 DS1 module except that this new screen reports on totals for the error events over a longer period of time. Therefore the counts are increased from three digits to four.

Table 4-5 describes the information on the 24 Hour Total error event screen.

**Table 4-5. 24-Hour Total Line Descriptions**

Line	Description
24-Hour Slot xx	xx is the slot currently being reported on.
nn Valid Intervals	nn is the number of valid 15-minute intervals from the past 24 hours. Reporting on the number of valid intervals allows you to distinguish a truly error-free interval from one that contains zeroes due to other reasons.
MIS, SLP, ES, BS	Misframes (MIS), Slips (SLP), Errored Seconds (ES), Bursty Errored Seconds (BS). Each error figure is the sum of all error events from all available intervals. 9999 represents an overflow situation.
SEC, FS, BPV	Severely Errored Seconds (SEC), Failed Seconds (FS), Bipolar Violations (BPV). Each error figure is the sum of all error events from all available intervals. 9999 represents an overflow situation.

**NOTE** ► You can refresh the 24-Hour Total screen by pressing **Back** and then pressing **24 hr total** again.

### Current Event

The Current Event reports error statistics for the 15-minute interval which is currently active. Because intervals are not synchronized with the system clock, the Elapsed minutes line displays the number of minutes that have elapsed for the current interval. The number of minutes reported is rounded to the nearest minute and can be a value between zero and 15.

From your system programming console, use the following sequence to access the Current screen (be sure to select the corresponding 100R INA or 100 DCD module slot number).

#### Procedure

Menu→Maintenance→Slot→Slot#→Enter→Error Events→Current

**NOTE** ► You can refresh the Current screen by pressing *Back* and then pressing *Current* again.

### Interval Event

The Interval Event reports error statistics for a specific 15-minute interval from the past 24 hours. There are 96 15-minute intervals in a 24-hour period segment. Interval one is the most current and interval 96 is the oldest. From your system programming console, use the following sequence to select an interval number from the Interval screen (be sure to select the corresponding 100R INA or 100 DCD module slot number).

#### Procedure

Menu→Maintenance→Slot→Slot#→Enter→Error Events→Interval→Interval #→Enter

**NOTE** ► Invalid intervals have all zeroes for error data, but no visual indication is given to show that the interval is not valid. You can use the Valid interval count on the 24-hour total screen to determine which intervals are valid so as to distinguish how many intervals are invalid.

### Clear Error Events

The Clear Error Events causes error events for intervals, including the current interval, to be cleared and reset to zero. If you select a slot containing a 100 DCD module, you can choose to clear individual intervals or all intervals. If you select a slot containing a 100R INA module, you may clear only all intervals.

From your system programming console, use the following sequence to access the Clear screen (be sure to select the corresponding 100R INA or 100 DCD module slot number).

#### Procedure to Clear All Intervals

Menu→Maintenance→Slot→Slot#→Enter→Error Events→Clear

### Procedure to Clear Individual Intervals

Menu→Maintenance→Slot→Slot#→Enter→Error  
Events→Clear→Interval→Enter Interval #→Enter→Yes

**NOTE** ► To stop the clear event and retain all error events press **Back** or **Cancel**. You will return to the Error Events screen.

---

## MERLIN Messaging Module Problems

The MERLIN Messaging maintenance reset will cause telephone users to experience unanticipated interruptions in the normal operation during the time when the MERLIN Messaging is performing a maintenance reset on itself.

The MERLIN Messaging System, Release 1, performs a maintenance reset on itself every day at 3:00am. On the MERLIN Messaging System Release 1.1 and later releases, the maintenance reset time can be changed or the maintenance reset can be disabled. The maintenance reset is an option in MERLIN MAGIX Release 2.0 software but is not an option in MERLIN MAGIX Release 1.0 software. The reset time averages approximately 1.5 minutes to complete for a system with a small to medium number of mailboxes. The reset will take longer for a large number of mailboxes (approximately 4 to 5 minutes). Voice mail traffic and TTR functionality will be not be available from the MERLIN Messaging module during the reset as follows:

- **Voice Mail Traffic.** For the entire duration of the reset the voice mail traffic will be interrupted. Coverage calls being routed to MERLIN Messaging will not be answered. Users will hear busy tone or during some intervals of the reset they may get routed to the operator. Users attempting to retrieve messages will experience the same operation.
- **The TTR operation.** During the first 30 seconds of the maintenance reset, the TTRs on the MERLIN Messaging module will not function. However, the current MERLIN Messaging software does not inform the MERLIN MAGIX system of the reset and allows the TTRs to be selected. This means that a Tip/Ring user could attempt to make a call and it would not go through. This is because the MERLIN MAGIX system did not know that the TTRs were not available for use.

If the TTR audit was testing a messaging system with the current MERLIN Messaging software, the TTR audit will fail the TTRs and remove them from service. The TTRs would remain out of service until the TTR audit tested them again and they passed. In a small system this would take a minimum of 10 minutes. In a large system this could take nearly two hours, depending on the number of TTRs in the system.

## Computer Telephony Integration (CTI) Link Problems

If you experience CTI link problems, you can perform the following maintenance procedures:

- “Viewing Status” on page 4-28
- “CTI Link Test” on page 4-29.
- “Restart” on page 4-29.
- “Varying Hiding Time” on page 4-30.

**NOTE** ► Review the procedures in Module Problems [programmers: make link to this section which appears earlier in this chapter] to confirm that the module into which you have plugged is not faulty.

Before you start maintenance or troubleshooting procedures for the CTI link, verify the following:

- The MERLIN MAGIX system is operating in Hybrid/PBX mode.
- The CTI link is plugged into a port on an 008 MLX, 016 MLX or a 408 MLX module.
- The link is plugged into the RJ45 jack on the ISDN card in the Telephony Server and the wire connection to the server is complete.
- The firmware for the MLX module is of vintage earlier or later than 29. Link administration is prevented on modules using firmware 29.

### Viewing Status

This procedure checks extension status and identifies whether the MERLIN MAGIX system recognizes that the link is physically connected and operational.

#### Procedure

Menu→Maintenance→Port→Station→Dial port number→Enter→Status→Back

After selecting *Status*, the following screen appears.

CTI Link xxxx:
SlotPort: xxxx
Physical Link:
PBX Driver Conn:
Alarms:
Maintenance Busy:
Back

This screen provides the following information:

- xxxx is dial plan number, slot/port, or logical ID.
- Physical Link is up or down.
- PBX Driver Conn is up or down.
- Alarms are suspended or active.
- Maintenance Busy is yes or no. A *yes* in the Maintenance Busy field means that the slot shown in the Slot/Port field of this screen is maintenance busy. Do a slot restore on that slot.

**NOTE** ► The status screen cannot be used to check the router portion of the 100R INA and 100 DCD modules. You must use 100R INA and 100 DCD management interfaces to determine the status of the router. For information on the Router Management interface, refer to the documentation packaged with the 100R INA and 100 DCD modules.

## CTI Link Test

This test allows you to check whether the MERLIN MAGIX system and the PBX driver are communicating across the link without involving the Telephony Services product. This is helpful in isolating a problem to the Telephony Services product.

### Procedure

Menu→Maintenance→Port→Station→Dial port number→Enter→Test→Back

If the test fails, verify wiring. Then view a status screen; see *Viewing Status*. [programmers: make link to previous section.] On the status screen, see if Physical Link and PBX Driver Conn are both designated as up; if the PBS driver is not loaded, PBX Driver Conn is down.

## Restart

This procedure cleans up a link that is experiencing problems, then reconnects the link and makes it operational again. Restart does not shut down the link, but does affect traffic on that port.

### Procedure

Menu→Maintenance→Port→Station→Dial port number→Enter→Restart→  
Yes→Back

## Varying Hiding Time

### CAUTION:

*This procedure should be done only under the direction of NSAC/Tier 3 engineers. It is not recommended for users or service technicians. If this value is changed, a corresponding change must be made for the PBX driver under the direction of Technical Support Organization (TSO) personnel.*

Hiding time is the amount of time (in seconds) that the link could be broken but users would not notice. This interval occurs when the link experiences a hidden reset until the system generates a broadcast reset. A broadcast reset affects CTI link operations and reinitializes the link. The factory setting for hiding time is 25 seconds, with a range of settings from 0 to 90 seconds.

Varying the hiding time may be helpful if the link displays problems. If broadcast resets would help identify when a CTI link problem occurs, reduce the hiding time to 10. This broadcasts all link troubles that cause resets. If broadcast resets inhibit troubleshooting a CTI link problem, increase the hiding time. If the broadcast reset messages still interfere with troubleshooting the problem, set the hiding time to zero(0). Setting the value to zero eliminates all broadcast resets; everything is hidden.

### Procedure

Menu→Maintenance→Port→Station→Dial port number→Enter→Hiding Time is not shown on the display; press the associated softkey twice→Enter seconds for hiding a broken link (0–90)→Back

The default for the number of seconds to hide a broken link is 25 seconds. If you enter 1 through 9 in the procedure above, the value is changed to 10.

## Removing a CTI Link

The following two procedures are used for CTI link removal:

- Permanent Removal, when you want to permanently remove a CTI link from the MERLIN MAGIX system.
- Link Shutdown, when you want to temporarily idle a CTI link before working on it.

### Permanent Removal

For a permanent CTI link removal, follow these steps:

1. (optional) Suspend MERLIN MAGIX alarming for the CTI link.

Refer to the *MERLIN MAGIX PBX Driver Network Manager's Guide* for the steps to suspend the alarming. If Step 1 is not performed, the system may generate an alarm about the CTI link before Step 5 is performed.

2. Upload the PBX Driver (MLPD).

Refer to the *MERLIN MAGIX PBX Driver System Manager's Guide* for instructions.

3. Unplug the CTI link.
4. Remove the ISDN link interface card, if desired.

Refer to the PC/ISDN Platform Installation and Reference, or similar installation manual from the ISDN link interface card vendor.

5. Remove the MERLIN MAGIX administration.

Delete the MLX port from the list of CTI link ports, using MERLIN MAGIX system programming (at the 4425LD+ or MLX-20L console, or with WinSPM). After this, it is safe to plug in an MLX telephone, a data module, or an ISDN terminal adapter. See the CTI feature in *Feature Reference*.

### Link Shutdown

Temporarily idling a CTI link before performing maintenance is an optional procedure on the server side; it can prevent unwanted MERLIN MAGIX system alarms. However, a link shutdown is not required before performing maintenance.

For a link shutdown, perform the following steps:

1. Suspend MERLIN MAGIX alarming for the CTI link.

If Step 1 of the link shutdown is not performed, then the MERLIN MAGIX may generate alarms about the CTI link while under maintenance. See the *MERLIN MAGIX PBX Driver Network Manager's Guide* for detailed instructions on this procedure.

2. Prevent new CTI link traffic.

If Step 2 is not performed before working on the CTI link, an application may get confused. For example, if an application sent a service request (such as Make Call) but the CTI link is taken down for maintenance before the MERLIN MAGIX sends a reply, the application will think the request failed even if it succeeded. In contrast, if this step is performed, the application will immediately receive a failure reply. See the *MERLIN MAGIX PBX Network Manager's Guide* for detailed instructions on the Block, Offline, and mloam commands.

3. Wait for CTI link traffic to subside.
4. If the Offline or mloam command was used in Step 2, skip to Step 4. This step applies only if the Block command was used in Step 2.
5. Determine when traffic has stopped. On the NetWare server, start the mloam or wmloam tool, then go to the Link Status screen. View the line CTI Link Msg. Rate. If the value shown is 0, then traffic on the link has stopped. Refer to the *MERLIN MAGIX PBX Network Manager's Guide* for details.
6. Unplug the CTI link or perform appropriate maintenance.

## Carrier Problems

Typical carrier problems include power supply failure, sudden failure of one or more modules, or system problems that cannot be isolated to a specific module. If you find a problem with the carrier, it must be replaced; carriers cannot be repaired in the field.

### Removing the Faulty Carrier

1. Remove the cover from the carrier. See “Installing/Removing the Cover on the Carrier” in *Installation*.
2. Backup system programming to a floppy disk or memory card.  
See “Backup” in *Programming Basics* to backup to floppy disk, or Appendix D, “Backing up with a Memory Card” to backup to a memory card.
3. Power down the system by turning off the components listed below, in the order given.
  - a. Power supply on the basic carrier
  - b. Power supply on each expansion carrier
4. Unplug the control unit from the AC outlet.
5. Remove the processor, the power supply, and all other modules from the faulty carrier. (If you prefer to remove the cords first, make sure that they are labeled.)
6. Put the modules aside, in order, so that you can reinstall them later in the replacement carrier.
7. Remove all modules from the carriers to the right of the faulty carrier.
8. Disconnect the ground-screw on the carrier from the approved ground.
9. Loosen the screws holding the carrier onto the backboard.
10. Slide the carrier to the right until the connector disengages from the carrier to the left.
11. Pull the carrier away from the wall so that the screws slip through the large screw holes.

### Replacing the Carrier

After removing the faulty carrier, use the steps below as a guideline for installing a new carrier.

1. Install the replacement carrier(s). See “Mounting an Empty Carrier” or “Mounting a Populated Carrier” in *Installation* for instructions.
2. Replace the modules with all cords connected as they were before.

## Checking System and Slot Status

In addition to checking error logs, and the access log, and running module tests, you can request System Status and Slot Status information for each module.

### System Status

The power supply, processor, 100D, 100DCD, 100R, and 400 E&M module 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. The System Status procedure allows you to check simulated LEDs for the processor and other modules.

#### Procedure

Menu→Maintenance→System→Status

#### Interpreting the System Status Screen

Following is a sample System Status screen:

```
System Status:
Slot00:Raaa
Slot01:Raaa Yaaa Gaaa
Slot02:Raaa Yaaa Gaaa
Slot03:Raaa Yaaa Gaaa
Slot04:R    Y    G
```

The System Status screen simulates LEDs for each module. The simulated LEDs are represented as R (red), Y (yellow), and G (green).

Immediately following R, Y, or G is its status (aaa in the screen shown above), 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, 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. Slot 4 is empty, according to the sample screen in the last procedure.

---

## **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)

### **Procedure**

Menu→Maintenance→Slot→Dial the slot no. (00-17)→Enter→Status

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---

## Overview

If you have tested the telephones and the modules in the control unit, you have isolated the trouble to the trunks or the CO. To isolate the trouble further, follow the instructions in this chapter to troubleshoot the trunks. If the trouble persists after following these instructions, the customer should contact the CO and ask a representative to troubleshoot from that end.

---

## Trunk Errors

The system records errors not only for trunks, but for T1 ports on the module as well. In some cases, errors occur not because a single port fails, but because the entire T1 link fails. When this happens, 100D automatic testing activates an alarm.

Beginning with MERLIN MAGIX Release 1.5, when there is a T1 link failure the system busies out the 100R INA and 100 DCD modules and the following occurs:

- Calls are dropped, allowing the system to be idle so that programming and maintenance functions can be performed.
- Automatic Route Selection (ARS) calls immediately overflow to alternate pools.

When a circuit failure occurs on a 100R INA or 100 DCD module, the following can be observed on site:

- On the 100R INA module, when the T1 link goes down, there is a DS1 Loss of Signal alarm in the permanent alarm log, a red LED is illuminated on the module, and the module becomes maintenance-busy.
- When the Loss of Signal alarm is allowed to automatically retire once the T1 link is re-established, the red LED goes out and the module restores the functions properly.
- When a call is active and the T1 link goes down, the call is dropped by the 100R INA and 100 DCD modules. (The 100D module does not drop the call.)
- When the T1 link is in a Loss of Signal, calls to the pool receive a fast-busy, allowing calls to roll over to the next ARS route.

## Troubleshooting Trunk Problems

This table provides a quick guide to troubleshooting trunks.

**Table 5-1. Source of Trunk Problem—Section Reference**

Symptom	Section
General trunk problems	<a href="#">“Manual Correction of Trunk Problems”</a> on page 5-2
Incoming calls not being received	<a href="#">“Incoming Trunk Problems”</a> on page 5-3
Cannot make outgoing calls	<a href="#">“Outgoing Trunk Problems”</a> on page 5-3

**NOTE** ► If the customer reports echoes during conversations on T1 trunks with GS emulation to a toll office, check the system programming for T1 trunks. The system is not intended to work with GS emulation to a toll office. Tie trunk emulation must be programmed. Program the module to emulate tie trunks to the central office.

### Manual Correction of Trunk Problems

If the system cannot seize a trunk even after repeated attempts, you may have to replace the module.

To identify the trunk problem, follow these steps:

1. Check for dial tone at the control unit.
2. If you do not hear dial tone, check the error logs and make a trunk test call.
3. Check for dial tone at the network interface.

It is sometimes difficult for the customer to detect trunk troubles. If a trunk is down, the system records an error in the error log and takes the trunk out of service. However, if an incoming-only trunk is down, the only sign of trouble is customer complaints that incoming calls are not being received.

Check the error logs for messages about trunk type (such as DID, tie, and T1). Also check the wiring and the system parameters (for example, touch-tone/rotary, toll restriction, and disconnect time interval).

## Incoming Trunk Problems

If incoming trunks do not work properly, follow these steps:

1. Place an incoming call through the troubled trunk.
  - For a loop-start (LS) trunk, connect a single-line telephone to the trunk at the network interface.
  - For a ground-start (GS) trunk, connect a single-line telephone to the trunk at the network interface and press the **GS** button. (For GS trunks, the telephone must have a **GS** button attached to it.)
2. Listen for ringing.
3. Pick up the handset and check line seizure.
4. Dial an outside number and verify that you have good two-way transmission.
5. At the maintenance console, check the trunk programming to be sure this trunk has been properly translated. Refer to a copy of the completed System Planning Forms.
6. If the module continues to malfunction, replace it.

## Outgoing Trunk Problems

If the system cannot seize outgoing trunks, follow these steps for analog lines:

**NOTE** ► You cannot perform this procedure on a rotary telephone.

1. Check for outside dial tone at the network interface.

For GS trunks, apply ground to the ring lead to get dial tone. If dial tone is not present, notify the customer.

**NOTE** ► Steps 2 through 4 only apply to Hybrid/PBX mode. Go to Step 5 for systems in Key or Behind Switch mode.

2. Pick up the handset of a test telephone to check for system dial tone;  
Dial **\*03**, then dial the maintenance password.
  - If the password is not known, check the System Information Report or ask to speak with the system manager.
  - You can change the password without knowing the old password only when you perform on-site maintenance through the ADMIN jack.
3. Dial the 2-digit trunk number (01–80) of the trunk you want to test.
4. Listen for dial tone.
  - If dial tone is not present, use a test telephone to isolate the problems either to the module where the trunk terminates or to the location in the trunk access equipment.

- If dial tone is present, dial a working outside number to verify that the call can be completed.
  - Dialing an outside number on a single-line telephone works only if the trunk accepts touch-tone dialing.
  - If you are using a single-line telephone to dial out to an E&M tie trunk or a T1 tie trunk, wait for a click before dialing the outside number.

If the trunk is busy, you hear a busy tone. If you dial a wrong trunk type (such as DID) or an invalid trunk number, you hear a reorder tone.
- 5. If the module continues to malfunction, replace it.

### Testing Trunks Automatically

The automatic maintenance program takes the ports out of service when a trunk is malfunctioning. When a port is out of service, it has a maintenance-busy status. The trunk is periodically tested and put back into service if possible.

### Maintenance-Busy Status

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

**NOTE** ► Maintenance-busy does not apply to DID trunks, since DID trunks cannot be used to make outgoing calls.

While the trunk is in a maintenance-busy state, the software periodically runs tests, attempting to seize the trunk:

- If the seizure is unsuccessful, the trunk stays in a maintenance-busy state.
- If the seizure is successful, the trunk is placed back in service.
- If a test is running when an incoming call is received on the trunk, the test is dropped and the call is processed.

No more than 50 percent of trunks in a pool can be in maintenance-busy states at one time. The only exceptions are as follows:

- User-imposed maintenance-busy (for example, module replacement)
- Module maintenance-busy (for example, a loss-of-service alarm in the 100D module)
- No external release at the central office end of the line
- Digital Trunks

## Permanent Errors

A permanent error is entered in the error logs when more than 50 percent of analog trunks in a pool are maintenance-busy. When the maintenance-busy level falls below 50 percent, the system automatically removes the permanent error.

**NOTE** ► Make sure that modules are not in a maintenance-busy state during a backup procedure. Any module in a maintenance-busy state is recorded as such on the backup disk.

## Maintenance-Busy Causes

The causes of maintenance-busy vary according to the type of trunk, as follows:

- **Ground-Start (GS) Trunks.** The following events cause maintenance-busy on a ground-start trunk:
  - A seizure of the trunk is attempted that results in incomplete handshaking (or no loop current) between the central office and the system. After four occurrences, the trunk is put into a maintenance-busy state and a permanent error is logged.
  - The CO fails to disconnect when the GS trunk is dropped by the system. After two occurrences, the trunk is put into a maintenance-busy state and a permanent error is logged.
- **Loop-Start (LS) Trunks.** No loop current exists when the LS trunk is seized. The port is marked maintenance-busy, and a permanent error is logged after four occurrences.
- **Tie Trunks.** The following events cause maintenance-busy on a 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 central office 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.

## Checking Ports

Perform the procedures in this section from the maintenance console. By selecting Port from the Maintenance screen, you can check the maintenance-busy status and other information for individual trunks and extensions.

### Checking Trunk Maintenance-Busy Status

#### Procedure

Menu→Maintenance→Port→Line/Trunk→Dial the dial plan no.→Enter→Status→Next (to check status of next trunk)

### Checking Extension Maintenance-Busy Status

#### Procedure

Menu→Maintenance→Port→Station→Dial the dial plan no.→Enter→Status→Next (to check status of next extension)

### Checking Digital Subscriber Line (DSL) Maintenance-Busy Status

#### Procedure

Menu→Maintenance→Port→DSL→Dial the dial plan no. for the DSL (dial sspp where ss equals the slot no. and pp equals the port no.)→Enter→Status→Next (to check status of next DSL)

### Busying-Out a Trunk

#### Procedure

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

At the conclusion of this procedure, *Busy-Out in Progress* appears on the display. At successful completion, *Busy-Out Successfully Completed* appears. If *Busy-Out Failed* appears, exit and try again.

## Busying-Out an Extension

### Procedure

Menu→Maintenance→Port→Station→Dial the dial plan no. extension (1- to 4-digits)→  
Enter→Busy-Out

If the extension number you enter is a CTI link, a CTI link screen appears. Press Back or **F10** and enter another extension number.

At the conclusion of this procedure, `Busy-Out in Progress` appears on the display. At successful completion, `Busy-Out Successfully Completed` appears. If `Busy-Out Failed` appears, exit and try again.

## Busying-Out a Digital Subscriber Line (DSL)

### Procedure

Menu→Maintenance→Port→DSL→Dial the dial plan no. for the DSL (dial sspp where ss equals the slot no. and pp equals the port no.)→Enter→Busy-Out

At the conclusion of this procedure, `Busy-Out in Progress` appears on the display. At successful completion, `Busy-Out Successfully Completed` appears. If `Busy-Out Failed` appears, exit and try again.

## Restoring a Trunk

### Procedure

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

At the conclusion of this procedure, `Restore in Progress` appears on the display. At successful completion, `Restore Successfully Completed` appears. If `Restore Failed` appears, exit and try again.

## Restoring an Extension

### Procedure

Menu→Maintenance→Port→Station→Dial the dial plan no. extension (1- to 4-digits)→  
Enter→Restore

At the conclusion of this procedure, `Restore in Progress` appears on the display. At successful completion, `Restore Successfully Completed` appears. If `Restore Failed` appears, exit and try again.

## Restoring a Digital Subscriber Line (DSL)

### Procedure

Menu→Maintenance→Port→DSL→Dial the dial plan no. for the DSL (dial sspp where ss equals the slot no. and pp equals the port no.)→Enter→Restore

At the conclusion of this procedure, `Restore in Progress` appears on the display. At successful completion, `Restore Successfully Completed` appears. If `Restore Failed` appears, exit and try again.

## Resetting an RS-232 Port

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

### Procedure

Menu→Maintenance→RS232 Port 1 or RS232 Port 2→Dial the dial plan no. of the port (dial sspp where ss equals the slot no. and pp equals the port no.)→Enter→Reset→Yes

At the conclusion of this procedure, `Reset in Progress` appears on the display. At successful completion, `Reset Successfully Completed` appears. If `Reset Failed` appears, exit and try again.

## Resetting the Processor's Internal Modem

### Procedure

Menu→Maintenance→Port→Modem→Reset→Yes

At the conclusion of this procedure, `Reset in Progress` appears on the display. At successful completion, `Reset Successfully Completed` appears. If `Reset Failed` appears, exit and try again.

## Auditing DS1 PRI B-Channels

The Auditing Lines and Auditing Calls procedures initiate an audit. Once an audit is initiated, you need to wait for the far end to send a message, which usually takes about four minutes. After waiting four minutes, check the error logs to see if any new PRI errors have occurred.

- **Auditing Lines.** If troubleshooting indicates problems with PRI lines between the control unit and the central office, this audit, if successful, fixes the problem. It allows either side of the PRI interface to synchronize both ends by exchanging messages.

- **Auditing Calls.** If troubleshooting indicates problems with PRI calls to or from MLX telephones, this audit, if successful, fixes the problem. It allows either side of the PRI interface to synchronize both ends by exchanging messages.

**NOTE** ► If an audit fails, the customer should call the central office to correct the problem from that end. Repeat the audit when the problem is fixed.

## Auditing Lines

This test can be run only on the slot and port of a DS1 PRI B-channel. The estimated time for this test is approximately four minutes. A Backup, Restore, Busy-Out and Reset are not required when performing this test. This test cannot be interrupted.

### Procedure

Menu→Maintenance→Port→B-Channel→Enter the 2-digit slot and 2-digit port no.  
(enter sspp where ss equals the slot no. and pp equals the port no.)→Enter→Audit Line

Audit Initiated appears on the display if the audit message is successfully created and sent.

After about four minutes, check the error logs.

- If new PRI errors occur, contact the TSO for help on interpreting the results and your action.
- If no new PRI messages appear, the ends are most likely in agreement.

Audit Failed appears on the display if the audit message cannot be sent due to signaling failure. This indicates that the problem may be at the central office end. First, make sure the correct B-channel is selected. If the correct B-channel is selected, the customer or Avaya representative acting as the customer's agent should ask the central office to clear the problem from that end. If the problem is not at the central office end, select the correct B-channel and repeat the Auditing Lines procedure.

## Auditing Calls

This test can be run only on the slot and port of a DS1 PRI B-channel. The estimated time for this test is approximately four minutes. A Backup, Restore, Busy-Out and Reset are not required when performing this test. This test cannot be interrupted.

### Procedure

Menu→Maintenance→Port→B-Channel→Enter the 2-digit slot and 2-digit port no.  
(enter sspp where ss equals the slot no. and pp equals the port no.)→Enter→Audit Call

Audit Initiated appears on the display if the audit message is successfully created and sent.

After about four minutes, check the error logs.

- If new PRI errors occur, contact the TSO for help on interpreting the results and your action.
- If no new PRI messages appear, the ends are most likely in agreement.

Audit Failed appears on the display if the audit message cannot be sent. If this occurs, make sure an active call is in progress on the specified B-channel and try the audit again.

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## Private Network Calling Problems

When a system is configured in a private network, various calls placed on one switch to another switch may not complete correctly.

**NOTE** ► If your private network consists of more than two systems, a system manager in the private network should be appointed to maintain system forms for all systems in the private network. Any local modifications should be cleared with this coordinating system manager, who must ensure that changes to a local system do not have undesirable effects on the private network as a whole. When modifications are made, he or she should see that corresponding changes are made, as necessary, at private networked systems. If your private network consists of two systems, the managers should work together to assess and agree upon any changes.

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## Troubleshooting Guidelines and Preparation

Before troubleshooting problems, obtain copies of your system's planning forms. Many of the solutions offered in this chapter require that you contact the coordinating system manager in your private network, who maintains records of how systems in your private network are programmed and keeps them up to date. Problems can occur when changes are made in a private network without considering the needs of the private network as a whole. In particular, changes to local and non-local dial plans, Uniform Dial Plan (UDP) routes, Automatic Route Selection (ARS) routes, and remote access settings can have unintended effects on other systems in your private network.

To solve a problem, you may need to perform system programming using your MLX-20L programming console or PC equipped with System Programming and Maintenance (SPM) software.

Most of the problems outlined here can be solved by system managers working together in a two system private network or with the coordinating system manager in a larger private network. However, some problems require the intervention of an Avaya technician. In the USA only, Avaya provides a toll-free customer helpline, called the Technical Support Organization, (1 800 628-2888) 24 hours a day. You may want to allow only the coordinating system manager to contact the Helpline, because this person has the complete information that allows Avaya technicians to understand problems that you are experiencing. Under certain circumstances, you may be charged for consultation with Helpline personnel. Contact your Avaya representative or authorized dealer, if you have any questions concerning consultation charges.

The troubleshooting instructions in this chapter provide information about reviewing current programming on your local system. You can find out about current programming in the following three ways:

- **System Forms.** Review the filled-out system form that includes the programming information you need. This method requires that forms be available and up-to-date.
- **System Reports.** Appendix B, “Sample Reports,” in the *Network Reference* provides samples of reports that you may require when troubleshooting private network problems, along with the menu options for selecting each report. To see a report, select the Print option on the System Programming menu and then choose a report. Note that if you select the ALL option, the reports take from 30 minutes to 6 hours to print, depending on the size of the system. You may want to schedule printing during off-peak hours. Appendix F in the *Feature Reference* provides samples of all system reports.
- **System Programming.** Many of the system programming procedures that you may need to perform are summarized in Chapter 5, “System Management” of the *Network Reference*. Programming Basics in this guide provides instructions for accessing system programming through a 4424LD+ console, an MLX-20L console, or using WinSPM software on a personal computer.

## Reviewing the Non-Local Dial Plan and Routing

Some of the troubleshooting steps in this section require that you review the extension ranges programmed in the non-local dial plan and/or the routing for private network calls. Use one of the following three methods to do this:

- **System Form.** Check System Non-Local UDP Administration Form in the Installation Specification before proceeding. This form summarizes the extension ranges and routing for the patterns programmed in your system. For each route, the pool number, programmed digit manipulation, the Facility Restriction Level (FRL) value are listed, and the voice/data attribute is listed.
- **System Report.** To see a system print report of existing non-local extension ranges, patterns, and routes, select the Print option on the System Programming menu and then choose NonLcl UDP. Appendix B, “Network Reports” in the *Network Reference* provides a sample of this report.

- **System Programming.** To check the current call routing on a system, follow this procedure:

#### Procedure

Tables→UDP Routing→Press **Inspt** to view current patterns in use→Back→Dial the number of the pattern that you want to review→Enter→Press **Inspt** to view the current routing for the pattern→Back→Back→Back→Back

## Call to a Non-Local Extension: Unexpected Busy Tone

This topic discusses unexpected busy tones that may be caused by system features. It applies not only to regular calls from one private network extension to another but also to remote access calls that are routed among private network systems. Call to Non-Local Extension: Silence or Fast Busy Tone outlines possible causes for a busy tone that relate either to system programming of facilities or to call routing.

As a first step, the caller should try using Callback. All available local routes for the call may be busy, and Automatic or Selective Callback allows the call to queue for the next available tandem trunk assigned to the Route 1 pool.

If a user is having trouble with the Callback feature, see [“Callback Does Not Work”](#) on page 5-24.

If the wait time for an available local trunk is unacceptable, you may be able to change the local extension or barrier code FRL and/or route FRLs for the UDP pattern in order to make more routes available for the call.

If you want to make changes in FRLs for routes, speak with the coordinating system manager for your private network and consult the following resources:

- “How Facility Restrictions Levels Work in a Network” in Chapter 4 of *Network Reference* discusses FRL planning in detail.
- To change a UDP route FRL, see “Uniform Dial Plan Routing” in Chapter 5 of the *Network Reference*.
- To change the extension FRL, see “Programming Procedures” in the Automatic Selection feature in *Feature Reference*.
- To change the FRL assigned to a remote access barrier code, see “Remote Access” in *Feature Reference*. Follow the guidelines in “Remote Access Default Class-of-Restriction Settings” in Chapter 4 of *Network Reference*.



#### **SECURITY ALERT:**

*FRLs, applied to ARS and UDP routes, default class-of-restrictions (COR) for all tie and/or all non-tie tandem trunks, extensions, and remote access barrier codes are particularly important for maintaining security in a private network. Before changing FRLs in your system, check with the coordinating system manager, who should understand the security implications for your local system and for the private network as a whole.*

Changing local FRLs may not work simply because the problem is not on the local system. In this case, see [“Call to Non-Local Extension: Silence or Fast Busy Tone”](#) on page 5-13.

## Call to Non-Local Extension: Silence or Fast Busy Tone

The following are likely circumstances in which silence occurs when a call is attempted:

- A selected tie or analog facility between the caller or called extension is out of service. If your system is linked by tandem tie trunks and silence occurs, call the other system on a PSTN line/trunk in order to determine whether a tie trunk is out of service. If it is not, call the Technical Support Organization at 1 800 628-2888; consultation charges may apply.
- No Touch-Tone Receivers (TTRs) available at a remote system when using tie trunks. This can be verified by checking for the 0C03 error on the error log on the remote switches. If this error persists, contact your local service representative.

A fast busy tone can have one of several causes. Before investigating further, check the following possibilities:

- A technician may be performing maintenance on local tandem trunks or non-local tandem trunks included in the routes for the call.
- A power failure may have occurred at the destination system or at another private networked system whose tandem trunks are included in routes for the call.
- Some of the problems described in this section can occur when a system manager makes a change in a private networked system's local dial plan, non-local dial plan, switch identifier, or DS1 Switch Type setting. Ensure that your private network system forms are kept up-to-date and that changes are cleared with the coordinating system manager.

**Possible Cause 1:** All programmed available routes for the call are busy.

**What to do:** Note the extension number range(s) being called. Check that the pattern assigned to the range includes routes that include pools that have a sufficient number of trunks to handle the call volume.

- If you're not sure of the pattern number being used to route calls in your local system, see [“Reviewing the Non-Local Dial Plan and Routing”](#) on page 5-11.
- To add different routes that can handle the call, consult the coordinating system manager and see “Uniform Dial Plan Routing” in Chapter 5 of *Network Reference*.
- If you do not have enough tandem trunks to handle intersystem calls, consider assigning pools of PSTN trunks to less preferred routes (4 or 3 and 4, for example). If you program such routes and they involve higher toll costs than routes that specify tandem facilities, you may need to adjust extension and route FRLs in order to restrict access to them. Be sure that you discuss any changes with the coordinating system manager.

- If the routing is correct and enough routes are included in the pattern, but the problem persists, check if PRI lines are used. If they are, check the error log for D-channel inoperative and loss of signal alarms indicating lines are inoperative. If the D-channel inoperative alarm has occurred, check the CSU/DSU associated with the line for correct programming. If the loss of signal alarm has occurred, check for open cables, etc. If these conditions are not present, go to Possible Cause 3.

**Possible Cause 2:** Callback Queuing is not used.

**What to Do:** All available local routes for the call may be busy, and Automatic or Selective Callback allows the call to queue for the next available tandem trunk assigned to the Route 1 pool. As a first step, the caller should try using Callback.

If a user is having trouble with the Callback feature, see [“Callback Does Not Work”](#) on page 5-24. [programmers: make link]

**Possible Cause 3:** Not enough trunks are assigned to the pools for UDP routes.

**What to Do:** Consult System Form 2c, System Numbering: Line/Trunk Jacks to determine the assignments. To see a report of pool assignments, select the Print option on the System Programming menu and then choose `Trunk Info` and `General`.

- If more trunks are available and need to be assigned, follow the procedure in the System Programming section of the Pools feature in the *Feature Reference* to assign more tandem trunks. All the tandem trunks in a pool must be of the same type (tie or PRI).
- If not enough trunks are available, consider adding more to your system.
- If there are sufficient trunks assigned but the problem persists, go to Possible Cause 4.

**Possible Cause 4:** Facilities are available but restricted and the caller is not able to access them.

**What to Do:** Verify that the extension’s FRL is higher than or equal to the UDP route FRL.

If you want to make changes in FRLs for routes, speak with the coordinating system manager for your private network and consult the following resources:

- “How Facility Restrictions Levels Work in a Network” in Chapter 4 of *Network Reference* discusses FRL planning in detail.
- To change a UDP route FRL, see “Uniform Dial Plan Routing” in Chapter 5 of *Network Reference*.
- To change the extension FRL, see *System Programming*, Chapter 3, “Programming Procedures.”
- To change the FRL assigned to a remote access barrier code, see “Remote Access” in *Feature Reference*. Follow the guidelines in “Remote Access Default Class-of-Restriction Settings” in Chapter 4 of *Network Reference*.

 **SECURITY ALERT:**

*FRLs, applied to ARS and UDP routes, default CORs for all tie and/or all non-tie tandem trunks, extensions, and remote access barrier codes are particularly important for maintaining security in a private network. Before changing FRLs in your system, check with the coordinating system manager, who should understand the security implications for your local system and for the private network as a whole.*

Changing local FRLs may not work simply because the problem is not on the local system. In this case, go to Possible Cause 5.

**Possible Cause 5:** The FRL for the default COR for non-tie trunks (PRI) on the remote system may be blocking tandem calls. The private network is an all-PRI network.

**What to Do:** Check with the coordinating system manager so that he or she can determine where the problem exists. This may involve more than one system, depending upon how your private network is set up. For example, a call might be routed across the private network in a fashion such as this:

Origin System A→System B→System C→Destination System D

In this configuration, the coordinating system manager must check routes and default COR attributes for Systems B and C.

- Check to make sure the calling restriction of the default COR is set to unrestricted. The factory setting is outward restricted, which blocks calls across the private network.
- Check that the routes voice/data capability is correct for the type of call being made. The factory setting is Both, which will support both voice and data calls.
- In each intervening system, compare the FRLs assigned to routes for the call with the default COR FRL. The route FRL must be equal to or lower than the default COR value or the call is blocked. The factory setting is 3.
- If FRL settings are not the cause, go to Possible Cause 6.

**Possible Cause 6:** There may be a numbering conflict in the switch identifiers for the trunks that carry the call. Within a private network, switch identifiers should be unique and unambiguous. If they are not, calls may terminate prematurely or continue to route unexpectedly.

**What to Do:** The coordinating system manager must check system planning Form Non-Local UDP Administration Form in the Installation Specification and review the switch identifiers for all systems over which calls travel to reach the destination extension(s). To review a report including the switch identifiers programmed on your local system, select the `Print` option on the System Programming menu and then choose `Trunk Info` and `General`.

- If the switch identifiers are not correct, the coordinating system manager must see that a change is made at one or more non-local systems where the conflict exists. To change the current switch identifiers at your local system, see “Switch Identifiers” in Chapter 5 of *Network Reference*.

- If the switch identifiers are correct and the problem persists, do one of the following:
  - If the call is being routed over any tandem PRI facilities, go to Possible Cause 7.
  - If the call is being routed over tandem tie trunks only, call the Technical Support Organization at 1 800 628-2888; consultation charges may apply.

**Possible Cause 7:** The Switch Type setting at both ends of a tandem PRI facility may match.

**What to Do:** The coordinating system manager must check the programmed Switch Type settings at private networked systems. Calls are not routed properly unless the Switch Type setting is correctly programmed at the systems on both ends of any tandem PRI facilities on the call route. If only MERLIN MAGIX systems are included in the routing, the switch type settings on the systems must be different. For example, if System A is connected to System B by tandem PRI trunks, System A can be set to a switch type of MAGIX-PBX and System B can be set to MAGIX-Ntwk. It does not matter which system is assigned the PBX or Network switch type as long as the switch types are different.

If a DEFINITY ECS or DEFINITY ProLogix Solutions system has its Interface field set to Network, any MERLIN MAGIX systems connected to it by tandem PRI trunks must specify MAGIX-Ntwk. If the Interface field specifies User, the MERLIN MAGIX system facilities must be programmed with the MAGIX-PBX setting.

If the call is routed over a tandem PRI facility connected to your system, ensure that the system at the other end of the facility is programmed correctly to work with your own setting. Run the PRI Tandem Trunk Mode Demand Test by using the following procedure:

### Procedure

**Menu**→Maintenance→Enter slot no (00–17)→Enter→ or More→PriSwTypTst  
→Back →Back→Back

- **Test Passed** appears If the MERLIN MAGIX system at the other end of the PRI tandem trunk is programmed in the opposite mode, the screen below appears.
- **Test Failed** appears if the MERLIN MAGIX system at the other end of the PRI tandem trunk is programmed in the same mode, or does not respond within the timeout, the screen below appears.
- If the system at the other end does not respond, the 100D module at the other end may not be programmed for PRI, or the system at the other end of the PRI circuit may not be a MERLIN MAGIX system.

If the call is carried over other systems connected by tandem PRI facilities, the coordinating system manager must ensure that the settings are correct, as in this example of MERLIN MAGIX systems:

System A LEGEND-PBX→System B LEGEND-Ntwk→System C LEGEND-PBX

If you want more information about the Switch Type setting, consult the system Non-Local UDP Administration Form in the Installation Specification. To see a report including the switch type programmed for PRI facilities on your system, select the `Print` option on the System Programming menu, and then choose `PRI Info`. See “PRI Facilities Switch Type” in Chapter 5 of the *Network Reference* for instructions on changing the switch type programmed at your system.

If the switch type settings are correct and problem persists, do one of the following:

- If the call is a data call, go to Possible Cause 8.
- If the call is not a data call, call the Technical Support Organization at 1 800 628-2888; consultation charges may apply.

**Possible Cause 8:** The FRL for the default COR for tie trunks (T1-emulated voice or data, or analog) on the remote system may be blocking tandem calls. The private network includes at least one analog tie trunk.

**What to Do:** Check with the coordinating system manager so that he or she can determine where the problem exists. This may involve more than one system, depending upon how your private network is set up. For example, a call might be routed across the private network in a fashion such as this:

Origin System A→System B→System C→Destination System D

In this configuration, the coordinating system manager must check routes and default COR attributes for Systems B and C.

- Check to make sure the calling restriction of the default COR is set to unrestricted. The factory setting is outward restricted, which blocks calls across the private network.
- Check that the routes voice/data capability is correct for the type of call being made. The factory setting is Both, which will support both voice and data calls.
  - In each intervening system, compare the FRLs assigned to routes for the call with the default COR FRL. The route FRL must be equal to or lower than the default COR value or the call is blocked. The factory setting is 3.
  - If FRL settings are not the cause, go to Possible Cause 9.

**Possible Cause 9:** If the call is a 64-kbps data call, all routing facilities may not support this data speed.

**What to Do:** Unless you are directly connected to the destination system, the coordinating system manager must check the routes for the call. To check the local routes, see *Reviewing the Non-Local Dial Plan and Routing*. To change the routing in order to specify facilities that can handle the call, see “Uniform Dial Plan Routing” in Chapter 5 of *Network Reference*.

If the call is routed over any analog facilities (tie or loop-start, for example), T1-emulated voice or data facilities, it cannot go through. If the call is routed over PRI and/or BRI facilities, a speed of 64 kbps may be possible. If this is not the cause of the problem, call the Technical Support Organization at 1 800 628-2888; consultation charges may apply.

**Possible Cause 10:** Switch B has more B-channels than Switch A. When Switch B calls Switch A, it is trying to establish contact on a higher number B-channel than Switch A has. Therefore, Switch B receives the fast busy tone.

**What to Do:** Remove the extra B-channel from Switch B so that Switch B has the same number of B-channels as Switch A.

## Call to Non-Local Extension: Warble Tone (Error Tone)

There are several reasons why a call to a non-local extension receives warble tone. The first two possibilities are easy to check, because they all derive from the local system. The third possible cause only occurs when there are tandem PRI facilities included in the route for the call.

**Possible Cause 1:** The extension number is omitted from the non-local dial plan.

**What to do:** Check your system's non-local dial plan to see whether the destination extension number is included in a programmed extension range. If it is not, you have solved the problem. If it is included, check all tandem switches to ensure that the extension is in their non-local dial plans. To add the extension to the non-local dial plan, consult the coordinating system manager and see *Reviewing the Non-Local Dial Plan Numbering or System Renumbering* in the *Feature Reference*. If it is included in all programmed extension ranges, proceed to Possible Cause 2.

**Possible Cause 2:** The remote system rejects the dialed number on an all PRI network route.

**What to do:** Check that the number that arrived is in the non-local dial plan. If the number is in the non-local dial plan, verify that it is a valid extension number for a station, adjunct, calling group, Listed Directory Number (LDN), Remote Access, Dial 0, or ARS.

**Possible Cause 3:** The pattern does not have pools assigned to any routes.

**What to do:** Verify that the correct pattern is assigned to the range. If the pattern is correct, assign the pools to the routes.

**Possible Cause 4:** The FRL assigned to the extension may not permit the call on any of the routes included in the pattern for the call.

**What to do:** Look at the system form for the caller's extension. Depending on the type of extension (TDL, MLX, digital or analog data, operator, and so on) the extension form varies. You can see a report that lists all extension FRLs by choosing the `Print` option on the System Programming menu, then selecting `Ext Direct`. You can see programmed route FRLs by choosing `Non-Lcl UDP` from the same menu.

For the call to go through, the extension FRL must be equal to or greater than at least one of the route FRLs for the pattern that is programmed to reach the destination extension range.

- If it is appropriate to change the extension FRL, see "ARS Restriction Levels for Extensions" in the *Automatic Route Selection* feature in the *Feature Reference*.

- If you change one or more route FRLs, the modification may restrict or unrestrict calling from some private network extensions. Be sure to clear any changes with the coordinating system manager for the private network. If you decide to make this change, see “Uniform Dial Plan Routing” in Chapter 5 of the *Network Reference*. For details about FRLs in private networks, see “Facility Restriction Levels and Remote Access” in Chapter 4 of the *Network Reference*.
- If a local extension or route FRL is not the problem, the coordinating system manager must determine the private network route for the call once it leaves your local system. If there is an intervening system between yours and the destination, proceed to Possible Cause 5.
- If there is no intervening system between yours and the destination, go to Possible Cause 5.

**Possible Cause 5:** The FRL for the default COR for non-tie trunks (PRI) on the remote system may be blocking tandem calls. The private network is an all PRI network.

**What to Do:** Check with the coordinating system manager so that he or she can determine where the problem exists. This may involve more than one system, depending upon how your private network is set up. For example, a call might be routed across the private network in a fashion such as this:

Origin System A→System B→System C→Destination System D

In this configuration, the coordinating system manager must check routes and default COR attributes for Systems B and C.

- Check to make sure the calling restriction of the default COR is set to unrestricted. The factory setting is outward restricted, which blocks calls across the private network.
- Check that the routes voice/data capability is correct for the type of call being made. The factory setting is Both, which will support both voice and data calls.
- In each intervening system, compare the FRLs assigned to routes for the call with the default COR FRL. The route FRL must be equal to or lower than the default COR value or the call is blocked. The factory setting is 3.
- If FRL settings are not the cause, call the Technical Support Organization at 1 800 628-2888; consultation charges may apply.

## Calls to Non-Local Extensions: Unexpected Busy Tone

This topic discusses unexpected busy tones that may be caused by system features. It applies not only to regular calls from one private network extension to another but also to remote access calls that are routed among private network systems.

**Possible Cause:** Intersystem callers may receive a busy tone that is unexpected because they know that the call recipient has coverage. However, in a private network non-local calls are treated as outside calls by the system. The non-local extension may not have coverage for outside calls turned on.

**What to Do:** Depending upon how the non-local system is set up, try one of the following techniques in order to reach the extension:

- If the destination extension can be dialed directly via Direct Inward Dialing (DID) or PRI dial-plan routing, try calling the destination extension over public switched telephone network tandem trunks. If you receive the same busy tone, then the Coverage setting may be the problem. Call the system manager or receptionist at the non-local system and have them check the extension to ensure that coverage is correct and that the extension is functional.
- If you cannot dial the extension directly, use public switched telephone network facilities or the non-local dial plan in order to reach the operator for the non-local system. Have the operator transfer you to the extension. You should be able to leave a message for the extension user with voice mail or with the operator.

If neither of the above methods solves the problem, call the non-local system's system manager or the private network coordinating system manager and explain the situation.

### Call to Non-Local Extension Reaches Wrong Extension

**Possible Cause:** If a call to a non-local extension connects to the wrong extension, one or more non-local dial plan extension ranges and/or routes may be incorrectly programmed. Non-local dial plan numbers must be unique and unambiguous or calls can be misrouted. Furthermore, digit absorption and prepending for the routes must be programmed correctly.

**What to Do:** First, review the local routing for the call. See [“Reviewing the Non-Local Dial Plan and Routing”](#) on page 5-11. Then follow the steps below.

1. At your local system, ensure that routing for the destination extension specifies pools of trunks connecting to the correct adjacent system (if there is more than one). If digit prepending or absorption is needed, make sure that it is correctly programmed. If you find an error, you have solved the problem. If not, proceed to Step 2.
2. If you are directly connected to the system where the destination extension is located, go to Step 3. Otherwise, the coordinating system manager should repeat Step 1 for each system through which the call is routed until you reach the system where the destination extension is located.
3. Check with the system manager at the destination system or with the coordinating system manager to ensure that the extension number is in the local dial plan for that system.

**NOTE** ► The system does not permit programming of non-local extension ranges that conflict with extension numbers included in the local or non-local dial plan. However, conflicts can still arise due to digit prepending or absorption as a call is routed across the private network.

If this is not the problem, call the Technical Support Organization at 1 800 628-2888; consultation charges may apply.

## Call to Non-Local Extension: Message from CO

**Possible Cause:** If someone calls a non-local extension and connects to a central office message announcing a misdialed number or some other problem, the call is routed over a PSTN trunk (PSTN facility pools rather than tandem trunk pools are sometimes assigned to secondary UDP routes such as Routes 3 or 4). Problems can occur when the programming for a PSTN route does not at least prepend the correct digits (as in 555, for a local access call, or 1555 for a toll access call prefixed before a 4-digit extension number) and possibly absorb digits as well, in order for the call to be directed properly.

**What to Do:** Check the UDP range for the pattern to which the dialed extension is assigned. See *Reviewing the Non-Local Dial Plan and Routing*.

If there is no error in the local programming and there is an intervening system between yours and the system where the destination extension is located, speak with the coordinating system manager. The coordinating system manager should check the intervening system's UDP tables for proper digit manipulation. He or she can determine whether the routing problem is on that system.

If this is not the problem, call the Technical Support Organization at 1 800 628-2888; consultation charges may apply.

## Transfer to Non-Local Extension Not Completed

There are several possible causes for an incomplete transfer. They are very easy to check.

- **Voice-Announced Transfer.** Voice-announced transfers cannot be made to non-local extensions.
- **Transfer from PassageWay Telephony Services Client.** Transfers with consultation cannot be made from PassageWay Telephony Services clients to non-local extensions. The user must make such a transfer by using a telephone.

**NOTE** ► PassageWay Telephony Services clients cannot use an application to transfer calls across the private network. The user must make transfers manually using a telephone. If the transfer recipient is a PassageWay Telephony Services client, only the transfer originator calling information is delivered to the extension, not information about the original caller.

- **PSTN Trunk Transfer.** The system permits trunk-to-trunk transfers of inside or outside calls to non-local extensions, regardless of whether system programming has prohibited trunk-to-trunk transfer. However, trunk-to-trunk transfer does not work under the following circumstances:
  - Trunk-to-trunk transfer is prohibited at the transferring extension and the call is an outside call being transferred to a local PSTN line/trunk.
  - The transfer originator is attempting to transfer an outside PSTN or private network call to or from a loop-start line that does not have reliable disconnect. All loop-start lines connected to private networked systems must have reliable disconnect.

If the problem persists, call the Technical Support Organization at 1 800 628-2888; consultation charges may apply.

## Transfer Call to Non-Local Extension Does Not Return

**Possible Cause:** If a transfer to a non-local extension cannot be completed (due to the extension being busy, for example), it only returns when the call is routed over tandem PRI facilities, not tandem tie trunks or the PSTN trunks that may be used for less preferred routes.

**What to Do:** Review the routing for the call. See *Reviewing the Non-Local Dial Plan and Routing* and check with the coordinating system manager if necessary. If the call is routed over any tandem tie trunks or over any PSTN facilities, you have solved the problem.

If the call is routed only over tandem PRI facilities, call the Technical Support Organization at 1 800 628-2888; consultation charges may apply.

## Conference: Cannot Add Call

Non-local extensions are treated as outside parties for the purpose of transfer. A non-local conference participant takes up one of the two outside calls permitted in a conference.

**NOTE** ► A PassageWay Telephony Services client cannot add a non-local extension to a conference. The user must add the conferee by using a telephone. If a conferee is dropped, the PassageWay Telephony Services client display does not so indicate. A PassageWay Telephony Services client, when added to a conference, only sees information about the conference originator, not about other conferees.

If this is not the problem, call the Technical Support Organization at 1 800 628-2888; consultation charges may apply.

## DID Calls Not Completed

There are several reasons why Direct Inward Dialing (DID) calls across a private network may not complete, either due to busy facilities or to faulty programming. The coordinating system manager may need to address the problem.

**Possible Cause 1:** All programmed and available routes for the call are busy.

**What to do:** This problem solves itself when traffic decreases. Only address the problem if it persists.

Note the extension number range for the DID destination. At the system where the call is received from the PSTN, check that the pattern assigned to the range includes sufficient different routes with pools (of tandem and/or PSTN facilities) to handle the call volume. This is accomplished by checking the error for errors 4C01 (Pool Empty), 4C02 (Pool Busy), or 4C03 (Pool Busy and/or Out-of-Service). If any of these error codes are present, check the pool index on the maintenance screen to determine if it matches the pool used to deliver the call. If it matches, check occurrence times and count. If the count is too high and the occurrences indicate the problem occurred within

the duration of the occurrences, consider changing the routing of the call, pool sizes, or add trunks to the pool if empty.

- To add more routes that can handle the call, see “Uniform Dial Plan Routing” in Chapter 5 of *Network Reference*.
- If more trunks are available and need to be assigned, follow the procedure in “Trunks to Pools Assignment” in the Pools feature in the *Feature Reference* to assign more tandem trunks. All the tandem trunks in a pool must be of the same type (tie or PRI).
- If not enough trunks are available, consider adding more to the system.
- If there are sufficient trunks assigned and the problem persists, the cause of the problem may be at an intervening system between the one where the calls are received from the PSTN and the destination. Go to Possible Cause 2.
- If there are sufficient trunks and routes and there are no intervening systems between the one where the calls are received from the PSTN and the destination, contact the provider of the DID service. If this does not solve the problem, call the Technical Support Organization at 1 800 628-2888; consultation charges may apply.

**Possible Cause 2:** The FRL for the default COR for all tie (T-1 emulated voice or data, or analog) or non-tie trunks (PRI) on the remote system may be blocking tandem calls.

**What to Do:** Check with the coordinating system manager so that he or she can determine where the problem exists. This may involve more than one system, depending upon how your private network is set up. For example, a call might be routed across the private network in a fashion such as this:

Origin System A→System B→System C→Destination System D

In this configuration, the coordinating system manager must check routes and default COR attributes for Systems B and C.

- Check to make sure the calling restriction of the default COR is set to unrestricted. The factory setting is outward restricted, which blocks calls across the private network.
- Check that the routes voice/data capability is correct for the type of call being made. The factory setting is Both, which will support both voice and data calls.
- In each intervening system, compare the FRLs assigned to routes for the call with the default COR FRL. The route FRL must be equal to or lower than the default COR value or the call is blocked. The factory setting is 3.
- If FRL settings are not the cause, call the Technical Support Organization at 1 800 628-2888; consultation charges may apply.

## ARS Calls Are Blocked

Check Possible Cause 2 listed in “DID Calls Not Completed” of the previous section. When an ARS call is routed across the private network, it can be intercepted because the default COR FRL at a private networked system is lower than the ARS route (or the UDP route if the system is sending the call to another private networked system).

If this is not the cause, check the Disallowed List entries applied to default COR settings at systems where the call is routed either to the PSTN or to another system in the private network. Compare the entries to the dialed digits; a Disallowed List may be blocking the call. If it is necessary to change the Disallowed List, see “Revising Allowed and Disallowed Lists” under “Managing Lines and Telephones” in the *System Manager’s Quick Reference*. Check the ARS programming to verify that the remote machine’s ARS code is being prepended. Verify that switch identifiers have been assigned to all private network tandem trunks.

If this does not solve the problem, call the Technical Support Organization at 1 800 628-2888; consultation charges may apply.

## Callback Does Not Work

Callback allows queueing for an available line/trunk connected to the local system. If a user attempts an ARS- or UDP-routed call and hears a busy signal or warble tone, the signal may be derived from a non-local system’s tandem or PSTN facilities. If this is the case, Callback does not work. When all available routes on the local system are busy, a caller can use Callback to wait for an available facility in the Route 1 pool.

## Private Network Call Transmission Level (Volume) Too Low or Too High

When transmission levels are too high or too low, the coordinating system manager must investigate the cause.

**Possible Cause 1:** Switch identifiers programmed incorrectly.

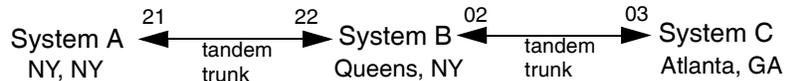
**What to Do:** Refer to the table below as you examine the problem. It lists the rules for programming switch identifiers. At each system in a private network, each tandem trunk is programmed (individually or as part of a block of trunks) to indicate the type of system connected to the other end of the trunk as well as the distance between the connected systems.

- 1–20 = trunk connected to a MERLIN MAGIX system that is more than 200 miles away
- 21–40 = trunk connected to a MERLIN MAGIX system that is within 200 miles
- 41–50 = trunk connected to a system that is not a MERLIN MAGIX system (for example, a DEFINITY ECS communications system) and is more than 200 miles away
- 51–60 = trunk connected to a system that is not a MERLIN MAGIX system (for example, a DEFINITY ProLogix Solutions communications system) and is within 200 miles

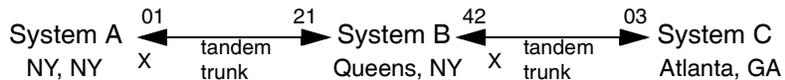
**NOTE** ► DEFINITY ECS and DEFINITY ProLogix Solutions systems are beyond the scope of this guide. For information about how these systems identify tandem facilities, see the documentation for the applicable system.

Follow the steps below to check on the problem.

1. Check the routing for the call, and identify each system where the call is routed, including the system where the call originated or was received from the public switched telephone network. See *Reviewing the Non-Local Dial Plan and Routing*.
2. As necessary, note the switch identifier programmed on each system for the trunks that carry the calls. To review a report including the switch identifiers programmed on a system, select the `Print` option on the System Programming menu and then choose `Trunk Info` and `General`.
3. Look for switch identifiers that incorrectly specify the distance between systems or that specify the incorrect type of system. The diagram below shows how switch identifiers might be programmed at either end of tandem trunks in a hypothetical private network. A switch identifier is programmed to identify the system at the *opposite* end of the tandem trunk. In the example, all three switches are MERLIN MAGIX systems. On the facility that links Systems A and B, the system managers program identifiers to indicate that they are within 200 miles of one another. Next to the name of each system, is the switch identifier associated with that switch. The switch is programmed on the switches on the other end of the tandem trunk. Systems B and C are linked by trunks whose identifiers indicate distant systems.



The example below shows programming that would be incorrect in the same private network. The link between Systems A and B has mismatched identifiers, because System B specifies that System A is more than 200 miles away. System C incorrectly specifies System B as a non-MERLIN MAGIX system.



4. If any of the programming is incorrect, one or more system managers must correct it. The coordinating system manager must clear any changes. To change the switch identifiers at your local system, see the UDP feature in the *Feature Reference*. If the programming appears to be correct, skip to Step 6.
5. Make some test calls across the private network. If calls are at the proper levels, the problem is solved. If transmission levels are still incorrect, proceed to Step 6.
6. If the identifiers appear correct but the distance between systems is between 180 and 220 miles, you may need to experiment with switch identifiers in order to achieve the correct transmission levels. Return to Step 4.

If changing one or more switch identifiers do not solve the problem, see Possible Cause 2.

**Possible Cause 2:** More than three analog spans are involved in the call.

**What to Do:** This may occur when calls are transferred or forwarded multiple times across analog facilities. Consider changing to digital facilities if this situation occurs frequently. Contact your Avaya representative or local authorized dealer for instructions.

If the problem is not solved with the above instructions, call the Technical Support Organization at 1 800 628-2888; consultation charges may apply.

## MLX Displays: Private Network Call Display Problems

There are several possible causes for this problem, all of them easy to check.

**Possible Cause 1:** Non-local extension calls and outside calls routed on tandem tie trunks display at recipient MLX display telephones as outside calls, for example, TIE-TRK.

**What to Do:** Check the call routing and find out whether any tandem tie trunks are included in the route. You may need to contact the coordinating system manager. If the call originated from the PSTN on a PRI or BRI facility with Automatic Number Identification (ANI), the original calling party information displays when private network routing is over tandem PRI trunks only. Check the call routing and see whether any tandem tie trunks are included in the route.

**Possible Cause 2:** Call transferred to the extension.

**What to Do:** If the call was transferred to the extension, only the transfer originator information displays, not the name and/or number of the original caller, even if PRI ANI was available for the original call.

**Possible Cause 3:** Display Preference setting for MLX incorrect

**What to Do:** If the call route for an intersystem call includes only tandem PRI trunks and the call was not transferred, the Display Preference setting for the MLX display telephone extension may not be programmed as you expect. The factory setting displays the caller's extension number. Check System Planning Form, MLX Telephones, for the recipient extension or see "Display Preferences for Intersystem Calls" in Chapter 5 of *Network Reference* to check the setting through system programming. If you see the word "Ext" in the display, change the programming to Both.

You can see a report for the extension, showing the display preference, by choosing the Print option on the System Programming menu, then selecting `Ext Info` and entering the extension number. If the display shows a 10-digit ANI as `PRI-TRK Ext 9089575555`, you may want to change the display option from Name to Both and then the display would look like `PRI-TRK 9089575555`.

**Possible Cause 4:** Transfer completed too quickly.

**What to Do:** Callers must wait at least two seconds before completing transfers.

If none of these factors caused the problem, call the Technical Support Organization at 1 800 628-2888; consultation charges may apply.

## PassageWay Call Display Problems

In private networks, calls to and from PassageWay Telephony services clients may not display or initiate screen pop as expected. The operation varies according to the application, according to the following rules:

- For an outgoing call, if the PassageWay Telephony Services application uses the length of a destination telephone number to differentiate PSTN calls from UDP calls, a PassageWay Telephony Services client displays a non-local extension call in the same way as it does inside calls.
- For an outgoing call, if the PassageWay Telephony Services application uses receipt of the *Network Reached* event to differentiate PSTN calls from inside calls, a PassageWay Telephony Services client displays a non-local extension call or other UDP-routed call in the same way as it does an outside call made to the public switched telephone network.
- For an incoming call, if the PassageWay Telephony Services application uses the length of ANI information to differentiate PSTN calls from UDP calls, a PassageWay Telephony Services client displays a non-local dial plan call as an inside call.
- For an incoming call, if the PassageWay Telephony Services application uses the presence of a trunk identifier in the *delivered event* to differentiate PSTN calls from UDP calls, a PassageWay Telephony Services client displays a non-local dial plan call in the same way it does a PSTN call.
- For an incoming PSTN call that enters the private network on a PRI trunk with an ANI of length shorter than seven digits and crosses PRI tandem trunks only, the recipient PassageWay Telephony Services client display depends on the PassageWay Telephony Services application implementation.

If none of these factors explain the problem, contact the application provider. If the application provider instructs you to do so, call the Technical Support Organization at 1 800 628-2888; consultation charges may apply.

## ARS Calls Go to System Operator (Unassigned Extension)

**Possible Cause:** System managers in your private network may have set up ARS and remote access to route outgoing calls to PSTN facilities on switches where these calls are most economical.

**What to Do:** If such calls are reaching a system operator (unassigned extension) on a private networked system, rather than being routed to the PSTN, the coordinating system manager must check the tandem facilities that carry calls to the system where the operator is located. The problem is caused when one or more tandem trunks has no switch identifier (the factory setting).

If this is not the problem, call the Technical Support Organization at 1 800 628-2888; consultation charges may apply.

## DID or PRI Dial-Plan Routed Calls Not Completed

There are two possible causes for this occurring

**Possible Cause 1:** DID and PRI calls cannot be routed to a 5-digit DEFINITY ECS or DEFINITY ProLogix Solutions system.

**What to Do:** Verify system programming and the digits received from the PSTN. Refer to “Non-Local Dial Plan Number” in Chapter 5 of the *Network Reference* for details on programming required.

**Possible Cause 2: DID or PRI routing not correct.**

**What to Do:** The coordinating system manager should check the DID or PRI routing. These calls may come into one private networked switch and be routed across the private network to an extension on another system in the private network. The routing must specify the correct tandem trunk pools, extension numbers, and digit manipulation.

If the routing is correct, contact the service provider. If the service provider instructs you to do so, call the Technical Support Organization at 1 800 628-2888; consultation charges may apply.

## Excessive Line Noise on Voice and Data Calls

**Possible Cause:** Clocks are not properly synchronized.

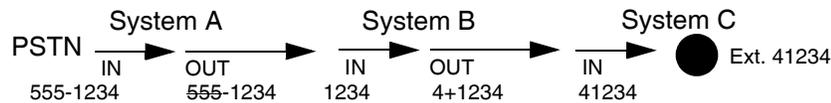
**What to Do:** The coordinating system manager should check error logs at problem systems. If slips are occurring at a high rate or an alarm was raised, clock synchronization is a problem. The coordinating system manager should then check the programming for the PRI tandem trunk(s) and/or PSTN digital facilities that carry the calls. A single clock source is used for all private networked systems so that calls are properly synchronized. For details about clock synchronization in a private network, see “Clock Synchronization” in Chapter 5 of the *Network Reference*.

If the clock source is correct, ensure that the specified port is functioning properly and has an in-service facility connected to it.

If this does not solve or explain the problem, call the Technical Support Organization at 1 800 628-2888; consultation charges may apply.

## Station Message Detail Recording (SMDR) Reports Do Not Include Calls across the Private Network

SMDR reports may report calls using more than one call record on more than one system. Depending upon how SMDR is programmed and how calls are routed, you may need to consult several SMDR records to trace a call that is routed over private network tandem trunks. To log private network calls, SMDR should be programmed to report both incoming and outgoing calls.



The diagram above shows how a single call, routed across a private network, is both an incoming and an outgoing call in the same system. For private network calls, outgoing call records report the incoming tandem trunk number in the STN. field (see System B above). Dialed digits shown on the report do not reflect any digit manipulation (addition or absorption) performed by the local system.

Calls across the private network are not recorded, even at a tandem switch, if the call is not answered unless the outgoing facility is a loop-start or ground-start trunk. Then calls are logged, even unanswered calls.

If the system date and time are not synchronized across the private network, it may be hard to recognize the records for a single call, even when the systems are in the same time zone. When they are not, time zone differences must also be considered.

## T1 to PRI Conversion Fails

T1 to PRI conversion sometimes fails. Here is a typical scenario. The hub system in a private network has two 100D modules configured as tandem PRI. The 100D module in Slot 5 used B-channel group 80, and the 100D module in Slot 10 used B-channel group 79. Then the 100D module in Slot 5 was reconfigured for T1, and the translations were backed up.

Whenever the 100D module in Slot 5 needs to be converted back to PRI, follow these steps to populate a B-channel group:

1. Move a B-channel from group 79 to 80.
2. Select PRI for Slot 5.
3. Change the switch type to something other than MAGIX-PBX or MAGIX-Ntwk.
4. Change the switch type back to MAGIX-PBX or MAGIX-Ntwk.

The B-channel group 78 will be occupied.

## **PRI B-Channel Alarms are Not Dropped**

When a B-channel that has been assigned to a PRI B-channel group is removed from the group, the alarms on that B-channel are not automatically dropped. This causes the system to track alarms on facilities that are not in service. It also renders the channel useless when you try to reassign the B-channel.

In addition, even when you manually drop the PRI SVC AUDIT TIMEOUT alarm from the permanent alarm table, it reappears 15 minutes later after it tries to remove alarms from the B-channel.

To remove alarms from a B-channel that has been taken out of a PRI B-channel group, follow these steps:

1. Manually drop the alarm or alarms.
2. Immediately back up the programming.
3. Verify that the alarm or alarms dropped in Step 1 has not been re-logged. If the alarm or alarms has been re-logged, return to Step 1 and follow the procedure.
4. Frigid-start the MERLIN MAGIX System.
5. Restore the backed-up programming.

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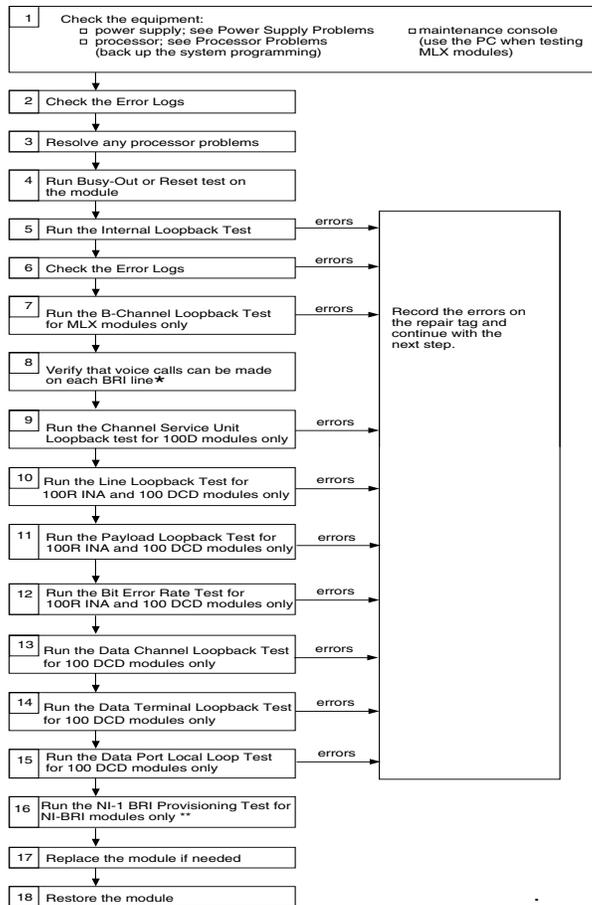
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This section provides the module tests.

### Module Test Process

This flow chart illustrates the recommended approach to testing modules. Review flow chart as well as Considerations before you begin a module test.



\* If any problem arises with the voice call on an NI-BRI module, run the NI-BRI Provisioning Test next. While the BRI test is running, you can run the voice test on the next module.

\*\* Run the NI-BRI Provisioning Test on any NI-BRI module that is going to be used for data calls or that had a problem with voice calls and was not previously tested with the tool.

Figure 6-1. Module Test Process

## Considerations

- Before running a module test, make sure the following system components are working:
  - Power supply
  - Processor
  - Maintenance Console (4424LD+ or MLX-20L console)
- Before running a module test, backup system programming to a floppy disk or memory card. See “Backup” in the Programming Basics section of this guide to backup to floppy disk, or Appendix D, Backing up with a Memory Card to backup to a memory card.
- To run tests on the TDL module connected to the 4424LD+ console, or on the MLX module connected to the MLX-20L console, you must run the test from the PC, not from the console.
- Before running a module test, busy-out or reset the modules. Busy-Out is the best method, but it will not work if any line or extension is on a stable call. See Busy-Out and Reset.
- 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`.
- 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.

**NOTE** ► If the system does not recognize a 408 GS/LS-MLX module during testing, check the release number of the system. The 408 GS/LS-MLX module does *not* work with MERLIN MAGIX Releases 1.0 or 1.1. An 008 MLX module *must* be used to provide extension jacks with Releases 1.0 or 1.1.

- If any of the module tests fail and replacing the module does not clear the trouble, then 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; use this procedure:  
Menu→Maintenance→Slot→Status

**NOTE** ► The status screen cannot be used to check the router portion of the 100R INA and 100 DCD modules. You must use 100R INA and 100 DCD management interfaces to determine the status of the router. For information on the Router Management interface, refer to the documentation packaged with the 100R INA and 100 DCD modules.

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

## Busy-Out

Before running any test, be sure to busy-out or reset the module. Busy-out discontinues service to each line/trunk and extension connected to the module being tested only as the line or extension becomes idle. Busy-out is the preferred method, because it does not disrupt calls in progress.

**Procedure**                      **Menu**→**Maintenance**→**Slot**→**Enter the slot no. (01-17)**→**Enter**→**Busy-Out**→**Yes**

While the module is discontinuing service to the lines/trunks and extensions, a **Busy-Out in Progress** message is shown on the screen. When the module is successfully busied-out, **Busy-Out Complete** is displayed.

**Appropriate Modules** Any module that you are about to test.

In the procedure above, when you select **Enter**, the following additional options appear, depending on the module:

- For all MLX modules, **BChLoopback** is also displayed.
- For 100D modules, **CSU-lpbk**, **Error Events**, and **Clock** are also displayed.
- For all 800 NI-BRI modules, **Clock**, **BChLoopback**, and **Provisioning** are also displayed

**Time Estimate**                      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.

When you Busy-Out the 100R INA or 100 DCD modules, router services are disrupted at the module level during the time the module is busied-out.

## Reset

Before running any test, be sure to busy-out or reset the module. 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, a demand test cannot be performed because the module is not busied out. If you reset a module, be sure to check the status of that module before performing a demand test.

**NOTE** ► Busy-out is the preferred method of discontinuing service to a module, because it does not disrupt calls in progress

**Procedure**                      Menu→Maintenance→Slot→Enter the slot no. (01-17)→ Enter→ Reset→Yes

While the module is discontinuing service to the lines/trunks and extensions, a `Reset in Progress` message is shown on the screen. When the module is successfully reset, `Reset Complete` is displayed. If the reset fails, `Reset FAILED` is displayed.

**Appropriate Modules**      Any module that you are about to test.

In the procedure above, when you select `Enter`, the following additional options appear, depending on the module:

- For all MLX modules, `BChLoopback` is also displayed.
- For 100D modules, `CSU-lpbk`, `Error Events`, and `Clock` are also displayed.
- For all 800 NI-BRI modules, `Clock`, `BChLoopback`, and `Provisioning` are also displayed.

To reset a 100 DCD module, you select each of the two data ports or slots separately. The system indicates if the reset completed successfully or failed. When the 100 DCD module is not installed in the carrier, the maintenance screens do not display the maintenance options to busy-out the data ports.

**Time Estimate**                Less than 1 second (all calls in progress are terminated or put on hold immediately). If you do not want to interrupt calls in progress, use `Busy-Out` instead of `Reset`.

## Restore

Once you complete module testing, restore it to terminate the Busy-Out or Reset condition.

Procedure	<p>Menu→Maintenance→Slot→Enter the slot no. (01-17)→Enter→Restore→Yes</p> <p>While the module is restoring service to the lines/trunks and extensions, a <i>Restore in Progress</i> message is shown on the screen. When the module is successfully restored, <i>Restore Complete</i> is displayed. If the restore fails, <i>Restore FAILED Board Mismatch</i> is displayed. In this case, try the restore again and be sure you specified the correct slot.</p>
Appropriate Modules	<p>Any module after testing it.</p> <p>In the procedure above, when you select <i>Enter</i>, the following additional options appear, depending on the module:</p> <ul style="list-style-type: none"><li>■ For all MLX modules, <i>BChLoopback</i> is also displayed.</li><li>■ For 100D modules, <i>CSU-lpbk</i>, <i>Error Events</i>, and <i>Clock</i> are also displayed.</li><li>■ For all 800 NI-BRI modules, <i>Clock</i>, <i>BChLoopback</i>, and <i>Provisioning</i> are also displayed.</li></ul>
Time Estimate	<p>Less than 1 second.</p> <p>When the 100R INA and 100 DCD modules are restored, router service is restored at the module level.</p>

## Internal Loopback Test

This test checks communication between the processor and the module being tested. If you have not read [“Module Test Process”](#) on page 6-1, do so before performing this test.

**NOTE** ► Remove Music-On-Hold before conducting this test. If Music-On-Hold is assigned to any line/trunk ports on the module you are testing, this test will fail even though the line/trunks are functioning properly.

Procedure	Menu→Maintenance→Slot→Enter the slot no. (01-17)→Enter→Demand Test→IntLoopback→Test Once or Test Repetitive
Appropriate Modules	In the procedure above, when you select Enter, the following additional options appear, depending on the module: <ul style="list-style-type: none"> <li>■ For all MLX modules, BChLoopback is also displayed.</li> <li>■ For 100D modules, CSU-lpbk, Error Events, and Clock are also displayed.</li> <li>■ For all 800 NI-BRI modules, Clock, BChLoopback, and Provisioning are also displayed.</li> </ul>
Time Estimate	It takes approximately 1.5 minutes to run each test. The 100D module and 408 GS/LS-MLX module each take approximately 3 minutes, because they each have two DSEs.
Busy-Out or Reset	Busy-out or reset the module being tested prior to beginning the test. See <a href="#">“Busy-Out”</a> on page 6-4 and <a href="#">“Reset”</a> on page 6-5.
Interrupting the Test	You can interrupt the test (both Test Once and Repetitive) by selecting Back.
Test Failure	If the test fails, record the errors on the repair tag and replace the module. Lines 5 and 6 on the failure test results identify the cause of the failure or the number of errors found per port. There are up to 16 ports, numbered 0 through 15. Line 5 displays the results for ports 0 through 7; Line 6 is for ports 8 through 15.
Restore	Restore the module if it successfully completes all module tests and the errors no longer occur. See <a href="#">“Restore”</a> on page 6-6.

## Interpreting Internal Loopback Test Results

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 finished testing.

If the test fails, find the error message in Table 6-1 “Internal Loopback Test Errors” and proceed as indicated in the “Corrective Action” column.

**Table 6-1. Internal Loopback Test Errors**

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** ►
- If Music-On-Hold is assigned to any line/trunk ports on the module you are testing, the test will fail even though the line/trunks are functioning properly. Remove the Music-On-Hold assignment and perform this test again.
  - Be sure to check the second screen if testing a 100D module or a 408 GS/LS-MLX module. Press the **More** button to check the second screen.

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## Board Controller Test

This procedure tests the module's internal functions, such as ROM, RAM, the timer, and dual-port RAM.

Procedure	Menu→Maintenance→Slot→Enter the slot no. (01-17)→Enter→Demand Test→BoardCntrlr→Test Once or Test Repetitive
Appropriate Modules	<p>This test can be run on all modules except the processor.</p> <p>In the procedure above, when you select <code>Enter</code>, the following additional options appear, depending on the module:</p> <ul style="list-style-type: none"><li>■ For all MLX modules, <code>BChLoopback</code> is also displayed.</li><li>■ For 100D modules, <code>CSU-lpbk</code>, <code>Error Events</code>, and <code>Clock</code> are also displayed.</li><li>■ For all 800 NI-BRI modules, <code>Clock</code>, <code>BChLoopback</code>, and <code>Provisioning</code> are also displayed.</li></ul>
Time Estimate	Less than 1 second
Busy-Out or Reset	Busy-out or reset the module being tested prior to beginning the test. See <a href="#">“Busy-Out”</a> on page 6-4 and <a href="#">“Reset”</a> on page 6-5.
Interrupting the Test	You can interrupt the test ( <code>Test Once</code> or <code>Repetitive</code> ) by selecting <code>Back</code> .
Test Failure	If the test fails, record the errors on the repair tag and replace the module.
Restore	Restore the module if it successfully completes all module tests and the errors no longer occur. See <a href="#">“Restore”</a> on page 6-6.

## Interpreting Test Results

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 "Board Controller Test Errors" and proceed as indicated in the "Corrective Action" column.

**Table 6-2. Board Controller Test Errors**

<b>Error Messages</b>	<b>Corrective Action</b>
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.

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## B-Channel Loopback Test

This test verifies that specific communication paths on the MLX or 800 NI-BRI modules are operational. If you have not read [“Module Test Process”](#) on page 6-1, do so before performing this test.

Procedure	Menu→Maintenance→Slot→Enter the slot no. (01-17)→Enter→BchLoopback
Appropriate Modules	<p>This test can be run only on MLX or 800 NI-BRI modules.</p> <p>In the procedure above, when you select <code>Enter</code>, the following additional options appear, depending on the module:</p> <ul style="list-style-type: none"><li>■ For all MLX modules, <code>BChLoopback</code> is also displayed.</li><li>■ For all 800 NI-BRI modules, <code>Clock</code>, <code>BChLoopback</code>, and <code>Provisioning</code> are also displayed.</li></ul>
Time Estimate	Approximately 1.5 minutes.
Busy-Out or Reset	Busy-out or reset the module being tested prior to beginning the test. See <a href="#">“Busy-Out”</a> on page 6-4 and <a href="#">“Reset”</a> on page 6-5.
Interrupting the Test	Interrupt the test by selecting <code>Back</code> .
Test Failure	If the test fails, record the errors on the repair tag and replace the module. Lines 3 and 4 of the test failure results identify the cause of the failure or the number of errors found per B-channel. On an MLX module, there are 16 B-channels, numbered 0 through 15. Line 3 displays the results for B-channels 0 through 7; Line 4 is for B-channels 8 through 15.
Restore	Restore the module if it successfully completes all module tests and the errors no longer occur. See <a href="#">“Restore”</a> on page 6-6.

## Interpreting Test Results

If the test completes successfully, the communication paths on the MLX or 800 NI-BRI modules are 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 6-3 “B-Channel Loopback Errors” and proceed as indicated in the “Corrective Action” column.

**Table 6-3. B-Channel Loopback Errors**

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.

## NI-1 BRI Provisioning Test

This test verifies that each communication path on the 800 NI-BRI module is operational by establishing and disconnecting a series of voice and data calls between any two communication paths on the module.

The NI-BRI Provisioning Test includes testing for BRI facilities that are part of Multiline Hunt Groups (MLHGs). Prior to testing, the BRI facility must have a MLHG group number programmed. The number (up to 10 digits) is appended to the end of the Directory Number (DN) (separated by a # character) programmed for the BRI line.

Before proceeding with this test, obtain completed copies of System Planning Form 3-i, Incoming Trunks: BRI Options and the NI-1 BRI Planner Form.

**NOTE** ► If an 800 NI-BRI module has only one DN/SPID provisioned on it, the provisioning test cannot be run on that module. To test the line, move one DSL from another 800 NI-BRI module to this module. The DSL that is moved should have been tested successfully and, to make testing easier, should not be part of a MLHG. This move involves administering a line on the DSL and connecting the cable on the target module. Run the test on the two DNs. When the test is successfully completed, remove the programming from the board just tested so that the single line is left on the board. Then reconnect the cable to the original slot and port.

All 800 NI-BRI modules must be busied out and those BRI boards not being tested must be unplugged from the carrier before testing can begin.

Procedure	Menu→Maintenance→Slot→Enter the BRI slot no. (01-17)→Enter→Provisioning
Busy-Out or Reset	Busy-out or reset the module being tested prior to beginning the test. See “Busy-Out” on page 6-4 and “Reset” on page 6-5.
Appropriate Modules	This test can be run only on 800 NI-BRI modules.
Time Estimate	Approximately 20 minutes for a fully utilized board. However, communication paths with errors increase the time. Boards with fewer programmed lines and no errors decrease the time.
LEDs	While the test is running, the LEDs are in the following states: <ul style="list-style-type: none"> <li>■ Green – blinks to indicate the test is running</li> <li>■ Yellow – flashes on and off while calls are being established and disconnected</li> <li>■ Red – stays on until Layers 1–3 are initialized for all programmed communication paths on the module</li> </ul>
Interrupting the Test	Interrupt the test by selecting <i>Back</i> .
Test Failure	If the test fails, see NI-1 BRI Provisioning Test Errors and NI-1 BRI Provisioning Test Result Codes. If the module must be replaced, record the errors on the repair tag and replace the module.
Restore	Restore the module if it successfully completes all module tests and the errors no longer occur. See “Restore” on page 6-6.

## Interpreting Test Results

The following screen appears when the testing for all 16 communication paths is completed.

```

Provisioning slot xx:

xxxxx xxxxx xxxxx xxxxx
xxxxx xxxxx xxxxx xxxxx
xxxxx xxxxx xxxxx xxxxx
xxxxx xxxxx xxxxx xxxxx
Back
    
```

Lines 3 through 6 of the test results provide test result codes. On a module with fewer than 16 programmed paths, the screen shows `OKNOH` or `OKH` for all successful paths; error codes for all failed paths; and `SPID` for any path that was not programmed. Be sure to record all the result codes on this screen, in the correct order.

Locate the test result codes in the NI-1 BRI Provisioning Test Result Codes table and follow the corrective action provided.

If the test fails, find the error message in Table 6-4 “NI-1 BRI Provisioning Test Errors” and proceed as indicated in the “Corrective Action” column.

**Table 6-4. NI-1 BRI Provisioning Test Errors**

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). If the problem persists, replace the 800 NI-BRI module.
Test running too long	Exit the test. Remove half of the DSL connectors and rerun the test. Note the result codes of those that fail and then disconnect them. Reconnect the untested DSLs and rerun the test. Note those that fail. Reconnect all DSLs.
Test won't start	Check that all BRI boards not being tested are busied out and unplugged from the carrier. Run the test again.

Table 6-5. NI-1 BRI Provisioning Test Result Codes

Result Code	Description	Corrective Action
CO-V	CO provisioning error for voice calls on that facility	<p>The facility is correctly programmed and established on Layers 1, 2, and 3. However, a problem associated with the provisioning at the CO for voice calls was detected.</p> <p>If the facility is intended to provide voice calls, perform the following tests and record the results before contacting the LEC:</p> <p>Outgoing Voice Call Test</p> <p>Incoming Voice Call Test</p> <p>Possible causes of this error are:</p> <p><b>Outgoing voice calls are not possible.</b> Error identified at Outgoing Voice Call Test.</p> <p><b>Incoming voice calls are not possible.</b> Error identified at Incoming Voice Call Test.</p> <p>If MLH is expected, the possible cause is that CO provisioning does not allow incoming voice calls, but either the DN or MLHG DN has been verified to be correct.</p> <p>IF MLH is not expected, the possible cause is that provisioning on the facility does not allow incoming voice calls.</p> <p><b>Additional call offering is provisioned.</b> Additional call offering allows a voice call to be presented to a busy facility without either party recognizing the condition. Therefore, this condition cannot be detected by manual testing. This cause is valid if incoming voice calls can be received successfully.</p> <p><b>Features provisioned.</b> Supplementary features such as transfer and conference are provisioned at the CO. This condition cannot be detected by manual testing. This cause is valid if incoming voice calls can be received successfully.</p> <p><b>Provisioning on the facility does not always allow outgoing and/or incoming calls.</b> Error identified at Outgoing Voice Call Test and/or Incoming Voice Call Test.</p> <p>This condition may or may not be detected by any single manual test. Therefore, a sequence of calls may be necessary to determine the condition for the failure.</p>

**Table 6-5. NI-1 BRI Provisioning Test Result Codes—Continued**

Result Code	Description	Corrective Action
CO-D	CO provisioning error for data calls on that facility	<p>The facility is correctly programmed and established on Layers 1, 2, and 3. However, a problem associated with the provisioning at the CO for data calls was detected.</p> <p>If the facility is intended to provide data calls, perform the following tests with either digital data terminals or analog data terminals and modem pools. Record the results before contacting the LEC:</p> <p>Outgoing Data Call Test</p> <p>Incoming Data Call Test</p> <p>If data terminals are not available, contact the LEC and advise them that the provisioning for data on the facility requires checking. If more information is required, contact the TSO and provide them with the result code, the slot number, the port number, and the site information (remote access number, etc.).</p> <p>The possible causes of this error are:</p> <p><b>Outgoing data calls are not possible.</b> Error identified at Outgoing Data Call Test.</p> <p><b>Incoming data calls are not possible.</b> Error identified at Incoming Data Call Test.</p> <p>If MLH is expected, the possible cause is that CO provisioning does not allow incoming data calls, but either the DN or MLHG DN has been verified to be correct.</p> <p>If MLH is not expected, the possible cause is that provisioning on the facility does not allow incoming data calls.</p> <p><b>Provisioning on the facility does not allow incoming data calls.</b> Error identified at Outgoing Data Call Test and/or Incoming Voice Call Test.</p> <p>This condition may or may not be detected by any single manual test. Therefore, a sequence of calls may be necessary to determine the condition for the failure.</p>

Table 6-5. NI-1 BRI Provisioning Test Result Codes—Continued

Result Code	Description	Corrective Action
CO-DNV	Error in MERLIN MAGIX administration of DN and/or CO provisioning error for voice calls on that facility	<p>The facility is correctly programmed and established with layers 1, 2, and 3. However, no incoming voice calls can be received. Check that the facility is programmed with the DN provided by the LEC.</p> <p>If the facility is part of an MLHG, check if the voice MLHG DN is absent. If the voice MLHG DN is absent, administer it and rerun the test. The possible causes of this error are:</p> <p>Incorrect DN/MLHG DN</p> <p><b>Incoming voice calls are not possible.</b> Error identified at Incoming Voice Call Test and the DN and MLHG DN cannot be verified.</p>
CO-DND	Error in MERLIN MAGIX administration of DN and/or CO provisioning error for data calls on that facility	<p>The facility is correctly programmed and established with Layers 1, 2, and 3. However, no incoming data calls can be received. Check that the facility is programmed with the DN provided by the LEC.</p> <p>If the facility is part of an MLHG, check if the data MLHG DN is absent. If the data MLHG DN is absent, administer it and rerun the test. The possible causes of this error are:</p> <p>Incorrect DN/MLHG DN</p> <p><b>Incoming data calls are not possible.</b> Error identified at Incoming Voice Call Test and the DN and MLHG DN cannot be verified.</p>
CO-DDV	Error in MERLIN MAGIX administration of DN and/or CO provisioning error for voice and data calls on that facility	<p>The facility is correctly programmed and established with Layers 1, 2, and 3. However, no incoming data calls can be received. Check that the facility is programmed with the DN provided by the LEC.</p> <p>If the facility is part of an MLHG, check if the MLHG DN is absent. If the MLHG DN is absent, administer it and rerun the test.</p> <p>The possible cause of this error is any combination of the causes of CODNV and CODND.</p>
DN	Incorrect DN administration	<p>The facility is established in Layers 1, 2, and 3. Check that the facility is programmed with the DN provided by the LEC and rerun the test. If the error persists, contact the LEC.</p> <p>If the facility is part of an MLHG, check if the MLHG DN is absent. If the MLHG DN is absent, administer it and rerun the test.</p>

Table 6-5. NI-1 BRI Provisioning Test Result Codes—Continued

Result Code	Description	Corrective Action
MLHV	<p>No voice hunting, or</p> <p>Incorrect voice MLHG DN and DN if MLHG DN is present, or</p> <p>Voice hunting was observed with no MLHG DN</p>	<p>The facility is correctly programmed and established with Layers 1, 2, and 3 with functioning voice capabilities.</p> <p>The possible causes of this error are:</p> <p><b>Incoming voice calls using the MLHG DN are not possible, but incoming voice calls using the DN are possible.</b> If voice hunting is expected, with the programmed MLHG DN, check that the facility is programmed with the MLHG DN provided by the LEC and rerun the test. If the error persists, contact the LEC.</p> <p><b>Incoming voice calls using either the MLHG DN or DN are not possible, and both the MLHG DN and DN have been verified to be incorrect.</b> Reprogram the MLHG DN or DN and rerun the test. If the error persists, contact the LEC.</p> <p><b>MLH is not expected.</b> The MLHG DN is not programmed and voice calls to the facility using the DN are terminated at the facility as a hunt call. Contact the LEC.</p>
MLHD	<p>No data hunting, or</p> <p>Incorrect data MLHG DN if MLHG DN is present, or</p> <p>Data hunting was observed with no MLHG DN</p>	<p>The facility is correctly programmed and established with Layers 1, 2, and 3 with functioning data capabilities.</p> <p>The possible causes of this error are:</p> <p><b>Incoming data calls using the MLHG DN are not possible, but incoming data calls using the DN are possible.</b> If data hunting is expected, with the programmed MLHG DN, check that the facility is programmed with the MLHG DN provided by the LEC and rerun the test. If the error persists, contact the LEC.</p> <p><b>Incoming data calls using either the MLHG DN or DN are not possible, and both the MLHG DN and DN have been verified to be correct.</b> Reprogram the MLHG DN or DN and rerun the test. If the error persists, contact the LEC.</p> <p><b>MLH is not expected.</b> The MLHG DN is not programmed and data calls to the facility using the DN are terminated at the facility as a hunt call. Contact the LEC.</p>

Table 6-5. NI-1 BRI Provisioning Test Result Codes—Continued

Result Code	Description	Corrective Action
MLHDV	No voice or data hunting, or Incorrect voice and data MLHG DN if MLHG DN is present, or Voice and data hunting was observed with no MLHG DN	The facility is correctly programmed and established with Layers 1, 2, and 3 with functioning voice and data capabilities. Combination of the causes of MLHV and MLHD.
OKH	BRI facility that is part of an MLHG is provisioned with functioning voice and data capabilities	No action is required if the MLH voice and data functionalities are expected. If MLH is not expected, verify that the MLHG DN is present and, if so, remove it and rerun the test.
OKNOH	BRI facility that is <i>not</i> part of an MLHG is provisioned with functioning voice and data capabilities	No action is required if non-MLH voice and data functions are expected. If MLH is expected, verify that the MLHG DN is not present and, if so, administer it and rerun the test.
SPID	No or incorrect SPID administration	Check that the facility is programmed with the SPID provided by the LEC and rerun the test. If the error persists, contact the LEC.
LG	MERLIN MAGIX BRI error on that facility	This result should never appear; if it does, contact the TSO.

**Table 6-5. NI-1 BRI Provisioning Test Result Codes—Continued**

Result Code	Description	Corrective Action
ADMCO	MERLIN MAGIX administration error and/or CO provisioning error on that facility	<p>Check that the facility is programmed with the DN provided by the CO. If the DN was not programmed properly, correct it and rerun the test. If the error persists, perform the appropriate set of tests and record the results before contacting the LEC:</p> <p>“Outgoing Voice Call Test” on page 6-22</p> <p>“Incoming Voice Call Test” on page 6-23</p> <p>and/or</p> <p>“Outgoing Data Call Test” on page 6-23</p> <p>“Incoming Data Call Test” on page 6-24</p> <p>The possible causes of this error are:</p> <p><b>Incorrect DN.</b> Error identified at Incoming Voice/Data Call Test. Incoming calls fail.</p> <p>Any of the causes listed for CO-V and CO-D</p>
ADMIN	No administration or incorrect administration on that facility	<p>Check that the facility is programmed with the SPID and DN provided by the CO. If the SPID and DN were not programmed properly, correct it and rerun the test. If the error persists, perform the appropriate set of tests and record the results before contacting the LEC:</p> <p>“Outgoing Voice Call Test” on page 6-22</p> <p>“Incoming Voice Call Test” on page 6-23</p> <p>and/or</p> <p>“Outgoing Data Call Test” on page 6-23</p> <p>“Incoming Data Call Test” on page 6-24</p> <p>The possible causes of this error are:</p> <p>Incorrect SPID. Error identified at Incoming Voice Call Test; Outgoing Data Call Test, and/or Incoming Data Call Test. Both outgoing and incoming calls fail.</p> <p><b>Incorrect DN.</b> Error identified at Incoming Voice/Data Call Test. Incoming calls fail.</p>

Table 6-5. NI-1 BRI Provisioning Test Result Codes—Continued

Result Code	Description	Corrective Action
LAYR1	LAYER 1 BRI Provisioning error on facility	<p>Examine the wiring for the line, ensuring that all connections have been closed. Rerun the test if a wiring problem is identified. If the problem persists, or if there is no wiring problem identified, swap the DSL and its administration to another port on the board.</p> <p>If the problem follows the DSL, contact the LEC.</p> <p>If the problem remains on the original port, mark the port defective and replace the 800 NI-BRI board.</p>
LAYR2	LAYER 2 BRI Provisioning error on facility	<p>Layer 1 is established. Unplug the connector and replug it into the same port. Rerun the test. If the problem persists, contact the LEC.</p> <p>The possible causes of this problem are:</p> <p>The DSL is provisioned with only one active DN (rather than two) at the CO.</p> <p>Two lines are programmed when only one line is provided by the CO.</p> <p>Check that the facilities are programmed properly and rerun the tests if you made any corrections.</p>
LAYR3	LAYER 3 BRI Provisioning error on facility	<p>Layers 1 and 2 are established.</p> <p>This result indicates that the CO does not do Layer 3 initialization. This error may not affect service, but the LEC must be contacted.</p>
NOTST	Testing was not performed on this facility because no other Layer 3 initialized facility was available in the time allowed for testing.	Layers 1, 2 and 3 are established. Correct the known problems on the other facilities and rerun the test.
?????	Testing was inconclusive because the line(s) used to test this one had problems.	Correct the known problems on other facilities and rerun the test.

## Outgoing Voice Call Test

Place a voice call from the BRI line under test. Call either a working facility on the system or a phone on the premises that is connected to the central office (CO).

**NOTE** ► The 800 NI-BRI module must be restored (removed from the Maintenance-Busy state) before performing this test. See Restoring the Module.

1. Assign the BRI line to a button on a 4400-Series or MLX display phone.  
If using a facility on the system as a destination, also assign the destination facility to a button on another 4400-Series or MLX display phone.
2. Press the button associated with the BRI line under test.  
The red LED next to this button should be on and steady. If not, check that the BRI line has been correctly assigned to this button.
3. Go off-hook by lifting the handset or pressing the speakerphone button.
4. The red and green LEDs on this button should be on and steady. A dial tone should be heard. If not, record that the outgoing voice call test has failed.
5. Dial the destination number. (In a Centrex environment, it is necessary to dial a 9 before the destination number.)

Verify the following results and note any failures:

- Dial tone should be off after the first digit is dialed.
  - Verify that the originating end hears ringback after the last digit is dialed and that the destination phone is ringing.
  - If either indication is absent, check that the dialed digits are those of the destination Directory Number (DN).
  - If the destination telephone can display calling party number, verify that the DN of the BRI line under test is displayed correctly.  
If not, record that the calling party information displayed is either incorrect or absent at the destination telephone.
6. Answer the call at the destination telephone and verify the connection.
  7. Disconnect the call at either the originating or receiving end.
  8. Verify that the green LED next to this button turns off and the connection is removed.

---

## Incoming Voice Call Test

Place a voice call from a known working telephone to the BRI line under test.

**NOTE** ► The 800 NI-BRI module must be restored (removed from the Maintenance-Busy state) before performing this test. See [“Restoring the Module”](#) on page 6-31.

1. Assign the BRI line to a button on a 4400-Series or MLX display phone.  
If using a facility on the system as a destination, also assign the destination facility to a button on another 4400-Series or MLX display phone.
2. Dial the DN of the BRI line under test at the originating telephone.
3. Verify that alerting is indicated on the button associated with the BRI line being tested.
4. Verify that the originating number appears on the display of the 4400-Series or MLX telephone programmed with the BRI line under test. Verify that the associated green LED flashes.
5. If the correct number is not displayed, verify that the number dialed and the DFT administration are correct. If they are incorrect, repeat the test.
6. Answer the call (press line button if necessary) and verify the connection.
7. Verify that the green LED next to this button is on and steady.
8. Disconnect the call at either the originating end or the receiving end.
9. Verify that the green LED next to the button associated with the BRI line under test turns off.

## Outgoing Data Call Test

Place a data call from the BRI line under test to either a working facility on the system or a data endpoint on the premise that is connected to the central office (CO). See the *Data and Video Reference* for details regarding setting up a data call with specific equipment.

**NOTE** ► The 800 NI-BRI module must be restored (removed from the Maintenance-Busy state) before performing this test. See [Restoring the Module](#).

1. Assign the BRI line to a data terminal.  
If using a facility on the system as a destination, assign the destination facility to another data terminal.
2. Dial the destination number. (In a Centrex environment, it is necessary to dial a 9 before the destination number.)

Verify the following results and note any failures:

- You may hear dial tone at the beginning of dialing and ringback after completion. Alerting may be indicated at the destination.

- If both ringback and alerting are absent, check that the dialed digits are those of the destination DN. Redial, if necessary. If the call could not be established and the dialing was correct, record that an outgoing data call cannot be completed from this line and indicate the type of tone, if any, that was present at both ends.
  - If the destination telephone can display the calling party number, verify that the DN of the BRI line under test is displayed correctly.  
If not, record that the calling party information displayed at the destination telephone is incorrect or absent.
3. Answer the call at the destination telephone and verify the connection.  
The destination data extension may be programmed for auto-answer. Verify that the red and green LEDs next to this button are on steady and the communication path is established.
  4. Disconnect the call from either the originating or receiving end.  
Verify that the green LED turns off and the communication path is removed.

### Incoming Data Call Test

Place a data call from a known working facility to the BRI line under test. See the *Data and Video Reference* for details regarding answering a data call with specific equipment.

**NOTE** ► The 800 NI-BRI module must be restored (removed from the Maintenance-Busy state) before performing this test. See [“Restoring the Module”](#) on page 6-31.

1. Assign the BRI line to a data terminal.  
If using a facility on the system as a destination, assign the destination facility to another data terminal.
2. Place a test call to the BRI line under test.  
Verify that alerting is indicated at the data extension associated with the BRI line. If not, check that the dialed number corresponds to the DN of the line.
  - If the number is not correct, redial the call.
  - Otherwise, record that the incoming data call test has failed and note the type of tone (busy, reorder, ringback, etc.) heard at the originating end.
3. If the data extension associated with the BRI line under test can display calling party number, verify that the originating DN appears on its display.
4. If not, record that the calling party information displayed at the destination telephone is either incorrect or absent.
5. Answer the call and verify the connection.
6. The data extension may be programmed for auto-answer. Verify that the green LED flashes until the call is answered.
7. Disconnect the call from either the originating or receiving end.

---

## 800 NI-BRI Module Clock Status

If you have not been trained to perform BRI maintenance, contact the TSO for instructions on using this procedure.

Procedure	Menu→Maintenance→Slot→Enter the slot no. (01-17)→Enter→Clock→Back
Results Displayed	Clock Slot xx: mm/dd/yy hh:00-hh:mm Active: xxxx Synch: xxxxxx Source: xxxx Port: xx Back

If you need assistance in interpreting the results displayed on the screen, contact the TSO.

---

## Channel Service Unit (CSU) Loopback Test

The CSU Loopback Test verifies that the communication path between the 551 T1, ESF T1, or the ACCULINK 3150 CSU and the 100D module is operational.

Procedure	Menu→Maintenance→Slot→Enter the slot no. (01-17)→Enter→CSU-lpbk
Appropriate Modules	This test can be run only on 100D modules.  In the procedure above, when you select <b>Enter</b> , the options <b>Error Events</b> and <b>Clock</b> appear only for the 100D module.
Time Estimate	Approximately 2 minutes
EQ IN and EQ OUT (551 T1 CSU)	For the 551 T1 CSU only, connect a patch cord from the CSU EQ IN jack to the CSU EQ OUT jack.
DTE LOOPBACK (ESF T1 CSU)	For the ESF T1 CSU only, flip the DTE LOOPBACK switch on the front panel to the up position to activate the loopback. Details are provided below.
LINE LOOPBACK (ACCULINK 3150 CSU)	For the ACCULINK 3150 only, select front panel Line Loopback command. Details are provided below.
Busy-Out or Reset	Busy-out or reset the 100D module prior to beginning the test. See <a href="#">“Busy-Out”</a> on page 6-4 and <a href="#">“Reset”</a> on page 6-5.
Interrupting the Test	You can interrupt the test by selecting <b>Back</b> .
Test Failure	If the test fails, record the errors on the repair tag and replace the module.
Restore	Restore the module if it successfully completes the CSU Loopback test. See <a href="#">“Restore”</a> on page 6-6.

## Preparing for the CSU Loopback Test

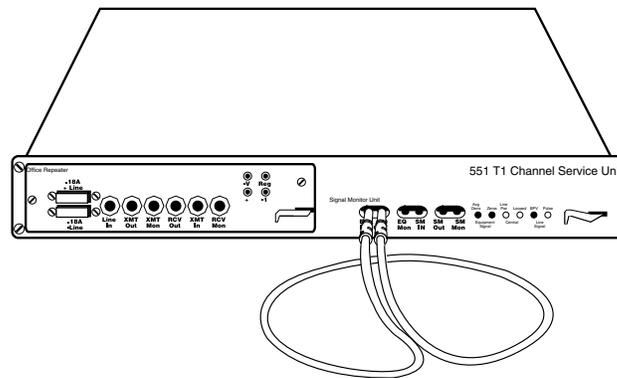
In preparation for running the CSU Loopback Test, first Busy-Out the 100D module and then perform the steps for the appropriate CSU from the CSUs listed under below.

### 551 T1 CSU

For the 551 T1 CSU, connect the EQ OUT and EQ IN jacks.

1. Plug one end of a bantam-to-bantam patch cord (or a loopback fixture) into the EQ OUT jack on the front of the CSU.
2. Plug the other end of the patch cord into the EQ IN jack on the CSU.

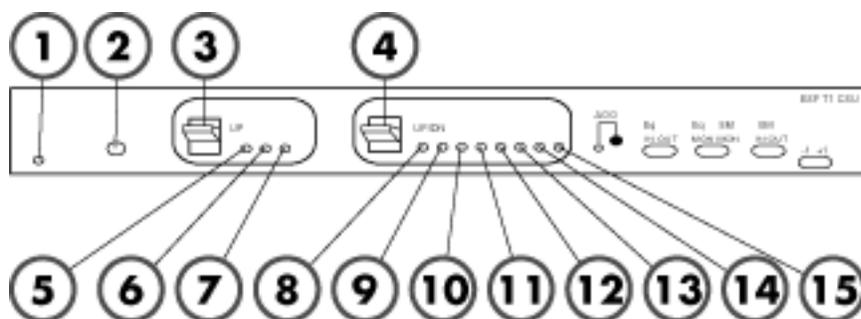
This causes the 551 T1 CSU to either loop back the private network signal or send the all-ones pattern, depending on the chosen CSU option.



**Figure 6-2. 551 T1 CSU Loopback Connection**

### ESF T1 CSU

For the ESF T1 CSU, flip the DTE LOOPBACK switch on the front panel to the up position to activate the loopback test.



**Figure 6-3. ESF T1 CSU DTE Loopback Connection**

- 1 Local Power
- 2 Diagnostic Interface
- 3 DTE Loopback
- 4 Send Code
- 5 Looped
- 6 Low Dens
- 7 Frame Loss
- 8 Far End Looped
- 9 Critical Power
- 10 Pulses
- 11 Frame Loss
- 12 CRC Error
- 13 BPV
- 14 Near End Looped
- 15 Alarm

### ACCULINK 3150 CSU

For the ACCULINK 3150 CSU, press the F2 button on the front panel to select *Test* from the menu screen. From the *Test* screen, press the F2 button to select *Lpbk*. From the *Loopback* screen, press the right arrow once to display additional loopback tests. Press the F3 button to display *DLB* (DTE Loopback). When *DLB* is selected, *Test Started* appears on line 2 of the menu screen.

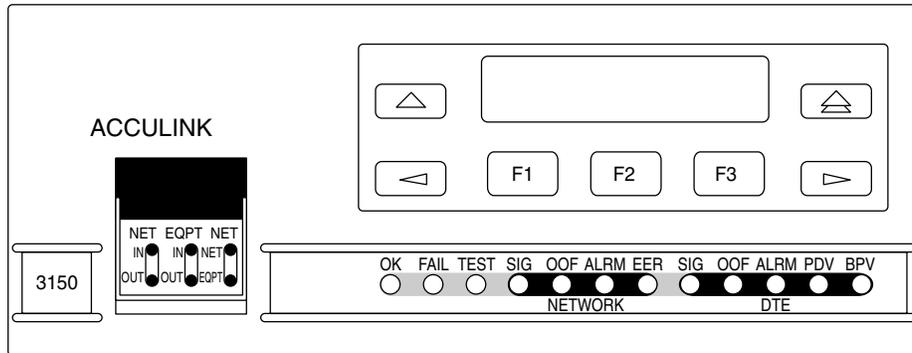


Figure 6-4. ACCULINK 3150 CSU Front Panel

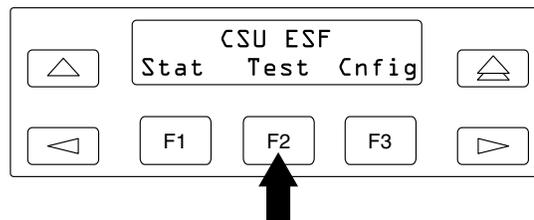


Figure 6-5. ACCULINK 3150 CSU DTE Loopback Command 1

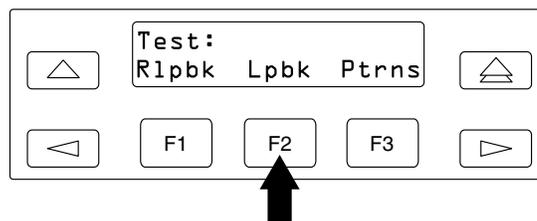
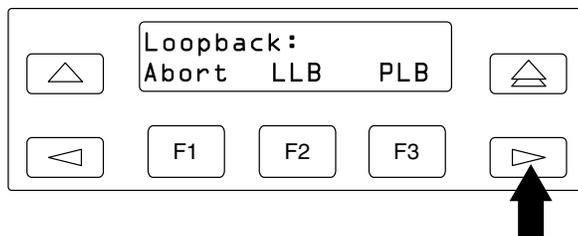
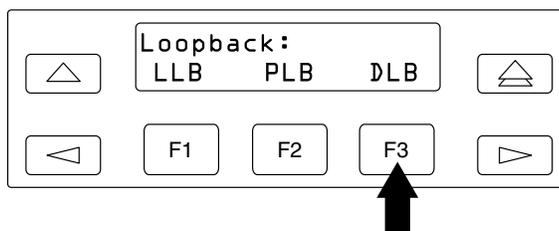


Figure 6-6. ACCULINK 3150 CSU DTE Loopback Command 2



**Figure 6-7. ACCULINK 3150 CSU DTE Loopback Command 3**



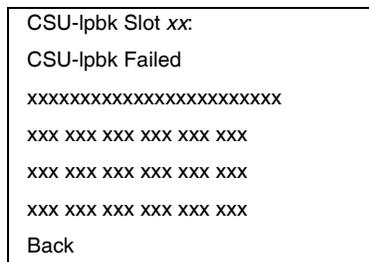
**Figure 6-8. ACCULINK 3150 CSU DTE Loopback Command 4**

### ACCULINK 3160/3164

The ACCULINK 3160/3164 DSU/CSU is physically similar to the ACCULINK 3150 CSU with programming on the front panel and menus appearing on the LCD screen. For the preparation of specific tests, see the operator's guide that comes with the unit.

### Interpreting Test Results

The screen below appears when the test fails.



Lines 3 through 6 identify the cause of the failure or the number of errors found per channel. There are 24 channels, numbered 1 through 24. Line 3 displays the results for channels 1 through 6; Line 4 is for channels 7 through 12; Line 5 is for channels 13 through 18; Line 6 is for channels 19 through 24.

If the test is successful, the connection between the CSU and the 100D module is good, and the 100D module is probably okay.

If the test fails, find the error message below and proceed as indicated.

**Table 6-6. CSU Loopback Test Errors**

<b>Error Messages</b>	<b>Corrective Action</b>
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 errors on the CSU-lpbk Failed screen	Check the cable between the 100D module and the CSU; then retest. If the problem persists, check the CSU settings.  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; if in doubt, escalate to your technical support organization.

---

## Restoring the Module

After completing the CSU Loopback Test, follow the steps below to restore the module.

1. If you are finished testing modules, Restore the 100D module (see “Restore” on page 6-6).
2. Reset the CSU.
  - For the 551 T1 CSU, unplug the patch cord, first from the EQ IN jack and then from the EQ OUT jack.
  - For the ESF T1 CSU, flip the DTE LOOPBACK switch down (to deactivate the loopback).
  - For the ACCULINK 3150 CSU press the right arrow key once to display the `Ctrl` selection, then press the **F3** button to select `Ctrl`. Press the right arrow key twice to display the reset selection. Now press the **F1** button to initiate a reset of the CSU.

## Automatic Tests for the 100D, 100DCD, and 100R INA Modules

Every 15 minutes, the system checks the 100D module for the following:

- **Initialization.** The system ensures that all T1 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.** The system detects errors and takes the trunk out of service, if appropriate. It attempts to restore the trunk 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 T1 facilities through audits, status checks, and error logging.
- **Synchronization.** 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.

## Line Loopback Test

The Line Loopback Test is used for both the 100R INA and for the 100 DCD modules. This test loops the T1 interface back towards the network on the network side of the framer. To perform this test, you must first busy-out the module. From your system programming console, use the following sequence to access the Line loopback test.

**NOTE** ► When this test is activated, the far end generates the test pattern using the built-in BERT Tests or other data-generating equipment.

Procedure                      Menu→Maintenance→Slot→Enter the slot no. (01-17)→Enter→  
   Demand test→LineLpbk

Appropriate Modules    This test can be run on the 100R INA and 100 DCD modules only.

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## Payload Loopback test

The Payload Loopback Test is used for both the 100R INA and for the 100 DCD modules. This test loops the T1 interface back towards the network on the communications system side of the framer. To perform this test, you must first busy-out the board. From your system programming console, use the following sequence to access the Payload loopback test.

**NOTE** ► When this test is activated, the far end generates the test pattern using the built-in BERT Tests or other data-generating equipment.

Procedure                      Menu→Maintenance→Slot→Enter the slot no. (01-17)→Enter→  
   Demand test→PayloadLpbk

Appropriate Modules    This test can be run on the 100R INA and 100 DCD modules only.

---

## Bit Error Rate Test (BERT)

The Bit Error Rate Test is used for both the 100R INA and for the 100 DCD modules. This test allows you to generate several test patterns and monitor the progress of the test to see if the pattern being generated is being received back. The error count and state of the test represents a real-time snapshot of the information available in dual-port RAM (DPRAM).

For the 100 DCD module, you can choose to run a BERT for all the channels or for individual channels. For the 100R INA module, you can run a BERT only for all the channels.

**Procedure** To select BERT for all channels (100 DCD and 100r INA modules):

Menu→Maintenance→Slot→Enter the slot no. (01-17)→Enter→Demand test→Bert test→All→QRSS or 3 in 24 or All zeroes or All ones

To select BERT for an individual channel (100 DCD module only):

Menu→Maintenance→Slot→Enter the slot no. (01-17)→Enter→Demand test→Bert test→Individual→QRSS or 3 in 24 or All zeroes or All ones

**Appropriate Modules** This test can be run on the 100R INA and 100 DCD modules only.

**Table 6-7. BERT Test Options**

Test Options	Description
QRSS	This produces a quasi random test pattern. To monitor the test, press →Monitor. To refresh the monitoring information, press →Back, and re-select →Monitor. This does not affect or terminate the test.
3 in 24	This produces a bit pattern consisting of 3 ones in 24 (one, three zeroes, one, three zeros, one, and fifteen zeroes). To monitor the test press →Monitor. To refresh the monitoring information, press →Back, and re-select→Monitor. This does not affect or terminate the test.
All zeroes	This produces a test pattern of all zeroes. To monitor the test, press→Monitor. To refresh the monitoring information, press→Back, and re-select →Monitor. This does not affect or terminate the test.
All ones	This produces a test pattern of all ones. To monitor the test, press →Monitor. To refresh the monitoring information, press →Back, and re-select →Monitor. This does not affect or terminate the test.

## Test Results

- **No Synchron** – Indicates that the BERT test pattern is not being successfully received back.
- **Sync-Errors** – Indicates that the BERT test pattern is being successfully received back. The console displays the number of bit error detected. For overflow situations “9999” is displayed.

## Data-Channel Loopback Test

The Data-Channel Loopback Test is used for both the 100R INA and for the 100 DCD modules. This test takes all the channels assigned to a particular data port and loops them towards the T1 network. All 1's are transmitted across the channels assigned to the data port. To perform this test, you must first busy-out the module. From your system programming console, use the following sequence to access the Data-Channel Loopback Test.

Procedure                    Menu→Maintenance→Slot→Enter the slot no. (01-17)→Enter→  
More→Data-Channel→Data Port 1 or Data Port 2→  
Enter→Back (to exit)

Appropriate Modules    This test can be run on the 100 DCD module only.

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## Data-Terminal Loopback Test

The Data-Terminal Loopback Test is used for the 100 DCD module only. This test loops the data received on one data port to the same data port. All 1's are transmitted to the channels assigned to the data port. *You do not have to busy out this module to perform this test.* From your system programming console, use the following sequence to access the Data Terminal Loopback Test.

Procedure                    Menu→Maintenance→Slot→Enter the slot no. (01-17)→Enter→  
More→Data-Terminal→Data Port 1 or Data Port 2→  
Enter →Back (to exit)

Appropriate Modules    This test can be run on the 100 DCD module only.

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## Data-Port Local Loop Test

The Data-Port Local Loop Test is used for the 100 DCD module only. This test loops the data port back to the system. A test pattern is generated on all transmit data channels for the selected port. All receive T1 channels are monitored by the module to determine if the test pattern is being received back accurately. To perform this test, you must first busy-out the module. From your system programming console, use the following sequence to access the Data Port Local Loop test.

Procedure                    Menu→Maintenance→Slot→Enter the slot no. (01-17)→Enter→  
More→Lcal D. Prt→Data Port 1 or Data Port 2→511,2047,  
All ones, or All zeroes→Back (to exit)

Appropriate Modules    This test can be run on the 100 DCD module only.

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# Customer Support Information



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## Support Telephone Number

**In the USA only**, Avaya provides a toll-tree customer Helpline (1 800 628-2888) 24 hours a day. If you need assistance when installing, programming, or using your system, call the Helpline or your Avaya representative. Consultation charges may apply.

**Outside the USA**, if you need assistance when installing, programming, or using your system, contact your Avaya representative.

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## 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 or her own expense.

## Canadian Department of Communications (DOC)

### Interference Information

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

Le Présent Appareil Numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de la classe A prescrites dans le règlement sur le brouillage radioélectrique édicté par le ministère des Communications du Canada.

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### FCC Notification and Repair Information

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

- **Means of Connection.** Connection of this equipment to the telephone network shall be through a standard network interface jack, USOC RJ11C, RJ14C, or RJ21X. Connection to E&M tie trunks requires a USOC RJ2GX. Connection to off-premises extensions requires a USOC RJ11C or RJ14C. Connection to 1.544-MBps digital facilities must be through a USOC RJ48C or RJ48X. Connection to DID requires a USOC RJ11C, RJ14C, or RJ21X. These USOCs must be ordered from your telephone company. Connection to 56-kbps or 64-kbps facilities requires a USOC RJ11C, RJ14C, or RJ21.
- **Party Lines and Coin Telephones.** This equipment may not be used with party lines or coin telephone lines.
- **Notification to the Telephone Companies.** Before connecting this equipment, you or your equipment supplier must notify your local telephone company's business office of the following:
  - The telephone number or numbers you will be using with this equipment.
    - The appropriate registration number and ringer equivalence number (REN), which can be found on the back or bottom of the control unit, as follows:
    - If this equipment is to be used as a Key system, report the number AS593M-72914-KF-E.
    - If the system provides both manual and automatic selection of incoming/outgoing access to the network, report the number AS593M-72682-MF-E.
    - If there are no directly terminated trunks, or if the only directly terminated facilities are Personal Lines, report the number AS593M-65646-PF-E.
    - The REN (Ringer Equivalence Number) for all three systems is 1.5A.
  - The facility interface code (FIC) and service order code (SOC): For tie line connection, the FIC is TL31M and the SOC is 9.0F.
    - For connection to off-premises stations, the FIC is OL13C and the SOC is 9.0F.

- For equipment to be connected to DID facilities, the FIC is 02RV2-T and the SOC is AS.2.
- For equipment to be connected to 1.544-MBps digital service, the SOC is 6.0P and the FIC is:
  - 04DU9-BN for D4 framing format with AMI zero code suppression.
  - 04DU9-DN for D4 framing format with bipolar 8 zero code suppression (B8ZS).04DU9-IKN for extended superframe format (ESF) with AMI zero code suppression.
  - 04DU9-ISN with ESF and B8ZS.
- For equipment to be connected to 56-kbps or 64-kbps digital facilities, the FIC is 02IS5.
  - The quantities and USOC numbers of the jacks required.
  - For each jack, the sequence in which lines are to be connected, the line types, the FIC, and the REN by position, when applicable.
- **Ringer Equivalence Number (REN).** The REN is used to determine the number of devices that may be connected to the telephone line. Excessive RENs on the line may result in the devices not ringing in response to an incoming call. In most, but not all, areas, the sum of the RENs should not exceed five (5.0). To be certain of the number of devices that may be connected to the line, as determined by the total RENs, contact the local telephone company to determine the maximum REN for the calling area.
- **Disconnection.** You must also notify your local telephone company if and when this equipment is permanently disconnected from the line or lines.

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## Installation and Operational Procedures

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

- **Repair Instructions.** If you experience trouble because your equipment is malfunctioning, the FCC requires that the equipment not be used and that it be disconnected from the network until the problem has been corrected. Repairs to this equipment can be made only by the manufacturers, their authorized agents, or others who may be authorized by the FCC. In the event repairs are needed on this equipment, contact your authorized Avaya dealer or, **in the USA only**, contact the Avaya Helpline at 1 800 628-2888.
- **Rights of the Local Telephone Company.** If this equipment causes harm to the telephone network, the local telephone company may discontinue your service temporarily. If possible, they will notify you in advance. But if advance notice is not practical, you will be notified as soon as possible. You will also be informed of your right to file a complaint with the FCC.
- **Changes at Local Telephone Company.** Your local telephone company may make changes in its facilities, equipment, operations, or procedures that affect the proper functioning of this equipment. If they do, you will be notified in advance to give you an opportunity to maintain uninterrupted telephone service.
- **Hearing Aid Compatibility.** The custom telephone sets for this system are compatible with inductively coupled hearing aids as prescribed by the FCC.

- **Automatic Dialers.** WHEN PROGRAMMING EMERGENCY NUMBERS AND/OR MAKING TEST CALLS TO EMERGENCY NUMBERS:
  - Remain on the line and briefly explain to the dispatcher the reason for the call.
  - Perform such activities in off-peak hours, such as early morning or late evening.
- **Direct Inward Dialing (DID).** This equipment returns answer supervision signals to the Public Switched Telephone Network when:
  - Answered by the called station.
  - Answered by the attendant.
  - Routed to a recorded announcement that can be administered by the customer premises equipment user.
  - Routed to a dial prompt.

This equipment returns answer supervision on all DID calls forwarded back to the Public Switched Telephone Network. Permissible exceptions are when:

- A call is unanswered
- A busy tone is received
- A reorder tone is received

Allowing this equipment to be operated in such a manner as not to provide proper answer supervision signaling is in violation of Part 68 rules.

**New Network Area and Exchange Codes.** The MERLIN MAGIX Integrated System software does not restrict access to any new area codes or exchange codes established by a local telephone company. If the user has established Toll Restrictions on the system that could restrict access, then the user should check the lists of allowed and disallowed dial codes and modify them as needed.

**Equal Access Codes.** This equipment is capable of providing users access to interstate providers of operator services through the use of access codes. Modifications of this equipment by call aggregators to block access dialing codes is a violation of the Telephone Operator Consumers Act of 1990.

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## DOC Notification and Repair Information

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

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

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

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

 **CAUTION:**

*Users should not attempt to make such connections themselves, but should contact the appropriate electrical inspection authority or electrician. To prevent overloading, the Load Number (LN) assigned to each terminal device denotes the percentage of the total load to be connected to a telephone loop used by the device. The termination on a loop may consist of any combination of devices subject only to the requirement that the total of the Load Numbers of all the devices does not exceed 100.*

**DOC Certification No.:** 230 4095A

**CSA Certification No.:** LR 56260

**Load No.:** 6

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## Renseignements sur la Notification du Ministère des Communications du Canada et la Réparation

**AVIS:** L'étiquette du ministère des Communications du Canada identifie le matériel homologué. Cette étiquette certifie que le matériel est conforme à certaines normes de protection, d'exploitation et de sécurité des réseaux de télécommunications. Le Ministère n'assure toutefois pas que le matériel fonctionnera à la satisfaction de l'utilisateur.

Avant d'installer ce matériel, l'utilisateur doit s'assurer qu'il est permis de le raccorder aux installations de l'entreprise locale de télécommunication. Le matériel doit également être installé en suivant une méthode acceptée de raccordement. Dans certains cas, les fils intérieurs de l'entreprise utilisés pour un service individuel à ligne unique peuvent être prolongés au moyen d'un dispositif homologué de raccordement (cordon prolongateur téléphonique interne). L'abonné ne doit pas oublier qu'il est possible que la conformité aux conditions énoncées ci-dessus n'empêchent pas la dégradation du service dans certaines situations. Actuellement, les entreprises de télécommunication ne permettent pas que l'on raccorde leur matériel à des jacks d'abonné, sauf dans les cas précis prévus par les tarifs particuliers de ces entreprises.

Les réparations de matériel homologué doivent être effectuées par un centre d'entretien canadien autorisé désigné par le fournisseur. La compagnie de télécommunications peut demander à l'utilisateur de débrancher un appareil à la suite de réparations ou de modifications effectuées par l'utilisateur ou à cause de mauvais fonctionnement.

Pour sa propre protection, l'utilisateur doit s'assurer que tous les fils de mise à la terre de la source d'énergie électrique, des lignes téléphoniques et des canalisations d'eau métalliques, s'il y en a, sont raccordés ensemble. Cette précaution est particulièrement importante dans les régions rurales.

**AVERTISSEMENT:** L'utilisateur ne doit pas tenter de faire ces raccordements lui-même; il doit avoir recours à un service d'inspection des installations électriques, ou à un électricien, selon le cas.

L'indice de charge (IC) assigné à chaque dispositif terminal indique, pour éviter toute surcharge, le pourcentage de la charge totale qui peut être raccordée à un circuit téléphonique bouclé utilisé par ce dispositif. La terminaison du circuit bouclé peut être constituée de n'importe quelle combinaison de dispositifs, pourvu que la somme des indices de charge de l'ensemble des dispositifs ne dépasse pas 100.

**No d'homologation:** 230 4095A

**No de certification:** CSA LR 56260

**L'indice de charge:** 6

## MERLIN MAGIX D.O.C. Location Label Placement

Ministère des  
Communications  
du Canada  
emplacement  
de l'étiquette

AVAYA

MERLIN MAGIX  
Model 515A Control Unit

INFORMATION TECHNOLOGY EQUIPMENT



This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Complies with Part 68, FCC Rules. See MF: AS593M-72682-MF-E  
the System Reference Manual for proper KF: AS593M-72914-KF-E  
FCC Classification. FCC Reg. Nos. PF: AS5USA-65646-PF-E  
MADE IN USA REN: 1.5A

DR ID

CANADA

Use only Avaya Inc. manufactured MERLIN MAGIX® circuit modules, carrier assemblies, and power units, as specified in the Installation Manual, in this product. There are no user serviceable parts inside. Contact your authorized agent for service and repair. This digital apparatus does not exceed the Class A limits for radio noise emissions set out in the radio interference regulations of the Canadian Department of Communications.

Utilisez exclusivement des cartes électroniques, meubles et blocs d'alimentation de Avaya Inc., comme indiqué dans le Manuel d'installation joint au produit. Cet emballage ne contient aucune pièce pouvant être révisée par l'utilisateur. Pour l'entretien et la réparation, veuillez contacter votre agent agréé.

Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de la classe A prescrites dans le Règlement sur le brouillage radioélectrique édicté par le ministère des Communications du Canada.

Use solo circuitos modulares, gabinetes y fuentes de poder manufacturadas por Avaya Inc. en este producto. No hay piezas de mantenimiento en el interior del sistema. Contacta a un agente autorizado para darle servicio y mantenimiento.

Este equipo digital no excede los límites de la Clase A para radiaciones de ruido enviadas en un radio mayor a lo permitido en la regulaciones del Departamento de Comunicaciones de Canada.

Use somente no MERLIN MAGIX as placas (módulos), gabinetes e fontes de alimentação fabricados pela Avaya Inc., conforme especificado no Manual de Instalação. Não há partes para serviços de reparo inclusos. Contatar seu distribuidor autorizado para os serviços de reparo.

Este aparelho digital não excede os limites para equipamentos Classe A, com relação às perturbações eletromagnéticas emitidas, conforme a regulamentação de rádio perturbação em Equipamentos de Tecnologia da Informação (ETI), na NBR 12304.

**WARNING:** IF EQUIPMENT IS USED FOR OUT-OF-BUILDING APPLICATIONS, APPROVED SECONDARY PROTECTORS ARE REQUIRED. SEE INSTALLATION MANUAL.

**AVERTISSEMENT:** SI L'ÉQUIPMENT EST UTILISÉ POUR DES APPLICATIONS EXTÉRIEURES, L'INSTALLATION D'UN PROTECTEUR SECONDAIR EST REQUISE. VOIR LE MANUEL D'INSTALLATION.

**PRECAUTION:** SI EL EQUIPO VA SER UTILIZADO PARA APLICACIONES EN EL EXTERIOR DE UN EDIFICIO, DEBEN USARSE PROTECTORES ADICIONALES DEBIDAMENTE APROVADOS. VEA EL MANUAL DE INSTALACION.

**AVISO:** CASO O EQUIPAMENTO FOR INSTALADO EM APLICAÇÕES EXTERNAS AO PRÉDIO, DISPOSITIVOS PROTETORES EXTERNOS AUTORIZADOS PARA REDES EXTERNAS SÃO NECESSÁRIOS. VER O MANUAL DE INSTALAÇÃO.

## Security of Your System: Preventing Toll Fraud

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

The Remote Access features of your system, if you choose to use them, permit off-premises callers to access the system from a remote telephone by using a telephone number with or without a barrier code. The system returns an acknowledgment, signaling the user to key in his or her barrier code, which is selected and administered by the System Manager. After the barrier code is accepted, the system returns dial tone to the user. Barrier codes are, by default, restricted from making outside calls.

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

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

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

- Use an unpublished Remote Access number.
- Assign access codes randomly to users on a need-to-have basis, keeping a log of *all* authorized users and assigning one code to each person.
- Use random-sequence access codes, which are less likely to be broken.
- Use the longest-length access codes the system will allow.
- Deactivate all unassigned codes promptly.
- Ensure that Remote Access users are aware of their responsibility to keep the telephone number and any access codes secure.

- When possible, restrict the off-network capability of off-premises callers, using calling restrictions, Facility Restriction Levels (Hybrid/PBX mode only), and Disallowed List capabilities. A prepared Disallowed List (number 7) is provided and is designed to prevent the types of calls that toll-fraud abusers often make.
- 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 Forwarding to persons on a need-to-have basis.
- Change access codes every 90 days.
- Use the longest-length barrier codes possible, following the guidelines for passwords. (See [“Choosing Passwords”](#) on page 16.)

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## Toll Fraud Prevention

Toll fraud is the unauthorized use of your telecommunications system by third parties to make long-distance telephone calls. Under the law, you, the customer, are responsible for paying part or all of those unauthorized calls. Thus, the following information is of critical importance.

Unauthorized persons concentrate their activities in two areas with the MERLIN MAGIX Integrated System:

- They try to transfer out of the MERLIN MAGIX Integrated System to gain access to an outgoing trunk and make long-distance calls.
- They try to locate unused or unprotected mailboxes and use them as drop-off points for their own messages.

The following is a discussion of how toll fraud is often perpetrated and ways to prevent unauthorized access that can lead to toll fraud.

## 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 or employees of Avaya 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 your telecommunications 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 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 Avaya needs to use the MERLIN MAGIX Integrated System to test facilities (lines/trunks). If a caller claims to be an Avaya 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 an Avaya 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.
- Any time a call appears to be suspicious, call the Avaya Helpline at 1 800 628-2888 (fraud intervention for System 25, PARTNER<sup>®</sup> and MERLIN Systems).
- Customers should also take advantage of Avaya monitoring services and devices, such as the NetPROTECT<sup>®</sup> family of fraud-detection services, CAS with HackerTracker<sup>®</sup>, and CAT Terminal with Watchdog. Call 1 800 638-7233 to get more information on these Avaya fraud detection services and products.

## Security Risks Associated with Transferring through Voice Messaging Systems

Toll fraud hackers try to dial into a voice mailbox and then execute a transfer by dialing \*T. The hacker then dials an access code (either 9 for Automatic Route Selection or a pooled facility code), followed by the appropriate digit string to either direct dial or access a network operator to complete the call.

**NOTE** ► All extensions are initially, and by default, restricted from dial access to pools. In order for an extension to use a pool to access an outside line/trunk, this restriction must be removed.

## Preventive Measures

Take the following preventive measures to limit the risk of unauthorized transfers by hackers:

- Outward restrict all MERLIN MAGIX Integrated System voice mail port extension numbers. This denies access to facilities (lines/trunks). Voice mail ports are, by default, outward restricted.
- As an additional security step, network dialing for all extensions, including voice mail port extensions, should be processed through ARS using dial access code 9.

### SECURITY ALERT:

*The MERLIN MAGIX Integrated System ships with ARS activated with all extensions set to Facility Restriction Level 3, allowing all international calling. **To prevent toll fraud**, ARS Facility Restriction Levels (FRLs) should be established using:*

- FRL 0 for restriction to internal dialing only
- FRL 2 for restriction to local network calling only
- FRL 3 for restriction to domestic long-distance (excluding area code 809 for the Dominican Republic as this is part of the North American Numbering Plan, unless 809 is required)
- FRL 4 for international calling

### WARNING:

*Default local and default toll tables are factory-assigned an FRL of 2. This simplifies the task of restricting extensions: the FRL for an extension merely needs to be changed from the default of 3.*

### WARNING:

*Each extension should be assigned the appropriate FRL to match its calling requirements. All voice mail port extensions not used for Outcalling should be assigned to FRL 0 (the default setting).*

- Deny access to pooled facility codes by removing pool dial-out codes 70, 890–899, or any others on your system.
- 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. Disallowed List number 7 does not include 800, 1800, 411, and 1411, but Avaya recommends that you add them.

**NOTE** ► Assign all voice mail port extensions to this Disallowed List. Avaya 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, by default, to Disallowed List number 7.)

If Outcalling is required by voice messaging system extensions:

- Program an ARS Facility Restriction Level (FRL) of 2 on voice mail port extensions used for Outcalling.
- If 800 and 411 numbers are used, remove 1800, 800, 411, and 1411 from Disallowed List number 7.
- If Outcalling is allowed to long-distance numbers, build an Allowed List for the voice mail port extensions used for Outcalling. This list should contain the area code and the first three digits of the local exchange telephone numbers to be allowed.

Additional general security for voice messaging systems:

- Use a secure password for the General Mailboxes.
- The default administration mailbox, 9997, must be reassigned to the System Manager's mailbox/extension number and securely password protected.
- All voice messaging system users must use secure passwords known only to the user.

## **Security Risks Associated with the Automated Attendant Feature of Voice Messaging Systems**

Two areas of toll fraud risk associated with the Automated Attendant feature of voice messaging systems are:

- Pooled facility (line/trunk) access codes are translated to a menu prompt to allow Remote Access. If a hacker finds this prompt, the hacker has immediate access. (Dial access to pools is initially factory-set to restrict all extensions: to allow pool access, this restriction must be removed by the System Manager.)
- If the Automated Attendant prompts callers to use Remote Call Forwarding (RCF) to reach an outside telephone number, the system may be susceptible to toll fraud. An example of this application is a menu or submenu that says, "To reach our answering service, select prompt number 5," and transfers a caller to an external telephone number.

Remote Call Forwarding can be used securely only when the Central Office provides "reliable disconnect" (sometimes referred to as forward disconnect or disconnect supervision), which guarantees that the Central Office does not return a dial tone after the called party hangs up. In most cases, the Central Office facility is a loop-start line/trunk which does not provide reliable disconnect. When loop-start lines/trunks are used, if the calling party stays on the line, the Central Office does return a dial tone at the conclusion of the call, enabling the caller to place another call as if it were being placed from your company. Ground-start trunks provide reliable disconnect and should be used whenever possible.

## Preventive Measures

Take the following preventive measures to limit the risk of unauthorized use of the Automated Attendant feature by hackers:

- *Do not* use Automated Attendant prompts for Automatic Route Selection (ARS) codes or Pooled Facility codes.
- Assign all unused Automated Attendant selector codes to zero, so that attempts to dial these are routed to the system attendant.
- If Remote Call Forwarding (RCF) is required, MERLIN MAGIX Integrated System owners should coordinate with their Avaya Account Team or authorized dealer to verify the type of Central Office facility used for RCF. If it is a ground-start line/trunk, or if it is a loop-start line/trunk and Central Office reliable disconnect can be ensured, then nothing else needs to be done.

**NOTE** ► In most cases, these are loop-start lines/trunks without reliable disconnect. The local telephone company must be involved in order to change the facilities used for RCF to ground-start line/trunks. Usually, a charge applies for this change. Also, hardware and software changes may be necessary in the MERLIN MAGIX Integrated System. The Octel Messaging 100 Automated Attendant feature merely accesses the RCF feature in the MERLIN MAGIX Integrated System. Without these changes being made, this feature is highly susceptible to toll fraud. These same preventive measures must be taken if the RCF feature is active for MERLIN MAGIX Integrated System extensions, whether or not it is accessed by an Automated Attendant menu.

## Security Risks Associated with the Remote Access Feature

Remote Access allows the MERLIN MAGIX Integrated System owner to access the system from a remote telephone and make an outgoing call or perform system administration using the network facilities (lines/trunks) connected to the MERLIN MAGIX Integrated System. Hackers, scanning the public switched network by randomly dialing numbers with war dialers (a device that randomly dials telephone numbers, including 800 numbers, until a modem or dial tone is obtained), can find this feature, which will return a dial tone to them. They can even employ war dialers to attempt to discover barrier codes.

## Preventive Measures

Take the following preventive measures to limit the risk of unauthorized use of the MERLIN MAGIX Integrated System Remote Access feature:

- The Remote Access feature can be abused by criminal toll fraud hackers if it is not properly administered. Therefore, this feature should not be used unless there is a strong business need.

- It is strongly recommended that customers invest in security adjuncts, which typically use one-time passcode algorithms. These security adjuncts discourage hackers. Since a secure use of the Remote Access feature generally offers savings over credit-card calling, the break-even period can make the investment in security adjuncts worthwhile.
- If a customer chooses to use the Remote Access feature without a security adjunct, then multiple barrier codes should be employed, with one per user, if the system permits. The MERLIN MAGIX Integrated System permits a maximum of 16 barrier codes.
- The maximum length should be used for each barrier code, and should be changed periodically. Barrier codes, like passwords, should consist of a random, hard-to-guess sequence of digits. The MERLIN MAGIX Integrated System permits a barrier code of up to 11 digits.

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## Other Security Hints

Make sure that the Automated Attendant selector codes do not permit outside line selection.

Multiple layers of security are always recommended to keep your system secure.

A number of measures and guidelines that can help you ensure the security of your communications system and voice messaging system follows:

## Educating Users

Everyone in your company who uses the telephone system is responsible for system security. Users and attendants/operators need to be aware of how to recognize and react to potential hacker activity. Informed people are more likely to cooperate with security measures that often make the system less flexible and more difficult to use.

- Never program passwords or authorization codes onto Auto Dial buttons. Display telephones reveal the programmed numbers and internal abusers can use the Auto Dial buttons to originate unauthorized calls.
- Discourage the practice of writing down barrier codes or passwords. If a barrier code or password needs to be written down, keep it in a secure place and never discard it while it is active.
- Instruct operators and attendants to inform tell their System Manager whenever they answer a series of calls where there is silence on the other end or the caller hangs up.
- Advise users who are assigned voice mailboxes to frequently change personal passwords and not to choose obvious passwords.
- Ensure that the System Manager advises users with special telephone privileges (such as Remote Access, Outcalling, and Remote Call Forwarding) of the potential risks and responsibilities.
- Be suspicious of any caller who claims to be with the telephone company and wants to check an outside line. Ask for a callback number, hang up, and confirm the caller's identity.

- Never distribute the office telephone directory to anyone outside the company; be careful when discarding it (shred the directory).
- Never accept collect telephone calls.
- Never discuss your telephone system's numbering plan with anyone outside the company.

## Educating Operators

Operators or attendants need to be especially aware of how to recognize and react to potential hacker activity. To defend against toll fraud, operators should follow the guidelines below:

- Establish procedures to counter *social engineering*. Social engineering is a con game that hackers frequently use to obtain information that may help them gain access to your communications system or voice messaging system.
- When callers ask for assistance in placing outside or long-distance calls, ask for a callback extension.
- Verify the source. Ask callers claiming to be maintenance or service personnel for a callback number. Never transfer to \*10 without this verification. Never transfer to extension 900.
- Remove the headset and/or handset when the console is not in use.

## Detecting Toll Fraud

To detect toll fraud, users and operators should look for the following:

- Lost voice mail messages, mailbox lockout, or altered greetings
- Inability to log into voice mail
- Inability to get an outside line
- Foreign language callers
- Frequent hang-ups
- Touch-Tone sounds
- Caller or employee complaints that the lines are busy
- Increases in internal requests for assistance in making outbound calls (particularly international calls or requests for dial tone)
- Outsiders trying to obtain sensitive information
- Callers claiming to be the "telephone" company
- Sudden increase in wrong numbers

## Establishing a Policy

As a safeguard against toll fraud, follow these guidelines for your MERLIN MAGIX Integrated System and voice messaging system:

- Change passwords frequently (at least quarterly). Changing passwords routinely on a specific date (such as the first of the month) helps users to remember to do so.
- Always use the longest-length password allowed.
- Establish well-controlled procedures for resetting passwords.
- Limit the number of invalid attempts to access a voice mailbox to five or less.
- Monitor access to the MERLIN MAGIX Integrated System dial-up maintenance port. Change the access password regularly and issue it only to authorized personnel. Disconnect the maintenance port when not in use. (This however, eliminates Avaya's 24-hour maintenance surveillance capability and may result in additional maintenance costs.)
- Create a communications system management policy concerning employee turnover and include these suggestions:
  - Delete all unused voice mailboxes in the voice mail system.
  - If a terminated employee had Remote Access calling privileges and a personal authorization code, remove the authorization code immediately.
  - If barrier codes and/or authorization codes were shared by the terminated employee, these should be changed immediately.
- Regularly back up your MERLIN MAGIX Integrated System files to ensure a timely recovery should it be required. Schedule regular, off-site backups.
- Keep the Remote Maintenance Device turned off when not in use by Avaya or your authorized dealer.
- Limit transfers to registered subscribers only.
- Use the Security Violations Notification options (Mailbox Lock or Warning Message) to alert you of any mailbox break-in attempts. Investigate all incidents.
- Review security policies and procedures and keep them up to date.

### Choosing Passwords

Passwords should be the maximum length allowed by the system.

Passwords should be hard to guess and should not contain:

- All the same numbers (for example, 1111, 666666)
- Sequential characters (for example, 123456)
- Numbers that can be associated with you or your business, such as your name, birthday, business name, business address, telephone number, or social security number
- Words and commonly used names

Passwords should be changed regularly—at least on a quarterly basis. Recycling old passwords is not recommended. Never program passwords (or authorization codes or barrier codes) onto a speed dial button.

## Physical Security

You should always limit access to the system console (or attendant console) and supporting documentation. The following are some recommendations:

- Keep the system console and supporting documentation in an office that is secured with a changeable combination lock. Provide the combination only to those individuals having a real need to enter the office.
- Keep telephone wiring closets and equipment rooms locked.
- Keep telephone logs and printed reports in locations that only authorized personnel can enter.
- Design distributed reports so they do not reveal password or trunk access code information.
- Keep the voice messaging system Remote Maintenance Device turned off.

## Limiting Outcalling

When Outcalling is used to contact subscribers who are off-site, use the MERLIN MAGIX Integrated System Allowed Lists and Disallowed Lists or Automatic Route Selection features to minimize toll fraud.

If the Outcalling feature will not be used, outward restrict all voice messaging system ports. If Outcalling will be used, ports not used for Outcalling should be Outward Restricted. Use Outward Restriction, Toll Restrictions, Allowed Lists, Disallowed Lists and Facility Restrictions Levels, as appropriate, to minimize the possibility of toll fraud.

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## Limited Warranty and Limitation of Liability

Avaya Inc. warrants to you, the customer, that your MERLIN MAGIX Integrated System will be in good working order on the date Avaya or its authorized reseller delivers or installs the system, whichever is later ("Warranty Date"). If you notify Avaya or its authorized reseller within one year of the Warranty Date that your system is not in good working order, Avaya will, without charge to you, repair or replace, at its option, the system components that are not in good working order. Repair or replacement parts may be new or refurbished and will be provided on an exchange basis.

If you purchased your system directly from Avaya, Avaya will perform warranty repair in accordance with the terms and conditions of the specific type of Avaya maintenance coverage you selected. If you purchased your system from an Avaya-authorized reseller, contact your reseller for the details of the maintenance plan applicable to your system.

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

- Failure to follow Avaya's installation, operation, or maintenance instructions
- Unauthorized system modification, movement, or alteration
- Unauthorized use of common carrier communications services accessed through the system

- Abuse, misuse, or negligent acts or omissions of the customer and persons under the customer's control
- Power surges, including power surges due to lightning
- Acts of third parties and acts of God

AVAYA'S OBLIGATION TO REPAIR, REPLACE, OR REFUND AS SET FORTH ABOVE IS YOUR EXCLUSIVE REMEDY.

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

### Limitation of Liability

Except as provided below, the liability of Avaya and its affiliates and suppliers 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 the lesser of: (1) the direct damages proven; or (2) the repair cost, replacement cost, license fee, annual rental charge, or purchase price, as the case may be, of the equipment that gives rise to the claim. Except as provided below, Avaya and its affiliates and suppliers shall not be liable for any incidental, special, reliance, consequential, or indirect loss or damage incurred in connection with the equipment. As used in this paragraph, consequential damages include, but are not limited to, the following: lost profits, lost 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 equipment. For personal injury caused by Avaya's negligence, Avaya's liability shall be limited to proven damages to person. **No action or proceeding against Avaya or its affiliates or suppliers may be commenced more than twenty-four (24) months after the cause of action accrues.** THIS PARAGRAPH SHALL SURVIVE FAILURE OF AN EXCLUSIVE REMEDY.

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## Remote Administration and Maintenance

The Remote Administration and Maintenance feature of your telecommunications system, if you choose to use it, permits users to change the system features and capabilities from a remote location.

The Remote Administration and Maintenance feature, through proper administration, can help you reduce the risk of unauthorized persons gaining access to the network. However, telephone numbers and access codes can be compromised when overheard in a public location, or lost through theft of a wallet or purse containing access information or through carelessness (for example, writing codes on a piece of paper and improperly discarding them). Additionally, hackers may use a computer to dial an access code and then publish the information to other hackers. Substantial charges can accumulate quickly. It is your responsibility to take appropriate steps to

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

Under applicable tariffs, you will be responsible for payment of toll charges. Avaya cannot be responsible for such charges and will not make any allowance or give any credit resulting from unauthorized access.

To reduce the risk of unauthorized access through Remote Administration and Maintenance, please observe the following procedures:

- The System Administration and Maintenance capability of a Hybrid/PBX or Key system is protected by a password.
  - Change the default password immediately.
  - Continue to change the password regularly.
  - Give the password only to people who need it and impress upon them the need to keep it secret.
  - If anyone who knows the password leaves the company, change the password immediately.
- If you have a special telephone line connected to your Hybrid/PBX or Key system for Remote Administration and Maintenance, you should do one of the following:
  - Unplug the line when it is not being used.
  - Install a switch in the line to turn it off when it is not being used.
  - Keep the Remote Administration and Maintenance telephone number secret. Give it only to people who need to know it, and impress upon them the need to keep it a secret. Do not write the telephone number on the Hybrid/PBX or Key system, the connecting equipment, or anywhere else in the system room.

If your Remote Administration and Maintenance feature requires that someone in your office transfer the caller to the Remote Administration and Maintenance extension, you should impress upon your employees the importance of transferring only authorized individuals to that extension.



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## Overview

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 appendix covers the following memory card functions:

- Memory card formatting
- Restore
- Backup
- Automatic backup

---

## Card Types

The types of memory cards are described below. The card type is identified by a preprinted, color-coded label.

- **Upgrade Memory 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. This card is identified by an orange label with black lettering.
- **Translation Memory Card.** This card is used for MERLIN MAGIX Integrated System Backup and Restore procedures performed through the Backup/Restore option on the System Menu. An automatic backup feature permits you to set the system to perform automatic backups to the memory card on a daily or weekly basis. This card is identified by a white label with black lettering, as shown in Figure B-1.
- **Forced Installation Memory Card.** 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.

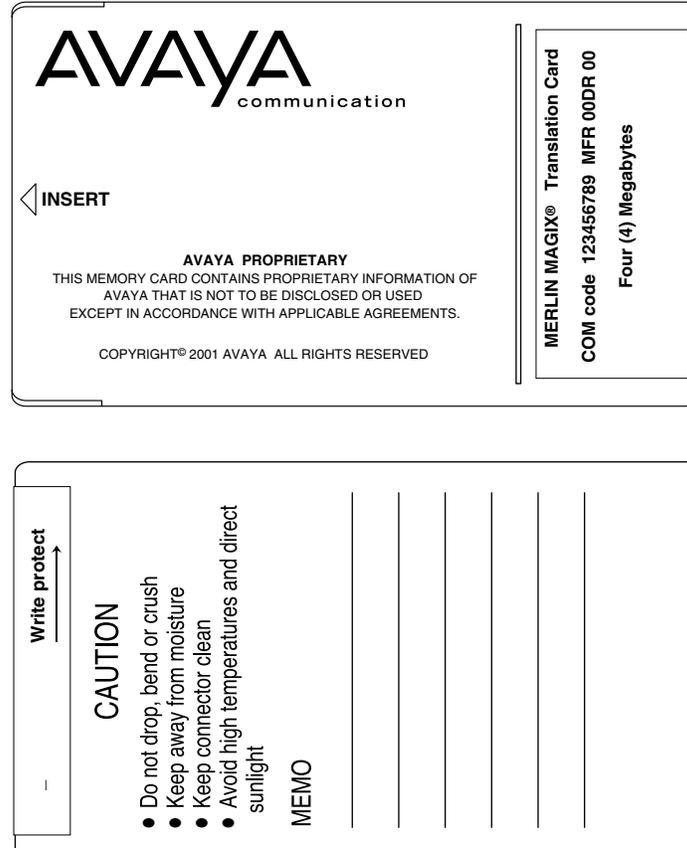


Figure B-1. PCMCIA Translation Memory Card

## Inserting the Card

To insert the card, hold the card with the Avaya logo facing up and the arrow pointing toward the slot. See Figure 4-3 on page 4-13 for the proper way to insert the memory card into the slot on the processor module.

## 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

If you begin a backup procedure with an unformatted or incorrectly formatted card, this screen appears:

```
Memory Card Backup:
Inserted Memory Card is
not the correct type.
Do you want it
formatted?
Yes
No
Exit
```

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 translation memory card.

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 backup files for the system.

**NOTE** ► Only 4-MB Series I or Series II PCMCIA memory cards may be formatted, except those already formatted as translation cards.

This screen appears if you respond to format the memory card:

```
Format Memory Card:
All data on card will be
DELETED.
Do you want it
formatted?
Yes
No
Exit
```

Select **Yes** to begin the memory card format. Table [B-1](#) lists the screen messages that may appear while formatting is in progress.

**Table B-1. 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.

## 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.

Procedure	<p>Insert memory card→System→Back/Restore→Backup→Select backup file (if you select AUTO.BACK1 or AUTO.BACK2, you cannot rename the file)→Dial the new backup filename→Enter→Yes→Back→Back→Back</p> <p>(When entering the new backup filename, select Punctuation to toggle between the letters and punctuation. Use the buttons next to the display to specify the letters A through I and punctuation. Use the line/feature buttons to specify additional alpha-numeric characters for labels. Use the template provided with the 4424LD+ or MLX-20L telephone to see which line buttons correspond to which alphanumeric characters.)</p>
Programmable by Mode	System Manager
Idle Condition	All
Planning Form	System Forced Idle
Factory Setting	Form 1, System Planning
Valid Entries	Not applicable
Inspect	1- to 11-character filename
Copy Option	Yes
	No

## Automatic Backup

If an automatic backup fails for any reason, except when the failure results from the memory card being write-protected, the automatic backup feature is turned off. Follow this procedure to reprogram automatic backup.

Procedure	To program daily backup: Insert memory card→System→Back/Restore→Auto Backup→Daily→Drop (erases current daily backup time)→Dial time→Enter→Back→Back
	To program weekly backup: Insert memory card→System→Back/Restore→Auto Backup→Weekly→Drop (erases current weekly backup day and time)→Dial day and time→Enter→Back→Back
Programmable by Mode	System Manager All
Idle Condition	Not required
Planning Form	Form 1, System Planning
Factory Setting	Weekly backup (Sunday at 2:00 am)
Valid Entries	Daily: hhmm (00 to 23; 00 to 59) Weekly: dhhmm (0 to 6, where 0 equals Sunday; 00 to 23; 00 to 59)
Inspect	No
Copy Option	No

## 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. Table B-2 lists the messages that can appear during a Backup and describes what action to take.

**Table B-2. Messages That Can Appear During a Backup**

Backup Message	What It Means	What To Do
BACKUP IS CANCELED. File has been DELETED.	If the system detects an error, either on the memory card or with the backup file, or if you abort the backup, this message appears. The backup file being created is deleted, and the backup is aborted.	Repeat the backup procedure.
BACKUP IS CANCELED. Verify that Memory Card has been inserted correctly. File has been DELETED.	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 aborted.	Reinsert the memory card and repeat the backup procedure.

**Table B-2. Messages That Can Appear During a Backup—Continued**

<b>Backup Message</b>	<b>What It Means</b>	<b>What To Do</b>
Verify that Memory Card has been inserted correctly.	<p>The memory card is either not inserted or is inserted incorrectly. The backup is aborted.</p> <p>This message 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.</p>	<p>Reinsert the memory card and repeat the backup procedure.</p> <p>Verify that the card is a translation memory card</p>
Memory Card is Write-Protected. Reset Write-Protect tab on Memory Card.	<p>Memory card is write-protected.</p> <p>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.</p>	<p>Remove the memory card, flip the write-protect tab, reinsert the memory card, and repeat the backup procedure.</p>
Backup Failure. Try a different file or new Memory Card.	<p>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, this message appears.</p>	<p>Repeat the backup procedure using a different file and/or memory card.</p>

## 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.
- The processor module is replaced.
- After a System Erase (frigid start) has been performed.
- The system software has been reinstalled.

The Inspect feature 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 backup/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 canceled and the number of the 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 canceled and the number of the active line appears on the screen. Repeat the restore procedure when the line becomes idle.

Procedure	Insert memory card→System→Back/Restore→ Restore→ Select the restore file→Yes
Programmable by Mode	System Manager All
Idle Condition	System Forced Idle
Planning Form	Not applicable
Factory Setting	Not applicable
Valid Entries	Not applicable
Inspect	Yes
Copy Option	No

## 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. Table B-3 lists the messages that can appear during a Restore and describes what action to take.

**Table B-3. Message That Can Appear During a Restore**

Restore Message	What It Means	What To Do
Verify that Memory Card has been inserted correctly.	The memory card is either not inserted or is inserted incorrectly. The restore is aborted.  This message may also appear if the wrong type of memory card is inserted and a restore is requested within one minute of insertion.	Reinsert the memory card and repeat the restore procedure.  Verify that the card is a translation memory card.
RESTORE IS CANCELED. System is DOWN.	The memory card was removed from the processor slot while the restore was in progress. The restore is aborted; the system performs a System Erase (frigid start).	Reinsert the memory card and repeat the restore procedure.
Change Sys Programming Port to Extension xxxx before Restoring.	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 and repeat the restore procedure.
File is not Compatible for Release X.Y. Restore Canceled. Conversion Required.	This message appears only if Releases are not compatible.	Conversion required.
Restore Failure. Try a different file or a new Memory Card.	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.
Restore Failure. RESTORE IS CANCELED. System is DOWN.	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.

**Table B-3. Message That Can Appear During a Restore—Continued**

Restore Message	What It Means	What To Do
Inserted Memory Card is not the correct type. Remove and insert MERLIN MAGIX Backup/Restore Card.	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 “ <a href="#">Card Types</a> ” on page <a href="#">B-1</a> for information about the card labels.
Restore Failure. RESTORE IS CANCELED. Board mismatch between control unit and file.	A mismatch exists between the hardware components present on the current system and the hardware components reflected in the backup file. The restore is aborted.	Do one of the following:  Repeat the restore procedure with another file.  Modify the system hardware to match the configuration of the backup file and repeat the restore procedure with the same file.
Restore Failure. RESTORE IS CANCELED. Restore file Mode is Hybrid/PBX. Control Unit strap in place for KEY.	If the processor module has been strapped for Permanent Key mode, a restore to Hybrid/PBX mode is not possible.	Modify the processor.   <b>CAUTION:</b> <i>This procedure should be performed only by qualified service personnel.</i>



---

## NI-1 BRI Provisioning

This appendix provides detailed information concerning the features and translations that make up the ISDN Ordering Code (IOC) standardized capability package “S,” as well as the Multiline Hunt (MLH) feature. The MLH feature is provisioned using either the Multiline Hunt Group or the Series Completion feature, depending on the central office switch type.

Specific translations are provided for the following switches:

- Lucent Technologies 5ESS
- Northern Telecom DMS-100
- Siemens SSC EWSD

After determining that the local service provider offers National ISDN-1 service, the information contained in this appendix should be given to the local service provider, if necessary.

**NOTE** ► The programming screens shown in this appendix are representative samples only. The local service provider will need to enter applicable data (such as the telephone numbers) where necessary. Also note that the programming covered in this appendix *does not* take place on the MERLIN MAGIX Integrated System. All programming is performed by the local service provider on the central office switch.

## Lucent Technologies 5ESS Switch Translations

For the Lucent Technologies 5ESS switch, Capability Package "S" includes alternate voice/circuit-switched data on two B-channels. It also supports Calling Number Identification on data and voice connections. Please note that in order to have simultaneous calls on the two B-channels, two Directory Numbers (DNs) must be assigned with this package.

The Lucent Technologies 5ESS switch also allows alternate voice and data hunting on one DN using the Series Completion feature.

### ISDN Capability Package "S"

The information listed below provides the DN translations that define Capability Package "S," and the screens and fields that must be programmed.

The information provided shows the translations for one Digital Subscriber Line (DSL) and two DN's. For multiple DSLs/DN's, the central office will duplicate these screens and enter the applicable DSL and DN values as needed.

#### ISDN Ordering Code: Capability S

##### VIEW 23.2

##### DN1 Translations

Fields that must be programmed on Screens 1, 2, 3, and 4:

1	DSL TN	<C plus Telephone number>
9	ASSOC	<U>
11	OE	<enter OE and type>
14	D ISCN	<enter value>
15	DSERV	<SX>
16	B1SERV	<DMD>
17	B2SERV	<DMD>
18	NT1 TYPE	<enter NT1 type>
20	DSL CLS	<STD>
21	RSTR MP	<N>
23	MDPKT	<0>
24	MTERM	<2>
28	USPID	<enter value>
29	MAXB CHL	<2>
30	ACT USER	<Y>

Fields that must be populated on Screens 4, 5, and 6:

34	CKT TN	<enter TN>
35	CKT LCC	<enter LCC>
36	CKT RAX	<enter RAX value>
41	TERMTYP	<TYPEA>
42	DISPLAY	<Y>
46	CSV	<1>
47	CSV CHL	<ANY>
49	CSV LIMIT	<1>
55	CSD	<2>
56	CSD CHL	<ANY>
58	CSD LIMIT	<2>
126	CPN SCRN	<Y>
91	PIC	<enter PIC>

The Calling Number Identification feature is assigned using the standard BRCS preconstructed features /LICNDA and /CPCOFA. If it is possible, request /CPCPFA for the Calling Number Identification feature, as it provides a clearer display of the CPN information.

The Redirecting Number Delivery (RND) feature is assigned using the preconstructed RND feature, /RND. These features are assigned to the user in View 23.8, Field 109.

### **DN2 Translations (Note: DSL information was built with DN1)**

Fields that must be populated on Screens 1, 2, 3, and 4:

1	DSL TN	<C plus second Telephone number>
9	ASSOC	<U>
11	OE	<enter OE and type>
28	USPID	<enter value>
29	MAXB CHL	<2>
30	ACT USER	<Y>

Fields that must be populated on Screens 4, 5, and 6:

34	CKT TN	<enter TN>
35	CKT LCC	<enter LCC>
36	CKT RAX	<enter RAX value>
41	TERMTYP	<TYPEA>
42	DISPLAY	<Y>
46	CSV	<1>
47	CSV CHL	<ANY>
49	CSV LIMIT	<1>
55	CSD	<2>
56	CSD CHL	<ANY>
58	CSD LIMIT	<2>
126	CPN SCRN	<Y>
91	PIC	<enter PIC>

The Calling Number Identification feature is assigned using the standard BRCS preconstructed features /LICNDA and /CPCOFA. If it is possible, request /CPCPFA for the Calling Number Identification feature, as it provides a clearer display of the CPN information.

The Redirecting Number Delivery (RND) feature is assigned using the preconstructed RND feature, /RND. These features are assigned to the user in View 23.8, Field 109.

## Series Completion Feature Translations

The sample screens shown below illustrate the translations for alternate voice and data hunting on one main DSL and three DNs forming a linear series completion group. Voice hunting is provided using Series Completion (Field 87, SERHLN). Data hunting is provided with Call Forward Data Busy Line (/CFDBLAC).

The 5ESS limits the number of members of a series completion group to 16 DNs, and the number of lines forwarded using /CFDBLAC to the value specified on Screen 9, Field 176 (SIMINTRA). This value is currently set to 99 series completion groups, but can be changed.

```

SCREEN 1 OF 14          RECENT CHANGE 23.8
                        DSL/BRCS ASSIGNMENT
(*)1. DSL TN C 2228700  SERVICES AND FEATURES  SCREENS
(*)4. MLHG_____      -----
(*)5. TERM_____      BRCS FEATURE LIST      6
(*)6. DSL OE  _ _____ BRCS FEATURE PARAMETERS 7 to 9
(*)9. ASSOC  UCKT      4 & 5
                        DELFEAT LIST      14
                        DPKT              10
                        DSL INFO          2
                        ODB              11
                        PPB1             C
                        PPB2             13
                        USER INFO        3
    
```

```

5ESS SWITCH LABNSC1
SCREEN 2 OF 14          RECENT CHANGE 23.8
                        DSL/BRCS ASSIGNMENT (DSL INFO)
>11. OE  I 00101209    25. CUT DGTS              2228
14. D ISCN 007096     26. ACSR GRP_____
15. D SERV SX         27. DFLT SRV_____
16. B1 SERV DMD
17. B2 SERV DMD
18. NT1 TYPE AULC
19. PM GRP PMDEF
20. DSL CLS STD
21. RSTR MP N
22. ACSR INH Y
23. MDPKT 8
24. MTERM 2
    
```

## Maintenance and Troubleshooting

---

---

SCREEN 3 OF 14

5ESS SWITCH LABNSC1  
RECENT CHANGE 23.8  
DSL/BRCS ASSIGNMENT (USER INFO)

>28. USPID 0122287000  
29. MAXB CHL1  
30. ACT USERY  
31. PPB1 USRN  
32. PPB2 USRN  
33. AGI \_

---

---

SCREEN 4 OF 14

5ESS SWITCH LABNSC1  
RECENT CHANGE 23.8  
DSL/BRCS ASSIGNMENT (CKT)

		CIRCUIT VOICE (CSV)	CIRCUIT DATA (CSD)
>34. CKT TN	2228700		
35. CKT LCC	DSL	46. CSV 1	55. CSD 1
36. CKT RAX	1	47. CSV CHL ANY	56. CSD CHL ANY
37. CKT MLHG	_____	48. CSV ACO	57. CSD ACO _____
38. CKT TERM	_____	49. CSV LIMIT 1	58. CSD LIMIT 1
39. NEW TN	_____	50. CSV NBLIMIT _____	59. CSD NBLIMIT _____
40. CONFIG GRP	NI17507B	50. CSV NBLIMIT _____	60. K56 DNA _____
41. TERMTYP	TYPEA	51. SP DNA _____	61. K56 DNA QTY _____
42. DISPLAY	Y	52. SP DNA QTY _____	62. K64 DNA _____
43. EKTS	_____	53. AU DNA	63. K64 DNA QTY _____
44. CA	_____	54. AU DNA QTY	
45. CA QT	_____		

---

```

SCREEN 5 OF 14          5ESS SWITCH LABNSC1
                        RECENT CHANGE 23.8
                        DSL/BRCS ASSIGNMENT (CKT)
>64. TKSN              72. SAR QTY__          82. BUSY MONITORN
65. TAUTON             73. SAR ORIGN          83. ATT MLHG_____
66. SHAREDN           74. SAR TERMN          84. RBV TGN_____
67. SAUTON            75. INCOMINGN         85. ERCO ASGNN
68. PRIVACYN          76. INTERCOMN         86. ERCO ACTN
69. ICPN              77. ORIG CWN          87. SERHLN2228701
70. SUSON             78. PPN               88. BCK LNKN
71. SUSTN             79. CA PREF           90. CIDIALALLOW
                        80. AUTO HOLD         91. PIC_____
                        81. ONE TOUCHN        92. PTC_____
                        95. E911 PSAPN
    
```

```

SCREEN 6 OF 14          5ESS SWITCH LABNSC1
                        RECENT CHANGE 23.8
                        DSL/BRCS ASSIGNMENT
>106. BFGN _____ 109. FEATURE LIST (FL)
                        A                A                A                A
ROW FEATURE A P C R  FEATURE  A P C R  FEATURE  A P C R  FEATURE  A P C R
1 /LIDLXA  Y _ N N  10 _____  19 _____  28 _____
2 /CPCPFA  Y _ N N  11 _____  20 _____  29 _____
3 /CFDBLAC Y _ N N  12 _____  21 _____  30 _____
4 _____  - - - -  13 _____  22 _____  31 _____
5 _____  - - - -  14 _____  23 _____  32 _____
6 _____  - - - -  15 _____  24 _____  33 _____
7 _____  - - - -  16 _____  25 _____  34 _____
8 _____  - - - -  17 _____  26 _____  35 _____
9 _____  - - - -  18 _____  27 _____  36 _____
    
```

## Maintenance and Troubleshooting

SCREEN 7 OF 14

5ESS SWITCH LABNSC1  
RECENT CHANGE 23.8

DSL/BRCS ASSIGNMENT (HIGH RUNNER FEATURE PARAMETERS)

>134. TG:GRPID	0	146. ACSR GRPNM	_____	158. QALWD	__
135. MOH ALW	__	147. EDS:GRPNM	_____	159. PRIORITY Q	__
136. IDP NAME	_____	148. BCLID GR	_____	160. ARSSI	__
137. DPAT CAT	0	149. PFA:VGRPN	_____	161. DIALPLN	__
138. ICR SFG	0	150. PFA:DGRPNM	_____	162. ALWMDR	__
139. SC1NAME	_____	151. ATH:VGRPNM	_____	163. ACSR PINREQ	__
140. SC1S	__	152. ATH:DGRPNM	_____	164. DRING	__
141. SC2NAME	_____	153. MDR:GRPNM	_____	165. DCW DRING	__
142. SC2S	_____	154. ACCT:GRPNM	_____	166. CWO DRING	__
143. CPUO:SELQ1	0	155. ARS:VGRPNM	_____	167. MWY DRING	__
144. CPUO:SELQ2	0	156. ARS:DGRPNM	_____		
145. CPUT:TPREDQ	0	157. FRL	_____		

SCREEN 8 OF 14

5ESS SWITCH LABNSC1  
RECENT CHANGE 23.8

DSL/BRCS ASSIGNMENT (HIGH RUNNER FEATURE PARAMETERS)

>172. MESSAGE SERVICE (MSS) \_\_\_\_\_ 175. MW:DCNDN \_\_\_\_\_

ROW	FEATURE	GRPNM
1	_____	_____
2	_____	_____
3	_____	_____
4	_____	_____

SCREEN 9 OF 14

5ESS SWITCH LABNSC1  
RECENT CHANGE 23.8

DSL/BRCS ASSIGNMENT (HIGH RUNNER FEATURE PARAMETERS)

>176. CALL FORWARDING FEATURE PARAMETERS (CF)

ROW	FEATURE	FWD TO DN	TIMEOUT	BSRING	SIMINTER	SIMINTRA
1	/CFDBLAC2228701		0	N	1	99
2	_____		0	__	0	0
3	_____		0	__	0	0
4	_____		0	__	0	0
5	_____		0	__	0	0
6	_____		0	__	0	0

```

SCREEN 10 OF 14          5ESS SWITCH LABNSC1
                        RECENT CHANGE 23.8
                        DSL/BRCS ASSIGNMENT (DPKT)
>183. DPKT TN          _____ 192. IECP DNIC          _____ 198. H PVC LCN          _____
184. LCC                _____ 193. PB GRP            _____ 199. L IN LCN          _____
185. RAX                _____ 194. NOTIF            NO      200. H IN LCN          _____
186. MLHG              _____ 195. ICP              N       201. L 2W LCN          _____
187. TERM              _____ 196. HUNT NOTIF      _____ 202. H 2W LCN          _____
188. LNR HNT TN       _____ 197. TCID            _____ 203. L OUT LCN         _____
190. CHL SEL           N          _____ 204. H OUT LCN         _____
191. NEW TN           _____ 206. PMDR GRP         _____
                                           207. PMDR ACT         _____
                                           208. DNA               _____
                                           209. DNA QTY           _____
    
```

```

SCREEN 11 OF 14         5ESS SWITCH LABNSC
                        RECENT CHANGE 23.8
                        DSL/BRCS ASSIGNMENT (ODB)
>210. ODB TN          _____ 222. RATE             _____ 234. L IN LCN          _____
211. LCC                _____ 223. N2               _____ 235. H IN LCN          _____
212. RAX                0          _____ 224. T1               _____ 236. L 2W LCN          _____
213. MLHG              _____ 225. T3               _____ 237. H 2W LCN          _____
214. TERM              _____ 226. WNDSZ            _____ 238. L OUT LCN         _____
215. LNR HNT TN       _____ 227. NEW TN           _____ 239. H OUT LCN         _____
216. HUNT DEACT       _____ 228. IECP DNIC       _____ 240. BUSY LIMIT        _____
217. CHL SEL           N          _____ 229. PB GRP           _____ 241. PMDR GRP          _____
218. ISCN1            _____ 230. NOTIF            _____ 242. PMDR ACT          _____
219. ISCN2            _____ 231. T3XX             0       243. DNA                _____
220. BAND              0          _____ 232. ICP              N       244. DNA QTY           _____
221. ODB                _____ 233. HUNT NOTIF      _____
    
```

```

SCREEN 12 OF 14                5ESS SWITCH LABNSC1
                                RECENT CHANGE 23.8
                                DSL/BRCS ASSIGNMENT (PPB1)
>245. PPB1 TN      _____ 254. RATE           _____ 264. H PVC LCN      _____
246. LCC           _____ 255. N2            _____ 265. L IN LCN      _____
247. RAX           0         _____ 256. T1            _____ 266. H IN LCN      _____
248. MLHG          _____ 257. T3            _____ 267. L 2W LCN      _____
249. TERM          _____ 258. WNDSZ         _____ 268. H 2W LCN      _____
250. LNR HNT TN   _____ 259. NEW TN        _____ 239. H OUT LCN     _____
251. HUNT DEACT   _____ 260. IECP DNIC     _____ 269. L OUT LCN     _____
252. CHL SEL      N         _____ 261. PB GRP        _____ 270. H OUT LCN     _____
253. ISCN         _____ 262. ICP           N         _____ 271. BUSY LIMIT    _____
                                263. HUNT NOTIF   _____ 272. PMDR GRP      _____
                                                273. PMDR AC       _____
    
```

```

SCREEN 13 OF 14                5ESS SWITCH LABNSC1
                                RECENT CHANGE 23.8
                                DSL/BRCS ASSIGNMENT (PPB2)
>274. PPB2 TN      _____ 283. RATE           _____ 293. H PVC LCN      _____
275. LCC           _____ 284. N2            _____ 294. L IN LCN      _____
276. RAX           0         _____ 285. T1            _____ 295. H IN LCN      _____
277. MLHG          _____ 286. T3            _____ 296. L 2W LCN      _____
278. TERM          _____ 287. WNDSZ         _____ 297. H 2W LCN      _____
279. LNR HNT TN   _____ 288. NEW TN        _____ 298. L OUT LCN     _____
280. HUNT DEACT   _____ 289. IECP DNIC     _____ 299. H OUT LCN     _____
281. CHL SEL      N         _____ 290. PB GRP        _____ 300. BUSY LIMIT    _____
282. ISCN         _____ 291. ICP           N         _____ 301. PMDR GRP      _____
                                292. HUNT NOTIF   _____ 302. PMDR ACT       _____
    
```

```

SCREEN 14 OF 14                5ESS SWITCH LABNSC1
                                RECENT CHANGE 23.8
                                DSL/BRCS ASSIGNMENT

WARNING: These fields delete features currently on the view or in a BFG.
         Deletion of a feature in BFG may invoke BFG reselection.

303. DELFEAT

ROW FEATURE
1   _____
2   _____
3   _____
    
```

SCREEN 14 OF 14

5ESS SWITCH LABNSC1  
 RECENT CHANGE 23.8  
 DSL/BRCS ASSIGNMENT

No Messages

SCREEN 1 OF 14

5ESS SWITCH LABNSC1  
 RECENT CHANGE 23.8  
 DSL/BRCS ASSIGNMENT

(*) 1. DSL	TN C	2228701	SERVICES AND FEATURES	SCREENS
(*) 4. MLHG	_____		-----	-----
(*) 5. TERM	_____		BRCS FEATURE LIST	6
(*) 6. DSL	_____	_____	BRCS FEATURE PARAMETERS	7 to 9
(*) 9. ASSOC	U	CKT		4 & 5
			DELFEAT LIST	14
			DPKT	10
			DSL INFO	2
			ODB	11
			PPB1	12
			PPB2	13
			USER INFO	3

SCREEN 2 OF 14

5ESS SWITCH LABNSC1  
 RECENT CHANGE 23.8  
 DSL/BRCS ASSIGNMENT (DSL INFO)

>11. OE I	00101209	25. CUT DGTS	2228
14. D ISCN	007096	26. ACSR GRP	_____
15. D SERV	SX	27. DFLT SRV	_____
16. B1 SERV	DMD		
17. B2 SERV	DMD		
18. NT1 TYPE	AULC		
19. PM GRP	PMDEF		
20. DSL CLS			
21. RSTR MP	N		
22. ACSR INH	Y		
23. MDPKT	8		
24. MTERM	2		

## Maintenance and Troubleshooting

---

SCREEN 3 OF 14

5ESS SWITCH LABNSC1  
RECENT CHANGE 23.8  
DSL/BRCS ASSIGNMENT (USER INFO)

>28. USPID0122287010  
29. MAXB CHL1  
30. ACT USERY  
31. PPB1 USRN  
32. PPB2 USRN  
33. AGI \_\_\_\_\_

---

SCREEN 4 OF 14

5ESS SWITCH LABNSC1  
RECENT CHANGE 23.8  
DSL/BRCS ASSIGNMENT (CKT)

>34. CKT TN	2228701	CIRCUIT VOICE	(CSV)	CIRCUIT DATA	(CSD)
35. CKT LCC	DSL	46. CSV	1	55. CSD	1
36. CKT RAX	1	47. CSV CHL	ANY	56. CSD CHL	ANY
37. CKT MLHG	_____	48. CSV ACO	_____	57. CSD ACO	_____
38. CKT TERM	_____	49. CSV LIMIT	1	58. CSD LIMIT	1
39. NEW TN	_____	50. CSV NBLIMIT	_____	59. CSD NBLIMIT	_____
40. CONFIG GRP	NI17507A	51. SP DNA	_____	60. K56 DNA	_____
41. TERMTYP	TYPEA	52. SP DNA QTY	_____	61. K56 DNA QTY	_____
42. DISPLAY	Y	53. AU DNA	_____	62. K64 DNA	_____
43. EKTS	_____	54. AU DNA	_____	63. K64 DNA QTY	_____
44. CA	_____				
45. CA QTY	_____				

---

SCREEN 5 OF 14

5ESS SWITCH LABNSC1  
RECENT CHANGE 23.8  
DSL/BRCS ASSIGNMENT (CKT)

>64. TKS	72. SAR QTY__	82. BUSY MONITORN
65. TAUTON	73. SAR ORIGN	83. ATT MLHG_____
66. SHAREDN	74. SAR TERMN	84. RBV TGN_____
67. SAUTON	75. INCOMINGN	85. ERCO ASGNN
68. PRIVACYN	76. INTERCOMN	86. ERCO ACTN2228703
69. ICPN	77. ORIG CWN	87. SERHLN
70. SUSON	78. PPN	88. BCK LNKY
71. SUSTN	79. CA PREFI	89. ACD POS NUM_____
	80. AUTO HOLDN	90. CIDIALALLOW
	81. ONE TOUCHN	91. PIC_____

SCREEN 5 OF 14

5ESS SWITCH LABNSC1  
 RECENT CHANGE 23.8  
 DSL/BRCS ASSIGNMENT (CKT)  
 92. PTC\_\_\_\_  
 95. E911 PSAPN

SCREEN 6 OF 14

5ESS SWITCH LABNSC1  
 RECENT CHANGE 23.8  
 DSL/BRCS ASSIGNMENT

>106. BFGN \_\_\_\_\_ 109. FEATURE LIST (FL)

ROW	FEATURE	A	P	C	R	FEATURE	A	P	C	R	FEATURE	A	P	C	R	FEATURE	A	P	C	R
1	/CPCPFA	Y	_	N	N	10	_____	_____	_____	_____	19	_____	_____	_____	_____	28	_____	_____	_____	_____
2	/LIDLXA	Y	_	N	N	11	_____	_____	_____	_____	20	_____	_____	_____	_____	29	_____	_____	_____	_____
3	/CFDBLAC	Y	_	N	N	12	_____	_____	_____	_____	21	_____	_____	_____	_____	30	_____	_____	_____	_____
4	_____	_____	_____	_____	_____	13	_____	_____	_____	_____	22	_____	_____	_____	_____	31	_____	_____	_____	_____
5	_____	_____	_____	_____	_____	14	_____	_____	_____	_____	23	_____	_____	_____	_____	32	_____	_____	_____	_____
6	_____	_____	_____	_____	_____	15	_____	_____	_____	_____	24	_____	_____	_____	_____	33	_____	_____	_____	_____
7	_____	_____	_____	_____	_____	16	_____	_____	_____	_____	25	_____	_____	_____	_____	34	_____	_____	_____	_____
8	_____	_____	_____	_____	_____	17	_____	_____	_____	_____	26	_____	_____	_____	_____	35	_____	_____	_____	_____
9	_____	_____	_____	_____	_____	18	_____	_____	_____	_____	27	_____	_____	_____	_____	36	_____	_____	_____	_____

SCREEN 7 OF 14

5ESS SWITCH LABNSC1  
 RECENT CHANGE 23.8  
 DSL/BRCS ASSIGNMENT (HIGH RUNNER FEATURE PARAMETERS)

>134. TG:GRPID	0	146. ACSR GRPNM	_____	158. QALWD	_____
135. MOH ALW	_____	147. EDS:GRPNM	_____	159. PRIORITY Q	_____
136. IDP NAME	_____	148. BCLID GRP	_____	160. ARSSI	_____
137. DPAT CAT	0	149. PFA:VGRPNM	_____	161. DIALPLN	_____
138. ICR SFG	0	150. PFA:DGRPNM	_____	162. ALWMDR	_____
139. SC1NAME	_____	151. ATH:VGRPNM	_____	163. ACSR PINREQ	_____
140. SC1S	_____	152. ATH:DGRPNM	_____	164. DRING	_____
141. SC2NAME	_____	153. MDR:GRPNM	_____	165. DCW DRING	_____
142. SC2S	_____	154. ACCT:GRPNM	_____	166. CWO DRING	_____
143. CPUO:SELQ1	0	156. ARS:DGRPNM	_____	167. MWY DRING	_____
144. CPUO:SELQ2	0	157. FRL	_____		
145. CPUT:TPREDQ	0				

## Maintenance and Troubleshooting

SCREEN 8 OF 14            5ESS SWITCH LABNSC1  
 RECENT CHANGE 23.8  
 DSL/BRCs ASSIGNMENT (HIGH RUNNER FEATURE PARAMETERS)  
 >172. MESSAGE SERVICE (MSS)                            175. MW:DCNDN \_\_\_\_\_

ROW	FEATURE	GRPNM
1	_____	_____
2	_____	_____
3	_____	_____
4	_____	_____

SCREEN 9 OF 14            5ESS SWITCH LABNSC1  
 RECENT CHANGE 23.8  
 DSL/BRCs ASSIGNMENT (HIGH RUNNER FEATURE PARAMETERS)  
 >176. CALL FORWARDING FEATURE PARAMETERS (CF)

ROW	FEATURE	FWD TO DN	TIMEOUT	BSRING	SIMINTER	SIMINTRA
1	/CFDBLAC2228703		0	N	1	99
2	_____		0	-	0	0
3	_____		0	-	0	0
4	_____		0	-	0	0
5	_____		0	-	0	0
6	_____		0	-	0	0

SCREEN 1 OF 14            5ESS SWITCH LABNSC1  
 RECENT CHANGE 23.8  
 DSL/BRCs ASSIGNMENT

(*)	ROW	FEATURE	PARAMETERS	SCREENS
(*)	1.	DSL	TN C 2228703 SERVICES AND FEATURES	SCREENS
(*)	4.	MLHG	_____	-----
(*)	5.	TERM	_____	BRCs FEATURE LIST 6
(*)	6.	DSL OE	_____	BRCs FEATURE PARAMETERS 7 to 9
(*)	9.	ASSOC	U CKT	4 & 5
			DELFEAT LIST	14
			DPKT	10
			DSL INFO	2
			ODB	11
			PPB1	12

```

SCREEN 1 OF 14          5ESS SWITCH LABNSC1
                        RECENT CHANGE 23.8
                        DSL/BRCS ASSIGNMENT
                                PPB2          13
                                USER INFO     3
    
```

```

SCREEN 2 OF 14          5ESS SWITCH LABNSC1
                        RECENT CHANGE 23.8
                        DSL/BRCS ASSIGNMENT (DSL INFO)
>11. OE      I      00101221  25. CUT DGTS      2228
    14. D ISCN      007105  26. ACSR GRP      _____
    15. D SERV      SX      27. DFLT SRV      _____
    16. B1 SERV      DMD
    17. B2 SERV      DMD
    18. NT1 TYPE      TLC
    19. PM GRP      _____
    20. DSL CLS      STD
    21. RSTR MP      N
    22. ACSR INH      Y
    23. MDPKT      8
    24. MTERM      2
    
```

```

SCREEN 3 OF 14          5ESS SWITCH LABNSC1
                        RECENT CHANGE 23.8
                        DSL/BRCS ASSIGNMENT (USER INFO)
>28. USPID0122287030
    29. MAXB CHL1
    30. ACT USERY
    31. PPB1 USRN
    32. PPB2 USRN
    33. AGI      _____
    
```

```

SCREEN 4 OF 14          5ESS SWITCH LABNSC1
                        RECENT CHANGE 23.8
                        DSL/BRCS ASSIGNMENT (CKT)
>34. CKT TN      2228703  CIRCUIT VOICE      (CSV)      CIRCUIT DATA      (CSD)
    35. CKT LCC      DSL      46. CSV      1      55. CSD      1
    36. CKT RAX      1      47. CSV CHL      ANY      56. CSD CHL      ANY
    
```

## Maintenance and Troubleshooting

```

SCREEN 4 OF 14          5ESS SWITCH LABNSC1
                        RECENT CHANGE 23.8
                        DSL/BRCS ASSIGNMENT (CKT)

37. CKT MLHG          _____ 48. CSV ACO          _____ 57. CSD ACO          _____
38. CKT TERM          _____ 49. CSV LIMIT      1          _____ 58. CSD LIMIT      1          _____
39. NEW TN            _____ 50. CSV NBLIMIT   _____ 59. CSD NBLIMIT   _____
40. CONFIG GRP       _____ 51. SP DNA        _____ 60. K56 DNA        _____
41. TERMTYP          TYPEA      52. SP DNA QTY    _____ 61. K56 DNA QTY    _____
42. DISPLAY          Y          53. AU DNA        _____ 62. K64 DNA        _____
43. EKTS             _____ 54. AU DNA        _____ 63. K64 DNA QTY    _____
44. CA               _____
45. CA QTY           _____
    
```

```

SCREEN 5 OF 14          5ESS SWITCH LABNSC1
                        RECENT CHANGE 23.8
                        DSL/BRCS ASSIGNMENT (CKT)

>64. TKS             72. SAR QTY__      82. BUSY MONITORN
65. TAUTON           73. SAR ORIGN      83. ATT MLHG__
66. SHAREDN          74. SAR TERMN      84. RBV TGN__
67. SAUTON           75. INCOMINGN      85. ERCO ASGNN
68. PRIVACYN         76. INTERCOMN      86. ERCO ACTN
69. ICPN             77. ORIG CWN       87. SERHLN2228704
70. SUSON            78. PPN            88. BCK LNKY
71. SUSTN            79. CA PREFI       89. ACD POS NUM__
                        80. AUTO HOLDN     90. CIDIALALLOW
                        81. ONE TOUCHN     91. PIC__
                        92. PTC__
                        95. E911 PSAPN
    
```

```

SCREEN 6 OF 14          5ESS SWITCH LABNSC1
                        RECENT CHANGE 23.8
                        DSL/BRCS ASSIGNMENT

>106. BFGN           _____ 109. FEATURE LIST (FL)
                        A
ROW FEATURE A P C R   FEATURE   A P C R   FEATURE   A P C R   FEATURE   A P C R
1 /CPCPFA  Y _ N N    10 _____ - - - -  19 _____ - - - -  28 _____ - - - -
2 /LIDLXA  Y _ N N    11 _____ - - - -  20 _____ - - - -  29 _____ - - - -
3 /CFDBLAC Y _ N N    12 _____ - - - -  21 _____ - - - -  30 _____ - - - -
4 _____ - - - -    13 _____ - - - -  22 _____ - - - -  31 _____ - - - -
5 _____ - - - -    14 _____ - - - -  23 _____ - - - -  32 _____ - - - -
6 _____ - - - -    15 _____ - - - -  24 _____ - - - -  33 _____ - - - -
    
```

```

SCREEN 6 OF 14      5ESS SWITCH LABNSC1
                    RECENT CHANGE 23.8
                    DSL/BRCS ASSIGNMENT
7 _____ 16 _____ 25 _____ 34 _____
8 _____ 17 _____ 26 _____ 35 _____
9 _____ 18 _____ 27 _____ 36 _____
    
```

```

SCREEN 7 OF 14      5ESS SWITCH LABNSC1
                    RECENT CHANGE 23.8
                    DSL/BRCS ASSIGNMENT (HIGH RUNNER FEATURE PARAMETERS)
>134. TG:GRPID    0      146. ACSR GRPNM _____ 158. QALWD _____
135. MOH ALW      _____ 147. EDS:GRPNM _____ 159. PRIORITY Q _____
136. IDP NAME     _____ 148. BCLID GRP _____ 160. ARSSI _____
137. DPAT CAT    0      149. PFA:VGRPNM _____ 161. DIALPLN _____
138. ICR SFG     0      150. PFA:DGRPNM _____ 162. ALWMDR _____
139. SC1NAME     _____ 151. ATH:VGRPNM _____ 163. ACSR PINREQ _____
140. SC1S        _____ 152. ATH:DGRPNM _____ 164. DRING _____
141. SC2NAME     _____ 153. MDR:GRPNM _____ 165. DCW DRING _____
142. SC2S        _____ 154. ACCT:GRPNM _____ 166. CWO DRING _____
143. CPUO:SELQ1  0      156. ARS:DGRPNM _____ 167. MWY DRING _____
144. CPUO:SELQ2  0      157. FRL _____
145. CPUT:TPREDQ 0
    
```

```

SCREEN 8 OF 14      5ESS SWITCH LABNSC1
                    RECENT CHANGE 23.8
                    DSL/BRCS ASSIGNMENT (HIGH RUNNER FEATURE PARAMETERS)
>172. MESSAGE SERVICE (MSS)      175. MW:DCNDN _____

ROW   FEATURE   GRPNM
1     _____
2     _____
3     _____
4     _____
    
```

## Maintenance and Troubleshooting

---

---

SCREEN 9 OF 14      5ESS SWITCH LABNSC1  
RECENT CHANGE 23.8  
DSL/BRCS ASSIGNMENT (HIGH RUNNER FEATURE PARAMETERS)  
  
>176. CALL FORWARDING FEATURE PARAMETERS (CF)

ROW	FEATURE	FWD TO DN	TIMEOUT	BSRING	SIMINTER	SIMINTRA
1	/CFDBLAC2228704		0	Y	1	99
2	_____		0	-	0	0
3	_____		0	-	0	0
4	_____		0	-	0	0
5	_____		0	-	0	0
6	_____		0	-	0	0

---

---

SCREEN 1 OF 14      5ESS SWITCH LABNSC1  
RECENT CHANGE 23.8  
DSL/BRCS ASSIGNMENT

(*)	1. DSL	TN C	2228704	SERVICES AND FEATURES	SCREENS
(*)	4. MLHG	_____		-----	-----
(*)	5. TERM	_____		BRCS FEATURE LIST	6
(*)	6. DSL OE	- _____		BRCS FEATURE PARAMETERS	7 to 9
(*)	9. ASSOC	U      CKT			4 & 5
				DELFEAT LIST	14
				DPKT	10
				DSL INFO	2
				ODB	11
				PPB1	12
				PPB2	13
				USER INFO	3

---

---

SCREEN 2 OF 14      5ESS SWITCH LABNSC1  
RECENT CHANGE 23.8  
DSL/BRCS ASSIGNMENT (DSL INFO)

>11. OE	I	00101221	25. CUT DGTS	2228
14. D ISCN		007105	26. ACSR GRP	_____
15. D SERV	SX		27. DFLT SRV	_____
16. B1 SERV	DMD			
17. B2 SERV	DMD			
18. NT1 TYPE	TLC			

---

SCREEN 2 OF 14

5ESS SWITCH LABNSC1  
 RECENT CHANGE 23.8  
 DSL/BRCS ASSIGNMENT (DSL INFO)

19. PM GRP	_____
20. DSL CLS	STD
21. RSTR MP	N
22. ACSR INH	Y
23. MDPKT	8
24. MTERM	2

SCREEN 3 OF 14

5ESS SWITCH LABNSC1  
 RECENT CHANGE 23.8  
 DSL/BRCS ASSIGNMENT (USER INFO)

>28. USPID0122287040  
 29. MAXB CHL1  
 30. ACT USERY  
 31. PPB1 USRN  
 32. PPB2 USRN  
 33. AGI\_

SCREEN 4 OF 14

5ESS SWITCH LABNSC1  
 RECENT CHANGE 23.8  
 DSL/BRCS ASSIGNMENT (CKT)

>34. CKT TN	2228704	CIRCUIT VOICE	(CSV)	CIRCUIT DATA	(CSD)
35. CKT LCC	DSL	46. CSV	1	55. CSD	1
36. CKT RAX	1	47. CSV CHL	ANY	56. CSD CHL	ANY
37. CKT MLHG	_____	48. CSV ACO	_____	57. CSD ACO	_____
38. CKT TERM	_____	49. CSV LIMIT	1	58. CSD LIMIT	1
39. NEW TN	_____	50. CSV NBLIMIT	_____	59. CSD NBLIMIT	_____
40. CONFIG GRP	_____	51. SP DNA	_____	60. K56 DNA	_____
41. TERMTYP	TYPEA	52. SP DNA QTY	_____	61. K56 DNA QTY	_____
42. DISPLAY	Y	53. AU DNA	_____	62. K64 DNA	_____
43. EKTS	_____	54. AU DNA	_____	63. K64 DNA QTY	_____
44. CA	_____				
45. CA QTY	_____				

Maintenance and Troubleshooting

SCREEN 5 OF 14

5ESS SWITCH LABNSC1  
 RECENT CHANGE 23.8  
 DSL/BRCS ASSIGNMENT (CKT)

>64. TKS	N	72. SAR QTY	___	82. BUSY MONITOR	N
65. TAUTO	N	73. SAR ORIG	N	83. ATT MLHG	___
66. SHARED	N	74. SAR TERM	N	84. RBV TGN	___
67. SAUTO	N	75. INCOMING	N	85. ERCO ASGN	N
68. PRIVACY	N	76. INTERCOM	N	86. ERCO ACT	N
69. ICP	N	77. ORIG CW	N	87. SERHLN	___
70. SUSO	N	78. PP	N	88. BCK LNK	Y
71. SUST	N	79. CA PREF	I	89. ACD POS NUM	___
		80. AUTO HOLD	N	90. CIDIAL	ALLOW
		81. ONE TOUCH	N	91. PIC	___
				92. PTC	___
				95. E911 PSAP	N

SCREEN 6 OF 14

5ESS SWITCH LABNSC1  
 RECENT CHANGE 23.8  
 DSL/BRCS ASSIGNMENT

>106. BFGN \_\_\_\_\_ 109. FEATURE LIST (FL)

ROW	FEATURE	A	P	C	R	FEATURE	A	P	C	R	FEATURE	A	P	C	R	FEATURE	A	P	C	R
1	/CPCPFA	Y	_	N	N	10	_____	_____	_____	_____	19	_____	_____	_____	_____	28	_____	_____	_____	_____
2	/LIDLXA	Y	_	N	N	11	_____	_____	_____	_____	20	_____	_____	_____	_____	29	_____	_____	_____	_____
3	_____	_____	_____	_____	_____	12	_____	_____	_____	_____	21	_____	_____	_____	_____	30	_____	_____	_____	_____
4	_____	_____	_____	_____	_____	13	_____	_____	_____	_____	22	_____	_____	_____	_____	31	_____	_____	_____	_____
5	_____	_____	_____	_____	_____	14	_____	_____	_____	_____	23	_____	_____	_____	_____	32	_____	_____	_____	_____
6	_____	_____	_____	_____	_____	15	_____	_____	_____	_____	24	_____	_____	_____	_____	33	_____	_____	_____	_____
7	_____	_____	_____	_____	_____	16	_____	_____	_____	_____	25	_____	_____	_____	_____	34	_____	_____	_____	_____
8	_____	_____	_____	_____	_____	17	_____	_____	_____	_____	26	_____	_____	_____	_____	35	_____	_____	_____	_____
9	_____	_____	_____	_____	_____	18	_____	_____	_____	_____	27	_____	_____	_____	_____	36	_____	_____	_____	_____

SCREEN 7 OF 14

5ESS SWITCH LABNSC1  
 RECENT CHANGE 23.8  
 DSL/BRCS ASSIGNMENT (HIGH RUNNER FEATURE PARAMETERS)

>134. TG:GRPID	0	146. ACSR GRPNM	_____	158. QALWD	_____
135. MOH ALW	_____	147. EDS:GRPNM	_____	159. PRIORITY Q	_____
136. IDP NAME	_____	148. BCLID GRP	_____	160. ARSSI	_____
137. DPAT CAT	0	149. PFA:VGRPNM	_____	161. DIALPLN	_____
138. ICR SFG	0	150. PFA:DGRPNM	_____	162. ALWMDR	_____



## Northern Telecom DMS-100 Switch Translations

For the Northern Telecom DMS-100 switch, Capability Package “S” includes alternate voice/circuit-switched data on two B-channels. It also supports Calling Number Identification on data and voice connections. Please note that the assignment of two DNs is required for this package.

The DMS-100 switch also allows alternate voice and data hunting on one DN through the Multiline Hunt Group feature.

### ISDN Capability Package “S”

The information listed below provides the DN translations that define Capability Package “S,” and the commands that must be executed.

#### ISDN Ordering Code: Capability S

#### Provision DN1 using the following translations

Define a new Logical Terminal Identifier (LTID) using the SLT command:

SONUMBER	<<cr> or \$>
LTID	<enter identifier value>
FUNCTION	<enter identifier value>
LTCLASS	<BRAFS>
CS	<Y>
PS	<N>
MAXKEYS	<64>
TEI_TYPE	<DTEI>
ABS	<NOPMD>
ABS	<\$>
EKTS	<N>
SPIDSFX option	
SPID_SUFFIX	<enter spid suffix value>
PVC option	
VERSION	<FUNCTIONAL>
ISSUE	<2>

Associate new DN with LTID using the NEW command:

SONUMBER	<<cr> or \$>
DN	<enter DN>
LCC	<ISDNKSET>
GROUP	<enter group name>
SUBGRP	<enter subgrp value>
NCOS	<enter ncos value>
SNPA	<enter NXX value>
KEY	<1>
RINGING	<Y>
LATANAME	<enter value>
LTG	<enter value>
LEN_OR_LTID	<enter assigned value>

DMS-100 normally delivers the Calling Party Number and the Redirecting Number, if available.

Attach LTIDs to LEN using the SLT command:

SONUMBER	<<cr> or \$>
LTID	<enter value>
FUNCTION	<ATT>
LEN	<enter LEN to which LTID will be attached>

### Provision DN2 using the following translations

Define a new Logical Terminal Identifier (LTID) using the SLT command:

SONUMBER	<<cr> or \$>
LTID	<enter identifier value>
FUNCTION	<ADD>
LTCLASS	<BRAFS>
CS	<Y>
PS	<N>
MAXKEYS	<64>
TEI_TYPE	<DTEI>
ABS	<NOPMD>
ABS	<\$>
EKTS	<N>
SPIDSFX option	
SPID_SUFFIX	<enter spid suffix value>
PVC option	
VERSION	<FUNCTIONAL>
ISSUE	<2>

Associate new DN with LTID using the NEW command:

SONUMBER	<<cr> or \$>
DN	<enter DN>
LCC	<ISDNKSET>
GROUP	<enter group name>
SUBGRP	<enter subgrp value>
NCOS	<enter ncos value>
SNPA	<enter NXX value>
KEY	<1>
RINGING	<Y>
LATANAME	<enter value>
LTG	<enter value>
LEN_OR_LTID	<enter assigned value>

DMS-100 normally delivers the Calling Party Number and the Redirecting Number, if available.

Attach LTIDs to LEN using the SLT command:

SONUMBER	<<cr> or \$>
LTID	<enter value>
FUNCTION	<ATT>
LEN	<enter LEN to which LTID will be attached>

## Multiline Hunt Group Feature Translations

The sample screens shown below illustrate the translations for alternate voice and data hunting on three Digital Subscriber Lines (DSLs) and six Directory Numbers (DNs) forming a circular hunt group. This hunting is provided using the Multiline Hunt Group feature.

The screens shown in this section are examples, DNs shown on these screens should be replaced with applicable data.

QDN 2257141

---

```

DN:      2257141
TYPE:    PILOT OF DNH HUNT GROUP
SNPA:    201SIG:  N/A LNATTIDX: N/A
HUNT GROUP:  22      HUNT MEMBER:  O
LTID:    PSATS      141
LTCLASS:  BRAFS
LINE CLASS CODE:  ISDNKSET
KEY:      1
CUSTGRP:  MDCSCA  SUBGRP:  O NCOS:  O  RING:  Y
OPTIONS:
SFC
GROUP OPTIONS:
CIR RCVD
MEMBER INFO:
  1      2257146
  2      2257145
  3      2257144
  4      2257143
  5      2257142

```

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## Maintenance and Troubleshooting

---

QLT PSATS 141

---

LTID: PSATS 141  
SNPA: 201  
DIRECTORY NUMBER: 2257141  
LT GROUP NO: 13  
LTCLASS: BRAFS DEFAULT LOGICAL TERMINAL: N  
EKTS: N CACH: N  
BEARER SERVICE RESTRICTIONS: NOPMD  
CS: Y PS: N  
VERSION: FUNCTIONAL ISSUE: 2  
SPID-SUFFIX: 01  
LEN: HOST 01 1 10 01 TEI: DYNAMIC  
CUSTGRP: MDCSCA SUBGRP: O NCOS: ORING: Y  
LINE CLASS CODE: ISDNKSET  
MAXKEYS: 64  
DN IS ASSIGNED AS A DNH HUNT PILOT.  
HUNT GROUP: 22 HUNT MEMBER: O  
OPTIONS:  
SFC

KEY	DN	
---	--	
1	DN	2257141

KEY	FEATURE
---	-----
	NONE

6GROUP OPTIONS:

CIR RCVD

MEMBER INFO:

1	2257146
2	2257145
3	2257144
4	2257143
5	2257142

---

QLT PSATS 142

---

LTID: PSATS 142  
 SNPA: 201  
 DIRECTORY NUMBER: 2257142  
 LT GROUP NO: 13  
 LTCLASS: BRAFS DEFAULT LOGICAL TERMINAL: N  
 EKTS: N CACH: N  
 BEARER SERVICE RESTRICTIONS: NOPMD  
 CS: Y PS: N  
 VERSION: FUNCTIONAL ISSUE: 2  
 SPID-SUFFIX: 01  
 LEN: HOST 01 1 10 02 TEI: DYNAMIC  
 CUSTGRP: MDCSCA SUBGRP: O NCOS: O RING: Y  
 LINE CLASS CODE: ISDNKSET  
 MAXKEYS: 64  
 DN IS ASSIGNED AS A DNH HUNT MEMBER (NOT PILOT).  
 HUNT GROUP: 22 HUNT MEMBER: 5  
 OPTIONS:  
 SFC

KEY	DN	
---	--	
1	DN	2257142

KEY FEATURE  
 --- -----  
 NONE

PILOT DN: 2257141  
 GROUP OPTIONS:  
 CIR RCVD

---

DN: 2257143  
 TYPE: MEMBER OF DNH HUNT GROUP  
 SNPA: 201 SIG: N/A LNATTIDX: N/A  
 HUNT GROUP: 22 HUNT MEMBER: 4  
 LTID: PSATS 143  
 LTCLASS: BRAFS  
 LINE CLASS CODE: ISDNKSET  
 KEY: 1  
 CUSTGRP: MDCSCA SUBGRP: O NCOS: O RING: Y  
 OPTIONS:  
 SFC  
 PILOT DN: 2257141  
 GROUP OPTIONS:  
 CIR RCVD

---

## Maintenance and Troubleshooting

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---

LTID: PSATS 143  
SNPA: 201  
DIRECTORY NUMBER: 2257143  
LT GROUP NO: 13  
LTCLASS: BRAFS DEFAULT LOGICAL TERMINAL: N  
EKTS: N CACH: N  
BEARER SERVICE RESTRICTIONS: NOPMD  
CS: Y PS: N  
VERSION: FUNCTIONAL ISSUE: 2  
SPID-SUFFIX: 01  
LEN: HOST 01 0 07 01 TEI: DYNAMIC  
CUSTGRP: MDCSCA SUBGRP: O NCOS: O RING: Y  
LINE CLASS CODE: ISDNKSET  
MAXKEYS: 64  
DN IS ASSIGNED AS A DNH HUNT MEMBER (NOT PILOT).  
HUNT GROUP: 22 HUNT MEMBER: 4  
OPTIONS:  
SFC

KEY	DN	
---	--	
1	DN	2257143

KEY FEATURE  
-----  
NONE

PILOT DN: 2257141  
GROUP OPTIONS:  
CIR RCVD

---

QDN 2257144;QLT PSATS 144

---

DN: 2257144  
TYPE: MEMBER OF DNH HUNT GROUP  
SNPA: 201 SIG: N/A LNATTIDX: N/A  
HUNT GROUP: 22 HUNT MEMBER: 3  
LTID: PSATS 144  
LTCLASS: BRAFS  
LINE CLASS CODE: ISDNKSET  
KEY: 1  
CUSTGRP: MDCSCA SUBGRP: O NCOS: O RING: Y  
OPTIONS:  
SFC  
PILOT DN: 2257141  
GROUP OPTIONS:  
CIR RCVD

---

LTID: PSATS 144  
 SNPA: 201  
 DIRECTORY NUMBER: 2257144  
 LT GROUP NO: 13  
 LTCLASS: BRAFS DEFAULT LOGICAL TERMINAL: N  
 EKTS: N CACH: N  
 BEARER SERVICE RESTRICTIONS: NOPMD  
 CS: Y PS: N  
 VERSION: FUNCTIONAL ISSUE: 2  
 SPID-SUFFIX: 01  
 LEN: HOST 01 1 10 01 TEI: DYNAMIC  
 CUSTGRP: MDCSCA SUBGRP: O NCOS: O RING: Y  
 LINE CLASS CODE: ISDNKSET  
 MAXKEYS: 64  
 DN IS ASSIGNED AS A DNH HUNT MEMBER (NOT PILOT).  
 HUNT GROUP: 22 HUNT MEMBER: 3  
 OPTIONS:  
 SFC

KEY	DN	
---	--	
1	DN	2257144

KEY FEATURE  
 ---  
 NONE

PILOT DN: 2257141  
 GROUP OPTIONS:  
 CIR RCVD

QDN 2257145;QLT PSATS 145

DN: 2257145  
 TYPE: MEMBER OF DNH HUNT GROUP  
 SNPA: 201 SIG: N/A LNATTIDX: N/A  
 HUNT GROUP: 22 HUNT HENBER: 2  
 LTID: PSATS 145  
 LTCLASS: BRAFS  
 LINE CLASS CODE: ISDNKSET  
 KEY: 1  
 CUSTGRP: MDCSCA SUBGRP: O NCOS: O RING: Y  
 OPTIONS:  
 SFC  
 PILOT DN: 2257141  
 GROUP OPTIONS:  
 CIR RCVD

## Maintenance and Troubleshooting

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---

LTID: PSATS 145  
SNPA: 201  
DIRECTORY NUMBER: 2257145  
LT GROUP NO: 13  
LTCLASS: BRAFS DEFAULT LOGICAL TERMINAL: N  
EKTS: N CACH: N  
BEARER SERVICE RESTRICTIONS: NOPMD  
CS: Y PS: N  
VERSION: FUNCTIONAL ISSUE: 2  
SPID-SUFFIX: 01  
LEN: HOST 01 1 10 02 TEI: DYNAMIC  
CUSTGRP: MDCSCA SUBGRP: O NCOS: O RING: Y  
LINE CLASS CODE: ISDNKSET  
MAXKEYS: 64  
DN IS ASSIGNED AS A DNH HUNT MEMBER (NOT PILOT).  
HUNT GROUP: 22 HUNT MEMBER: 2  
OPTIONS:  
SFC

KEY	DN	
---	--	
1	DN	2257145

KEY	FEATURE
---	-----
	NONE

PILOT DN: 2257141  
GROUP OPTIONS:  
CIR RCVD

QDN 2257146;QLT PSATS 146

---

DN: 2257146  
TYPE: MEMBER OF DNH HUNT GROUP  
SNPA: 201 SIG: N/A LNATTIDX: N/A  
HUNT GROUP: 22 HUNT MEMBER: 1  
LTID: PSATS 146  
LTCLASS: BRAFS  
LINE CLASS CODE: ISDNKSET  
KEY: 1  
CUSTGRP: MDCSCA SUBGRP: O NCOS: O RING: Y  
OPTIONS:  
SFC  
PILOT DN: 2257141  
GROUP OPTIONS:  
CIR RCVD

---

LTID: PSATS 146  
 SNPA: 201  
 DIRECTORY NUMBER:2257146  
 LT GROUP NO: 13  
 LTCLASS: BRAFS      DEFAULT LOGICAL TERMINAL: N  
 EKTS: N    CACH: N  
 BEARER SERVICE RESTRICTIONS:      NOPMD  
 CS: Y PS: N  
 VERSION: FUNCTIONAL   ISSUE: 2  
 SPID-SUFFIX:         01  
 LEN: HOST 01 0 07 01      TEI: DYNAMIC  
 CUSTGRP:         MDCSCA   SUBGRP: O   NCOS: O   RING: Y  
 LINE CLASS CODE: ISDNKSET  
 MAXKEYS: 64  
 DN IS ASSIGNED AS A DNH HUNT MEMBER (NOT PILOT).  
 HUNT GROUP: 22            HUNT MEMBER: 1  
 OPTIONS:  
 SFC

KEY	DN	
---	--	
1	DN	2257146

KEY FEATURE  
 ---  
 NONE

PILOT DN: 2257141  
 GROUP OPTIONS:  
 CIR RCVD

QLEN 1 1 10 1;QLEN 1 1 10 2;QLEN 1 0 7 1

LEN:         HOST 01 1 10 01  
 ISG: 0 DCH: 1 ISG BRA Channel: 21  
 CARCODE: BX27AA      PADGRP: NPDGP  
 PM NODE NUMBER: 32  
 PM TERMINAL NUMBER:     322

TEI	LTID	CSPSBCH/ISG Bd	
---	-----	--	---
DYNAMIC	PSATS	141	Y N -
DYNAMIC	PSATS	144	Y N -

## Maintenance and Troubleshooting

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---

LEN: HOST 01 1 10 02  
ISG: 0 DCH: 1 ISG BRA Channel: 21  
CARCODE: BX27AA PADGRP: NPDGP  
PM NODE NUMBER: 32  
PM TERMINAL NUMBER: 323

TEI	LTID	CSPSBCH/ISG Bd			
---	-----	--	--	-----	
DYNAMIC	PSATS	142	Y	N	-
DYNAMIC	PSATS	145	Y	N	-

---

LEN: HOST 01 0 07 01  
ISG: 0 DCH: 1 ISG BRA Channel: 24  
CARCODE: BX27AA PADGRP: NPDGP  
PM NODE NUMBER: 31  
PM TERMINAL NUMBER: 226

TEI	LTID	CSPSBCH/ISG Bd			
---	-----	--	--	-----	
DYNAMIC	PSATS	143	Y	N	-
DYNAMIC	PSATS	146	Y	N	-

STOP2

---

---

## Siemens SSC EWSD Switch Translations

For the Siemens SSC EWSD switch, Capability Package "S" includes alternate voice/circuit-switched data on two B-channels. It also supports Calling Number Identification on data and voice connections. Please note that the assignment of two Directory Numbers (DNs) is required for this package.

The Siemens SSC EWSD switch allows either voice or data hunting on one DN using the Series Completion feature. The same provisioning is used for either a voice or data series completion group.

### ISDN Capability Package "S"

The information listed below provides the DN translations that define Capability Package "S," and the screens and fields that must be populated.

The information provided shows the translations for one DSL and two DN. For multiple DSLs/ DN, the central office will duplicate these screens and enter the applicable DSL and DN values as needed.

#### ISDN Ordering Code: Capability S

DISPACCESS:EQN=20-0-5-4;	EXEC'D
ACCESS DATA	MASKNO:04328
	MASKNO:00000
EQN =20-0-5-4,	
CLOSS = 0,	
BCHEQN =2,	
BCEQN = SP & AU3 & C56 & C64,	
CPDDN = 2156855917-VI & 2156855917-CMD,	
CPVDN2 = 2156855917,	
COE = CLASS1,	
LINKOPT = DYNNOPAL,	
BAPROF = 0;	

DISPSUB:DN=6855917;	
NPA = 215    DN = 6855917    EQN = 20-0-5-4	MASKNO:03800
CAT = IBA	MASKNO:03774
BCHDN = 2	MASKNO:03798
BCDN = SP    &AU3    &C56    &C64	MASKNO:04535
CT = VI	MASKNO:04396
LCC = BVCE    RAX = 1	MASKNO:03785
BCHCT = 2	MASKNO:06282
IBCHCT = 2	MASKNO:06288
OBCHCT = 2	MASKNO:06291
PIC = 0288-SP	MASKNO:04398
& 0288-AU3	
CHRG = FRSA1	MASKNO:03775
COS = ICND & RND	MASKNO:03777
CRBLIM = 2	MASKNO:03798
CT = CMD	MASKNO:04396
LCC = BCMD    RAX = 1	MASKNO:03785
BCHCT = 2	MASKNO:06282
IBCHCT = 2	MASKNO:06288
OBCHCT = 2	MASKNO:06291
PIC = 0288-C56	MASKNO:04398
& 0288-C64	
CHRG = FRSA1	MASKNO:03775
COS = ICND    &RND	MASKNO:03777
CRBLM = 2	MASKNO:03798
DISPTSP:TSPID=215685591701	MASKNO:04383
EQN: 20-0-5-4	
USID: 5	
TSPID: 215685591701	
TERMLIM: 1	MASKNO:04386
DN: 6855917	MASKNO:04382
CT: VI	MASKNO:04385
DN: 6855917	MASKNO:04382
CT: CMD	MASKNO:04385

DISPSUB:DN=6855919;  
 NPA = 215 DN = 6855919 EQN = 20-0-5-4MASKNO:03800  
   CAT = IBA MASKNO:03774  
   BCHDN = 2 MASKNO:03798  
   BCDN = SP &AU3 &C56 &C64 MASKNO:04535  
   CT = VI MASKNO:04396  
   LCC =BVCE RAX = 1 MASKNO:03785  
   BCHCT = 2 MASKNO:06282  
   IBCHCT = 2 MASKNO:06288  
   OBCHCT = 2 MASKNO:06291  
   PIC = 0288-SP MASKNO:04398  
     & 0288-AU3  
   CHRG = FRSA1 MASKNO:03775  
   COS = ICND & RND MASKNO:03777  
   CRBLIM = 2 MASKNO:03798  
   CT = CMD MASKNO:04396  
   LCC = BCMD RAX = 1 MASKNO:03785  
   BCHCT = 2 MASKNO:06282  
   IBCHCT = 2 MASKNO:06288  
   OBCHCT = 2 MASKNO:06291  
   PIC = 0288-C56 MASKNO:04398  
     & 0288-C64  
   CHRG = FRSA1 MASKNO:03775  
   COS = ICND &RND MASKNO:03777  
   CRBLIM = 2 MASKNO:03798

DISPTSP:TSPID=215685591901; MASKNO:04383  
 EQN: 20-0-5-4  
 USID: 1  
 TSPID: 215685591901  
 TERMLIM: 1 MASKNO:04386  
 DN: 6855919 MASKNO:04382  
 CT: VI MASKNO:04385  
 DN: 6855919 MASKNO:04382  
 CT: CMD MASKNO:04385

## Series Completion Feature Translations

The information listed below provides the translation for either voice or data hunting on three Digital Subscriber Lines (DSLs) and six Directory Numbers (DNs) forming a circular series completion group.

The screens shown in this section are examples. DNs shown on these screens should be replaced with applicable data.

---

M	NAVK1/BELLCORNJRB/APS 13.0 PS0071/000 0959 OMT-00/LEONLY 2816/04328	96-01-18	16:22:05
	DISPSDNDAT:EQN=20-0-0-1&20-0-5-0&40-0-2-4:		EXEC'D
	ISDN ACCESS DATA		MASKNO:04328 MASKNO:00000
	VIEW = EQN. EQN = 20-0-00-01. BCHEQN = 2. BCEQN = SP. BCEQN = AU3. BCEQN = C56. BCEQN = C64. CPDDN = 2156851189-VI. CPDDN = 2156851189-CMD. COE = CLASS1. LINKOPT = DYNNOPAL. NCCSL = D1--4. NCCSL = D2--4. NPCSL = P1--0. NPCSL = P2--0. NSL = 10. L2TIM = T200-10. L2TIM = T201-10. L2TIM = T203-3. L2COUNT = N200-3. L2COUNT = OIFDCC-1. L2COUNT = OIFDPC-3. CPVDN2 = 2156851189. CPVDN2 = 2156851289:		
	INTERRUPTION TEXT JOB 0959		

CONTINUATION TEXT 0001

M NAVK1/BELLCORNJRB/APS 13.0 PS0071/000  
 0959 OMT-00/LEONLY2816/04328

96-01-18

16:22:08

SUBSCRIBER

MASKNO:04328  
 MASKNO:00000

VIEW = DN.  
 NPA = 215.  
 DN = 6851189.  
 EQN = 20-0-00-01.  
 BCHDN = 2.  
 BCDN = SP.  
 BCDN = AU3.  
 BCDN = C56.  
 BCDN = C64.  
 BCHCT = 2-VI.  
 BCHCT = 2-CMD.  
 BCHCT = 0-PMD.  
 IBCHCT = 2-VI.  
 IBCHCT = 2-CMD.  
 IBCHCT = 0-PMD.  
 OBCHCT = 2-VI.  
 OBCHCT = 2-CMD.  
 OBCHCT = 0-PMD.  
 CT = VI.  
 C1 = CMD:

INTERRUPTION TEXT JOB 0959

CONTINUATION TEXT 0002

M NAVK1/BELLCORNJRB/APS 13.0 PS0071/000  
 0959 OMT-00/LEONLY2816/04328

96-01-18

16:22:31

SUBSCRIBER

MASKNO:04328  
 MASKNO:00000

VIEW = DNCT.  
 NPA = 215.  
 DN = 6851189.  
 EQN = 20-0-00-01.  
 CT = VI.  
 CAT = IBA.  
 LCC = PKGSV.  
 RAX = 1.  
 COS = ICND.  
 COS = RND.  
 COSDAT = SERCOMP-6851289.  
 PIC = 222-SP.  
 PIC = 288-AU3.  
 CRBLIM = 1:

INTERRUPTION TEXT JOB 0959

CONTINUATION TEXT 0003

M NAVK1/BELLCORNJRB/APS 13.0 PS0071/000 96-01-18 16:22:15  
0959 OMT-00/LEONLY2816/04328

SUBSCRIBER

MASKNO:04328  
MASKNO:00000

VIEW = DNCT.  
NPA = 215.  
DN = 6851189.  
EQN = 20-0-00-01.  
CT = CMD.  
CAT = IBA.  
LCC = PKGSD.  
RAX = 1.  
COS = ICND.  
COS = RND.  
COSDAT = SERCOMP-6851289.  
PIC = 222-C56.  
PIC = 288-C64.  
CRBLIM = 1:

INTERRUPTION TEXT JOB 0959

CONTINUATION TEXT 0004

M NAVK1/BELLCORNJRB/APS 13.0 PS0071/000 96-01-18 16:22:19  
0959 OMT-00/LEONLY2816/04328

SUBSCRIBER

MASKNO:04328  
MASKNO:00000

VIEW = DN.  
NPA = 215.  
DN = 6851289.  
EQN = 20-0-00-01.  
BCHDN = 2.  
BCDN = SP.  
BCDN = AU3.  
BCDN = C56.  
BCDN = C64.  
BCHCT = 2-VI.  
BCHCT = 2-CMD.  
BCHCT = 0-PMD.  
IBCHCT = 2-VI.  
IBCHCT = 2-CMD.  
IBCHCT = 0-PMD.  
OBCHCT = 2-VI.  
OBCHCT = 2-CMD.  
OBCHCT = 0-PMD.  
CT = VI.  
CT = CMD:

INTERRUPTION TEXT JOB 0959

CONTINUATION TEXT 0005

M NAVK1/BELLCORNJRB/APS 13.0 PS0071/000 96-01-18 16:22:22  
 0959 OMT-00/LEONLY2816/04328

SUBSCRIBER

MASKNO:04328  
 MASKNO:00000

VIEW = DNCT.  
 NPA = 215.  
 DN = 6851289.  
 EQN = 20-0-00-01.  
 CT = VI.  
 CAT = IBA.  
 LCC = PKGSV.  
 RAX = 1.  
 COS = ICND.  
 COS = RND.  
 COSDAT = SERCOMP-6852199.  
 PIC = 222-SP.  
 PIC = 288-AU3.  
 CRBLIM = 1:

INTERRUPTION TEXT JOB 0959

CONTINUATION TEXT 0006

M NAVK1/BELLCORNJRB/APS 13.0 PS0071/000 96-01-18 16:22:26  
 0959 OMT-00/LEONLY2816/04328

SUBSCRIBER

MASKNO:04328  
 MASKNO:00000

VIEW = DNCT.  
 NPA = 215.  
 DN = 6851289.  
 EQN = 20-0-00-01.  
 CT = CMD.  
 CAT = IBA.  
 LCC = PKGSD.  
 RAX = 1.  
 COS = ICND.  
 COS = RND.  
 COSDAT = SERCOMP-6852199.  
 PIC = 222-C56.  
 PIC = 288-C64.  
 CRBLIM = 1:

INTERRUPTION TEXT JOB 0959

CONTINUATION TEXT 0007  
M NAVK1/BELLCORNJRB/APS 13.0 PS0071/000 96-01-18 16:22:29  
0959 OMT-00/LEONLY2816/04328  
  
TERMINAL SERVICE PROFILE DATAMASKNO:04328  
MASKNO:00000  
  
VIEW = TSP.  
EQN = 20-0-00-01.  
USID = 1.  
TSPID = 2156851189.  
TERMLIM = 1.  
TSPCOS = CHDBCHR:  
INTERRUPTION TEXT JOB 0959

CONTINUATION TEXT 0008  
M NAVK1/BELLCORNJRB/APS 13.0 PS0071/000 96-01-18 16:22:32  
0959 OMT-00/LEONLY2816/04328  
  
TERMINAL SERVICE PROFILE DATA  
MASKNO:04328  
MASKNO:00000  
  
VIEW = TSPDNCT.  
EQN = 20-0-00-01.  
TSPID = 2156851189.  
NPA = 215.  
DN = 6851189.  
CT= VI:  
INTERRUPTION TEXT JOB 0959

CONTINUATION TEXT 0009  
M NAVK1/BELLCORNJRB/APS 13.0 PS0071/000 96-01-18 16:22:35  
0959 OMT-00/LEONLY2816/04328  
  
TERMINAL SERVICE PROFILE DATA  
MASKNO:04328  
MASKNO:00000  
  
VIEW = TSPDNCT.  
EQN = 20-0-00-01.  
TSPID = 2156851189.  
NPA = 215.  
DN = 6851189.  
CT= CMD:  
INTERRUPTION TEXT JOB 0959

CONTINUATION TEXT 0010

M NAVK1/BELLCORNJRB/APS 13.0 PS0071/000 96-01-18 16:22:38  
 0959 OMT-00/LEONLY2816/04328

TERMINAL SERVICE PROFILE DATA

MASKNO:04328  
 MASKNO:00000

VIEW = TSP.  
 EQN = 20-0-00-01.  
 USID = 2.  
 TSPID = 2156851289.  
 TERMLIM = 1.  
 TSPCOS = CHDBCHR:

INTERRUPTION TEXT JOB 0959

CONTINUATION TEXT 0011

M NAVK1/BELLCORNJRB/APS 13.0 PS0071/000 96-01-18 16:22:40  
 0959 OMT-00/LEONLY2816/04328

ISDN ACCESS DATA

MASKNO:04328  
 MASKNO:00000

VIEW = EQN.  
 EQN = 20-0-05-01.  
 BCHEQN = 2.  
 BCEQN = SP.  
 BCEQN = AU3.  
 BCEQN = C56.  
 BCEQN = C64.  
 CPDDN = 2156852199-VI.  
 CPDDN = 2156852199-CMD.  
 COE = CLASS1.  
 LINKOPT = DYNNOPAL.  
 NCCSL = D1--4.  
 NCCSL = D2--4.  
 NPCSL = P1--0.  
 NPCSL = P2--0.  
 NSL = 10.  
 L2TIM = T200-10.  
 L2TIM = T201-10.  
 L2TIM = T203-3.  
 L2COUNT = N200-3.  
 L2COUNT = OIFDCC-1.  
 L2COUNT = OIFDPC-3.  
 CPVDN2 = 2156852199.  
 CPVDN2 = 2156852299:

INTERRUPTION TEXT JOB 0959

CONTINUATION TEXT 0012

M NAVK1/BELLCORNJRB/APS 13.0 PS0071/000 96-01-18 16:22:44  
0959 OMT-00/LEONLY2816/04328

SUBSCRIBER

MASKNO:04328  
MASKNO:00000

VIEW = DN.  
NPA = 215.  
DN = 6852199.  
EQN = 20-0-05-00.  
BCHDN = 2.  
BCDN = SP.  
BCDN = AU3.  
BCDN = C56.  
BCDN = C64.  
BCHCT = 2-VI.  
BCHCT = 2-CMD.  
BCHCT = 0-PMD.  
IBCHCT = 2-VI.  
IBCHCT = 2-CMD.  
IBCHCT = 0-PMD.  
OBCHCT = 2-VI.  
OBCHCT = 2-CMD.  
OBCHCT = 0-PMD.  
CT = VI.  
CT = CMD:

INTERRUPTION TEXT JOB 0959

CONTINUATION TEXT 0013

M NAVK1/BELLCORNJRB/APS 13.0 PS0071/000 96-01-18 16:22:48  
0959 OMT-00/LEONLY2816/04328

SUBSCRIBER

MASKNO:04328  
MASKNO:00000

VIEW = DNCT.  
NPA = 215.  
DN = 6852199.  
EQN = 20-0-05-00.  
CT = VI.  
CAT = IBA.  
LCC = PKGSV.  
RAX = 1.  
COS = ICND.  
COS = RND.  
COSDAT = SERCOMP-6852299.  
PIC = 222-SP.  
PIC = 288-AU3.  
CRBLIM = 1:

INTERRUPTION TEXT JOB 0959

CONTINUATION TEXT 0014

M NAVK1/BELLCORNJRB/APS 13.0 PS0071/000 96-01-18 16:22:51  
 0959 OMT-00/LEONLY2816/04328

SUBSCRIBER

MASKNO:04328  
 MASKNO:00000

VIEW = DNCT.  
 NPA = 215.  
 DN = 6852199.  
 EQN = 20-0-05-00.  
 CT = CMD.  
 CAT = IBA.  
 LCC = PKGSD.  
 RAX = 1.  
 COS = ICND.  
 COS = RND.  
 COSDAT = SERCOMP-6852299.  
 PIC = 222-C56.  
 PIC = 288-C64.  
 CRBLIM = 1:

INTERRUPTION TEXT JOB 0959

CONTINUATION TEXT 0015

M NAVK1/BELLCORNJRB/APS 13.0 PS0071/000 96-01-18 16:22:55  
 0959 OMT-00/LEONLY2816/04328

SUBSCRIBER

MASKNO:04328  
 MASKNO:00000

VIEW = DN.  
 NPA = 215.  
 DN = 6852299.  
 EQN = 20-0-05-00.  
 BCHDN = 2.  
 BCDN = SP.  
 BCDN = AU3.  
 BCDN = C56.  
 BCDN = C64.  
 BCHCT = 2-VI.  
 BCHCT = 2-CMD.  
 BCHCT = 0-PMD.  
 IBCHCT = 2-VI.  
 IBCHCT = 2-CMD.  
 IBCHCT = 0-PMD.  
 OBCHCT = 2-VI.  
 OBCHCT = 2-CMD.  
 OBCHCT = 0-PMD.  
 CT = VI.  
 CT = CMD:

INTERRUPTION TEXT JOB 0959

CONTINUATION TEXT 0016

M NAVK1/BELLCORNJRB/APS 13.0 PS0071/000 96-01-18 16:22:58  
0959 OMT-00/LEONLY2816/04328

SUBSCRIBER

MASKNO:04328  
MASKNO:00000

VIEW = DNCT.  
NPA = 215.  
DN = 6852299.  
EQN = 20-0-05-00.  
CT = VI.  
CAT = IBA.  
LCC = PKGSV.  
RAX = 1.  
COS = ICND.  
COS = RND.  
COSDAT = SERCOMP-6853119.  
PIC = 222-SP.  
PIC = 288-AU3.  
CRBLIM = 1:

INTERRUPTION TEXT JOB 0959

CONTINUATION TEXT 0017

M NAVK1/BELLCORNJRB/APS 13.0 PS0071/000 96-01-18 16:23:01  
0959 OMT-00/LEONLY2816/04328

SUBSCRIBER

MASKNO:04328  
MASKNO:00000

VIEW = DNCT.  
NPA = 215.  
DN = 6852299.  
EQN = 20-0-05-00.  
CT = CMD.  
CAT = IBA.  
LCC = PKGSD.  
RAX = 1.  
COS = ICND.  
COS = RND.  
COSDAT = SERCOMP-6853119.  
PIC = 222-C56.  
PIC = 288-C64.  
CRBLIM = 1:

INTERRUPTION TEXT JOB 0959

CONTINUATION TEXT 0018  
 NAVK1/BELLCORNJRB/APS 13.0 PS0071/000 96-01-18 16:23:05  
 M 0959 OMT-00/LEONLY2816/04328  
 TERMINAL SERVICE PROFILE DATA MASKNO:04328  
 MASKNO:00000  
 VIEW = TSP.  
 EQN = 20-0-05-00.  
 USID = 1.  
 TSPID = 2156852199.  
 TERMLIM = 1.  
 TSPCOS = CHDBCHR:  
 INTERRUPTION TEXT JOB 0959

CONTINUATION TEXT 0019  
 NAVK1/BELLCORNJRB/APS 13.0 PS0071/000 96-01-18 16:23:07  
 M 0959 OMT-00/LEONLY2816/04328  
 TERMINAL SERVICE PROFILE DATA MASKNO:04328  
 MASKNO:00000  
 VIEW = TSPDNCT.  
 EQN = 20-0-05-00.  
 TSPID = 2156852199.  
 NPA = 215.  
 DN = 6852199.  
 CT= VI:  
 INTERRUPTION TEXT JOB 0959

CONTINUATION TEXT 0020  
 NAVK1/BELLCORNJRB/APS 13.0 PS0071/000 96-01-18 16:23:11  
 M 0959 OMT-00/LEONLY2816/04328  
 TERMINAL SERVICE PROFILE DATA MASKNO:04328  
 MASKNO:00000  
 VIEW = TSPDNCT.  
 EQN = 20-0-05-00.  
 TSPID = 2156852199.  
 NPA = 215.  
 DN = 6852199.  
 CT= CMD:  
 INTERRUPTION TEXT JOB 0959

CONTINUATION TEXT 0021

M NAVK1/BELLCORNJRB/APS 13.0 PS0071/000 96-01-18 16:23:13  
0959 OMT-00/LEONLY2816/04328

TERMINAL SERVICE PROFILE DATA

MASKNO:04328  
MASKNO:00000

VIEW = TSP.  
EQN = 20-0-05-00.  
USID = 2.  
TSPID = 2156852299.  
TERMLIM = 1.  
TSPCOS = CHDBCHR:

INTERRUPTION TEXT JOB 0959

CONTINUATION TEXT 0022

M NAVK1/BELLCORNJRB/APS 13.0 PS0071/000 96-01-18 16:23:16  
0959 OMT-00/LEONLY2816/04328

ISDN ACCESS DATA

MASKNO:04328  
MASKNO:00000

VIEW = EQN.  
EQN = 40-0-02-04.  
BCHEQN = 2.  
BCEQN = SP.  
BCEQN = AU3.  
BCEQN = C56.  
BCEQN = C64.  
CPDDN = 2156853119-VI.  
CPDDN = 2156853119-CMD.  
COE = CLASS1.  
LINKOPT = DYNNOPAL.  
NCCSL = D1--4.  
NCCSL = D2--4.  
NPCSL = P1--0.  
NPCSL = P2--0.  
NSL = 10.  
L2TIM = T200-10.  
L2TIM = T201-10.  
L2TIM = T203-3.  
L2COUNT = N200-3.  
L2COUNT = OIFDCC-1.  
L2COUNT = OIFDPC-3.  
CPVDN2 = 2156853119.  
CPVDN2 = 2156853219:

INTERRUPTION TEXT JOB 0959

CONTINUATION TEXT 0023

M NAVK1/BELLCORNJRB/APS 13.0 PS0071/000  
 0959 OMT-00/LEONLY2816/04328

96-01-18

16:23:20

SUBSCRIBER

MASKNO:04328  
 MASKNO:00000

VIEW = DN.  
 NPA = 215.  
 DN = 6853119.  
 EQN = 40-0-02-04.  
 BCHDN = 2.  
 BCDN = SP.  
 BCDN = AU3.  
 BCDN = C56.  
 BCDN = C64.  
 BCHCT = 2-VI.  
 BCHCT = 2-CMD.  
 BCHCT = 0-PMD.  
 IBCHCT = 2-VI.  
 IBCHCT = 2-CMD.  
 IBCHCT = 0-PMD.  
 OBCHCT = 2-VI.  
 OBCHCT = 2-CMD.  
 OBCHCT = 0-PMD.  
 CT = VI.  
 CT = CMD:

INTERRUPTION TEXT JOB 0959

CONTINUATION TEXT 0024

M NAVK1/BELLCORNJRB/APS 13.0 PS0071/000  
 0959 OMT-00/LEONLY2816/04328

96-01-18

16:23:23

SUBSCRIBER

MASKNO:04328  
 MASKNO:00000

VIEW = DNCT.  
 NPA = 215.  
 DN = 6853119.  
 EQN = 40-0-02-04.  
 CT = VI.  
 CAT = IBA.  
 LCC = PKGSV.  
 RAX = 1.  
 COS = ICND.  
 COS = RND.  
 COSDAT = SERCOMP-6853219.  
 PIC = 222-SP.  
 PIC = 288-AU3.  
 CRBLIM = 1:

INTERRUPTION TEXT JOB 0959

CONTINUATION TEXT 0025

M NAVK1/BELLCORNJRB/APS 13.0 PS0071/000 96-01-18 16:23:27  
0959 OMT-00/LEONLY2816/04328

SUBSCRIBER

MASKNO:04328  
MASKNO:00000

VIEW = DNCT.  
NPA = 215.  
DN = 6853119.  
EQN = 40-0-02-04.  
CT = CMD.  
CAT = IBA.  
LCC = PKGSD.  
RAX = 1.  
COS = ICND.  
COS = RND.  
COSDAT = SERCOMP-6853219.  
PIC = 222-C56.  
PIC = 288-C64.  
CRBLIM = 1:

INTERRUPTION TEXT JOB 0959

CONTINUATION TEXT 0026

M NAVK1/BELLCORNJRB/APS 13.0 PS0071/000 96-01-18 16:23:30  
0959 OMT-00/LEONLY2816/04328

SUBSCRIBER

MASKNO:04328  
MASKNO:00000

VIEW = DN.  
NPA = 215.  
DN = 6853219.  
EQN = 40-0-02-04.  
BCHDN = 2.  
BCDN = SP.  
BCDN = AU3.  
BCDN = C56.  
BCDN = C64.  
BCHCT = 2-VI.  
BCHCT = 2-CMD.  
BCHCT = 0-PMD.  
IBCHCT = 2-VI.  
IBCHCT = 2-CMD.  
IBCHCT = 0-PMD.  
OBCHCT = 2-VI.  
OBCHCT = 2-CMD.  
OBCHCT = 0-PMD.  
CT = VI.  
CT = CMD:

INTERRUPTION TEXT JOB 0959

CONTINUATION TEXT 0027

M NAVK1/BELLCORNJRB/APS 13.0 PS0071/000 96-01-18 16:23:34  
 0959 OMT-00/LEONLY2816/04328

SUBSCRIBER

MASKNO:04328  
 MASKNO:00000

VIEW = DNCT.  
 NPA = 215.  
 DN = 6853219.  
 EQN = 40-0-02-04.  
 CT = VI.  
 CAT = IBA.  
 LCC = PKGSV.  
 RAX = 1.  
 COS = ICND.  
 COS = RND.  
 COSDAT = SERCOMP-6851189.  
 PIC = 222-SP.  
 PIC = 288-AU3.  
 CRBLIM = 1:

INTERRUPTION TEXT JOB 0959

CONTINUATION TEXT 0028

M NAVK1/BELLCORNJRB/APS 13.0 PS0071/000 96-01-18 16:23:37  
 0959 OMT-00/LEONLY2816/04328

SUBSCRIBER

MASKNO:04328  
 MASKNO:00000

VIEW = DNCT.  
 NPA = 215.  
 DN = 6853219.  
 EQN = 40-0-02-04.  
 CT = CMD.  
 CAT = IBA.  
 LCC = PKGSD.  
 RAX = 1.  
 COS = ICND.  
 COS = RND.  
 COSDAT = SERCOMP-6851189.  
 PIC = 222-C56.  
 PIC = 288-C64.  
 CRBLIM = 1:

INTERRUPTION TEXT JOB 0959

CONTINUATION TEXT 0029  
M NAVK1/BELLCORNJRB/APS 13.0 PS0071/000 96-01-18 16:23:40  
0959 OMT-00/LEONLY2816/04328

TERMINAL SERVICE PROFILE DATA MASKNO:04328  
MASKNO:00000

VIEW = TSP.  
EQN = 40-0-02-04.  
USID = 1.  
TSPID = 2156853119.  
TERMLIM = 1.  
TSPCOS = CHDBCHR:

INTERRUPTION TEXT JOB 0959

CONTINUATION TEXT 0030  
M NAVK1/BELLCORNJRB/APS 13.0 PS0071/000 96-01-18 16:23:43  
0959 OMT-00/LEONLY2816/04328

TERMINAL SERVICE PROFILE DATA MASKNO:04328  
MASKNO:00000

VIEW = TSPDNCT.  
EQN = 40-0-02-04.  
TSPID = 2156853119.  
NPA = 215.  
DN = 6853119.  
CT= VI:

INTERRUPTION TEXT JOB 0959

CONTINUATION TEXT 0031  
M NAVK1/BELLCORNJRB/APS 13.0 PS0071/000 96-01-18 16:23:46  
0959 OMT-00/LEONLY2816/04328

TERMINAL SERVICE PROFILE DATA MASKNO:04328  
MASKNO:00000

VIEW = TSPDNCT.  
EQN = 40-0-02-04.  
TSPID = 2156853119.  
NPA = 215.  
DN = 6853119.  
CT= CMD:

INTERRUPTION TEXT JOB 0959

CONTINUATION TEXT 0032  
M NAVK1/BELLCORNJRB/APS 13.0 PS0071/000 96-01-18 16:23:49  
0959 OMT-00/LEONLY2816/04328

TERMINAL SERVICE PROFILE DATA MASKNO:04328  
MASKNO:00000

VIEW = TSP.  
EQN = 40-0-02-04.  
USID = 2.  
TSPID = 2156853219.  
TERMLIM = 1.  
TSPCOS = CHDBCHR:

END JOB 0959 EXEC'D









# Glossary

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**NOTE** ► The use of italics in this glossary denotes a cross-reference to other glossary entries or the expanded name for an acronym.

## Numerics

### **2B Data**

Digital information carried by two *B-Channels* for better performance and quality; the *Bit Rate* is twice that of one B-channel used alone.

### **4400-Series Telephones**

A family of digital multiline and digital single-line telephones.

## A

### **Account Code**

Code used to associate incoming and outgoing calls with corresponding accounts, employees, projects, and clients.

### **ACCUNET**

AT&T's switched digital service for 56-kbps, 64-kbps restricted, and 64-kbps clear circuit-switched data calls.

### **Address**

Coded representation of the destination of data or of the data's originating terminal, such as the dialed extension number assigned to the data terminal. Multiple terminals on one communications line each must have a unique address.

### **ADDS**

*Automated Document Delivery System*. Computer-based application that stores documents in a database and automatically faxes them on request.

### **Adjunct**

Optional equipment used with the communications system, such as an alerting device or *Modem* that connects to a multiline telephone or to an extension jack.

### **ALS**

*Automatic Line Selection*. Programmed order in which the system makes outside lines available to a user.

### **Ambiguous Numbering**

Numbering of extension ranges, remote access codes, or other system components that causes conflicts in network operations. These numbers can be unique and still be ambiguous. For example, Extension 441 is different from Extension 4410; for *UDP* routing purposes, however, the two numbers are ambiguous and a call intended for Extension 4410 would be misrouted, on the first three digits sent, to Extension 441. See also *Unambiguous Numbering*.

### **AMI**

*Alternate Mark Inversion*. Line coding format in which a binary one is represented by a positive or negative pulse, a binary zero is represented by no line signal, and subsequent binary ones must alternate in polarity; otherwise, a *Bipolar Violation* occurs. AMI is used in the *DS1* interface.

### **Analog Data Station**

See *Modem Data Station*.

### **Analog Transmission**

Mode of transmission in which information is represented in continuously variable physical quantities, such as amplitude, frequency, phase, or resistance. See also *Digital Transmission*.

### **ANI**

*Automatic Number Identification*. Process of automatically identifying a caller's billing number and transmitting that number from the caller's local central office to another point on or off the public network.

### **Application**

Software and/or hardware that adds functional capabilities to the system. For example, MERLIN MAGIX Reporter is an application that provides call management information (if available in the local area or jurisdiction).

### **ARS**

*Automatic Route Selection*. System feature that routes calls on outside facilities according to the number dialed and line/trunk availability. To initiate ARS, the user dials a *Dial-Out Code*, also called an "*ARS* access code."

### **ASCAP**

*American Society of Composers, Artists, and Producers*.

### **Ascend Pipeline**

ISDN-BRI bridge/router that enables high-speed Internet access over a digital facility. It makes outgoing calls only.

**ASN**

*AT&T Switched Network*. AT&T telecommunications services provided through an Integrated Digital Services Network Primary Rate Interface (ISDN-PRI) trunk, *ACCUNET* switched digital service, *Megacom*, *Megacom 800*, Software Defined Network (*SDN*), Multiquest, and Shared Access for Switch Services (SASS).

**Asynchronous Data Transmission**

Method of transmitting a short bitstream of digital data, such as printable characters represented by a 7- or 8-*Bit* ASCII code. Each string of data bits is preceded by a start bit and followed by a stop bit, thus permitting data to be transmitted at irregular intervals. See also *Synchronous Data Transmission*.

**AT&T Attendant**

Application with equipment that connects to one or more *Tip/Ring* extension jacks and automatically answers incoming calls with a recorded announcement; directs calls in response to touch tones.

**AT&T Switched Network**

See *ASN*.

**Automated Attendant**

An application that automatically answers incoming calls with a recorded announcement and directs callers to a department, an extension, or the system operator.

**Automated Document Delivery System**

See *ADDS*.

**Automatic Immediate Cycling**

Process that occurs in a *Private Network* when all available routes for a call specify systems with a matching *Switch Identifier*. The call is routed from the originating system to the destination system and back to the originating system in a continuous loop. *Switch Identifier* labeling systems must be unique across a network.

**Automatic Line Selection**

See *ALS*.

**Automatic Number Identification**

See *ANI*.

**Automatic Ringdown Tie-Trunk**

See *Automatic-Start Tie Trunk*.

**Automatic Route Selection**

See *ARS*.

### **Automatic-Start Tie Trunk**

*Tie Trunk* on which incoming calls are routed to an operator or other designated destination without a start signal, as soon as the trunk is seized; the destination is specified during programming. Also called “Automatic Ringdown” or “Auto-In” Tie Trunk.

## **B**

### **B8ZS**

*Bipolar 8 Zero Substitution*. Line-coding format that encodes a string of eight zeros in a unique binary sequence to detect bipolar violations.

### **Backup**

Procedure for saving a copy of system programming onto a floppy disk or *Memory Card*. See also *Restore*.

### **Bandwidth**

Difference, expressed in hertz, between the highest and lowest frequencies in a range that determines channel capacity.

### **Barrier Code**

Password used to limit access to the *Remote Access* feature of the system. In a *Private Network*, it is especially important that barrier codes be required for all types of remote access.

### **Basic Carrier**

Hardware that holds and connects the *Processor Module*, *Power Supply Module*, and up to five other modules in the system. See also *Expansion Carrier*.

### **Baud Rate**

Strictly speaking, a measurement of transmission speed equal to the number of signal level changes per second. In practice, often used synonymously with *Bit Rate* and *bps*.

### **B-Channels**

*Bearer-Channel*. 64- or 56-kbps channel that carries a variety of digital information streams, such as voice at 64 kbps, data at up to 64 kbps, wideband voice encoded at 64 kbps, and voice at less than 64 kbps, alone or combined.

### **Basic Rate Interface**

See *BRI*.

### **Bearer-Channel**

See *B-Channels*.

**Behind Switch Mode**

One of three modes of system operation in which the control unit is connected to (behind) another telephone switching system, such as *Centrex* or DEFINITY, which provides features and services to telephone users. See also *Hybrid/PBX Mode* and *Key Mode*.

**Binary Code**

Electrical representation of quantities or symbols expressed in the base-2 number system, which includes zeros and ones.

**Bipolar 8 Zero Substitution**

See *B8ZS*.

**Bipolar Signal**

Digital signal in which pulses (ones) alternate between positive and negative. See also *AMI*, *B8ZS*, and *Bipolar Violation*.

**Bipolar Violation**

Condition occurring when two positive or two negative pulses are received in succession. See also *AMI* and *B8ZS*.

**Bit**

*Binary Digit*. One unit of information in binary notation; it can have one of two values—zero or one.

**Bit Rate**

Speed at which bits are transmitted, usually expressed in *bps*. Also called “data rate.”

**Blocking**

Condition in which end-to-end connections cannot be made on calls because of a full load on all possible services and facilities. See also *Glare*.

**BMI**

*Broadcast Music Incorporated*.

**Board**

Module—for example, 100D or 408 MLX GS/LS—that allows you to connect lines/trunks and extensions to the communications system.

**Board Assignment**

System Programming and Maintenance (SPM) procedure for assigning line/trunk and extension modules to slots on the control unit.

### **Board Renumbering**

System programming procedure for renumbering boards that have already been assigned to specific slots on the control unit.

### **bps**

*Bits per second.*

### **BRI**

*Basic Rate Interface.* Standard protocol for accessing Integrated Service Digital Network (ISDN) services.

### **Broadband**

Transmission path having a bandwidth greater than a voice-grade channel.

### **Bus**

Multiconductor electrical path used to transfer information over a common connection from any of several sources to any of several destinations.

### **Business Cordless 905**

Wireless, multiline telephone that connects to an ETR port.

### **Button**

Key on the face of a telephone that is used to access a line, activate a feature, or enter a code on a communications system.

### **Byte**

Sequence of eight *Bits* processed together. Also called "octet."

## **C**

### **Call Accounting System**

See *CAS*.

### **Call Accounting Terminal**

See *CAT*.

### **Caller ID**

Service provided by some local telephone companies (if local regulations allow) that supplies the calling party telephone number and name. An 800 GS/LS-ID, 408 GS/LS-ID-MLX, or 412 LS-ID-TDL module can capture both the number and name of the calling party and display them on the screens of 44xx, MLX, ETR, and MLS telephones. See also *ANI*.

**Calling Group**

Team of individuals who answer the same types of calls.

**Calling Party Name on Caller ID**

This central office service allows a subscriber to view the name of the calling party on a 44xx, MLX, ETR, or MLS display telephone.

**Calling Party Number on Caller ID**

This central office service allows a subscriber to view the number of the calling party on a 44xx, MLX, ETR, or MLS display telephone.

**CAS**

*Call Accounting System*. DOS- or UNIX System-based application that monitors and manages telecommunications costs.

**CAT**

*Call Accounting Terminal*. Stand-alone unit with a built-in microprocessor and data buffer that provides simple call accounting at a low cost.

**CCITT**

*International Telegraph and Telephone Consultative Committee*.

**CCS**

*Common Channel Signaling*. Signaling in which one channel of a group of channels carries signaling information for each of the remaining channels, permitting each of the remaining channels to be used to nearly full capacity. In the system's 100D module, channel 24 can be designated as the signaling channel for channels 1–23.

**Centralized Telephone Programming**

Programming of features on individual telephones; performed at a central location by the system manager. See also *System Programming* and *Extension Programming*.

**Centralized Voice Messaging**

Sharing of a voice messaging system by two or more directly connected MERLIN MAGIX, MERLIN LEGEND (Release 6.1 or higher), DEFINITY ECS, DEFINITY BCS, or DEFINITY ProLogix Solutions systems in a *Private Network*.

**Central Office**

See *CO*.

**Centrex**

Set of system features to which a user can subscribe on telephone trunks from the local telephone company.

**Channel**

Telecommunications transmission path for voice and/or data.

**Channel Service Unit**

See [CSU](#).

**Checksum**

Sum of ones in a sequence of ones and zeros, used to detect or correct errors in data transmission.

**Circuit-Switched Data Call**

Data call made through an exclusively established and maintained connection between [Data Stations](#).

**Class of Restriction**

See [COR](#).

**Clear Data Channel**

Clear data channels (also called unrestricted data channels) allow the transmission of occurrences of more than seven contiguous zero bits. If a clear data channel is requested and only restricted channels are available, the call will be rejected. See also [Restricted Data Channel](#).

**Clock Synchronization**

When digital signals are transmitted over a communications link, the receiving end must be synchronized with the transmitting end to receive the digital signals without errors using clock synchronization. A system synchronizes itself by extracting a timing signal from an incoming digital stream. All the digital facilities in a network operate from a single common clock—preferably a port connected to a digital [PSTN](#) facility on a [Hub System](#) or a system that connects two network systems. In this case, all digital facilities specify a loop clock source. One system in a network may be specified as a local clock source when no functioning digital facility in the network is connected to the [PSTN](#). All other digital facilities then use this clock and specify their clock sources as loop. Primary, secondary, and tertiary clock sources are specified to allow backup synchronization in the event that the primary source is out of service.

**CO**

[Central Office](#). Location of telephone switching equipment that provides local telephone service and access to toll facilities for long-distance calling.

**Coaxial Cable**

Cable consisting of one conductor, usually a small copper tube or wire within, and insulated from, another conductor of larger diameter—usually copper tubing or copper braid.

**Codec**

*Coder-Decoder*. Device used to convert analog signals— such as speech, music, or television—to digital form for transmission over a digital medium and back to the original analog form.

**Collected Digits**

Digits that a caller dials in response to an integrated voice response application's menu; collected digits may be used to initiate a *Screen Pop* at a system extension. See also *CTI Link* and *Enhanced Customer Care Solution*.

**Combination Configuration**

*Private Network* arrangement that combines characteristics of *Virtual Private Network (VPN)*, a *Series Configuration*, and a *Star Configuration*.

**Common Channel Signaling**

See *CCS*.

**Control Unit**

*Processor Module*, *Power Supply Module*, other *Modules*, carriers, and housing of the system.

**Console**

Telephone and *Adjuncts* (if any) at an operator or system programmer extension.

**CONVERSANT**

Entry-level voice response application that automatically answers and routes calls and executes telephone transactions.

**Conversion Resource**

See *Modem Pool*.

**Coordinating System Manager**

In a *Private Network* that includes more than two systems, the system manager who acts as a clearinghouse for any changes made on local systems that affect the network, assuring that all system managers work together and that local system changes do not have undesirable effects on the network as a whole.

## **COR**

*Class of Restriction.* Various types of restrictions that can be assigned to *Remote Access* trunks or barrier codes. These restrictions consist of calling restrictions, *ARS* Facility Restriction Levels (*FRLs*), Allowed Lists, Disallowed Lists, and Automatic Callback queuing.

## **Coverage**

Set of system features that can determine how an extension's calls are covered when the person at the extension is busy or not available.

## **CRC**

*Cyclic Redundancy Check.* Error-detection code used on *DS1* facilities with the extended superframe format (*ESF*).

## **CSU**

*Channel Service Unit.* Equipment used on customer premises to provide *DS1* facility terminations and signaling compatibility.

## **CTI Link**

*Computer Telephony Integration.* Hardware/software feature that is part of the PassageWay Telephony Services application. It allows the use of Lucent Technologies-certified software applications on a *LAN* running Novell NetWare or Windows NT software in a *Hybrid/PBX Mode* system. These applications may provide special features for client control of such calling activities as power dialing. See also *Screen Pop*.

## **Cyclic Redundancy Check**

See *CRC*.

# **D**

## **D4 Framing Format**

*Framing Format* consisting of a sequence of individual frames of 24 eight-*Bit* slots and one signal bit (193 bits) in a 12-frame superframe. See also *ESF*.

## **Data-Channel**

See *D-Channel*.

## **Data Communications Equipment**

See *DCE*.

**Data Module**

Type of *ISDN Terminal Adapter* that acts as the *DCE* at a *Data Workstation* that communicates over high-speed *Digital* facilities.

**Data Rate**

See *bps*.

**Data Station**

Special type of extension where data communications take place; includes *DTE* and *DCE*; sometimes a telephone is also part of a data station.

**Data Terminal**

Input/output device (often a personal computer) that can be connected to the control unit via an interface.

**Data Terminal Equipment**

See and *Data Terminal*.

**Data Workstation**

Special type of extension where data communications take place; includes *DTE* and *DCE*; sometimes a telephone is also part of a data workstation.

**DCE**

*Data Communications Equipment*. Equipment, such as *Modems* or ISDN terminal adapters, used to establish, maintain, and terminate a connection between the system and data terminal equipment (*DTE*)—such as printers, personal computers, host computers, or network workstations.

**DCP**

*Digital Communications Protocol*. AT&T proprietary protocol to transmit digitized voice and data over the same communications link.

**D-Channel**

*Data-Channel*. 16- or 64-kbps channel that carries signaling information or data on a *PRI* or *BRI*.

**Dedicated Feature Buttons**

The imprinted feature buttons on a telephone: for example, Conf or Conference, Drop, Feature, HFAI (Hands-Free Answer on Intercom), Hold, Message, Mute or Microphone, Recall, Speakerphone or Spkrphone, and Transfer.

**Delay-Start Tie Trunk**

*Tie Trunk* or *Tandem Tie Trunk* on which the originating end of the tie trunk transmits an off-hook signal to the receiving end and waits for the receiving end to send an off-hook signal followed by an on-hook signal. Also called “dial-repeating tie trunk.”

### **Desktop Videoconferencing System**

System application that allows face-to-face, simultaneous video and voice communications between individuals and requires high-speed data transmission facilities. See also *Group Videoconferencing System*.

### **DFT**

*Direct Facility Termination*. See *Personal Line*.

### **DHG**

*Data Hunt Group*. Group of analog or digital *Data Station* that share a common access code. Calls are connected in a round-robin fashion to the first available data station in the group.

### **Dial Access**

See *Feature Code*.

### **Dialed Number Identification Service**

See *DNIS*.

### **Dial-Out Code**

Digit (usually a 9) or digits dialed by telephone users to get an outside line.

### **Dial Plan**

Numbering scheme for system extensions, lines, and trunks.

### **Dial-Repeating Tie Trunk**

*Tie Trunk* on which the originating end of the tie trunk transmits an off-hook signal to the receiving end and waits for the receiving end to send an off-hook signal followed by an on-hook signal.

### **DID**

*Direct Inward Dial*. Service that transmits from the telephone company central office and routes incoming calls directly to the called extension, *Calling Group*, or outgoing line/trunk *Pool*, bypassing the system operator.

### **DID Trunk**

Incoming trunk that receives dialed digits from the local exchange, allowing the system to connect directly to an extension without assistance from the system operator.

### **Digital**

Representation of information in discrete elements—such as off and on or zero and one. See also *Analog Transmission*.

**Digital Communications Protocol**

See [DCP](#).

**Digital Data Station**

See [ISDN Terminal Adapter Data Station](#).

**Digital Signal 0**

See [DS0](#).

**Digital Signal 1**

See [DS1](#).

**Digital Subscriber Line**

See [DSL](#).

**Digital Transmission**

Mode of transmission in which the information to be transmitted is first converted to digital form and then transmitted as a serial stream of pulses. See also [Analog Transmission](#).

**DIP Switch**

[Dual In-line Package](#). Switch on a 400EM module used to select the signaling format for tie-line transmission. Also used on other equipment for setting hardware options.

**Direct Facility Termination**

[DFT](#). See [Personal Line](#).

**Direct Inward Dial**

See [DID](#).

**Direct-Line Console**

See [DLC](#).

**Direct Station Selector**

See [DSS](#).

**Display Buttons**

Buttons on a 4412D+, 4424D+, 4424LD+, or MLX display telephone used to access the telephone's display.

### **DLC**

*Direct-Line Console.* Telephone used by a system operator to answer outside calls (not directed to an individual or a group) and inside calls, to transfer calls, to make outside calls for users with outward calling restrictions, to set up conference calls, and to monitor system operation.

### **DNIS**

*Dialed Number Identification Service.* Service provided by AT&T and MCI to route incoming 800 or 900 calls according to customer-selected parameters, such as area code, state, or time of call.

### **Door Answering Unit**

Device connected to a *Tip/Ring* jack and used at an unattended extension or front desk.

### **DOS**

*Disk Operating System.*

### **Drop-and-Insert Equipment**

Device that can be installed between systems connected by *Tandem PRI Trunks* or T1-Emulated *Tandem Tie Trunks* to allow fractional use of the facility—that is, use of fewer than 23 of the PRI *B-Channels* or fewer than 24 of the T1 *Channels*. In a PRI facility, the equipment must never drop Channel 24, the *D-Channel*. All channels must still be programmed and all count towards the system maximum of 80 lines.

### **DS0**

*Digital Signal 0.* Single 64-kbps voice or data channel.

### **DS1**

*Digital Signal 1.* *Bit*-oriented signaling interface that multiplexes twenty-four 64-kbps channels into a single 1.544-mbps stream.

### **DSL**

*Digital Subscriber Line.* Digital Subscriber Line provides full-duplex service on a single twisted metallic pair (2-wire) at a rate sufficient to support ISDN Basic Rate Access.

### **DSS**

*Direct Station Selector.* Fifty-button *Adjunct* that enhances the call-handling capabilities of a 4424D+, 4424LD+, MLX-20L, or MLX-28D telephone used as an operator console.

**DTE**

*Data Terminal Equipment.* Equipment that makes the endpoints in a connection over a data connection—for example, a data terminal, personal computer, host computer, or printer.

**DTMF signaling**

*Dual-Tone Multifrequency Signaling.* Touch-tone signaling from telephones using the voice transmission path. DTMF signaling provides 12 distinct signals, each representing a dialed digit or character, and each composed of two voiceband frequencies.

**E****E911**

Enhanced 911 service; available in Release 1.5 and later systems. E911 service speeds up the handling of emergency calls and helps to pinpoint the location of the caller. The two types of E911 service are the E911 Partition and the E911 Adjunct.

**E&M Signaling**

Trunk supervisory signaling, used between two communications systems, in which signaling information is transferred through two-state voltage conditions (on the Ear and Mouth leads) for analog applications and through two *Bits* for digital applications. See also *Tie Trunk*.

**EIA**

*Electronic Industries Association.*

**EIA-232-D**

Physical interface, specified by the *EIA*, that transmits and receives asynchronous data at speeds of up to 19.2-kbps over cable distances of 50 feet (15 meters).

**Electronic Switching System**

See *ESS*.

**Endpoint**

Final destination in the path of an electrical or telecommunications signal.

**Enhanced Customer Care Solution**

Application that sends calls to available agents in a calling group. The Enhanced Customer Care Solution places calls in queue, plays announcements, tracks agent activity and availability, and provides real-time reports.

### **ESF**

*Extended Superframe Format. PRI* framing format consisting of individual frames of 24 eight-bit slots and one signal bit (193 bits) in a 24-frame extended superframe.

### **ESS**

*Electronic Switching System.* Class of central office (*CO*) switching systems developed by Lucent Technologies in which the control functions are performed principally by electronic data processors operating under the direction of a stored program.

### **ETR Telephone**

Enhanced tip/ring telephone (Series 4).

### **Expansion Carrier**

Carrier added to the control unit when the basic carrier cannot house all of the required modules. Houses a power supply module and up to six additional modules.

### **Extended Superframe Format**

See *ESF*.

### **Extension**

*Endpoint* on the internal side of the communications system. An extension can be a telephone with or without an adjunct. Also called “station.” See also *Data Workstation*.

### **Extension Jack**

An analog, digital, or *Tip/Ring* physical interface on a module in the control unit for connecting a telephone or other device to the system. Also called “station jack.”

### **Extension Programming**

Programming performed at an extension to customize telephones for personal needs; users can program features on buttons, set the telephone ringing pattern, and so on. See also *Centralized Telephone Programming* and *System Programming*.

## **F**

### **Facility**

Equipment (often a *Line/Trunk*) constituting a telecommunications path between the system and the telephone company central office (*CO*).

**Facility Restriction Level**

See [FRL](#).

**Factory Setting**

Default state of a device or feature when an optional setting is not programmed by the user or system manager.

**Fax**

[Facsimile](#). Scanning and transmission of a graphic image over a telecommunications facility, or the resulting reproduced image, or the machine that does the scanning and transmitting.

**FCC**

[Federal Communications Commission](#).

**Feature**

Function or service provided by the system.

**Feature Code**

Code entered on a dialpad to activate a feature.

**Feature Screen**

Display screen on 4412D+, 4424D+, 4424LD+, and MLX display telephones; provides quick access to commonly used features.

**Flash ROM**

Type of read-only memory provided on the [Processor Module](#), used to supply system features.

**Foil Shield**

Copper foil sheet (for power units), used to prevent excessive noise on the module.

**Forced Idle**

Condition of the system during certain programming or maintenance procedures; system prevents initiation of new calls.

**Foreign Exchange**

See [FX](#).

**Fractional-T1**

A digital transmission facility consisting of at least one, and fewer than 24, [DS0](#) channels using robbed-bit signaling, and connecting a [PBX](#) and a [Central Office](#) or toll office.

### **Frame**

One of several segments of an analog or digital signal that has a repetitive characteristic. For example, a *DS1* frame consists of a framing *Bit* and 24 bytes, which equals 193 bits.

### **Framing Format**

Pattern of *Frames* used in transmissions.

### **FRL**

*Facility Restriction Level*. Calling restriction type that restricts calls to certain specified *ARS* and *UDP* routes.

### **FX**

*Foreign Exchange*. *Central Office* other than the one that is providing local access to the public telephone network.

## **G**

### **Glare**

Condition that occurs when a user tries to call out on a *Loop-Start Line* at the same time that another call arrives on the same line.

### **Ground-Start Trunk**

Trunk on which the communications system, after verifying that the trunk is idle (no ground on tip lead), transmits a request for service (puts ground on ring lead) to the telephone company *Central Office*.

### **Group IV (G4) Fax Machine**

Fax unit, offering 400 by 100 dots per inch (DPI) in fine mode, that can operate at any speed for communication with a Group III (G3) fax machine or another Group IV (G4) fax machine.

### **Group Videoconferencing System**

System application that allows face-to-face, simultaneous video and voice communications between groups and requires high-speed data transmission facilities. See also *Desktop Videoconferencing System*.

## **H**

### **Hands-Free Answer Intercom**

See *HFAI*.

**Headset**

Lightweight earpiece and microphone used for hands-free telephone operation.

**HFAI**

*Hands-Free Answer Intercom*. Feature that allows a user to answer a voice-announced call.

**Home Screen**

Display normally shown on a 44xx or MLX display telephone; shows time, date, and call information, as well as when some features are in use.

**Host**

Telephone company or other switch providing features and services to the system users, usually when the system is operating in *Behind Switch Mode*.

**Hub System**

In a *Private Network* that is arranged in a *Star Configuration*, the communications system through which all calls across the network pass.

**Hybrid/PBX Mode**

One of three modes of system operation in which the system uses line/trunk *Pools* and *ARS* in addition to *Personal Lines*. Provides a single interface (SA buttons) to users for both internal and external calling. See also *Behind Switch Mode* and *Key Mode*.

**I****ICLID**

*Incoming Call Line Identification*. See *Caller ID*.

**ICOM Buttons**

*Intercom Buttons*. Telephone buttons that provide access to inside system lines for calling other extensions or receiving calls from them.

**Immediate-Start Tie Trunk**

*Tie Trunk* on which no start signal is necessary; dialing can begin immediately after the trunk is seized.

**In-Band Signaling**

See *Robbed-Bit Signaling*.

**Inside Dial Tone**

Tone users hear when they are off-hook on an SA or ICOM *Button*.

### **Inspect Screen**

Display screen on a multiline 44xx or MLX display telephone that allows the user to preview incoming calls and view a list of the features programmed on line buttons.

### **Integrated Services Digital Network**

See [ISDN](#).

### **Integrated Solution III**

See [IS III](#).

### **Integrated System**

Software-controlled processor complex that interprets dialing pulses, tones, and/or keyboard characters and makes the proper interconnections—both inside and outside. Consists of a computer, software, a storage device, and carriers with special hardware to perform the actual connections. Provides voice and/or data communications services, including access to public and private networks, for telephones and other equipment. Also referred to in this guide as “system,” short for MERLIN MAGIX Integrated System.

### **Intercom Buttons**

See [ICOM Buttons](#).

### **Interface**

Hardware and/or software that links systems, programs, or devices.

### **Intersystem Calls**

In a [Private Network](#), calls between a local extension and a [Local Dial Plan](#) or [Non-Local Dial Plan](#) extension.

### **Intuity**

Set of integrated applications that provides voice mail, fax messaging, Automated Attendant, call accounting, and system programming.

### **Intuity CONVERSANT**

Voice response application that automatically answers and routes calls and executes telephone transactions.

### **I/O Device**

[Input/Output Device](#). Equipment that can be attached to a computer internally or externally for managing a computer system’s input and output of information.

### **IROB Protector**

[In-Range Out-of-Building protector](#). Surge-protection device for off-premises telephones at a location within 1000 feet (305 meters) of cable distance from the control unit.

**IS III**

*Integrated Solution III*. Set of UNIX System-based applications that augments and provides additional services using the system. IS III is no longer available.

**ISDN**

*Integrated Services Digital Network*. Public or private network that provides end-to-end digital connectivity for all services to which users have access by a limited set of standard multipurpose user and *Network Interface*; provides digital circuit-switched or packet-switched connections within the network and to other networks for national and international digital connectivity.

**ISDN Terminal Adapter**

*Integrated Services Digital Network Terminal Adapter*. A device that connects the communications system with *Data Terminal Equipment (DTE)*.

**ISDN Terminal Adapter Data Station**

Type of data station that includes an ISDN terminal adapter as its DCE. It may also include an MLX telephone for simultaneous voice and data (ISDN terminal adapter data-only station). These data stations connect to MLX extension jack modules for digital transmission of data over a DS1 facility.

**J****Jack**

Physical connection point to the system for a telephone, line/trunk, or other device. Also called "port."

**K****kbits**

*kilobits per second*.

**Key Mode**

One of three modes of system operation, in which the system uses personal lines on line buttons for outside calls, with a separate interface (*ICOM Buttons*) for inside calling. See also *Behind Switch Mode* and *Hybrid/PBX Mode*.

## L

### LAN

*Local Area Network*. Arrangement of interconnected personal computers or terminals, which sometimes access a host computer, and sometimes sharing resources such as files and printers.

### LDN

*Listed Directory Number*.

### LED

*Light-Emitting Diode*. Semiconductor device that produces light when voltage is applied; light on a telephone.

### Line

Connection between extensions within the communications system; often, however, used synonymously with *Trunk*.

### Line and Trunk Assignment

Assignment of lines and trunks connected to the system control unit to specific buttons on each telephone.

### Line Coding

Pattern that data assumes as it is transmitted over a communications channel.

### Line Compensation

Adjustment for the amount of cable loss in decibels (dB), based on the length of cable between a 100D module and a channel service unit (*CSU*) or other far-end connection point.

### Line/Trunk

Refers to inside system lines and outside lines/trunks in general terms. See also *Line* and *Trunk*.

### Line/Trunk Jack

Physical interface on a module in the control unit for connecting an outside line/trunk to the communications system. Also called "trunk jack."

### Line/Trunk and Extension Module

Module on which the jacks for connecting central office lines/trunks and/or the jacks for connecting the extensions are located.

### Local Dial Plan

In a system that is part of a *Private Network*, list of extension ranges that the local system refers to in order to route local *Intersystem Calls* via *UDP*.

**Local Extension**

In a system that is part of a *Private Network*, extension that is listed in the system's *Local Dial Plan*.

**Local Host Computer Access**

Method for connecting an extension jack to an on-site computer for data-only calls through a *Modem* or *ISDN Terminal Adapter*.

**Local Loop**

The two-way connection between a customer's premises and the *Central Office*.

**Local User**

In a *Private Network*, person whose extension is connected to the local control unit.

**Logical ID**

Unique numeric identifier for each *Extension* and *Line/Trunk Jack* in the system control unit.

**Loop-Start Line**

Line on which a closure between the tip and ring leads is used to originate or answer a call. High-voltage 20-Hz AC ringing current from the *Central Office* signals an incoming call.

**M****Magic On Hold**

Lucent Technologies Music-On-Hold enhancement that promotes a company's products or services.

**mbps**

*megabits per second*.

**Megacom**

AT&T tariffed digital *WATS* offering for outward calling.

**Megacom 800**

AT&T tariffed digital 800 offering for inward calling.

**Memory Card**

Storage medium, similar in function to a floppy disk, that allows information to be added to, or obtained from, the communications system through the PCMCIA interface slot on the processor module.

### **MERLIN Messaging System**

Voice-messaging system that provides Automated Attendant, call answering, and voice-mail services. It is housed in its own module.

### **Messaging 2000**

See [Octel 100 Messaging](#).

### **MFM**

[Multi-Function Module](#). Adapter that has a [Tip/Ring](#) mode for answering machines, modems, fax machines, and tip/ring alerts, and an [SAA](#) mode for -48 VDC alerts. It is installed inside an MLX telephone and is used to connect optional equipment to the telephone. The optional equipment and the telephone operate simultaneously and independently.

### **MLS Telephone**

An enhanced [Tip/Ring](#) (Series 3) telephone. No longer available.

### **MLX Telephone**

Multiline button telephone that transmits and receives digital signals.

### **Mode Codes**

Streams of touch-tone codes used by voice messaging applications to communicate with the system's control unit.

### **Modem**

Device that converts digital data signals to analog signals for transmission over a telephone line, and analog signals received on a telephone line to digital signals.

### **Modem Data Station**

Type of data station that includes a modem as its DCE. It may also include an MLX telephone for simultaneous voice and data (MLX voice and modem data station), an analog multiline telephone (analog voice and modem data station), or a single-line telephone for dialing only (modem data-only station). These data stations connect respectively to MLX, analog, or [Tip/Ring](#) extension jack modules. They provide analog transmission of data.

### **Modem Pool**

Pair, or group of pairs, of [Modems](#) and data modules with interconnected RS-232 interfaces that converts digital signals to analog, or analog signals to digital, thereby allowing users with [ISDN Terminal Adapter Data Station](#) to communicate with users who have analog [Modem Data Stations](#).

**Module**

Circuit pack in the control unit that provides the physical jacks for connecting telephones and/or outside lines/trunks to the communications system. In the name of a module, the first digit indicates the number of *Line/Trunk Jacks* it contains; the last digit indicates the number of *Extension Jacks* it contains. If no letters appear after the number, a line/trunk module provides *Loop-Start Lines* or an extension jack module provides analog or *Tip/Ring* jacks. For example, a 408 GS/LS-MLX module contains four line/trunk jacks and eight digital (MLX) extension jacks, and provides either Loop Start (LS) or *Ground-Start Trunks* (GS).

**Monitored Extension**

Extension for which one or more CTI applications is receiving call information. The CTI application does not have to be directly attached to the equipment at the extension in order to monitor calls. The call information may appear on the PC screen of another extension that has been programmed to receive it. See also *CTI Link* and *Unmonitored Extension*.

**Multi-Function Module**

See *MFM*.

**Multiline Telephone**

Telephone that provides multiple line buttons for making or receiving calls or programming features.

**Multiplexing**

Division of a transmission channel into two or more independent channels—either by splitting the frequency band into a number of narrower bands or by dividing the channel into successive time slots.

**Music-On-Hold**

Customer-provided music source or Magic On Hold connected to the system through a loop-start jack.

**N****Network**

Configuration of communications devices and software connected for information interchange.

**Network Interface**

Hardware, software, or both that links two systems in an interconnected group of systems—for example, between the local telephone company and a PBX.

### **NI-1 BRI**

*National Integrated Services Digital Network 1 Basic Rate Interface*. Type of digital facility that carries the equivalent of three lines. Two are called *B-Channels* and provide voice and data communications services. A third *D-Channel* controls signaling and maintains operations on the B-channels.

### **Non-Local Dial Plan**

In a system that is part of a *Private Network*, list of extension ranges that the local system references in order to route non-local *Intersystem Calls* via *UDP*.

### **Non-Local Extension**

In a system that is part of a *Private Network*, extension that is in the *Non-Local Dial Plan*.

### **Non-Local User**

In a *Private Network*, user who is connected to another system in the network and not to the local system.

### **Non-Satellite System**

In a *Private Network*, communications system that is directly connected to and located more than 200 miles from the local system.

## **O**

### **Octel 100 Messaging**

Voice-messaging system housed in a PC that connects to *Tip/Ring* ports on the system's modules. Messaging 2000 provides voice mail, Automated Attendant, call answering, and fax messaging services.

### **Off-Hook**

Telephone is said to be off-hook when the user has lifted the handset, pressed the speakerphone button to turn on the speakerphone, or used a headset to connect to the communications system or the telephone network.

### **Off-Premises Telephone**

See *OPT*.

### **Ones Density**

Requirement for channelized *DS1* service to the public network that prohibits eight consecutive zeros in a digital data stream.

### **On-Hook**

Telephone is said to be on-hook when the handset is hung up, the speakerphone is turned off, and the user is not using a headset to connect to the communications system or the telephone network.

**OPT**

*Off-Premises Telephone. Single-Line Telephone* or other *Tip/Ring* device connected to the system via a 008 OPT module in the control unit. Appears as an inside extension to the system, but may be physically located away from the system.

**OPX**

*Off-Premises Extension.*

**Out-of-Band Signaling**

Signaling that uses the same path as voice-frequency transmission and in which the signaling is outside the band used for voice frequencies.

**P****Parity**

Addition of a *Bit* to a bit string so that the total number of ones is odd or even; used to detect and correct transmission errors.

**PassageWay Direct Connection Solution**

Set of software applications that provides an interface between a personal computer and an MLX telephone.

**PBX**

*Private Branch Exchange.* Local electronic telephone switch that serves local stations (for example, extensions within a business) and provides them with access to the public network.

**PC**

*Personal Computer.*

**PCMCIA Memory Card**

*Personal Computer Memory Card International Association Memory Card.* See *Memory Card.*

**Peripheral System**

In a *Private Network*, system that does not connect to more than one other system, sometimes called an "end node."

**Personal Line**

*Central Office* line/trunk that terminates directly at one or more extensions. In *Hybrid/PBX Mode*, a personal line cannot be part of a line/trunk *Pool*. Also called "DFT" (Direct Facility Termination).

### **PFT**

*Power Failure Transfer*. Feature that provides continuity of telephone service during a commercial power failure by switching some of the system's line/trunk connections to telephones connected to specially designated extension jacks.

### **Phantom Extension**

Extension that is not actually plugged into the system, but is used, for example, as a calling group member covered by a *Voice Messaging Interface*.

### **Pool**

In *Hybrid/PBX Mode*, a group of outside lines/trunks that users can access with a Pool button or by dialing an access code on *SA buttons*. Also used by the *ARS* feature when choosing the least expensive route for a call.

### **Point-to-Point Facility**

In a *Private Network*, a line/trunk that passes through the *PSTN* without using the switching capabilities of the PSTN.

### **Port**

See *Jack*. Also, refers to *Extension* or *Line/Trunk Jack* before these are numbered according to the *Dial Plan* during programming. The lowest jack on a module is always Port 1.

### **Power Failure Transfer**

See *PFT*.

### **Power Supply Module**

Device that directs electricity to modules and telephones on the system. One power supply module is needed for each carrier.

### **PRI**

*Primary Rate Interface*. Standard interface that specifies the protocol used between two or more communications systems. As used in North America, it provides twenty-three 64-kbps *B-Channels* for voice and/or data and one 16-kbps *D-Channel*, which carries multiplexed signaling information for the other 23 channels.

### **Primary System Operator Position**

First extension *Jack* on the first TDL or MLX module in the control unit—that is, the extension jack with the lowest logical ID in the system.

### **Prime Line**

Individual extension number assigned to a telephone in a system operating in *Behind Switch Mode*. Each telephone user has his or her own prime line and is automatically connected to that line when he or she lifts the handset.

**Priority Call Queuing**

System function that prioritizes calling groups, thereby allowing certain incoming calls to be answered before others.

**Private Communications Network**

See *Private Network*.

**Private Network**

Interconnected group of communications systems, which may consist of MERLIN MAGIX Integrated Systems, MERLIN LEGEND Communications Systems, DEFINITY Enterprise Communications Servers (ECS), DEFINITY Business Communications Servers (BCS), and/or DEFINITY ProLogix Solutions.

**Private Network Trunks**

Facilities that connect communications systems in a *Private Network*. See also *Tandem Tie Trunk* and *Tandem PRI Trunk*.

**Processor Module**

Module in the second slot of the control unit (Slot 0, to the right of the *Power Supply Module*). Includes the software and memory that runs the system.

**Programming Port Reassignment**

Reassignment of the system programming jack position to any of the first five extension jacks on the first TDL or MLX module in the control unit.

**Protocol**

Set of conventions governing the format and timing of message exchanges between devices, such as an MLX telephone and the control unit.

**PSTN**

*Public Switched Telephone Network*. Network that is commonly accessible for local or long-distance calling. Also called “public network” or “public switched network.”

**PSTN Trunk**

In a *Private Network*, facility that connects a networked system to the *Public Switched Telephone Network*.

**Public Switched Telephone Network**

See *PSTN*.

## Q

### QCC

*Queued Call Console*. A 4424LD+ or MLX-20L telephone used by a system operator in *Hybrid/PBX Mode* only. Used to answer outside calls (directed to a system operator position) and inside calls, to direct inside and outside calls to an extension or to an outside telephone number, to serve as a message center, to make outside calls for users with outward calling restrictions, to set up conference calls, and to monitor system operation.

## R

### RAM

*Random-Access Memory*. Computer memory in which an individual *Byte* or range of bytes can be addressed and read or changed without affecting other parts of memory.

### Read-Only Memory

See *ROM*.

### Remote Access

System feature that allows an outside caller to gain access to the system, almost as if at a system extension. In a *Private Network*, remote access settings are used to control calls routed via *ARS* or *UDP* routing across the network.

### Restore

Procedure whereby saved and archived system programming is reinstated on the system, from a floppy disk or *Memory Card*. See also *Backup*.

### Restricted Data Channel

Channels that do not allow the transmission of occurrences of more than seven contiguous zero bits. See also *Unrestricted Data Channels*.

### Rotary Dial Enable

Through centralized programming, T/R ports (including the T/R ports on the new ETR modules) can be programmed to accept rotary-dial and touch-tone digits or just touch-tone digits.

### Riser Cable

Cable that runs between floors in a multi-story building and connects wiring closets.

**RS-232**

Physical interface, specified by the Electronics Industries Association (EIA), that transmits and receives asynchronous data at distances of up to 50 feet (15 meters).

**Robbed-Bit Signaling**

Signaling in which the least significant *Bit* of every sixth *Frame* per channel is used for signaling in that channel.

**ROM**

*Read-Only Memory*. Computer memory that can be read, but cannot be changed.

**S****SA buttons**

Telephone buttons that provide access to both inside and outside calls.

**Satellite System**

In a *Private Network*, a communications system that is directly connected to, and located within 200 miles of the local system.

**Screen Pop**

Refers to a computer-telephony software application that takes caller information (for example, the calling party number provided by Caller ID service), queries a database, and displays a screen with information about the caller onto a user's PC screen. Screen pop requires that an identifying number or code be available to identify the calling party. See also *CTI Link*.

**SDN**

*Software Defined Network*. AT&T private networking service created by specialized software within the public network.

**Series Configuration**

*Private Network* arrangement whereby either two or four or more communications systems are connected in a line, with no particular system acting as the *Hub System*. See also *Star Configuration*.

**Service Observing**

Feature that allows one extension to listen in (observe) on calls that arrive at another extension.

**SID**

*Station (Extension) Identification.*

**Signaling**

Sending of information between devices to set up, maintain, or cease a connection, such as a telephone call.

**Simplex Signaling**

Transmission of signals in one direction only, across a telecommunications channel.

**Single-Line Telephone**

Industry-standard touch-tone or rotary dial telephone that handles one call at a time. It is connected to the system via an *Extension Jack* on a 016 (T/R) or 008 OPT module, or via a *Port* on an 016 ETR module programmed for *Tip/Ring* operation.

**Slot**

Position in a carrier for a module; numbered from 0.

**SMDR**

*Station Message Detail Recording.* Feature that captures usage information on incoming and outgoing calls.

**SMDR Printer**

Printer used to produce *SMDR* reports. Connected to the system via an RS-232 *Jack* on the *Processor Module*.

**Software Defined Network**

See *SDN*.

**Special Character**

Pause, Stop, or End-of-Dialing signal in a programmed dialing sequence, such as a speed dial number.

**Square Key**

Configuration in *Key Mode* operation in which all outside lines appear on all telephones.

**Star Configuration**

*Private Network* arrangement whereby either three or more communications systems are connected with one system acting as the *Hub System*. See also *Series Configuration*.

**Station**

See [Extension](#).

**Station Jack**

See [Extension Jack](#).

**Station Message Detail Recording**

See [SMDR](#).

**Switch**

See [Integrated System](#).

**Switched 56 Service**

*DS1* Switched 56 service is an end-to-end digital, 56-kbps, full-duplex, synchronous, circuit-switched service offering. The service is offered by network service providers and by some Local Exchange Carriers (LECs) as circuit-switched, 56-kbps service. T1-emulated [Tandem Tie Trunks](#) in a [Private Network](#) can be programmed for data.

**Switchhook Flash**

Momentary (320 ms to 1 sec) on-hook signal used as a control; may be directed to the control unit or to a [Host](#) switch outside the system. Also called “Recall” or “timed flash.”

**Switch Identifier**

Number assigned to a [Tandem Trunk](#) in a [Private Network](#). It identifies the system connected to the far end of the trunk. A switch identifier is based on the type of system and its distance from the system where the identifier is assigned. See also [Satellite System](#) and [Non-Satellite System](#).

**Synchronous Data Transmission**

Method of transmitting a continuous digital data stream in which the transmission of each binary [Bit](#) is synchronized with a master clock. See also [Asynchronous Data Transmission](#).

**System Acceptance Test**

Test of all trunks, telephones, data terminals, and features after installation to ensure that they are working correctly.

**System Access Buttons**

See [SA buttons](#).

**System Date and Time**

Date and time that appear on 44xx, MLX, and ETR display telephones and [SMDR](#) reports.

### **System Programming**

Programming of system functions and features that affect most users, performed from a 4424LD+ or MLX-20L telephone or a computer using [WinSPM](#). See also [Extension Programming](#) and [Centralized Telephone Programming](#).

### **System Programming and Maintenance**

See [WinSPM](#).

### **System Renumbering**

Procedure used to change the numbers assigned to telephones, [Adjuncts](#), [Calling Groups](#), paging groups, park zones, [Remote Access](#), and lines/trunks.

## **T**

### **T1**

Type of digital transmission facility that, in North America, transmits at the [DS1](#) rate of 1.544 mbps.

### **T1-Emulated Data**

A T1 [Tie Trunk](#) programmed for S56DATA for use by data calls at speeds up to 56 kbps. These trunks may be used for tandem and non-tandem operation.

### **T1-Emulated Voice**

A T1 [Tie Trunk](#) programmed for Tie-PBX or Tie-Toll for use by voice calls.

### **T1 Switched 56 Service**

[T1](#) digital data transmission over the [Private Network](#) or over a private network at 56 kbps. See [Switched 56 Service](#).

### **Tandem Switching**

Capability of [Private Network](#) communications systems that allows them to direct outside calls from one facility to another, rather than just to an extension. Calls may be sent, for example, from a [PSTN](#) facility to a [Tandem Trunk](#), or vice versa.

### **Tandem Trunk**

Private outside facility (as opposed to an inside system line) that connects two communications systems in a [Private Network](#) and can carry calls to another outside facility through [Tandem Switching](#). The trunk is not connected to the [PSTN](#).

**Tandem Tie Trunk**

*Tandem Trunk* that is an analog *Delay-Start Tie Trunk*, providing a single line/trunk per facility and allowing *Analog Transmission* of voice and low-speed data; or a T1 facility offering 24 channels on emulated tie trunks and programmed for voice or data.

**Tandem PRI Trunk**

*Tandem Primary Rate Interface Trunk*. See also *Private Network Trunks*.

**TAPI**

*Telephony Application Programming Interface*. Application programming interface that allows computer telephony applications to be used with MLX telephones. See also *PassageWay Direct Connection Solution*.

**Telephone Power Supply Unit**

Equipment that provides power to an individual telephone.

**Terminal Adapter**

See *ISDN Terminal Adapter*.

**Tie Trunk**

Private trunk directly connecting two telephone switches.

**Timed Flash**

See *Switchhook Flash*.

**Tip/Ring**

Contacts and associated conductors of a *Single-Line Telephone* plug or jack.

**Touch-Tone Receiver**

See *TTR*.

**T/R**

See *Tip/Ring*.

**TransTalk Telephones**

The TransTalk 9031 and TransTalk 9040 are wireless, multiline telephones.

**Trunk**

Telecommunications path between the communications system and the telephone company *Central Office* or another switch. Often used synonymously with *Line*.

**Trunk Jack**

See [Line/Trunk Jack](#).

**Trunk Pool**

See [Pool](#).

**TSAPI**

[Telephony Services Application Programming Interface](#). Application programming interface that allows computer telephony applications to be used. See also [TAPI](#) and [CTI Link](#).

**TTR**

[Touch-Tone Receiver](#). Device used to decode DTMF touch-tones dialed from [Single-Line Telephones](#) or [Remote Access](#) telephones.

**U**

**UDP**

[Uniform Dial Plan](#). Composed of the [Local Dial Plan](#) and [Non-Local Dial Plan](#). A dial plan that allows a caller at any [Extension](#) in a [Private Network](#) to dial the same number of digits to reach any other extension in the private network, even if the originating extension is physically connected to one communications system and the terminating extension is physically connected to a different communications system.

**Unambiguous Numbering**

Practice of numbering of extension ranges, remote access codes, or other system components to avoid routing conflicts in network or local calling. For example, Extension 441 is unique when compared to Extension 4410; however, this is ambiguous, because the system routes as soon as it matches the digits sent for a call with the digits in a [Local Dial Plan](#) or in a [Non-Local Dial Plan](#) extension range. When a caller dials 4410, therefore, the system routes the call to Extension 441 without considering the last dialed digit.

**Uniform Dial Plan**

See [UDP](#).

**Uninterruptible Power Supply**

See [UPS](#).

**Unit Load**

Measure of the power load drain of a module, telephone, or [Adjunct](#).

**Unmonitored Extension**

*Extension* for which no CTI application is receiving call information. See also *CTI Link* and *Monitored Extension*.

**Unrestricted Data Channels**

Also called *Clear Data Channel*. Allow the transmission of occurrences of more than seven contiguous zero bits. If an unrestricted data channel is requested and only restricted channels are available, the call will be rejected. See also *Restricted Data Channel*.

**UPS**

*Uninterruptible Power Supply*. Device that connects to the system to provide 117 VAC to the equipment when the commercial power source fails.

**V****VAC**

*Alternating Current Voltage*.

**VDC**

*Direct Current Voltage*.

**VMI**

*Voice Messaging Interface*. Enhanced *Tip/Ring* port.

**VideoconferencingSystem**

System application that allows face-to-face meetings, with voice and video, between individuals or groups. This application requires high-speed data transmission facilities. See also *Desktop Videoconferencing System* and *Group Videoconferencing System*.

**Virtual Private Network**

See *VPN*.

**VPN**

*Virtual Private Network*. Type of *Private Network* that uses the switching capabilities of the *PSTN*, rather than *Tandem Switching*, to direct calls between connected communications systems. A VPN may constitute a part of a private network.

**Voice Announce**

System feature that allows users to receive voice announcements on their telephones. In Release 7.0 and later systems, the VA On Idle Only option (only for MLX telephones) allows voice announcement calls to go through only when the telephone is idle.

**Voice-Band Channel**

Transmission channel, generally in the 300–3400-Hz frequency band.

**Voice Mail**

Application that allows users to send messages to other system extensions, to forward messages received with comments, and to reply to messages.

**Voice Messaging Interface**

See [VMI](#).

**W**

**WATS**

[Wide Area Telecommunications Service](#). Service that allows calls to certain areas for a flat-rate charge based on expected usage.

**Wink-Start Tie Trunk**

[Tie Trunk](#) on which the originating end transmits an off-hook signal and waits for the remote end to send back a signal (a wink) that it is ready for transmission.

**WinSPM**

Windows [System Programming and Maintenance](#). Windows-based application for programming the system.





# **MERLIN MAGIX™ Integrated System**

System Programming Basics  
Release 2.0 and Earlier

555-720-140  
Comcode 108873564  
Issue 1  
January 2001

## 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.

## Avaya Web Page

The world wide web home page for Avaya is <http://www.avaya.com>.

## Heritage Statement

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## Preventing Toll Fraud

Toll Fraud is the unauthorized use of your telecommunications system by an unauthorized party (for example, a person who is not a corporate employee, agent, subcontractor, or working on your company's behalf). Be aware that there is a risk of toll fraud associated with your system and that, if toll fraud occurs, it can result in substantial additional charges for your telecommunications services.

## Avaya Fraud Intervention

If you suspect that you are being victimized by toll fraud and you need technical assistance or support, call the Avaya Customer Care Center at **1 800 628-2888**.

## Providing Telecommunications Security

Telecommunications security of voice, data, and/or video communications is the prevention of any type of intrusion to, that is, either unauthorized or malicious access to or use of, your company's telecommunications equipment by some party.

Your company's "telecommunications equipment" includes both this Avaya product and any other voice/data/video equipment that could be accessed via this Avaya product (that is, "networked equipment").

An "outside party" is anyone who is not a corporate employee, agent, subcontractor, or working on your company's behalf. Whereas, a "malicious party" is anyone, including someone who may be otherwise authorized, who accesses your telecommunications equipment with either malicious or mischievous intent.

Such intrusions may be either to/through synchronous (time multiplexed and/or circuit-based) or asynchronous (character-, message-, or packet-based) equipment or interfaces for reasons of:

- Utilization (of capabilities special to the accessed equipment)
- Theft (such as, of intellectual property, financial assets, or toll-facility access)
- Eavesdropping (privacy invasions to humans)
- Mischief (troubling, but apparently innocuous, tampering)
- Harm (such as harmful tampering, data loss or alteration, regardless of motive or intent).

Be aware that there may be a risk of unauthorized or malicious intrusions associated with your system and/or its networked equipment. Also realize that, if such an intrusion should occur, it could result in a variety of losses to your company, including, but not limited to, human/data privacy, intellectual property, material assets, financial resources, labor costs, and/or legal costs.

### **Your Responsibility for Your Company's Telecommunications Security**

The final responsibility for securing both this system and its networked equipment rests with you - an Avaya customer's system administrator, your telecommunications peers, and your managers. Base the fulfillment of your responsibility on acquired knowledge and resources from a variety of sources, including, but not limited to:

- Installation documents
- System administration documents
- Security documents
- Hardware-/software-based security tools
- Shared information between you and your peers
- Telecommunications security experts

To prevent intrusions to your telecommunications equipment, you and your peers should carefully program and configure your:

- Avaya provided telecommunications system and their interfaces
- Avaya provided software applications, as well as their underlying hardware/software platforms and interfaces
- Any other equipment networked to your Avaya products

### **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*.

### **Canadian Department of Communications (DOC) Interference Information**

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

Le Présent Appareil Numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de la classe A prescrites dans le règlement sur le brouillage radioélectrique édicté par le ministère des Communications du Canada.

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## Ordering Information

**Call:** Avaya Publications Center  
Voice 1 800 457-1235 International Voice 317 322-6791  
Fax 1 800 457-1764 International Fax 317 322-6699

**Write:** Avaya Publications Center  
2855 North Franklin Road  
Indianapolis, IN 46219-1385

**Order:** Document No. 555-720-140  
Comcode: 108873564  
Issue 1, January, 2001

For more information about Avaya documents, refer to the section entitled "Related Documents" in "About This Guide" in *Feature Reference*.

## Support Telephone Number

In the continental U.S., Avaya provides a toll free customer helpline 24 hours a day. Call the Avaya Customer Care Center at **1 800 628-2888** or your Avaya authorized dealer if you need assistance when installing, programming, or using your system. Outside the continental U.S., contact your local Avaya authorized representative.

## Warranty

Avaya provides a limited warranty on this product. Refer to "Limited Warranty and Limitation of Liability" in "Customer Support Information" in *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.

When installing telephone equipment, always follow basic safety precautions to reduce the risk of fire, electrical shock, and injury to person, including:

- Read and understand all instructions.
- Follow all warnings and instructions marked on or packed with the product.
- Never install telephone wiring during a lightning storm.
- Never install 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 Avaya Inc.-manufactured MERLIN MAGIX Integrated System circuit modules, carrier assemblies, and power units in the MERLIN MAGIX Integrated System control unit.
- Use only Avaya Inc.-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.
- 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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# System Programming Basics

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# About This Guide

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The MERLIN MAGIX Integrated System is an advanced digital switching system that integrates voice and data communications features. Voice features include traditional telephone features, such as Transfer and Hold, and advanced features, such as Group Coverage, Direct Voice Mail, and Tandem Switching. Data features allow both voice and data to be transmitted over the same system wiring.

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## Intended Audience

This book provides detailed information about system features, extension features, and system applications of the MERLIN MAGIX Integrated System. It is intended as a reference for anyone needing such information, including support personnel, sales representatives, System Managers, and account executives. It is also intended for technicians who are responsible for system installation, maintenance, and troubleshooting.

---

## How to Use This Guide

This guide has been designed to provide optimal assistance to you in completing the planning forms—for example:

1. Since some chapters and/or sections apply to one or another of the configurations (Key or Behind Switch, Hybrid/PBX, or data communications), these sections are clearly marked—for example, “Hybrid/PBX Only.” Also, you are alerted to proceed to the next appropriate section, or to skip chapters or sections that do not apply to your particular system. Proceed through this guide as appropriate.
2. A list of forms or information that will be needed for particular procedures appears at the beginning of each chapter and section.
3. Where appropriate, examples of completed forms are included so you can confirm what you have done.

Since this guide assumes that you are familiar with the system, detailed information about equipment, features, and programming are not included. Refer to the following documentation for additional information:

- *System Programming* gives procedural instructions for programming system features.
- User and operator guides give procedural instructions for programming and using telephone features.

[“Related Documents,”](#) later in this section, provides a complete list of system documentation, together with ordering information.

**In the USA only**, Avaya provides a toll free customer Helpline 24 hours a day. Call the Helpline at 1 800 628-2888 (consultation charges may apply), or contact your Avaya representative if you need assistance when installing, programming, or using your system.

**Outside the USA**, if you need assistance when installing, programming, or using your system, contact your Avaya authorized representative.

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## Terms and Conventions Used

The terms described here are used in preference to other, equally acceptable terms for describing communications systems.

### Lines, Trunks, and Facilities

*Facility* is a general term that designates a communications path between a telephone system and the telephone company central office. Technically, a *trunk* connects a switch to a switch—for example, the MERLIN MAGIX Integrated System to the central office. Technically, a *line* is a loop-start facility or a communications path that does not connect switches—for example, an intercom line or a Centrex line. In actual usage, however, the terms *line* and *trunk* are often applied interchangeably. In this guide, we use *line/trunk* and *lines/trunks* to refer to facilities in general. Specifically, we refer to *digital facilities*. We also use specific terms such as *Personal Line*, *ground-start trunk*, *Direct Inward Dialing (DID) trunk*, and so on. When you talk to personnel at your local telephone company central office, ask them which terms they use for the specific facilities they connect to your system.

---

Some older terms have been replaced with newer terms, as follows:

Old Term	New Term
trunk module	line/trunk module
trunk jack	line/trunk jack
station	extension
station jack	extension jack
analog data station	modem data workstation
digital data station	terminal adapter workstation
7500B data station	ISDN terminal adapter data workstation
digital voice and analog data station	MLX voice and modem data workstation
analog data-only station	modem data-only workstation
digital data-only station	terminal adapter data-only workstation
7500B data-only station	ISDN terminal adapter data-only workstation
digital voice and digital data station	MLX voice and terminal adapter workstation
MLX voice and 7500B data station	MLX voice and ISDN terminal adapter data workstation

---

## Typographical Conventions

Certain type fonts and styles act as visual cues to help you rapidly understand the information presented:

Convention	Example
Italics or bold indicates emphasis.	It is <i>very</i> important that you follow these steps.  WARNING: Do <b>not</b> remove modules from the carrier without following proper procedures.
Italics also sets off special terms.	The part of the headset that fits over one or both ears is called a <i>headpiece</i> .
Plain constant-width type indicates text that appears on the telephone display or PC screen, as well as characters you dial at the telephone or type at the PC.	Choose <code>Ext Prog</code> from the display screen. To activate Call Waiting, dial <code>*11</code> .

## Product Safety Advisories

Throughout these documents, hazardous situations are indicated by an exclamation point inside a triangle and 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 could cause minor personal injury or property damage if the hazard is not avoided.*

---

## Security

Certain features of the system can be protected by passwords to prevent unauthorized users from abusing the system. You should assign passwords wherever possible and limit distribution of such passwords to three or fewer people.

Nondisplaying authorization codes and telephone numbers provide another layer of security. For more information, see Appendix A, “*Customer Support Information in the Feature Reference.*”

Throughout this guide, toll fraud security hazards are indicated by an exclamation point inside a triangle and the words *SECURITY ALERT*.

 **SECURITY ALERT:**

*Security Alert indicates the presence of a toll fraud security hazard. Toll fraud is the unauthorized use of your telecommunications system, or use by an unauthorized party (e.g., persons other than your company’s employees, agents, subcontractors, or persons working on your company’s behalf). Be sure to read “Your Responsibility for Your Company’s Telecommunications Security” on the inside front cover of this guide and “Security of Your System: Preventing Toll Fraud” in Appendix A, in the “Customer Support Information” section of Feature Reference.*

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## Related Documents

The documents listed in the following table are part of the MERLIN MAGIX documentation set. Within the continental United States, contact the Avaya Publications Center by calling 1 800 457-1235.

Document No.	Title
<b>System Documents:</b>	
555-720-100	<i>Customer Documentation Package:</i> Consists of paper versions of the <i>System Manager's Quick Reference</i> and the <i>Feature Reference</i>
555-720-110	<i>Feature Reference</i>
555-720-112	<i>System Planning</i>
555-720-113	<i>System Planning Forms</i>
555-720-119	<i>System Manager's Quick Reference</i>
555-661-150	<i>Network Reference</i>
555-720-800	<i>Customer Reference CD-ROM:</i> Consists of the <i>System Manager's Quick Reference</i> , and the <i>Feature Reference</i>
<b>Telephone User Support:</b>	
555-710-123 (U.S. English)	<i>4400/4400D Telephone User's Guide</i>
555-710-123FRC (Canadian French)	<i>4400/4400D Telephone User's Guide</i>
555-710-127 (U.S. English)	<i>4406D+, 4412D+, 4424D+, and 4424LD+ Telephone User's Guide</i>
555-710-127FRC (Canadian French)	<i>4406D+, 4412D+, 4424D+, and 4424LD+ Telephone User's Guide</i>
555-660-122	<i>MLX Display Telephone User's Guide</i>
555-630-150	<i>MLX-5D, MLX-10D and MLX-10DP Display Telephone Tray Cards (5 cards)</i>
555-630-152	<i>MLX-28D and MLX-20L Telephone Tray Cards (5 cards)</i>
555-660-124	<i>MLX-5<sup>®</sup> and MLX-10<sup>®</sup> Nondisplay Telephone User's Guide</i>
555-630-151	<i>MLX-5 and MLX-10 Nondisplay Telephone Tray Cards (6 cards)</i>
555-630-155	<i>MLX-16DP Display Telephone Tray Cards (5 cards)</i>
555-670-151	<i>MLS and ETR Telephone Tray Cards</i>
555-670-152	<i>MLS and ETR Telephone Tray Cards (16 cards)</i>

<b>Document No.</b>	<b>Title</b>
555-660-126	<i>Single-Line Telephones User's Guide</i>
555-660-138	<i>MDC and MDW Telephones User's Guide</i>
<b>System Operator Support:</b>	
555-710-134	<i>Digital Direct Line Console Operator's Guide</i>
555-710-136	<i>Digital Queued Call Console Operator's Guide</i>
<b>Miscellaneous User Support:</b>	
555-661-130	<i>Calling Group Supervisor and Service Observer User Guide</i>
555-650-105	<i>Data and Video Reference</i>
555-661-140	<i>Installation, SPM, Maintenance and Troubleshooting</i>
555-720-140	<i>Installation, Programming Basics, Maintenance and Troubleshooting</i>
555-720-116	<i>Pocket Reference</i>
<b>Toll Fraud Security:</b>	
555-025-600	<i>BCS Products Security Handbook</i>

---

## How to Comment on This Guide

We welcome your comments, both positive and negative. Please use the feedback form on the next page to let us know how we can continue to serve you. If the feedback form is missing, write directly to:

Documentation Manager  
Avaya Inc.  
150 Allen Road, Room C-19  
Liberty Corner, New Jersey 07938

**We'd like your opinion . . .**

We welcome your feedback on this document. Your comments can be of great value in helping us improve our documentation.

**MERLIN MAGIX™ Integrated System  
System Programming Basics  
Issue 1, January 2001  
555-710-140, Comcode 108873564**

1. Please rate the effectiveness of this document in the following areas:

	Excellent	Good	Fair	Poor
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# About System Programming

# 1

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## Overview

The MERLIN MAGIX Integrated System offers easy-to-use, menu-driven software for system programming. As part of the installation, the system was programmed with specific features, settings, and options. The system programming software allows you to easily modify the system programming to accommodate a company's changing needs for such enhancements and modifications as upgraded lines, additional modules, and new extension programming.

There are three types of programming, as well as two ways, or methods, to perform the programming. The types and methods of programming as well as some general information about programming procedures are described in the following sections.

---

## Types of Programming

Three types of programming are available for the MERLIN MAGIX system:

- **System Programming.** This type of programming enables the System Manager to program features that affect all or most system users; it requires one of the following:
  - A system programming console which is an MLX-20L or 4424LD+ telephone connected to one of the first five jacks of the first MLX or TDL module in the control unit. See [“System Programming Console Buttons”](#) on page 2-7 for more information.
  - 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, adding or deleting members of groups, performing system inventories, creating reports, administering multiple systems, making station labels shown on display telephones, and more). Pictorial representations of system components, such as modules and their vintages, and the creation of MLX or 4400-Series telephone button labels are available through Quick Access. See [“Using Quick Access”](#) on page 3-19 for more information.

- The Standard SPM Mode provides an emulation display of the system programming console. It allows all system programming of the MERLIN MAGIX system to be performed from a PC and supports programming for options not included in the Quick Access GUI. In addition, the SPM Main Menu provides four options intended for qualified service personnel. See [“Using Standard SPM Mode”](#) on page 3-27 for more information.
- **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 through the system programming console or through WinSPM using Standard SPM Mode. It is provided as an option on the second screen of the System Programming Menu.

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## Methods of Programming

A System Manager primarily performs system programming and centralized telephone programming. As previously explained, the other type of programming--extension programming--is performed at each individual telephone, usually by the telephone user.

To perform system programming and centralized telephone programming, the following two methods are available:

- Programming from the system programming console.
- Programming from a PC with WinSPM software, using Standard SPM Mode.

**NOTE** ► WinSPM also provides Quick Access to manage those tasks most commonly performed by a System Manager. Refer to the documentation and online help provided with the WinSPM application for information on how to program using Quick Access. See [“Using Quick Access”](#) on page 3-19 for an overview of this programming method.

## About Programming Procedures

Programming procedures using either the system programming console or a PC with WinSPM using the Standard SPM Mode are presented in the same format. Following is an example of a programming procedure and a description of how to follow it from the console or from a PC with WinSPM using the Standard SPM Mode:

**Menu** →Sys Program→Start→Extensions→Lines/Trunks →Dial ext. no. →Enter→Entry Mode→Dial line/trunk no. →Enter →Back →Back

- To select **Menu** if you are programming from a system programming console, press the fixed display button; to select **Menu** if you are programming from WinSPM in Standard SPM Mode, click on the picture of the fixed display button in the console display screen emulated on your PC monitor.
- To select Sys Program if you are programming from a system programming console, press the unlabeled display button next to the Sys Program option; to select Sys Program if you are programming from WinSPM in Standard SPM Mode, click on Sys Program in the console display screen emulated on your PC monitor.

**NOTE** ► When programming from your PC with WinSPM in Standard SPM Mode, you can also select options from the console display screen by using the function keys on your keyboard. See [“Using Standard SPM Mode”](#) on page 3-27.

The arrows within the programming procedure separate each step. Three typefaces are used to help indicate what the step involves, as shown in the following table:

**Table 1-1. Typefaces Used in Programming Procedures**

Typeface Sample	On System Programming Console	On PC using Standard SPM Mode
<b>More</b>	Select this option by pressing the imprinted button on the console.	Select this option by clicking on the imprinted button on the console emulated on the PC monitor.
GrpCalling	Select this menu option by pressing the unlabeled display button next to the option.	Select this menu option by clicking on the option in the console display screen emulated on your PC monitor.
Dial ext. no.	Enter this information.	Enter this information.

## Moving Among System Programming Screens

Some general comments regarding moving from one system programming screen to another follow:

- In most cases, you can select **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 select **Back**, you usually move up one screen in the menu hierarchy.

Occasionally, when you select **Back**, you return to the previous screen. In a few cases, pressing **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, select **Enter**.
- If you are programming a group of sequentially numbered extensions or trunks, you may optionally select **Next**. This saves your entry and automatically provides the number of the next extension or trunk in the sequence, thus saving you several 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 select **Back** again. This usually takes you back to the System Programming menu. If not, you can continue programming on the current screen or select **Back** again.

---

## About Programming and 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 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 appears.

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
- Program T/R on an 016 ETR module

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- or tie-trunk type
- Specify tie-trunk direction
- Specify tie-trunk E&M signal

## 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.

## 100D, 100DCD, or 100R INA Module Idle

The following procedures can be performed only when the 100D, 100DCD, or 100R INA module is idle:

- Specify board type
- Specify frame format
- Specify board signaling format
- Specify board suppression format
- Specify board facility compensation

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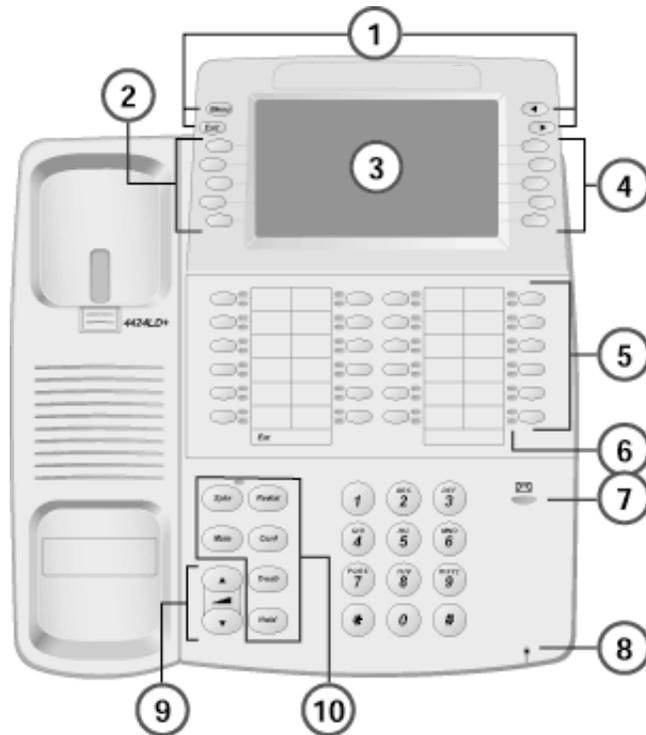
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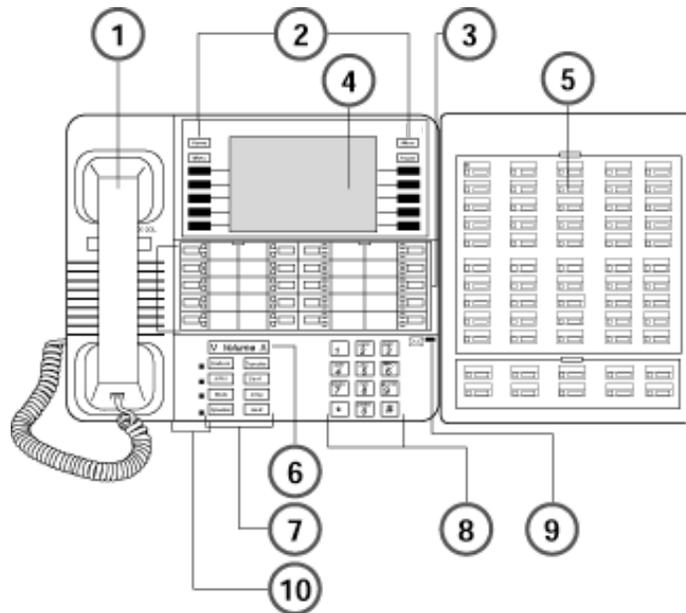
## Overview

The system programming console is a 4424LD+ telephone (see Figure 2-1 on page 2-2) or MLX-20L telephone (see Figure 2-2 on page 2-3) 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 412 LS-ID-TDL or 024 TDL module if you are using a 4424 LD+ telephone, or to the first jack on the first 008 MLX module, 016 MLX module, or 408 GS/LS-ID-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 412 LS-ID-TDL module or 024 TDL module, or on the first 008 MLX module or 408 GS/LS-ID-MLX module. This allows you to program without interfering with the operator's call handling.



**Figure 2-1. The 4424-LD+ Telephone**

- 1 Fixed Buttons
- 2 Softkeys
- 3 7 Line x 24 Character Display
- 4 Softkeys
- 5 Line Buttons
- 6 LEDs
- 7 Message Waiting LED
- 8 Microphone
- 9 Volume
- 10 Fixed Buttons



**Figure 2-2. The MLX-20L Telephone**

- 1 Handset
- 2 Display Buttons
- 3 Call and Fixed-Feature Buttons
- 4 Display Screen
- 5 Direct Station Selector (DSS)
- 6 Volume Control
- 7 Fixed-Feature Buttons (8)
- 8 Dial Pad
- 9 Message Light
- 10 User Cards and Tray

## 4424LD+ and MLX-20L Console Components

Refer to the Figure 2-1 on page 2-2 and Figure 2-2 on page 2-3 for the location of the components described in this table.

**Table 2-1. 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.
Fixed Feature Buttons	<p>4424LD+ telephone fixed display buttons for most-used features:</p> <ul style="list-style-type: none"> <li>■ <b>Spkr</b> (Speaker) for turning the speakerphone on and off.</li> <li>■ <b>Mute</b> for turning the speakerphone's microphone and, if applicable, the headset's microphone on and off.</li> <li>■ <b>Trnsfr</b> (Transfer) for sending a call to another telephone.</li> <li>■ <b>Conf</b> for adding a line or extension to a conference call.</li> <li>■ <b>Redial</b> for redialing the last number dialed from the telephone.</li> <li>■ <b>Hold</b> for putting a call on hold.</li> </ul> <p>MLX-20L telephone fixed display buttons for most-used features:</p> <ul style="list-style-type: none"> <li>■ <b>Feature</b> for viewing the Feature screen and selecting features.</li> <li>■ <b>HFAI</b> (Hands-Free Answer on Intercom) for answering voice-announced calls without the handset.</li> <li>■ <b>Mute</b> for turning the speakerphone's microphone on and off.</li> <li>■ <b>Speaker</b> for talking on a call through the speakerphone without lifting the handset.</li> <li>■ <b>Transfer</b> for sending a call to another telephone.</li> <li>■ <b>Conf</b> for adding a line or extension to a conference call.</li> <li>■ <b>Drop</b> for disconnecting an extension or line from a conference call.</li> <li>■ <b>Hold</b> for putting a call on hold.</li> </ul>
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 <a href="#">“Direct Station Selector (DSS)”</a> on page 2-5.
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 <a href="#">“System Programming Console Buttons”</a> .

**Table 2-1. 4424LD+ and MLX-20L Console Components—Continued**

Component	Function
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.
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.

## Direct Station Selector (DSS)

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 shown in Figure 2-3.

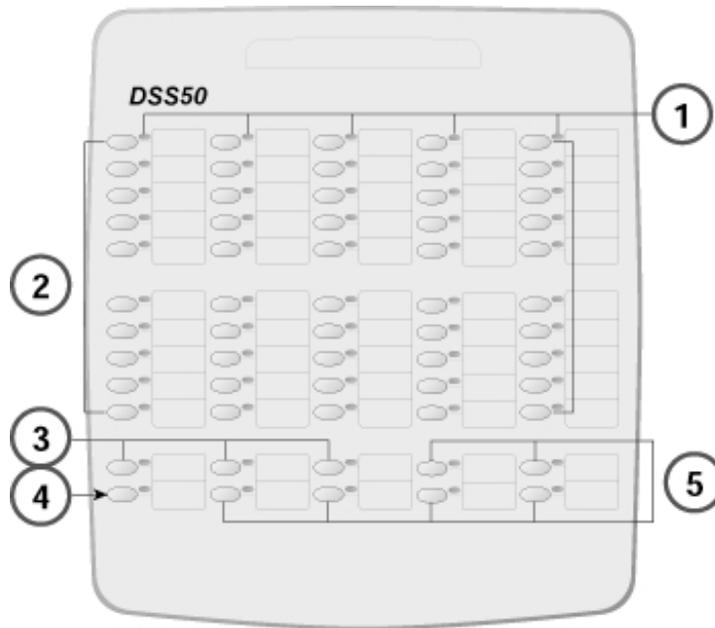
The LEDs on the DSS indicate the status of telephone features during system programming, such as calling restrictions. Each LED on the DSS represents an extension connected to the system. When certain features are selected from the System Programming menu, the LEDs on the DSS indicate the status of the feature for each extension. For example, if Restriction is selected from the Extension menu, the red LED is on for each extension that is toll-restricted.

The LEDs on a DSS change during programming:

- If a local extension is busy because features are being assigned through system or centralized telephone programming, the red LED next to the associated DSS button is on to indicate the busy condition. This occurs when the telephone with the attached DSS is not the one being programmed.
- When you are using a telephone with an attached DSS to program itself or another extension, all but the bottom two rows of LEDs on the DSS turn off during programming mode. The bottom two rows remain unchanged.

When you program a telephone with an attached DSS from another extension, all the LEDs on the DSS turn off, including the bottom two rows, during programming mode.

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**Figure 2-3. DSS4450 for 4400-Series Telephones**

- 1 LEDs (50)
- 2 DSS Buttons (50)
- 3 Page Buttons
- 4 Message Status Button
- 5 Reserved Buttons

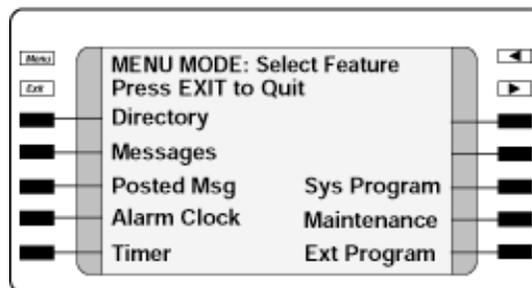
Refer to the Figure 2-3 for the location of the components described in the following table.

**Table 2-2. DSS 4450 Components**

Component	Function
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.

## System Programming 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. 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.



**Figure 2-4. 4424LD+ Display Buttons and Main Menu**

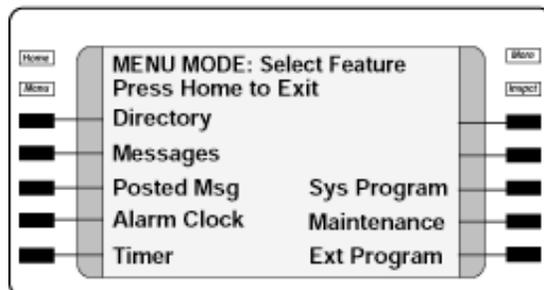


Figure 2-5. MLX-20L Display Buttons and Main Menu

### 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. The functions of the fixed display buttons for the 4424LD+ and MLX-20L consoles are described in the following table.

Table 2-3. Fixed Display Buttons Functions

MLX-20L Buttons	4424LD+ Buttons	Function
Home	Exit	Return to normal call handling mode after you finish programming.
Menu	Menu	Display the Main Menu.
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 display 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 in Standard SPM Mode for system programming, the simulated 4424DL+ or MLX-20L console screen on your PC monitor shows the PC function keys that correspond to the console screen selections. You can use the PC function keys on your keyboard to select an item on the screen, or you can use your Mouse to select a function key or option in the simulated console screen.

---

## Console Overlay

The programmable line buttons are on the main part of the console. There are 24 line buttons on the 4424LD+; 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.

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.

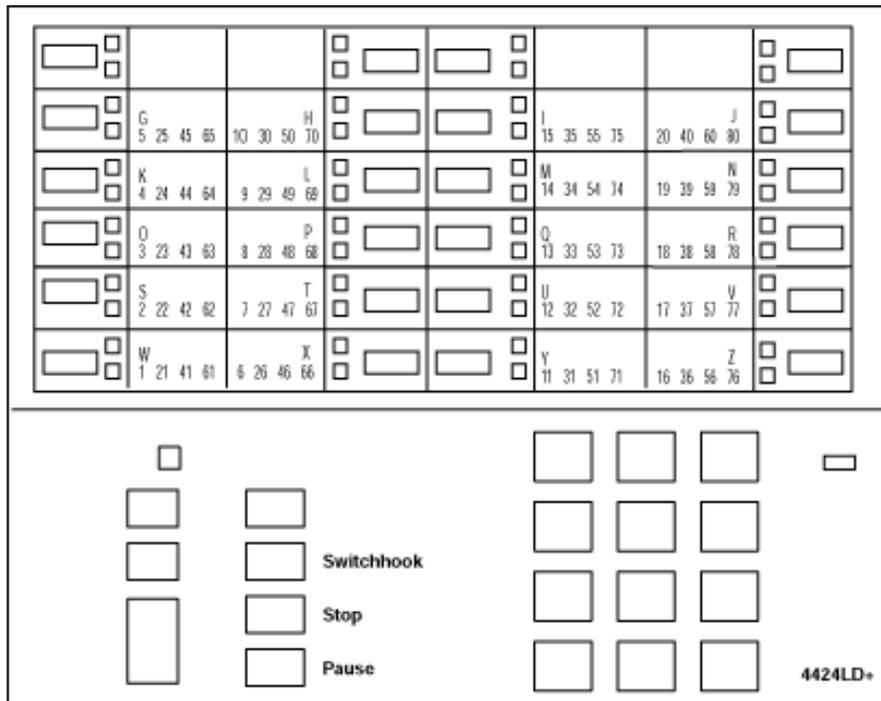
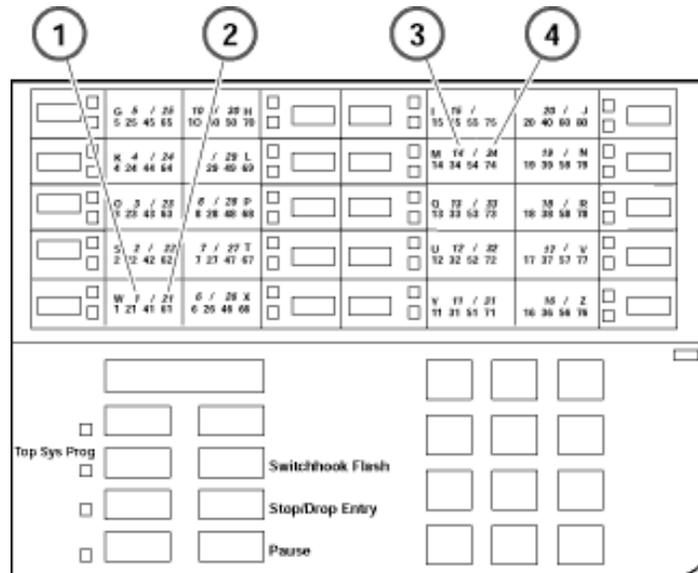


Figure 2-6. 4424LD+ System Programming Console Overlay

**NOTE** ► The function labeled **Top Sys Prog** on the MLX-20L console overlay 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.



**Figure 2-7. MLX-20L System Programming Console Overlay**

- 1 To Central Office or Serving Facility
- 2 C O Lines
- 3 C O Line Protector
- 4 Network Interface

## 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 and on if the line is in a pool. Appendix C in *Feature Reference* provides a table that shows the default LED status for line/trunk options.

## 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. Appendix C in Feature Reference, provides a table that shows the default DSS status of LEDs for system features.

## Displaying the System Programming Menu from the Console

Follow these steps to begin system programming:

**Menu** → Sys Program → Start

The System Programming Menu appears:

System Programming > Make a selection	System Programming: Make a selection
System            Extensions	Labeling            Language
SysRenumbr    Options	Data
Operator        Tables	Print
LinesTrunks   AuxEquip	Cntr-Prg
Back            NightService	Back

**Table 2-4. Description of Options in System Programming Menu**

Option	Description
<b>System</b>	Set system operating conditions.
<b>SysRenumbr</b>	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.
<b>Operator</b>	Assign or remove operator positions, and program operator features (such as Operator Hold Timer or QCC options).
<b>LinesTrunks</b>	Program line/trunk options.
<b>Extensions</b>	Program extension features (such as line assignments).
<b>Options</b>	Program system-wide features (such as Transfer Return).

**Table 2-4. Description of Options in System Programming Menu—Continued**

Option	Description
<b>Tables</b>	Program features that require entering information in a table (such as Allowed Lists and Disallowed Lists).
<b>AuxEquip</b>	Program auxiliary equipment connected to the system (such as loudspeaker paging and fax).
<b>NightSrvce</b>	Program Night Service features.
<b>Labeling</b>	Program the labels shown on display telephones (such as Posted Messages and entries in the System Directory).
<b>Data</b>	Specify extensions that need voice and data capability.
<b>Print</b>	Print system programming reports (such as system configuration and extension assignments).
<b>Cntr-Prog</b>	Perform centralized telephone programming (assign features to specific buttons on telephones).
<b>Language</b>	Select the language for: the system, 4400-Series or MLX display telephones, SMDR reports, and print reports.

## Exiting System Programming

Use the information in this table to return to the System Programming menu, the Main menu (Menu Mode screen), or the Home screen from within a programming screen.

**Table 2-5. Selections to Return to the System Programming Menu**

To return to...	Select...
Previous menu	<b>Back</b>
Main menu	<b>Menu</b>
Normal Call-Handling	MLX-20L Console: <b>Home</b> 4424LD+ Console: <b>Exit</b>



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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 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 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, administering 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. The WinSPM software can be used directly from the CD-ROM on your PC. If your PC has a hard disk, however, you should install WinSPM from the 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 more (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 [“Setting Font Size”](#) under [“Setting Up your Desktop”](#).

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 is installed from the 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.)

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. Upon installation of the WinSPM software, the WinSPM main screen appears (see [“About the WinSPM Main Screen Options”](#) on page 17 for more information):



**Figure 3-1. WinSPM Main Screen**

After WinSPM is installed, the First Time User Wizard (FTUW) assists you through the following four steps described in detail on the following pages:

- Setting Up Your Desktop
- Defining Your Password
- Setting Up a Site
- Connecting a PC to the MERLIN MAGIX Integrated System

## Setting Up your Desktop

Setting up your desktop includes the following tasks:

- Setting Font Size
- Setting the Modem Definition
- Setting the Start Bar Auto Hide Property/Changing the Screen Resolution

### Setting Font Size

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.

### Setting the 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 baud, the modem in the MERLIN MAGIX Integrated System may time-out before your modem has enough time to step down to 2400 baud and establish communications. For this reason, it is suggested that you use a modem definition with a Maximum Speed of 2400 baud. 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 dial tone 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 “Auto hide” 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 3-41](#) 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 the following pages):

- **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, follow these steps:

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 Connection 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 system programming port.
7. For MERLIN MAGIX systems or MERLIN LEGEND systems Release 3.0 and later, make sure that 2400 is shown in the Baud Rate combo box. For MERLIN LEGEND systems Release 1.0/2.0, 1200 baud is recommended.
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 get a message indicating that the cable between your PC and the communications system is not connected, check to be sure that the cable is connected properly. If the cable is connected properly, try disabling Direct Connection Detection in the Options screen.
  - 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, follow these steps:

1. Using the instructions packaged with your PC modem, verify that the software and hardware flow control is disabled in the modem properties. This is required when connecting to a MERLIN MAGIX Release 1.5 or later system, and is recommended for all releases of the communications system.
2. From the Site Setup screen, click Add. The cursor moves to the Site Name field.
3. 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.
4. 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
5. Click the Internal Connection tab.
6. Select the Enabled check box. A check mark appears in the box and the Dial String dialog box is no longer grayed out.
7. Be sure that the Dial String check box displays \*10.
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.

## External Connection

To set up a site for an External Connection, do the following:

1. Using the instructions packaged with your PC modem, verify that the software and hardware flow control is disabled in the modem properties. This is required when connecting to a MERLIN MAGIX Release 1.5 or later system, and is recommended for all releases of the communications system.
2. From the Site Setup screen, click Add. The cursor moves to the Site Name field.
3. 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.
4. 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
5. Click the External Connection tab.
6. Select the Enabled check box. A check mark appears in the box and the Dial String dialog box is no longer grayed out.
7. 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.

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.

## Manual Connection

To set up a site for a Manual Connection, do the following:

1. Using the instructions packaged with your PC modem, verify that the software and hardware flow control is disabled in the modem properties. This is required when connecting to a MERLIN MAGIX Release 1.5 or later system, and is recommended for all releases of the communications system.
2. From the Site Setup screen, click Add. The cursor moves to the Site Name field.
3. 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.
4. 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
5. Click the Manual Connection tab.
6. Click the Enabled check box. A check mark appears in the box and the Dial String dialog box is no longer grayed out.
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 Apply.

When using Manual to connect, a dialog box with an OK button appears. When you see this box, place a voice call to the system on a regular line and ask the operator to transfer you to the MERLIN MAGIX programming port by dialing \*10. When you hear the modem answer tone, click OK to complete the connection and then hang up the handset.

- 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 a PC to a MERLIN MAGIX Integrated System

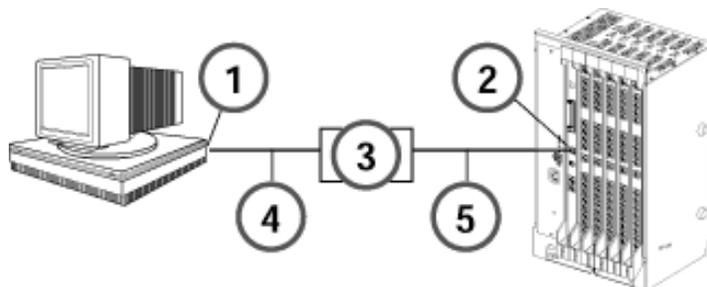
There are three ways to connect to the MERLIN MAGIX system:

- Direct Local Connection
- Internal Connection
- External Connection

### 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 6-2. (The upper jack is reserved for the SMDR printer.)

For direct local connections, the system supports speeds of 1,200 and 2,400 bps.



**Figure 3-2. Direct Connection, PC Less Than 50 Feet Away**

- 1 Serial Communications Port
- 2 System Programming Jack
- 3 355AF Adapter
- 4 RS-232
- 5 D8W

To connect a PC more than 50 feet from the control unit, see “Connecting a PC More Than 50 Feet (15.2 m) Away” in the *Installation Guide*.

**NOTE** ► You must use a direct local connection to program in surrogate mode. See “[About Surrogate Mode Programming](#)” for more information.

## About Surrogate Mode Programming

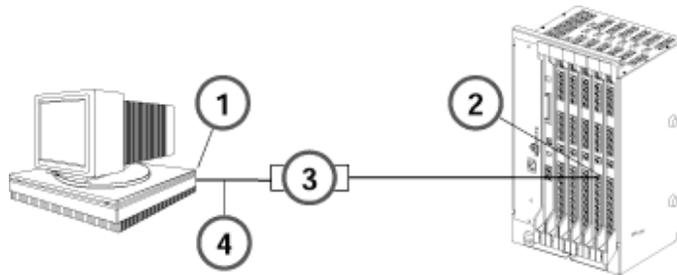
Surrogate mode allows qualified service personnel to perform system programming at an off-site service location. The actual system hardware does not have to be installed -- the programmer needs a power supply, carrier, processor, and a direct connection from the PC to the processor module. By following 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.

## 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, or to a jack that has been programmed for T/R on a 016 ETR module in the control unit, as shown in Figure 6-4.

The internal modem operates at speeds of 1200 and 2400 bps.

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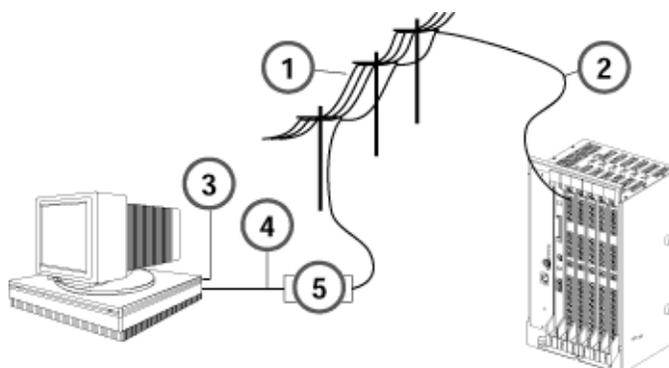
**Figure 3-3. Connecting a Modem to a T/R Extension Jack**

- 1 To Central Office or Serving Facility
- 2 CO Lines
- 3 CO Line Protector
- 4 Network Interface

## 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 6-5.

The internal modem operates at speeds of 1200 and 2400 bps.



**Figure 3-4. Connect to the MERLIN MAGIX Internal Modem from a Remote Location**

- 1 Public or Private Telephone Network
- 2 Incoming Trunk Line
- 3 Serial Communications Port
- 4 RS-232
- 5 Modem

## About the WinSPM Main Screen Options

The following options are available from the left hand panel on the WinSPM Main Screen:

- **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. See [“Using Standard SPM Mode”](#) for more information.
- **Pass-Thru.** This icon appears if a 100R INA module is installed and you are not connected using a Direct Connection. It will launch a terminal emulation window, allowing the user to access the “command line” administration of the 100R INA module.
- **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, Telephone Restrictions.

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## Using View

WinSPM provides the View interface which allows you to browse and view, save and/or print reports and notes saved in WinSPM. The Tools option is available from the left-hand panel on the WinSPM Main Screen. For instructions on performing these tasks, refer to [“Browse” on page 3-36](#).

---

## Using Tools

WinSPM provides the Tools interface which allows you to complete common system tasks in an extremely user-friendly manner. The Tools option is available from the left-hand panel on the WinSPM Main Screen. For instructions on performing these tasks, refer to [“Basic System Management Procedures” on page 3-31](#).

The following tasks can be performed from the Tools option:

- **Backup.** The Backup option 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. For detailed instructions, refer to [“Backup” on page 3-31](#).
- **Restore.** The Restore option is by qualified service personnel to load system programming from either a disk or from the hard disk into the processor module memory. For detailed instructions, refer to [“Restore” on page 3-44](#).
- **Browse.** The Browse option is used to browse through reports and notes saved in WinSPM. For detailed instructions, refer to [“Browse” on page 3-36](#).

## Using Quick Access

WinSPM provides the Quick Access interface which allows you to complete common tasks in an extremely user-friendly manner. The Quick Access tasks are available from the left-hand panel on the WinSPM Main Screen. Overviews of these tasks are provided in this section. For more information on how to use Quick Access, refer to the documentation and online help provided with the WinSPM application.

The Quick Access window 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 [“Using Standard SPM Mode”](#) on page 27.

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 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, see “Allowed Lists/Disallowed Lists” in *Feature Reference*.

### 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 “Automatic Route Selection” in *Feature Reference*.

### 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 “Pickup” in *Feature Reference*.

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. For more information, refer to “Group Calling” in *Feature Reference*.

From the Calling Group Quick Access screen, you pick the Calling Group you wish to modify by highlighting it. There are seven tabs able to 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.
  - Using the non-local UDP (Universal Dial Plan) button, extensions defined in the non-local UDP ranges can be added as a member of a Calling Group. When added to a group, the single non-local extension can be the ONLY member of the group. If there are already “local” members in the group when you attempt to add the Non-Local Extension, you are asked if you want them removed (WinSPM handles the removal).

## Capture Data

This feature allows you to read from MERLIN MAGIX in one large batch. This is useful if you are setting up MERLIN MAGIX 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” in the Coverage section of *Feature Reference*.

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. For more information, refer to “Persona Lines” in *Feature Reference*.

**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.
- A Synchronize button that will give 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.

For more information, refer to "Speed Dial" in *Feature Reference*.

## Station Responding Test

For Release 1.5 and later systems, this feature allows you to check the connection between an extension and the system. When you select this test from the maintenance screen, the system sends a request to the telephone at the extension you specify, asking for the telephone's classmark. You can request the Refer to Maintenance and Troubleshooting for details on this test.

## 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. For more information, refer to “Calling Restrictions” in *Feature Reference*.

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).
- 

## Using Standard SPM Mode

Standard SPM provides an emulation display of the system programming console. It allows all system programming of the MERLIN MAGIX system to be performed from a PC and supports programming for options not included in the Quick Access GUI. In addition, the SPM Main Menu provides four options-- Backup, Boards, Print Opts, and Restore --that are intended for qualified service personnel only and are not available from the system programming console. This section describes how to use the Standard SPM Mode screens.

## Displaying the SPM Main Menu

To open WinSPM and display the SPM Main Menu, follow these steps:

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. In the left-hand panel 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. In the left-hand panel of the WinSPM main screen, click the Standard SPM icon. The system programming console appears in the emulation window and the SPM Main Menu appears in the console display area (Figure 3-5).

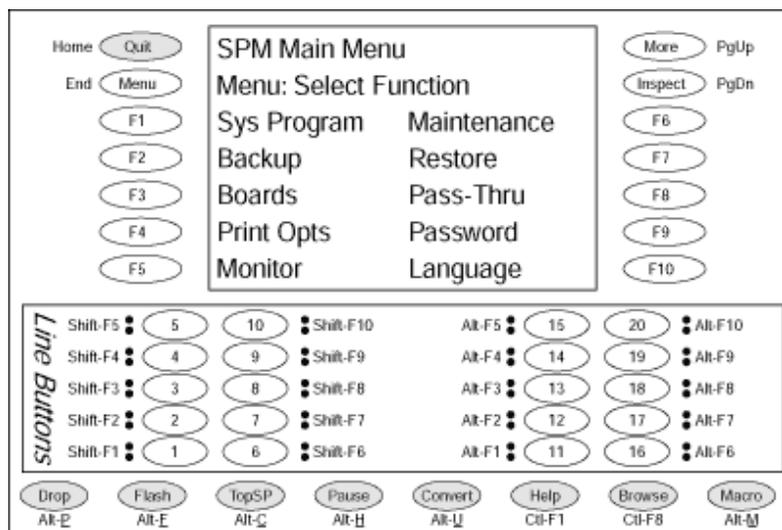


Figure 3-5. Standard SPM Mode Display

### About the Emulation Window

The standard SPM Mode screens simulate the programming console. The screen consists of the following:

- A 7-line by 24-character console simulation screen that corresponds to the display area of the MLX-20L or 4424LD+ telephone.
- Four PC keys (Home, End, PgUp, and PgDn) displayed on either side of the console simulation screen. They represent the fixed display buttons on the MLX-20L or 4424LD+ telephone.
- Function keys [F1] through [F10] displayed on either side of the console simulation screen. They represent the keyboard function keys to use to select the corresponding options. They are similarly located to the telephone buttons on the MLX-20L or 4424LD+ telephone that you would use to select a programming option.
- 20 simulated line buttons displayed below the console simulation screen. Press the key combination on the keyboard to select the corresponding line button.
- 8 labels along the bottom of the screen correspond to buttons on the 4424LD+ or MLX-20L telephone.

**NOTE** ▶ Rather than using the keyboard, you can use your mouse to select any option in the Standard SPM Mode screens.

Table 3-1 describes the function of PC keys in Standard SPM Mode.

### Using Standard SPM Mode

Table 3-1. Function of PC Keys in WinSPM

PC Key	MLX-20L	4424LD+	WinSPM Function
Home	Home	Exit	Quit. Exit from WinSPM when you finish with system programming. If you are using a modem, the call is disconnected.
End	Menu	Menu	Return to the WinSPM Main menu.
PgUp	More	>	Display more menu items (when there is another screen and the > symbol appears next to the key).
PgDn	Inspct (MLX- 20L only)		Display the current information that has been programmed for a feature or button. <i>(There is no fixed Inspct button on the 4424LD+ console. This button must be programmed onto a feature key on the 4424LD+ console.)</i>
Drop	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. <i>(There is no fixed Drop button on the 4424LD+ console. This button must be programmed onto a feature key on the 4424LD+ console.)</i>
Flash	Conf	Conf	Flash. Enter a switchhook flash in a speed-dialing sequence.
TopSP	n/a	n/a	TopSP. Return to the top of the System Programming menu.
Pause	Hold	Hold	Pause. Enter a pause in a speed-dialing sequence.
Toggle	n/a	n/a	Toggle modem speed between 1200 and 2400 bps.
Help	n/a	n/a	Help. Display a Help screen about WinSPM operations.
Reset	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.
Browse	n/a	n/a	Browse. View print reports saved with Print Opts.
Enter	Enter	Enter	The <b>Enter</b> key on your PC can be used instead of <b>F10</b> when <b>Enter</b> appears as a choice in the console simulation window.
Bksp	Backspace	Backspace	The <b>Bksp</b> key on your PC can be used instead of <b>F9</b> (Backspace) when <b>Backspace</b> appears as a choice in the console simulation window.

**Table 3-1. Function of PC Keys in WinSPM—Continued**

PC Key	MLX-20L	4424LD+	WinSPM Function
Del	Delete	Delete	The <b>Del</b> key on your PC can be used instead of <b>F8</b> (Delete) when Delete 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.

## Options in the SPM Main Menu

Table 3-2 lists the options in the SPM Main Menu and gives a brief description of each option. Detailed procedures for each option are on the following pages.

**Table 3-2. SPM Main Menu Options**

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	(IS II/III and 100R INA only) To make a remote connection, through the control unit, to a 100R INA module or IS II/III PC to program applications on the IS II/III PC.
Password	To change the password for remote entry into the system
Language	To select a language (U.S. English, Canadian French, or Latin American Spanish) 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.

## Basic System Management Procedures

This section contains detailed instructions for the following basic system management tasks:

Backup

Boards

Browse

Language

Maintenance

Monitor

Pass-Thru

Password

Print Options

Restore

Instructions are provided for completing each of these task using WinSPM in Standard Mode and where available, using the Tools option from the WinSPM Main Screen. Tasks are listed in alphabetical order in this section. Refer to [“Displaying the System Programming Menu from the Console”](#) on page 2-12.

### 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.

### Standard SPM Mode Procedure

To perform the backup procedure in the Standard SPM mode, follow the steps below:

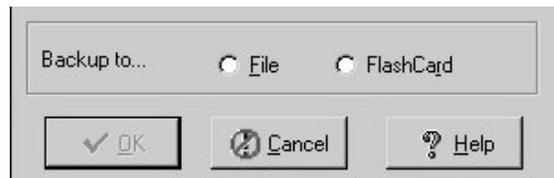
Backup → Select GOTO FLOPPY or GOTO HARD DISK →  → Specify default filename or Make new file name →  →  to continue or  to abort →  to abort or  to return to the Standard SPM Main menu

### WinSPM Tools Menu Procedure

To perform the backup procedure using the WinSPM Tools Menu, follow the steps below:

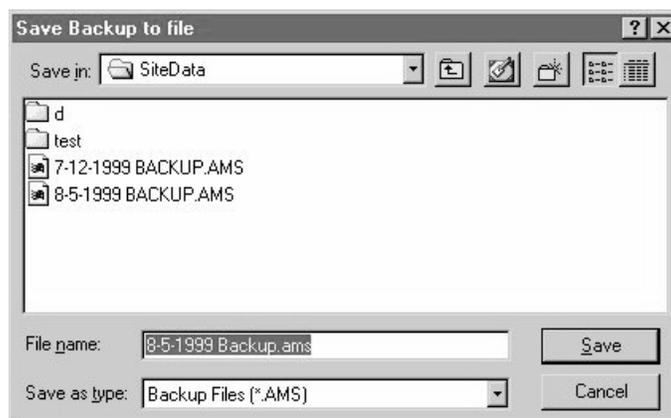
1. From the WinSPM Main window Outlook bar (left-hand panel), select **Tools**.
2. From the Outlook bar (left-hand panel), click the **Backup** icon.

*A selection dialog box displays.*



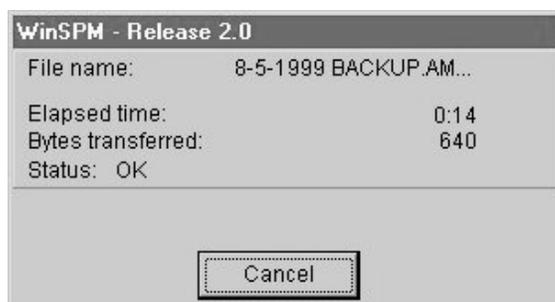
3. Select the File option.
4. Click **OK**.

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 module 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 modules 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 module type. All modules assigned with the Boards option, including phantom modules, are cleared (unassigned) if you perform a board renumber (`System→Board Renum`). See [“Board Renumbering with the 016 MLX Module” on page 3-46](#) for complete instructions for board renumbering when replacing MLX modules.

- You must assign phantom modules to higher slot numbers than those you assign to any real modules. If you assign a phantom module to a lower slot number than a real module, the control unit does not recognize the real module or modules that follow the phantom module.
- If you remove a module but do not replace it, and then perform a board renumber, the control unit will not recognize any modules that follow the empty slot. You must reseal all of the modules to fill the empty slot before you perform the board renumber. See [“Board Renumbering with the 016 MLX Module” on page 3-46](#) for complete instructions for board renumbering when replacing MLX modules.

The Inspect function (**PgDn**) lets you see which modules have been assigned to slots on the control unit. Note that both phantom modules and real modules appear if you use the Inspect feature. Table 6-3 shows the type of boards that you can select. To see only real module assignments, you must print the System Information report: `System→More→Print→SysSet-up`.

**Table 3-3. Board Types**

Board Type	Description
412LUP	4 loop-start line jacks and 12 digital extension jacks with 4 touch-tone receivers; Caller ID
024UPO	24 digital extension jacks
016MLX	16 MLX extension jacks (32 endpoints); upgradeable with PCMCIA card
008MLX	8 MLX extension jacks (16 endpoints)
016ETR	16 ETR extension jacks including 6 with tip/ring functionality with 4 touch-tone receivers
016TRR	16 tip/ring extension jacks with 4 touch-tone receivers
008OPT	008 OPT - 8 tip/ring extension jacks with 2 touch-tone receivers
MERLINMsg	MERLIN Messaging - 11 internal tip/ring extension jacks with 2 touch-tone receivers; MERLIN Messaging System resides on this module
100D	24 channels (“virtual” lines/trunks); upgradeable with PCMCIA card
800BRI	8 BRI facilities
408GLM	4 ground-start/loop-start line jacks and 8 MLX extension jacks (16 endpoints); Caller ID; upgradeable with PCMCIA card
100R	24 channels (virtual lines/trunks) with internal CSU; upgradeable with PCMCIA card
100DCD	24 channels (virtual lines/trunks) with internal CSU/DSU; upgradeable with PCMCIA card
800DID	8 DID line jacks
800LID	8 loop-start line jacks, Caller ID
400E&M	4 tie trunks

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

**NOTE** ► Select 100D for either a 100D-U or a 100 DCD module. When you use the Inspect feature, 100DCD is shown on the list. To see the module that is physically installed, use a print report or inventory screen.

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.

**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**.

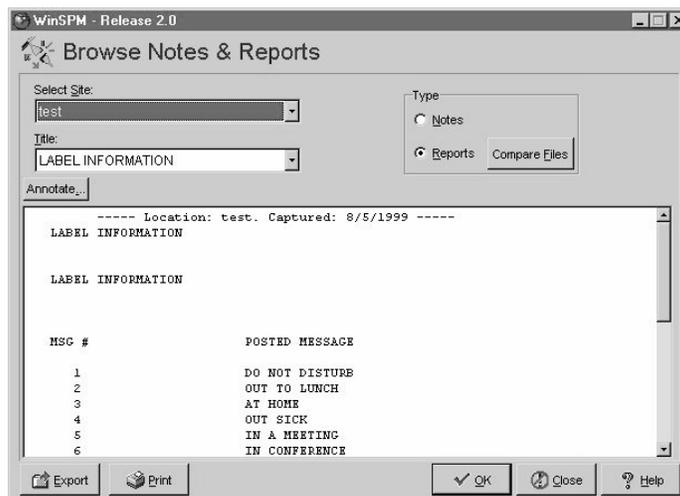
To view the previous page of a report, click **PgUp**.

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.

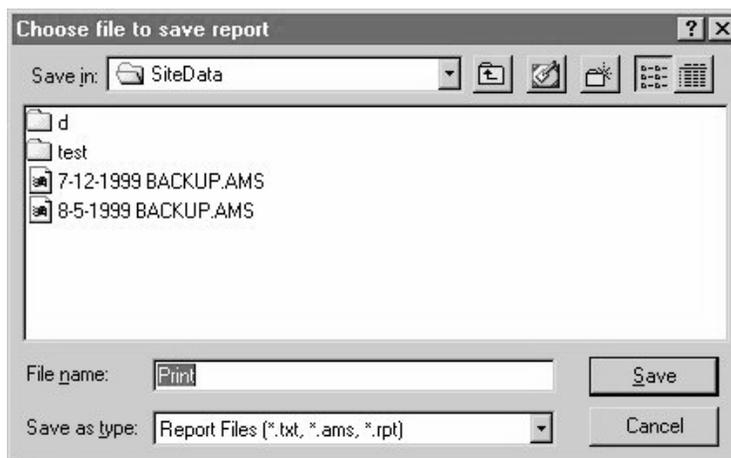


3. From the Type field, select whether you want to view reports or notes.
4. From the drop-down list, select the report/notes you want to view.
5. Click **Print** to print the report to your default printer.

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, or Latin American Spanish. 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 information pertains 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
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 allows qualified service personnel to program IS II/III<sup>1</sup> applications (and a 100R INA module) on a remote PC. It permits you to establish a remote connection with the control unit to which the IS II/III PC is directly connected.

A Pass-Thru request must be initiated at a PC; it is not available from a UNIX System PC—that is, Pass-Thru cannot be established between two IS II/III PCs. The local admin PC must be in an idle state.

A Pass-Thru request to a locally connected IS II/III system causes the modem to fall back to 1200 bps if the speed is set to 2400 bps and the modem call to the control unit is at 1200 bps. If necessary, the system adjusts its speed to that of the local SPM PC.

Once the Pass-Thru connection is established, you can program in any of the following IS II/III applications from your SPM PC:

- AUDIX Voice Power<sup>®</sup>
- Call Accounting System<sup>2</sup>
- Fax Attendant System (IS III only)
- CONVERSANT Intro (IS III only)

---

1 Can no longer be ordered.

2 Can be ordered only as an upgrade to existing CAS installations.

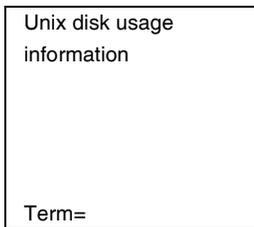


3. Type the IS II/III password, and press **Enter**.



Terminal window showing the prompt "Password:".

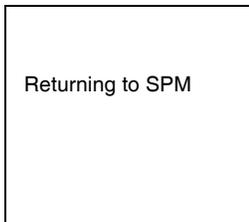
4. Type `ams` for the terminal emulation type, and press **Enter**.



Terminal window showing "Unix disk usage information" and "Term=".

- If you are working with IS II, the IS II Main menu appears.
  - If you are working with IS III, the system prompts you for your login registration. After you enter your login and press **Enter**, the IS III Main menu appears.
5. To exit from IS II/III programming, click **F5** (**Back**).

The system prompts you for confirmation that you want to exit. After confirmation, the following message appears:



Terminal window showing the message "Returning to SPM".

## 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” in *Feature Reference* for more information about the print procedure using the system console and the SMDR port.

## PC Port Output

See “Printing Reports” in *Feature Reference* 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 “Backup” on page 3-31.
- 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.*

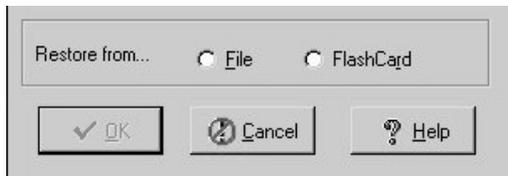
#### Standard SPM

**F7** → Select Restore → Select hard disk or floppy → **F10** → Select a file → **Enter** → **Ctrl F5** to abort → **Enter**

#### WinSPM

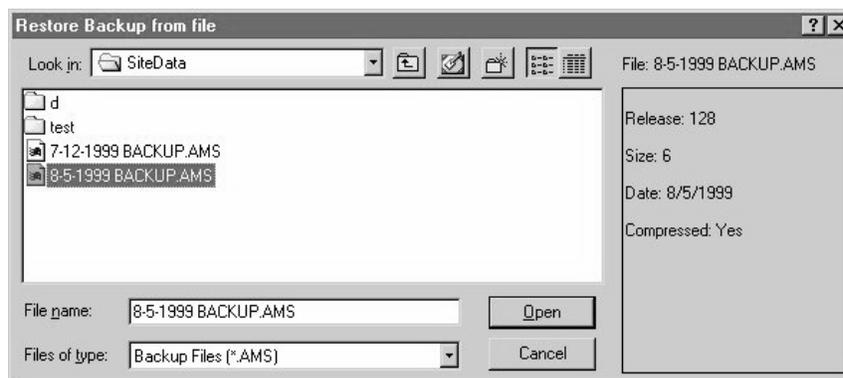
1. From the WinSPM Main window Outlook bar, select **Tools**.
2. From the Outlook bar, click the **Restore** icon.

*A selection dialog box displays.*



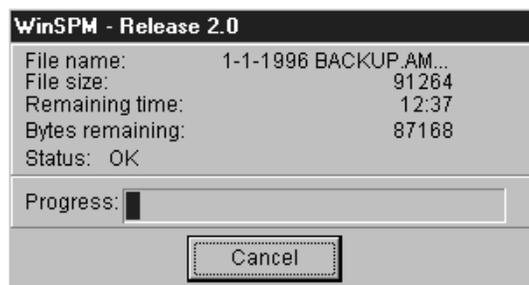
3. Select the File option.
4. Click **OK**.

*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

The **Sys Program** option provides the System Programming Menu from which you can perform all system programming available on the system programming console.

### Procedure

To display the System Programming Menu from the SPM Main Menu, follow these steps:

Sys Program→Start (System Programming Menu appears)→**More** (to view the second page of the System Programming Menu)→Back (to return to previous menu)

See [“Description of Options in System Programming Menu”](#) on page 2-12 for a brief description of each option on the System Programming Menu.

---

## Board Renumbering with the 016 MLX Module

### CAUTION:

*For installed MERLIN MAGIX systems:*

- *Replacing one module (such as the 008 MLX module) with the 016 MLX module may result in the shifting of logical IDs and require numerous extension programming changes.*
- *This document includes the supported configurations where you can use the Board Renumber procedure instead of reprogramming the system and includes detailed procedures that you must follow for each configuration.*
- *For instructions on how to remove or install modules in a carrier, please see “Replacing a Module” in the Installation Guide (document number 555-661-140) for details. If you do not have the Installation Guide, you can order one by calling the BCS Publications Center at 1 800 457-1235.*

Your service call may involve installing a 016 MLX module to replace other telephone modules in the MERLIN MAGIX Integrated System. Replacing another module with a 016 MLX module may cause the logical IDs to shift. In some cases, you can use the Board Renumber procedure to reassign the logical ID numbers to the extension and line ports. In other cases, you must completely reprogram the entire system to restore the customer's configuration.

The following are SUPPORTED configurations where you can use Board Renumber procedure to reassign the logical ID numbers:

- Adding a 016 MLX module at the end of an existing system.
- Replacing two 008 MLX modules that are the last two modules in the system with one 016 MLX module.
- Replacing a 008 MLX module with a 016 MLX module.

- Replacing a 008 OPT module with a 016 MLX module.
- Replacing a 016 T/R module with a 016 MLX module.

The procedure for each of the supported configurations is explained in the following sections. If you have a situation that is different from one of these configurations, you must completely reprogram the system. A Board Renumber will not correct the logical ID shift.

- NOTES** ►
- You may encounter more than one of these configurations while completing an installation. Be sure to finish one procedure completely before you start the procedure for another configuration. An example of this is when a customer wants to replace one 008 MLX module and one 008 OPT module with two 016 MLX modules. Complete all steps for the 008 MLX procedure before doing the 008 OPT procedure.
  - If you are replacing a 016 ETR module with a 016 MLX module, contact the Avaya Customer Care Center at 1 800 628-2888.



**CAUTION:**

*This procedure does not apply for exchanges of any module that includes line/trunk ports. If you must exchange a line/trunk module (408 GS/LS-ID-MLX, etc.), you must completely reprogram the entire system manually to restore the customer's configuration. A Board Renumber procedure should not be used.*

## Adding a 016 Module at the End of an Existing System

Follow these steps when you are adding a 016 MLX module to the end of an existing system:

1. Back up the system programming to the customer backup card. Use a filename that describes the pre-016 MLX configuration—for example, “pre-016 MLX.”
2. Print a System Setup report. Determine whether the last slot/slots are programmed with phantom modules. If there are phantom modules, the programming for these modules will be removed when the new 016 MLX module is implemented.
3. If no phantom modules are programmed, go to Step 4. If there are phantom modules, print all Extension Information reports for the extensions and MFMs connected to the phantom modules. The extensions must be re-programmed after the new 016 MLX module is implemented.
4. Power down the system and install the 016 MLX module in the next available slot.
5. Power up the system.
6. Perform a Board Renumber procedure (Sys Program (F1) → System → (F1) → Board Renum (F1) → Yes (F2)).
7. Print an Extension Directory report to verify the new extension numbers on the 016 MLX module, and program as necessary to meet customer needs.
8. If phantom modules were programmed, re-program the phantom modules, as needed using the information in the Extension Information reports printed in Step 3.

9. Back up the system to a new filename to keep the first backup intact. Use a filename that describes the post-016 MLX configuration-for example, "post-016 MLX."

### **Replacing Two 008 MLX Modules with One 016 MLX Module When the 008 MLX Modules are the Last Two Modules in the System**

Follow these steps when you are replacing two 008 MLX modules at the end of the system with one 016 MLX module:

1. Back up the system programming to the customer backup card. Use a filename that describes the pre-016 MLX configuration-for example, "pre-016 MLX."
2. Print a System Setup report. Determine whether the last slot/slots are programmed with phantom modules. If there are phantom modules, the programming for these modules will be removed when the new 016 MLX module is implemented.
3. If no phantom modules are programmed, go to Step 4. If there are phantom modules, print all Extension Information reports for the extensions and MFMs connected to the phantom modules. The extensions must be re-programmed after the new 016 MLX module is implemented.
4. Print an Extension Directory report. (This report also includes phantom extension numbers.)
5. Print a Group Calling Information report.
6. Print a Group Coverage Information report.
7. Print Extension Information reports for all ports (including MFMs) on the two 008 MLX modules that are being replaced.
8. Identify all Inside Auto Dial, Manual Signal, or Extension Pickup buttons programmed on other telephones that point to the extensions on the 008 MLX module to be replaced. The programming for these buttons will be removed after the Board Renumber procedure. These buttons are not shown on the Extension Information report, so you must identify these buttons with the customer.
9. Power down the system, and replace the two 008 MLX modules with the 016 MLX module.
10. Power up the system.
11. Perform a Board Renumber procedure: Sys Program (F1)→System (F1) → Board Renum (F4) →Yes (F2).
12. Print a new Extension Directory report. Verify that the extensions on the new 016 MLX match those of the previous two 008 MLX modules.
13. Program the extensions and MFMs by using the Extension Information reports printed in Step 7.
14. Program any Calling Group or coverage group membership, and any buttons identified in Step 8.
15. If phantom modules were programmed, re-program the phantom modules, as needed using the information in the Extension Information reports printed in Step 3.

16. Back up the system to a new filename to keep the first backup intact. Use a filename that describes the post-016 MLX configuration-for example, "post-016 MLX."

## Replacing a 008 MLX Module with a 016 MLX Module

### WARNING:

*If you are replacing more than one 008 MLX module, repeat Steps 1-17 for each module. Do not try to replace more than one 008 MLX module at a time, because the system programming will be corrupted and you will need to completely reprogram the entire system manually to restore the customer's configuration.*

Follow these steps to replace a 008 MLX module with a 016 MLX module:

**NOTE** ► This procedure adds eight additional logical IDs to the system configuration, starting after the first eight ports of the new 016 MLX module. (This occurs because you are adding eight ports to the system for each 016 MLX module that replaces a 008 MLX module.) The second set of eight ports on the 016 MLX module will acquire the extension numbers from the next extension module to the right in the system. This slippage continues for the rest of the extension modules in the system. You must do extensive station renumbering for the extensions that follow the new 016 MLX module.

1. Back up the system programming to the customer backup card. Use a filename that describes the pre-016 MLX configuration-for example, "pre-016 MLX."
2. Print a System Setup report. Determine whether the last slot/slots are programmed with phantom modules. If there are phantom modules, the programming for these modules will be removed when the new 016 MLX module is implemented.
3. If no phantom modules are programmed, go to Step 4. If there are phantom modules, print out all the Extension Information reports for the extensions and MFMs connected to the phantom modules. The extensions must be re-programmed after the module is implemented.
4. Print an Extension Directory report. (This report also includes phantom extension numbers.)
5. Print a Group Calling Information report.
6. Print a Group Coverage Information report.
7. Print Extension Information reports for all ports (including MFMs) on the 008 MLX module that is being replaced.
8. Power down the system and replace the 008 MLX module with the 016 MLX module.
9. Power up the system.
10. Perform a Board Renumber procedure: Sys Program (F1)→System (F1)→Board Renum (F4)→Yes (F2).

11. Print a new Extension Directory report.

**NOTE** ► Remember that the extension numbers have increased by eight, beginning after the first eight extension numbers on the 016 MLX module.

12. Extension numbers from the module immediately to the right of the 016 MLX module have migrated to the top eight ports of the 016 MLX module. Renumber these ports to unused extensions. This releases the migrated extensions to be moved back into their original slot/ports.
13. Using the Extension Directory report that was printed in Step 4, renumber the extensions back to their original ports. Start the renumbering with the first module after the 016 MLX module. Use the eight extensions that were released in Step 12. These extensions are the extensions originally located on the first eight ports of the module after the replaced module. Use individual or block renumber as needed to perform this operation.
14. Continue to renumber the rest of the extensions back to their original ports until you reach the end of the system.
15. Print a Group Calling Information report, and compare it to the Group Calling Information report you printed in Step 5. Since Calling Group extensions may reverse themselves after a Board Renumber, verify that the extension numbers are in the correct order. If the extensions are reversed, re-program as necessary to put in correct order.
16. Verify the programming on the first eight ports of the 016 MLX module. Use the Extension Information reports that were printed in Step 7.
17. Print a new Group Coverage Information report and compare it to the previous Group Coverage Information report. Verify that the appropriate members are in the group. Program as necessary to match the previously printed report.
18. If additional 016 MLX modules are to be added, repeat ALL of the above steps for each module. If not, go to Step 19.
19. If phantom modules were programmed, re-program the phantom modules, as needed using the information in the Extension Information reports printed in Step 3.
20. Program the new extension ports to meet the customer's needs.
21. Back up the system to a new filename to keep the first backup intact. Use a filename that describes the post-016 MLX configuration-for example, "post-016 MLX."

## Replacing a 008 OPT Module with a 016 MLX Module

### WARNING:

*If you are replacing more than one 008 OPT module, repeat Steps 1-19 for each module. Do not try to replace more than one 008 OPT module at a time, because the system translations will be corrupted and you will need to completely reprogram the entire system manually to restore the customer's configuration.*

**NOTE** ► This procedure adds an additional four logical IDs to the system configuration, starting after the first 12 ports of the new 016 MLX module. (This occurs because you are adding four ports to the system for each 016 MLX module.) The four top ports on the 016 MLX module will acquire the extension numbers from the next extension module to the right in the system. This slippage continues for the rest of the extension modules in the system. You must do extensive renumbering for the extensions that follow the new 016 MLX module. This procedure removes any T/R functionality, any features that may have been programmed, and any buttons (for example Inside Auto Dial) that point to those extensions.

Follow these steps to replace a 008 OPT module with a 016 MLX module:

1. Back up the system programming to the customer backup card. Use a filename that describes the pre-016 MLX configuration-for example, "pre-016 MLX."
2. Print a System Setup report. Determine whether the last slot/slots are programmed with phantom modules. If there are phantom modules, the programming for these modules will be removed when the new 016 MLX module is implemented.
3. If no phantom modules are programmed, go to Step 4. If there are phantom modules, print all Extension Information reports for the extensions and MFMs connected to the phantom modules. The extensions must be re-programmed after the new 016 MLX module is implemented.
4. Print an Extension Directory report. (This report also includes phantom extension numbers.)
5. Print a Group Calling Information report.
6. Print a Group Coverage Information report.
7. Print Extension Information reports for all ports on the 008 OPT module that is being replaced.
8. Identify all Inside Auto Dial, Manual Signal, or Extension Pickup buttons programmed on other telephones that point to the extensions on the 012 (T/R) module to be replaced. The programming for these buttons will be removed after the Board Renumber procedure. These buttons are not shown on the Extension Information report, so you must identify these buttons with the customer.
9. Power down the system and replace the 008 OPT module with the 016 MLX module.
10. Power up the system.
11. Perform a Board Renumber procedure: Sys Program (**F1**)→System (**F1**)→Board Renum (**F4**)→Yes (**F2**).

12. Print a new Extension Directory report.

**NOTE** ► Remember that the extension numbers have increased by four, beginning after the first 12 extension numbers on the 016 MLX module.

13. Extension numbers from the module immediately to the right of the 016 MLX module have migrated to the top four ports of the 016 MLX module. Renumber these ports to unused extensions. This releases the migrated extensions to be moved back into their original slot/ports.
14. Using the Extension Directory report that was printed in Step 4, renumber the extensions back to their original ports. Start the renumbering with the first module after the 016 MLX module. Use the four extensions that were released in Step 13. These extensions are the extensions originally located on the first four ports of the module after the replaced module. Use individual or block renumber as needed to perform this operation.
15. Continue to renumber the rest of the extensions back to their original ports until you reach the end of the system.
16. Print a Group Calling Information report, and compare it to the Group Calling Information report you printed in Step 5. Since Calling Group extensions may reverse themselves after a Board Renumber, verify that the extension numbers are in the correct order. If the extensions are reversed, re-program as necessary to put in correct order.
17. Verify the programming on the first eight ports of the 016 MLX module. Use the Extension Information reports that were printed in Step 7.
18. Print a new Group Coverage Information report and compare it to the previous Group Coverage Information report. Verify that the appropriate members are in the group. Program as necessary to match the previously printed report.
19. Program the buttons that were identified in Step 8 that previously pointed to the extensions on the 008 OPT module you replaced.

**NOTE** ► Because the extension type changed for the T/R extensions, these buttons may not be needed. Confirm the need with the customer before restoring.

20. If additional 016 MLX modules are to be added, repeat ALL of the above steps. If not, go to Step 21.
21. If phantom modules were programmed, re-program the phantom modules, as needed using the information in the Extension Information reports printed in Step 3.
22. Program the new extension ports to meet the customer's needs.
23. Back up the system to a new filename to keep the first backup intact. Use a filename that describes the post-016 MLX configuration-for example, "post-016 MLX."

## Replacing a 016 T/R Module with a 016 MLX Module

### **WARNING:**

*If you are replacing more than one 016 T/R module, repeat Steps 1-15 for each module. Do not try to replace more than one 016 T/R module at a time, because the system translations will be and you will need to completely reprogram the entire system manually to restore the customer's configuration.*

**NOTE** ► This procedure removes any T/R or single-line telephone functionality, any features that may have been programmed, any buttons (for example Inside Auto Dial) that point to those extensions.

Follow these steps to replace a 016 T/R module with a 016 MLX module:

1. Back up the system programming to the customer backup card. Use a filename that describes the pre-016 MLX configuration-for example, "pre-016 MLX."
2. Print a System Setup report. Determine whether the last slot/slots are programmed with phantom modules. If there are phantom modules, the programming for these modules will be removed when the new 016 MLX module is implemented.
3. If no phantom modules are programmed, go to Step 4. If there are phantom modules, print all Extension Information reports for the extensions and MFMs connected to the phantom modules. The extensions must be re-programmed after the new 016 MLX module is implemented.
4. Print an Extension Directory report. (This report also includes phantom extension numbers.)
5. Print a Group Calling Information report.
6. Print a Group Coverage Information report.
7. Print Extension Information reports for all ports on the 016 T/R module that is being replaced.
8. Identify all Inside Auto Dial, Manual Signal, or Extension Pickup buttons programmed on other telephones that point to the extensions on the 016 T/R module to be replaced. The programming for these buttons will be removed after the Board Renum procedure. These buttons are not shown on the Extension Information report, so you must identify these buttons with the customer.
9. Power down the system and replace the 016 T/R module with the 016 MLX module.
10. Power up the system.
11. Perform a Board Renum procedure: Sys Program (F1)→System (F1)→Board Renum (F4)→Yes (F2).
12. Print a new Extension Directory report.
13. Print a Group Calling Information report, and compare it to the Group Calling Information report you printed in Step 5. Since Calling Group extensions may reverse themselves after a Board Renum, verify that the extension numbers are in the correct order. If the extensions are reversed, re-program as necessary to put in correct order.

14. Print a new Group Coverage Information report and compare it to the previous Group Coverage Information report. Verify that the appropriate members are in the group. Program as necessary to match the previously printed report.
15. Program the buttons that were identified in Step 8 that previously pointed to the extensions on the 016 T/R module you replaced.

**NOTE** ► Because the extension type changed for the T/R extensions, these buttons may not be needed. Confirm the need with the customer before restoring.

16. If additional 016 MLX modules are to be added, repeat ALL of the above steps. If not, go to Step 17.
17. If phantom modules were programmed, re-program the phantom modules, as needed using the information in the Extension Information reports printed in Step 3.
18. Program the new extension ports to meet the customer's needs.
19. Back up the system to a new filename to keep the first backup intact. Use a filename that describes the post-016 MLX configuration-for example, "post-016 MLX."