MITEL

Data Interface Specifications

MiVoice Business Release 7.0
SX-2000 LIGHTWARE 34 Release 1.0

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Data Interface Specifications Developer Guide
MiVoice Business Release 7.0
SX-2000 LIGHTWARE 34 Release 1.0

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What's New

The following changes are present in this version of the guide:

- The Property Management System (PMS) now supports up to seven digits for suite/extension numbers. This is also supported in all PMS and SMDR-related logs.

This guide is valid for MiVoice Business Release 7.0 and up, and SX-2000 LIGHTWARE 34 Release 1.0 and up.

Mitel Communications Director (MCD) Release 4.0 introduced separate brands for the Mitel range of hardware and software-only solutions for the IP communications market.

MiVoice Business is the brand name of the call-processing software that runs on hardware platforms such as the 3300 ICP and industry standard servers. The 3300 ICP name continues as the brand for Mitel hardware platforms that run MiVoice Business. This guide has been updated accordingly.

Introduction

MSA is a program that offers third-party firms and end-user companies access to software development tool kits and support services for integration to our award-winning range of IP communication devices. To extend the many telephony devices and applications that Mitel markets, we provide a collection of interfaces for third-party software companies to develop their own applications to interact with Mitel products.

The focus of this document is on the MSA data interfaces and is intended for third-party application developers to use as a reference when building data interface applications on Mitel's 3300ICP (MiVoice Business) and SX-2000 switching platforms. Included is an overview and detailed specifications of the data interfaces available on the Mitel 3300ICP (Release 8.0 and 9.0), MCD (Release 4.0 and up), and SX-2000 LIGHT (Lightware 34 Release 1.0 and up).

Readers of this document will obtain the information necessary to integrate third-party applications into Mitel's products, with access to the data interface details captured at the following Mitel data streams:

- Real Time Events Automatic Call Distribution (ACD)
- Station Message Detail Recording (SMDR)
- Property Management System (PMS), (as stand-alone, and interfaced with Hotel/Motel and Voice Mail feature packages)
- Hotel/Motel
- Software/Maintenance

Unless otherwise noted, all information in this document applies to both MiVoice Business and the SX-2000 LIGHT.

What the Developer Needs to Know

The development process outlined in this section provides important considerations associated with customizing Mitel's APIs. This section functions as a reference guide to facilitate initial planning and development phases; it does not provide a comprehensive development procedure.

The application development process consists of three stages:

1. **Planning**
   - Consider the features and functionality your application requires.
   - Consider any restrictions associated with the platform you are building on.
   - Research the Mitel interfaces using the documents listed in the Documentation Index on page 2 and select the one that best meets your needs.
2. **Creating**
   - Use the appropriate Installation and Maintenance Guide to install your selected interface.
   - Use the appropriate Developer Guide for reference.
   - Create and test your application.
   - Assess performance.
3. **Supporting**
   - Confirm that your application observes platform restrictions.
   - Deploy and support your customized software application.

Documentation Index

Mitel maintains a rich documentation suite at both Mitel OnLine and at the MSA secure web site. For information about available documentation and how to access it, refer to:

Accessing Product Documentation

Note: For access to all product documents except telephone user guides, you need a Mitel OnLine username and password.

To access Mitel product documentation at Mitel OnLine:

4. Go to http://edocs.mitel.com.
5. Select a documentation suite from one of the following drop-down menus:
   - Communications Platforms
   - Messaging
   - Applications & Solutions
   - Software Development
   - End User Documents
6. Log in if asked to do so

Note: For Technical Bulletins (TB) and Release Notes (RN), click **Knowledge Base** in the **Other Resources** window in the left-side navigation pane.

7. To access IP Phone documentation, select **PDF Guides** from the **End User Documents** drop-down menu at the top of the page.

Accessing the MSA web site

Note: You must be a member of MSA to access the secure web site.

To access the MSA web site (including software downloads and MSA documentation):

1. Go to http://www.mitel.com, and click **Login** near the top of the page.
2. Enter your User ID and Password in the login area and then click Log in.
3. Point to MSA and then click MSA Downloads.
4. Scroll to the appropriate section for documentation or downloads, and click on the appropriate link.

The MSA web site also includes:

- Software downloads for both controller/PBX and developer software
- Software Release Notices
- Sample Code
- Additional documentation for 3300 database configuration

Advanced Interfaces Documentation

Topic	Document Name	Detail	Find it at:
SDK	Installation & Maintenance Guide	Installation, upgrade, maintenance, and troubleshooting information for all SDK software including MiTAI and MiAUDIO	MSA-on-MOL Portal
	Engineering Guidelines	Assist in planning and installation of SDK software; intended to highlight specific areas of the product that need to be considered before installation.	
	MiTAI Developer Guide	Programming, maintenance, and troubleshooting procedures.	
	MiAUDIO Developer Guide	Programming, maintenance, and troubleshooting procedures.	
SRC	MiSsl Tunnel Developer Guide	Programming, maintenance, and troubleshooting procedures for the Mitel application library MiSslTunnel.	MOL Product Docs
	SRC Developer Guides	Programming, maintenance, and troubleshooting procedures.	
	Engineering Guidelines	Assist in planning and installation of SDK software; intended to highlight specific areas of the product that need to be considered before installation.	
Contact Center	Customer Service Manager SDK Reference Manual	Documents creation of user-defined actions, along with use of the CSM macro language and Active X control.	MSA-on-MOL Portal
System OAI	System OAI Toolkit Specifications Manual	Provide the information and tools you need to interface with and develop applications using the Axxess or 5000 CP System OAI link.	MSA-on-MOL Portal

Basic Interfaces Documentation

Topic	Document Name	Detail	Find it at:
SNMP	Simple Network Management Protocol Interface Specification Developer Guide	Access and programming.	MSA-on-MOL Portal
SMDR	Data Interface Specifications Developer Guide	Access, programming, maintenance, and troubleshooting procedures.	
ACD			
PMS			
HTML Toolkit	Developer Guide	Programming, maintenance, and troubleshooting procedures.	
SIP	Interoperability Guides	Functional criteria for SIP User Agent Clients. Support for SIP Trunking and a Certification Test Plan. **Note**: When available, these documents will be posted to the MSA web site.	
SMDR (Axxess & 5000)	Administrator Guide	Configuration and formatting of SMDR.	

Other Interfaces Documentation

Topic	Document Name	Detail	Find it at:
Live Business Gateway	Installation & Maintenance Guide	Installation, upgrade, maintenance, and troubleshooting information.	MOL – Product Docs
	Engineering Guidelines	Assist in planning and installation of LBG.	
CTI Toolkit	CTI Developer Toolkit Overview	Functional overview, sample applications, common user scenarios, and troubleshooting information.	MSA-on-MOL Portal
UCA SDK	Unified Communicator Advanced Software Development Kit Programmers Guide	Describes the programming environment of the Mitel UCA SDK, an optional component of the UCA client.	MSA-on-MOL Portal

Controller/PBX Documentation

This table below lists controller/PBX documentation that can be found in the electronic documentation included with the controller/PBX, and at Mitel OnLine:

Topic	Document Name	Detail
MiVoice Business(formerly MCD)	General Information Guide	Overview of system and associated peripherals and applications
	Technician's Handbook	Installation, upgrade, maintenance, and troubleshooting information
	Engineering Guidelines	Assist in planning and installation of MiVoice Business platforms; intended to highlight specific areas of the product that need to be considered before installation.
	Hardware Technical Reference	Hardware specifications
	Configuration Tool Help	Detailed procedures for configuring MiVoice Business with default database and for migration of other existing systems.
	Sys Admin Tool Help	Programming, maintenance, and troubleshooting procedures.
	Portable Directory Number (Clusters)	Description of Portable Directory Number (PDN) call processing feature
	Resiliency Guide	Comprehensive overview of Mitel resiliency solution
SX-2000 LIGHT	General Information Guide	Overview of system and associated peripherals and applications
	Technical Documentation	Programming, maintenance, and troubleshooting procedures.
	Technician's Handbook	Installation, upgrade, maintenance, and troubleshooting information. Quick reference to maintenance commands and frequently used procedures
SX-200 ICP	General Information Guide	Overview of system and associated peripherals and applications
	Technical Documentation	Programming, maintenance, and troubleshooting procedures
	Technician's Handbook	Installation, upgrade, maintenance, and troubleshooting information. Quick reference to maintenance commands and frequently used procedures.
	Engineering Guidelines	Assist in planning and installation of SX-200 ICP platforms; intended to highlight specific areas of the product that need to be considered before installation.
5000 CP	5000 CP Installation Guide	Provides information needed to plan, install, program, implement, and maintain any of three configurations of the 5000 advanced communications platform—the CS-5200, the CS-5400, and the CS-5600.
	5000 CP Administrator Guide	Provides system administrators and voice mail administrators with information about the 5000 CP family of products.
	5000 CP Program Planning Sheet	Assist in planning and installation of 5000 platforms; intended to highlight specific areas of the product that need to be considered before installation.
	Message Print Diagnostics Manual	Technician reference for diagnostic output from the 5000 CP and Axxess systems.

Other Documentation

Topic	Document Name	Detail
Axxess Converged Communication Platform	Axxess Converged Communications Platform Installation and Maintenance Manual	Provides information needed to plan, install, program, implement, maintain an Axxess Converged Communications Platform.
	Axxess Converged Communications Platform Administrator Guide	Provides information and detailed instructions about system hardware and features. Note: Refer to the User Guide provided with each endpoint for simplified instructions about using endpoint and voice mail system features.
Customer Service Manager (CSM) (formerly Contact Center Suite)	CSM Installation Manual	Provides information required to plan, install, program, implement, and maintain a Contact Center Suite platform.
	CSM User Guide	Instructions for agents and supervisors using Contact Center Suite client applications, including Connection Assistant.
Enterprise Messaging/OSE	Enterprise Messaging Installation Manual	Provides information required to plan, install, program, implement, maintain, and troubleshoot Enterprise Messaging (EM).
	Enterprise Messaging Field Configuration Utility Instructions	Instruction about starting and configuring the Enterprise Messaging Field Configuration Utility (FCU) for use with the EM voice processing unit.
	Unified Messaging Open Standards Edition (OSE) Administrator's Guide	Provides information and detailed instructions about system hardware and features.
Messaging Server	Mitel Messenger General Information Guide	An overview of the Mitel Messaging Server Release 2.0. It describes an all-in-one communication solution that gives users access to applications such as desktop call control, web messaging and administration, instant messaging and wireless connectivity.
	Engineering Guidelines	Provides network and server/client PC requirements, feature considerations and specific deployment recommendations.
	ActiveX Script Builder Guide	Provides detailed instructions for programming custom ActiveX scripts to provide back-end integration between the Call Manager screen-pop application and any open database connectivity (ODBC)-compliant contact database.

Technical Support

MSA member support is available to all current members of the MSA program who are in good standing and have sufficient Developer Support Credits (DSCs) available.

When to Contact Support

As a MSA member, you may wish to report problems or obtain troubleshooting advice. Contact support after you have:

- Referred to the MSA documentation library map and still require additional information to get started.
- Read the relevant supporting documentation available for your chosen APIs or associated platforms and require clarification or further information.
- Ensured that existing documentation does not fully respond to your specific enquiries.

Email Support (preferred)

Report a problem and supply full problem information to Product Support

Email: MSAsupport@mitel.com.

Hours: 8:30 A.M – 6:00 P.M. EST

Response Time: 3 business days

Details: Include the following details:

- Your TSID code in the subject line of your email
- A very detailed description of the problem/incident
- Attach any files/logs pertaining to the problem

General Support

Inquiries or other difficulties that are not considered to be defect-related can be described in an electronic mail message to MSAInfo@mitel.com.

Member Support

The Mitel MSA web site is designed for self-service. It provides all members with access to API documentation, SDK upgrades, troubleshooting tips, sample configuration, and sample code. The MSA web site is located at http://www.mitel.com/msa. Click **Login** in the uppermost navigation bar.

Web Support

In the uppermost navigation bar of the MSA web pages, you have the option to click **CONTACT US**. Since all Internet users can use this contact mechanism, we expect that the range of questions will be quite broad. Questions may vary from general information about the MSA program to specific product inquiries that may or may not be aimed at MSA. In the case of registered members using the web CONTACT US mechanism, Web Support will follow the policies and guidelines specified under Email Support.

Providing Feedback

Comments or suggestions relating to this document are welcome, and can be sent by email to the following address:

MSAInfo@mitel.com

Data Interfaces Connectivity

Accessing the Data Streams

The following section provides data interface connectivity information for both MiVoice Business and the SX-2000 Light.

Note: Unless otherwise noted, all information in this document applies to both MiVoice Business and the SX-2000 Light.

Data interfaces on both platforms are all accessible over a network connection using TCP/IP Ethernet ports. Data streams are provided on specific ports, as detailed below. There are a maximum of three connections for each system application, except for the Property Management System (PMS) application which allows only one connection.

Note: The PMS cannot connect to MiVoice Business in a clustered hospitality environment. In a Clustered Hospitality environment, the PMS connection must be to the Hospitality Gateway. When a PMS connection is attempted on a MiVoice Business that is not the Hospitality Gateway, the attempt is ignored and no response is provided to the PMS. The Hospitality Gateway only supports a single PMS connection at a time.

For information about how to program your devices, data ports, and associated data interfaces, refer directly to the MiVoice Business or SX-2000 technical documentation.

Note: If the TCP/IP connection drops, reconnect the client application to the ICP.

Data Port Addresses for Data Output Streams

Data Output Stream	Port Number
Software Logs	1750
Maintenance Logs	1751
SMDR	1752
Hotel/Motel Logs	1753 (only one direction)
Property Management System	
MiVoice Business: direct IP connection	15374 (Hotel/Motel management connection) 6830 (Voice Mail connection)
MiVoice Business: via 5500 IP console	RS232 (Hotel/Motel connection only)
MiVoice Business: via Serial Port Converter	6830 (Voice Mail connection only)
SX2000	RS232
ACD Real Time Event	15373
SNMP	161
SNMP Trap	162

Note: Please see the SNMP Interface Specification Developer Guide for more detailed information about the SNMP interfaces.

Resilient and Redundant Systems

The following data interface features are not specifically related to resiliency or a resilient or redundant device, but will work on a resilient or redundant system:

- ACD II (except for the ACD Make Busy feature on Resiliency)
- SMDR, including SMDR Extended Report Level 1, and Tag Call
- PMS and Hotel/Motel functionality, provided that the PMS to secondary setting is responsible for the wake-ups. (Note that Hotel/Motel Remote Wake-up Call feature is not supported in a resilient environment.)
- SNMP

MiVoice Business Resiliency

In the event that MiVoice Business fails, all data interface record generation and ACD-related events cease, all calls queued to ACD paths clear, and the primary system's data interface connections close. In order for data interface features to resume regular record generation, MCD must be configured as resilient.

To operate on a resilient system, a program must connect to all data interface ports within the resilient network using the IP addresses for each controller. If the primary ICP controller fails, output may stream from any of these data ports. During this time, new calls to the ACD paths are supported, and SMDR report generation continues as usual.

When the primary system recovers, the program should attempt to reconnect to it after a minute of its rebooting. Data interface functionality resumes, ACD agents register automatically with the recovered primary set as soon as their status becomes idle, and new ACD calls are queued to the primary set.

Note: When a Resilient MiVoice Business fails, an application does not detect port closure on the primary system until after the primary system reboots. Usually, the primary system resumes normal call-processing capability shortly after rebooting.

SX-2000 Light Main Controller Redundancy

When a Redundant SX-2000 switches controllers due to main controller failure, the impact on data interface functionality is similar to the impact described in a resilient environment (see MiVoice Business Resiliency above). ACD calls connected at the outset of the activity switch are maintained; however, calls in the process of being established at the time of the activity switch occurs are lost. Once the switch to the newly active controller is made, all data interface features function as they would on the main controller.

A customized application built on a main control redundant system will automatically remain operational if one of the main control complexes fails. At all times during operation, the inactive main control plane of a main control redundant system receives information from the active main control plane. This information enables the inactive plane to take over operation of the system if the active main control plane fails. However, at any given time, data will appear from only one of the two controllers, and a switch in the data port from which that

information comes indicates that the active main controller is no longer operational. Usually, the newly inactive main controller will close the connection so that data is received from one source only.

When the newly inactive main controller system recovers, its connection will reopen and be available for the program to connect to it.

Station Message Detail Recording (SMDR)

SMDR Overview

Station Message Detail Recording (SMDR) is a telephone call accounting system. The telephone system sends information regarding each telephone call to an SMDR port. The information is printed or captured and processed into reports.

SMDR functionality is included with MiVoice Business and must be enabled through the administrative interface.

The SMDR package is an option for the SX2000 system. Without an SMDR package:

- network calls cannot be identified when node IDs are not implemented
- the two ends of a digital trunk cannot be correlated because Originating Line Information (OLI) cannot be passed across a link
- multiple calls made by the same caller cannot be differentiated
- call records cannot be sequenced
- calls cannot be uniquely identified in cluster network formats.

Using the SMDR feature package can provide the following benefits:

- Unique OLI (Originating Line Information) data for trunks on different nodes within a cluster;
- The ability to preserve OLIs across a transit node;
- Access to OLI data in the record associated with the incoming trunk;
- The means to associate SMDR records with a single call regardless of routing, transfers, etc.;
- A simple method of sequencing records for a single call.

Internal and External SMDR

Internal SMDR and external SMDR are separate feature packages, and will be discussed in separate sections in this chapter. The system can be enabled with external SMDR, internal SMDR, or both. When both are enabled, external SMDR takes precedence over internal SMDR.

SMDR Connectivity

The SMDR events are obtained via an IP connection at port 1752. Note that there is a maximum of three connections per system application.

SMDR Conditions

General

- When both internal and external SMDR are enabled, external SMDR takes precedence over internal SMDR. As a result, if system programming allows for both an external SMDR record and an internal SMDR record to be made for a call, only the external SMDR record will be generated.
- When SMDR real time reporting is enabled, you cannot use the Logsys Read SMDR maintenance command.
- SMDR is not used in the following situations:
  - An attendant or station user receives busy tone when dialing an external number (because all trunks in the group are busy). If ANSWER PLUS - MITEL Call Distribution has been installed, SMDR will record a busy condition.
  - The calling or called party has a class of service which disables SMDR
  - A station user receives reorder tone due to dialing an invalid number
  - An attendant intercepts a station attempting to access a trunk group.

 **Note:** SMDR file size and buffer size parameters must be reset after a software upgrade.

Internal SMDR

- Internal SMDR records are not generated for calls that involve trunks.
- If two stations are involved in a call, and either or both of the stations have Internal SMDR enabled in their class of service, the system generates an Internal SMDR record.
- Only one internal SMDR record is generated per internal call, unsupervised call transfer, or conference call. A separate record is not produced for each member of an internal call, conference call or call transfer. For example, if Station A calls Station B, the internal SMDR feature generates a record that shows Station A called Station B. A second record showing that Station B conversed with Station A is not generated.
- An internal SMDR record is only generated for completed internal calls. Note that successful Directed Pages and Group Pages are completed internal calls.
- Internal SMDR records allow you to identify each member of an internal conference. At least one station in the conference must have internal SMDR enabled in its class of service.
- If a station transfers (unsupervised) an internal call to another station, a record is generated showing the numbers of all three stations involved in the transfer. At least one station involved in the call transfer must have Internal SMDR enabled in its class of service. Another record is generated for the 2-party call that results from the call transfer, if either of the stations has Internal SMDR enabled.

- If the extended digit length option is enabled in the SMDR Options form, then the line length of each SMDR record is increased from 88 to 99 columns, to allow 7-digit extension numbers in the Calling, Called and Third Party fields, and to allow 10 columns in the Duration of Call field.
- Internal SMDR does not interact with the MITEL Call Distribution feature, SMDA Meter Pulse Recording, or the ANI/DNIS/ISDN/CLASS Number Delivery feature.

External SMDR

- The *Network Format* option in the SMDR Options form may only be enabled if the MSDN/DPNSS Voice V feature has been installed on the system. This option provides for the recording of the calling party's node ID and extension number in the Digits Dialed on the Trunk field, as well as the actual digits dialed (called party's node ID and extension number).
- For external SMDR, if a station involved in a trunk call invokes a transfer to another station, only one record is generated; however, the number of the second station appears in the SMDR call record.
- External SMDR records are not created under the following circumstances:
  - calls which encounter busy trunks
  - internal calls between stations or between a station and an attendant
  - calls made from stations or going to trunks whose COS has SMDR disabled
- When two or more trunks are involved in a call, separate SMDR records are generated for each trunk, providing that the appropriate options have been enabled in the SMDR Options form. For example, in the case of tandem trunk calls, the SMDR feature of the central node in a tandem call would generate a record for the incoming trunk call to the central node of the system network and one for the outgoing trunk. In such instances, individual trunks can be analyzed for costing purposes.
- If the *SMDR Record Transfer* option is enabled in the SMDR Options form, an SMDR record is generated for each station involved in an outgoing trunk call stating the duration and number of meter pulses for that station's portion of the call.
- If *SMDR Meter Units per Station* is enabled in the SMDR Options form, meter pulses may be accumulated on a device and account code basis up to an assigned buffer size. The meter pulses can be read, printed and cleared from the operator's console. The options 'Report Outgoing Calls' and 'Report Meter Pulses' must also be set to 'Yes' for Station Message Detailed Accounting (SMDA) to be functional. Each device or account code may accumulate up to a maximum of 65535 meter units against it. When that total is exceeded, the number remains at 65535 until cleared by the operator.
- If the *Extended Digit Length* option is enabled in the SMDR Options form, then the line length of each SMDR record will be increased from 88 to 99 columns, to allow 7-digit extension numbers and 4-digit trunk numbers in the Calling, Called and Third Party fields, and to allow 10 columns in the Duration of Call field.
- The *SMDR Real Time Reporting* option, when enabled in the SMDR Options form, allows you to obtain real time SMDR records. This is accomplished by routing the SMDR records directly to a previously defined printer instead of storing the records on disk and then sending them to print. Once the real time option is enabled or disabled, you must perform a system restart.
- Location Based Accounting offers the capability to automatically determine a device's location within the network, and provides this information in the External SMDR records.

When the *Location Information Reporting* option in the SMDR Options form is enabled, two new Location Identifier fields are added to the SMDR records: one for the calling party, and one for the called party.

Internal SMDR

Internal SMDR collects data for calls made between stations. You can use internal SMDR call data to:

- bill internal calls back to departments;
- determine station usage;
- track hoax calls that originate from a station;
- keep a record of all internal calls that a specific station has been involved in.

You can output Internal SMDR records from the system providing that:

- the Internal SMDR feature package is enabled;
- A compatible output device (for example, printer, data recorder, personal computer) is connected to a printer port;
- Report Internal Calls is enabled in the SMDR Options form;
- SMDR - Internal is enabled in the Class of Service of any of the stations involved in the call.

Account Code Reporting for Internal SMDR

During a two-party call, Verified and/or Non-verified Account Codes can be reported in Internal SMDR logs. Each time an Account Code is entered during the call, a new SMDR record is generated. The first Verified/Non-verified Account Code entered during a call is the active Account Code.

When subsequent Account Codes are entered during the call, a new SMDR record is generated. The SMDR record reports the previously active Account Code in the Call Completion field of the SMDR record as follows:

- a "C" in the Call Completion field indicates the caller entered the Account Code.
- an "R" in the Call Completion field indicates the receiver entered the Account Code.

The newly entered Verified/Non-verified Account Code is now the active Account Code. When the call ends, the active Account Code is written to the final SMDR record for the call. The party that entered the Account Code is identified in the SMDR record. If no Account Codes are entered during the call, the Account Code field in the SMDR record is blank.

Account Code Reporting Conditions

- The Account Code Reporting for Internal Calls parameter in the SMDR Options form must be set to “Yes”. When the Account Code Reporting for Internal Calls parameter is set to “No”, Account Codes are not reported in the SMDR logs.

- The Report Account Codes parameter in the SMDR Options form must be set to “Yes”. When Report Account Codes is set to “No”, Account Codes are not reported in the SMDR logs, regardless of the value of the Account Code Reporting for Internal Calls parameter.
- Default Account Codes do not appear in Internal SMDR logs.

Operations

During a two-party call, enter a Verified or Non-verified Account Code as required.

The party that entered the account code, and the account code entered are written into the SMDR logs for the call.

External SMDR

External SMDR collects data for outgoing and incoming trunk calls. You can use the data to determine the cost of external telephone calls. Typically, external SMDR is used for the following purposes:

- for billing external calls back to individuals, customers or departments;
- for evaluating the system trunks (for example, number, type and traffic).

Both stations and trunks must have external SMDR enabled in their Class of Service Options Assignment form for an SMDR record to be generated for a call. Under these conditions, SMDR data collection is initiated every time an incoming or outgoing trunk is seized (if both incoming and outgoing recording are enabled). Call data is collected on a per-call basis, formatted into an SMDR record, and routed to an RS-232 output port for processing on a station message detail accounting (SMDA) machine or for storage. Alternately, call data can also be stored on the system hard disk and retrieved for processing at a later date.

The following external SMDR conditions are reported as follows when an attendant handles a call:

- When an attendant dials a trunk with no station or trunk involved, the calling party is the attendant.
- When an attendant answers a trunk call and does not transfer it to a station, the called party is the attendant.
- When the attendant dials a trunk while it has a station as its source, the calling party is reported as the station and an "?" or “*” appears in the Attendant field.

 **Note:** The ? is used for MiVoice Business, and the * is used for SX-2000.

- When an attendant connects a previously-held station to a trunk, the calling party is the station and an "?" or “*” appears in the Attendant field.
- When the attendant has a trunk as Source, and then connects a station to the trunk, the calling party is the trunk, the called party is the station, and an "?" or “*” appears in the Attendant field.
- The attendant will appear as the called party when involved in a Mitel Call Distribution call transfer (two records are generated).

When external SMDR is enabled for incoming calls the following conditions are reported:

- Digits dialed on incoming DID, DISA or dial-in tie trunks are reported in the digits dialed on the Trunk field. When the dial-in trunk dials an illegal or vacant number, or hangs up before completing the number, the call is reported. The called party is the station dialed. The DISA security code is reported in the Account Code field.
- The called party is always the attendant, except when an attendant forwards a call to a station. The station then becomes the called party and an "?" or “*” is reported in the Attendant field.
- Direct-in trunks show the station number as the called party (for example, dial-in trunks). The digits dialed on the Trunk field displays the incoming digits. When the trunk is directed to a hunt group, the station that answered the call is reported.
- On incoming calls, an "E" is reported in the Call Completion field when the trunk hangs up while listening to reorder tone, or a "B" is reported when the trunk hangs up while listening to busy tone. A "T" is reported when the incoming call is answered with TAFAS.
- If the attendant forwards a Mitel Call Distribution call to a station, a second record is generated and the attendant remains as the called party for the first record.

SMDR File Size

SMDR file size is selectable, by using the LOGSYS SIZE maintenance command. The default is
20 000 records, but it can be set as high as 75 000 records, which allows for the capture of data for a complete day and prevents overwriting issues.

Note: SMDR records continue to be produced when the system experiences a power cut-over to reserve battery. However, records are not produced when the system is in system fail transfer mode.

Standardized SMDR

Network OLI

Standardized Network Originating Line Identity (OLI) provides a mechanism which allows for the correlation of all SMDR events associated with a call, irrespective of the specific call scenario and applicable SMDR options. When the Standardized Network OLI option is enabled in the SMDR Options form, all SMDR events associated with a single call through the network are associated using the Network OLI.

When a call is transferred between extensions, the OLI on each segment of the call is based on the transferring party. All segments of the call report the Network OLI in the ANI portion of the ANI/DNIS field, but they may not match as a result of the transfer.

Note: Network OLI is not preserved across analog or digital tie trunks.

The application of the following mechanisms can be used to sequence the SMDR events involved in a call; however, we recommend Call ID Format be used for these purposes:

- **Network Originating Line Identity (OLI)** – all SMDR events associated with a call through the network share a common Network OLI based on the first party involved in the call (using the System ID and either the extension number of the caller, or the trunk number of the incoming trunk).
- **Common Calling Party and Called Party** – the SMDR event associated with the incoming trunk is associated with the SMDR event on the outgoing trunk, based on the common Calling Party and Called Party fields in both events.
- **Transfer Indication** – SMDR events associated with segments of a call across DPNSS trunks are associated based on the Third-Party and Called Party fields.
- **Call Pickup or TAFAS Answered** – The Calling Party and Called Party fields in the two SMDR events associated with a call are opposites, the Calling Party in one event is the Called Party in the other event. This is indicated by a "T" in the Call Completion Status field. This occurs in the case of Incoming CO-trunk calls, which are transferred to an extension upon which call pickup is exercised by a third-party extension.
- **Uniform Trunk Numbering Plan** – In the case of analog tie trunks there is no signaling of OLI across the span; therefore, SMDR events at either end of the tie trunk are generated independently. By assigning the same trunk number to both ends of the analog tie trunks, SMDR events associated with a call across the tie trunk can be correlated based on the common trunk number. As a result, correlation of these events is based on the Calling Party and Called Party being the same. The Digits Dialed on the Trunk field in both SMDR events also match (subject to digit modification).

Call ID Format

Standardized Call ID Format facilitates the sequencing of SMDR events within a call and distinguishes SMDR events between calls, when the calls are made by the same caller. When the Standardized Call ID Format option is enabled in the SMDR Options form, the following identifier fields are added to the SMDR record (the Standardized Network OLI option must also be enabled):

- **Call Identifier** – an 8-digit field in the SMDR record, which uniquely identifies all SMDR events associated with a single call through the network (subject to roll over - calls with the same identifier can be differentiated by elapsed time between calls).
- **Call Sequence Identifier** – a single field in the SMDR record starting at "A" on the first SMDR event associated with a particular call, and incrementing for each SMDR event progressing through the call.
- **Associated Call Identifier** – an 8-digit field in the SMDR record, which is the call identifier of a previous call associated with the current call (for example, transfer, conference, call pickup, etc.). This field is used to correlate all SMDR events associated with a series of related calls.

Standardized Call ID Format simplifies SMDR event correlation, is consistent and reliable, and can accommodate internal SMDR.

XNET SMDR

SMDR is supported for XNET calls, which are treated as leased-line DPNSS calls for these purposes. The B-channel and D-channel calls, used to make the XNET calls, are treated as external CO calls.

XNET calls are recorded as follows:

- The originating PBX dialing party and dialed digits are the same as for leased-line DPNSS. The trunk number is the B-channel trunk number and call duration is the duration of the XNET call.
- The terminating PBX answering device digits are those of the device seized by the XNET call. The incoming trunk is the B-channel trunk and call duration is the duration of the XNET call.
- SMDR records are not generated for calls where the call has not progressed far enough to establish a B-channel call.

Note: The duration of an XNET call includes the time required to setup the B-channel call and the time required to setup a D-channel call, if a signaling channel is not already setup and available.

XNET B-channel calls are recorded as follows:

- The originating PBX dialing party and dialed digits for the B-channel call are the directory number of the XNET user (calling party). The dialed digits are the B-channel DID digits that are dialed. The trunk number is the B-channel trunk number and call duration is the duration of the B-channel call.
- The terminating PBX answering device digits are the DID digits after digit modification. The incoming trunk is the B-channel incoming trunk and call duration is the duration of the B-channel call.

XNET D-channel calls are recorded as follows:

- The originating PBX dialing party digits are either blank or the Administrative Directory Number programmed in the Miscellaneous Assignment form. The dialed digits are the DID digits that are dialed. The trunk number is the D-channel trunk number and call duration is the duration of the D-channel call.
- The terminating PBX answering device digits are the DID digits after digit modification. The incoming trunk is the D-channel incoming trunk and call duration is the duration of the D-channel call.
- As multiple XNET calls may be made during a single D-link session (or call), not every XNET call causes the generation of a D-link SMDR record. Only one SMDR record is generated for the entire D-link call regardless of how many XNET calls that were supported during the duration of the link.
- XNET D-channel calls over Ethernet do not have SMDR records associated with them as no variable costs are incurred.

XNET Example SMDR Records
XNET Calls Outgoing B-channel Call 08/28 10:32 00:00:51 5177 1264 A X525 Incoming B-channel Call 08/28 10:30 00:00:52 X509 001 1264 1264
XNET B-channel Calls Outgoing B-channel Call

XNET Example SMDR Records
08/28 10:32 00:00:51 5177 12143535243 A T525 Incoming B-channel Call 08/28 10:30 00:00:52 T509 001 5243 5243
XNET D-channel Calls Outgoing D-channel Call 08/28 10:32 00:00:11 999 12143535245 A T619 **Note**: No originator DN on D-channel call. Incoming D-channel Call 08/28 10:30 00:00:12 T600 001 5245 5245

Suite Services SMDR

All external calls involving a suite extension include the Suite Pilot number in the associated SMDR record. It is also provided when internal SMDR records are generated. This enables calls to be correlated for billing purposes.

SMDR records generated by calls involving the suite extensions of linked suite member suites indicate the Linked Suite Pilot number instead of the associated Suite Pilot number.

The Suite Services Reporting option in the SMDR Options form can only be set to "Yes" if the Suite Services feature is enabled.

External Hot Desk User (EHDU) SMDR

An External Hot Desk User (EHDU) is a hot desk user (HDU) logged in via PSTN. The SMDR record has been modified to enable EHDU reporting. The SMDR Options form includes a new field, **External Hot Desk User Reporting**. The default value is set to **No**, and is retained during backups and restores.

SMDR Extended Reporting Level 1 and SMDR Extended Reporting Level 2 must be enabled to support External Hot Desk User Reporting.

Note: SMDR External Reporting must be enabled on the COS of the trunk and the device in order for these SMDR records to be generated.

All SMDR records will reflect the HDU and NOT the device to which the HDU is actually logged in.

For a call from an EHDU, the SMDR record will include the CLID information (if present from the EHDU calling in). For a call to an EHDU, the SMDR record will contain the HDU external digits used to call the EHDU.

When the **External Hot Desk User Reporting** option is enabled in the SMDR Options form, the HDU digits will be recorded with all the trunk SMDR record information that is currently recorded.

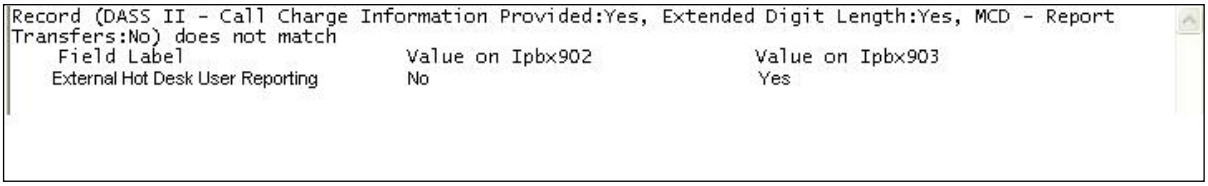
The SMDR record contains the following two new fields to capture EHDU reporting:

- **Calling Hot Desk User** – In columns 181-187, the HDU DN. This field will be filled in for all calls from an EHDU.
- **Called Hot Desk User** – In columns 189-195, the HDU DN. This field will be filled in for all calls to an EHDU.

Note: There is a Spacer in column 188.

SMDR records on transit and end nodes that are unaware of an EHDU being active will continue to record SMDR with no changes.

If the **External Hot Desk User Reporting** option gets out of step within the cluster/network, a form compare on the SMDR assignment will detect the discrepancy and report an error, as shown in the following example:



Location Based Accounting SMDR

Location Based Accounting provides the capability to automatically determine an IP device's location based on its IP address. System administrators have the capability to attribute calls to specific locations, and bill these locations accordingly.

One component of Location Based Accounting provides device location information in the MCD SMDR records. The SMDR Options form includes a new field, **Location Information Reporting**. The default value is **No**.

When the **Location Information Reporting** is enabled in the SMDR Options form, the generated SMDR record contains the new SMDR Tag field for the calling party's zone in the calling party's Location Identifier field. The same is done for the called party. The Network Zones form contains the SMDR Tag (which identifies the location the IP device) used in the SMDR record.

The following table shows the new fields in the SMDR record that captures location identification reporting:

Field Name	Field Type	Column
Spacer	Blank	196
Calling Party Location Identifier	5 ASCII character string	197-201
Spacer	Blank	202
Called Party Location Identifier	5 ASCII character string	203-207

The Location Identifier fields apply to consoles and sets only, not trunks.

SMDR Extended Reporting Level 2 must be enabled to support Location Information Reporting.

Note: If **Location Information Reporting** is not enabled in the SMDR Options form, the generated SMDR record will contain the additional columns, but not contain any values.

SMDR File Transfer

When the SMDR File Transfer option is enabled in the SMDR Options form, the following additions are introduced to regular SMDR logging:

- A duplicate SMDR log facility is created, at system restart.
- The *.ops catalog is created.
- SMDR logs are generated to both the SMDR file and the duplicate SMDR file (ftsmdr).

The duplicate SMDR log facility continually captures SMDR events to the ftsmdr file. This file is identical to the regular SMDR file, but is created on the non-redundant partition and is provided only for the support of SMDR File Transfer. No action is performed on the duplicate SMDR file unless requested through the use of authorized maintenance commands.

Programming Internal SMDR

Enabling Internal SMDR

- In the Dimension and Feature Selection form, set the SMDR-Internal field to "Yes".
- See Enable Options and MFRDs (Non-redundant System) or Enable Options and MFRDs (Redundant System) for detailed procedures on enabling optional software.

Selecting Internal SMDR Options

- In the SMDR Options form, enter "Yes" in the Value field beside the Report Internal Calls field.

Programming Internal SMDR for Desired Stations

- In the Class of Service Options Assignment form for each group of stations that you want to record internal SMDR data from, enable SMDR-Internal.

Programming External SMDR

Enabling External SMDR

- In the Dimension and Feature Selection form, set the SMDR-External field to "Yes".
- See Enable Options and MFRDs (Non-redundant System) or Enable Options and MFRDs (Redundant System) for detailed procedures on enabling optional software.

Selecting External SMDR Options

- In the SMDR Options form, enter "Yes" in the Value field beside the desired options. The only exceptions are the *System Identification* and *Report Internal Calls* fields. The *System Identification* field accepts alphanumeric digits only (000 to 999). The *Report Internal Calls* field applies only to internal SMDR.

The following programming conditions affect the way external calls get logged in the SMDR record:

- If *Report Outgoing Calls* is enabled and *Report Incoming Calls* is disabled in the SMDR Options form, then only outgoing calls are recorded.
- If *Report Outgoing Calls* is disabled and *Report Incoming Calls* is enabled in the SMDR Options form, then only incoming calls are recorded.
- Trunks with the *Public Trunk COS* option enabled in the Class of Service Options form are reported as CO trunks.

However, if external call forwarding is programmed at a station, under any of these conditions, the SMDR record resulting from an externally forwarded call will indicate:

- the number of the incoming trunk or internal station that originated the call
- the number being called via the incoming trunk
- the number of the outgoing trunk used to forward a call
- the number of the internal station that enabled the call forward feature in the third party field of the SMDR record.

Note: MSDN/DPNSS Voice V must be purchased and installed to enable the Network Format SMDR option.
The DASS II - Call Charge Information Provided SMDR option is not available in North America.

Programming External SMDR for Trunks and Stations

- Enable *SMDR-External* in the Class of Service Options form for each group of trunks or stations that you want to record external SMDR data from.

SMDR Format Specification

SMDR call data is recorded in table format. Each call record consists of a single line of data 90 characters in length (101 characters if Extended Digit Length is enabled in the SMDR Options form). If ANI/DNIS is enabled, then a single line of data will extend to 112 and 120 characters. The table is divided into fields which provide information on the call. The SMDR records provide information on the following items:

- account codes
- call start time
- calling party
- called party

- call duration
- digits dialed (maximum 26 digits)
- meter pulses (optional) - external SMDR only
- ANI/DNIS reporting (optional) - external SMDR only
- outgoing and incoming trunk numbers - external SMDR only
- hardware identifier
- long call identification
- time to answer incoming external calls - external SMDR only
- identifies the second station in a transfer or in a conference
- identifies conferences and transfers
- identifies trunks involved in route optimization - external SMDR only
- indicates when an attendant was involved in the call
- call completion status (for example, called number busy).

SMDR Recorded Information

The Summary of Fields table beginning on page 33 provides the location of each field within the record and the meaning of the symbols that are used. The following paragraphs describe each field in an SMDR data record. Descriptions of the extended digit length and the network format options are included.

Long Call (z)

This field

- is blank ( ) for a call duration of less than 5 minutes;
- shows a dash (-) for calls of 5 to 9 minutes 59 seconds;
- shows a percent symbol (%) for calls of 10 to 29 minutes 59 seconds;
- or shows a plus symbol (+) for calls of 30 or more minutes.

This field is particularly useful when you are visually scanning records for calls of a particular length.

Date (mm/dd)

The date is reported numerically as a 2-digit month followed by a 2-digit day. The year is not reported.

Start Time (hh:mmp or hh:mm:ssp)

Start Time (hh:mmp) - Level 1 enabled
Start Time (hh:mm:ssp) - Level 1 and Level 2 enabled

The start time of a call is reported in hours and minutes in either a 12- or 24-hour format. If a 12-hour clock is used, the letter “P” indicates PM.

Duration of Call (hh:mm:ss)

Duration of a call is reported in hours, minutes and seconds. Leading zeros are output (Maximum time = 99 hours, 59 minutes, 59 seconds). If the call duration exceeds 100 hours, a call duration of 99 hours, 99 minutes, 99 seconds will be recorded.

Calling Party (pppp)

This is the identity of the party that originated the call. It may be a station, an attendant, or an incoming trunk, as described below:

a. Station Number as Calling Party (cccc). A station number may be one to four digits (0-9, ? or ∗, #) which are left-justified; i.e., no leading zeros.

Note: The ? is used for 3300 ICP, and the * is used for SX-2000.

b. Attendant as Calling Party (ATTm). Calls originated by an attendant that do not involve a third party are reported as a calling party by ATT followed by the console number. When the console number is in the range of 10 through 99, the format is modified to be ATmm. If an attendant calls an outside party on behalf of a station or trunk, that station or trunk is reported as the caller but the attendant flag symbol “?” (for 3300 ICP) or “∗” (for SX-2000) appears in the “Attendant was Involved” field.
With Report Attendant Name enabled, the first four characters of an Attendant's user name are recorded in SMDR logs instead of "ATTm” (five characters with extended digit format). The characters are automatically retrieved from a SUPERCONSOLE 2000.

Log example without Report Attendant Name:

```
02/13     02:02P          0000:0019          ATT1  *0001 6204 ... I   6204   ... 062
02/13 01:40P              0000:00:07  6250  0000   6260  ... I ATT1  6260 ... 062
```

Log example with Report Attendant Name

```
02/13     02:02P          0000:0019          JANE  *0001 6204       ... I   6204  ... 062
02/13     01:40P          0000:00:07  6250  0000   6260  ... I  JANE 6260   ... 062
```

c. Trunk Number as Calling Party (Tnnn or Xnnn). When the originating party is an incoming CO trunk, “Tnnn” appears on the record (where “nnn” is the number of the trunk). If the trunk number is less than 3 digits long, it is left-padded with zeros. If the extended digit length option is enabled, the trunk number “nnnn” may be up to four digits long, left-justified, and without leading zeros. When the originating party is an incoming non-CO trunk, “Xnnn” appears in the trunk’s record.
The “T” or “X” ensures that CO trunks and CO Attendant trunks can be distinguished from tie trunks; however, any trunk with the Public Trunk COS option set to "Yes" is reported as a CO trunk. The trunk number is the trunk ID specified during CDE in the Trunk Assignment form.

Attendant (f)

This 1-digit field contains a question mark (?) or an asterisk (∗) when a call is assisted by, or initially answered by, an attendant. This flag will not appear if a call is transferred to an attendant. If the Extended Time To Answer option is enabled in the SMDR Options form, this field is shifted to the left by one column.

Note: The ? is used for 3300 ICP, and the * is used for SX-2000.

Time to Answer (ttt) or (tttt)

Note: This field does not apply to internal SMDR.

This is the number of seconds from the time an incoming external call rings the destination until the call is answered. If a call is never answered, this field displays *?* or *∗*. Leading zeros are output and the field remains at 999 when an overflow is reached. If the ANSWER PLUS - MITEL Call Distribution feature package is installed, and the Mitel Call Distribution - Report Transfers option is enabled, this field contains the total time to answer regardless of the number of times the call is rerouted. If the Extended Time To Answer option is enabled, this field is expanded to 4 columns and remains at 9999 when an overflow is reached.

Note: The *?* is used for 3300 ICP, and the *∗* is used for SX-2000.

Digits Dialed (xx…x)

External SMDR: The external SMDR application records the digits dialed on the outgoing trunk. A maximum of 26 digits is recorded. This number is reduced to 20 when the 'Report Meter Pulses' option is selected. This field does not include the trunk group access code on outgoing calls. The digits recorded are the actual digits outpulsed on the trunk after digit modification has been performed. On incoming calls, the digits dialed in on the trunk are recorded. When more than 26/20 digits are dialed, the remaining digits are ignored.

If the Mitel Call Distribution option is enabled, each device is listed whenever the call is rerouted, rather than the last device as in non- Mitel Call Distribution loads. To reflect the Mitel Call Distribution option, the Digits Dialed on the Trunk field shows dd1 ddd2 ddd3.

Internal SMDR : The Internal SMDR application records the digits dialed on an internal line. Up to 26 digits are recorded.

Meter Pulses (mmmmm)

The number of reversals (for example, meter pulses) received from an outgoing trunk can be recorded when this option is selected. The range is 0 to 64000. Leading zeros are output. The maximum number of digits recorded reduces from 26 to 20. The trunk group must be programmed for "Answer Supervision". This field is not used for internal SMDR.

Call Completion Status (h)

External SMDR (Outgoing Calls): This reports the completion status of an outgoing call in so far as the system is able to determine it. When an outgoing call fails toll-deny checking and is dropped, this field contains a "T". When the trunk group is programmed to receive "Answer Supervision" and a supervision is received, an "A" is reported. When the trunk group is programmed for "Toll Reversal" and a supervision is received, a "T" is reported.

External SMDR (Incoming Calls): The system can monitor the outcome of a call and can provide a comprehensive report on call completion. When the station or hunt group to which a call is directed is busy, a "B" is recorded. When an incoming trunk accesses an invalid number and receives reorder tone, an "E" is reported. An "E" is also reported for incomplete calls. A "T" is reported if the incoming trunk is answered with Trunk Answer From Any Station (TAFAS) and if an outgoing trunk call is toll denied, or if the call is Pickup answered. When an incoming call is forwarded by an attendant to a busy station, a "B" appears in the call completion status field, the number called appears as the third party, and the Attendant appears as the called party.

Internal SMDR: An “I” indicates that an internal call was completed.

Speed Call or Call Forward Flags (S or F)

This field contains an “S” when the number is a System Speed Call or Personal Speed Call, and an “F” when an external call is forwarded through the external call forward feature.

If Internal SMDR is enabled, an “F” is also recorded when an internal call is forwarded through the call forward feature. However, for internal calls, the Third Party field does not contain the number of the station that initiated the call forward feature. The Third Party field is left blank because the Digit Dialed field identifies the station that has call forward enabled.

Called Party (qqqq)

A called party can be a station number, an attendant, or for outgoing calls, the outgoing trunk number. The Called Party output format is identical to that used for the Calling party; see Calling Party (pppp). For incoming calls to an attendant, the called party is recorded as the attendant unless the attendant transfers a call to a station. For direct-in-lines, it would be the station number. On outgoing calls handled by an attendant, the called party would be the outgoing trunk’s ID. If an IP Trunk is used, X9999 appears in this field.

Transfer/Conference Call (K)

This field identifies calls involving three or more parties. It contains a “T” for supervised transfers, “X” for unsupervised transfers (i.e., transfer into busy reports a “T”, transfer into ringing reports an “X”) and a “C” for 3-way conversations or conferences.

Mitel Call Distribution Transferred Calls

If the Mitel Call Distribution reporting option (on the SMDR Options form) is set to “ALL” or “MCD”, a new record is generated each time a call is transferred. The first record contains trunk number or attendant number as well as the following information:

- Transfer/Conference (66 or 74): T, X or C
- Third party field (68-71 or 76-82): Lists destination device for transferred call.

The second and subsequent numbers include:

- Calling Party field (24-27 or 26-32): LDN of originating device
- Called Party field (62-65 or 67-73): LDN of destination device

Attendant transfers are reported only if the Mitel Call Distribution Reporting option is set to “ALL”.

Third Party (rrrr)

The third party field contains the number of the station to which a trunk call has been transferred. When several transfers take place during a trunk call, the first party is the only one reported, as long as MCD Report Transfers = "No", and Record Transfers = "No".

If an external call is made to a station whose call forwarding is set to an external number, the Third Party field contains the number of the station that initiated the call forward feature. For internal calls, the Third Party field is left blank because the Digit Dialed field identifies the station that has external call forward enabled.

Account Code (aa…a)

Enabling the Report Account Codes option in the SMDR Options form allows an account code of 2 to 12 digits to be recorded if one is used to make a call (not supported for XNET calls on the SX-2000). Leading zeros are reported if they are entered. When Malicious Call Trace is enabled, the Tag Call Identifier appears in this field in the MCI SMDR record.

Route Optimization Flag (s)

At the starting and end nodes of a network call a flag will appear in this field if route optimization has taken place. A route optimized call involves two different trunks to the same party: the pre-optimization trunk and the post-optimization trunk. An SMDR record will be generated for both trunks, which will be distinguished by a lower case “r” for the pre-optimization trunk, and an upper case “R” for the post-optimization trunk. Route Optimization is only available with the MSDN/DPNSS Voice IV feature package. For more information, see MSDN/DPNSS features.

System Identifier (iii)

This optional 3-digit field may contain values from “000” to “999”. “000” indicates that no identifier has been entered. In the absence of a System Identifier, a Node Identifier is printed (when programmed). When more than one node identifier exists, the first one on the programmed list is printed. When both a System ID and a Node ID are programmed, the System ID takes precedence. Programming of System Identifiers and Node Identifiers is described in the Program System document.

ANI/DNIS (xx…….xxxxxxx)

ANI/DNIS digits are recorded in this field. ANI and DNIS numbers can be up to 10 digits in length, and are recorded for incoming calls on ANI/DNIS trunks. COS option ANI/DNIS reporting must be enabled.

Extended Digit Length Option

With the extended digit length option enabled in the SMDR Options form, the following fields will be affected:

>Duration of Call (hhhh:mm:ss)

Maximum time is 9999 hours, 59 minutes, 59 seconds. If call duration exceeds 10000 hours, a call duration of 9999 hours, 99 minutes, 99 seconds will be recorded.

>Calling Party (ppppppp)

With the extended digit length option enabled, the station number may be up to seven digits long and the trunk number may be up to four digits long, as described below:

a. Station Number as Calling Party (ccccccc). A station number may be up to seven digits long.

b. Trunk Number as Calling Party (Tnnnn or Xnnnn). With the extended digit length option enabled, the trunk number “nnnn” may be up to four digits long, left-justified and without leading zeros.

>Called Party (qqqqqqq)

The Called Party output format is identical to that used for the Calling Party. With the extended digit length option enabled, the station number may be up to seven digits long and the trunk number may be up to four digits long.

>Third party (rrrrrrr)

The format is identical to that of the Calling Party. With the extended format option enabled, the station number may be up to seven digits long and the trunk number may be up to four digits long.

Network Format Option

With the Network Format option enabled in the SMDR Options form, the Digits Dialed on the Trunk field will be affected as follows:

>Digits Dialed on the Trunk (x...x y...y) or (Tx...x y...y)

For DPNSS and APNSS calls with the MSDN/DPNSS Voice V feature package option (see MSDN/DPNSS feature packages) and the network format option enabled:

- x...x (up to 14 digits) is the calling party's node ID (up to 7 digits) and extension number (up to 7 digits). y...y is the actual digits dialed on the trunk. The x...x and y...y numbers are separated by a blank.
- Tx...x is the originating node ID of the incoming DPNSS/APNSS trunk call followed by the trunk number. Note that the "OLI Node ID Format for Incoming Trunk Calls" option in the SMDR Options form must be set to "Yes".
- If any digit of the calling party's node ID and extension number is not a telephony digit (i.e., 0-9, ∗, #), an "∗" (asterisk) will be substituted on the SX-2000 system and a "?" (question mark) will be substituted on the 3300 ICP system.

>ANI/DNIS Numbers (a…a d…d)

If the system receives more than seven DNIS digits for an incoming call, only the seven right most digits appear in the extended SMDR report. The remaining digits are not recorded. For example, if the system receives the DNIS number 70355551212, only 5551212 is recorded.

Standardized Network OLI Option

When the Standardized Network OLI option is enabled in the SMDR Options form, all SMDR events associated with a single call through the network are associated using the Network OLI reported in the ANI portion of this field. The format depends on the originator of the call:

Note: ANI and Extension format can be differentiated by the appearance of the calling extension in ANI format and the Network OLI in Extension format.

- aaaaaaaaaa (ANI format) where one of an ANI digit, 0 to 9, #, or * is used. For example, 6135922122.
- sssxxxxxxx (Extension format), where the system identifier (sss = 0-9) is followed by the extension number (xxxxxxx = 0-9.). For example, 6406501. Leading zeros in both the

system identifier and extension number are suppressed, and the extension number is left justified.

- Tssscccc (Trunk format), where T is the trunk format identifier, sss is the system identifier (0-9, where leading zeros are suppressed), and cccc is the trunk number (0-9, where leading zeros are suppressed and the trunk number is left justified). For example, T6405.

>Call Identifier (psssсccc)

This 8-digit field records all SMDR events associated with a single call through the network. Identifier numbers are subject to roll over (calls can then be identified by time elapsed). A leading letter (x = "A" to "Z") is followed by the system identifier (sss = 0-9) and the call number (cccc = 0-9). For example, R6300001. Leading zeros in the system identifier and call number are reported as zeros.

>Call Sequence Identifier (s)

The call sequence identifier begins with "A" on the first SMDR event associated with a particular call. It is incremented (from "A" to "Z") with each SMDR event as the call progresses, without roll over. For example, "C" indicates the third SMDR event for a specific call.

>Associated Call Identifier (psssсccc)

This 8-digit field records the call identifier of the previous call which is associated with the current call (for example in the case of a transfer, conference, call pickup, etc.). It is used to correlate all SMDR events associated with a series of related calls. A leading letter (p = "A" to "Z") indicates the associated plane: odd letters represent plane A and even letters represent plane B. The system identifier (sss = 0 to 9) is followed by the call number (c = 0 to 9). For example, E6300001. Leading zeros in the system identifier and call number are reported as zeros. The call number may roll over.

>Suite Identifier (sssssss) (for SX2000 only)

This 7-digit field indicates the associated Suite Pilot number (s = 0 to 9). Leading zeros in the Suite Identifier are suppressed and reported as blanks. If the suite is a member of a Linked Suite, the Suite Identifier indicates the associated Linked Suite Pilot number. It is blank when a call is not associated with a Suite.

Note: See the SMDR Extended Reporting Level 1 for information on how it changes SMDR report format and size.

Summary of Fields in SMDR Records

The following options affect the length of an SMDR record and the fields recorded:

- Extended Digit Length
- ANI/DNIS/ISDN/CLASS Number Delivery Reporting
- Standardized Network OLI
- Extended Reporting Level 1
- Extended Reporting Level 1 and Level 2

The following SMDR options affect the format of certain SMDR record fields:

- Extended Time to Answer
- Network Format

Standard SMDR Record Fields

The standard SMDR record has 90 characters:

```
zmm/dd_hh:mmp_hh:mm:ss_pppp_fttt_xxxxxxxxxxxxxxxxxxxxxmmmmmhsqqqqk_r
rrr_aaaaaaaaaaaasiii__
```

When "ANI/DNIS/ISDN/CLASS Number Delivery Reporting" is enabled in the SMDR Options form, the SMDR record is extended to 112 characters.

```
zmm/dd_hh:mmp_hh:mm:ss_pppp_fttt_xxxxxxxxxxxxxxxxxxxxxmmmmmhsqqqqk_r
rrr_aaaaaaaaaaaasiii__
_________|_________|_________|_________|_________|_________|________
_|_________|_________|
_aaaaaaaaaa_ddddddddddd
```

When "Standardized Network OLI" is enabled in the SMDR Options form, the SMDR record is extended to 131 characters:

```
zmm/dd_hh:mmp_hh:mm:ss_pppp_fttt_xxxxxxxxxxxxxxxxxxxxxmmmmmhsqqqqk_r
rrr_aaaaaaaaaaaasiii__
_ _ _ _ _|_ _ _ _ _|_ _ _ _ _|_ _ _ _ _|_ _ _ _ _|_ _ _ _ _|_ _ _ _ _|_ _ _ _
_|_ _ _ _ _|_ _ _ _ _|
_aaaaaaaaaa_ddddddddddd_pssscccs_psssccc
```

Extended Digit Length SMDR Record Fields

The Extended Digit Length SMDR record has 101 characters:

```
zmm/dd_hh:mmp_hhhh:mm:ss_ppppppp_fttt_xxxxxxxxxxxxxxxxxxxxxmmmmmhsqq
qqqqqk_rrrrrr_
_________|_________|_________|_________|_________|_________|________
_|_________|___
aaaaaaaaaaaasiii__
```

When "ANI/DNIS/ISDN/CLASS Number Delivery Reporting" is enabled in the SMDR Options form, the SMDR record is extended to 120 characters:

```
zmm/dd_hh:mmp_hhhh:mm:ss_ppppppp_fttt_xxxxxxxxxxxxxxxxxxxxmmmmmhsqq
qqqqqk_rrrrrr_
_________|_________|_________|_________|_________|_________|_______
_|_________|___
aaaaaaaaaaaasiii___aaaaaaaaaa_ddddddd
```

When "Standardized Network OLI" is enabled in the SMDR Options form, the SMDR record is extended to 139 characters:

```
zmm/dd_hh:mmp_hhhh:mm:ss_ppppppp_fttt_xxxxxxxxxxxxxxxxxxxxmmmmmhsqq
qqqqqk_rrrrrr_
_________|_________|_________|_________|_________|_________|_______
_|_________|___
aaaaaaaaaaaasiii___aaaaaaaaaa_ddddddd_pssscccs_psssccc
```

Extended Time to Answer SMDR Record Fields

When the "Extended Time to Answer" field is enabled in the SMDR Options form, the Time to Answer field is increased by one digit, and the spacer between the Calling Party and Attendant fields disappears.

The same changes apply when ANI/DNIS/ISDN/CLASS Number Delivery Reporting and/or Standardized Network OLI are enabled.

Standard SMDR Record fields with Extended Time to Answer Enabled

The Standard SMDR record with Extended Time to Answer enabled has 90 characters:

```
zmm/dd_hh:mmp_hh:mm:ss_ppppftttt_xxxxxxxxxxxxxxxxxxxxmmmmmhsqqqk_r
rrr_aaaaaaaaaaasiii__
```

Extended Digit Length SMDR Record fields with Extended Time to Answer Enabled

The Extended Time to Answer SMDR with Extended Digit Length enabled record has 101 characters:

```
zmm/dd_hh:mmp_hhhh:mm:ss_pppppppftttt_xxxxxxxxxxxxxxxxxxxxmmmmmhsqq
qqqqqk_rrrrrr_
_________|_________|_________|_________|_________|_________|_______
_|_________|___
aaaaaaaaaaaasiii__
```

Extended Reporting Level 1 SMDR Record Fields

If "SMDR Extended Reporting Level 1" is enabled in the SMDR Options form, the ANI and DNIS field sizes are increased, and two new fields are added: LDN Called (after the Called Party field) and Suite Identifier (after the DNIS field). The changes are shown in the tables below (only the affected fields are shown).

Note: When Extended Reporting Level 1 is enabled, Extended Digit Length, Extended Time to Answer and Standardized Network OLI must also be enabled.

The Extended Report Level 1 SMDR record has 168 characters:

```
zmm/dd_hh:mmp_hhhh:mm:ss_ppppppppftttt_xxxxxxxxxxxxxxxxxxxxxxmmmmmhsqq
qqqqq_lllllllk_rrrrrrr_
_ _ _ _ _|_ _ _ _ _|_ _ _ _ _|_ _ _ _ _|_ _ _ _ _|_ _ _ _ _|_ _ _ _
_|_ _ _ _ _|_ _ _ _ _|_
aaaaaaaaaaaasiii___aaaaaaaaaaaaaaaaaaa_ddddddddddd_sssssss_psssccccs
_pssscccc
```

Extended Reporting Level 1 and Level 2 SMDR Record Fields

If SMDR Extended Reporting Level 1 and Level 2 are enabled in the SMDR Options form, the Start Time field records the call start time to the second (hour:minute:second).

Summary of Fields in SMDR Records

Name	Columns	Format	Definition	Notes
Long Call	1	z	blank if less than 5 minutes - = 5 - 9 minutes % = 10 - 29 minutes + = 30 or more minutes	
Date	2 – 6	mm/dd	mm = Month dd = Day	mm = 01 - 12 dd = 01 - 31
Spacer	7		-- = Space	
Start Time	8 – 13	hh:mmp	hh = Hours mm = Minutes p = pm	hh = 00 - 12 or 00 - 23 mm = 00 - 59 p = PM (12-hour clock)
Spacer	14		-- = Space	
Duration of Call	15 – 22 15 - 24 (Extended Digit Length)	hh:mm:ss hhhh:mm:ss	hh:mm:ss = duration in hours:minutes:seconds hhhh:mm:ss = duration in hours:minutes:seconds hours:minutes: seconds	hh = 00 - 99 mm = 00 - 59 ss = 00 - 59 hhhh = 0000 - 9999 mm = 00 - 59 ss = 00 - 59
Spacer	23		-- = Space	

Summary of Fields in SMDR Records				
Name	**Columns**	**Format**	**Definition**	**Notes**
Calling Party	24 - 27	pppp	cccc = Extension # Tnnn = Trunk # (CO) Xnnn = Trunk # (non-CO) ATTm = Attendant number	c = 0 - 9, *, # nnn= 000 – 999 m = Console # (ATmm for Attendant 00 - 99)
Calling Party	26 - 32 (Extended Digit Length)	ppppppp	ccccccc = Extension # Tnnnn = Trunk # (CO) Xnnnn = Trunk # (Non-CO) ATTmm = Attendant number	c = 0 - 9, *, # nnnn = 0000 - 9999 mm = Console #
Calling Party	26 - 32 (Report Attendant Name)	ppppppp	ccccccc = Extension # Tnnnn = Trunk # (CO) Xnnnn = Trunk # (Non-CO) First four characters of an Attendant's user name (five with extended digit format)	
Spacer	28 33 (Extended Digit Length)		-- = Space	If the Extended Time To Answer option is enabled this spacer is not available.
Attendant	29 33 (Extended Digit Length) Extended Time to Answer enabled: 28 33 (Extended Digit Length)	f	* = Attendant -- = Attendant not involved	Attendant answered or initiated the call, then transferred it to an extension

Summary of Fields in SMDR Records				
Name	**Columns**	**Format**	**Definition**	**Notes**
Time To Answer	30 - 32 34 - 37 (Extended Digit Length) Extended Time to Answer enabled: 29 - 32 34 - 37 (Extended Digit Length)	ttt tttt	ttt = time in seconds (000 - 999) tttt = time in seconds (0000 - 9999 *** = Call unanswered	Leading zeros output. Incoming calls only.
Spacer	33 38 (Extended Digit Length)		-- = Space	
Digits Dialed on the Trunk	34 - 59 39 - 64 (Extended Digit Length)	xx...x x...x y...y or Tx...x y...y (Network Format)	Up to 26 (20 if metering) digits dialed on the trunk Network Format: up to 26 digits (20 if metering) in total	x = 0 - 9, *, # y = 0 - 9, *, # x...x = Node ID & Extension # (up to 14 digits); y...y = actual digits dialed Tx...x = Node ID & Trunk #
Meter Pulses (Opt.)	55-59 60 - 64 (Extended Digit Length)	mmmmm	mmmm = number of meter pulses	mmmm = 0 to 64000. Leading zeros output.
Call Completion Status	60 65 (Extended Digit Length)	h	A = Answer Supervision B =Called Party Busy E =Caller Error T = Toll-Denied, TAFAS answered, or Pickup answered I = Internal Call P = MLPP Preemption	Outgoing Incoming Direct/Dial-In Incoming/Dial-In Incoming Incoming/Outgoing
Speed Call or Call Fwd Flags	61 66 (Extended Digit Length)	S or F	S =Number was a System Speed Call or Personal Speed Call F =External call forwarded through External Call Fwd feature or internal call forwarded through Call Forward feature	Outgoing

Summary of Fields in SMDR Records				
Name	**Columns**	**Format**	**Definition**	**Notes**
Called Party	62 - 65	qqqq	cccc = Extension # Tnnn = Trunk # (CO) Xnnn = Trunk # (non-CO) ATTm = Attendant	c = 0 - 9, *, # nnn = Range specified in Feature Dimension table (Customer Data Entry) m = Console # (ATmm for Attendant 00 - 99)
Called Party	67 - 73 (Extended Digit Length)	qqqqqqq	ccccccc = Extension # Tnnnn = Trunk # (CO) Xnnnn = Trunk # (non-CO) ATTmm = Attendant	c = 0 - 9, *, # nnnn = 0000 - 9999 | mm = Console #
Called Party	67 - 73 (Extended Digit Length)		ccccccc = Extension # Tnnnn = Trunk # (CO) Xnnnn = Trunk # (Non-CO) First four characters of an Attendant's user name (five with extended digit format)	
Transfer/ Conference Call	66 74 (Extended Digit Length)	K	T = Supervised Transfer X = Unsupervised Transfer C = 3-Way or Conference U = Path Unavailable I = Interflow	'U' and 'I' only apply to ACD 2000.
Spacer	67 75 (Extended Digit Length)		-- = Space	
Third Party	68 - 71 76 - 82 (Extended Digit Length)	rrrr rrrrrrr	cccc = Extension # cccccccc = Extension #	c = 0 - 9, *, # c = 0 - 9, *, #
Spacer	72 83 (Extended Digit Length)			

Summary of Fields in SMDR Records				
Name	**Columns**	**Format**	**Definition**	**Notes**
Account Code (Optional)	73 – 84 84 - 95 (Extended Digit Length)	aa....a	Length of 2 to 12 digits	a = 0 - 9, space-filled Tag Call Identifier only: a - z, 0 - 9, #, *, space-filled. Note: some third-party SMDR log readers can only handle numeric characters in this field.
Route Optimization Flag (Optional)	85 96 (Extended Digit Length)	s	r = pre-optimization trunk R = post-optimization trunk -- = Space (no route optimization)	
System Identifier (Optional)	86 - 88 97 - 99 (Extended Digit Length)	iii	Entered by System ID	i = 0 - 9 iii = 000 - 999 000 = 'No Code Entered' In the absence of a System ID, a Node ID is printed (if programmed). When both System ID and Node ID are programmed, System ID takes precedence.
Spacer	89 100 (Extended Digit Length)			
MLPP Call Priority Level	90 101 (Extended Digit Length)	j	Indicate call priority for preemption purposes	0 = Flash Override 1 = Flash 2 = Immediate 3 = Priority 4 = Routine

Summary of Fields in SMDR Records				
Name	**Columns**	**Format**	**Definition**	**Notes**
ANI	92 - 101 103 - 112 (Extended Digit Length) Standard. Network OLI 92 - 101 103 - 112 (Extended Digit Length)	aaaaaaaaaa Standard. Network OLI: aaaaaaaaaa or Extension: sssxxxxxxx or Trunk: Tssscccc	a = ANI digit Standardized Network OLI: a = ANI number, 0-9, #, or * s = system identifier x = extension number T = trunk format identifier c = trunk number	
Spacer	102 113 (Extended Digit Length)			
DNIS	103 - 112 114 -120 (Extended Digit Length)	ddddddddddd	d = DNIS digit	For Extended Digit Length format, only the 7 right most DNIS digits are recorded
Spacer	113 121 (Extended Digit Length)			
Suite Identifier (SX-2000 only)	114 - 120 122 - 128 (Extended Digit Length)	sssssss	s = Suite Pilot number or Linked Suite Pilot number (0 - 9)	If Standardized Call ID format is enabled the Suite Identifier is not reported. If the call does not involve a suite, the Suite Identifier is left blank.
Call Identifier	114 -121 122 - 129 (Extended Digit Length)	pssscccc	p ="A" to "Z" s = system identifier (0 - 9) c = call number (0 - 9)	p indicates the plane, where odd letters represent plane A and even letters represent plane B.
Call Sequence Identifier	122 130 (Extended Digit Length)	s	s = "A" to "Z"	s increments without rollover.
Spacer	123 131 (Extended Digit Length)			
Associated Call Identifier	124 - 131 132 - 139 (Extended Digit Length)	pssscccc	p = "A" to "Z s = system identifier (0 - 9) c - call number (0 - 9 with rollover)	p indicates the plane, where odd letters represent plane A and even letters represent plane B.

SMDR Extended Reporting Level 1 and Level 2

SMDR Extended Reporting Level 1 and Level 2 allow SMDR records to be produced in Extended Reporting format. This format accommodates International ANI digit strings and Attendant Line Appearances resulting in longer SMDR records. The increased length impacts SMDR file system storage requirements as more disk space is required to store the same number of records (whether Extended Reporting format is used or not). Incomplete internal calls can also be reported (optional). SMDR File Transfer Operation will take into account the new record size and the different record formats it may encounter.

The Extended Reporting feature applies the following changes to the SMDR record:

- ANI field – increased to 20 columns (from 10 columns) and stores up to 20 digits of incoming ANI information on a trunk call. The column position of all fields following the ANI field are shifted to the right.
- DNIS field – increased to 10 columns (from 7 columns in Extended Digit format). This field is 10 columns long in regular SMDR format.
- LDN (Listed Directory Number) Called field – reports the extension number (limited to 7 digits) of an attendant answered call. It is added to the right of the Called Party field. The column position of all fields following the LDN Called field are shifted to the right
- Suite and Call Identifiers – separate column positions are provided for Suite identifiers and Call identifiers.

If you enable Level 1, the Start Time field records the call start time to the minute (hour:minute). If you enable both Level 1 and Level 2, the Start Time field is extended to record the call start time to the second (hour:minute:second).

SMDR event generation for all unanswered internal calls with valid dialed DNs is controlled by the Report Internal Unanswered Calls SMDR Options option. Four call completion status flags are introduced for internal calls:

- "O" (Occupied) indicates the called party was busy and the calling party was connected to busy tone
- "D" indicates the called party was in Do Not Disturb (DND) mode and the calling party was connected to DND tone.
- "S" indicates that the called party was out-of-service and the calling party was connected to Reorder tone.
- "U" indicates that a called attendant was unavailable and the calling party was connected to Reorder tone.
- Use of these flags prevents the "I" flag from appearing in some Internal SMDR logs. The "O", "D", "S", and "U" flags are reserved for internal calls; therefore, they also signify an internal call.

Extended Reporting Conditions

- All Extended Reporting options in the SMDR Options form (Extended Digit Length, Extended Time to Answer, Standardized Network OLI, and Standardized Call ID Format) must be enabled.
- The SMDR Extended Reporting Level 1 option must be enabled before the Report Internal Unanswered Calls option.
- You must enable SMDR Extended Reporting Level 1 option in order to enable Level 2.

Programming

In the SMDR Options form:

- Set SMDR Extended Reporting Level 1 option to "Yes".
- If required, set SMDR Extended Reporting Level 2 option to "Yes".
- Set the Report Internal Unanswered Calls option to "Yes", to report incomplete internal calls.

Operation

The SMDR record format changes to accommodate SMDR Extended Reporting. The following tables list the column positions (see SMDR Recorded Information for comparison):

Extended Reporting Level 1	
Name	**Columns**
Long Call	1
Date	2-6
Spacer	7
Start Time	8-13
Spacer	14
Duration of Call	15-24
Spacer	25
Calling Party	26-32
Attendant	33
Time To answer	34-37
Spacer	38
Digits Dialed on the Trunk	39-64 or 39-58
Spacer	N/A or 59
Meter Pulses	N/A or 60-64
Call Completion Status	65
Speed Call or Call Forward Flags	66
Called Party	67-73
Spacer	74
LDN Called	75-81
Transfer/Conference Call	82
Spacer	83
Third Party	84-90
Spacer	91
Account Code	92-103
Route Optimization Flag	104
System Identifier	105-107
Spacer	108
Autovon Call Priority Level	109

Extended Reporting Level 1	
Name	**Columns**
Spacer	110
ANI	111-130
Spacer	131
DNIS	132-141
Spacer	142
Suite Identifier	143-149
Spacer	150
Call Identifier	151-158
Spacer	159
Call Sequence Identifier	160
Spacer	161
Associated Call Identifier	162-169

Extended Reporting Level 2	
Name	**Columns**
Long Call	1
Date	2-6
Spacer	7
Start Time	8-16
Spacer	17
Duration of Call	18-27
Spacer	28
Calling Party	29-35
Spacer	36
Attendant	37
Time To answer	38-40
Spacer	41
Digits Dialed on the Trunk	42-67 or 42-61
Spacer	N/A or 62
Meter Pulses	N/A or 63-67
Call Completion Status	68
Speed Call or Call Forward Flags	69
Called Party	70-76
Spacer	77
LDN Called	78-84
Transfer/Conference Call	85
Spacer	86
Third Party	87-93

Extended Reporting Level 2	
Name	**Columns**
Spacer	94
Account Code	95-106
Route Optimization Flag	107
System Identifier	108-110
Spacer	111
Autovon Call Priority Level	112
Spacer	113
ANI	114-133
Spacer	134
DNIS	135-144
Spacer	145
Suite Identifier	146-152
Spacer	153
Call Identifier	154-161
Spacer	162
Call Sequence Identifier	163
Spacer	164
Associated Call Identifier	165-172
Two B-Channel Transfer. Identifier (TBCT)	174-180
Calling Hot Desk User	181-187
Spacer	188
Called Hot Desk User	189-195
Spacer	196
Calling Party Location Identifier	197-201
Spacer	202
Called Party Location Identifier	203-207

Call Timing

Trunk call timing aspects (for example, call start time), form one of the prime function areas of the SMDR feature. Accuracy in recording call timing is essential in order to avoid false system analysis and incorrect accounting. One safeguard against false time records is the time change reporting option. This option, when selected, causes two time stamps to be printed whenever the system clock is changed. The first indicates the time and date immediately prior to the change, and the second indicates the time and date immediately after the change. The format for the time stamp record is shown in the example given in the Time Stamp Format illustration. The system clock can be set by maintenance personnel or by an attendant at any time.

Tag Call

The Tag Call feature will provide a record of malicious calls in the SMDR record. The calls can be internal or external. The activation of the Tag Call feature key can occur at anytime during a call and will generate two SMDR records. The first record will correspond to the usual SMDR record for the call and it will not record that a Tag Call was invoked. The second record will be identical, with the exception that the 'Tag Call Identifier' will appear in the Account Code field.

If the call is internal, the party tagging the call will also be identified in the Call Completion Status field of the SMDR Record.

If the Tag Call was accepted, the user will receive a "Thank you" message and/or will be reconnected to the held party. If the Tag Call was not accepted, the user will receive a "Not Allowed" message and/or will receive reorder tone and will not be reconnected to the held party. If the Tag Call was successful, the Tag Call Identifier will appear in the second SMDR record unless records for the particular call type are disabled. For example, if the call is internal and Internal SMDR records are disabled then no SMDR records will be written for the call.

Tag Call Conditions

- The Tag Call Feature Key and Feature Access Code are only available during a call. The ability to tag is lost once the call has cleared.
- Codes entered while in a conference or on hold are not recorded.
- The Tag Call Feature Key will be available on all Advanced and Simple Display Sets.
- The SUPERSET 4015 supports the tag call feature key programming via CDE only and not via SuperKey.
- Console support is provided via the Feature Access Code.

Programming

- In the Feature Access Code Assignment form, assign a value for Tag Call.
- The SMDR Options form includes two new fields:
  - Tag Call Reporting - to enable or disable the reporting of the Tag Call Identifier in the SMDR record. The default value is No. Tag Call Reporting cannot be set to YES if there is no value for the Tag Call Identifier.
  - Tag Call Identifier - to specify the value to appear in the SMDR record for a tagged call. The field is blank by default. The identifier is an alphanumeric string up to 12 digits in length.
- The Multiline Set Key Assignment Form will accept a new Line type of Tag Call. The Directory Number and Ring Type fields must be blank. When a Tag Call Feature Key is programmed via Superkey, the line type of Tag Call will appear in the Multiline Set Key Assignment form.

A Tag Call Feature Key may be programmed through CDE. For programming and operation information, refer to the technical documentation for the appropriate system and release.

Timing Functions

The timing functions that apply to incoming and outgoing calls are described as follows:

Incoming Call: Three aspects, related to the timing of an incoming call are recorded on an SMDR call record: the date, the time taken for the called party to answer and the duration of the call. The time to answer is the difference between the time when the called device is seized and the time when the called party answers. The duration of the call is the difference between the time when the call is answered and the time when the call is released, such as call cleardown.

Outgoing Call: Three aspects related to the timing of an outgoing call are recorded on an SMDR call record: the date, the call start time and the call duration. The latter is only recorded for calls which are answered. In the case of unanswered calls, the call start time is recorded as the time when the called device is seized. In the case of answered calls, the call start time is recorded as the time when the called device is answered. Call answer is determined by the detection of speech or by the detection of an answer supervision signal provided by the trunk. "Fake Answer Supervision After Outpulsing" can be programmed, which causes the system to recognize answer status immediately after digits are outpulsed, regardless of far-end conditions. The call duration is the difference between the time when the call is answered and the time when the call is released; such as, call cleardown.

Error Handling

SMDR error handling is limited to the recognition and reporting of clock malfunctions. In the event of a clock failure, the identity of the calling and called parties appears in the call record; however, the start time portion of the record remains blank and the call duration portion of the record contains the words "CLOCK MALFUNCTION" (columns 1 - 17). Any error other than a clock malfunction causes the SMDR output, and hence call record printing, to be inhibited.

External SMDR Record Examples

Without Extended Digit Length, Network Format, or SMDR Record Transfer Enabled

Example 1: 2-Party Outgoing Call

```
11:42   11:42   00:08:29   214          16139252122   AT054   000
```

On June 13th at 11:42 AM, station 214 accessed Trunk Number 54 and dialed “613-592-2122”. Answer supervision (A) was provided. The conversation lasted 8 minutes, 29 seconds.

Example 2: 2-Party Outgoing Call

```
05/17   10:51   00:01:52   213          201           AX082 1200  000
```

On May 17 at 10:51 AM, station 213 accessed an identified Tie Trunk, then 201 to obtain a station in the other PBX. The other PBX provided answer supervision (A) and the conversation lasted 1 minute, 52 seconds. The trunk number was 082.

Example 3: 2-Party Incoming Call

01/30 03:10P 00:02:22 T102 008 201 201 000

On January 30 at 3:10 PM, incoming Direct-in Trunk Number 102 rang in to station 201. The station answered after 8 seconds and the two parties talked for 2 minutes, 22 seconds.

Example 4: 2-Party Incoming Call

03/12 09:11 00:01:12 X116 007 63224 224 000

On March 12 at 9:11 AM, Dial-in Tie Trunk 116 dialed Hunt Group with Access Code “63”. Station 224 answered after 7 seconds, and the conversation lasted 1 minute, 12 seconds.

Example 5: Attendant-Handled Call - Outgoing Trunk

+01/30 03:27P 00:35:11 201 * 16545996951 AT052 000

On January 30, station 201 dialed the attendant and asked for an outside line. The attendant dialed 1-654-599-6951. At 3:27 PM, the called party answered and the conversation lasted 35 minutes, 11 seconds. Trunk Number 52 was used. An ‘A’ appears before the number of the trunk because the attendant handled the call (Answer supervision).

Example 6: Attendant-Handled Call - Incoming Trunk

04/15 01:42P 00:00:31 T090 *009 ATT2 000

On April 15th at 1:42 PM, Trunk 90 rang in to the attendant. After 9 seconds, the attendant at Console 2 answered. The calling party spoke to the attendant for 31 seconds, then hung up.

Example 7: Calling Station Transfer Call

04/02 09:36 00:04:55 103 5922122 T162T 100 000

On April 2nd at 9:36 AM, station 103 dialed a trunk access code followed by 592-2122. The called party answered, and after conversing, the caller transferred the called party to station 100. After further conversation station 100 hung up. The total period for both conversations was 4 minutes, 55 seconds. Trunk Equipment 162 was used for the call.

Example 8: Called Station Transfer Call

04/02 09:36 00:04:55 103 5922122 T162T 100 000

On March 12th at 7:42 AM, Trunk 162 rang the console and requested station 241. The attendant took 3 seconds to answer the call. station 241 then transferred the call to station 215. The total conversation lasted 3 minutes, 6 seconds.

Example 9: Attendant-Controlled Conference (with trunk)

%03/10 09:48 00:13:40 ATT1 5924130 T178C 000

At 9:48 AM on March 10th, the attendant dialed the CO trunk access code and seized Trunk number 178. The call was then completed by dialing 592-4130. After speaking to the called party, the attendant set up a controlled conference (C) by dialing some internal stations and adding them to the conference in turn. The conference lasted for 13 minutes, 40 seconds. The record does not show what or how many stations were added.

Example 10-A: Incoming Call/call Forward Enabled At Called Station

%03/10 09:48 00:13:40 ATT1 5924130 T178C 000

At 10:22 AM on January 13th, a call was received on an incoming trunk, 014. Because Call Forwarding was in effect at the called station (1200), the call was routed on a CO trunk (005) to the external number 592-2122.

Example 10-B: Internal Call/call Forward Enabled at Called Station

-01/13 10:25 00:05:57 1202 5922122 FT005 1200 000

At 10:25 AM on January 13th, an internal call was generated at station 1202 to reach station 1200. Since station 1200 had Call Forwarding in effect, the call was routed to an external number, 592-2122 via an external CO trunk, number 005.

EHDU SMDR

Example 1: Call to EHDU that is abandoned before the call has been answered

The make call SMDR will contain the EHDU default account code if one is provisioned against the user.

Example 2 Call to EHDU that fails

08/20 14:24:43 20004 90020004 6135921234 T15 00 90020004 6135921234 A9000037 A 1001

An internal number (20004) calls an EHDU (1001 – 6135921234) and fails on the make call.

Example 3 Basic Call from EHDU

08/20 14:24:43 0000:00:04 T15 0003 6135921234 20004 A 20004 00 6135921234 90020004 A9000073 A 1001

An EHDU (1001 - 6135921234) calls an internal number (20004).

Example 4 Call from EHDU with no CLID

08/20 14:24:43 0000:00:04 T15 0003 20004 A 20004 00 A9000073 A 1001

An EHDU (1001 – 613921234) calls in on a trunk that does not support CLID.

Example 5 Basic Call to EHDU

08/20 14:24:43 0000:00:04 20004 0003 90020004 6135921234 A T15 00 90020004 6135921234 A9000148 A 1001

An internal destination (20004) calls an EHDU (1001) that is associated with the PSTN digits 96135921234.

Example 6 Basic Call from EHDU to another EHDU

```
08/20  14:24:43      0000:00:04     T15    0003   6135921234   6135925555
A      T9999  00     6135921234     6135925555    A9000155     A      1001
1002
```

An EHDU (1001 - 6135921234) calls another EHDU (1002 – 6135925555).

Example 7 Call Transferred from EHDU to internal destination

```
08/20  14:24:43      0000:00:04     T15    0003   6135921234   A      20004
x      20005  00     6135921234     90020004      A9000182     A      1001
```

An EHDU (1001 - 6135921234) transfers a call (originating from 20004) to another internal destination (20005).

Example 8 Call Transferred from EHDU to external destination

```
08/20  14:24:43      0000:00:04     T15    0003   6135921234   A      20004
x      T199   00     6135921234     6131234567    A9000182     A      1001
```

An EHDU (1001 - 6135921234) transfers a call (originating from 20004) to an external destination (via Trunk number 199 – 6131234567).

Example 9 Call Transferred to EHDU

```
08/20  14:24:43      0000:00:04     20004  0003   I      20005  x      T198   00
08/20  14:24:43      0000:00:04     20005  90020005      6135921234   A
T198   x      20004  00     90020004      6135921234    A9000148     A      1001
08/20  14:24:43      0000:00:04     20004  90020004      6135921234   A
T198   900    90020004      6135921234    A9000192      A      1001
```

A call between 2 internal destinations (20004 transfers call to 20005) is transferred to a EHDU (1001 – 6135921234).

SMDR Record Transfer with option SMDR Record Transfer enabled

Example 1: Unsupervised Transfer - Toll Call Meter Pulse Updates

```
1.  09/13     14:05    00:02:05    1201    95922122    00090  X002X  1202
2.  09/13 14:07        00:01:05            1202        95922122       00030
    X002
```

On September 13th at 2:05 PM, station 1201 makes a call on toll trunk #002 for 2 minutes, 5 seconds, then transfers the call on hold to station 1202. Station 1202 continues the toll call for 1 minute, 5 seconds.

Example 2: Multiple Supervised Transfer

```
1.  09/13    14:05 00:02:05    1201    95922122    00000  X002T 1202
2.  09/13    14:05 00:02:30    1202    95922122    00000  X002T 1203
3.  09/13    14:05 00:02:50    1203    95922122    00000  X002
```

On September 13th at 2:05 PM, station 1201 makes a call on toll trunk #002 for 2 minutes, 5 seconds, then makes a supervised transfer to station 1202. In turn, station 1202 makes a supervised transfer to station 1203. Three SMDR records are generated.

Example 3: Three Party Conference Breakdown

1. -09/13 14:05 00:05:00 1201 95922122 00000 X002T 1202
2. 09/13 14:07 00:01:00 1202 95922122 00000 X002

On September 13th at 2:05 PM, station 1201 forms a 3-party conference with station 1202 and trunk #002. After 5 minutes station 1201 hangs up, and 1 minute later station 1201 also hangs up. Two call records are generated.

With Extended Digit Length and Network Format Enabled

Example 1: Network Call

Node 41 03/18 12:25P 0000:01:10 100006 41100006 43300006 X1
Node 42 03/18 12:25P 0000:01:10 X2 41100006 43300006 X1234
Node 43 03/18 12:25P 0000:01:10 X1234 41100006 300006 300006

At 12:25 PM on March 18th, a network call was generated on station 100006 at node 41 to station 300006 on node 43, via node 42. It was carried from node 41 to node 42 over a non-CO trunk #1, and from node 42 to node 43 via non-CO trunk #1234.

Example 2: Network Call With Digit Truncation And Digit Modification

Node 41 03/18 13:00 0000:03:09 100007 41100007 91234567890123456 X1
Node 42 03/18 13:00 0000:03:09 X1 41100007 91234567890123456 x2
Node 43 03/18 13:00 0000:03:09 X2 41100007 12345678901234567 T3

At 1:00 PM on March 18th, a network call was generated on station 100007 at node 41 to an unknown destination outside the network. The digits dialed were '91234567890123456789'. The call passed through node 42 (via non-CO trunk #1) to node 43 (via non-CO trunk #2), where it went out on CO trunk #3. The leading digit '9' was deleted at node 43. Note that the sum of the originator's station number and the digits dialed was greater than 26 digits long and had to be truncated in all of the call records.

Example 3: Long Duration Network Call (Data Call)

Node 41 +03/18 03:00P 9999:99:99 10005 4110005 4220005 X1
Node 42 +03/18 03:00P 9999:99:99 X1 4110005 20005 X2

At 3:00 PM on March 18th, a network call was generated on station 10005 at node 41 to station 20005 on node 42, via non-CO trunk #1. The call remained open for 1 year and 2 months (10152 hours).

Example 4: Network Call With Route Optimization

Node 4141414: -03/20 01:00P 0000:01:00 1111117 42424242222227 A X2000
123456789012 r

Node 4141414: -03/20 01:01P 0000:05:03 1111117 42424242222227 A X2000 T X1000
123456789012 R4141414

Node 4242424: -03/20 01:00P 0000:01:00 X3000 424242422222 2222227 r
-03/20 01:01P 0000:05:03 X1000 42424242222227 2222227 R

Node 43: -03/20 01:00P 0000:01:00 X2000 424242422222227 X3000

At 1:00 PM on March 20th, a network call was generated on station 1111117 at node 4141414 to station 2222227 on node 4242424. The call would normally have gone out on

trunk #1000, but since it was busy, the call went out on trunk #3000 to node 43, and then to node 4242424 via trunk #2000. Part way through the call, trunk #1000 became available, and the call was Route Optimized directly to node 4242424 via trunk #1000. Note the Route Optimization flags ('r' and 'R') in column 96 of call records at nodes 4141414 and 4242424.

Example 5: Network Call With Loop Avoidance

Node 41	-03/20	13:00	0000:03:09	100001	42200001	X1	
	-03/20	13:00	0000:03:09	X2	42200001	41100001	100001
Node 42	-03/20	13:00	0000:03:09	X1	41100001	200001	200001
	-03/20	13:00	0000:03:09	200001	42200001	41100002	X2
	-03/20	13:00	0000:03:09	X1	41100001	A X2	T200001

At 1:00 PM on March 20th, a network call was generated on station 100001 at node 41 to station 200001 on node 42, via trunk #1. Station 200001 transfers the call to station 100002 at node 41, via trunk #2, and then hangs up. Since stations 100001 and 100002 are at the same node, trunks #1 and #2 are dropped.

SMDA Meter Report

Example: SMDA Meter Report

Meter Units Report Time: 20-JUN-90 11:40

Accounts

Code	Units	Code	Units	Code	Units
1945834	472	1945879	27	1946069	397
194681	231	1954012	1734	1954112	612
1955112	25	1955234	582	1955632	45
1957812	312	2045783	478	2067676	1289
2121212	412	503467334	345		

Stations

Ext.	Units	Ext.	Units	Ext.	Units
0	345	110	317	112	10
130	216	140	67		

Ext.	Units	Ext.	Units	Ext.	Units
200	145	210	317	212	73
230	516	240	87		

Ext.	Units	Ext.	Units	Ext.	Units
310	345	311	23	412	812
321	176	322	287	441	92
445	189				

Trunks

Trk.	Units	Trk.	Units	Trk.	Units
210	345	211	23	213	12
221	176	222	1287	223	196
226	3498				

Trk.	Units	Trk.	Units	Trk.	Units

304	34	311	431	212	812
331	312	340	298	341	92
367	1189				

Trk.	**Units**	**Trk.**	**Units**	**Trk.**	**Units**
500	58	509	667	510	212
539	5	541	610	547	21
567	219	572	229	590	109
593	310	595	301	596	291

Mitel Call Distribution Record

Note: The Mitel Call Distribution Report Transfer mechanism monitors incoming calls only.

SMDR Records for Mitel Call Distribution

Example 1: Calls To A Hunt Group

1.	07/07	07:54P	00:00:08	X016 003	3558			4001
2.	07/07	07:57P	00:00:09	X016 027	3556	3557		4002
3.	07/07	07:55P	00:00:10	X016 037	3558	3557	3556	4000

Each call generates one record:

- Record 1. On July 7 at 7:54 PM, a call on non-co trunk 016 arrives at hunt group 3558 and rings station 4001 where it is answered in 3 seconds. Total call duration was 8 seconds.
- Record 2. On July 7 at 7:57 PM, a call on non-co trunk 016 arrives at hunt group 3556. It reroutes to hunt group 3557 and is answered by station 4002 (member of hunt group 3557). The call was answered in 27 seconds and lasts 9 seconds.
- Record 3. On July 7 at 7:55 PM, a call on non-co trunk 016 arrives at hunt group 3558 and reroutes to hunt group 3557. It reroutes again to hunt group 3556 where it is answered by station 4000. The call was answered in 37 seconds and lasts 10 seconds.

Example 2: Abandoned Calls

1.	07/07	06:32P	00:00:08	X009	***	3558			4001
2.	07/07	06:32P	00:00:34	X010	***	3556	3557		4002
3.	07/07	06:32P	00:00:47	X009	***	3558	3557	3556	4000

Each call generates one record:

- Record 1. On July 7 at 6:32 PM, a call arrives at hunt group 3558 via non-co trunk 009. It rings station 4001 for 8 seconds before being abandoned.
- Record 2. On July 7 at 6:32 PM, a call arrives at hunt group 3556 via non-co trunk 010 and rings station 4001. It reroutes to hunt group 3557 and rings station 4002. The call is abandoned before 4002 answers. Total duration is 34 seconds.

- Record 3. On July 7 at 6:32 PM a call arrives at hunt group 3558 via non-co trunk 009 and rings station 4001. It reroutes to hunt group 3557, then to hunt group 3556 and rings station 4000. The call is abandoned before 4000 answers.

Example 3-A: Call Transferred (Unsupervised)

1.	07/17	07:56	00:00:07	X009	027	3558	3557	4002X	3556
2.	07/17	07:56	00:00:06	X009	011	3556		4000	

Two call records are generated:

- Record 1. On July 17 at 7:56 AM a call arrives at hunt group 3558 via non-co trunk 009 and reroutes to hunt group 3557. It is answered by station 4002 in 27 seconds and lasts 7 seconds.
- Record 2. Station 4002 transfers the call to hunt group 3556. Station 4000 answers it in 11 seconds. The call lasts 6 seconds.

Example 3-B: Call Transferred (Supervised)

1.	07/17	08:09	00:00:10	X009	007	3558	4001T	4002
2.	07/17	08:09	00:00:06	X009	000	3557	4002	

Two records are generated:

- Record 1. On July 17, at 8:09 AM, a call arrives at hunt group 3558 via a non-co trunk 009 and is answered by station 4001. The call is answered in 7 seconds and lasts 10 seconds.
- Record 2. Station 4001 transfers the call to hunt group 3557 where it answered by station 4002. For a supervised transfer, the time to answer field will always display 0. The call lasted 6 seconds.

Example 4: Attendant Handled Calls

1.	07/17	08:09	00:00:10	T042	*007	3555	ATT1X	3101
2.	07/17	08:09	00:00:06	3555	*010	3101		3101

In this example, MCD Record Transfers = All, otherwise only one record is generated.

- Record 1. On July 17 at 8:09 AM, Attendant 1 receives a call on CO trunk T042. (Trunk answer point is 3555).
- Record 2. Attendant 1 transfers the call to 3101 using an unsupervised transfer. (If a supervised transfer was used, call record 2 would display 000 in Time to Answer field – columns 30-32).

Internal SMDR Records Examples

Applications that use internal SMDR fall into two categories:

- Applications in which all stations, or a majority of stations, have internal SMDR enabled (for example, billing of internal calls)
- Applications in which only a few specific stations have internal SMDR enabled (for example, tracking the internal calls made by certain individuals).

Printout for All Stations with Internal SMDR Enabled

Typically, if internal SMDR is used to support the billing of internal calls, all stations would have internal SMDR enabled.

Example 1: 2-Party Call

09/13	14:04	00:01:11	1200	1201	I	1201

On September 13th at 2:04 PM, station 1200 called station 1201 and station 1201 answered the call. The call lasted 1 minute, 11 seconds. The 'I' indicates that the record is for an internal call.

Example 2: Supervised Transfer Call

05/17	10:51	00:02:10	1200	1201	I	1201T	1202
05/17	10:51	00:01:45	1200	1202	I	1202T	1201
05/17	10:53	00:02:40		1201	I	1202	

The first record shows that on May 17th at 10:51 AM, station 1200 called station 1201 and then transferred station 1201 to station 1202. The second record shows station 1200 calling station 1202 and transferring 1202 to station 1201. The 'T' in each of the first two records indicates that a supervised transfer was performed. The third record shows that station 1201 spoke with station 1202 for 2 minutes, 40 seconds.

Example 3: Unsupervised Transfer Call

05/19	09:45	00:03:25	1200	1201	I	1201X	1202
-05/19	09:48	00:05:23		1201	I	1202	

The first record shows that on May 19th at 9:45 AM, station 1200 called station 1201. Station 1200 then transferred station 1201 to station 1202. The 'X' indicates that an unsupervised transfer was performed. The second record shows that station 1201 spoke with station1202 for 5 minutes, 23 seconds.

Example 4: Conference Call

01/30	15:30	00:04:05	1200	1201	I	1201C	1202
01/30	15:32	00:02:07	1200	1202	I	1202C	1201

On January 30, at 3:30 PM, station 1200 called station 1201, and then conferenced station 1202 into the conversation to form a 3-party conference. Two records are generated for the conference.

Example 5: Clearing Down a Conference Call

- 01/30	15:34	00:05:22	1201	I	1202

In Example 4, if station 1200 exits the conference a third record is produced showing the length of time that station 1201 conversed with station 1202. In the above example, station 1201 spoke with station 1202 for 5 minutes, 22 seconds after station 1200 exited the conference.

Example 6: Splitting a Conference Call

01/30	15:34	00:02:10	1200	I	1201
01/30	15:34	00:01:00	1200	I	1202

For Example 4, a third and fourth record are produced if station 1200 splits the conference. The two records above show that station 1200 split the conference and conversed with station 1201. While station 1200 was speaking with station 1201, station 1202 was on hold.

Printout for Only One Station with Internal SMDR Enabled

Typically, when internal SMDR is used to track hoax calls or track the calls made by specific individuals, only a few stations in the system will have Internal SMDR enabled.

Example 1: 2-Party Call

-04/03	09:36	00:05:10	1200	1201	I	1201

On April 3rd at 9:36 AM, station 1200 called station 1201 and station 1201 answered the call. The call lasted 5 minutes, 10 seconds.

Example 2: 2-Party Call

04/02	09:36	00:04:10	1201	1200	I	1200

On April 2nd at 9:36 AM, station 1201 called station 1200 and station 1200 answered the call. The call lasted 4 minutes, 10 seconds.

Example 3: Unsupervised Transfer Call

03/16	13:27	00:02:18	1200	1201	I	1201X	1202

This record shows that at 1:27 PM on March 16th, station 1200 called station 1201. Station 1200 then transferred station 1201 to station 1202. The ‘X’ indicates that the transfer was unsupervised. Since station 1201 and station 1202 do not have Internal SMDR enabled, a second record is not produced for their call.

Example 4: Supervised Transfer Call

03/12	11:03	00:03:15	1201	1202	I	1202T	1200
03/12	11:05	00:00:25	1201	1200	I	1200T	1202
%03/12	11:06	00:10:00	1202		I	1200	

The first record shows that at 11:03 AM on March 12th, station 1201 called station 1202 and then transferred station 1200 to station 1202. The second record shows that station 1201 transferred station 1200 to station 1202. The ‘T’ in each of the first two records indicates that a supervised transfer was performed. The third record shows that station 1202 had a 10-minute conversation with station 1200.

Example 5: Supervised and Unsupervised Transfer Call

03/13	14:04	00:00:11	1200	1201		1201T	1202
03/13	14:05	00:01:00	1201	1202	I	1202T	1200
03/13	14:06	00:02:15	1202	1203	I	1203X	1200
03/13	14:08	00:02:45	1200		I	1203	

The first record shows that at 2:04 PM on March 13th, station 1200 called station 1201. Station 1201 then transferred station 1200 to station 1202. The second record shows that station 1202 transferred station 1200 to station 1203 after station 1202 spoke with station 1203. The ‘T’ in each of the first two records indicates that the transfer was supervised. The third record shows that station 1202 called station 1203 and then transferred station 1200 to

station 1203. The 'X' indicates that the transfer was unsupervised. The last record shows that station 1200 had a 2 minute, 45 second conversation with station 1203.

Example 6: Conference Call

03/13	14:04	00:02:10	1200	1201	I	1201C	1202
03/13	14:04	00:01:45	1200	1202	I	1202C	1201

The first record shows that on March 13th at 2:04 PM, station 1200 called station 1201, placed station 1201 on softhold and then called station 1202. After speaking with station 1202, station 1200 formed a 3-party conference by adding station 1201 into the call. The second record shows that station 1200 called station 1202 and then conferenced in station 1201. The 'C' in each record indicates that a conference call was held.

Example 7: Conference Call

03/13	14:04	00:03:20	1200	1201	I	1201C	1202
03/13	14:05	00:02:15	1201	1202	I	1202C	1200

The first record shows that station 1200 called station 1201. Station 1201 placed station 1200 on softhold, called station 1202 and then added station 1202 to form a 3-party conference. The second record shows that station 1201 called station 1202 and then conferenced in station 1200. The 'C' in each record indicates that a conference call was held. If station 1201 then called station 1203 and added station 1203 to the conference, the following record would appear:

03/13	14:05	00:02:00	1201	1203	I	1203C	1200

The above record shows that station 1203 was in a conference with station 1200.

Example 8: Conference Cleardown

03/13	14:06	00:02:40	1200	I	1202

In Example 6, if station 1201 exits the conference a third record is produced showing the length of time that station 1200 conversed with station 1202. In the above example, station 1200 spoke with station 1202 for 2 minutes, 40 seconds after station 1201 exited the conference.

If station 1200 exits the conference leaving station 1201 and station 1202 connected, a third record isn't generated because station 1201 and station 1202 do not have Internal SMDR enabled in their class of service.

Example 9: Splitting a Conference Call

03/13	14:06	00:02:10	1200	I	1201
03/13	14:06	00:01:00	1200	I	1202

For Example 6, a third and fourth record are produced if station 1200 splits the conference. The two records above show that station 1200 split the conference and conversed with station 1201. While station 1200 was speaking with station 1201, station 1202 was on hold.

Example 10: Camp-on Call

03/13	14:07	00:02:00	1200	1201	I	1201C	1202
03/13	14:07	00:02:00	1200	1202	I	1202C	1201

The two records above show that station 1200, station 1201, and station 1202 were in a conference call. If station 1203 camped-on to station 1201 during the conference, a record would not be generated because station 1201 does not have Internal SMDR enabled in its class of service. However, if station 1201 added station 1203 into the conference, a record like the following would be generated, showing that station 1203 called station 1201 and was then added to the conference:

```
03/13  14:08  00:01:00  1203  1201  I  1201C  1200
```

Example 11: Stacked Hold Conferences

```
-03/13  14:08  00:06:00  1201  1202  I  1202C  1200
-03/13  14:09  00:05:00  1202  1203  I  1203C  1200
03/13   14:10  00:04:00  1203  1204  I  1204C  1200
03/13   14:11  00:03:00  1204  1200  I  1200C  1203
```

The above records are an example of a stacked hold conference. The first record shows that station 1201 called station 1202 and was eventually conferenced with station 1200. Each of the subsequent records shows another station being called and then added into the conference.

Example 12: Stacked Hold Transfers

```
-09/13  14:05  00:10:00  1201  1202  I  1202T  1200
-09/13  14:06  00:09:00  1202  1203  I  1203T  1200
-09/13  14:07  00:08:00  1203  1204  I  1204T  1200
-09/13  14:08  00:07:00  1204  1200  I  1200T  1203
-09/13  14:09  00:06:00  1203        I  1200T  1202
-09/13  14:08  00:05:00  1202        I  1200T  1201
 09/13  14:11  00:04:00  1201        I  1200
```

The first four records track the following calls and transfers:

- Station 1201 called station 1202, placed station 1201 on softhold and called station 1203.
- Station 1203 placed station 1202 on softhold and called station 1204.
- Station 1204 placed station 1203 on softhold and called station 1200.
- Station 1204 then transferred station 1203 to station 1200.
- Station 1203 transferred station 1202 to station 1200.
- Station 1202 transferred station 1201 to station 1200.

The fifth record was generated as a result of the transfer of station 1203 to station 1200. The fifth record also shows the subsequent transfer of station 1200 to station 1202. The sixth record was generated as a result of the transfer of station 1202 to station 1200. The sixth record also shows the subsequent transfer of station 1201 to station 1200.

The seventh record shows the resulting conversation that took place between station 1201 and station 1200.

Local and Network Hunt Group SMDR Examples

In the following examples, 58585 is a non-networked hunt group with one local member, 16131. 57575 is a network hunt group with two remote members, 16716 and 16717. A local member, 16131, is added at the beginning or end of the group in certain examples. Terminal hunting is used. The calling set is 16130 and is local to both hunt groups. The extended format and internal unanswered SMDR options are selected.

Example 1. Local hunt group 58585 is called by 16130 and answered by 16131.

```
01/25   07:25P   0000:00:06   16130     0004        58585   I       16131     161
```

Example 2. Network hunt group 57575 is called locally by 16130. The remote members are hunted first but are busy. Local member 16131 is seized, rung, and answered.

```
01/25   07:29P   0000:00:06   16130     0007        57575   I       16131     161
```

Example 3. Network hunt group 57575 is called locally by 16130. Remote member 16716 is hunted first, seized, rung, and answered.

```
01/25 07:59P 0000:00:04 16130 22216130 16716 A X9999 161 16116130 A1610013 A
```

Example 4. Local hunt group 58585 is called by 16130. All members are busy.

```
01/25 08:02P 0000:00:00 16130 **** 58585 O 58585 161
```

Example 5. Network hunt group 57575 is called locally by 16130. All members are busy.

```
01/25 08:05P 0000:00:00 16130 **** 57575 O 5757 161
```

Example 6. Local hunt group 58585 is called by 16130. 16131 rings until time out (ring, no answer).

```
01/26 11:47A 0000:01:02 16130 **** 58585 I 58585 161
```

Example 7. Network hunt group 57575 is called locally by 16130, but all remote members are busy. A local member is then hunted and rings until time out:

```
01/26 12:58P 0000:01:02 16130 **** 57575 I 57575 161
```

Example 8. Network hunt group 57575 is called locally by 16130, remote member rings until time out.

01/26 11:54A 16130 22216130 16716 X9999 161 16116130 A1610657 A

Example 9. Network hunt group 57575 is called locally by 16130. A remote member rings until time out; the local members are hunted first:

01/26 12:00P 16130 22216130 16716 X9999 161 16116130 A1610661 A

Example 10. A call comes in over MSDN/DPNSS to the hunt group. In this case, the caller is at the remote member switch and is one of the hunt group members.

The following three scenarios are described:

a. Call from 16717 on ipbx167 to hunt group 57575 hosted on ip161. Remote member 16716 is idle, rings, and is answered.

- The following records are generated at ipbx167:

01/27 03:50P 0000:00:05 16717 716157575 A X9999 167 16716717 A1670415 A

01/27 03:50P 0000:00:05 X9999 0005 16716 16716 167 16716717 A1670415 D

- The following records are generated at ip161:

01/27 06:09P 0000:00:04 X9999 16717 16716 A X9999 161 16716717 A1670415 C

01/27 06:09P 0000:00:04 X9999 0006 16717 716157575 X99 161 16716717 A1670415 B

b. 16716 is busy, local member 16131 is rung and answers.

- The following record is generated at ipbx167:

01/27 04:06P 0000:00:03 16717 716157575 A X9999 167 16716717 A1670605 A

- The following record is generated at ip161:

01/27 06:25P 0000:00:04 X9999 0004 16717 716157575 16131 161 16716717 A1670605 B

c. All members are busy.

- The following record is generated at ipbx167:

01/27 04:13P 16717 716157575 X9999 167 16716717 A1670728 A

- The following record is generated at ip161:

01/27 06:32P 0000:00:01 X9999 **** 16717 716157575 B 57575 161 16716717 A1670728 B

Two B-Channel Transfer SMDR Example

A station user on the 3300 ICP transfers an external caller to another external caller and releases the call. The external callers are connected through the CO. After the user performs the transfer and the system clears down the trunks, the TBCT tag (shown below in bold) is sent from the CO and written into the records of both trunk calls.

06/07 13:22:43 0000:00:06 2002 2002 5555555 00000A T632 199 000001

After the external call is cleared down, the CO sends the same TBCT tag to the 3300 ICP and it is recorded in an SMDR record to identify when the external call was completed.

06/07 13:22:52 000001

SMDR Output and Printing

Types of Output Devices

The call data collected by the SMDR feature is sent to a PBX RS-232 printer port. You can connect any of the following output devices to an RS-232 printer port:

- a local printer
- a data recording device
- a personal computer
- a modem on a dedicated line to an SMDR accounting service.

An SMDR printer must be able to print up to 88 characters per line (99 characters per line if Extended Digit Length is enabled) as well as accept ASCII characters. The following table shows the subset of ASCII characters used by the SMDR feature. The SMDR feature translates hex codes into printing characters. For example, hex code 4A translates into the print character J.

ASCII Character Set																
	_0	_1	_2	_3	_4	_5	_6	_7	_8	_9	_A	_B	_C	_D	_E	_F
0_	NUL							BEL			LF		FF	CR		
1_		DC1		DC3												
2_	SPC	!	”	#		%	&	/	(	)	*	+	,	-		./
3_	0	1	2	3	4	5	6	7	8	9	:	;		=		?
4_		A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
5_	P	Q	R	S	T	U	V	W	X	Y	Z					
6_		a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
7_	p	q	r	s	t	u	v	w	x	y	z	.				

Note: Control DC1 or a break or NULL starts printing.
Control DC3 suspends printer.

Connecting a tape machine to a printer port allows you to store SMDR records. You can connect any tape machine capable of operating over an RS-232 interface at a minimum 1200 baud character rate.

Installing the Output Device

For installation procedures for the output device, including information on locating, connecting, and programming the printer port, refer to the appropriate technical documentation for your system.

Printing SMDR Logs

SMDR call records may be stored in a log on the system hard disk or they may by-pass the hard disk and be routed directly to a previously defined printer (by enabling the SMDR Real

Time Reporting Option in the SMDR Options form). The operating parameters of this log determine how and when the SMDR call records are printed. Use the LOGSYS ATTRIBUTES SMDR maintenance command to display the current operating parameters of the SMDR record from the Maintenance Terminal. See LOGSYS ATTRIBUTES for descriptions of the operating parameters.

When you have displayed the operating parameters, check the 'Print Reason' parameter. The 'Print Reason' parameter determines whether the printouts are generated

- at set time intervals (TIME)
- when a preprogrammed number of records have been received (LOAD)
- only when a printout is requested (USER).

When the 'Print Reason' parameter is programmed to generate a printout upon user request, you must use the LOGSYS PRINT maintenance command to obtain a printout.

The system defaults to printing the records as soon as the system generates them. The 'Print Reason' parameter is set to LOAD; the 'first' load qualifier is set to 1 and the 'increment' load qualifier is set to 1. However, you can change the operating parameters of the SMDR record, including the printing parameters, using the LOGSYS CHANGE command (as long as the SMDR Real Time Reporting Option is disabled in the SMDR Options form).

For example, to program the system to collect and send 10 SMDR records in the first load and 100 records in subsequent loads, perform the following steps:

1. Enter maintenance mode on the Maintenance Terminal.
2. Change the Print Reason parameter to LOAD by entering the following command:
   LOGSYS CHANGE SMDR LOAD
3. Enter the number of records that you want the system to collect in the first load before sending the records to the printer. To program the system to collect and print 10 records in the first load, enter the following command:
   LOGSYS CHANGE SMDR LOAD first 10
4. Enter the number of log entries that you want the system to collect in the subsequent loads before sending the entries to the printer. To program the system to collect and print 100 records in each subsequent load, enter the following command:
   LOGSYS CHANGE SMDR LOAD increment 100

SMDR Reports and Automatic Call Distribution 2000

Station Message Detail Recording (SMDR) provides additional details about call rerouting and call transfer when Automatic Call Distribution 2000 (ACD II) is enabled.

External SMDR records are generated for incoming trunk calls if external SMDR is enabled in the trunk's COS and the trunk seizes an ACDII path destination.

SMDR Path Reporting for Internal ACD II Calls

Calls that originate internally to the PBX can be tracked in SMDR logs.

When the "Path Reporting for Internal ACD2 Calls" option in the SMDR Options form is set to "Yes":

- path reporting for internal calls resembles the path reporting of external calls.
- the Dialed Digits field contains the path and group reporting numbers that show a given ADC2 call's progression through the path.
- the Requeue (R), Interflow (I), Unavailable (U) flags and the Third Party field of the SMDR record are filled in as appropriate for the call.

When an incoming internal call is submitted to a remote agent:

- the remote agent's group number appears in the Internal SMDR record's Path Reporting string, whether or not the remote agent answers the call.
- the Duration of Call and Time to Answer fields (of the Internal SMDR record responsible for Path Reporting) are filled in as if the call had not been answered, whether or not the remote agent answers the call.
- the call is transferred to the remote agent on an outgoing trunk creating an external log that details the final outcome of the call.

When a Requeue occurs as the result of a remote agent Auto-Logout, the Requeue information does not appear in the Internal SMDR record responsible for Path Reporting on the Distributor PBX.

When Path Reporting for Internal ACD II Calls is set to No, the SMDR record for an internal ACD II call displays the digits that were dialed in the Dialed Digits field, not the Path Reporting for that internal call.

Agent IDs for Calling, Called and Third Party Fields

Within SMDR, the calling party, called party, and third party fields will identify the agent ID of logged in agents rather than the extension number of the agent’s set; in addition, the ACD 2000 paths are represented by their path IDs rather than their directory numbers.

Path Reporting Numbers at an Answer PBX

Path reporting number is now provided for remotely answered ACD calls. When a remote ACD call is answered by an agent, the SMDR record output on the answering PBX shows the

path reporting number if available. If it is not available then the Path DN is shown in the SMDR output.

Example 1: Path reporting number is available

```
01/28 12:11P 0000:00:08 X100 0005 2226204 P234 4001 3001
888 7776204 A7770013 B
```

In this example, the answering PBX path reporting number is P234.

Example 2: Path reporting number is not available

```
01/28 12:11P 0000:00:08 X100 0005 2226204 2228001 4001 3001
888 7776204 A7770013 B
```

In this example, the path DN is 2228001.

Path Unavailable

If an incoming trunk attempts to seize an unavailable path, the SMDR handling resembles path interflow handling. A second SMDR record is generated if there is a path unavailable answer point. The path unavailable is indicated by the presence of the letter “U” in the transfer/conference field. If no unavailable answer point is programmed, only one SMDR record is generated. The first SMDR record identifies the path unavailable answer point in the third party field. The second record is created as though the trunk directly dialed the interflow destination. The call start time, call duration and time to answer fields are reset for the second record. The following examples show the operation.

Example 1: Path Unavailable

```
09/10    08:31    00:00:01    T022    ***    P016                P016    U    P123
09/10    08:31    00:00:55    T022    023    P123 020 021 020    1007
```

Example 2: Path Unavailable

```
09/10    08:31    00:00:01    T022    ***    P016    P016          U    7000
09/10    08:31    00:00:23    T022    *      009     7000    ATT1
```

Example 3: Path Unavailable

```
09/10    08:31    00:00:01    T022    ***    P016    P016          U    2500
09/10    08:31    00:00:24    T022    ***    2500    P016
```

Example 4: Path Unavailable

```
09/10    08:31    00:00:10    T022    ***    P016    P016          U
```

The above examples show CO trunk 022 calling path 016 which is not available. The first example shows the records for an unavailable answer point which is another path. The second shows the records for an unavailable answer point which is an attendant console. The third shows the case where the answer point is a RAD. The last example shows the case when there is no unavailable answer point programmed.

Agent Logout on No Answer

If an agent is logged out as a result of not answering an ACD II path call, the caller is requeued to the same groups. In the event that the availability status of a group or path changes while a caller is being requeued, that caller may not always be queued to the same groups. The SMDR record is output at the time of the attempted requeue and the trunk’s

SMDR record is updated to collect the remainder of the call progression information. This operation is similar to the generation of SMDR records for interflow and path unavailable. The agent ID of the logged out agent is recorded in the third party field of the first record.

The caller requeue SMDR record is indicated by the letter “R” in the transfer/conference field and the logged out agent’s ID in the 3rd party field. The second record is generated as though the trunk made a second call to the same path. The call start time, time to answer and call duration are reset for the second record. The path dialed digits are re-captured so that changes to group and or path status can be reflected in the second record. The following example shows the operation:

Example 1: Caller Requeue SMDR Records

```
09/10   08:31   00:01:55   T022   ***   P016 012 013 014   P016   R   1234
09/10   08:33   00:00:45   T022   030   P016 012 013 013   1008
```

CO trunk 022 seized path 016 and queued to group 12, 13 and 14. Agent 1234 in group 14 became available and was rung. The agent did not answer, the agent was logged out and the caller requeued to path 16. However, since the auto-logged out agent was the last agent in group 14, group 14 became unavailable and the call was not requeued to group 14. Agent 1008, of group 13, then answered and completed the call.

Digits Dialed Format for Path Calls

There is a new format for the digits dialed field, columns 34 through 59 inclusive. For ACD 2000 path calls, the field includes:

- the path called
- the primary and overflow groups to which the call was presented
- the group which answered the call.

To accommodate both networked ACD and the quantity of information within the field, paths and groups are identified by their programmable identifier numbers rather than their directory numbers. Path numbers are always prefaced with the letter “P” and interflowed calls are indicated by the presence of the letter “I” in the transfer/conference field. If there is an interflow destination it is provided in the third party field. The following example shows the format.

Example 1: Digits dialed field for path calls

```
09/10   08:31   00:01:55   T011   023   P001 012 013 014 015 013   1234
09/10   08:31   00:01:55   T012   ***   P001 012 013 014 015       P001   I   P123
```

In the first record, CO trunk 011 seized path number 001 and was presented to primary group 012 and overflow groups 013, 014 and 015. The call was answered by agent 1234 of group 013.

In the second record, CO trunk 012 seized path 001 and was presented to primary group 012 and overflow groups 013, 014 and 015. The call interflowed to path 123 before it was answered.

Interflow Out of a Path

If an incoming trunk call interflows out of an ACD path without being answered, a second SMDR record can be created. The first record provides the ACD path formatted digits dialed field. The interflow is indicated by the presence of the letter “I” in the transfer/conference

field. If there is an interflow destination it is provided in the third party field. The second record is created if an interflow destination is programmed. The second record is created as though the trunk directly dialed the interflow destination. The call start time, call duration and time to answer fields are reset for the second record. The following examples shows the format.

Example 1: No Interflow destination

```
09/10  08:31    00:01:55  T020   ***    P001 001 002 003 004    P001   I
```

CO trunk 020 seized path 001 and queued for agent groups 001, 002, 003 and 004 after the appropriate overflow times. The call interflowed and was dropped since no interflow destination was programmed for the path.

Example 2: Interflow destination is attendant

```
09/10  08:31    00:00:55  T021   ***    P016 012 013 014 015    P001   I    7000
09/10  08:32    00:00:54  T021   *      009                     ATT1
```

CO trunk 021 seized path 016 and interflowed to the attendant at directory number 7000 after queuing for groups 012, 013, 014 and 015. The attendant answered the call and the call was completed.

Example 3: Interflow destination is a path

```
09/10  08:31    00:00:55  T022   ***    P016 012 013 014 015    P016   I    P002
09/10  08:32    00:00:55  T022   030    P002 002 003 002        1008
```

CO trunk 022 seized path 016 and interflowed to path 002 after queuing for groups 012, 013, 014 and 015. Agent 1008 of group 002 answered and completed the call.

External SMDR Features Affected

The Management and Reporting aspects of the ACD 2000 feature package have some impact on the output of external SMDR records. The following paragraphs describe and show examples of the interactions of multiple transfers by extensions and attendants and conferences.

Unsupervised Transfer To A Path, No Transfer Options Enabled

If the incoming trunk call is transferred, unsupervised to an ACD path, either by the attendant or from another telephone, a second SMDR record is created. The first record is the normal incoming trunk SMDR record that shows the call being transferred to the ACD path. The second record is the same as though the trunk directly seized the path. The call start time, call duration and time to answer fields will be reset for the second record. The third party field only shows the first transfer. The following examples show the format.

Example 1: Unsupervised transfer, extension to path

```
09/10  08:31    00:00:20  T011   005    4000                    4000   X    P002
09/10  08:31    00:01:55  T011   030    P002 012 013 014 014    1008
```

CO trunk 011 seized extension 4000. Extension 4000 answered the call and transferred the caller to path 002. The caller was answered by agent 1008 of 014 after queuing for agent groups 012, 013 and 014.

Example 2: Multiple extension, unsupervised transfers to path

```
09/10  08:31    00:00:20   T011   005     4000                    4000    X     5000
09/10  08:31    00:01:55   T011   030     P002 012 013 014 014    1008
```

CO trunk 011 rang extension 4000. Extension 4000 answered and transferred the caller to 5000. Extension 5000 answered and transferred the caller to ACD path 002. This shows that third party field provides only the first transfer in a call.

Example 3: Unsupervised transfer, attendant to path

```
09/10  08:31    00:00:20   T010   *   005   7000                  ATT1    X       P002
09/10  08:31    00:01:55   T010   *   030   P002 012 013 014 014          1008    1008
```

CO trunk 010 seized the attendant, who transferred the caller to path 002. The caller was answered by agent 1008 of 014 after queuing for agent groups 012, 013 and 014.

Example 4: Multiple attendant, unsupervised transfer to path

```
09/10  08:31    00:00:20   T011   *   005   7000                  ATT3    X       P002
09/10  08:31    00:00:01   T011   *   030   P002 001 002 003 003          1009    1009
```

CO trunk 011 rang attendant 1 (7000). Attendant 1 answered and transferred the caller to attendant 2. Attendant 2 answered and transferred the caller to attendant 3. Attendant 3 transferred the caller to path 002. Agent 1009 answered and completed the call.

Example 5: Unsupervised transfer of outgoing call to path by extension

```
09/10  08:31    00:00:20   4000   5551212   000000   A   T034    X   P002
09/10  08:31    00:00:15   1003   5551212   000035   A   T034
```

Station 4000 makes an external call to 555-1212 and then transfers this external call to path 002. Agent 1003 answers and completes the call. NOTE: Meter pulses only reported when trunk clears down.

Example 6: Multiple unsupervised transfers of external call to path by extensions

```
09/10  08:31    00:01:20   4000   5551212   000000   A   T034    X   5000
09/10  08:31    00:00:15   1003   5551212   000095   A   T034
```

Station 4000 makes an external call to 555-1212 and then transfers this external call to extension 5000. Extension 5000 then transfers the external call to path 002. Agent 1003 answers and completes the call.

Note: This shows that the third party field provides the first transfer only. Meter pulses only reported when trunk clears down. If the external caller hung up before the agent answered, then second record would indicate P002, the path id, as the calling party.

Example 7: Unsupervised transfer of outgoing call to path by attendant

```
09/10  08:31    00:00:20   ATT1   *   5551212   000000   A   T034    X   P001
09/10  08:31    00:00:15   1003   *   5551212   000035   A   T034
```

Attendant 1 placed an outgoing call to 9-555-1212. Then the attendant unsupervised transferred the call to path 001. If the external party hung up prior to the agent answering, the second record would indicate the path id as the calling party.

Example 8: Multiple unsupervised transfers of external call to path by attendants

```
09/10  08:31    00:00:20   ATT3  *   5551212    000000    A     T034      X     P002
09/10  08:31    00:00:18   1007  *   5551212    000000    A     T034
```

Attendant 1 placed an outgoing call to 9-555-1212. Then the attendant unsupervised transferred the call to attendant 2. Attendant 2 transferred the call to attendant 3. Attendant 3 transferred the call to path 002 and agent 1007 answered and completed the call. If the external party hung up prior to the agent answering, the second record would indicate the path id as the calling party.

Supervised Transfer to a Path, No Transfer Options Enabled

If the incoming trunk call is supervised transferred to a path agent or from a path agent to another destination only one SMDR record is generated. This SMDR record will have its digits dialed field formatted consistent with having dialed a path or another destination. The third party field will indicate the party receiving the transferred trunk call. The SMDR record will be marked in the normal manner to indicate the supervised transfer. The following example shows the format. The third party field indicates the first transfer of a multiple transfer call.

Example 1: Supervised transfer, extension to path

```
09/10  08:31    00:01:55  T014      023      400                4001       T      1234
```

CO trunk 014 rung extension 4001. Extension 4001, answered then flashed and dialed path 001. Agent 1234 answered the call. Extension 4001 then transferred the trunk caller to the agent.

Example 2: Multiple supervised transfer to paths by extensions

```
09/10  08:31    00:00:20  T011      005      4000               4000       T      5000
```

CO trunk 011 rang extension 4000. Extension 4000 answered and transferred the caller to 5000. Extension 5000 answered and transferred the caller to ACD II path 002. This shows that third party field provides only the first transfer in a call.

Example 3: Supervised transfer, attendant to path

```
09/10  08:31    00:01:55       T016     *      023                7000       1008
```

CO trunk 016 is answered by the attendant (7000). The attendant dialed path 002 and was answered by agent 1008. The attendant then transferred the trunk call to the agent.

Example 4: Multiple supervised transfers of outgoing calls to path by attendants

```
09/10  08:31    00:01:55       T016     *      023                7000       1008
```

CO trunk 016 is answered by the attendant 1 (7000). Attendant 1 transferred the call supervised to attendant 2. Attendant 2 transferred the call to attendant 3 and attendant 3 dialed path 002 and was answered by agent 1008. Attendant 3 then transferred the trunk call to the agent.

Example 5: Supervised transfer of outgoing call to path by extension

09/10 08:31 00:01:20 4000 5551212 000080 A T034 T 1003

Station 4000 makes an external call to 9-555-1212 and then flashes and calls path 002. Agent 1003 answers and station 4000 transfers. Agent 1003 completes the call.

Example 6: Multiple supervised transfers of outgoing call to path by attendant

09/10 08:31 00:01:20 4000 5551212 000080 A T034 T 5000

Station 4000 makes an external call to 9-555-1212 and then supervised transfers this external call to extension 5000. Extension 5000 then supervised transfers the external call to path 002. Agent 1003 completes the call.

Note: This shows that the third party field provides the first transfer only.

Example 7: Supervised transfer of outgoing call to path by attendants

09/10 08:31 00:00:15 1003 * 5551212 000035 A T034

Attendant 1 placed an outgoing call to 9-555-1212. Then the attendant supervised transferred the call to path 001. Agent completes the call.

Example 8: Multiple supervised transfer of external call to path by attendants

09/10 08:31 00:02:20 1007 * 5551212 000140 A T034

Attendant 1 placed an outgoing call to 9-555-1212. Then the attendant supervised transferred the call to attendant 2. Attendant 2 Supervised transferred the call to attendant 3. Attendant 3 supervised transferred the call to path 002 and agent 1007 completed the call.

Unsupervised Transfer To A Path, Report Transfers = MCD

If a trunk call is transferred, unsupervised to any destination by an extension, a second SMDR record is created. For attendants, only unsupervised transfers of trunk calls to ACD paths generate an interim SMDR record.

The first record is the normal incoming or outgoing trunk SMDR record with the third party showing the recipient of the transfer. The call start time, call duration, and time to answer fields are reset for the second record. For incoming records, the dialed digits is updated to reflect the new destination. If the destination is a path then the field is formatted according to ACD. For attendant handled transfers, the functionality is the same as with no transfer options enabled, therefore, these are omitted.

Example 1: Unsupervised transfers, extension to path

09/10 08:31 00:00:20 T011 005 4000 4000 X P002
09/10 08:31 00:01:55 T011 030 P002 012 013 014 014 1008

CO trunk 011 seized extension 4000. Extension 4000 answered the call and transferred the caller to path 002. The caller was answered by agent 1008 of 014 after queuing for agent groups 012, 013 and 014.

Example 2: Multiple extension unsupervised transfers to path

```
09/10  08:31  00:00:20  T011  005  4000                4000  X  5000
09/10  08:31  00:00:20  T011  005  5000                5000  X  P002
09/10  08:31  00:01:55  T011  030  P002 012 013 014 014        1008
```

CO trunk 011 rang extension 4000. Extension 4000 answered and transferred the caller to 5000. Extension 5000 answered and transferred the caller to ACD II path 002.

Example 3: Unsupervised transfer of outgoing calls to path by extension

```
09/10  08:31  00:00:20  4000  5551212  000000  A  T034  X  P002
09/10  08:31  00:00:15  1003  5551212  000035  A  T034
```

Station 4000 makes an external call to 555-1212 and then transfers this external call to path 002. Agent 1003 answers and completes the call. NOTE: Meter pulses only reported when trunk clears down.

Example 4: Multiple unsupervised transfers of external calls to path by extension

```
09/10  08:31  00:01:20  4000  5551212  000000  A  T034  X  5000
09/10  08:31  00:01:20  5000  5551212  000000  A  T034  X  P002
09/10  08:31  00:00:15  1003  5551212  000095  A  T034
```

Station 4000 makes an external call to 555-1212 and then transfers this external call to extension 5000. Extension 5000 then transfers the external call to path 002. Agent 1003 answers and completes the call.

Note: Meter pulses only reported when trunk clears down. If the external caller hung up before the agent answered, then second record would indicate P002, the path id, as the calling party.

Supervised Transfer To A Path, Report Transfers = MCD

If an extension transfers a trunk supervised, a record is generated at the time of the transfer and a second record is setup to capture the remaining call progression. If an attendant transfers a trunk supervised, no interim record is generated even if the call is to a path. For attendants, the functionality is the same as that with no SMDR transfer options enabled.

For incoming calls, if a second record is generated and the called destination is a path, then the dialed digits is path formatted.

Example 1: Supervised transfer, extension to path

```
09/10  08:31  00:01:55  T014  023  4001                4001  T  1234
09/10  08:31  00:00:30  T014  014  P001 001 002 001      1234
```

CO trunk 014 rung extension 4001. Extension 4001, answered then flashed and dialed path 001. Agent 1234 answered the call. Extension 4001 then transferred the trunk caller to the agent.

Example 2: Multiple supervised transfers to path

```
09/10  08:31  00:00:20  T012  005  4000                4000  T  5000
09/10  08:31  00:00:20  T012  005  5000                5000  T  1008
```

```
09/10   08:31   00:01:55   T012    030   P002 012 013 014 014                1008
```

CO trunk 012 rang extension 4000. Extension 4000 answered and transferred the caller to 5000. Extension 5000 answered and transferred the caller to ACD path 002.

Example 3: Supervised transfer of outgoing calls to path by extension

```
09/10   08:31   00:01:20   4000    5551212   000000   A    T034   T   1003
09/10   08:32   00:00:45   1003    5551212   000080   A    T034
```

Station 4000 makes an external call to 9-555-1212 and then flashes and calls path 002. Agent 1003 answers and station 4000 transfers. Agent 1003 completes the call.

Example 4: Multiple supervised transfers of outgoing calls to path by extensions

```
09/10   08:31   00:00:20   4000    5551212   000000   A    T034   T   5000
09/10   08:31   00:00:30   5000    5551212   000000   A    T034   T   1003
09/10   08:31   00:00:20   1003    5551212   000070   A    T034
```

Station 4000 makes an external call to 9-555-1212 and then supervised transfers this external call to extension 5000. Extension 5000 then supervised transfers the external call to path 002. Agent 1003 completes the call.

Unsupervised Transfer To A Path, Report Transfers = All

If a trunk call is transferred unsupervised to any destination by an extension or attendant, a second SMDR record is created. The first record is the normal incoming or outgoing trunk SMDR record with the third party showing the recipient of the transfer. The call start time, call duration, and time to answer fields are reset for the second record. For incoming records, the dialed digits is updated to reflect the new destination, and, if the destination is a path, then the field is formatted according to ACD. The following examples show the format. Only calls involving attendants are different than those that show for MCD Report Transfers = MCD.

Example 1: Unsupervised transfer, attendant to path

```
09/10   08:31   00:00:20   T010    *   005   7000                 ATT1   X   P002
09/10   08:31   00:01:55   T010    *   030   P002 012 013 014 014 1008
```

CO trunk 010 seized the attendant, who transferred the caller to path 002. The caller was answered by agent 1008 of 014 after queuing for agent groups 012, 013 and 014.

Example 2: Multiple attendant unsupervised transfers to path

```
09/10   08:31   00:00:20   T012   *005   7000                 ATT1   X   ATT2
09/10   08:31   00:00:20   T012    *   005   7001             ATT2   X   ATT3
09/10   08:32   00:00:20   T012    *   005   7002             ATT3   X   P002
09/10   08:32   00:00:39   T012    *   030   P002 001 002 003 003 1009
```

CO trunk 12 rang attendant 1 (7000). Attendant 1 answered and transferred the caller to attendant 2. Attendant 2 answered and transferred the caller to attendant 3. Attendant 3 transferred the caller to path 002. Agent 1009 answered and completed the call.

Example 3: Unsupervised transfer of outgoing calls to path by attendant

```
09/10  08:31   00:00:20   ATT1  *   5551212     000000     A     T034   X   P001
09/10  08:31   00:00:15   1003  *   5551212     000035     A     T034
```

Attendant 1 placed an outgoing call to 9-555-1212. Then the attendant unsupervised transferred the call to path 001. If the external party hung up prior to the agent answering, the second record would indicate the path id as the calling party.

Example 4: Multiple unsupervised transfers of external calls to path by attendants

```
09/10  08:31   00:00:20   ATT1  *   5551212     000000     A     T034   X   ATT2
09/10  08:31   00:00:20   ATT2  *   5551212     000000     A     T034   X   ATT3
09/10  08:31   00:00:20   ATT3  *   5551212     000000     A     T034   X   P002
09/10  08:31   00:00:01   1007  *   5551212     000000     A     T034
```

Attendant 1 placed an outgoing call to 9-555-1212. Then the attendant unsupervised transferred the call to attendant 2. Attendant 2 transferred the call to attendant 3. Attendant 3 transferred the call to path 002 and agent 1007 answered and completed the call. If the external party hung up prior to the agent answering, the second record would indicate the path id as the calling party.

Supervised Transfer To A Path, Report Transfers = All

If an extension or attendant transfers a trunk supervised, a record is generated at the time of the transfer and a second record is setup to capture the remaining call progression.

For incoming calls, where a second record is generated and the called destination is a path, then the dialed digits is path formatted. Only calls involving attendants are different than those shown for MCD Report Transfer = MCD, therefore only calls involving attendants are shown in the following examples.

Example 1: Supervised transfers of outgoing calls to path by attendant

```
09/10   08:31   00:00:15   T016   *   0077000                    ATT1  T    1008
09/10   08:31   00:00:50   T016   *   025P002 001 002 003 002                 1008
```

CO trunk 016 is answered by the attendant (7000). The attendant dialed path 002 and was answered by agent 1008. The attendant then transferred the trunk call to the agent.

Example 2: Multiple supervised transfers of outgoing calls to path by attendants

```
09/10   08:31   00:00:15   T016   *   005   7000                 ATT1  T   ATT2
09/10   08:31   00:00:13   T016   *   006   7001                 ATT2  T   ATT3
09/10   08:31   00:00:09   T016   *   003   7002                 ATT3  T   1008
09/10   08:32   00:00:50   T016   *   025   P002 001 002 003 002            1008
```

CO trunk 016 is answered by the attendant 1 (7000). Attendant 1 transferred the call supervised to attendant 2. Attendant 2 transferred the call to attendant 3 and attendant 3 dialed path 002 and was answered by agent 1008. Attendant 3 then transferred the trunk call to the agent.

Example 3: Supervised transfer of outgoing calls to path by attendant

09/10	08:31	00:00:25	ATT1	*	5551212	000000	A	T034	T	1008
09/10	08:31	00:00:35	1008	*	5551212	000035	A	T034		

Attendant 1 placed an outgoing call to 9-555-1212. Then the attendant supervised transferred the call to path 001. Agent 1008 completes the call.

Example 4: Multiple supervised transfers of external calls to path by attendants

09/10	08:31	00:00:20	ATT1	*	5551212	000000	A	T034	T	ATT2
09/10	08:31	00:00:20	ATT2	*	5551212	000000	A	T034	T	ATT3
09/10	08:31	00:00:20	ATT3	*	5551212	000000	A	T034	T	1007
09/10	08:31	00:01:20	1007	*	5551212	000140	A	T034		

Attendant 1 placed an outgoing call to 9-555-1212. Then the attendant supervised transferred the call to attendant 2. Attendant 2 Supervised transferred the call to attendant 3. Attendant 3 supervised transferred the call to path 002 and agent 1007 completed the call.

Transfers To Path, SMDR record transfer = Yes

The Record Transfer feature only applies to outgoing external SMDR records. It works with the meter pulse reporting feature of SMDR to ensure fairness of call charging. This feature generates a new SMDR record for each transfer, whether it is supervised or unsupervised. Only answered transfers are reported; therefore, recalls are not reported as transfers. The Digits Dialed field retains the external number for each new record until the call is completed. Meter pulse readings are updated for each interim transfer record. This feature takes precedence over:

- Mitel Call Distribution - Report Transfers for outgoing calls
- ACD 2000 dialed digits format
- ACD 2000 reporting of interflows
- path unavailable and requeues for outgoing calls.

The ACD 2000 feature only interacts with this feature if a logged in agent or path is involved. In this case, these entries are represented by their IDs rather than directory numbers. The Record Transfer feature is not supported for XNET calls. The following show the interaction with ACD 2000.

Example 1: Supervised transfer of outgoing calls to path, record transfer and meter pulse recording

09/10	08:31	00:00:20	4000	5551212	000020	A	T034	T	1002
09/10	08:31	00:00:34	1002	5551212	000034	A	T034	T	4001
09/10	08:31	00:00:23	4001	5551212	000023	A	T034		

Extension 4000 placed an outgoing call to 555-1212, then flashed and dialed path 002. Agent 1002 answered the call and extension 4000 transferred the external party to the agent. Agent 1002 flashed and called station 4001, who answered. Agent 1002 transferred the trunk to station 4001.

Example 2: Unsupervised transfer of outgoing calls to path, record transfer and meter pulse recording

```
09/10  08:31   00:00:45  4000   5551212      000045  A   T034  X   1003
09/10  08:31   00:00:15  1003   5551212      000015  A   T034  X   4001
09/10  08:31   00:00:23  4001   5551212      000023  A   T034
```

Station 4000 makes an external call to 555-1212 and transfers, unsupervised, the call to path 002. Agent 1003 answers and transfers the external call to station 4001, whom answers and completes the call.

Example 3: Unsupervised transfer of outgoing calls to path that interflowed, record transfer and meter pulse recording

```
09/10  08:31   00:02:03  4000   5551212      000123  A   T034  X   1007
09/10  08:34   00:00:25  1007   5551212      000025  A   T034
```

Station 4000 makes an external call to 555-1212 and transfers, unsupervised, the call to path 002. No agents answers and the external call interflows to path 234. Agent 1007 answers and completes the call.

Conference Calls

ACD II interacts with conference calls in that logged in agents, groups and paths are reported by their IDs rather than their directory numbers. If an incoming trunk calls a path, the incoming SMDR record will use the ACD II format for the dialed digits.

Mitel Call Distribution Report Transfers feature interacts with conferences based on this rule: the Mitel Call Distribution Report Transfers feature does not generate an interim transfer record if the third party field is already filled and does not overwrite the third party field. This implies that transfers for a particular call are reported until a conference occurs. Once a conference is setup, Mitel Call Distribution will not report further transfers for the call. The implied supervised transfers when a conferences breakdown are not reported, by Mitel Call Distribution.

With no SMDR transfer options enabled, conferences will not overwrite transfers and vice versa. The following examples show the format.

Example 1: Conferenced path calls

```
09/10  08:31   00:00:50  T011   005    P123 030 031 032 031  1009  C   1008
09/10  08:31   00:00:20  T011   005    P123 030 031 032 031  1009  C   4000
```

In the first record CO trunk 011 called path 123 and was answered by agent 1009. Agent 1009 dialed agent 1008 and conferenced the agent with the external caller.

In the second record CO trunk 011 called path 123 and was answered by agent 1009. Agent 1009 dialed extension 4000 (non-ACD agent) and conferenced the extension with the external caller.

Example 2: Multiple extension unsupervised transfers to path

```
09/10  08:31   00:00:20  T012   005    4000   4000    X   5000
09/10  08:31   00:00:20  T012   005    5000   5000    C   1008
```

CO trunk 11 rang extension 4000. Extension 4000 answered and transferred the caller to 5000. Extension 5000 answered and called ACD II path 002. After agent 1008 answered, extension 5000 setup a conference. Then extension 5000 hung performing an implied

supervised transfer to agent 1008. This shows that the transfers after conference are not reported by Mitel Call Distribution Report Transfers = All feature.

Example 3: Multiple supervised transfers of external calls to path by attendants

```
09/10  08:31  00:00:20  ATT1  *  5551212  000000  A  T034  T  ATT2
09/10  08:31  00:00:20  ATT2  *  5551212  000000  A  T034  X  ATT3
09/10  08:31  00:01:40  ATT3  *  5551212  000140  A  T034  C  1007
```

Attendant 1 placed an outgoing call to 9-555-1212. Then the attendant supervised transferred the call to attendant 2. Attendant 2 unsupervised transferred the call to attendant 3. Attendant 3 conference in agent 1007 after calling path 002. Then attendant 3 hung up and agent 1007 completed the call. This shows that the transfers after conference are not reported by Mitel Call Distribution Report Transfers = All feature.

Example 4: Conference information does not override transfer information

```
09/10  08:31  00:00:30  T011  005  4000  4000  X  4001
```

CO trunk 11 rings extension 4000 and is answered by 4000. Extension 4000 then transfers the call unsupervised to extension 4001. Extension 4001, then conferences in extension 4002 and call is completed. This shows that the conference information is not recorded since there was a previous transfer and no SMDR option of recording of transfers is enabled.

Example 5: Transfer information does not override conference information

```
09/10  08:31  00:00:30  T011  004  4000  4000  C  4001
```

CO trunk 11 rings extension 4000, which answers and conferences in extension 4001. Extension 4000 then hangs up. Extension 4001 then transfers the trunk to extension 4002, which answers and completes the call. This shows that the transfer information is not recorded since there was a previous conference.

SMDR Network Format

When the current SMDR Network Format is enabled, it places the calling party's Originating Line Identifier (OLI) digits or trunk number in the digits dialed field in addition to the dialed number. This SMDR option is overridden by the path format if a network trunk seizes an ACD path. The following examples show the operation.

Examples

```
09/10  08:31  00:00:45  X171  010  584000              3000  3000
09/10  08:31  00:00:30  X171  011  031                 3000  3000

09/10  08:31  00:0045   X171  035  P002 010 011 012 011  1008
```

The first example shows an incoming trunk record for network trunk 171, with a call from extension user 4000 on node ID 58, calling extension 3000. The second example shows an incoming trunk record for network trunk 171, with a call originating from CO trunk 031, calling extension 3000. The last example shows an incoming trunk record for network trunk 171, with a call originating from a remote extension or CO trunk calling ACD path 002.

Hold Retrieve

The PBX generates a new SMDR record for each hold retrieve by a different set while retaining the original digits dialed field. Each time the call is retrieved the answering agent group is updated in the digits dialed field.

When a call is retrieved by a non-agent or an agent who is not a member of the group that originally received the call, the answering group in the SMDR record appears as 000.

Example 1: Report for hold retrieve by non-agent

```
09/10   08:31   00:00:20   T011   005   P123 030 031 032 031   1009
09/10   08:31   00:00:20   T011   005   P123 030 031 032 000   4000
09/10   08:31   00:00:20   T011   005   P123 030 031 032 039   1007
```

CO trunk 011 calls path 123 and is answered by agent 1009 of group 031. Agent 1009 places the call on hard hold. The held call is retrieved by a non-agent at station 4000, who then places the call back on hard hold. The call is retrieved by agent 1007 of agent group 039, who then completes the call.

Call Pickup and Directed Pickup

If a path call is answered by a non-agent via either of the Call Pickup features, the digits dialed field is appended a 000 entry for the number of the agent group which answered and the extension number of the set is given in the called party field.

If a path call is answered by an agent via either of the Call Pickup features, the agent's group number is appended to the digits dialed field as the group which answered the call, regardless of whether group is a member of the path. The following examples show the format.

Example 1: Path call answered by non-agent via call pickup

```
09/11   08:31   00:00:19   T023   008   P001 012 013 000   T   4000
```

CO trunk 023 dialed path 001 and was answered by extension 4000, an non-ACD agent, using the directed pickup feature, after the call had queued for agent groups 012 and 013.

Example 2: Path call answered by agent via call pickup

```
09/11   08:31   00:00:19   T023   008   P001 012 013 034   T   1002
```

CO trunk 023 called path 001 and was answered by agent 1002 of group 034, using the call pickup feature, after the call had queued for agent groups 012 and 013.

Transfer Recalls

This section highlights interaction of transfer recalls with external SMDR with no transfer of options enabled and with Mitel Call Distribution transfer options enabled. With no SMDR transfer options enabled, transfer recalls appear the same as answered unsupervised transfers. With no SMDR transfer options enabled, attendant handled transfers which recall will appear as a single call to the attendant which was not transferred.

With Mitel Call Distribution Report Transfers set to MCD, the first record of the transfer will be the same as for an answered unsupervised transfer. The second record will, however, indicate the transferring party rather than the transferred to party (for example, the third party of the first record) as the calling or called party. For coming in records the dialed digits field will reflect the digits of the transferred to party.

With Mitel Call Distribution Report Transfers set to All, the first record of an attendant handled call will be the same as for an answered unsupervised transfer. The second record will, however, indicate the attendant (for example, the transferring party) as the calling or called party. For coming in records the dialed digits field will reflect the digits of the transferred to party.

Example 1: Extension transfer recall, no transfer options enabled, incoming

```
09/10   08:31   00:00:30   T011        006      4000      4000        X     4001
```

CO trunk rang extension 4000, was answered and unsupervised transferred to extension 4001. Extension 4001 did not answer and the call recalled to 4000 which answered and completed the call. No SMDR transfer options enabled.

Example 2: Extension transfer recall, no transfer options enabled, outgoing

```
09/10   08:31   00:00:20   4000   5551212   000000      A     T034   X   4001
```

Extension 4000 made an external call to 9-555-1212 and then unsupervised transferred the call to extension 4001. Extension 4001 did not answer the call and it recalled to extension 4000, which answered and completed the call.

Example 3: Attendant transfer recall, no transfer options enabled, incoming

```
09/10   08:31   00:00:30   T011 *      006          7000          ATT1
```

CO trunk rang attendant 1 (7000), was answered and extended to extension 4000. Extension 4000 did not answer and the trunk recalled the attendant. The attendant answered and completed the call.

Example 4: Attendant transfer recall, no transfer options enabled, outgoing

```
09/10   08:31   00:00:20   ATT1 *   5551212    000000    A     T034
```

Attendant 1 placed an external call to 9-555-1212 and extended the call to extension 4000. Extension 4000 did not answer and the call recalled to the attendant. The attendant answered and completed the call.

Example 5: Extension transfer recall, Mitel Call Distribution report transfer = ALL, incoming

```
09/10   08:31   00:00:30   T011   006   4000   4000      X      4001
09/10   08:32   00:00:30   T011   017   4001   4000
```

CO trunk rang extension 4000, was answered and unsupervised transferred to extension 4001. Extension 4001 did not answer and the call recalled to 4000 which answered and completed the call.

Example 6: Extension transfer recall, Mitel Call Distribution report transfer = ALL, outgoing

```
09/10   08:31   00:00:20   4000   5551212   000000   A   T034      X   4001
09/10   08:31   00:00:15   4000   5551212   000000   A   T034
```

Extension 4000 made an external call to 9-555-1212 and then unsupervised transferred the call to extension 4001. Extension 4001 did not answer the call and it recalled to extension 4000, which answered and completed the call.

Example 7: Attendant transfer recall, Mitel Call Distribution report transfer = ALL, outgoing

```
09/10   08:31   00:00:20   ATT1   *   5551212   000000   A   T034   X  4000
09/10   08:31   00:00:20   ATT1   *   5551212   000000   A   T034
```

Attendant 1 placed an external call to 9-555-1212 and extended the call to extension 4000. Extension 4000 did not answer and the call recalled to the attendant. The attendant answered and completed the call.

Mitel Call Distribution SMDR indication of rerouted incoming calls

Current SMDR operation, with Mitel Call Distribution option enabled, records all reroutes incurred for incoming calls (call forwards are not recorded). For simple incoming calls and Mitel Call Distribution calls, this operation will remain the same. For calls which reroute or forward to a Path, there will be no indication in the SMDR record. The call duration and time to answer fields will include the time to reroute or forward to the path.

Normalizing Transfer Recording and Interim Record Generation

When the Mitel Call Distribution Report Transfer and the Record Transfer features are both enabled, the Record Transfer feature takes priority over the Mitel Call Distribution feature for going out records.

With no SMDR transfer options enabled, or only the Mitel Call Distribution transfer options enabled, the SMDR recording of transfers follows this rule: once the transfer/conference and third party fields are setup, they are not overwritten until the SMDR record is output. DISA calls re-initialize the SMDR record when the trunk dials a digit hash, but only after outputting its current SMDR record.

Attendant handled calls (i.e. trunk calls transferred by an attendant) without the Mitel Call Distribution report all transfers option enabled follow this rule: the recipient of the transfer overwrites the called or calling SMDR fields of coming in or going out records respectively. This rule applies until a call is transferred by a non-attendant, causing the transfer/conference field to be setup. Once the transfer/conference field is setup, attendant transfers no longer overwrite the called or calling party fields.

The call start time is recorded at the time a call successfully seizes or camps onto its destination party. The time to answer field of coming in records is based on the first party to answer the call. The call duration covers the time the call was first answered until a SMDR record is output for the call.

The Mitel Call Distribution report transfers option causes interim SMDR records to be generated at the time the call is transferred, supervised, or unsupervised. The third party and the transfer/conference fields, or the called or calling and attendant handled fields and call end time (such as, call duration) are setup and the record is output. After the record is output, the record is partially re-initialized. The following fields are initialized:

- Coming In Records
  - The call start time and call ring time fields are set to the current time, so supervised transfers will indicate zero time to answer.
  - The transfer/conference field is set to no transfer or conference.
  - The result of call field is set to unanswered.

  - The new called party becomes the third party of the output record and the new third party is cleared.
  - If the transfer was a transfer to busy the call completion status is set to callee busy, otherwise normal.
  - The dialed digits field is update to show the digits dialed by the transferring party.
- Going Out Records
  - The call start time field is set to the current time.
  - The transfer/conference field is set to no transfer or conference.
  - If the SMDR record transfer option is disabled, the result of call is set to unanswered.
  - The new calling party becomes the third party of the output record and the new third party is cleared.

The Mitel Call Distribution Report Transfers option does not generate interim records for conferences which breakdown to two party calls. In combination with the general rules regarding the transfer/conference fields, this means that once a call becomes a conference, the further recording of transfers stops, even if the Mitel Call Distribution report transfers option is set to all transfers.

For unsupervised transfers, generating the interim record at the time of transfer implies the third party field can be group pilot number rather than a specific party. If the unsupervised transfer is answered, the calling or called party is updated to represent the actual party, in the second record.

For unsupervised transfers with no transfer options enabled, the third party field is updated to reflect the actual party. The following examples depict the changes specific to the Mitel Call Distribution format of reporting transfers. Examples are also provided that show the functionality change of 'Mitel Call Distribution report all transfers' as it applies to transfers from an attendant.

Mitel Call Distribution Report All Transfers, Incoming

Example 1: Format for extensions

09/10	08:31	00:00:25	T011	003	4000	4000	X	4001
09/10	08:31	00:00:25	T011	005	4001	4001	T	4002
09/10	08:31	00:00:22	T011	003	4002	4002	X	4003
09/10	08:31	00:00:19	T011	006	4003	4003		

CO trunk 011 called extension 4000, who answered the call and unsupervised transferred the caller to extension 4001, who answered the call and supervised transferred the caller to extension 4002, who answered the call and unsupervised transferred the caller to extension 4003, who answered and completed the call.

Example 2: Formats for attendants

09/10	08:31	00:00:25	T011	*	003	7000	ATT1	X	4000
09/10	08:31	00:00:20	T011	*	005	4000	4000		

CO trunk 11 called the attendant, who answered and extended the call to extension 4000.

Mitel Call Distribution Report Transfers, New Functionality Applied to Outgoing and Incoming Calls

Example 1: Format for extensions, outgoing

```
09/10  08:31  00:00:30  4000  5551212  000000  A  X010  X  4001
09/10  08:32  00:00:20  4001  5551212  000000  A  X010  T  4002
09/10  08:32  00:00:25  4002  5551212  000075  A  X010
```

Extension 4000 dialed 9-555-1212 making an external call, which was answered. Then extension 4000 transferred the trunk unsupervised to extension 4001. Extension 4001 then transferred the call supervised to extension 4002. Meter pulses, one per second.

Example 2: Format for attendants, outgoing

```
09/10  08:31  00:00:30  ATT1  *  5551212  000000  A  X010  X  ATT2
09/10  08:32  00:00:20  ATT2  *  5551212  000000  A  X010  T  ATT3
09/10  08:32  00:00:40  ATT3  *  5551212  000090  A  X010
```

Extension attendant 1 dialed 9-555-1212 making an external call, which was answered. Then attendant 1 transferred the trunk unsupervised to attendant 2. Attendant 2 transferred the call supervised to attendant 3. Meter pulses, one per second.

Example 3: Format for attendants, incoming

```
09/10  08:31  00:00:40  T011  *  005  7000  4000
```

CO trunk 11 rang the attendant (7000) who answered and extended the call to extension 4000 who answered and completed the call.

Attendant Handled Transfers with Mitel Call Distribution Report Transfers Set to Mitel Call Distribution

Note: The Mitel Call Distribution value implies do not report interim transfer records for attendant handled transfers.

Example 4: Format for attendants, incoming

```
09/10  08:31  00:00:30  T011  *  007  7000  4000  X  ATT2
09/10  08:31  00:00:25  T011  *  003  7001        ATT2
```

CO trunk 11 rang the attendant (7000) who answered and extended the call to extension 4000. Extension 4000 then transferred the call unsupervised to attendant 2 (7001) who answered and completed the call.

Note: Further transfers are not recorded.

Example 5: Format for attendants, outgoing

```
09/10  08:31  00:00:25  4000  *  5551212  A  X010
```

Extension 4000 called attendant 1 who answered and placed an external call to 9-555-1212 and transferred extension 4000 to the external call.

Example 6: Format for attendants, outgoing

09/10 08:31 00:00:25 ATT2 * 5551212 A X010 X 4000

Attendant 1 placed an external call to 9-555-1212, and transferred the call to attendant 2. Attendant 2 then transferred the call unsupervised to extension 4000.

Note: Further transfers are not recorded.

Automatic Call Distribution 2000 Real Time Events

ACD 2000 Overview

ACD 2000 (ACD II) is an advanced Automatic Call Distribution feature package that allows call centers to process incoming calls based on a number of customer-definable parameters. Mitel offers the ACD package as the ideal platform for developing high value applications that can easily interface with every aspect of the communications system, including:

- call control
- call center manipulation
- database modification
- operational data collection

The 3300 ICP and SX-2000 Light provide fully integrated ACD / Call-Contact Center functionality that includes:

- call distribution
- agent mobility
- management and reporting
- feature configuration
- administration
- recorded announcement devices (RADs).

Note**:** For definitions of ACD terminology and concepts, refer to Appendix A of this guide.

Each ACD agent is given a unique agent identification (ID) number. The agent ID number is similar to a telephone directory number and can be assigned a name in the telephone directory. The maximum number of Agent Appearances is eight, and the total number of agent identification numbers is 1181.

Agents can log into any ACD set and receive calls. During agent log in, the set assumes the personal profile of the agent. The agent profile includes the assigned name, COS, COR, group memberships and path memberships.

Callers in an ACD path hear ringback tone while the system attempts to find an available agent. The caller hears this tone until an agent answers, an interflow occurs, the caller hangs up, or the first RAD plays.

If all agents are busy, the caller hears ringback tone until the "Recording 1: Delay to Start Time" timer expires. At this point the caller hears the first recorded announcement. When no recorded announcements are programmed, the caller continues hear ring back tone until the call is answered, an interflow occurs, or the caller hangs up.

Agent groups allow agents to be grouped according to their line of business. Up to four agent groups can be programmed in an ACD path. Agent groups can appear in one or more paths.

Call Distribution

The ACD II feature package manages and controls calls from both the caller's and the agent's perspective. Call distribution is responsible for all routing of calls entering the ACD system as well as the audible and visual indications callers and agents receive during ACD calls.

Agent Mobility

Agents can log into any ACD set and receive ACD calls. When an agent logs into an ACD set, the set assumes the personal profile of the agent. The agent profile includes the assigned name, COS, COR, group memberships and path memberships.

Call Center Management

Real Time Events and SMDR reporting features provide streams of data for call management and reporting systems. These features enhance an agent's and supervisor's productivity in managing ACD calls.

The system also supports ACD functions over the MSDN/DPNSS digital network to allow multi-site networking. Agents at different locations can service calls on the network independently of where they entered the network.

ACD Path

ACD 2000 is built around the ACD Path, a flexible call routing method that provides the information required for handling incoming calls. The ACD path controls the resources used, the order in which resources are encountered, and the timing of the steps. Calls are queued for an agent group based on the call priority, and order of arrival at that path. Queuing is the same as for new calls and overflow calls. If an agent group is not available, new calls are not queued for that group.

Each ACD path is assigned a priority from one to 64. A call to a path adopts the path's priority. This allows incoming calls to be directed based on their importance and expense.

A call's priority may change if an interflow occurs. See Interflow below.

Call Flow

ACD calls to a group are routed to the longest-idle agent. Idle time is calculated from completion of an agent's last ACD call. Non-ACD calls are not considered.

A caller never receives busy tone from an available path. An incoming ACD call is handled as follows:

- the caller receives a ringback tone
- the RAD timer starts
- the interflow timer programmed in the path starts
- the overflow timer for the primary group in the path starts
- the call goes to the longest idle agent.

The caller connects to the agent when the agent answers the call. When no agent is available, the caller is automatically queued to the primary agent group in the path. In both cases, the caller's communication path remains unaffected and the caller remains listening to

its tone or RAD. The caller receives ringback tone until the first RAD answers, an agent answers, interflow occurs, or the caller hangs up. ACD Call Progress - All Agents Busy shows the ACD path progress when all agents are busy.

Overflow

A path contains one primary agent group and can have up to three overflow groups. This provides backup resources to the primary agent group to ensure that service level goals are met. Calls that overflow maintain their position in queue. Group overflow timers determine how long a call waits before overflowing.

Predictive Overflow

Predictive overflow determines whether a newly-queued call to an agent group should be immediately overflowed or sent to the next agent group. The average call duration is based on the average agent talk time, including the work timer. If the system predicts that a call will not be answered before the overflow timer expires, the system places the call in overflow before the timer expires.

Unavailable Agent Group

Calls that are directed to an unavailable agent group are prevented from being queued. An immediate overflow is attempted. If all agent groups are unavailable, then the path is unavailable and "path unavailable" handling is used.

Interflow

Interflow is a timed-based or load-based feature that takes an ACD call out of the path and routes it to the interflow answer point (if one is programmed). A call that interflows to another path adopts the priority of the new path if:

- the new path has "Interflow To This Path Uses This Path Priority" set to "Yes" in its Path Assignment form
- the call interflows from a path that has a priority of 64.

Otherwise, the call's priority does not change.

Recordings

An ACD path can define up to four recorded messages (specific RADs or groups of RADs) and their relative start times for callers waiting for an agent to answer. The path also specifies whether the programmed recording is repeated and its repeat interval.

Music between Recordings

Between each recording (RAD) on an ACD path, the incoming caller, by default, listens to the multi-embedded music source (if programmed). An alternate music source may be specified between each recording and after the last recording.

Note: If a call from a remote switch is answered by a RAD before being queued to an ACD path, the caller will not hear music unless there is a Music on Hold source at the local switch.

Alternative Recording Device (ARD)

Up to four alternative recordings are available on each path. The Alternative Recording Device (ARD) is an off-hook ONS port that connects to callers in a listen-only conference. The user decides what is supplied on the ONS port: silence, music, or endless loop recordings.

Note**:** An ARD should not be used as a first-level announcement (Music on Hold, for example).

Between RAD messages, callers hear ARDs when they are available. If ARDs are not available or an ARD becomes unavailable when callers are connected to it, callers hear the System Music On Hold. If the System Music On Hold is not available, callers hear silence between RAD messages.

Attempts to directly dial, forward to, transfer to, or system reroute to an ARD result in the message "INVALID DIALING" on display sets and/or reorder tone. Attempts to program call forwarding to an ARD result in the message "NOT ALLOWED" on display sets, and/or reorder tone.

The Path Assignment form can be programmed to provide the same alternative recording between each announcement or as many as four different alternative recordings—one between each recorded announcement.

The ARD can be a telephone, a recording device, or a transfer device (8/600 ohms) that simulates an off-hook device and allows connection of an audio source such as a radio. The system connects callers only if the device is off hook. There are no restrictions on how paths share ARDs.

Note: Depending upon country of installation, the ARD must be either an FCC Part 68 or DOC approved voice coupler or voice connecting arrangement to an ONS circuit.

Path Unavailable

When a path is unavailable, calls can be routed to a path unavailable answer point such as an attendant, voice mail, recorded announcement, another ACD path or a system speed call number. This allows the supervisor the choice of where to send calls received after hours or during holidays.

An ACD path becomes unavailable in the following situations:

- the path directory number is remotely placed in do not disturb (DND) mode
- the primary and all programmed overflow agent group directory numbers are remotely put in DND mode
- all members of all agent groups in the path are logged out
- a combination where all agent groups are either in DND mode or have no agents logged in.

When a path is unavailable, calls can be routed to a path unavailable answer point. The path unavailable answer point can be:

- an attendant or valid extension (display set, non-display set, auto attendant, or night bell)
- a voice mailbox

- a RAD
- another ACD path
- a system speed call number.

Interconnect Restriction

If an interconnect restriction exists between the caller's station or trunk and members of an ACD group, the call waits in queue like any other call. When an agent is ready to service the call, the call is dequeued from the path and forwarded to the destination designated in the Intercept Handling Assignment form. If no alternate directory number is provided, the caller hears reorder tone.

Agent No Answer Call Handling

An agent who fails to answer a call within a programmed amount of time is automatically logged out of ACD. The call is requeued as the oldest call in the queue, to all of the agent groups prior to the call offer to the agent.

When the "ACD 2000 Logout Agent No Answer" COS timer expires, the following events occur:

- The caller is automatically requeued into all agent groups the caller was previously in as the oldest call within its priority.
- The agent is logged out.

Note: If the "Auto Logout Last Agent No Answer" system option is set to "no", the caller will not be requeued when the "ACD 2000 Logout Agent No Answer" timer expires. Instead, the caller continues to hear ringback tone, recordings, music, or silence until the agent answers, the caller hangs up, an overflow or an interflow occurs.

Dial out of Queue

Callers in an ACD path can dial out during or between RAD messages, if they cannot hold for an agent to answer, or if they want to change their current action. The business is not lost because the caller does not leave the ACD path.

Note: Sufficient DTMF Receivers must be available to handle the extra demand generated by this feature. The number of DTMF Receivers required is dependent on several variables including:
– the number of available trunks
– the volume of calls
– the length of each RAD message.

Note: The extra demand generated by this feature can be minimized by providing dial out capability during the first RAD message only in the Path Interflow Dialing List Assignment form.

Silent Monitoring

In order to monitor the quality response of an agent, supervisors can listen to calls answered by an ACD agent or agent group.

Note: Silent monitoring is not permitted on a non-prime line, and is not supported on MSDN networks.

Skills Based Routing

In ACD 2000 Skill-based Routing, each agent in an agent group is assigned a skill level. Agents who appear in more than one group may be assigned a different skill level in each group. Calls to a group are routed to the most skilled available agent. If agents of equal skill are available, the call is routed to the longest-idle agent.

Networked ACD

Incoming calls are simultaneously queued against local and/or remote agent groups within a path. This allows multi-site customers to design call routing schemes that take advantage of, and optimize, their call handling resources.

Networked ACD supports ACD functions over a MITEL Switched Digital Network (MSDN) by allowing agent groups at different locations (on different systems) to service calls on the network independently of where the call first entered the network. ACD agents may be located at different systems for reasons such as language, coverage outside of local office hours, or location of agent groups in different areas.

Like ACD 2000, Networked ACD queues incoming calls to agent groups in ACD paths for direction to idle agents, and it can overflow incoming calls from an overloaded local agent group to another group. Calls can be distributed by an ACD path to agents in any one of its programmed agent groups or to remote agent subgroups.

MSDN D-channel signaling is used to queue calls remotely. When a remote agent becomes available to service a call, a signal is sent over the MSDN D-channel, and the agent is blocked from servicing any other call for a short period of time. The Distributor system (the system into which the original call was dialed) then sets up the call by using an MSDN B-channel for the voice channel. This method keeps B-channels free until a remote agent is available.

Examples of typical applications that would benefit from Networked ACD include:

- sharing a load across a network;
- answering calls from a time zone where the local office is closed;
- sharing traffic with co-located (or nearby) systems which have low trunk costs and agents at each system;
- reducing time to answer, especially for incoming toll trunks (1-800 numbers).

ACD 2000 Real Time Event Records

Real time events records are used to monitor and record the activity of the entire ACD operation. Events are divided into two groups:

1. call events, which report on individual ACD agent activity
2. group statistics events, which provide a cumulative reports on agent group usage

Recorded Information

Real time events records are used to monitor activities of the entire ACD operation. Events records are output as they happen and are interpreted by an off-board processor which generates the reports. Events records are only generated for ACD agents.

Call events are generated only for ACD agents. As agent activities occur, a report is generated.

Functions recorded are as described in the following paragraphs.

Call events are generated only for ACD agents. The following types of reports are generated when agent activities occur:

- agent log in
- agent log out
- set do not disturb
- remove do not disturb
- set make busy
- remove make busy
- answer ACD call
- answer personal call
- originate a call
- agent idle
- work timer start
- work timer expire
- call hold
- call hold retrieved
- call hold abandoned

Agent Log In

This record is generated each time an agent successfully logs on. When an agent logs on, Make Busy and Do Not Disturb (DND) are removed on that extension. No record is generated for the removal of Make Busy. A remove DND record will only be generated if the extension was in DND. The extension number is the prime line of the ACD set which an agent is logged on to.

Agent Log Out

This record is generated whenever an agent successfully logs out. If agent A is currently logged on extension X and agent B logs on extension X, a log out record is automatically generated for A. This is followed by the log in record for B. Make Busy is automatically enabled on the extension when the agent logs out. No Remove Make Busy record is generated. The extension number is the prime line of the ACD set which an agent is logged on to.

Set DND

A record is not generated when an agent group is placed in Do Not Disturb mode. The records do not differentiate between setting DND locally and remotely. The extension number reported is always the prime line of the ACD extension. A set DND record will be generated for the following conditions:

- Setting DND locally by using the DND access code
- Setting DND remotely by using the remote DND access code
- Setting DND remotely by using the attendant console features key
- Setting DND locally on a SUPERSET 4 telephone by pressing the Select Features hardkey and dialing the digit 2
- Setting DND locally by pressing the DO NOT DISTURB feature key.

Remove DND

The extension number is always the prime line of the ACD extension. A Clear Do Not Disturb record will be generated for the following:

- Clearing DND locally by using an access code
- Clearing DND remotely by using the Cancel Remote DND access code
- Clearing DND remotely by using the attendant console feature key
- Clearing DND by using the Cancel All Features access code
- Clearing DND by using the Cancel All DND feature on the attendant console
- Agent log in on an extension in DND

Set Make Busy

This record is generated whenever an extension is placed on the Make Busy state. A record is not generated when an agent logs out because Set Make Busy is implied when an agent log out record is received. The extension number is always the prime line of the ACD extension.

Remove Make Busy

The extension number is always the prime line of the ACD extension. This is similar to the Set Make Busy. Again, no record is generated when the agent logs on. The remove make busy is implied by the log in record.

Answering ACD Call

This record is generated whenever an agent answers a call that was directed to the ACD agent group. The event record contains Agent ID and extension number (agent group pilot number that the call was placed to). The ACD extension that answered the call can be determined by using the last agent log in event for that extension. If the ACD set does not have a logged in agent, the Agent ID area is blank and the extension number is that extension's prime line.

Answering Personal Call

All non-ACD agent group calls are included in this category. The extension number is always the prime line of the ACD extension that answered.

Originate Call

This record is generated whenever an agent originates a call and enters a conversation. A record is not generated when an agent enters a Feature Access code, dials an invalid number, or hangs up before the called party answers. An agent extension number is always the prime line of the ACD set that originated the call.

Agent Idle

If "Work Timer" is in effect, the "Agent Idle" record is generated when the work timer expires or when it is canceled. If the agent enters "Make Busy" while "Work Timer" is in effect, an "Agent Idle" record is generated followed immediately by a "Set Make Busy" record. A record is not generated to show the end of the call or the start of the work timer. This entire period is treated as part of the time to process the call.

If "Work Timer" is not in effect, the "Agent Idle" record is generated at the end of a call, not when the agent hangs up. For example, if the agent presses the HANG-UP softkey and remains off-hook for 5 seconds, the record is generated when the HANG-UP is pressed, not when the agent actually goes on-hook. The extension number is always the prime line of the ACD set that is now idle.

Work Timer Start

This record is generated when an agent terminates an ACD call and the work timer is started for that agent. If the work timer cannot be started, an idle event record is generated instead.

Work Timer Expire

This record is generated when the work timer expires for that agent.

Call Hold

When an agent places a call on hold, a record is generated for that line appearance. If the agent places another call or answers a call on a second line, the call event record for the new line will not cause confusion for the reporting package.

Hold Retrieve

When the held call is retrieved, a record is generated for that line indicating that the agent is now busy on that line.

Hold Abandon

When the held call is abandoned, a record is generated for that line.

ACD Hold Retrieve/Abandon Event Report Modified

Set ACD Real Time Events Feature Level in the System Options Assignment form at 1 to modify the reporting of the Hold Retrieve and Hold Abandon events. ACD Real Time Events assumes the Hold Retrieve event is generated under the following conditions:

A held call is retrieved on the key line on which the agent that initiated the hold originally placed the party. Any variation will be considered a Hold Abandon Event. ACD real time event reporting is missing an event (Call Abandon) when a non-ACD call is answered on DTS/ KEYLINE on an Agent's phone and then placed on hold to be retrieved by another set.

Report Output Port

The events records are output to an RS-232 port.

The port is defined on the Application Logical Port Assignment form with the name ‘ACD Report Port’. The physical location identifier of this port must be an attendant console. The console port is given a name in the System Port Assignment form. This name is referenced in the ‘ACD Report Port’ in the Application Logical Port Assignment form. SUPERSET 7000 ports cannot be used for this purpose.

In order to provide the highest degree of reliability to this interface for the SX-2000, do not use the designated attendant console for Customer Data Entry. All other operations are available. Although CDE is not physically disabled on this attendant console and programming can be performed, it is recommended only during periods of low activity in the ACD operation, otherwise information is delayed.

The recommended port speed is 9600 baud. All records are output as standard ASCII text. Flow control is supported through xon/xoff. The system buffers a maximum of 128 records. The purpose of this buffer is to handle short bursts of traffic that cause events to be generated faster than the port can handle them.

Conditions

- Deprogramming the Application Logical Port Assignment form will stop the generation of records. If there are any failures in the link, the system does not report them. The report generating package must report lost records.
- Records will be lost as a result of the following conditions:
  - the attendant console port is disconnected any buffered records are purged by the system
  - a software restart is executed on the attendant console
  - the link between the controller and the attendant console goes down
  - the port assignment is changed while the link is in use.

Path and Agent Group Statistics Events

Path and agent group statistics events generate a record every 5 seconds, or less frequently, depending on traffic.

Path and agent group statistics events provide regular reports on groups and paths.

The group statistics event is generated for each agent group assigned real time events in the Path Assignment form.

For the SX-2000 Light, Real Time Events records are available through the purchase of the ACD Real Time Events feature package.

Group Statistics

This record is generated for each agent group assigned real time events in the Agent Group Assignment form. A record is generated every 5 seconds or more, independent of the threshold level crossings.

The group statistics event is modified to identify the agent group by its ID number. The agent group number is prefaced by the letter "G" (G003 in the example).

For example:

STX 01 Group Statistics 12:23:27 G003 20 14 1133 ETX

The group statistics event indicates agent group ID 003 has 20 calls waiting, 14 free agents and the longest waiting caller has been queued for 11 minutes, 33 seconds.

Path Statistics

This record is generated for each path assigned real time events in the Path Assignment form. A record is generated every 5 seconds or more, depending on traffic.

The path statistics event identifies the path by its ID number prefaced by the letter "P".

Example:

STX 01 Path Statistics 12:23:27 P123 50 34 2408 ETX

The path statistics event indicates path 123 has 50 calls waiting, 34 free agents and the longest waiting caller has been queued for 24 minutes, 8 seconds. The following is an example of this path statistics event exported from the PBX:

01Q1223271230500342408

Where:

01	Record Number (01)
Q	Queue Report (Q)
122327	Time (12:23:27)
123	Path Reporting Number (123)
050	Calls Waiting (50)
034	Number of Active Agents (34)
2408	Longest Call Waiting MM:SS (24:08)

Note that the Longest Call Waiting can be queued up to a maximum of 99 minutes, 59 seconds (9959), at which point the timer will stop.

Agent Answer

The local ACD call answered "G" event output will contain the path reporting number if it is available. The event will contain the path DN digits if the reporting number is not available.

Example 1: Answered local ACD call with path reporting number

89G172915P100 3001 00

In this example, the path reporting number is P100.

Example 2: Answered local ACD call without path reporting number

89G1729152228001 3001 00

In this example, the Path DN displayed is 2228001.

Remote Agent Answer

The remote ACD call answered "S" event output will contain the path reporting number if it is available and will be in a field 7 characters in length. The event will contain the path DN digits if the reporting number is not available. The path DN field is 14 characters in length.

Example 1: Answered remote ACD call with path reporting number

89S172915P100 3001 00

In this example, the path number is P100

Example 2: Answered remote ACD call without path reporting number

89S1729152228001 3001 00

In this example the Path DN is 2228001.

Agent Ringing

Agent ringing 'T' event is generated for both local and remote path calls. The ringing event contains the path reporting number if it is available. For local calls the path reporting number will always be available if it is programmed. For networked ACD calls both the distributor and answer point PBX need to be running 4.0 or later software to allow path reporting to be delivered via DPNSS. The programmed path reporting number at the Distributor PBX must be non-zero. If the path reporting number is not available then the path DN will be used. This applies to both local and networked ACD calls.

Example 1: Ringing RTE when path reporting number is available

88T172859P100 3001 00

In this example, the path reporting number is P100.

Example 2: Ringing RTE, when path reporting number is not available

88T1728592228001 3001 00

In this example, the path DN is 2228001.

Agent End Ringing

Agent end ringing "U" event is generated for both local and remote path calls. The event contains the path reporting number if it is available. For local calls the path reporting number will always be available if it is programmed. For networked ACD calls both the distributor and

answer point PBX need to be running LIGHTWARE 32 Release 1.1 (or later) software to allow path reporting to be delivered via DPNSS. The programmed path reporting number at the Distributor PBX must be non-zero. If the path reporting number is not available then the path DN will be used. This applies to both local and networked ACD calls.

Example 1: End Ringing RTE when path reporting number is available

01U111530P100 3001 00

In this example, the path reporting number is P100.

Example 2: End Ringing RTE when path reporting number is not available

01U1115302228001 3001 00

In this example, the path DN is 2228001.

Refresh Reports

This record is generated once at the start of each new cycle of agent group and path statistic events. A record is generated every 5 seconds or greater, depending on traffic.

Example: New cycle of agent group and path statistic events

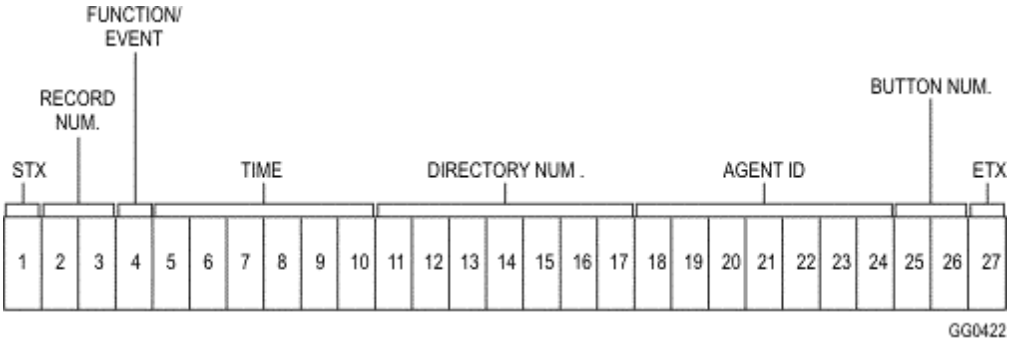
STX 01 Refresh Reports 12:23:27 19981231 ETX

The refresh reports event signifies the start of new cycle of group and path statistic events. The event provides the current system date; in this example, Dec. 31, 1994, as data.

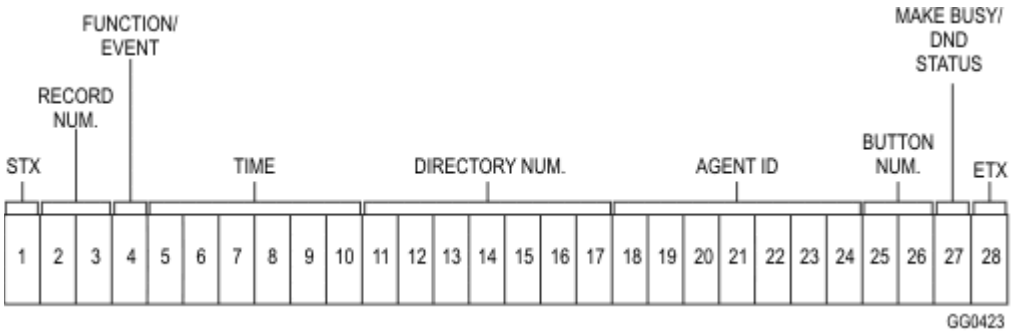
Real Time Event Record Formats

The basic format for call events is shown in the following illustrations. Note that all ASCII characters are enclosed in single quotes.

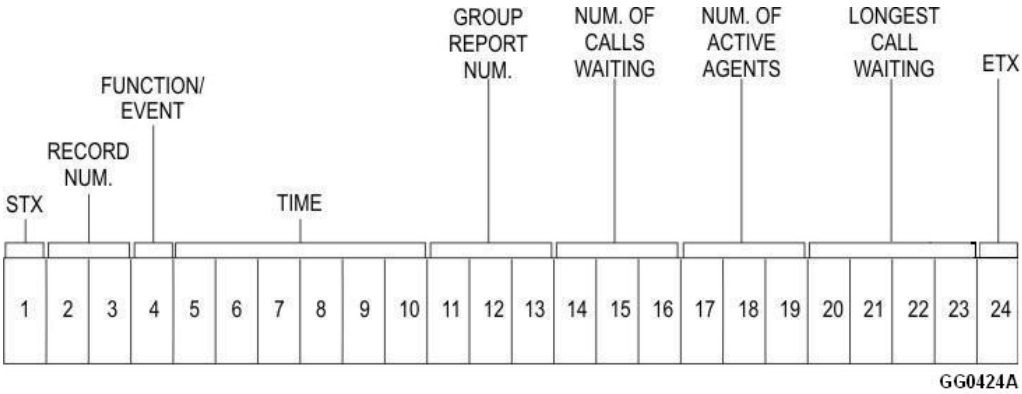
Call Event Format



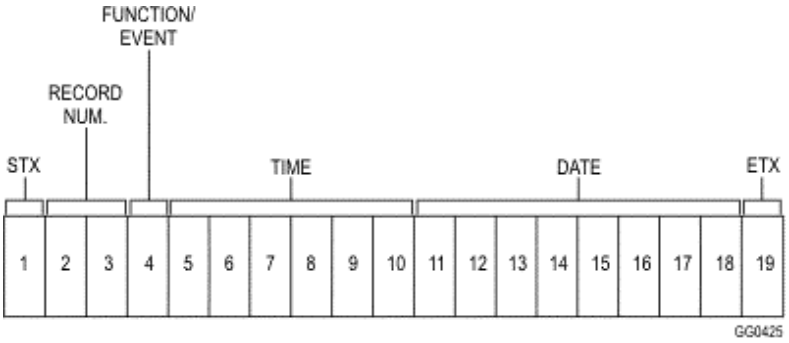
Idle Event Format



Group and Path Statistics Event Format



Refresh Reports Event Format



Field Definitions for Event Records

Field Definitions for Event Records	
STX	ASCII start of text. Hex value 02.

Field Definitions for Event Records	
REC NUM	This is a two character field that contains the record number. This field goes from ’00’ to ’99’. After the ’99’ the record, the numbers cycle back to ’00’.
FUNCTION/EVENT	A agent login B agent logout C set DND D remove DND E set make busy F remove make busy G answer ACD call H answer personal call I originate CALL J agent idle K group report L work timer start M work timer expire N call hold O hold retrieve P hold abandon Q path report R refresh reports S answered remote ACD call T agent ringing U agent end ringing
TIME	This six character field displays the time in 24-hour format.
DIRECTORY NUMBER	The directory number is a seven character field.
AGENT ID	This seven character field displays the agent ID. Blanks in this field means an agent is not logged in.
BUTTON NUMBER	If ACD Make Busy Reason Codes are used, the reason code is placed in the Button Number field. This field is the button number of the line appearance that initiated the event. Events that are line appearance independent, have a button number of zero. The following events always have a button number of zero: • agent log on • agent log off • work timer start • work timer end • set make busy • remove make busy • set DND • remove DND event. • The call events that have button numbers are: • answer ACD call • answer personal call • originate call • agent idle • call hold • call hold retrieve • call hold abandon
ETX	End of text. Hex value 03

Call Event Record Examples

The following examples show a real time event in a modified format to enhance readability.

Example 1

Path 001 has a directory number of 8800, agent 1007 is logged in on set directory number 2007, agent 1008 is logged in on set directory number 2008. A work timer is programmed.

In this example, agent 1007 answers a call for path 8800 and completes the call.

STX 01 Answer ACD In 12:23:07 P001 1007 00 ETX

STX 02 Work Timer Start 12:23:37 2007 1007 00 ETX

STX 03 Work Timer Expire 12:23:47 2007 1007 00 ETX

Example 2

Call (4231) comes in on DPNSS channel and is picked up by 4221 as key line on that set. The agent puts the call on hold. Extension 4211 picks up the call on its key line and then hangs up.

10R12144820000420

11H1215004221 55555 05 (call answered by 4221)

12R12150320000420

13N1215044221 55555 05 (call hold on 4221)

14O1215094211 06 (Hold retrieve by 4211)

15R12151820000420

16J1215224211 062 (agent idle 4211)

There is no Call Abandon between Call Hold on 4221 and Hold Retrieve by 4211.

Example 3

Call (4221) comes in internal and is picked up by 4221 on the prime line on that set. The agent puts the call put on hold. Extension 4211 picks up the call by using the feature code, and then hangs up.

32R13061720000420

33H1306244221 55555 00 (call answered by 4221)

34N1306254221 55555 00 (call hold by 4221)

35P1306294221 55555 00 (call abandon by 4221)

36I1306294211 00 (new call 4211)

37R13063220000420

38J1306374211 002 (idle 4211)

39R13064720000420

Example 4

ACD Real Time report when the ACD Real Time Events Feature Level is set to "0" (default). Call (4231) comes in on DPNSS channel and is picked up by 4221 as a key line. The agent puts the call on hold. Extension 4211 picks up the call on key line, then hangs up.

10R12144820000420

11H2115004221 55555 05 (call answered by 4221)

12R12150320000420

13N1215044221 55555 05 (call on hold on 4221)

14O1215094211 06 (4211 retrieves call on hold)

15R12151820000420

16J1215224211 062 (agent 4211 idle)

There is no Call Abandon between Call Hold on 4221 and Hold Retrieve by 4211.

Example 5

ACD real time report when the ACD Real Time Events Feature Level is set to "1". Internal call (4221) comes in and is picked up by 4221 on prime line. The agent puts the call on hold. Extension 4211 picks up the call using a feature code, then hangs up.

32R13061720000420

33H1306244221 55555 05 (call answered by 4221)

34N1306254221 55555 05 (call on hold on 4221)

35P1306294221 55555 00 (call abandoned by 4221)

36I1306294211 00 (new call 4211)

37R13063220000420

38J1306474211 002 (agent 4211 idle)

39R13064720000420

This example shows the abandoned call on 4221.

Hotel/Motel Logs and Reports

Hotel/Motel Overview

The Hotel/Motel feature package provides useful features for a hotel or motel environment. The system can work independently, or in conjunction with a Property Management System (PMS). The Suite Services feature package can also be purchased to enhance the Suites capabilities of the Hotel/Motel feature package. The main focus of this section is on using a system independently of a PMS.

MITEL Attendant Consoles have the following six modes of operation:

- Guest Service Mode: Guest Service is the top-level mode. Access all other modes of operation from Guest Service Mode.
- Find Room Mode: Allows you to search for rooms on the basis of condition and/or occupancy status. Initiate searches by entering the command on the keyboard or by pressing the appropriate softkey.
- Room Monitor Mode: Allows the attendant to listen to an activated room monitor extension.
- Print Mode: Allows printing of room status, message registration, or wake-up reports.
- Hotel Program Mode: Allows you to turn system-wide features, such as Call Block, on or off.
- Guest Room Mode: Allows you to check guests in and out of the hotel, set automatic wake-up calls, activate call block, and program call restrictions.

Using the Hotel/Motel feature package, you can

- Display Guest Room Information: Provides information about the guest room, the guest, and the room extension. Existing information can be changed or new information added to a room.
- Check In and Check Out Guests: Allows you to keep track of arriving and departing guests.
- Change the Status of a Room: Allows you to set the condition and occupancy status of a room.
- Find Rooms: Allows you to search for rooms by using the room condition and occupancy status as search parameters.
- Monitor Rooms: Allows an attendant console, line, or trunk to listen to a room monitor extension.
- Set Automatic Wake-up Calls: Allows you to set an automatic wake-up call for a room extension. You can also set Multiple Wake-ups. Multiple Wake-ups are supported on the SC1000.
- Enable Call Blocking: Prevents calls from being made between guest rooms.
- Apply Call Restrictions: Restricts the type of calls that a guest can make from a room extension.

- Use Message Registration: Calculates the total cost of calls made from a room extension.
- Print Hotel/Motel Reports: Provides Automatic Wake-up, Room Status, and Message Registration reports.
- Access System Logs: Provides access to the hotel logs generated by the system during operation of the Hotel/Motel feature package.
- Support Hotel/Motel Multiple Wake-up: Provides up to 3 separate wake-up times for each room or suite, Daily repetition of wake-ups (without resetting each day) and VIP/Personal wake-ups.

Hotel/Motel Connectivity

The Hotel/Motel logs are obtained via an IP connection at port 1753, or a printer attached to a console printer port. Note that there is a maximum of three connections per system application.

Hotel/Motel Conditions

- A printer may be connected directly to the attendant console for printing hotel reports.
- CEPT or DS1 trunks should not be metered, and no message registration messages should be sent to the PMS with respect to these types of trunks. When CEPT or DS1 trunks are used to emulate CO trunks, these trunks are used to connect to outgoing CO trunks and the metering takes place when the actual CO trunk clears down. CEPT or DS1 trunks used to make calls within the network are not programmed to emulate CO trunks. They are not, and should not, be metered.
- The Suite Pilot number displaces the extension number of the guest room extension where applicable.

3300 ICP Systems

- The printer connects to the RS-232 port at the rear of the 5550 IP console.
- Hotel/Motel logs can be output to remote applications through TCP/IP Port 1753.
- The 5550 IP Console application takes ownership of the serial port while it is running; the following parameters should be set:
  - Speed = 1200 baud
  - Data Bit = 8
  - Parity = None
  - Stop Bit = 2
  - Handshake = ComNone.
- Hotel/Motel is not supported for Hot Desk users.

SX2000 Systems

- You cannot connect a printer to the SUPERSET 7000 console.
- The SUPERCONSOLE 2000 application takes ownership of the serial port while it is running; the following parameters should be set:
  - Speed = 1200 baud
  - Data Bit = 8
  - Parity = None
  - Stop Bit = 2
  - Handshake = ComNone.

Hotel/Motel Format Specification

This feature provides the user of the Hotel/Motel package with various types of Hotel/Motel reports and logs. A report page is 80 columns wide and 66 lines long. Each page has a page number and a time stamp in the top right hand corner. Each column of the report contains the extension number and the corresponding description entry.

The time stamp has the following format:

yyyy-mmm-dd hh:mm

Where:

yyyy-mmm-dd	= year/month/date
hh:mm	= hour/minute

Hotel/Motel Reports

Reports can be printed on demand or at a specified time. The following types of reports are generated:

- Automatic Wake-up – Lists all the guest rooms that have automatic wake-up calls set.
- Room Status – Lists the current condition and occupancy of all guest rooms in the hotel.
- Room Monitor – Three types of logs identify the status of room monitors.
  - Room Monitor Setup Hotel Log: Reports that an extension has been set up as a room monitor (see figure).
  - Room Monitor Terminate Hotel Log: Generated each time an extension terminates as a room monitor and reports the room monitor extension number and terminate time (see figure).
  - Monitored Call Hotel Log: Provides a summary of completed room monitor activity. Each time a room monitor or listener device clears a connection the log reports: the extension number of the room monitor, the extension or trunk number of the listener device, and the duration of the monitoring operation.

 **Note:** Two error logs may also be generated by the room monitor feature.

- Message Registration – Lists all of the guest rooms that have made telephone calls, the number of calls, and the total cost.

Programming Hotel/Motel Reports

- Enter the printer name to which hotel reports are to be sent in the Application Logical Port Assignment form.
- If required, enter the times that Hotel reports are to be printed, in the Hotel Options Assignment form.

Hotel/Motel Access System Logs

This feature provides user access to the logs generated by the system during operation of the Hotel/Motel feature package. The following logs can be generated:

- Automatic wake-up call: Logs all wake-up call attempts, changes, and cancellations.
- Call block: Logs all changes to call block attributes.
- Occupancy: Logs each check-in or check-out of every guest.
- Room monitor: Logs changes in the status of a room monitor, or errors in setting up a room monitor.
- Time: Logs generated when the system time is changed.

This information can be printed out as hotel logs or reports. The hotel logs are created as soon as there is a change to the system, for example, when Call Block attributes or an automatic wake-up call time are changed.

Note: If Single Suite Services or Linked Suite Services is used, then suites and rooms are presented as Rooms in the hotel logs.

Programming Hotel/Motel Logs

- Enter the port name from which the Hotel Logs are generated in the Application Logical Port Assignment form.

Report/Log Format Specification

Wake-Up Logs

A Wake-up log entry is generated each time that a wake-up call is set, attempted, changed or canceled. The Wake-up log has the following format:

yyyy-mmm-dd hh:mm HOTEL x/v #eeee
WAKE-UP: ggggggg hh:mm:ss cc (comment) sssssss

Where:

yyyy-mmm-dd is the date of the event
hh:mm is the time the event occurred

x is the control plane which issued the log
v is the activity status (inactive or active)
eeee is the position of this event in the hotel log
ggggggg is the directory number of the guest room extension, maximum of 7 digits
hh:mm:ss is the wake-up time set for the extension
sssssss is the extension number or the name “SYSTEM”.
cc is a comment, which can be one of:

- set by extension ♣
- set failed at extension ♣ (guest failed to enter call wake-up time correctly)
- changed by extension ♣
- canceled by extension ♣
- acknowledged by extension ♣
- no answer*
- busy*
- expired**
- deleted**
- system error**
- ♣ accompanied by the extension number or the Attendant Console number
- * accompanied by event number
- ** error message

♣□ accompanied by the extension number or the Attendant Console number
* accompanied by event number
** error message

Some of the comments are accompanied by the internal directory number of the extension performing the action in the comments field or an event number.

Note: When PMS is enabled, if the PMS sends a check-out message on a room with a pending or active wake-up, the wake-up log will be as follows:

```
1992-MAR-15 02:00:07 HOTEL    A/Active      -Info-MON.FIELD #0964
WAKE-UP       1013   Canceled By Extension  SYSTEM
```

Wake-up Log Errors

The last three items in the list above are Wake-up Log error messages. The following explanations describe the three errors that may be logged for the Hotel/Motel Wake-up feature:

- *Expired:* No expiration point for the wake-up call has been set. The expiration point did not answer when the wake-up call was rerouted.
- *Deleted:* The system has restarted and the wake-up call has been deleted (see Transient Calls in Setting Automatic Wake-Up Calls).
- *System Error:* The extension is locked out, the extension is out of service, no call processes are available, or another system-related error exists.

Call Block Logs

Call Block logs are generated when Call Block attributes are changed. They have the following format:

yyyy-mmm-dd hh:mm:ss HOTEL x/v #eeee
CALL BLOCK: cc (comment) sssssss

Where:

yyyy-mmm-dd is the date of the event
hh:mm:ss is the time the event occurred
x is the control plane which issued the log
v is the activity status (inactive or active)
eeee is the position of this event in the hotel log.
sssssss is the extension number
cc is a comment, which can be one of:

- set-up by ♣
- cleared by ♣
- unsuccessful set-up by system
- successful set up by system

♣ accompanied by extension number or “SYSTEM”

Room Monitor Logs

Room monitor logs report changes in the status of a room monitor, provide summary reports of room monitor activity, and report errors encountered in room monitor operation. These logs have the following format:

yyyy-mmm-dd hh:mm HOTEL x/v #eeee
ROOM MONITOR: DDDDDDD (comment)

Where:

yyyy-mmm-dd is the date of the event.
hh:mm is the time of the event.
x is the control plane which issued the log.
v is the activity status (inactive or active).
eeee is the position of the event in the hotel log.
DDDDDDD is the directory number of the room monitor.

Time Logs

The following two Time Logs are generated when the system time is changed:

- Previous Time - shows the time before the change
- New Time - shows the time after the change.

Note: It is recommended that the system time be changed when there are no wake-up calls scheduled. Time changing during a busy wake-up period causes system errors, as many wake-up calls are handled at the same time.

The Time Log has the following format:

yyyy-mmm-dd hh:mm:ss HOTEL x/v #eeee
TIME: (displayed time) YYYY-MMM-DD HH:MM:SS:TT DAY

Where:

yyyy-mmm-dd is the date of the event
hh:mm:ss is the time the event occurred
x is the control plane which issued the log
v is the activity status (inactive or active)
eeee is the position of this event in the hotel log
(displayed time) is either the previous time or new time
YYYY-MMM-DDD HH:MM:SS:TT DAY is the system display of the previous or new time.

Property Management System

Property Management System Overview

A Property Management System (PMS) provides a center for managing a hotel business. It may also be referred to as a Front of House (FOH) system, and can interface with a front desk system to provide reservation control, centralized accounting and billing, and call logging.

The PMS can interface with the 3300 ICP and SX2000 to provide a seamless enabling of guest room telephone services based on the status of the room.

When information about a guest is changed at the front desk system, messages are sent to the system via the PMS. Similarly, when information about any guest is changed on the system, messages are sent via the PMS to the front desk system.

Note: For SX2000 systems, you cannot use the SUPERSET 7000 attendant console. You can use other attendant consoles and datasets.

PMS Interface Requirements for 3300 ICP

The PMS can interface with the 3300 ICP using the following types of connections:

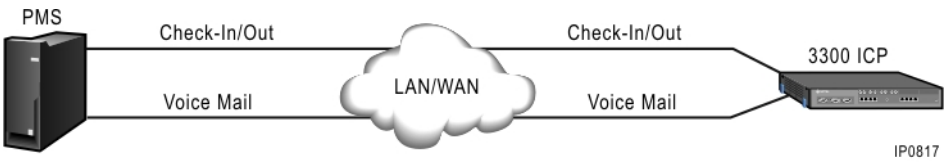
- Direct IP Connection (supported in 3300 ICP Release 6.0 or later)
- RS-232 Connection via the 5550 IP Console (for Hotel/Motel management connection only)
- RS-232 Connection via a Serial Port Converter (for both Hotel/Motel management and Voice Mail connections)

Direct IP Connection

The following direct IP connections can be used:

- hotel/motel management connection, through port 15374
- voice mail connection, through port 6830

Each connection from the PMS is connected to the LAN, which in turn connects to the 3300 ICP controller.



RS-232 Connection via the 5550 IP Console

This is only used for the hotel/motel management connection. The 5550 IP Console uses the COM 1 port on a PC to interface with the PMS. For information about how to install the 5550 IP Console application, refer to the *5550 IP Console Installation Guide* at http://edocs.mitel.com.

Note: The PMS cannot be connected to the CX and CXi controllers using this method.

The table below lists the details for the PMS/system interface configuration requirements on the 5500 IP Console.

Interface	EIA RS-232-C/Current Loop
Data Rate	Programmable baud rate
Interface Distance	50 feet (RS 232C)/600 Feet
Number of Data Lines	1
Operating Mode	Character, half-duplex
Character	10 bit ASCII code (11 for slower rates: extra stop bit) Start bit: 1 bit Bits per character: 7 or 8 bits Stop bits: 1 bit (for 1200 baud), 2 bits for slower rates Parity: even, odd or no parity

RS-232 Connection via a Serial Port Converter

This connection is only used for embedded voice mail.

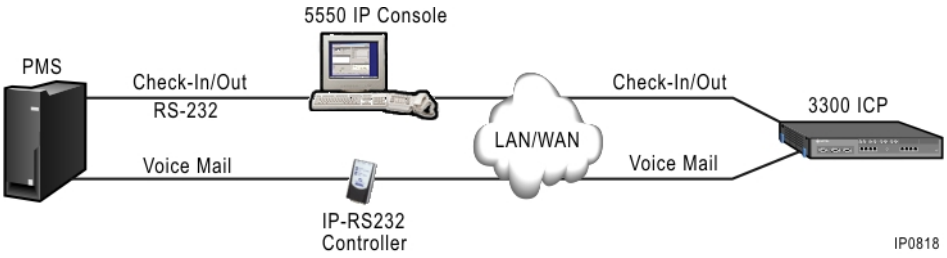
A third-party RS232-to-IP serial port converter (such as the Precidia Technologies Ether232) is used to connect the customer's PMS computer to the LAN, which in turn connects to the 3300 ICP controller. Follow the instructions supplied with the converter to configure its Ethernet and serial port settings.

The Ethernet settings (converter IP address, Subnet Mask and Gateway IP address) depend on the LAN configuration.

The table below lists the details for the serial port settings.

Setting	Value
Protocol	Terminated tcp-client.
Port speed	Varies with PMS system: HIS: 2400 baud, even parity, 7 data & 1 stop bit, no handshake Encore: 1200 baud, even parity, 7 data & 1 stop bit, no handshake
Connection control	DTR/DSR
Remote IP	3300 ICP controller RTC IP Address
Remote Port	6830 (for voicemail)
Terminators	ETX = decimal 3 Tail bytes = decimal 1

The diagram below shows the RS232 connections through a 5500 IP Console and a Serial Port Converter.



Note: Mitel does not supply RS232-to-IP serial port converters.

Programming PMS on the 3300 ICP

Note: You do not need to perform any programming for the voice mail PMS connection.

To program the hotel/motel administration PMS IP connection:

1. In the Hotel Options Assignment form:
   - set the Property Management System Installed field to "Yes"
   - set the PMS Connectivity field to "Network"

To program the hotel/motel administration PMS RS-232 connection:

2. In the System Port Assignment form:
   - assign a port name to the SC5550IP Input port
   - assign a port name to the SC5550IP Output port

Note: The 5550 IP Console must be programmed before these ports will appear in the form.

3. In the Application Logical Port Assignment form:
   - assign the Port Physical Names programmed in step 1 to the PMS Input Port and PMS Output Port logical names
4. In the Hotel Options Assignment form:
   - set the Property Management System Installed field to "Yes"
   - set the PMS connectivity field to Logical Port

Note: You can change the baud rate of the SC5550 IP Input and Output ports by using the Baud maintenance command.

Voice Mail and PMS Integration

PMS integration automates the management of the MiVoice Business voice mail system through the hotel's property management system. In the *VM Options* form in the MiVoice

Business System Administration Tool, select the protocol that the hotel/motel PMS system uses to communicate with the MiVoice Business voice mail system. A second connection is needed between the PMS and MiVoice Business, using the values in the table above.

PMS Interface Requirements for the SX2000

The SX2000 uses the RS232 connector to interface with the PMS. The table below lists the PMS/system interface requirements for the SX2000 configuration.

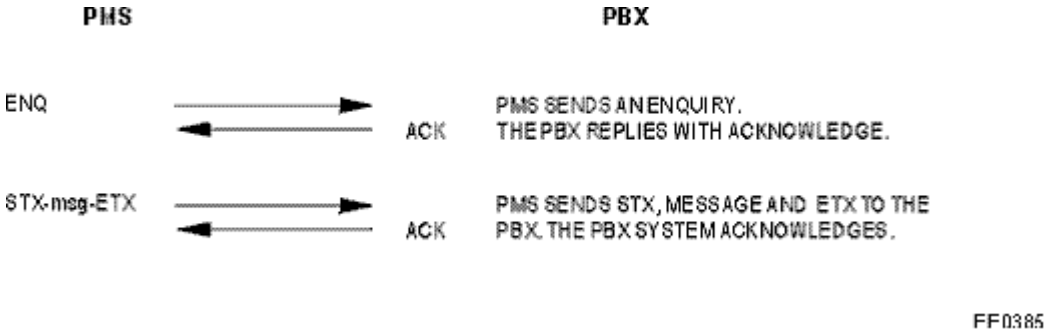
Interface	EIA RS-232-C/Current Loop
Data Rate	Programmable baud rate
Interface Distance	50 feet (RS 232C)/600 Feet
Number of Data Lines	1
Operating Mode	Character, half-duplex
Character	10 bit ASCII code (11 for slower rates: extra stop bit) Start bit: 1 bit Bits per character: 7 or 8 bits Stop bits: 1 bit (for 1200 baud)

Programming PMS on the SX2000

1. In the System Port Assignment form:
   - assign PMS_IN and PMS_OUT to a system port
2. In the Application Logical Port Assignment form:
   - assign the Port Physical Name entered in the System Port Assignment form to the PMS Input and Output Port Logical names
3. In the Hotel Options Assignment form:
   - enter “Yes” in the Property Management System Installed field. If this field is set to “No”, the system assumes there is no PMS interface.

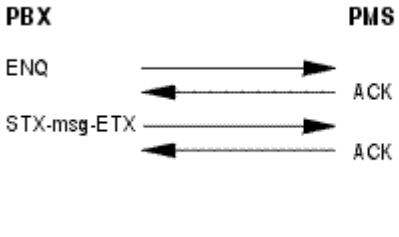
PMS/System Communication Protocol

The PMS/System bi-directional (through half-duplex) link uses the ENQ /ACK/STX-text-ETX/ACK protocol. Message flow diagrams in this section follow a consistent notation. The arrow indicates the direction of the message, from sender to receiver. The label aligned with the tail of the arrow indicates the type of message being sent. The order of the arrows will indicate the sequence of messages exchanged by the entities. Therefore, the PMS to system transmission sequence is:

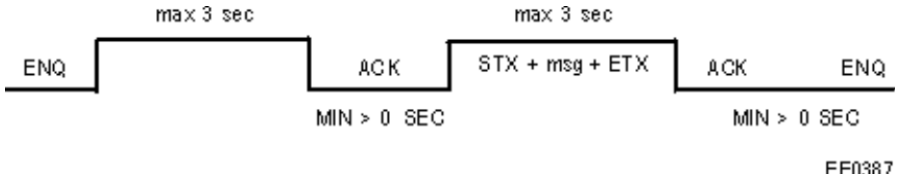


The transmission of the message is complete.

A similar sequence occurs for the system to PMS transmission.



There are timing restrictions imposed on the transmission sequences:



The maximum time to await for the ACK after a STX + msg + ETX transmission is 3 seconds.

PMS Format Specification

The following list contains the type of messages sent from the PMS to the system, and from the system to the PMS.

PMS messages can be used to manage a Suite or Linked Suite in the same manner as managing a Room except using the Suite Pilot number or Linked Suite Pilot number of the guest room extension (where applicable).

PMS System Messages

PMS to System	System to PMS
Enquire	Enquire
Acknowledgment	Acknowledgment
Negative Acknowledgment	Negative Acknowledgment
Are You There	Maid Status
Check In/Check Out Message	Message Registration

PMS to System	System to PMS
Message Waiting	Message Waiting
Wake-Up	Alert
Credit Limit	Request to Initialize
Station Restriction	
Name	
Name Transfer	
Affiliation	
Location	
Suite Messages	
Language	
VIP Status	
DND	
General Reset	
End	

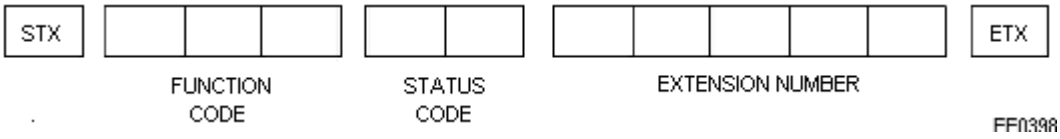
Enquire (ENQ), Acknowledgement (ACK), Negative Acknowledgement (NAK)

These are messages using single byte ASCI characters:

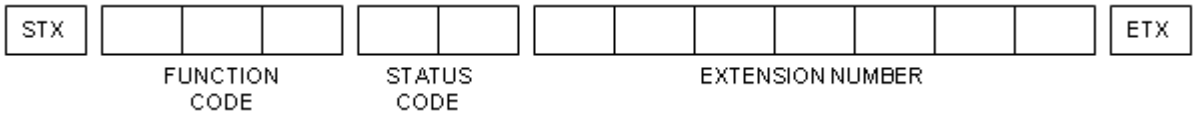
- Enquire (ENQ) – ASCII character HEX 05 – This character is sent from the PMS to the System or from the System to the PMS to indicate that the sender would like to initiate a transmission to the receiver. All transmission messages must be preceded by ENQ.
- Acknowledgement (ACK) – ASCII Character HEX 06 – This character is sent to acknowledge that the previous message was accepted. See Protocol description for more details.
- Negative Acknowledgement (NAK) – ASCII Character HEX 15 – This character is sent to indicate that the previous message was not accepted. See protocol description for more details.

All Other Messages

These messages have the following general format:



Here is an example showing the same format with a seven digit extension number:



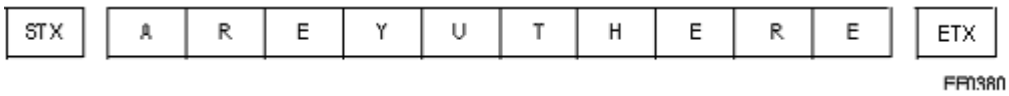
Each box represents 1 byte. Each data message is prefaced with an STX (the ASCII character for start-of-text) and is completed with the character ETX (the ASCII character for end-of-text). The characters mentioned in the messages below are all in upper case, unless otherwise stated.

The extension number can be up to 7 digits in length. If the extension number is less than 5 to 7 digits in length, it is padded with blank characters. For messages sent from the system to the PMS, blanks are padded on the RIGHT side. For messages sent from the PMS to the system, blanks are padded on the LEFT or RIGHT side, but not both. The space character (ASCII 32, HEX 20) must be used.

Notes: Extension length can be changed from 5 to 7 digits in the Hotel Options form in the MiVoice Business System Administration Tool. The examples in this topic reflect the 5-digit length.
If an older PMS application that supports the 5-digit DN format only receives a message in the 7-digit format, the PMS application identifies the message as invalid. In such cases, in accordance with existing PMS protocol behavior, the PMS application responds with a Not Acknowledged (NAK) message.

Are You There?

This message is sent by the PMS to ensure that the system is still responsive.



Check In/Out Messages

Check In operations include:

- changing the Call Restriction to Local or Long Distance, according to the Hotel Options Assignment form (see figure)
- setting the Call Block to be affected or unaffected, as specified in the Hotel Options Assignment form
- resetting the Message Registration to zero.
- deleting the Wake-Up
- Name, Affiliation, and Location fields: These are treated according to the “Keep Teldir Entry on Checkout” option. In SX2K and Pre-8.0 3300, this is a COS option and when enabled, these fields are maintained as is. With the option disabled, the Teldir entry is deleted. In 3300 8.0 and above, the option “Keep Teldir Entry” is a per guest room option. With the option enabled, these fields are maintained as is. With the option disabled, the Teldir entry is reinitialized with a blank entry.

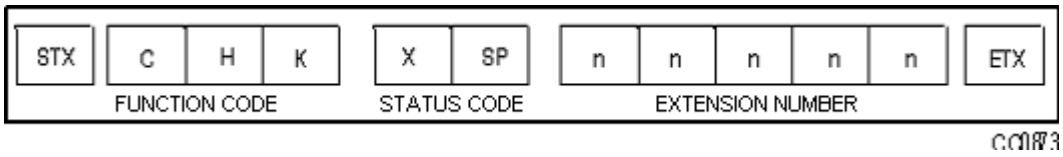
Check Out operations include:

- resetting the Message Registration to zero
- setting the Call Restriction to the Check Out value defined in the Hotel Options Assignment form
- clearing any pending Wake-Up calls

- setting the Call Block value to the Check Out value defined in the Hotel Options Assignment form
- clearing any Do Not Disturb functions
- clearing the Message Waiting lamp
- having all messages deleted against this guest, in systems using Message Center.
- Name, Affiliation, and Location fields: These are treated according to the “Keep Teldir Entry on Checkout” option. In SX2K and Pre-8.0 3300, this is a COS option and when enabled, these fields are maintained as is. With the option disabled, the Teldir entry is deleted. In 3300 8.0 and above, the option “Keep Teldir Entry” is a per guest room option. With the option enabled, these fields are maintained as is. With the option disabled, the Teldir entry is reinitialized with the default entry. For more information on the default entry, refer to 3300 documentation.

Note: If you are using Suite Services, check-in and check-out functions must be performed on Suite Pilot Numbers, not on individual suite extension numbers.

The message has the following format:



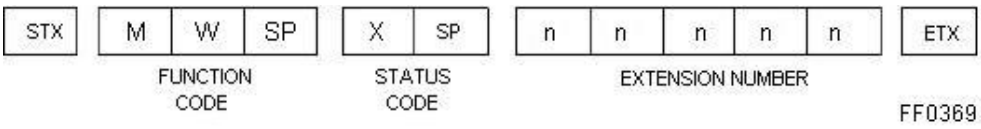
where:

- **X** is the Check In/Out status code:
  - ASCII character 1 for Check In
  - ASCII character 0 for Check Out
- **SP** is the ASCII blank character
- **n** is an extension number digit in ASCII

Message Waiting Message

The format of this message is the same for both directions. The status code sets the new state of the message waiting lamp. If from the PMS to the system, this message indicates that the room’s message waiting lamp is to be turned on or off to indicate the presence of a non-voicemail message for the occupant. From the system to the PMS, the message indicates that voice mail or a source other than the PMS turn the message waiting lamp on or off.

The Message Waiting message has the following format:



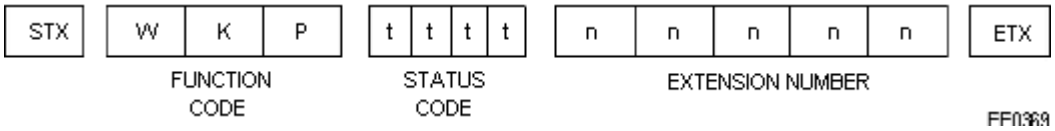
where:

- **SP** is the ASCII space character
- **X** is the Message Waiting Lamp status code
  - ASCII character 1 for Lamp On
  - ASCII character 0 for Lamp Off
- **n** is an extension number digit in ASCII

Wake-Up Message

The PMS system can inform the system to set a wake-up call for a particular guest station. Wake-up calls can be programmed against guest rooms, suite pilot numbers and suite members but cannot be programmed against Linked Suite Pilot numbers.

The Wake-up message has the following format:



where:

- **t** is the wake-up time digit in ASCII
- **n** is an extension number digit in ASCII

The wake-up time is specified in 24 hour time. All four characters, filled with ASCII spaces, represent a wake-up deletion.

Credit Limit Support

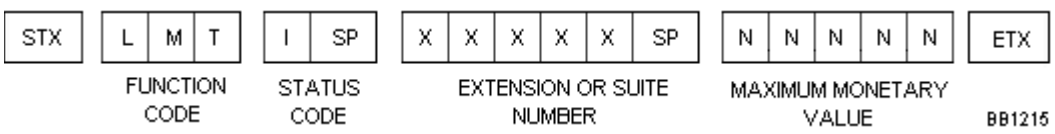
The PMS uses a Credit Limit message to set a credit limit on a guest room or suite. The system does not make any call restriction decisions; the PMS is solely responsible for informing the system of any action to take in regards to credit limit exhaustion.

Note: Emergency Services (911/999) and internal calls are never restricted.

Credit limit support works in conjunction with the existing Surcharge and Multiplier values described in Using Message Registration system documentation. One or both of these fields must be given values in the Hotel Options Assignment form in order to use the Credit Limit or Alert messages. Totals calculated using the Surcharge and Multiplier values may be printed at any time.

Note: When a credit limit is applied to a Linked Suite, it is applied in full to each member suite. For example, if a $100 Credit Limit is applied to a Linked Suite consisting of 3 Member Suites, each Member Suite may make up to $100 in calls for a total of $300 for the Linked Suite.

A Credit Limit message has the following format:



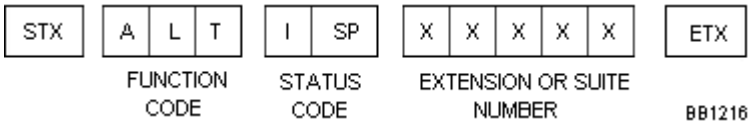
where:

- 1 is the Credit Limit status code in ASCII
- **SP** is the ASCII blank character
- **X** is an guest room or suite pilot digit in ASCII
- **NNNNN** is the maximum monetary units available (maximum 50000) in ASCII

Alert Message

An Alert message is used by the system to notify the PMS when the established telephone credit limit has been reached. The PMS may then send a Station Restriction message to the system to apply previously programmed Class of Restriction parameters (calls in progress are not affected when a credit limit is reached).

An Alert message has the following format:



where:

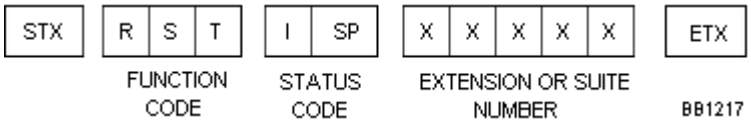
- 1 is the Alert Message status code in ASCII
- **SP** is the ASCII blank character
- **X** is an guest room or suite pilot digit in ASCII

Station Restriction

A Station Restriction message can be used to establish call restrictions. When this message is sent from the PMS to the system, it brings predefined Call Restrictions into effect as programmed in the Hotel Options Assignment.

Note: Emergency Services (911/999) and internal calls are never restricted.

The Station Restriction message has the following format:



where:

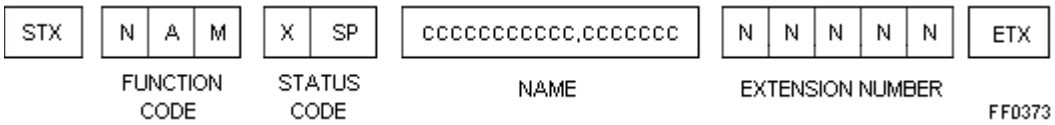
- **S** is one of the following status codes in ASCII:
  - 0 – Internal
  - 1 – Local
  - 2 – Long Distance
  - 3 – Option 1
  - 4 – Option 2

- 5 – Option 3
- **X** is an guest room or suite pilot digit in ASCII

Name Message

This message is sent from the PMS and is used to program the Telephone Directory of the system with the guest's name. If using Suite Services, the Name associated with a Linked Suite should also be programmed as the Affiliation of each Member Suite.

The Name message has the following input format:



where:

- **SP** is the ASCII space character
- **c** is a character of the NAME string (maximum 21 characters) in ASCII
- **n** is an extension number digit in ASCII
- **X** is the operation code. Use of the string operation code allows for addition and deletion of a specific name against an extension. The String Operation code is the first byte of the status code, and may be one of these options :
  - ASCII Character 1 - (addition) – the name is ADDED to the current list of names against this station. If there is no name against this number, a new telephone directory entry is created.
  - ASCII Character 2 - (replacement) – the name is used to REPLACE the first name found against this number. All other names against this number are not altered
  - ASCII Character 3 - (deletion) – all names associated with the specified extension number are DELETED from the telephone directory. The name in the message is ignored by the system.
  - ASCII Character 4 – (transfer) – See below.

The maximum length of the NAME field is 21 characters. The NAME string is left-justified within the NAME field, and padded with spaces (between name and extension number.) The length of a name can be up to 20 characters. If the name is 20 characters, the 21st character must be an ASCII space. The string can contain ASCII characters (lower case letters, upper case letters and numbers with the exception of square brackets "[" and "]" and pipe "|".) If the NAME string does not contain a comma, the string is treated as a LASTNAME. If the NAME string includes a comma, it is treated as the form LASTNAME,FIRSTNAME. When a comma is used, the total length of the string can be 21 characters. The comma cannot be in the 1st or 21st location, and the string cannot contain more than 1 comma.

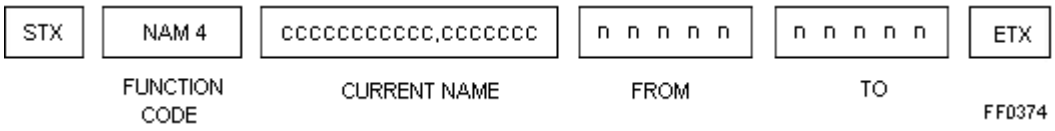
When interfacing with a 3300 ICP 8.0UR4, if there are spaces between the LASTNAME and FIRSTNAME (i.e. LASTNAME , FIRSTNAME), the spaces will be removed by the system (i.e. LASTNAME,FIRSTNAME.) However, when interfacing with an SX2000 or an earlier version of 3300, no spaces are permitted immediately before or after the comma. These will result in unpredictable behavior. If there are multiple space-separated strings in either the LASTNAME or FIRSTNAME (ie. a two part first or last name eg. LASTNAME,MARY JANE) then these spaces are maintained intact.

Name Transfer

This message is sent from the PMS to instruct the system to move the specified name from one extension to another extension. This function will not transfer room associated data such as COS, COR, interconnect number, room status, wake-up time, and meter unit totals.

Note: The Message Center messages will follow the name from one room to another.

The Name Transfer message has the following input format:



where:

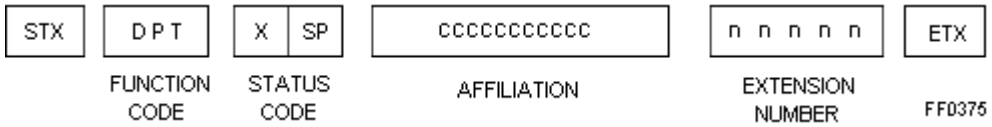
- **c** is a character of the name in ASCII
- **n** is an extension digit number in ASCII (maximum 5 digits total)

Affiliation Message

This message is sent from the PMS and is used to program the Telephone Directory of the system with the guest's affiliation. This is displayed in the Telephone Directory form under Department. The words department and affiliation are synonymous within this text.

Linked Suite names should be programmed in the Telephone Directory as the department/affiliation for each Member Suite.

The Affiliation message has the following input format:



where:

- **X** is the string operation code, with the same definitions as the NAME message
  - ASCII Character 1 - (addition) – the name is ADDED to the current list of names against this station. If there is no name against this number, a new telephone directory entry is created.
  - ASCII Character 2 - (replacement) – the name is used to REPLACE the first name found against this number. All other names against this number are not altered
  - ASCII Character 3 - (deletion) – all names associated with the specified extension number are DELETED from the telephone directory. The name in the message is ignored by the system.
- **SP** is the ASCII space character
- **c** is a character of the department (maximum 10 characters) in ASCII
- **n** is an extension number digit in ASCII

The length of the affiliation can be up to 10 characters and only one string may be used. It is left-justified, with blanks used for padding. A telephone directory entry is considered a unique name-telephone number pair.

For example, consider the following Telephone Directory form.

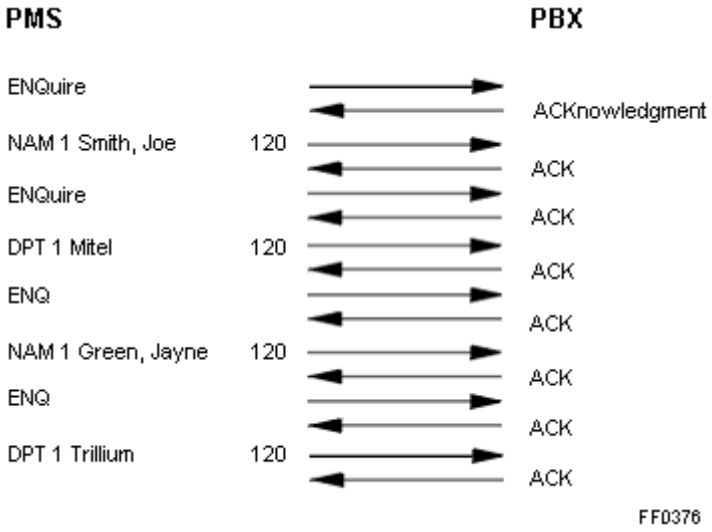
Name	Tel. Number	Department	Location	Prime
Green, Jayne	120	Trillium	March	No
Smith, Joe	120	Mitel	Kanata	No

Both Joe and Jayne share the same telephone number. However, they can each have a corporate directory entry with its own department and location as shown above.

Entry of Multiple Names and Departments against the Same Number

The PMS/System interface allows the entry of multiple names and departments against the same telephone number. This is done by having the department message described above immediately follow a name message. If the telephone number on the department message matches the telephone number on the earlier name request, the department is added to this name-number combination.

Assuming extension 120 does exist on the system, the following PMS to system messages can be sent to enter both Joe and Jayne into the PBX's corporate directory.

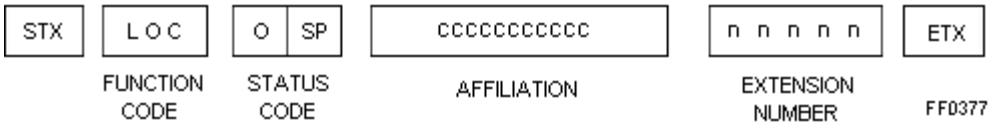


The ADD and REPLACE operations for the DPT function code perform the same function. That is, they take the current department and replace it with the given string.

Location Message

The location message allows a location to be entered against a telephone directory entry. The functionality is much the same as the department message except for the following message format.

The Location Message has the following input format:

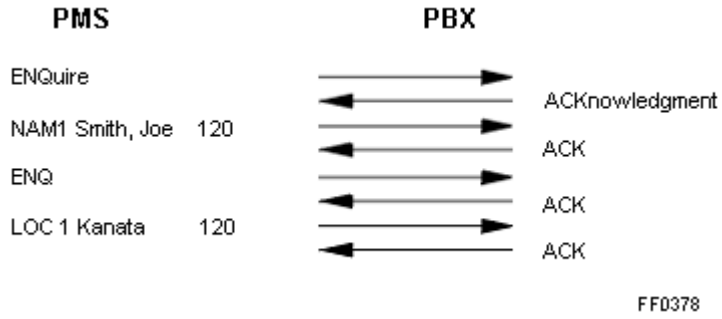


where:

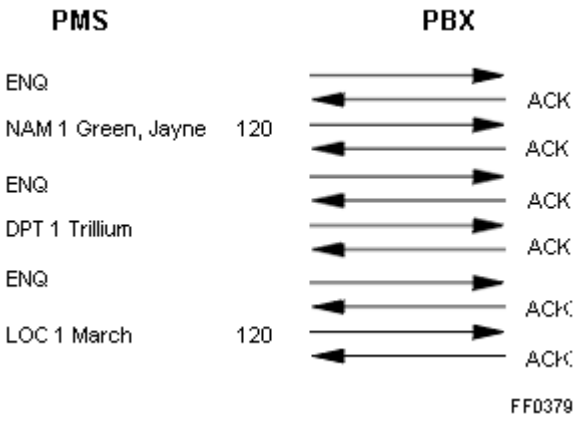
- **LOC** is the location function code
- **X** is the string operation code, with the same definitions as the NAME message
  - ASCII Character 1 - (addition) – the name is ADDED to the current list of names against this station. If there is no name against this number, a new telephone directory entry is created.
  - ASCII Character 2 - (replacement) – the name is used to REPLACE the first name found against this number. All other names against this number are not altered
  - ASCII Character 3 - (deletion) – all names associated with the specified extension number are DELETED from the telephone directory. The name in the message is ignored by the system.
- **SP** is the ASCII space character
- **c** is a character of the location (maximum 10 characters) in ASCII
- **n** is an extension number digit in ASCII

Entry of Multiple Names, Departments and Locations

To enter a location against a specific telephone directory entry, use the following PMS messaging scheme:



To enter a name, department, and location against a particular extension, use the following messaging sequence. To create a unique telephone directory entry, the first message of the triplet must be the NAM1 message. The department and location can follow in any order. They must however, not be interlaced with name, department, or location messages for other telephone numbers.



Note: For Name, Location, and Affiliation messages, Hotel Class of Service is not required.

Suite Messages

A Linked Suite may be formed, added to, deleted from, and dissolved using an available Linked Suite Pilot number. Upon formation of a Linked Suite, the provision of Shared Telephone Services (STS) is active or inactive. Member suites may be checked in or out during provisioning of Linked Suites or independently.

Note: Although both PMS and CDE (SX2000) or ESM (3300) can be used to manage Linked Suites at the same site, we recommend using a PMS system. Guest Services cannot be used to provision Linked Suites at this time.

The general suite message has the following format:

where:

- **STE** is the Suite function code
- **N** is one of the following Suite function variables:
  - 0 for create linked suite, check in, no STS
  - 1 for create linked suite, check in, STS active
  - 2 for add suite, check in
  - 3 for remove suite, check out
  - 4 for breakdown linked suite, check out
  - 5 for change linked suite pilot number, no check out
  - 6 for add suite, no check in
  - 7 for delete suite(s), no check out
  - 8 for create linked suite, no check in, no STS

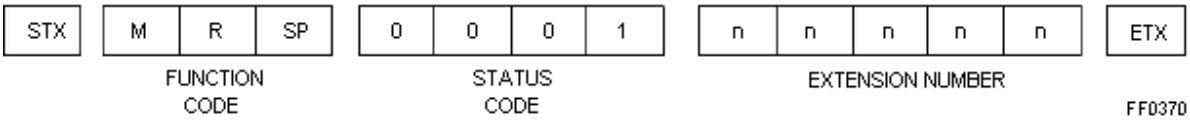
  - A for create linked suite, no check in, STS active
  - B for breakdown linked suite, no check out
- **SP** is the ASCII blank character
- **X** is an extension or suite number digit

The number of Member Suite Pilot Numbers is dynamic. Each Linked Suite and Member Suite Pilot number is 5 digits maximum in length. A maximum of 4 member suites may be included in a single Linked Suite message. If more than 4 members are included in a Linked Suite (maximum 32 members without STS), then several Suite Messages must be sent.

Message Registration Message

Each time a hotel extension makes a trunk call, the system sends a message to the PMS to update the total count of outside calls made against the guest room. No distinction is made between local and long-distance calls. Message Registration works by counting the number of meter pulses made over the duration of the call.

The Message Registration message has the following output format:



where:

- **SP** is the ASCII blank character
- **n** is an extension number digit in ASCII

The status code in this case is a fee or peg count. This is the one exception to the length of the status code, being 4 bytes instead of 2.

If the system does not receive a proper acknowledgment from the PMS, it generates a hotel log indicating the PMS is out of order. When the PMS is out of order, the system generates occupancy logs for every check in and check out operation. See Occupancy Logs.

Maid Status Message

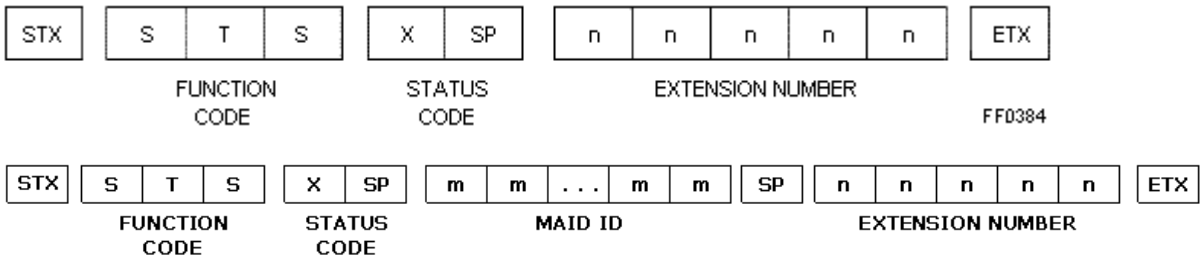
The Maid Status message is sent to the PMS whenever the Room Status Condition attribute is modified. The Maid dials a Feature Access code and a new Maid Status code from a hotel extension. The attendant can also change the Room Status Condition from the console, and automatic updates can be done via CDE or ESM. The updates will also be sent to the PMS system.

If Suite Services is used, Maid Status messages can be invoked using any suite telephone and are applied to the Suite Pilot number.

The Maid Status can have two formats. The new format supports Maid ID codes, and is an extension of the existing Maid Status message. It is up to the hospitality vendor to supply the necessary PMS handling for this message format. The two implementations are mutually exclusive so that only one Maid Status can be operational at any one point in time. If the handling has not been updated to support the new format, then the PMS should NAK the Maid Status message. The system will therefore continually have the Maid Status requests queue up.

Note: While the PMS is in recovery mode, the system will queue up notifications to the PMS, in particular the last entered Maid Status is

The Maid Status Message can have one of the two following formats:



where:

- **X** is the maid status code in ASCII (See Below)
- **SP** is the ASCII space character
- **m** is the 12-digit ASCII character Maid ID code
- **n** is the station number digit in ASCII

The Feature Access code that is dialed by the Maid changes the condition attribute of the Room Status as stored in the database of the system; it never changes the occupancy. When a Feature Access code is dialed, the system sends both a Function and Status code to the PMS, and the PMS should interpret the codes in the following way:

Maid Status Code	Room Condition
1	maid present
2	clean
3	not clean
4	out of service
5	to be inspected
6	Occupied/Clean
7	Occupied/Not Clean
8	Vacant/Clean
9	Vacant/Not Clean

Maid Status codes 1 to 5 would typically be used by a hotel which does not use a PMS interface. Here, the Maid, or Room Supervisor would enter the appropriate code to update the system database. Maid Status codes 6 through 9 would typically be used by a hotel that uses a PMS. To ensure proper use of the codes, program the PMS to accept these messages and to produce a discrepancy report when one exists between the occupancy status as indicated by the Maid Status code and the actual occupancy as stored on the PMS database.

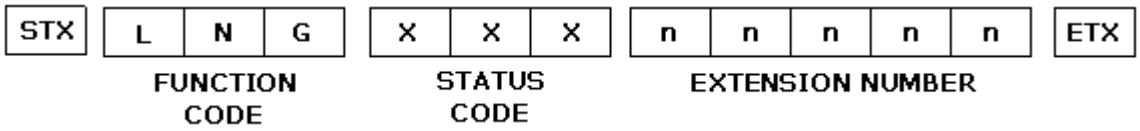
For example, a Maid cleans a room and notes that there are no signs of the guest still occupying the room. She enters the Maid Status Feature Access code and dials 8, indicating that the room is now vacant and clean. However, the PMS notes that the guest room is still

occupied. At this point a discrepancy report is output from the PMS notifying the hotel personnel.

Note: Maid Status codes do not change the occupancy as stored in the database of the system. These Status codes result in a message being sent to the PMS, and are used to indicate what the Maid believes the occupancy status of the room is.

Language Status

The Language Message supports multiple languages so that the PMS can select the language of a device. The Language Status message has the following format:



where:

- **X** is the language status code in ASCII (see below)
- **n** is the station number digit in ASCII

The language status code is padded with spaces on the right. The following languages and their corresponding codes are supported:

Language Code	Language
0	English
1	French
2	German
3	Latin American Spanish
4	Brazilian Portuguese
5	Dutch
6	Italian
7	Romanian
8	Portugal Portuguese
9	European Spanish
10	Russian
11	Swedish
12	Polish
13	Simplified Chinese
254	Local 2
255	Local 1

VIP Status

The VIP Status message supports the PMS selecting the VIP identifier of a device. The VIP Status message has the following format:

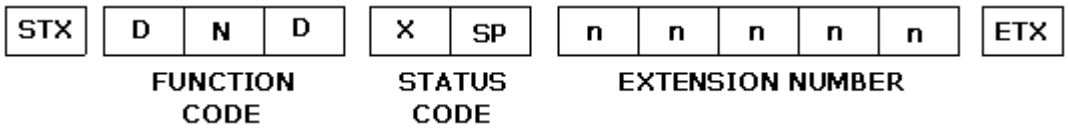
where:

- **X** is the VIP status code in ASCII; 0 indicates the VIP setting is off and 1 indicates that the setting is on
- **SP** is the ASCII space character
- **n** is the station number digit in ASCII

The VIP Status message is only valid for Hotel Room Extension not in a Suite (HRENIS) or Suite Pilots (not suite extensions or linked suites). Any existing (non-expiring) wakeup calls will be modified to become a Personal wakeup.

Do Not Disturb (DND) Status

The Do Not Disturb (DND) Status message supports the PMS adjusting the DND status of the guest room. The message has the following format:



where:

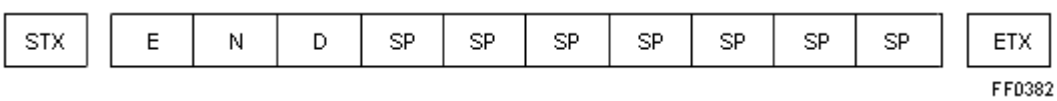
- **X** is the DND status code in ASCII; 0 indicates the DND setting is off and 1 indicates that the setting is on
- **SP** is the ASCII space character
- **n** is the station number digit in ASCII

General Reset

This message is sent by the PMS to indicate that it is beginning a database swap or general reset cycle. During this cycle the PMS will reset the system database to match the PMS's database. See PMS Recovery from Failure section below.

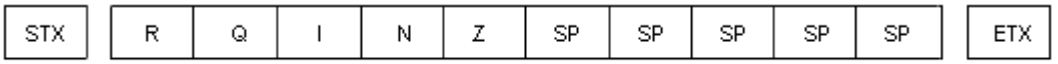
End (message used to indicate the end of the general reset process)

This message is sent by the PMS to end the GRS cycle. See PMS Recovery from Failure section below.



Request To Initialize

This message is sent by the system to recommend the PMS initiate a GRS cycle. This will be sent to the PMS only after a reboot of the system following the first communication from the PMS. See PMS Recovery from Failure section below.



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PMS/System Transmissions

System to PMS Transmission

The system sends an ENQ character to the PMS and awaits a reply.

- If no response is received within the time-out period of 3 seconds, the ENQ is retried 20 times before abandoning the transmission of the message (a total of 21 times and an elapsed time of 1 minute and 3 seconds). The system generates a hotel log and an alarm indicating the PMS is down. The request is held until the PMS recovers. The system then attempts to re-establish communication by sending an ENQ every three seconds. When the PMS is able to respond with an ACK (acknowledgment), the system generates a Hotel PMS log for PMS is up.
- If a NAK (negative acknowledgment) character is received by the system, the PMS is deemed operational but busy with another task and cannot accept additional requests. The ENQ is retried every three seconds until the PMS responds with an ACK or there is a 3 second timeout.
- If an ACK is received within three seconds of an ENQ, the transmission continues with the request.

The system sends a start-of-text (STX) character, the message text, and an end-of-text (ETX) character to the PMS. It then awaits an ACK from the PMS.

- If no response is received within the time-out period (3 seconds) the entire sequence, beginning with the ENQ, is retried 5 times (for a total of 6 attempts and an elapsed time of 18 seconds) before abandoning transmission. The system generates a hotel log and an alarm to indicate that the PMS is down. The system then attempts to re-establish communication by sending an ENQ every three seconds. When the PMS is able to respond with an ACK (acknowledgment), the system generates a Hotel PMS log for PMS is up.
- If a NAK is received, the complete sequence beginning with ENQ is retried 5 times before abandoning transmission. The system then generates a hotel log to indicate that the PMS refuses to accept the transaction. The transaction is then given up and discarded as the system assumes that the message was invalid. The system proceeds to send the next transaction starting with the ENQ.
- If an ACK is received, transmission is completed successfully. The system proceeds to send the next transaction starting with the ENQ.

Note: If the system determines the PMS link is down, an alarm is raised and presented on the console, along with a hotel log. If no console exists, only a hotel log will be issued.

PMS to System Transmission

The PMS sends an ENQ character to the system and awaits a reply. After receiving an ENQ character from the PMS, the system responds within 3 seconds with either an ACK or a NAK. The PMS must wait at least 3 seconds for a reply.

- If no response is received within the time-out period of 3 seconds, the ENQ should be retried up to 19 times (with a 3 second timeout each retry) before abandoning the transmission of the message (a total of 20 attempts and an elapsed time of 1 minute). No

other message can be sent to the system while the PMS waits for a response from the system. If no response is received after 20 retries, a network or system error is likely the cause. Check for alarms and logs to ensure the system is operational.

- If a NAK is received, the system is indicating that the system is busy. The PMS must delay for 3 seconds and the ENQ must be retried 19 times before abandoning the transmission of the message (for a total of 20 attempts). The system does not generate a log for this condition.
- If an ACK is received, the ENQ was successful and the PMS can continue its transmission with the request.
- If an ENQ is received, a glare condition is being encountered. See below for glare handling.

After sending the ACK, the system is immediately ready to receive the STX, message text, and ETX. The system must receive this message within three seconds. If no message is received by the system within the three seconds timeout, the ENQ sequence must be restarted by the PMS.

Upon receiving the STX message, the system responds within three seconds with either:

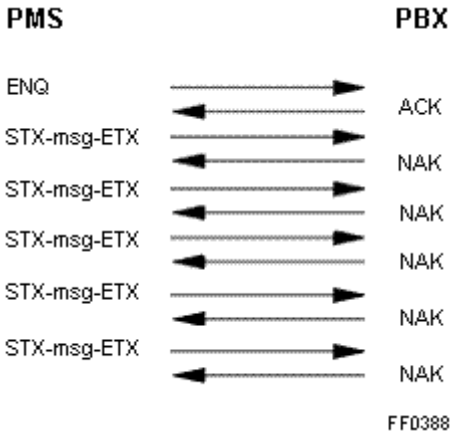
- ACK indicating the transmission was successful, and all of the message fields are valid. The operation will be executed by the system. If the operation itself is unsuccessful, a Hotel Log will be generated.
- NAK indicating that there was an error in either the transmission itself, in one of the message fields, or in the syntax of the message, Within 3 seconds of the NAK, the PMS is able to retry sending the message transmission (STX, message text and ETX) without retransmitting the ENQ. The sequence can be repeated 5 times following the initial message for a total of 6 attempts. Hotel Logs and system logs should be checked for error reason. Any further requests require a new ENQ.

If the cause for the NAK is an error, the system generates a hotel log indicating this error on every NAK.

Note: It is possible that due to network and system delays the message was not received by the system within its three second window. In that case, retries will all be NAKed since the system will be expecting a new ENQ.

- If no response is received by the PMS after 3 seconds, it must be assumed that a message was lost or that there is a system or network error. Logs and alarms should be checked. Further communication with the system must resume with an ENQ.

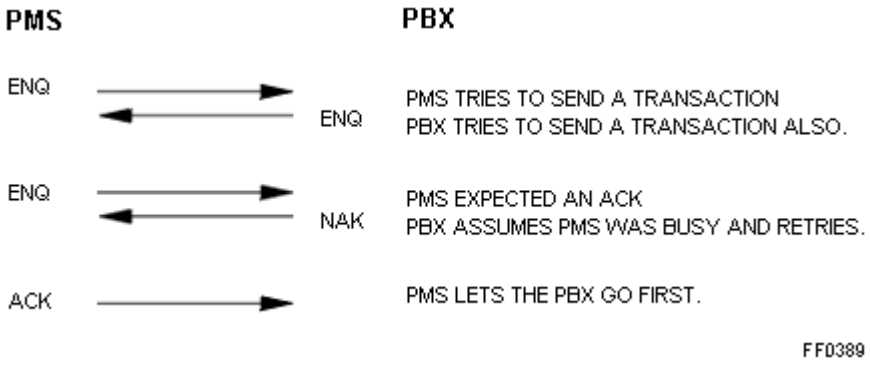
The following example illustrates a PMS transaction retry:



The PMS then discards the transaction. The PMS should log this failure.

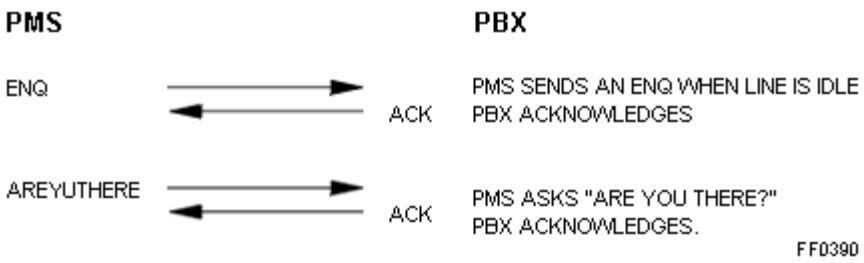
Glare handling: If the PMS and system both want to send a transaction at the same time, the PMS always permits the system to go first. This condition is indicated when the PMS receives an ENQ message while waiting for a response to its own ENQ message. In this case, the PMS must back off from initiating further transmission (including retries) for a period of 6 seconds. The PMS should expect an ENQ. Any other message from the system can be ignored. If the 6 second timer expires, the PMS must restart its original transmission beginning with the ENQ.

For example:



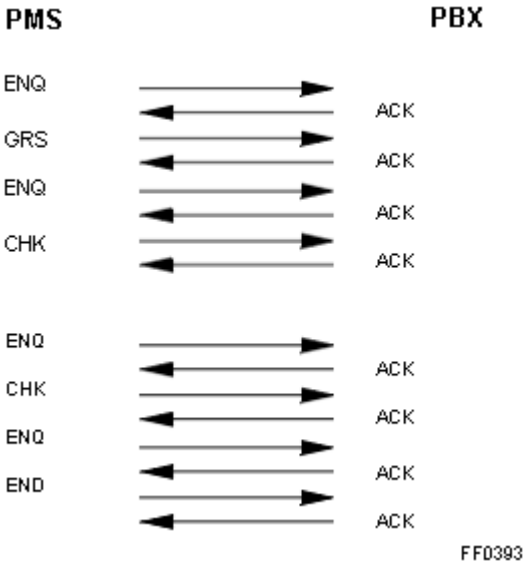
After the system is finished, the PMS must restart its original transmission beginning with the ENQ.

When the communication link is not busy between the two machines, the PMS may periodically send an ENQ to ensure the system is still up and functioning correctly. The system will reply with an ACK or NAK within three seconds. If the system replies with a NAK, the same retry sequence described above may be attempted. If the system replies with an ACK, the PMS must send an AREYUTHERE message. The system is expected to reply with an ACK within three seconds. For example:



The GRS Cycle

A GRS cycle is a sequence of messages initiated by the PMS to update the System database to match that of the PMS. The GRS message signals to the system that a sequence of Check in/out messages will be sent to the system concluding with a GRS END message. During the GRS cycle, any message initiated by the system (ie. Maid Status, Message Waiting, Alert, Message Registration) will be queued until the completion of the GRS cycle.



The PMS initiates the GRS cycle by sending an ENQ messages followed by a GRS message. The regular PMS to System handling for this message occurs including any timeout/retry handling. Upon receiving the GRS message the system will create a Hotel Log indicating that a GRS Message is Received. In 3300 Release 8.0 or greater, the GRS message is also forwarded to all the hospitality ICPs in the cluster so that all ICPs can act on the message. (In SX2000 or 3300 prior to Release 8.0, only the node connected to the PMS will act on the message.) The PMS is immediately sent a response. Each ICP that receives this GRS message will perform the necessary system action.

The system(s) that receive the GRS message will:

- Create a cache (in memory) for all the rooms to indicate that all the rooms are to be considered checked in.
- Provide a response to the Hospitality Gateway to indicate the memory was allocated properly.

Failures:

- A failure to distribute the GRS message to the necessary ICPs and receive its response within 10 seconds will result in the GRS cycle being abandoned.
- A failure to allocated cache memory in any of the hospitality nodes will result in the GRS cycle being abandoned.

In 3300 Release 8.0 and later, abandoning the GRS cycle simply clears the cache and no further database updates related to the GRS cycle are performed. A hotel log is generated for this case. The system remains in GRS mode and the PMS is not notified of this failure and any subsequent check-in/out messages will not be acted upon by the system until the system returns to normal mode. In SX2000 or 3300 Release 8.0 or earlier, abandoning the GRS cycle means that the system will update the database according to the GRS data for all the rooms that it has received so far.

 **Note:** If a system receives the GRS message when a GRS cycle has already been started, then the system will reinitialize its cache.

The PMS continues the GRS cycle by sending ENQ followed by check-in/out requests to the system. The regular PMS to System handling for this message occurs including any timeout/retry handling. During the GRS cycle only check-in/out messages are expected from the PMS. The PMS can send check-in/out status to indicate the occupancy status of each guest room. In a clustered environment (3300 Release 8.0 or greater), the check-in/out message is also forwarded to the hospitality ICP that hosts the guest room. The PMS is immediately sent a response. Each ICP that receives this GRS check-in/out message will perform the necessary system action.

The system(s) that receive the check-in/out message during the GRS cycle will:

- Update the cache to reflect the status from the PMS.
- Provide a response to the Hospitality Gateway to indicate that the memory was updated properly.

Failures:

- A failure to distribute the check-in/out message during the GRS cycle and receive its response within 10 seconds will result in the GRS cycle being abandoned.
- A GRS check-in/out message must be received within 20 seconds of the previous GRS check-in/out message or the GRS message. Otherwise a timeout of the GRS cycle will occur, and the GRS cycle will be canceled and the system returns to normal mode.
- A GRS check-in/out received without being able to allocate the GRS cache is a failure, and will result in the GRS cycle being abandoned.
- In SX2000 or 3300 Release 8.0 UR3 or earlier, if a check-in/out message specifies a non-guest room, then the GRS cycle will be abandoned.
- In 3300 Release 8.0 UR4 or later, if a check-in/out message specifies a DN that the hospitality gateway does not recognize as a guest room, then this transaction is logged, but the GRS cycle continues. If the check-in/out message specifies a DN that is a guest room on the hospitality gateway but not a guest room on the hospitality ICP, then the transaction is logged (at the hospitality ICP) and the GRS cycle is abandoned.

- Any other messages received by the system during a GRS cycle (e.g. Name) will result in the system canceling the GRS cycle, and acting on the received message. The system returns to normal mode.
- Any error distributing a GRS message to a hospitality ICP will result in the GRS cycle being abandoned.

Canceling a GRS cycle results in abandoning the cycle and returning to normal operation mode. The next request will be processed as outside the GRS cycle.

Note: Check-in/out's should be performed on guest rooms, and not suite members.

The PMS terminates the GRS cycle by sending an ENQ messages followed by an END message. The regular PMS to System handling for this message occurs including any timeout/retry handling. This END message is used by the system to indicate that the PMS is attempting to finish a GRS cycle. A Hotel Log is created indicating that a GRS Message is Received. In a clustered environment (3300 Release 8.0 or greater), the END message is also forwarded to all the hospitality ICPs in the cluster. The PMS is immediately sent a response. Each ICP that receives this END message will perform the necessary system action.

The system(s) that receive the END message during the GRS cycle will:

- Attempt to lock its database, The system will only continue to the next step once the database is locked. If it cannot lock the database (possibly due to a database write by another process), it will retry the lock again in 5 seconds. The system must lock the database to ensure data consistency and therefore will attempt the lock forever with a 5 seconds in between each attempt.
- Once the database is locked, the system will compare the data in the database, and the value in cached memory and perform the necessary actions for all rooms.
- If the database indicates that a room is checked in and the cache indicates the room is checked-out, then the room is checked-out.
- If the database indicates that a room is checked out and the cache indicates that the room is checked-in, then the room is marked as occupied. A check-in operation is not performed.
- NOTE: If the room is checked-in via a GRS cycle, only the occupancy is changed to occupied. Other hospitality data will be left intact. If the room is checked-out via a GRS cycle, then the all the regular database updates done upon a regular check-out are also done.
- The hospitality ICPs will provide a response to the Hospitality Gateway to indicate that the memory was updated properly.

Failures:

- A failure to distribute the END message during the GRS cycle and receive the responses response within 30 minutes will result in a hotel log on the hospitality gateway indicating that the GRS database updates took too long, and that the databases may be out of sync.
- A GRS END message must be received within 20 seconds of the previous GRS check-in/out message or the GRS message. Otherwise a timeout of the GRS cycle will occur, and the GRS cycle will be abandoned.

- A GRS END message received without ever receiving the GRS message is a failure, and will result in the GRS cycle being abandoned.

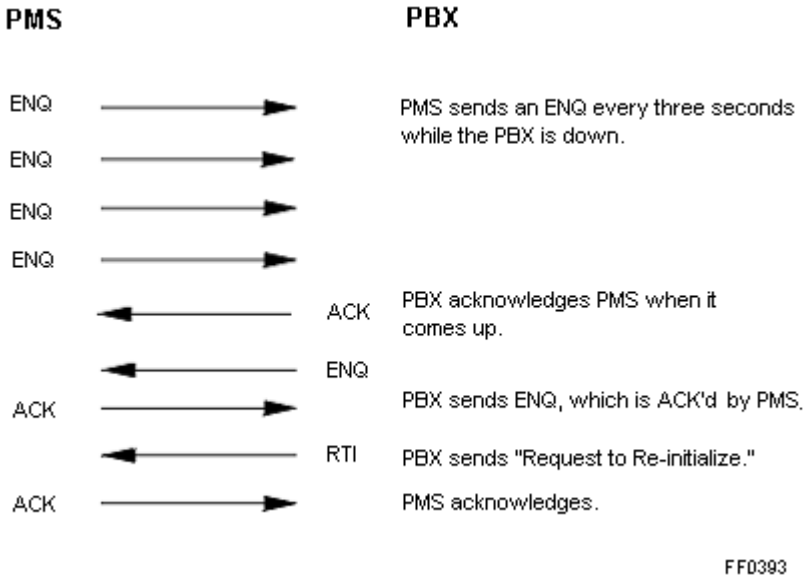
Once the GRS END is received, the Hospitality gateway and ICPs will independently commit their changes to the database. Prior to 3300 8.0 UR4 and in SX2000 all messages from the PMS will be rejected with a NAK during this phase. In 3300 8.0 UR4 and above, messages may be NAKed a number of times but eventually will succeed and will be buffered for processing once the database is again available.

PMS Recovery from Failure

When the System Fails

The PMS can detect a system failure situation when no response is received from the system following the PMS to System ENQ retry sequences described above. Once this failure has been detected, the PMS should periodically send ENQ messages to the system. While the system is down, these messages will time out indicating that the system is still not available. When the system comes up from a reboot, it does not send any messages until it receives an ENQ from the PMS.. The system queues its own transactions while waiting for the PMS to send an ENQ.

Once the system receives its first ENQ message from the PMS, the system will initiate the RTI sequence which begins with an ENQ to the PMS followed by the RTI message. If no RTI sequence is received by the PMS, the PMS can resume normal operation.



At this point, the PMS can either:

- Honor the RTI by sending a General Reset (GRS) message to the system
- NOT honor the RTI and simply send any applicable messages to the system

Case 1: Honoring RTI

Honoring the RTI involves invoking the complete GRS cycle. The GRS cycle ensures that the system database reflects the PMS database.

Case 2: Not Honoring RTI

Following the RTI message, the system will set a 2 minute timeout waiting for a GRS cycle to begin. The PMS may decide not to honor the RTI by simply resuming normal operation. During this two minute period the system will not initiate any messages (ie. Maid Status, Message Waiting, Alert, Message Registration) to the PMS and instead these will be queued for later delivery If no GRS message is received within the two minute period, the system will begin sending its own messages, including those queued up during the two minute period.

When PMS Fails

When the PMS is down, the system is able to track trunk calls, using SMDR, as well as using the Hotel/Motel feature package.

Prior to 3300 R8.0 and in the SX2000, the changing of Maid Status (Room Status Condition) must be monitored using the system operator console and the Hotel/Motel feature package. The system keeps a transaction buffer with the ability to store a maximum of 100 transactions. A transaction may either be for Message Registration or Maid Status (Room Status Condition). In the system database, information on Room Status Condition and on Message Registration is also maintained.

In 3300 R8.0 and above, a buffer exists for every room in the system and an up-to-date status of the room is maintained including Maid Status, Message Waiting Indicator, Credit Limit alert, and accumulated meter pulses.

While the PMS is down, the system will create a hotel log indicating the PMS is down

The system determines that the PMS is down when no transaction acknowledgment is received for a system initiated message within the 1 minute timeout period (20 tries every 3 seconds). It continues to send an ENQ every three seconds until the PMS recovers, and sends an ACK.

When the PMS system returns to service, the system creates a hotel log indicating the PMS has returned to service. All buffered messages are sent to the PMS via normal protocol.

The SX-2000 system maintains the PMS link over an activity switch.

Maintenance

If there is a fault with the PMS link, the PMS/system interface software sends a message to the maintenance software. The maintenance software responds by making entries in the Maintenance Log and raising an appropriate alarm.

PMS Logs

The system produces two types of PMS logs:

- PMS Failure logs
- Occupancy logs

PMS Failure Logs

The system produces PMS Failure Logs if the PMS/system interface fails for any reason.

If the PMS/system interface is defined but unavailable, the attendant console displays the following message:

PMS FAILURE

Note: If call blocking is enabled, the PMS FAILURE message appears but the CALL BLOCK ON message will not be displayed.

The PMS Failure Log has the following format:

yyyy-mmm-dd hh:mm:ss HOTEL x/v #eeee

PMS: CC SSSSS

Where:

- **yyyy-mmm-dd** is the date of the event
- **hh:mm:ss** is the time the event occurred
- **x** is the control plane which issued the log
- **v** is the activity status (inactive or active)
- **eeee** is the position of this event in the hotel log
- **SSSSS** is the extension number (or Suite Pilot number) sent by the PMS
  Note that the extension number can be up to 7 digits in length.
- **CC** is a comment which can be one of the following:
  - Returned to service
  - Out of service
  - TXN buffer full
  - Interface never came up
  - Cannot Send MSG to PMS
  - No START-OF-TEXT from PMS
  - No END-OF-TEXT from PMS
  - Invalid Function Code
  - Invalid Status Code
  - Invalid Room Number

- Invalid Name
- Invalid Affiliation
- Invalid Location
- Invalid Message Waiting
- Invalid Wake-Up Time
- GRS Message Received
- END Message Received
- GRS Mode Abandoned
- Database Locked By Another User
- Invalid Room COS
- RQINZ Not Honored

Occupancy Logs

If PMS is enabled, the system does not generate occupancy logs. If the PMS link becomes unavailable, occupancy logs will be generated for every check in and check out operation which occurs.

Occupancy Logs have the following format:

yyyy-mmm-dd hh:mm:ss HOTEL x/v #eeee

OCCUPANCY: CC NAME ROOM CALLS METERS

Where:

- **yyyy-mmm-dd** is the date of the event
- **hh:mm:ss** is the time the event occurred
- **x** is the control plane which issued the log
- **v** is the activity status (inactive or active)
- **eeee** is the position of this event in the hotel log
- **CC** is a comment which is one of the following:
  - Chk In (indicates room or Suite checked in)
  - Chk Out (indicates room or Suite checked out)
- **NAME** is the name of the person checking out
- **ROOM** is the room or Suite number
- **CALLS** is the number of outside calls made
- **METERS** is the number of meter pulses recorded.

Maintenance and Software Logs

Maintenance Logs

Maintenance Logs are used to record all maintenance-related information, including anything that affects the functioning or capacity of the system in any way. The logs can be viewed as

- All: Shows all the maintenance log entries
- Error: Shows log entries that caused an error on the system
- Warning: Shows log entries from the system that could cause an error
- Info: Shows logs that give specific information.

Software Logs

Software Logs are used to record unusual activities within the system. They can be viewed as

- All: Shows all the software log entries
- Error: Shows log entries that caused an error on the system
- Warning: Shows log entries from the system that could potentially cause an error
- Info: Shows general information logs that have no potential to cause an error.

Logs Connectivity

Maintenance Logs

Maintenance logs are obtained via port 1751. Note that there is a maximum of three connections per system application.

Software Logs

Software logs are obtained via port 1750. Note that there is a maximum of three connections per system application.

Maintenance and Software Logs Format Specifications

For log format specifications details, refer to Appendix B: Maintenance Logs in this guide.

Appendix A: Automatic Call Distribution II

ACD II Concepts and Terminology

ACD Call

An ACD call is an incoming call destined to an ACD path of agent groups.

ACD Caller

A caller becomes an ACD caller after successfully entering an ACD path and remain so until the call is interflowed out of the path, transferred to an non-path destination, or transferred to an extension that has no logged in agent.

ACD Path

An ACD path is a directory number-based service that guides an incoming call through a list of ACD agent groups.

Active Agent

An active agent is one who can take incoming ACD calls. An agent is considered "active" when

- logged in
- not in make busy
- not in DND
- the agent's work time is inactive
- idle.

Agent

An agent answers incoming ACD calls. Agents are specially trained to deal with the caller's requests.

Agent Group

An agent group is made up of ACD agents who can be grouped according to their line of business. Each agent group has its own unique identification number. Up to four agent groups can be programmed in an ACD path.

Networked ACD

Incoming calls are simultaneously queued against local and/or remote agent groups within a path. This allows multi-site customers to design call routing schemes that take advantage of, and optimize, their call handling resources.

Silent Monitoring

In order to monitor the quality response of an agent, supervisors can listen to calls answered by an ACD agent or agent group.

Silent monitoring is not permitted on a non-prime line, and is not supported on MSDN networks.

Skills-Based Routing

In ACD II Skills-Based Routing, each agent in an agent group is assigned a skill level. Agents who appear in more than one group may be assigned a different skill level in each group. Calls to a group are routed to the most skilled available agent. If agents of equal skill are available, the call is routed to the longest-idle agent.

Supervisor

A supervisor normally oversees ACD operation by monitoring agent activity, reassigning agents to handle overload conditions, and dealing with any unusual situations that arise. This position is not considered a separate entity by the system.

Unavailable Agent Group

An agent group is considered unavailable when it is in Do Not Disturb mode or has no agents logged in.

ACD 2000 Call Distribution Model

ACD Path

The ACD II feature package is built around the ACD Path, a flexible call routing method that provides the information required for handling incoming calls. When calls enter ACD, they are routed through ACD paths. The ACD path controls the resources used, the order in which resources are encountered, and the timing of the steps. Calls are queued for an agent group based on the call priority, and order of arrival at that path. Queuing is the same as for new calls and overflow calls. If an agent group is not available, new calls are not queued for that group.

Path Priority

Each ACD path is assigned a priority from one to 64. A call to a path adopts that path's priority. This allows incoming calls to be directed based on their importance and expense.

A call's priority may change if an interflow occurs.

Path Unavailable

When a path is unavailable, calls can be routed to a path unavailable answer point such as an attendant, voice mail, recorded announcement, another ACD path or a system speed call number. This allows the supervisor the choice of where to send calls received after hours or during holidays.

An ACD path becomes unavailable in the following situations:

- the path directory number is remotely placed in do not disturb (DND) mode.
- the primary and all programmed overflow agent group directory numbers are remotely put in DND mode.
- all members of all agent groups in the path are logged out.
- a combination of events in which all agent groups are either in DND mode or have no agents logged in

When a path is unavailable, calls can be routed to a path unavailable answer point. The path unavailable answer point can be

- an attendant or valid extension (display set, non-display set, auto attendant, or night bell)
- a voice mailbox
- a RAD
- another ACD path
- a system speed call number.

Agent Groups

ACD paths define a primary agent group and up to three overflow groups to answer incoming calls. Agent groups can appear in one or more paths. Up to four agent groups can be programmed in an ACD path.

Unavailable Agent Group

Calls that are directed to an unavailable agent group are prevented from being queued. An immediate overflow is attempted. If all agent groups are unavailable, then the path is unavailable and "path unavailable" handling is used.

Interflow

Interflow is a timed-based or load-based feature that takes an ACD call out of the path and routes it to the interflow answer point (if one is programmed). A call that interflows to another path adopts the priority of the new path if

- the new path has "Interflow To This Path Uses This Path Priority" set to "Yes" in its Path Assignment form
- the call interflows from a path that has a priority of 64.

Otherwise, the call's priority does not change.

Overflow

A path contains one primary agent group and can have up to three overflow groups. This provides backup resources to the primary agent group to ensure that service level goals are met. Calls that overflow maintain their position in queue. Group overflow timers determine how long a call waits before overflowing.

Predictive Overflow

Predictive overflow determines whether a newly-queued call to an agent group should be immediately overflowed or sent to the next agent group. The average call duration is based on the average agent talk time, including the work timer. If the system predicts that a call will not be answered before the overflow timer expires, the system places the call in overflow before the timer expires.

Interconnect Restriction

If an interconnect restriction exists between the caller's station or trunk and members of an ACD group, the call waits in queue like any other call. When an agent is ready to service the call, the call is dequeued from the path and forwarded to the destination designated in the Intercept Handling Assignment form. If no alternate directory number is provided, the caller hears reorder tone.

Agent Identification Numbers

Each ACD agent is given a unique agent identification (ID) number. The agent ID number is similar to a telephone directory number and can be assigned a name in the telephone directory.

The number of agent appearances (the number of groups that an agent can appear in) is determined by the MITEL Agent ID Capacity Level (MAIACL). The number of agent appearances provided by the MAIACL level determines the total number of agent ID numbers that can be programmed.

Maximum Number of Agent Appearances	Total Number of Agent Identification Numbers
2	1890
4	1575
8	1181

Call Flow

ACD calls to a group are routed to the longest-idle agent. Idle time is calculated from completion of an agent's last ACD call. Non-ACD calls are not considered.

A caller never receives busy tone from an available path. A caller who enters an ACD path hears a ringback tone while the system searches for an available agent. An incoming ACD call is handled as follows:

- the caller receives a ringback tone.
- the RAD timer starts.
- the interflow timer programmed in the path starts.
- the overflow timer for the primary group in the path starts.
- the call goes to the longest idle agent

The caller connects to the agent when the agent answers the call. When no agent is available, the caller is automatically queued to the primary agent group in the path. In both cases, the caller's communication path remains unaffected and the caller remains listening to

its tone or RAD. The caller receives ringback tone until the first RAD answers, an agent answers, interflow occurs, or the caller hangs up. ACD Call Progress - All Agents Busy shows the ACD path progress when all agents are busy.

Agent No Answer Call Handling

An agent who fails to answer a call within a programmed amount of time is automatically logged out of ACD. The call is requeued as the oldest call in the queue, to all of the agent groups prior to the call offer to the agent.

When the "ACD 2000 Logout Agent No Answer" COS timer expires, the following events occur:

- The caller is automatically requeued into all agent groups the caller was previously in as the oldest call within its priority.
- The agent is logged out.

Note: If the "Auto Logout Last Agent No Answer" system option is set to "no", the caller will not be requeued when the "ACD 2000 Logout Agent No Answer" timer expires. Instead, the caller continues to hear ringback tone, recordings, music, or silence until the agent answers, the caller hangs up, an overflow or an interflow occurs.

Dial out of Queue

Callers in an ACD path can dial out during or between RAD messages, if they cannot hold for an agent to answer, or if they want to change their current action. The business is not lost because the caller does not leave the ACD path.

Note: Sufficient DTMF Receivers must be available to handle the extra demand generated by this feature. The number of DTMF Receivers required is dependent on several variables including:

- the number of available trunks
- the volume of calls
- the length of each RAD message

Note: The extra demand generated by this feature can be minimized by providing dial out capability during the first RAD message only in the Path Interflow Dialing List Assignment form.

ACD 2000 Voice Announcement Capabilities

Recordings

An ACD path can define up to four recorded messages (specific RADs or groups of RADs) and their relative start times for callers waiting for an agent to answer. The path also specifies whether the programmed recording is repeated and its repeat interval.

Music between Recordings

Between each recording (RAD) on an ACD path, the incoming caller, by default, listens to the system music source (if programmed). An alternate music source may be specified between each recording and after the last recording.

Note: If a call from a remote switch is answered by a RAD before being queued to an ACD path, the caller will not hear music unless there is a Music on Hold source at the local switch.

Alternative Recording Device (ARD)

The Alternative Recording Device (ARD) is an off-hook ONS port that connects to callers in a listen-only conference. The user decides what is supplied on the ONS port - silence, music, or endless loop recordings. When ARDs are made available, callers hear ARDs between RAD messages. If ARDs are not available or if an ARD becomes unavailable when callers are connected to it, callers hear either Music On Hold, or silence if Music on Hold is not available.

The Path Assignment form can be programmed to provide the same alternative recording between each announcement or as many as four different alternative recordings -- one between each recorded announcement. There are no restrictions on how paths share ARDs.

An ARD can be a telephone, or a recording or transfer device (8/600 ohms) that simulates an off-hook device and allows for the connection of an audio source such as a radio. The system connects callers only if the device is off-hook.

Attempts to directly dial, forward to, transfer to, or system reroute to an ARD result in the message "INVALID DIALING" on display sets and/or a reorder tone. Attempts to program call forwarding to an ARD result in the message "NOT ALLOWED" on display sets, and/or a reorder tone.

Note: An ARD should not be used as a first-level announcement (Music on Hold, for example).

Note: Depending upon country of installation, the ARD must be either an FCC Part 68 or DOC approved voice coupler or voice connecting arrangement to an ONS circuit.

Appendix B: Maintenance Logs

Maintenance Logs Format Specification

All significant system events, including faults, failures, and alterations, are logged automatically in the Maintenance Log. The Maintenance Log can be reviewed from the Maintenance Terminal or printed.

To view the Maintenance Log, use the LOGSYS READ command.

To print the Maintenance Log, use the LOGSYS PRINT command.

Log Message Header

The log message header line is the first line in any log message and contains the following information:

- Time and Date of event
- Application (MAINTENANCE)
- Plane identification (A or B)
- Alarm Manager (ACTIVE or INACTIVE)
- Current system alarm state. One of the following:
  - no alarm : - Info –
  - minor alarm : * Minor *
  - major alarm : * Major *
  - critical alarm : * Critical *
- System name (programmable in CDE)
- Note that the log header lines which form part of the log messages in this document are examples only.
- Maintenance Log Entry Number (sequence number).
- This allows maintenance personnel to keep track of the sequence of printed log messages during an activity switch.

Activity Switch Reports

Activity Switch - Main Control

The first line in the activity switch report indicates which plane (Active or Inactive) underwent the activity switch. Activity Switch reports for the Main Control indicate whether the information is VALID or STALE. A STALE report indicates that the information is old and should be considered historical in nature. The following example describes a VALID activity switch on the Active plane.

Full Message Format:

1991-MAR-21 10:08:29 MAINTENANCE A/Active -Info- SYSTEM001 #0002
VALID Activity Switch postmortem information follows
The Activity Switch of the Active plane was due to
the ACTIVITY SWITCH being called.
ACTIVITY SWITCH to <card name> <card location> from <card name> <card location>
System Action - (see Activity Switch - Main Control Reports)
The reason(s) for the switch attempt:
(see Activity Switch Reasons)

Activity Switch - Main Control Reports	
System Action	**Notes/Action Required**
Was IGNORED because activity freeze was enabled.	The attempted Activity Switch was not performed because the ACTIVITY FREEZE switch was enabled. Find out why the ACTIVITY FREEZE was enabled and disable it, if appropriate. Switch activity if necessary. **Note:** Do not switch activity unless: a) the inactive mate plane is fully operational b) the redundant file system is “In synch” as seen from both planes. Failure to meet the above requirements before switching activity may result in loss of telephone service.
Was programmed but ABORTED due to mate plane fault	See Activity Switch Reasons.
Was SUCCESSFUL	See Activity Switch Reasons.
Was UNSUCCESSFUL	See Activity Switch Reasons.

Activity Switch - All Other Card Types

Full Message Format:

1991-MAR-21 10:08:29 MAINTENANCE A/Active -Info- SYSTEM001 #0002
ACTIVITY SWITCH to <card name> <card location>
from <card name> <card location>
System Action - (see Activity Switch - All Other Card Types Reports)
The reason(s) for the switch attempt:
(see Activity Switch Reasons)

Activity Switch - All Other Card Types Reports	
Activity Switch	**All Other Card Types Reports**
Was IGNORED because activity freeze was enabled	The attempted Activity Switch was not performed because the ACTIVITY FREEZE switch was enabled. Find out why the ACTIVITY FREEZE was enabled and disable it, if appropriate. Switch activity, if necessary. **Note:** Do not switch activity unless a) the inactive mate plane is fully operational b) the redundant file system is “In synch” as seen from both planes.

Activity Switch - All Other Card Types Reports	
Activity Switch	**All Other Card Types Reports**
	Failure to meet the above requirements before switching activity may result in loss of telephone service.
Was programmed but ABORTED due to mate plane fault	See Activity Switch Reasons.
Was SUCCESSFUL	See Activity Switch Reasons.
Was UNSUCCESSFUL	See Activity Switch Reasons.

Activity Switch - Programmed

Full Message Format:

1991-MAR-21 10:08:29 MAINTENANCE A/Active -Info- SYSTEM001 #0002
System Action - (see table)

Activity Switch - Programmed	
System Action	**Notes/Action Required**
The PROGRAMMED ACTIVITY SWITCH sequence has ABORTED	Inspect the Maintenance Logs for an 'Activity Switch ABORTED' message.
The PROGRAMMED ACTIVITY SWITCH sequence has STARTED	None. This is for information purposes only.
The PROGRAMMED ACTIVITY SWITCH sequence has STARTED	None. This is for information purposes only.

Activity Switch Reasons

The following table summarizes possible reasons for activity switches.

Activity Switch Reason	Explanation/Action Required
Cause is unknown	The plane became Active but the newly inactive plane gave no reason for transferring activity. Could have been caused by a Restart of the other plane. Inspect other plane's Maintenance Logs for the appropriate 'Restart' or 'Activity Switch' postmortem report.
Circuit switch control cards missing	Could be a faulty Circuit Switch Processor card or Circuit Switch Matrix card. Also CSM cards may have been programmed but not installed. Run a CONFIG command on slots 21 - 25 and check against installed cards.
Circuit Switch Two-port failure	If the Message Switch/Circuit Switch is requesting booting then replace the Comms RAM card. Otherwise reseat the card not requesting the reboot. If the trouble remains, replace this card.
CTG failure	Hardware problem. Replace the Clock/Tone Generator card.
Database has not yet been downloaded	Wait for inactive side to complete downloading before attempting activity switch.

Activity Switch Reason	Explanation/Action Required
Digital trunk hybrid failure	CEPT or DS1 Dual T1 card problem. Replace the card.
Directed Activity Switch in progress	None. Programmed switch failed because a directed switch was taking place.
Directed from Maintenance Terminal	An activity switch command was entered at the Maintenance Terminal.
Disk interface failure	Examine the Maintenance Logs for further information. Refer to the Mass Storage Subsystem part of the Troubleshoot section, as required.
Double Sanity Timeout on Active Control	Caused by a software failure. If persistent, may indicate problems with the RAM, Main Control Processor, or with the operating software.
File system error threshold exceeded	Examine the Maintenance Logs for further indications of file system problems, and refer to the Troubleshoot section, as required.
Hard-disk faults	Examine the Maintenance Logs for hard disk reports. Refer to the appropriate part(s) of the Troubleshoot section, as required.
Hardware Sanity Bit stuck	Possible hardware problem on Main Controller. Replace Main Control card.
Invoked from Front Panel	An activity switch was initiated from the Maintenance Unit.
Lost CEPT PCM links	Search the Maintenance Logs for indications of Conference PCM Path problems (see Note). Use PCM TOTALS command to verify Link failure. Refer to PCM Communication Paths in the Troubleshoot section, as required.
Lost Conf PCM Links	Search the Maintenance Logs for indications of Conference PCM Path problems (see Note, below). Use PCM TOTALS command to verify Link failure. Refer to PCM Communication Paths in the Troubleshoot section, as required.
Lost Conf Msg Links	Examine the Maintenance Logs for indications of Conference message link problems. Refer to Message Communication Links part of the Troubleshoot section, as required.
Lost DS1 PCM links	Search the Maintenance Logs for indications of Conference PCM Path problems (see Note, below). Use PCM TOTALS command to verify Link failure. Refer to PCM Communication Paths in the Troubleshoot section, as required.
Note: You may search the Maintenance Logs for specific character strings. Enter one of the following: LOGS READ MAINTENANCE NEWEST X MATCH “character string” LOGS READ MAINTENANCE OLDEST X MATCH “character string” LOGS READ MAINTENANCE ALL MATCH “character string” X represents a number of entries. “Character string” may be a date or any other word or word sequence contained in the logs. The character string between quotation marks must appear exactly as it does in the logs.	
Lost DTRX PCM Links	Examine the Maintenance Logs for indications of DTRX PCM Path problems. Use PCM TOTALS command to verify Link failure. Refer to PCM Communication Paths in the Troubleshoot section.

Activity Switch Reason	Explanation/Action Required
Lost Per PCM Links	Examine the Maintenance Logs for indications of Peripheral PCM Path problems. Use PCM TOTALS command to verify Link failure. For more information, refer to PCM Communication Paths in the Troubleshoot section.
Lost Per Msg Links	Examine the Maintenance Logs for indications of Peripheral message link problems. Use the MESSAGE SUBSYS command to verify Link failure. Refer to Main Control Complex in the Troubleshoot section.
Lost Tone Detector PCM Links	Examine the Maintenance Logs for indications of Tone Detector PCM Path problems. Use PCM TOTALS command to verify Link failure. Refer to PCM Communication Paths in the Troubleshoot section.
Lost Tone Detector Msg links	Examine the Maintenance Logs for indications of Tone Detector message link problems. Refer to Main Control Complex in the Troubleshoot section.
Maintenance detected a critical fault	Either a Tone Detector, a Conference card or a circuit on the Main Controller has failed. Examine the Maintenance Logs for problems with the Tone Detector or Conference card or Main Controller circuit. Refer to the appropriate part of the Troubleshoot section.
Mate was not on line	A programmed activity switch on a Peripheral or DSU failed because the redundant mate was not ready. Use CONFIG command to check status of the specified mate.
Message Link failure	A Main Control switch had to be made to regain communication with the peripherals or a DSU. Use MESSAGE SUB command to find faulty links. Also, search the Maintenance Logs for Message Communication Link reports. Refer to Message Communication Link in the Troubleshoot section.
Message Switch Two-port failure	If the Message Switch/Circuit Switch is requesting booting then replace the Comms RAM card. Otherwise reseat the card not requesting a reboot. If the trouble remains, replace this card.
Mtce Panel Link failure	The DX link between the Maintenance Panel and the Main Controller is not operational. Replace the Main Control card. If the fault persists, replace the Maintenance Panel.
Network synchronization failure	The CTG on the active plane cannot “talk” to the sync source but the CTG on the inactive plane can. Could be a message link problem.
No mate acknowledge for Activity Switch	A programmed activity switch on a Peripheral or DSU failed because the redundant mate was not ready. Use CONFIG command to check status of the specified mate.
Partitioned switch	This message can occur for 2 reasons: When issuing a PARTITION command, redundant nodes will switch, if necessary, to align their activity with the main control. When the system is partitioned and activity is switched from the maintenance unit, all redundant nodes will also switch activity to align their activity with the main control. No action is required in either case.
PCM Link failure	Use PCM TOTALS command to verify Link failure. Refer to PCM Communication Paths in the Troubleshoot section.

Activity Switch Reason	Explanation/Action Required
Peripheral switch control cards missing	Programmed switch of the Peripheral Subsystem failed for this reason. Use CONFIG LONG command to verify this.
Programmed Activity Switch	None. Verify Programmed Switch takes place on all nodes.
Process Death Rate threshold exceeded	Software errors, possibly caused by hardware errors. Examine the Maintenance Logs for trouble reports.
Recover lost Peripheral or DSU Msg Links	A Main Control switch had to be made to regain communication with the peripherals or a DSU. Use MESSAGE MAIN command to find faulty links. Also, inspect the Maintenance Logs to find Message Link Integrity reports. Refer to Message Communication Link in the Troubleshoot section.
Recover lost Peripheral or DSU PCM links	Examine the Maintenance Logs for indications of Peripheral PCM Path problems. Use PCM TOTALS command to verify Link failure. Refer to PCM Communication Paths in the Troubleshoot section.
Software initiated switch	The plane gave up activity voluntarily. See other plane's Maintenance Logs for the appropriate postmortem report.
The database files are inaccessible	This is a serious error. Inactive File System is unable to read the database. Perform a DBMS DOWNLOAD and DBMS SAVE procedure. Refer to Maintenance Commands in the Maintain volume for the full procedure.
Tone Generator failure	Examine the status of the Tone Generator. Inspect the Maintenance Logs for further indications of Tone Generator problems, and refer to the Troubleshoot section as required.

Alarm State Change Reports

An alarm log message is generated whenever there is an alarm state change. The meanings of most of the alarm category names are self-evident. For more information on alarm categories, see General Maintenance Information.

No Alarm

Full Message Format:

1991-MAR-21 10:08:29 MAINTENANCE A/Active -Info- SYSTEM001 #0002
Current System Alarm: **NO ALARM** viewed from Active

Action Required: None. The system is currently alarm free and no equipment is out of service.

Minor Alarms

Full Message Format:

1991-MAR-23 11:07:19 MAINTENANCE A/Active *MINOR* SYSTEM001 #0003

Current System Alarm : **MINOR** viewed from Active

Action Required: Examine the Cabinet Fault LEDs on the Maintenance Panels. Determine if any card LEDs are illuminated. For those that are, use the STATE and CONFIG commands to determine if equipment is faulty or if it has been set to MANBUSY. For faulty equipment, refer to the appropriate part of the Troubleshoot volume.

Major Alarms

Full Message Format:

1991-MAR-23 13:18:39 MAINTENANCE A/Active *MAJOR* SYSTEM001#0004

Current System Alarm: **MAJOR** viewed from Active

The reasons for a Major Alarm are listed in the following table.

Major Alarm Reasons	
Reason	**Action Required**
For MAJOR alarms involving the Lines, Trunks and DTMF Receivers	Use the same steps outlined for MINOR alarm conditions.
For MAJOR alarms involving the Power Converters	Examine the log messages for indications of the converter(s) at fault and then refer to the appropriate part of the Troubleshoot section.
For MAJOR alarms involving the Main message links	Use the MESSAGE MAIN command to determine which message links are down. Refer to the appropriate part of the Troubleshoot section.
For MAJOR alarms involving the Mate message links	Use the MESSAGE MATE command to determine the message link state. Refer to the appropriate part of the Troubleshoot section.
For MAJOR alarms involving the SFT Zones	Refer to System Fail Transfer in the Troubleshoot section.
For MAJOR alarms involving plane A or plane B hard disk modules	Refer to Mass Storage Subsystem in the Troubleshoot section.
For MAJOR alarms involving Maintenance Terminal lock-out, or repetitive failures accessing a DISA trunk	Refer to Maintenance Terminal Lock-Out Reports or DISA Call - Repetitive Failures Reports.
For MAJOR alarms involving use of default usernames or passwords	Refer to Maintenance Tools.
For MAJOR alarms involving Emergency Call Notification	Examine the log messages to determine the source of the calls. Refer to Emergency Services Feature Package.
For MAJOR alarms involving the Network Gateway	Refer to Network Gateway Reports and contact Product Support.

Critical Alarms

Full Message Format:

1991-MAR-22 13:18:39 MAINTENANCE A/Active *CRITICAL* SYSTEM001 #0004

Current System Alarm: **CRITICAL** viewed from Active

The reasons for a Critical Alarm are listed in the following table.

Critical Alarm Reasons	
Reason	**Action Required**
For CRITICAL alarms involving the Lines, Trunks and DTMF Receivers	Use the same steps outlined for MINOR alarm conditions.
For CRITICAL alarms involving the Power Converters	Examine the log messages for indications of the converter(s) at fault and then refer to the appropriate part of the Troubleshoot section.
For CRITICAL alarms involving the Main message links	Use the MESSAGE MAIN command to determine which message links are down. Refer to the appropriate part of the Troubleshoot section.
For CRITICAL alarms involving the Peripheral message links	Use the MESSAGE SUBS command to determine which message links are down. Refer to the appropriate part of the Troubleshoot section.
For CRITICAL alarms involving the DSU message links	Use the MESSAGE SUBS command to determine which message links are down. Refer to the appropriate part of the Troubleshoot section.
For CRITICAL alarms involving the Mate message links	Use the MESSAGE MATE command to determine the message link state. Refer to the appropriate part of the Troubleshoot section.
For CRITICAL alarms involving the SFT Zones	Refer to System Fail Transfer in the Troubleshoot section.

Ancillary System Reports

Full Message Format:

1991-MAR-21 10:08:29 MAINTENANCE A/Active -Info- SYSTEM001 #0002
ANCILLARY SYSTEM REPORT of a <NORMAL/FAULTY> operation condition:
<Reason>

The reasons for an Ancillary System Report are listed in the following table.

Ancillary System Report Reasons		
Reason	**Alarm Level**	**Action Required**
Auxiliary A FUSE is INOPERABLE	Major	Replace fuse for auxiliary -48 V output used for hard disk drive on Plane A.
Auxiliary B FUSE is INOPERABLE	Major	Replace fuse for auxiliary -48 V output used for hard disk drive on Plane B.
Auxiliary C FUSE is INOPERABLE	Major	Replace fuse for auxiliary -48 V general purpose output.
Auxiliary D FUSE is INOPERABLE	Major	Replace fuse for auxiliary -48 V general

Ancillary System Report Reasons		
Reason	**Alarm Level**	**Action Required**
		purpose output.
In cabinet x, FAN unit number x is OPERATING	No Alarm	None. Previous problem has been corrected.
In cabinet x, FAN unit number x is NOT FUNCTIONING	Minor	Refer to the Peripheral Cabinet Fan Unit part of the Troubleshoot section. Replace the Fan Unit as necessary.
In cabinet x, the auxiliary A FUSE is FUNCTIONAL	No Alarm	None. Previous problem has been corrected.
In cabinet x, the auxiliary A FUSE is INOPERABLE	Major	Blown auxiliary fuse indicated. Refer to the Troubleshoot section.
In cabinet x, the A0 LOOP FEED BREAKER is CLOSED	No Alarm	None. Previous problem has been corrected.
In cabinet x, the A0 LOOP FEED BREAKER is OPENED	Major	The -48 Vdc Loop Feed Breaker indicated was opened or tripped. Refer to the Troubleshoot section.
In cabinet x, the backup BATTERY is INOPERABLE	Major	No -48 V Battery input is recognized. Refer to the Power Subsystem part of the Troubleshoot section.
In cabinet x, the backup BATTERY is FUNCTIONAL	No Alarm	None. Previous problem has been corrected.
In cabinet x, the BATTERY CABINET's major alarm is OFF	No Alarm	None. Previous problem has been corrected.
In cabinet x, the BATTERY CABINET's major alarm is ON	Major	An alarm condition exists on the backup battery cabinet. Examine battery cabinet for fault condition.
In cabinet x, the BATTERY CABINET's minor alarm is OFF	No Alarm	None. Previous problem has been corrected.
In cabinet x, the BATTERY CABINET's minor alarm is ON	Minor	An alarm condition exists on the backup battery cabinet. Examine battery cabinet for fault condition.
In cabinet x, the BREAKER CLOSED	No Alarm	None. Previous problem has been corrected.
In cabinet x, the BREAKER OPENED	Major	The -48 Vdc breaker on the Power Distribution Unit indicated was opened or tripped. Refer to the Troubleshoot section.
In cabinet x, the cabinet panel TEMPERATURE is GREATER than 65^0C	Major	Refer to the Peripheral Cabinet Fan Unit part of the Troubleshoot section.
In cabinet x, the cabinet panel TEMPERATURE is LESS than 65^0C	No Alarm	None. Previous problem has been corrected.
In cabinet x, the CONVERTER on shelf 4 (plane B1) is INOPERABLE	Major	Verify that a converter is installed. If not, regard this message as a warning only. Otherwise, refer to the Peripheral Converter part of the Troubleshoot section
In cabinet x, the CONVERTER on shelf 4 (plane B1) is FUNCTIONAL	No Alarm	None. Previous problem has been corrected.
In cabinet x, the fan box TEMPERATURE	Major	Refer to the Cabinet Cooling part of the

Ancillary System Report Reasons		
Reason	**Alarm Level**	**Action Required**
is GREATER than 50^0C		Troubleshoot section.
In cabinet x, the fan box TEMPERATURE is LESS than 50^0C	No Alarm	None. Previous problem has been corrected.
In cabinet x, the FILTER CAPACITOR in the breaker panel is INOPERABLE	Major	Check and replace the filter capacitor fuses in the rear of the PDU as required. If fault persists replace filter capacitor.
In cabinet x, the FILTER CAPACITOR in the breaker panel is FUNCTIONAL	No Alarm	None. Previous problem has been corrected.

Note: Reports are not generated for fan faults.

Calibrated Flash Report

Full Message Format:

1991-MAR-21 10:08:29 MAINTENANCE A/Active -Info- SYSTEM001 #0002
MC320 On-Premise Line at location <PLID>
Calibrated flash report :
Fault detected : <Reason>

The reasons for a Calibrated Flash Report are listed in the following table.

Calibrated Flash Report Reasons	
Reason	**Action Required**
Mismatch between programmed and installed card type	Check programmed card against installed card. Replace card or re-program as necessary.
Sanity	Malfunction of calibrated flash hardware. Replace card.
ULA loopback	None. This is for information only.

Call Processing Audit Report

Full Message Format:

1991-MAR-23 11:07:19 MAINTENANCE A/Active *Minor* SYSTEM001 #0003
CALL PROCESSING AUDITS for xxxx calls :
<device specific information>

Action Required: This is not serious, unless the number of released devices is substantial. If there is a large number, inspect the Maintenance Log for other Call Processing Audit messages. If they are numerous, this could indicate software problems. Note that small numbers of release reports can be attributed to cards being pulled, etc.

Call Processing Fault Report

Full Message Format:

1991-MAR-23 11:07:19 MAINTENANCE A/Active *Minor* SYSTEM001 #0003
CALL PROCESSING FAULT REPORT :
<Part number> <card name> at location <PLID>
<Reason>

The reasons for a Call Processing Fault Report are listed in the following table.

Call Processing Fault Report Reasons	
Reason	**Action Required**
Bad digit received during call processing	This is a hardware problem. If persistent, take the station out of service (via BUSY command) and test it. Problem could also be with a PCM Link or a DTMF Receiver. Examine the Maintenance Log and refer to the appropriate part of the Troubleshoot section.
Ringing Voltage not detected during call processing	See above.
Trunk abort - no Ring	This can be either a hardware or software problem. If persistent, take the station out of service (via the BUSY command) and test it. Refer to the appropriate part of the Troubleshoot section.
Trunk card fault	See above.
Trunk is incorrectly released	See above.
Trunk protocol failure	See above.

Card Installed Report

Full Message Format:

1991-MAR-23 11:07:19 MAINTENANCE A/Active *Minor* SYSTEM001 #0003
<Part number> <card name> at location <PLID> correct card
card installed = <any other valid card>

ACTION REQUIRED: An incorrect card type has been installed in this slot. Remove the installed card and insert the correct card as per the Card Allocation Map.

Full Message Format:

1991-MAR-23 11:07:19 MAINTENANCE A/Active *Minor* SYSTEM001 #0003
No card should be at location <PLID>
incorrect card installed = <card>

Action Required: Use CONFIG LONG command to see which card type is supposed to be installed.

Full Message Format:

1991-MAR-21 10:08:29 MAINTENANCE A/Active -Info- SYSTEM001 #0002
<Part number> <card name> at location <PLID> Installed

Action Required: None. The correct card was installed as per the Card Allocation Map.

Card Removed Report

Full Message Format:

1991-MAR-21 10:08:29 MAINTENANCE A/Active -Info- SYSTEM001 #0002
<Part number> <card name> at location <PLID> Removed

Action Required: Verify that the card shown was actually removed.

CEPT Formatter Reports

The following table details the reasons for CEPT Formatter reports. Additional CEPT Formatter reports are detailed in TEST FAILURE REPORTS - CEPT Formatter.

Full Message Format:

1991-APR-11 10:18:26 MAINTENANCE A/Active *Critical* SYSTEM001 #0004
MC264 CEPT Formatter at location <PLID>
Scope of report : Channel/ Card/ Hybrid
Reason(s) for report

<additional information may be provided>

The reasons for a CEPT Formatter Report are listed in the following table.

CEPT Formatter Report Reasons	
Reason	**Action Required**
Bit error rate does not exceed maintenance threshold - bit error rate (per 24hours) : xx	None. This is the normal operating condition.
Bit error rate exceeds maintenance threshold - bit error rate (per 24hours) : xx	Refer to the Digital Service Units troubleshooting procedures.
Bit error rate does not exceed service threshold - bit error rate (per 24hours) : xx	None. This is the normal operating condition.
Bit error rate exceeds service threshold - bit error rate (per 24hours) : xx	Link has been removed from service. Contact network carrier.
Bit error rate does not exceed 1/1000 - bit error rate (per 24hours) : xx	None. This is the normal operating condition.
Bit error rate exceeds 1/1000 - bit error rate (per 24 hours) : xx	Link has been removed from service. Contact network carrier.
Far-end alarm : absent	None. This is the normal operating condition.
Far-end alarm : present	Investigate problem at far-end of system.
Frame loss rate does not exceed maintenance threshold - frame loss rate (per 24 hours) : xx	None. This is the normal operating condition.
Frame loss rate exceeds maintenance threshold - frame loss rate (per 24 hours) : xx	Refer to the CEPT or DS1 Formatter card procedures in the Troubleshoot volume.
Frame loss rate does not exceed service threshold - frame loss rate (per 24 hours) : xx	None. This is the normal operating condition.
Frame loss rate exceeds service threshold - frame loss rate (per 24 hours) : xx	Link has been removed from service. Contact network carrier.
Link power : present	None. This is the normal operating condition.

CEPT Formatter Report Reasons	
Reason	**Action Required**
Link power : absent	Refer to the CEPT or DS1 Formatter card procedures in the Troubleshoot section.
Multiframe alignment: present	None. This is the normal operating condition.
Multiframe alignment: absent	This indicates that there has been a loss of multiframe alignment. Refer to the CEPT Formatter card and/or Networking part of the Troubleshoot section.
Remote alarm indication service: present	This indicates that there are problems at the far-end node. Investigate at the far-end node.
Remote alarm indication service: absent	None. This is the normal operating condition.
Serial Communications Controller passed	None. This is the normal operating condition.
Serial Communications Controller failed Type of test : Transmit guard timer	Refer to the CEPT or DS1 Formatter card procedures in the Troubleshoot volume.
Serial Communications Controller failed Type of test : Transmitter underran	Refer to the CEPT or DS1 Formatter card procedures in the Troubleshoot volume.
Slip rate does not exceed maintenance threshold - slip rate (per 24 hours) : xx	None. This is the normal operating condition.
Slip rate exceeds maintenance threshold - slip rate (per 24 hours) : xx	Refer to the NETSYNC procedures in the Troubleshoot section.
Slip rate does not exceed service threshold - slip rate (per 24 hours) : xx	None. This is the normal operating condition.
Slip rate exceeds service threshold - slip rate (per 24 hours) : xx	Link has been removed from service. Contact network carrier.
Synchronization : present	None. This is the normal operating condition.
Synchronization : absent	Refer to the CEPT Formatter and/or Networking part of the Troubleshoot section.

Change in Synchronization Reports

The following tables detail the reasons and justifications for a change in the synchronization source.

Full Message Format:

1991-APR-11 10:18:26 MAINTENANCE A/Active *Critical* SYSTEM001 #0004
Change in synchronization selection mode to auto.
Justification: <additional information>

Action Required: None. This is normal system operation.

Full Message Format:

1991-APR-11 10:18:26 MAINTENANCE A/Active *Critical* SYSTEM001 #0004
Change in synchronization source from <sync change - see Sync. Source Change Reasons>

Justification: <justification> (See Reasons For Clock Source Change).

Sync. Source Change Reasons	
Sync Change	**Notes**
source xx to active system clock	Check justification. See Reasons For Clock Source Change.
source xx to freerun	All network sync sources are either unstable or unavailable, or may have been set at Maintenance Terminal. This is not desirable. Check justification. See Reasons For Clock Source Change.
source xx to source yy	Check justification. See Reasons For Clock Source Change.
freerun to <anything>	This is likely a change for the better. Check justification. See Reasons For Clock Source Change.

Reasons For Clock Source Change	
Justification	**Action Required**
At least 4 consecutive hours of freerun mode	After being in freerun for at least 4 hours, the system automatically switched to the most suitable available source.
System clock at 01 01 20 fails to synchronize	Clock could not synchronize with the sync source. Use DTSTAT commands to check the affected sync source. If necessary, refer to NETSYNC procedures in the Troubleshoot section.
Directed from Maintenance Terminal	None. Information only. Verify that this is a desired state.
New synchronization source has just become available	None. This is for information only. A previously unavailable source has recently become available.
New synchronizing source now below network slip threshold	None. Information only. New source is functioning correctly.
Synchronizing source exceeds network slip threshold	Use NETSYNC SUMMARY, NETSYNC STATE and DTSTAT READ commands to clarify the problem. Refer to the NETSYNC procedures in the Troubleshoot section.
Synchronizing source is not available	Use NETSYNC SUMMARY, NETSYNC STATE and DTSTAT READ commands to clarify the problem. Refer to the NETSYNC procedures in the Troubleshoot section.

Communications Card Reports

Full Message Format:

1991-MAR-23 11:07:19 MAINTENANCE A/Active *Minor* SYSTEM001 #0003
COMMUNICATIONS CARD REPORT -
<Part number> <card name> at location <PLID>
<Reason for Report>

The following table lists the reasons why a Communications Card report will be generated.

Communications Card Report Reasons	
Reason	**Action Required**
The SS7 network layer has performed a SOFT RESET	None. The system performed an activity switch or a user performed a control-C operation.
The Comms Card has just performed a FULL (both hard and soft) RESET	If the SUPERSET 7 unit will not come up, refer to the SUPERSET 7 Console and the applicable Line Card parts of the Troubleshoot section.
The SUPERSET 7 was restarted by the user	None. Information only.

COV Line Reports

Full Message Format:

1991-MAR-21 10:08:29 MAINTENANCE A/Active -Info- SYSTEM001 #0002
MC323 COV Line at location <PLID>
<Reason>

The following table details the reasons for a COV Line Report. Additional COV Line reports are detailed in TEST FAILURE REPORTS - COV Line.

COV Line Report Reasons	
Reason	**Action Required**
Data was lost when the CIRCUIT: Caused the card to force its message link open. The circuit was in the ...	Possible problem with the set attached to the specified COV circuit. Also could be problem with another set associated with another circuit on the card. Use the STATE and STATE COV commands to investigate further.
The card is OUT OF SERVICE due to loss of communication with it. This is because of an unexpected reset.	Verify this via the STATE command. Could have been caused by something external, causing a loss of communication with the Peripheral subsystem. If persistent, reseat the card and refer to the COV Line card part of the Troubleshoot section.
The card is OUT OF SERVICE due to loss of communication with it. This is because the peripheral detected a parity error	Verify this via the STATE command. If persistent, reseat the card and refer to the COV Line Card part of the Troubleshoot section.
The set has been returned to service	The set was (re)connected to the specified circuit. Verify this.
The set is OUT OF SERVICE due to loss of communication with it	No set is connected to the circuit or was disconnected. Verify this.
This set has received 255 hits during the last 60 minute period.	Data from the card to the set was garbled (1 hit). The set was then refreshed. This is not serious if the number of hits is 1 or 2. If greater, refer to the COV Line card part of the Troubleshoot section.

Data Call Processing Reports

Full Message Format:

1991-MAR-22 13:18:39 MAINTENANCE A/Active *Major* SYSTEM001 #0004 DATA CALL PROCESSING report : <card name(s)> at location(s) <PLID(s)>
<Reason for Report>

The reasons for Data Call Processing reports are listed in the following table.

Data Call Processing Report Reasons	
Reason For Report	**Action Required**
Data Transmission has polarity inverted	Could be caused by faulty dataset, line circuit, or noisy cable. Run a directed test on the Dataset Line Circuit. Refer to the Troubleshoot section, as required.
DSLC or DATASET problem	Run a directed test on the specified Dataset Line circuit. Refer to the Troubleshoot section, as required. If necessary, inspect the Maintenance Log for further indications of DSLC or Dataset problems.
DTRX reports a PORT failure during a call	Run a directed test on the specified circuit. Refer to the Troubleshoot section, as required.
DTRX self-directed tests report a PORT failure	Run a directed test on the specified circuit. Refer to the Troubleshoot section, as required.
Main Controller and Peripheral out of sync	Run a directed test on the specified Dataset Line circuit, check logs for problems with Peripheral Control or Main Control. Refer to the Troubleshoot section, as required.
Modem or ONS circuit may be out of order	Run directed tests on the specified circuit(s). Refer to the Troubleshoot section, as required.
Pool modem may be out of order	Run directed tests on the specified circuits. Refer to the Troubleshooting section, as required. If this is unsuccessful, modem likely requires service.

Database File Corruption Reports

Full Message Format:

1991-MAR-22 13:18:39 MAINTENANCE A/Active *Major* SYSTEM001 #0004
Database File Corruption.
Error accessing <file name>
Detected on plane <A, B or both>
File System Error: <more information>

Action Required: This is a critical problem. Call MITEL Field Service immediately.

Full Message Format:

1991-MAR-22 13:18:39 MAINTENANCE A/Active *Major* SYSTEM001 #0004
Database File Corruption.
Error accessing <file name>
Detected on plane <A, B or both>
Database File Check: No Errors Detected.

Action Required: Information only.

DBMS Information Reports

Full Message Format:

1991-MAR-22 13:18:39 MAINTENANCE A/Active *Major* SYSTEM001 #0004
DBMS info: DBMS CHECK completed.
<Reason for Report> (See table).

DBMS Information Report Reasons	
Reason For Report	**Action Required**
XX database error(s) detected	If "XX" is 0, there are no problems. If the number is greater than 0, a DATA SAVE and DATA RESTORE operation should be performed. See Maintenance Commands.
XX form(s) could not be accessed	If "XX" is 0, there are no problems. If the number is greater than 0, check if there was a CDE session, Guest Service function, or a FORMPRINT operation running. The DBMS CHECK operation will fail if any user is accessing any of these operations.

Disk Capacity Reports

Full Message Format:

1991-MAR-22 13:18:39 MAINTENANCE A/Active *Major* SYSTEM001 #0004
DISK CAPACITY REPORT
<Reason for Report>

The reasons for a Disk Capacity Report are listed in the following table.

Disk Capacity Report Reasons	
Reason For Report	**Action Required**
(Non)Redundant partition on winchester is 100% full	Use the CATALOG INFO, FILE INFO, CATALOG DELETE and FILE DELETE commands to remove unnecessary files. Also, check the size of the logs. If too large, reduce via the LOGS PURGE command. Refer to Maintenance Commands.
(Non)Redundant partition on winchester is less than 95% full	Information only. Problem has been corrected.

DISA Call - Repetitive Failures Reports

Full Message Format:

1996-JUN-13 06:57:38 MAINTENANCE A/Active *Major* Cte-42 #0090
SECURITY: DISA Call - Repetitive Failures with invalid Account Codes

Action Required: This is an indication that repeated attempts have been made to access DISA numbers. This is a security feature of the system. The associated major alarm will be cleared when a valid account code is entered for the DISA trunk number in question.

DNI Line Reports

The following section details the DNI Line Reports. Additional DNI Line reports are detailed in TEST FAILURE REPORTS - DNI Line.

Full Message Format:

1991-APR-11 10:18:26 MAINTENANCE A/Active *Critical* SYSTEM001#0004
MC330 DNI Line at location <PLID>
The set is out of service due to loss of communication.

Action Required: Set may have been unplugged. Check all connections. If problem persists, refer to the Troubleshoot volume.

Full Message Format:

1991-APR-11 10:18:26 MAINTENANCE A/Active *Critical* SYSTEM001#0004
MC330 DNI Line at location <PLID>
The set has been returned to service.

Action Required: None. A previous problem has been corrected.

Full Message Format:

1991-APR-11 10:18:26 MAINTENANCE A/Active *Critical*SYSTEM001 #0004
MC330 DNI Line at location <PLID>
Programmed DNIC device type : <device>
Installed DNIC device type : <device>

Action Required: Incorrect device is installed. Either install the correct device or change programming.

DS1 Formatter Reports

These reports are exactly the same as the CEPT Formatter reports. The “Action Required” for each message will be the same as that for the corresponding CEPT Formatter message.

Additional reports are detailed in TEST FAILURE REPORTS - DS1 Formatter.

Full Message Format:

1991-APR-11 10:18:26 MAINTENANCE A/Active *Critical* SYSTEM001#0004
MC263 DS1 Formatter at location <PLID>
Scope of report: Link/ Card/ Hybrid
Reason(s) for report: <see CEPT Formatter Reports>
<additional information may be provided>

Action Required: See “CEPT Formatter Reports” on page 121 of this guide.

DSS/BLF Reports

Logs Generated by Receiving PBX

Full Message Format:

1997-APR-30 13:18:05 MAINTENANCE -Info- SYSTEM001 #0028
Terminator PBX Busy Lamp Group exception report
Service: Wrt Rmt Blg, BLG Exception: (See Below)
OLI: 77007607, Mntr Dvc: 77005702, DA: 7608

Possible values in the “BLG Exception” field are: Nil Exception, Database Err, Dest Invalid, OLI Unknown, Servc Invld, Reason Invld, Mn Dvc Invld, Status Invld, Count Invld, No Dvc Mntr, Count Dffrnc.

Action Required: Check CDE programming on broadcasting and receiving systems.

Full Message Format:

1997-APR-30 13:18:05 MAINTENANCE -Info- SYSTEM001 #0028
Originator PBX DSS exception report.
Monitored Device: 5888, DSS Key Device: 6888
Device not monitored.

Action Required: Check CDE programming on broadcasting and receiving systems.

Logs Generated by Broadcasting PBX

Full Message Format:

1997-APR-30 13:18:05 MAINTENANCE -Info- SYSTEM001 #0028
Originator PBX Busy Lamp Group exception report.
CP Exception: (See Below)
Mntr Dvc: 5702, CEID Index: 1
Service: Wrt Rmt Blg, BLG Exception: (See below)

Possible values in the “CP Exception” field are numerous. Possible values in the “BLG Exception” field are the same as for the first Maintenance Log listed under “Logs Generated by Receiving PBX”.

Action Required: Check CDE programming on broadcasting and receiving systems.

Full Message Format:

1997-APR-30 13:18:05 MAINTENANCE -Info- SYSTEM001 #0028
Terminator PBX DSS exception report
OLI: 77007607, DA: 77075888
Device not monitored.

Action Required: Check CDE programming on broadcasting and receiving systems.

EDC Error Reports

Full Message Format:

1991-MAR-22 13:18:39 MAINTENANCE A/Active *Major* SYSTEM001 #0004
<Part number> <card name> at location <PLID>
EDC <type of error> ERROR --
<further information may be provided>

The following table details the error messages generated for the EDC Error Report.

EDC Error Report Messages	
Message	**Action Required**
HARD	Set the plane to inactive and reload from the Hard Disk. This will cause the Initialization tests to be run. If the card fails the tests, replace the card. Otherwise, if the condition does not cause the plane to reset, keep the card under observation.
MULTI-BIT	Set the plane to inactive and reload from the Hard Disk. This will cause the Initialization tests to be run. If the card fails the tests, replace the card. Otherwise, if the condition does not cause the plane to reset, keep the card under observation.
RAM PARITY	If the problem is persistent, replace the card. Otherwise keep the card under observation. If problem persists, check for problems with subsystem specified in the “Error Source” field. Refer to the Troubleshoot volume, as required.
SOFT	Soft errors of this type sometimes escalate to hard error conditions requiring card replacement. Keep the card under observation. The ‘Error Count’ figure in the message indicates the number of errors that have occurred since the last report. The ‘# Errors’ figures indicate the cumulative number of errors that have occurred on the specified card(s) since the last reload.

Exception Reports

Full Message Format:

1991-MAR-21 10:08:29 MAINTENANCE A/Active -Info- SYSTEM001 #0002
<card name>
EXCEPTION REPORT -
Exception Type: <Type>
<further information may be provided>

The following table details the types of messages generated for the Exception Report.

Exception Report Message Types	
Type	**Action Required**
address error	Note the “DATA ADDRESS”. Refer to the System Bus Error part of the Troubleshoot volume.
bus error	See above.
CHK instruction error	If this Exception report is persistent (does not appear to be a random occurrence) then the card indicated should be replaced.
emulation 1111 error	See above.
emulation 1010 error	See above.

Exception Report Message Types	
Type	**Action Required**
illegal instruction	See above.
NO INFORMATION AVAILABLE	If problem is not of a random nature, replace the identified card. Refer to the appropriate subsystem part of the Troubleshoot volume.
privilege violation	If this Exception report is persistent (does not appear to be a random occurrence) then the card indicated should be replaced.
spurious interrupt	See above.
trap number 37	See above.
TRAPV instruction error	See above.
zero divide	See above.

Fiber Interface Reports

Fiber Interface Reports are described below.

Full Message Format:

> 1992-MAR-23 19:50:39 MAINTENANCE A/Active *Critical* SYSTEM001 #0002 Fiber Interface Mod at location <PLID> was taken out of service.

Action Required: The above report indicates a loss of local or remote synchronization. Check the FIM LEDs to determine if the Fiber Interface Module has detected a loss of synchronization.

Full Message Format:

> 1992-MAR-23 19:53:24 MAINTENANCE A/Active *Critical* SYSTEM001 #0003 Fiber Interface Mod at location <PLID> removed.

Action Required: Verify that the indicated FIM was actually removed.

Full Message Format:

> 1992-MAR-23 19:54:12 MAINTENANCE A/Active - Info - SYSTEM001 #0007 Fiber Interface Mod at location <PLID> was returned to service.

Action Required: None. A previous synchronization problem has been corrected.

Full Message Format:

> 1992-MAR-23 19:56:49 MAINTENANCE A/Active - Info - SYSTEM001 #0008 Fiber Interface Mod at location <PLID> installed.

Action Required: None.

Link Reports

Full Message Format:

1991-MAR-21 10:08:29 MAINTENANCE A/Active -Info- SYSTEM001 #0002
The link from <card name>at location <PLID> Active
to <card name>at location <PLID> Active is now CLOSED.

The following table lists the cards identified in the Link reports.

Link Report Card Types	
Card Type	**Action Required**
MC200 System Processor at location 1 x 01 Inactive	The mate link communication is lost between the Main Controller and the specified circuit processor. Use the MESSAGE SUBSYS command to determine if a reload is in progress. Inspect the Maintenance Log for indications of other problems with either card.
MC200 System Processor at location 1 x 16 Active	The mate link communication is lost between the Main Control processor and the specified message processor. Use the MESSAGE MAIN command to determine if a reload is in progress. Inspect the Maintenance Log for indications of problems with either card.
MC200 System Processor at location 1 x 25 Active	The mate link communication is lost between the Main Control processor and the specified circuit processor. Use the MESSAGE MAIN command to determine if a reload is in progress. Inspect the Maintenance Log for indications of problems with either card.
MC200 System Processor at location 1 x 29 Active	The mate link communication is lost between the Main Control processor and the specified peripheral processor. Use the MESSAGE SUBSYS command to determine if a reload is in progress. Inspect the Maintenance Log for indications of problems with either card.
MC312 Peripheral Controller I	The mate link communication is lost between the Main Controller and the specified circuit processor. Use the MESSAGE SUBSYS command to determine if a reload is in progress. Inspect the Maintenance Log for indications of other problems with either card.
MC260 Conference	Communication between the Message Switch processor and the indicated Conference card has been lost. Use the MESSAGE SUBSYS command to obtain further information. Inspect the Maintenance Log for further indications of problems with either card. Reload the Conference card if necessary. See Message Communication Link, in the Troubleshoot volume, for more information.
MC262 Tone Detector	Communication between the Message Switch processor and the indicated Tone Detector card has been lost. Use the MESSAGE SUBSYS command to obtain further information. Inspect the Maintenance Log for further indications of problems with either card. Reload the Tone Detector card if necessary.
MC264 or MC269 CEPT Formatter (MC269 cards are reported as Universal E1 cards)	Communication between the Main Controller and the indicated CEPT Formatter card has been lost. Use the MESSAGE SUBSYS command to obtain further information. Inspect the Maintenance Log for further indications of problems with either card. Reload the CEPT Formatter card if necessary.

Link Report Card Types	
Card Type	**Action Required**
MC263 or MC270 DS1 Formatter (MC270 cards are reported as Universal T1 cards)	Communication between the Main Controller and the indicated DS1 Formatter card has been lost. Use the MESSAGE SUBSYS command to obtain further information. Inspect the Maintenance Log for further indications of problems with either card. Reload the DS1 Formatter card if necessary.
E1/T1 (PRI) Cards (reported as Universal cards)	Communication between the Main Controller and the indicated Universal (PRI) Card has been lost. Use the MESSAGE SUBSYS command to obtain further information. Inspect the Maintenance Log for further indications of problems with either card. Reload the card if necessary.

Main Controller Reports

Full Message Format:

1991-MAR-23 11:07:19 MAINTENANCE A/Active *Minor* SYSTEM001 #0003
MC210 Main Controller at location <PLID>
<circuit type> Circuit(s) (x -x) TAKEN OUT OF SERVICE
DUE TO loss of sanity / failed diagnostics

Full Message Format:

1991-MAR-23 11:07:19 MAINTENANCE A/Active *Minor* SYSTEM001 #0003
MC210 Main Controller at location <PLID>
<circuit type> Circuit(s) (x -x) RETURNED TO SERVICE

Action Required: None. Previous problem, or unknown status, corrected.

The following table identifies the circuit types reported in the Main Controller reports. Additional Main Controller reports are detailed in TEST FAILURE REPORTS - Main Controller.

Main Controller Report Circuit Types	
Circuit Type	**Action Required**
Conference	If “loss of sanity”, try an activity switch. If “failed diagnostics”, try a directed test. If problem persists, refer to the Troubleshoot volume.
Tone Detection	See above.
Tone Generation	If “loss of sanity”, try an activity switch. If problem persists, refer to the Troubleshoot volume.

Memory Fragmented Reports

Full Message Format:

1991-MAR-21 10:08:29 MAINTENANCE A/Active *Critical* SYSTEM001 #0002
MC211 Main Controller at location <PLID>
Dynamic Memory is fragmented

Action Required: Reboot the system as soon as possible either from the Maintenance Panel or by using the PROGRAMMED REBOOT command.

Maintenance Log Setting Reports

Full Message Format:

1991-MAR-21 10:08:29 MAINTENANCE A/Active -Info- SYSTEM001 #0002
MAINTENANCE LOG SETTINGS
ON: <further information>
OFF: <further information>

Action Required: None. This message appears in the Maintenance Log as a result of a change in the category of logs to be output, via the MTCELOGS ON/OFF command.

Maintenance Panel Reports

The Maintenance Panel Reports are detailed in the following three message format examples. Additional Maintenance Panel reports are detailed in TEST FAILURE REPORTS - Maintenance Panel.

Full Message Format:

1991-APR-11 10:18:26 MAINTENANCE A/Active *Critical* SYSTEM001 #0004
MC090 Maint Panel at location <PLID>
The set is out of service due to loss of communication.

Action Required: Set may have been unplugged. Check all connections.

Full Message Format:

1991-APR-11 10:18:26 MAINTENANCE A/Active *Critical* SYSTEM001#0004
MC090 Maint Panel at location <PLID>
The set has been returned to service.

Action Required: None. A previous problem has been corrected.

Full Message Format:

1991-APR-11 10:18:26 MAINTENANCE A/Active *Critical* SYSTEM001#0004
MC090 Maint Panel at location <PLID>
Programmed DNIC device type: <device>
Installed DNIC device type: <device>

ACTION REQUIRED: Incorrect device is installed. Either install the correct device, or change programming.

Maintenance Panel Mgr Reports

Full Message Format:

1991-MAR-23 11:07:19 MAINTENANCE A/Active *Minor* SYSTEM001 #0003
MTCE PANEL MGR <Message>

The following table details the messages produced by the Maintenance Panel Manager Report.

Maintenance Panel Manager Report Messages	
Message	**Action Required**
indicates activity freeze disabled	Verify that the ACTIVITY FREEZE pushbutton on the Maintenance Unit was deactivated. If not, refer to the Maintenance Unit part of the Troubleshoot volume.
indicates activity freeze enabled	Verify that the ACTIVITY FREEZE pushbutton on the Maintenance Unit was activated. If not, refer to the Maintenance Unit part of the Troubleshoot volume.
indicates main ctrl changes from inactive to active	The Maintenance Unit is acknowledging the occurrence of an Activity Switch. Verify that the switch took place.
indicates main ctrl initializes maintenance panel	This can be caused by a System reset, or by powering down the Maintenance Unit. If this is persistent, inspect the Maintenance Log for indications of problems causing resets.
indicates main ctrl reports msg checksum error	This is not serious unless it is persistent. If persistent, problem could lie in the active Main Controller card (in which case a software reload could clear it up), in the cable from the card to the Maintenance Unit, or in the Maintenance Unit. Refer to the Troubleshoot volume.
indicates main ctrl reports msg parity error	See above.
indicates main ctrl reports msg xmit error	See above.
indicates main ctrl reports timeout on msg xmit	See above.
indicates mtce panel clock battery low	The battery level is low and the battery requires replacement.
indicates mtce panel clock battery ok	None. Battery level is now adequate.
indicates mtce panel reports DX fault	This is not serious unless it is persistent. If persistent, refer to the Troubleshoot volume.
indicates mtce panel reports illegal interrupt	This is not serious unless it is persistent. If persistent, problem could lie in the active Main Controller card (in which case a software reload could clear it up), in the cable from the card to the Maintenance Unit, or in the Maintenance Unit. Refer to the Troubleshoot volume.
indicates mtce panel reports msg parity fault	See above.
indicates mtce panel reports msg checksum fault	See above.
indicates mtce panel reports power up	Verify it was powered up. May have to set TIME and DATE.
indicates mtce panel reports PROM fault	This is not serious unless it is persistent. If persistent, refer to the Troubleshoot volume.
indicates mtce panel reports RAM fault	See above.
indicates mtce panel reports real time clock faults	See above.

Maintenance Panel Manager Report Messages	
Message	**Action Required**
indicates Mtce panel reset complete	None. Panel reset was successful.
indicates Mtce panel reset started	Verify that Maintenance Unit reset occurred as a result of a reasonable action. If not, verify the cabling to the Main Controller. Refer to the Troubleshoot volume.
indicates mtce panel reports timeout on msg xmit	This is not serious unless it is persistent. If persistent, problem could lie in the active Main Controller card (in which case a software reload could clear it up), in the cable from the card to the Maintenance Unit, or in the Maintenance Unit. Refer to the Troubleshoot volume.
indicates PFT gone to auto mode	Verify that the Power Fail Transfer switch on the Maintenance Unit was activated. If not, refer to the Maintenance Unit part of the Troubleshoot volume.
indicates PFT has been disabled	See above.
indicates PFT gone to force mode	See above.
indicates remote alarm off	Verify that the REMOTE ALARM pushbutton on the Maintenance Unit was deactivated. If not, refer to the Maintenance Unit part of the Troubleshoot volume.
indicates remote alarm on	Verify that the REMOTE ALARM pushbutton on the Maintenance Unit was activated. If not, refer to the Maintenance Unit part of the Troubleshoot volume.

Maintenance Terminal Lock-out Reports

Full message format:

1996-JUN-13 06:57:38 MAINTENANCE A/Active *Major* Cte-42 #0089
SECURITY: Repetitive Login Failures - Lock-Out on Username SYSTEM

Action Required: This is an indication that Username performed three consecutive failed login attempts. This is a security feature of the system. The associated major alarm will be cleared when a user successfully logs in.

Mass Storage Subsystem Fault Reports

Full Message Format:

1991-OCT-18 08:30:29 MAINTENANCE B/Active *Major* SYSTEM001 #0002
Mass Storage Subsystem Fault Report:
Hard error found on <Device>
<further information may be provided>

The following table identifies the device types reported in the Mass Storage Subsystem Fault reports.

Mass Storage Subsystem Report Device Types	
Device	**Action Required**
plane A winchester	Replace plane A hard disk unit. Refer to the Install Upgrades and FRUs section for replacement procedures.
plane B winchester	Replace plane B hard disk unit. Refer to the Install Upgrades and FRUs section for replacement procedures.
mate plane winchester	None. This indicates problems with the hard disk drive on the other plane. Check the logs on the other plane for a similar message.
RSD	Replace the RSD. If the fault persists, replace the RSD drive. Refer to the Install Upgrades and FRUs section for replacement procedures.
MSX card	Replace the Mass Storage Expander card located in the Maintenance Panel assembly. Refer to the Install Upgrades and FRUs section for replacement procedures.

Message Links to Peripheral Reports

The following details the Message Links to Peripheral Report.

Full Message Format:

1991-MAR-21 10:08:29 MAINTENANCE A/Active -Info- SYSTEM001 #0002
MESSAGE LINKS TO PERIPHERALS report -
The message links to MC200 System Processor at location x x 29
and to MC200 System Processor at location x x 29 are CLOSED.
In cabinet x all cards on shelves x and x are now logically removed.

Action Required: Message links from the Active Message Switch and the specified Peripheral pair have been lost. Use the MESSAGE SUBSYS command to obtain further information. Inspect the Maintenance Log for further indications of problems with the message links to/from the specified peripherals, or the active Main Control. Also refer to the Message Link part of the Troubleshoot volume.

Nailed Up Voice/Data Call Reports

Full Message Format:

1991-MAR-22 13:18:39 MAINTENANCE A/Active *Major* SYSTEM001 #0004
NAILED UP VOICE/DATA CALL INFORMATION
Device at <PLID> failed to initiate call <Route or destination info>
Recovery: <System recovery action>

The following table details the Route and Destinations reported in the Nailed Up Voice/Data Call Reports. Note that this report is for information only. No action on the part of maintenance personnel is required.

Nailed Up Voice/Data Call Report Routes/Destinations	
Route/Destination	**Recovery Action**
To device at <PLID>	Recovery: Attempting to seize backup
To device at <PLID>	Recovery: Camping on to original call destination
To group xxxxxx	Recovery: Attempting to seize backup
To group xxxxxx	Recovery: Camping on to original call destination
Through route plan: x	Recovery: Camping on to route : y
Through route list: x	Recovery: Camping on to route : y
Through route: x	Recovery: Camping on to route : y

Network Gateway Reports

The following details reports and required actions related to the Security Access Module (SAM) on the Network Gateway.

Full Message Format:

1996-MAR-23 11:07:19 MAINTENANCE A/Active *Major* SYSTEM001 #0003
MC312 Peripheral Cont at location <PLID>
Product Tampering detected. 10 day warning.

Action Required: Options will be disabled in ten days. Contact Product Support.

Peripheral Control Complex Reports

The following details the Peripheral Control Complex reports. Additional Peripheral Control Complex reports are described in TEST FAILURE REPORTS - Peripheral Control Complex.

Full Message Format:

1991-MAR-23 11:07:19 MAINTENANCE A/Active *Minor* SYSTEM001 #0003
MC312 Peripheral Cont at location <PLID>
DTMF Circuit(s) (x - x) TAKEN OUT OF SERVICE
DUE TO loss of sanity / failed diagnostics

Action Required: If “loss of sanity”, try an activity switch. If “failed diagnostics”, try a directed test. If problem persists, refer to the Troubleshoot volume.

Full Message Format:

1991-MAR-23 11:07:19 MAINTENANCE A/Active *Minor* SYSTEM001 #0003
MC312 Peripheral Cont at location <PLID>
<circuit type> Circuit(s) (x - x) RETURNED TO SERVICE

Action Required: None. Previous problem, or unknown status corrected.

Programmed Activity Switch Reports

See Activity Switch - Programmed.

Programmed Reboot Reports

The following details the Programmed Reboot report.

Full Message Format:

1991-MAR-22 13:18:39 MAINTENANCE A/Active*Minor* SYSTEM001 #0004
PROGRAMMED REBOOT of <card name>
has been initiated.

Action Required: None. Information only.

STALE Restart Postmortem Reports

The following details the Stale Restart Postmortem report.

Full Message Format:

1991-MAR-22 13:18:39 MAINTENANCE A/Active *Minor* SYSTEM001 #0004
STALE Restart postmortem information follows
Time stamp : <time and date>
The Restart of the Active plane was due to
<reason>

Action Required: None. This information is historical. The system suffered a reset and recovered. For further information, refer to the corresponding entry in Valid Restart Postmortem Reports.

State Change Reports

Full Message Format:

1991-MAR-23 11:07:19 MAINTENANCE A/Active *Minor* SYSTEM001 #0003
<Part number> <card name> at location <PLID> state change
<Old state> <New state>
<Source of change>

The following table details the old and new states together with the source of the state change reported by the State Change reports.

State Change Report Old/New States and Change Sources	
Old/New State & Source Of Change	**Action Required**
The old state was <any valid state> the new state is manbusy source of change: <one of the valid usernames>	The card shown was placed in the Manbusy state by use of the BUSY command. Verify that this is the desired condition.
The old state was manbusy the new state is idle device source of change : <one of the valid usernames>	The card shown was returned to service by use of the RETURN TO SERVICE command. Verify that this is the desired condition.
The trunk is OUT OF SERVICE due to failure to seize	The trunk shown could not be seized during a call attempt. Run a directed diagnostic test on the circuit to verify the problem. Refer to the appropriate trunk procedures in the Troubleshoot volume.
The circuit is out of service as the CO cannot be detected	Do a directed diagnostic test on the specified circuit to verify that the problem is not with the circuit.
The circuit is returned to service as CO has been detected	None.
Undefined group number specified	The command STATE APNSS GROUP n, or the command STATE TRUNK GROUP n was invoked on an APNSS group or on a TRUNK group, using an invalid group number. Take one of the following actions: re-enter the command using a valid group number define the specified group, using the APNSS Group Assignment form or the Trunk Group Assignment form, and then re-enter the command.
Virtual parameter not supported for specified physical location	The command STATE <PLID> VIRTUAL was invoked on a circuit that is not an APNSS circuit or a DPNSS circuit. Re-enter the command using a valid PLID.
Specified group number has no virtual circuits	The command STATE APNSS GROUP n VIRTUAL, or the command STATE TRUNK GROUP n VIRTUAL was invoked on a group that is not a DPNSS or APNSS group. Re-enter the command, specifying a valid group.

Switching Matrix Crosspoint Reports

The following details the Switching Matrix Crosspoint report.

Full Message Format:

1991-MAR-21 10:08:29 MAINTENANCE A/Active *Major* SYSTEM001 #0002
SWITCHING MATRIX - CROSSPOINT REPORT:
<Part number> <card name> at location <PLID>
Crosspoints found FAULTY: xx
Crosspoints TESTED: xxx xxx

Action Required: This is not serious unless the number of faulty crosspoints is over 100. If over 100, system performance could be affected. Refer to the applicable part of the Troubleshoot volume and replace card as required.

System Fail Transfer Reports

Full Message Format:

1991-MAR-21 10:08:29 MAINTENANCE A/Active -Info- SYSTEM001 #0002 The SYSTEM FAIL TRANSFER Zone at cab 1 shelves 1 , 2 <SFT action>
The reason(s) for the transfer : <any number of the valid reasons>

The following table details the System Fail Transfer (SFT) actions reported by the System Fail Transfer reports.

System Fail Transfer Actions Reported	
SFT Action	**Comments**
ISOLATED itself from the switch	This indicates problem(s) with the availability of system resources. Refer to the System Fail Transfer section of the Troubleshoot section. Also, see below for the individual reasons for the SFT isolation.
RECONNECTED itself to the switch	Previous problem has been corrected successfully. Verify that the cause of the SFT invocation has been remedied.
Message Link failures	Use the MESSAGE commands to find which message links are affected. Note which cards the faulty link(s) are attached to. Refer to the appropriate section of the Troubleshoot section. Also refer to the Main Control Complex Subsystem section of the Troubleshoot volume.
No communication with Circuit Switch	Check the Maintenance Log for other problems in the Circuit Switch. Refer to the Main Control Complex section of the Troubleshoot section.
No communication with Message Switch	Check the Maintenance Log for other problems in the Message Switch. Refer to the Main Control Complex Subsystem section of the Troubleshoot section.
PCM Path failures	Check the Maintenance Log and use the PCM TOTALS command to find any faulty PCM links. Refer to the PCM Communication Path part of the Troubleshoot section.
Tone Generator failure	Check the Maintenance Log for any problems with the Tone Generator. Refer to the Tone Generator part of the Troubleshoot section.

System Identification Reports

Full Message Format:

1991-OCT-01 10:08:29 MAINTENANCE A/Active *Major* SYSTEM001 #0031
System identification audit report:
Current system identification state:
<State>

The following table details the states reported by the System Identification reports.

System Identification Report States Reported	
State	**Action Required**
Match system identification	None. This is for information only.
Mismatch system identification	Call MITEL Field Service.

Test Passed Reports

The following details the Test Passed report.

Full Message Format:

1991-APR-01 05:23:11 MAINTENANCE A/Active *Minor* SYSTEM001 #0003
<Part number> <card name> at location <PLID> PASSED Test
<further information may be provided>

Action Required: None. The specified circuit passed a diagnostic test. Any previous problem with the circuit has been corrected, or was transient.

Test Failure Reports

The following components receive failure testing and corresponding reports in the Maintenance Log:

- DNI Line
- ONS Line
- ONS CLASS/CLIP Line
- OPS Line
- COV Line
- Dataset (DSLC) Line
- LS/GS Trunk
- E&M Trunk
- DID/Loop Trunk
- DID/2 Trunk
- DID/3 Trunk
- AC15 Trunk
- DTMF Receiver
- Tone Detector
- CEPT Formatter
- DS1 Formatter
- PCM Links
- Conference Card DSU
- Disk Interface
- Main Controller
- Maintenance Panel
- Peripheral Controller
- Peripheral Switch Matrix
- APNSS and Trunk Groups

AC15 Trunk

Full Message Format:

1991-MAR-23 11:07:19 MAINTENANCE A/Active *Minor* SYSTEM001 #0003
MC344 AC15 Trunk at location <PLID> FAILED Test
Test Failed: <Test>

The following table details the test failures reported on AC15 Trunk circuits.

AC15 Trunk Tests Reported	
Failed Test	**Action Required**
DC Codec Loopback	Run a directed diagnostic test on the specified circuit to verify the problem. If it persists, refer to the Trunk Card part of the Troubleshoot section.
Signaling	See above.

APNSS and Trunk Groups

Full Message Format:

1991-MAR-23 11:07:19 MAINTENANCE A/Active *Minor* SYSTEM001 #0003
MC264 CEPT Formatter at location <PLID> FAILED Test
Test Failed: <Test>

The following table details the test failure reasons for APNSS or Trunk Group circuits.

APNSS and Trunk Groups Test Reported	
Reason	**Action Required**
Undefined group number specified	The command TEST APNSS GROUP n, or the command TEST TRUNK GROUP n was invoked on an APNSS group or on a TRUNK group, using an invalid group number. Take one of the following actions: • re-enter the command using a valid group number • define the specified group, using the APNSS Group Assignment form or the Trunk Group Assignment form, and then re-enter the command.

CEPT Formatter

The following details the test failed report on the CEPT Formatter. Additional CEPT Formatter reports are detailed in CEPT Formatter Reports.

Full Message Format:

1991-APR-11 10:18:26 MAINTENANCE A/Active *Critical* SYSTEM001 #0004
MC264 CEPT Formatter at location <PLID>
Type of diagnostics: Background/ Directed/ Warm Start
Scope of the report: Link/ Card/ Hybrid
Test(s) Failed: <see Table>
<additional information may be provided>

CEPT Formatter Tests Reported	
Failed Test / Reason for Failure	**Action Required**
Background:	
Channel loopback	Run a directed diagnostic test on the specified circuit to verify the problem. If it persists, refer to the CEPT Formatter part of the Troubleshoot section.
Directed:	
Channel loopback	Re-issue the test command to verify the problem. If it persists, refer to the CEPT Formatter part of the Troubleshoot section.
Hybrid loopback	Re-issue the test command to verify the problem. If it persists, refer to the CEPT Formatter part of the Troubleshoot section.
Warm Start:	
12 volt power Relay test	Load card. If problem persists, refer to the CEPT Formatter part of the Troubleshoot section.
Serial Communications Controller or Direct Memory Access	See above.
Hybrid timing or signaling	See above.
DX failure	See above.

Conference Card DSU

Full Message Format:

1991-MAR-19 10:28:18 MAINTENANCE A/Active *Critical* SYSTEM001 #0005
MC260 Conference at location <PLID> FAILED Test
Test Failed :<Test>

The following table details the test failures reported on the Conference card.

Conference Card Tests Reported	
Failed Test	**Action Required**
Hardware Test	If this persists, refer to the Conference Card part of the Troubleshoot section.
DX Chip Test	See above.
RAM Test	See above.
ROM Test	See above.

COV Line

Full Message Format:

1991-MAR-23 11:07:19 MAINTENANCE A/Active *Minor* SYSTEM001 #0003
MC323 COV Line at location <PLID> FAILED Test
Test Failed: <Test>
<additional information may be provided>

The following table details the test failures reported on the COV Line card. Additional COV Line card reports are detailed in COV Line Reports.

COV Line Card Tests Reported	
Failed Test	**Action Required**
AC Codec Loopback	Run a directed diagnostic test on the specified circuit to verify the problem. If it persists, refer to the COV Line Card part of the Troubleshoot section.
DC Codec Loopback	See above.

Dataset (DSLC) Line

Full Message Format:

1991-MAR-23 11:07:19 MAINTENANCE A/Active *Minor* SYSTEM001 #0003
MC324 Dataset Line at location <PLID> FAILED Test
Test Failed : <Reason / Test>
<further information may be provided>

The following table details the tests and reasons for failure reported on the Dataset (DSLC) Line card.

Dataset (DSLC) Line Tests and Failures Reported	
Reason/Test	**Action Required**
analog loopback through the hybrid	Run a directed diagnostic test on the specified circuit to verify the problem.
digital loopback to the Codec	See above.
modem loopback	See above.
analog loopback cannot be enabled	See above.
the auto polarity circuit is inoperable	See above.
the circuit was not present	See above.
dataset loopback	Run a directed diagnostic test on the specified circuit to verify the problem. Examine/replace the Dataset and associated wiring if required.
modem initialization	See above.
a nil DSW test was specified	None. This is a software problem. Log and note further instances.

DID/Loop Trunk

Full Message Format:

1991-MAR-23 11:07:19 MAINTENANCE A/Active *Minor* SYSTEM001 #0003
MC341 DID/Loop Trunk at location <PLID> FAILED Test
Test Failed: <Test>
<additional information may be provided>

The following table details the test failures reported on the DID/Loop Trunk card.

DID/Loop Trunk Card Tests Reported	
Failed Test	**Action Required**
AC Codec Loopback	Run a directed diagnostic test on the specified circuit to verify the problem. If it persists, refer to the DID/Loop Tie Trunk part of the Troubleshoot section.
AC Codec Loopback Out	See above.
AC Hybrid Loopback	See above.
AC Hybrid Loopback Out	See above.
DC Codec Loopback	See above.
Seize Test	The indicated trunk failed a seize test and has been put out of service. Run a directed seize test on the trunk to verify the problem. See Trunk Card. Each pass of background diagnostics runs the seize test on trunks that are out of service, and returns them to service if they pass.
Signaling	See above.

DID/2 Trunk

Full Message Format:

1991-MAR-23 11:07:19 MAINTENANCE A/Active *Minor* SYSTEM001 #0003
MC349 DID/2 Trunk at location <PLID> FAILED Test
Test Failed: <Test>
<additional information may be provided>

The following table details the test failures reported on the DID/2 Trunk card.

DID/2 Trunk Card Tests Reported	
Failed Test	**Action Required**
AC Codec Loopback	Run a directed diagnostic test on the specified circuit to verify the problem. If it persists, refer to the DID/2 Trunk part of the Troubleshoot section.
AC Hybrid Loopback	See above.
DC Codec Loopback	See above.
Signaling	See above.

DID/3 Trunk

Full Message Format:

1991-MAR-23 11:07:19 MAINTENANCE A/Active *Minor* SYSTEM001 #0003
MC349 DID/3 Trunk at location <PLID> FAILED Test
Test Failed: <Test>
<additional information may be provided>

The following table details the test failures reported on the DID/3 Trunk card.

DID/3 Trunk Card Tests Reported	
Failed Test	**Action Required**
AC Codec Loopback	Do a directed diagnostic test on the specified circuit to verify the problem. If it persists, refer to the DID/3 Trunk part of the Troubleshoot section.
AC Hybrid Loopback	See above.
DC Codec Loopback	See above.
Signaling	See above.

Disk Interface Card

The following tables detail the test failures and MSS Application failures reported on the Disk Interface card.

Full Message Format:

1991-MAR-23 11:07:19 MAINTENANCE A/Active *Minor* SYSTEM001 #0003
MC207 Disk Interface at location <PLID> FAILED Test
BDC slave card # x
<device>
MSS application - <test failed>

Disk Interface Card Test Failures Reported	
Failed Test	**Action Required**
Device fault	For Hard Disk: This is not serious unless it is persistent. If persistent, replace the Hard Disk Drive. Refer to the Disk Subsystem part of the Troubleshoot volume. For RSD drive: This is not serious unless it is persistent. If persistent, replace the RSD drive. Refer to the Mass Storage Subsystem part of the Troubleshoot volume.
Recovery failed	Check for loose connection on the rear of the Hard Disk Unit. Check that power is being supplied to the Hard Disk Unit.
SASI device fault : correctable crc error; no reallocation	This is not serious unless it is persistent. If persistent, replace the Hard Disk Drive. Refer to the Disk Subsystem part of the Troubleshoot volume.
SASI device fault : correctable crc error; reallocated	See above.
SASI device fault : disk requires servicing	Service/replace Hard Disk immediately.

Disk Interface Card Test Failures Reported	
Failed Test	**Action Required**
SASI device fault : format error	This is not serious unless it is persistent. If persistent, replace the Hard Disk Drive. Refer to the Disk Subsystem part of the Troubleshoot volume.
SASI device fault : No seek complete from drive	See above.
SASI device fault : Parity error during SASI Transfer	See above.
SASI device fault : target sector not found	See above.
SASI device fault : Track 00 not found	See above.
SASI device fault : Write fault from disk	See above.
SASI device fault : uncorrectable data error	This will cause an immediate Activity Switch. The Hard Disk must now be recommissioned via backup RSD.

Full Message Format:

1991-MAR-23 11:07:19 MAINTENANCE A/Active *Minor* SYSTEM001 #0003
MC207 Disk Interface at location <PLID> FAILED Test
BDC slave card # x
MSS application - <MSS Application>

Disk Interface Card MSS Application Test Failures Reported	
MSS Application	**Action Required**
DIF fault	This is not serious unless it is persistent. If persistent, replace the specified Disk Interface card. Refer to the Disk Subsystem part of the Troubleshoot section.
DMA timeout	See above.
DMA transfer error on logical bus	See above.
DMA transfer error on slave bus	See above.
SASI device fault : SASI timeout error	See above.
Write verify failed	Service or replace the disk drive.

DNI Line

Full Message Format:

1991-MAR-23 11:07:19 MAINTENANCE A/Active *Minor* SYSTEM001 #0003
MC330 DNI Line at location <PLID> FAILED Test
Test Failed: <Test>

DNI Line Card Tests Reported	
Failed Test	**Action Required**
BPHONE/TPHONE Test	Run a directed diagnostic test to verify the problem. Refer to the SUPERCONSOLE 1000 Console or the appropriate SUPERSET procedure.
DNIC Dataset loopback	Run a directed diagnostic test to verify the problem. Refer to the applicable dataset procedure.
DNIC DS4113 loopback	Run a directed diagnostic test to verify the problem. Refer to the DATASET 4100 Series procedure in the Datasets portion of the Troubleshoot section.
DNIC DS4122 loopback	See above.
DNIC IBM 3270 loopback	See above.
DNIC IBM Controller loopback	See above.
DNIC loopback	Run a directed diagnostic test to verify the problem. Refer to the applicable procedure in the Datasets portion of the Troubleshoot section. Note that the problem has been isolated to the DNI Line circuit.
DX loopback	See above.
EPROM Checksum	Run a directed diagnostic test to verify the problem. Refer to the SUPERCONSOLE 1000 Console or the appropriate SUPERSET procedure.
SC1000 Port Test	See above.

DS1 Formatter

The following details the test failure reasons reported on the DS1 Formatter card. Additional DS1 Formatter card reports are detailed in CEPT Formatter Reports.

Full Message Format:

1991-APR-11 10:18:26 MAINTENANCE A/Active *Critical* SYSTEM001 #0004
MC263 DS1 Formatter at location <PLID>
Type of diagnostics : Background/ Directed/ Warm Start
Scope of the report : Link/ Card/ Hybrid
Test(s) Failed: <see Table>
<additional information may be provided>

Tests Reported	
Failed Test	**Action Required**
Background:	
Channel loopback	Run a directed diagnostic test on the specified circuit to verify the problem. If it persists, refer to the DS1 Formatter part of the Troubleshoot section.
Directed:	
Channel loopback	Re-issue the test command to verify the problem. If it persists, refer to the DS1 Formatter part of the Troubleshoot section.
Hybrid loopback	Re-issue the test command to verify the problem. If it persists, refer to the DS1 Formatter part of the Troubleshoot section.
Warm Start:	
12 volt power Relay test	Load card. If problem persists, refer to the DS1 Formatter part of the Troubleshoot section.
Serial Communications Controller or Direct Memory Access	See above.
Hybrid timing or signaling	See above.
DX failure	See above.

DTMF Receiver

Full Message Format:

1991-MAR-23 11:07:19 MAINTENANCE A/Active Minor* SYSTEM001 #0003
MC380 DTMF Receiver at location <PLID> FAILED Test
Test Failed: Tone Detection
Reason: <Reason>

The following table details the test failure reasons reported on the DTMF Receiver card.

DTMF Receiver Card Test Failure Reasons Reported	
Reason	**Action Required**
Detected Too Many Digits	Run a directed diagnostic test to verify the problem. Refer to the DTMF Receiver part of the Troubleshoot section.
Digit Timeout	See above.
Wrong Tone Detected Digit Sent X Digit Detected Y Receive link: xx Channel: xx Transmit link: xx Channel: xx	See above.

E&M Trunk

Full Message Format:

1991-MAR-23 11:07:19 MAINTENANCE A/Active *Minor* SYSTEM001 #0003
MC342 E&M Trunk at location <PLID> FAILED Test
Test Failed: <Test>
<additional information may be provided>

The following table details the test failures reported on the E&M Trunk card.

E&M Trunk Card Tests Reported	
Failed Test	**Action Required**
AC Codec Loopback	Run a directed diagnostic test on the specified circuit to verify the problem. If it persists, refer to the E&M Trunk part of the Troubleshoot section.
AC Hybrid Loopback	See above.
DC Codec Loopback	See above.
Seize Test	The indicated trunk failed a seize test and has been put out of service. Run a directed seize test on the trunk to verify the problem. Refer to the Trunk Cards section of the Troubleshoot section. Each pass of background diagnostics runs the seize test on trunks that are out of service, and returns them to service if they pass.
Switch Hook	Run a directed diagnostic test on the specified circuit to verify the problem. If it persists, refer to the E&M Trunk part of the Troubleshoot section.

LS/GS Trunk

Full Message Format:

1991-MAR-23 11:07:19 MAINTENANCE A/Active *Minor* SYSTEM001 #0003
MC340 LS/GS Trunk at location <PLID> FAILED Test
Test Failed: <Test>
<additional information may be provided>

The following table details the test failures reported on the LS/GS Trunk card.

LS/GS Trunk Card Tests Reported	
Failed Test	**Action Required**
AC Codec Loopback	Run a directed diagnostic test on the specified circuit to verify the problem. If it persists, refer to the LS/GS Trunk part of the Troubleshoot section.
AC Hybrid Loopback	See above.
DC Codec Loopback	See above.
Seize Test	The indicated trunk failed a seize test and has been put out of service. Run a directed seize test on the trunk to verify the problem. Refer to the Trunk Cards section in the Troubleshoot section. Each pass of background diagnostics runs the seize test on trunks that are out of service, and returns them to service if they pass.
Signaling	Do a directed diagnostic test on the specified circuit to verify the problem. If it persists, refer to the LS/GS Trunk part of the Troubleshoot section.

Main Controller

The following describes the test failure reason reported on the Main Controller. Additional Main Controller reports are detailed in Main Controller Reports.

Full Message Format:

1991-OCT-22 10:04:39 MAINTENANCE A/Active *Minor* SYSTEM001 #0002
MC211 Main Controller IIIE at location <PLID> FAILED Test
TONE GENERATOR TEST REPORT of tone number <tone # >
Reason for failure : Level error
LEVEL READ = 255
FREQUENCY READ = 14974
ENVELOPE COUNT READ = 43

ACTION REQUIRED: Directed Activity Switch should regain tone. If problem persists after Activity Switch, refer to the Main Control Sub-system part of the Troubleshoot volume. The fault could also be a PCM path problem.

Maintenance Panel

Full Message Format:

1991-MAR-23 11:07:19 MAINTENANCE A/ACTIVE *MINOR* SYSTEM001 #0003
MA090 Maint Panel at location <PLID> FAILED Test

The following table lists the test failures reported on the Maintenance panel. Additional Maintenance Panel reports are described in Maintenance panel Reports.

Maintenance Panel Tests Reported	
Failed Test	**Action Required**
BPHONE/TPHONE Test	Run a directed diagnostic test to verify the problem. Refer to the SUPERCONSOLE 1000 Console or the appropriate SUPERSET procedure in the Troubleshoot volume.
DNIC Dataset loopback	Run a directed diagnostic test to verify the problem. Refer to the applicable dataset procedure in the Troubleshoot volume.
DNIC DS4113 loopback	Run a directed diagnostic test to verify the problem. Refer to the DATASET 4100 Series procedure in the Troubleshoot volume.
DNIC DS4122 loopback	See above.
DNIC IBM 3270 loopback	See above.
DNIC IBM Controller loopback	See above.
DNIC loopback	Run a directed diagnostic test to verify the problem. Refer to the applicable dataset procedure in the Troubleshoot volume. Note that the problem has been isolated to the DNI Line circuit.
DX loopback	See above.
EPROM Checksum	Run a directed diagnostic test to verify the problem. Refer to the SUPERCONSOLE 1000 Console or the appropriate SUPERSET procedure in the Troubleshoot volume.
SC1000 Port Test	See above.

OPS Line Card

Full Message Format:

1991-MAR-23 11:07:19 MAINTENANCE A/Active *Minor* SYSTEM001 #0003
MC321 Off-Premise Line at location <PLID> FAILED Test
Test Failed: <Test>
<additional information may be provided>

The following table details the test failures reported on the OPS line card.

OPS Line Card Tests Reported	
Failed Test	**Action Required**
AC Codec Loopback	Do a directed diagnostic test on the specified circuit to verify the problem. If it persists, refer to the OPS Line Card part of the Troubleshoot section.
AC Hybrid Loopback	See above.
DC Codec Loopback	See above.
Signaling	See above.

ONS and ONS CLASS/CLIP Line Cards

Full Message Format:

1991-MAR-23 11:07:19 MAINTENANCE A/Active *Minor* SYSTEM001 #0003
MC320 On-Premise Line at location <PLID> FAILED Test
Test Failed: <Test>
<additional information may be provided>

The following table details the test failures reported on the ONS and ONS CLASS/CLIP line cards.

ONS and ONS CLASS/CLIP Line Card Tests Reported	
Failed Test	**Action Required**
AC Codec Loopback	Do a directed diagnostic test on the specified circuit to verify the problem. If it persists, refer to ONS, ONS CLASS/CLIP, and OPS Line Cards.
AC Hybrid Loopback	See above.
DC Codec Loopback	See above.
Ring Continuity	See above.
Switch Hook	See above.

PCM Path Integrity Test Reports

The following details the test failure report for the PCM Path Integrity test.

Full Message Format:

1991-MAR-23 11:07:19 MAINTENANCE A/Active *Minor* SYSTEM001 #0003
The PCM PATH INTEGRITY TESTING of receive link xx channel xx
between <card name> at location <PLID>
and <card name> at location <PLID> was FAILED.
This channel now has a maint state of out of service, isolated/unisolated
The following cards were found to be faulty :
<faulty card(s)>
<further information is provided if state is isolated>

Action Required: Refer to the PCM Communication Path part of the Troubleshoot section.

Peripheral Control Complex

Full Message Format:

1991-MAR-23 11:07:19 MAINTENANCE A/Active *Minor* SYSTEM001 #0003
MC312 Peripheral Cont I at location <PLID> FAILED Test
Test Failed: <Test>
Reason: <Reason>

The following table details the test failure reasons reported on the Peripheral Control Complex. Additional Peripheral Control Complex reports are detailed in Peripheral Control Complex Reports.

Peripheral Control Complex Test Failure Reasons Reported	
Reason	**Action Required**
Detected Too Many Digits	Run a directed diagnostic test to verify the problem. Refer to the Peripheral Control Complex part of the Troubleshoot section.
Digit Timeout	Run a directed diagnostic test to verify the problem. Refer to the DTMF Receiver part of the Troubleshoot section.
Wrong Tone Detected Digit Sent X Digit Detected Y Receive link: xx Channel: xx Transmit link: xx Channel: xx	Run a directed diagnostic test to verify the problem. Refer to the DTMF Receiver part of the Troubleshoot section.

Peripheral Switch Matrix

Full Message Format:

1991-MAR-21 10:08:29 MAINTENANCE A/Active -Info- SYSTEM001 #0002
MC302 Peripheral Switch Matrix at location <PLID> FAILED Test
<Reason>

The following table details the test failure reasons reported on the Peripheral Switch Matrix.

Peripheral Switch Matrix Test Failure Reasons Reported	
Reason	**Action Required**
DX chip test of receive link xx channel xx	Refer to the Peripheral Switch Subsystem part of the Troubleshoot section.
DX chip test of transmit link xx channel xx	See above.

Tone Detector

Full Message Format:

1991-MAR-22 13:18:39 MAINTENANCE A/Active *Major* SYSTEM001 #0004
MC262 Tone Detector at location <PLID> FAILED Test
Test Failed: <Test>

The following table details the test failures reported on the Tone Detector.

Tone Detector Tests Reported	
Failed Test	**Action Required**
DX Chip Check	Do a directed diagnostic test on the specified circuit to verify the problem. If it persists, refer to the Tone Detector part of the Troubleshoot section.
Envelope Check	See above.
Paged Memory Check	See above.
Level Meter Check	See above.

Test Inconclusive Reports

Full Message Format:

1991-MAR-23 11:07:19 MAINTENANCE A/Active *Minor* SYSTEM001 #0003
<Part number> <card name> at location <PLID> NOT TESTED
<Reason>
<further information may be provided>

The following table details the reasons for a Test Inconclusive report.

Test Inconclusive Report Reasons	
Reason	**Action Required**
Bad response from peripheral	Likely a software fault. Log and note further occurrences.
BDC slave card # x Plane A Hard Disk # x Percent of Resource Lost = x	This is not serious unless the percentage lost is above 80%. This would indicate that trouble is pending. If the percentage is over 90, the disk should be replaced. Refer to the Disk Subsystem part of

Test Inconclusive Report Reasons	
Reason	**Action Required**
	the Troubleshoot volume.
Because of a Tone Detection data error	Use the STATE and CONFIG commands to check the status of the Tone Detector. Do a directed test on the specified Tone Detector. Also inspect the Maintenance Log for indications of Tone Detector problems. Refer to the Troubleshoot volume, as required.
Because of a tone index error	Only tones 0 through 62 are defined. This is not a Tone Generator problem; it is a software error. Next scheduled Activity Switch should clear it up.
Because the tone was not in service	See above.
Circuit allocated to another application	Resource currently occupied. Next pass of background diagnostics will retry test. Use the STATE command to obtain further information. If persistent, do a directed test. Refer to the Troubleshoot section, as required.
Circuit does not exist	Likely data fault in System Configuration Table (Customer Data Entry). CDE data should be examined. Could also be problem with the hybrid. Ensure circuit is physically present. If persistent, refer to the Troubleshoot volume.
Circuit in Locked Out state - test not allowed	Use the STATE command to verify. Next pass of background diagnostics will retry test.
Circuit switch link was closed	Use PCM commands to investigate further.
DATA COMPARISON ERROR - data written = 43 data read = 72 number of errors = 14	Hard Disk may be faulty. If log message appears consistently, refer to the Hard Disk part of the Troubleshoot volume.
Data Transceiver is not responding.	Ensure Data Transceiver is functional (via CONFIG command). Refer to the Troubleshoot volume, as required.
For query parameter fail, bad parameter sent for requested operation	See above.
For read operation, bad parameter sent for requested operation,	See above.
For write operation, bad parameter sent for requested operation	Invalid test parameters. Next pass of background diagnostic will retry tests.
Glare - device origination while under test	Call processing took control of the specified circuit just before, or during, the testing. Next pass of the background diagnostics will retry tests.
No peripheral buffers available - busy with traffic	System is heavily loaded with traffic. Try a directed test. If persistent, could be software fault.
No response from peripheral	Ensure Peripheral subsystems are currently in service. Inspect the Maintenance Log for indications of peripheral subsystem problems. Refer to the Troubleshoot section, as required.
Test Device not responding	Very high traffic on peripheral OR card not seated properly OR card was pulled out during test OR could be hardware/software bug. Ensure card is plugged in properly, and do a directed test.

Test Inconclusive Report Reasons	
Reason	**Action Required**
Software Error - Invalid Test Request	None. Log and note further occurrences.
Test not allowed for current circuit state	Use the STATE command to investigate further. Background diagnostics will retry test.
The CEPT Formatter was not available / not responding	Examine logs for problems with the CEPT Formatter. If so, refer to the CEPT Formatter part of the Troubleshoot section.
The Conference card was not available / not responding	Examine logs for problems with the Conference card. If so, refer to the Conference card part of the Troubleshoot section.
The DS1 Formatter was not available / not responding	Examine logs for problems with the DS1 Formatter card. If so, refer to the DS1 Formatter part of the Troubleshoot volume.
The Sys. Tone Generator was not available / not responding	Examine logs for problems with the Tone Generator. If there is a problem, refer to the Tone Generator part of the Troubleshoot volume.
The Tone Detector is not responding.	Verify that the Tone Detector is functional. Switch Main Controller activity as required. Refer to the Troubleshoot volume, if necessary.
The tone detector was not in the system	Verify the absence of the Tone Detector.
The tone detector was not available	Use the STATE and CONFIG commands to check status of the Tone Detector. Also inspect the Maintenance Log for indications of Tone Detector problems. Refer to the Troubleshoot volume, as required.
The Tone Generator was not available	Examine logs for problems with the Tone Generator. If there is a problem, refer to the Tone Generator part of the Troubleshoot volume.
There was no Data Transceiver available	See above.
There was no reply from the Tone Detector	Use the STATE and CONFIG commands to check status of the Tone Detector. Do a directed test on the specified Tone Detector. Also inspect the Maintenance Log for indications of Tone Detector problems. Refer to the Troubleshoot volume, as required.
There were no PCM Channels available	Use PCM commands to investigate further. Next pass of background diagnostics will retry test.
Timeout requesting circuit - no response from peripheral	Ensure Peripheral subsystems are currently in service. Inspect the Maintenance Log for indications of peripheral subsystem problems. Refer to the Troubleshoot volume, as required.
Timeout while waiting for response from diagnostic	System may be heavily loaded. If problem persists, there is likely a software error. Background diagnostics will test circuit on next pass. Watch for further occurrences.
Unable to allocate PCM channels for test	Use PCM commands to investigate further. Also, check the status of the peripheral subsystem. Next pass of the background diagnostics will retry tests.

TMS320 Reports

The TMS320 reports are provided to report changes in the status of the following Digital Signal Processor (DSP) functions in a Main Controller:

- Conference
- Tone Detection
- Tone Generation
- DTMF

The status of the DSPs can be changed from TAKEN OUT OF SERVICE to RETURNED TO SERVICE, and from RETURNED TO SERVICE to TAKEN OUT OF SERVICE.

Full Message Format:

1991-JUL-7 07:07:07 MAINTENANCE A/Active *Major* SYSTEM001 #007
MC211AA <DSP> at location <PLID> TAKEN OUT OF SERVICE
Reason: <reason>

The <reason> for the change of status may be either LOSS OF SANITY or FAILED DIAGNOSTICS.
The DSP that is taken out of service is automatically reloaded and returned to service, causing the following message to be reported:

Full Message Format:

1991-JUL-7 07:08:02 MAINTENANCE A/Active *Major* SYSTEM001 #007
MC211AA <DSP> at location <PLID> RETURNED TO SERVICE

Action Required: If the problem persists, the Main Controller card should be replaced.

Tone Generator Upkeep Reports

Full Message Format:

1991-MAR-23 11:07:19 MAINTENANCE A/Active *Minor* SYSTEM001 #0003
MC223 System Tone Gen. at location <PLID>
TONE GENERATOR UPKEEP REPORT: <Report type>

The following table details the type of Tone Generator Upkeep reports generated.

Tone Generator Upkeep Report Types	
Report Type	**Action Required**
The 200 msec clock is suspect This fault has just been detected	If this is a transient fault, (i.e. one that is detected, corrected, detected, corrected, etc.) it may indicate overloading of the Message Switch. Inspect the Maintenance Log to check the health of the Message Switch. If the fault occurs once, and is not corrected even after an activity switch, refer to the Tone Generator part of the Troubleshoot section.
The 200 msec clock is suspect This fault has now been corrected	See above.
The parity error detecting circuit has failed	This message indicates a pending Activity Switch. If it persists after the Switch, refer to the Tone Generator part of

Tone Generator Upkeep Report Types	
Report Type	**Action Required**
This fault has just been detected	the Troubleshoot section.
The parity error detecting circuit has failed This fault has now been corrected	This indicates that the problem was spurious. Watch for recurrences of the same problem. If persistent, refer to the Tone Generator part of the Troubleshoot section.
Parity error rate exceeds threshold This fault has just been detected	This message indicates a pending Activity Switch. If it persists after the Switch, refer to the Tone Generator part of the Troubleshoot section.
Parity error rate exceeds threshold This fault has now been corrected	This indicates that the problem was spurious. Watch for recurrences of the same problem. If persistent, refer to the Tone Generator part of the Troubleshoot section.
12.8 sec task lost This fault has just been detected	This message indicates a pending Activity Switch. If it persists after the Switch, refer to the Tone Generator part of the Troubleshoot section.
12.8 sec task lost This fault has now been corrected	This indicates that the problem was spurious. Watch for recurrences of the same problem. If persistent, refer to the Tone Generator part of the Troubleshooting section.
100 msec task lost This fault has just been detected	This message indicates a pending Activity Switch. If it persists after the Switch, refer to the Tone Generator part of the Troubleshoot section.
100 msec task lost This fault has now been corrected	This indicates that the problem was spurious. Watch for recurrences of the same problem. If persistent, refer to the Tone Generator part of the Troubleshoot section.
10 msec task lost This fault has just been detected	This message indicates a pending Activity Switch. If it persists after the Switch, refer to the Tone Generator part of the Troubleshoot volume.
10 msec task lost This fault has now been corrected	This indicates that the problem was spurious. Watch for recurrences of the same problem. If persistent, refer to the Tone Generator part of the Troubleshoot section.
The tone plan data was corrupted for tone <tone # > This fault has just been detected	This message indicates a pending Activity Switch. Indicates problems with the Message Switch Processor. Examine the Maintenance Log for further indications of Message Switch Processor problems. Refer to the Message Switch Subsystem part of the Troubleshoot section.
The tone plan data was corrupted for tone <tone # > This fault has now been corrected	This indicates that the problem was spurious. Watch for recurrences of the same problem. If persistent, refer to the Tone Generator part of the Troubleshoot volume.
A checksum error has been detected on tone <tone # > This fault has just been detected	This message indicates a pending Activity Switch. Indicates problems with the Message Switch Processor. Examine the Maintenance Log for further indications of Message Switch Processor problems. Refer to the Message Switch Subsystem part of the Troubleshoot volume.
A checksum error has been detected on tone <tone # > This fault has now been corrected	This indicates that the problem was spurious. Watch for recurrences of the same problem. If persistent, refer to the Tone Generator part of the Troubleshoot volume.
CTG/message switch activity conflict This fault has just been detected	This message indicates a pending Activity Switch. If it persists after the Switch, refer to the Tone Generator part of the Troubleshoot section.

Tone Generator Upkeep Report Types	
Report Type	**Action Required**
Tone Generator/message switch activity conflict This fault has now been corrected	This indicates that the problem was spurious. Watch for recurrences of the same problem. If persistent, refer to the Tone Generator part of the Troubleshoot section.
Unable to sync with external clock This fault has just been detected.	This message indicates a pending Activity Switch. If it persists after the Switch, refer to the Tone Generator part of the Troubleshoot section.
Unable to sync with external clock This fault has now been corrected.	This indicates that the problem was spurious. Watch for recurrences of the same problem. If persistent, refer to the Tone Generator part of the Troubleshoot section.
Clock synchronization lost This fault has just been detected	This message indicates a pending Activity Switch. If it persists after the Switch, refer to the Tone Generator part of the Troubleshoot section
Clock synchronization lost This fault has now been corrected	This indicates that the problem was spurious. Watch for recurrences of the same problem. If persistent, refer to the Tone Generator part of the Troubleshoot section.
Loss of c244 or frame pulse This fault has just been detected	This message indicates a pending Activity Switch. If it persists after the Switch, refer to the Tone Generator part of the Troubleshoot section. Note that this fault could be due to faulty PCM Link(s).
Loss of c244 or frame pulse This fault has now been corrected	This indicates that the problem was spurious. Watch for recurrences of the same problem. If persistent, refer to the Tone Generator part of the Troubleshoot section.

Toneplan Reports

Full Message Format:

1991-APR-01 05:23:11 MAINTENANCE A/Active *Minor* SYSTEM001 #0002
TONEPLAN : <message>

The following table lists the messages which may be provided in the Toneplan reports.

Toneplan Report Messages	
Message	**Action Required**
Toneplan data is for wrong machine variant: <filename>	Wrong toneplan has been put on the hard disk. Check for the file on the other plane. If present and working, switch and copy it over. Otherwise, contact MITEL Field Service.
Cannot open toneplan data file: <filename>	Check if the toneplan file is on the hard disk. If not, check for it on the other plane. If present, switch and copy it over. Otherwise, contact MITEL Field Service.
Nationality of toneplan data is incorrect: <filename>	Wrong toneplan has been put on the hard disk. Check for the file on the other plane. If present and working, switch and copy it over. Otherwise, contact MITEL Field Service.
Problems reading toneplan data file: <filename>	Check if the toneplan file is on the hard disk. Check for problems with the hard disk. Check for problems with the file system. Initiate an activity switch.
Size of toneplan data exceeds reserved area: xxxxxx	Check the other plane's file (for example, compare size and data). If present and working, switch and copy over. Otherwise, contact MITEL Field Service.

Traffic Congestion Reports

Full Message Format:

1991-APR-01 05:23:11 MAINTENANCE A/Active *Minor* SYSTEM001 #0002
TRAFFIC CONGESTION REPORT FROM 04:12 TO 08:12
<message>

The following table lists the messages which may be provided in the Traffic Congestion reports. Every 4 hours, the Maintenance Logs will report all traffic congestion failures within that period. Verify no actual hardware problems exist. Note the occurrence of these messages and circumstances of their appearance for future reference.

Traffic Congestion Report Messages	
Message	**Action Required**
Fault Count: No receivers available : xx No call records available : xx No call processes available : xx Callback queue full : xx Camp-on queue full : xx No conference manager processes available : xx No MSDN Message blocks available : xx No MSDN blocks available : xx	No receivers available. Could either indicate that some DTMF receivers are not functioning, or that the system is not configured with enough receivers. Use the CONFIG and STATE commands to check status of the DTMF receivers. Other faults. Not serious if not persistent, or during heavy traffic periods. If persistent, especially during light traffic periods, an activity switch may be required.
No Trunks available : (Trunk group # : Total)	Could indicate either that some trunks are not functioning, or that the system is not configured with enough DTMF receivers. Use the CONFIG and STATE commands to check the status of the trunks.
No channel available: (Cabinet #, peripheral shelf pair, Total calls denied)	Use the PCM TOTALS command to see if peripheral PCM links are out of service. If this occurs persistently during low traffic periods, an activity switch may be required.

Unauthorized User Report

The following message will be provided by the Unauthorized User report.

Full Message Format:

1991-MAR-21 10:08:29 MAINTENANCE A/Active -Info- SYSTEM001 #0002
Unauthorized user disconnected from Maintenance Terminal.

Action Required: None. This message appears after three consecutive login failures.

Valid Restart Postmortem Reports

Full Message Format:

1991-MAR-22 13:18:39 MAINTENANCE A/Active *Minor* SYSTEM001 #0004
VALID Restart postmortem information follows
Time stamp : <time and date>
The Restart of the Active plane was due to
<reason>

The following table details the failure reasons reported in the Valid Restart Postmortem reports.

Valid Restart Postmortem Reports Reason For Failure Messages	
Reason	**Action**
The old state was <any valid state> the new state is manbusy source of change: <one of the valid usernames>	The card shown was placed in the Manbusy state by use of the BUSY command. Verify that this is the desired condition.
a HARDWARE TRAP; a register dump follows <register dump>	Problem may have been cleared up by the restart. Likely caused by bus errors. Inspect the Maintenance Log for Bus Error Reports, and refer to the Troubleshoot volume, as required. If persistent, refer problem to MITEL Field Support or Maintenance Supervisor.
a SOFTWARE TRAP; a register dump follows <register dump>	Problem may have been cleared up by the restart. Indicates code corruption. If persistent, refer problem to MITEL Field Support or Maintenance Supervisor.
A very important process dying; the process info follows <process info>	Problem may have been cleared up by the restart. If persistent, refer problem to MITEL Field Support or Maintenance Supervisor.
Directed Load command being issued	Verify that an Activity Switch also occurred.
Forced resynchronization of the redundant file system	None. Restart is normal in this situation. Usually caused by the JOIN command.
Parity error at location 001DEDFE	Problem may have been cleared up by the restart. If persistent, refer to MITEL Field Support or Maintenance Supervisor.
Restart information from hardware status register was due to - power up - sanity - external source - software - power failure	Problem may have been cleared up by the restart. If persistent, refer problem to MITEL Field Service.
Some inconsistencies in the Database	Could indicate a corrupted database, particularly if a new software load was recently installed. May be necessary to reload database from backup RSDs.
The Active Plane becoming Inactive	Verify that the Activity Switch took place.
the ACTIVITY SWITCH being called ACTIVITY SWITCH to <card name> from <card name> was SUCCESSFUL The reason(s) for the switch attempt: <one or more of the valid activity switch reasons>	Verify that the activity switch took place, then consult “Activity Switch Reasons”.
The GUARDIAN Cleanup routine failing	Problem may have been cleared up by the restart. If persistent, refer problem to MITEL Field Service.
The inability to access the Disk Subsystem	Could indicate that the MSS/BDC and the Main Controller are out of sync. Check logs for problems with Main Controller and/or Mass Storage Subsystem. Problem may have been cleared up by the restart. If persistent, refer problem to MITEL Field Service.

Valid Restart Postmortem Reports Reason For Failure Messages	
Reason	**Action**
The inability to create the Database catalog.	Could indicate that the MSS/BDC and the Main Controller are out of sync. Could also be problem in MSS. Inspect the Maintenance Log for further indications of these. Problem may have been cleared up by the restart. May be necessary to reload database from backup RSDs.
The RESTART routine being called	Verify that an Activity Switch also occurred.
The REBOOT being called	See above.
The user wanting to start again	See above.

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