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DMS-100 Family

Service Problem Analysis

Administration Guide

BASE 15 and up Standard 05.01 September 2000

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About this document

How to check the version and issue of this document

The version and issue of the document are indicated by numbers, for example, 01.01.

The first two digits indicate the version. The version number increases each time the document is updated to support a new software release. For example, the first release of a document is 01.01. In the *next* software release cycle, the first release of the same document is 02.01.

The second two digits indicate the issue. The issue number increases each time the document is revised but re released in the *same* software release cycle. For example, the second release of a document in the same software release cycle is 01.02.

To determine which version of this document applies to the software in your office and how documentation for your product is organized, check the release information in *Product Documentation Directory*, 297-8991-001.

References in this document

The following documents are referred to in this document:

- *Basic Administration Procedures*, 297-1001-300
- *Basic Translations Tools Guide*, 297-1001-360
- *Capacity Administration Guide*, 297-1001-304
- *Customer Data Schema Reference Manual*
- *DMS-100 Family Commands Reference Manual*, 297-1001-822
- *DMS-100 Family Commands Reference Manual*, 297-8991-824
- *Input/Output System Reference Manual*, 297-1001-129
- *Loading Administration Guide*, 297-1001-306
- *Log Report Reference Manual*
- *Memory Administration Guide*, 297-1001-305

- *Office Parameters Reference Manual*
- *Operational Measurements Reference Manual*
- *Translations Guide*

What precautionary messages mean

The types of precautionary messages used in Nortel Networks documents include attention boxes and danger, warning, and caution messages.

An attention box identifies information that is necessary for the proper performance of a procedure or task or the correct interpretation of information or data. Danger, warning, and caution messages indicate possible risks.

Examples of the precautionary messages follow.

ATTENTION

Information needed to perform a task

ATTENTION

If the unused DS-3 ports are not de provisioned before a DS-1/VT Mapper is installed, the DS-1 traffic will not be carried through the DS-1/VT Mapper, even though the DS-1/VT Mapper is properly provisioned.

DANGER

Possibility of personal injury



DANGER

Risk of electrocution

Do not open the front panel of the inverter unless fuses F1, F2, and F3 have been removed. The inverter contains high-voltage lines. Until the fuses are removed, the high-voltage lines are active, and you risk being electrocuted.

WARNING

Possibility of equipment damage

**WARNING****Damage to the backplane connector pins**

Align the card before seating it, to avoid bending the backplane connector pins. Use light thumb pressure to align the card with the connectors. Next, use the levers on the card to seat the card into the connectors.

CAUTION

Possibility of service interruption or degradation

**CAUTION****Possible loss of service**

Before continuing, confirm that you are removing the card from the inactive unit of the peripheral module. Subscriber service will be lost if you remove a card from the active unit.

How commands, parameters, and responses are represented

Commands, parameters, and responses in this document conform to the following conventions.

Input prompt (>)

An input prompt (>) indicates that the information that follows is a command:

>BSY

Commands and fixed parameters

Commands and fixed parameters that are entered at a MAP terminal are shown in uppercase letters:

>BSY CTRL

Variables

Variables are shown in lowercase letters:

>BSY CTRL ctrl_no

The letters or numbers that the variable represents must be entered. Each variable is explained in a list that follows the command string.

Responses

Responses correspond to the MAP display and are shown in a different type:

```
FP 3 Busy CTRL 0: Command request has been submitted.  
FP 3 Busy CTRL 0: Command passed.
```

The following excerpt from a procedure shows the command syntax used in this document:

- 1 Manually busy the CTRL on the inactive plane by typing

>BSY CTRL ctrl_no

and pressing the Enter key.

where

ctrl_no

is the number of the CTRL (0 or 1)

Example of a MAP response:

```
FP 3 Busy CTRL 0: Command request has been submitted.  
FP 3 Busy CTRL 0: Command passed.
```

1 What is service problem analysis?

Service as it is discussed in this guide means the service that is experienced by the customers of the operating company. The purpose of service problem analysis is systematically to monitor the level of service to your customers and, by analyzing the data obtained, to anticipate switch problems as they develop. Through prompt, effective action and reporting the operating company personnel can minimize the impact of switch problems on customer service.

This introductory chapter provides an overview of service problem analysis from the analyst's point of view. The emphasis is on ways in which you can use service and performance monitoring to detect potential trouble in the switch early enough to prevent serious problems that might degrade or disrupt service to the customer.

The service problem analyst's role

The role of the service problem analyst varies considerably from one operating company to another. Because the analyst's work involves both administration and maintenance, the position may be part of network administration or network maintenance. It may also reside in groups such as facilities administration or line support.

Similarly, the functions of the analyst are different depending on the size of the operating company, the style of operation, and factors such as whether the job is considered to be mainly administrative or more closely related to the maintenance area.

No matter what group you report to and what your job description includes, if you are a service problem analyst, your work can probably be summarized under these four headings:

- planning a service monitoring program
- analyzing the data produced by the program
- reporting on the results of analysis
- initiating follow-up procedures

1-2 What is service problem analysis?

The following is a more complete list of service problem analysis functions compiled from the collective experience of a number of operating companies:

- compute and analyze local and toll network service measurements for accessibility, switchability, and transmission
- record and summarize the results of this analysis
- plan, establish, and implement procedures to monitor overall switch and network performance to ensure that in-service requirements are being met
- analyze all exception reports, determine trouble conditions, log and refer for corrective action
- analyze line equipment output messages for blockage problems and correlation with other exception reports
- review official results standards and determine percentage of overflow thresholds for network components
- monitor, log, and analyze dial line and incoming trunk service evaluation charge notices by entity
- monitor reports, such as dial tone speed (DTS) and incoming matching loss (IML), to identify service problems
- monitor machine performance to identify any abnormal operating condition that could affect data output and data validity
- establish and communicate emergency plans to be followed during machine overloads
- establish procedures for activating and deactivating network management controls, and evaluate service when controls are implemented
- analyze and identify causes of equipment problems, and coordinate with responsible work group to restore equipment and re-establish load balancing

The aims of this guide are to provide an overview of these functions and to indicate where additional information can be obtained, should you require it.

Defining service problems

In your role as a service problem analyst, you are concerned primarily with three key factors in the operation of the system:

- accessibility—ensuring that customers have prompt access to the telephone network at all times
- switchability—ensuring that the switch itself is processing calls effectively
- transmission—ensuring that the quality of the call meets acceptable standards

Problems that affect service may be related either to the software that runs the switch or to the hardware—the switch itself or any of the peripheral modules (PM) in the system. This section describes the problems you will most commonly encounter during service monitoring.

Service problems are most likely to occur during periods when the switch or its components are operating at or close to maximum capacity. By studying normal usage patterns on the network, it is possible to predict when traffic will be at its peak—that is, at what time of day the greatest number of people will be using the phones. This is called the busy hour.

Similarly it's possible to predict that certain days will be busier than others. Even certain seasons of the year are predictably busier than others. The three months (not necessarily consecutive) that have the heaviest traffic volumes are called the busy season. The single hour with the most traffic is called the average busy season busy hour (ABSBH). The peak hour on the busiest day is called the high day busy hour (HDBH).

Traffic peaks may also occur predictably at other times, for example on holidays such as Mother's Day and Christmas. Because these kinds of peaks are predictable, they should not normally present serious service problems in a well-managed, adequately provisioned office. There are also unpredictable events, such as an earthquake or other natural or man-made disaster, that can cause overload resulting in severe service problems during the period of the emergency.

Overload conditions

A call can be viewed as a series of interactions (exchanges of information in the form of messages) between the PMs and the central control complex (CCC) area of the switch. The software that resides in the CCC area to process calls is executed in response to information (messages) from the PMs.

During high traffic periods, the system may momentarily become overloaded. When this happens, call processing capacity is reduced, and the resulting congestion will cause service problems. To offset this, internal overload controls are invoked automatically when conditions threaten call processing capacity.

Four factors may contribute to overload conditions:

- shortage of tone receivers
- shortage of speech paths
- shortage of processing capacity
- limits on system capacity

Overloading occurs because the resources required to complete a call are shared by several phones. Overload problems could be eliminated by providing dedicated resources—a speech link channel and a junctor path from network modules—for every phone. However, such a design would waste resources most of the time, so all telephone switches are designed so that phones will share common equipment resources.

To minimize the possibility of overload conditions, the switching equipment is designed to operate at or near capacity even when it is offered more than its rated load. Overload controls maintain service by providing flow control, overload protection, and overload indicators. However, if the designed load is exceeded, some of the traffic must be delayed or blocked. The exact effect depends on the nature of the overload.

For more information on the impact of overload conditions on service indicators, see the chapter, "Analyzing service data." For additional information, refer to the *Loading Administration Guide*, 297–1001–306.

Restarts

A restart is an ordered initialization of every module in the system. This may take place following the installation of new software or hardware system components, or as a last-resort form of error recovery while the system is operational.

Three types of restart may occur on an operational switch, and all will have some affect on service indicators, depending on the severity of the restart.

- A warm restart is the least severe. Temporary data store (DSTEMP) is cleared and deallocated. All other types of data store survive intact.
- A cold restart is more severe and will have an impact on some service indicators. Permanent data store (DSPERM) survives, but its contents are suspect. Many modules reinitialize DSPERM on cold restarts.
- A reload restart is more severe still. It has all the affects of a cold restart except that in this case DSPERM is cleared.

A fourth type of restart, the base restart, is a drastic measure. It disables the system's call processing capability and is not intended to be performed in a system that is operational.

Some specific affects of restarts on service indicators are described in the chapters, "Tools for monitoring service indicators" and "Analyzing service data." For additional information on restarts, refer to the *Memory Administration Guide*, 297–1001–305.

Network management controls

Network management controls are tools that enable operating companies' maintenance and administration personnel to make optimum use of available facilities under adverse conditions, such as an overload or failure.

From your point of view as a service problem analyst, network management controls are supplementary tools to enhance the throughput of the switch and to ensure network completion of traffic. The internal overload controls are used first to throttle traffic under unexpected conditions. If the conditions become so extreme that grade of service and call processing are seriously affected, network management controls may be implemented.

Grade of service is one of the primary factors used as the basis for implementing network management controls in any situation. The effect of network management controls on service indicators is discussed in more detail in the chapter, "Features that affect service."

Software load

Service problems are sometimes associated with a software load. When a new software is loaded onto the system, it is possible that changes are made inadvertently that affect service indicators, or that a difference between the new software and the old version affects service indicators.

For example, service monitoring is based on operational measurements (OM), which in turn reflect regular scanning of various switch functions. If data is not being scanned normally, this will affect OMs, and you may get skewed results from your monitoring. A software load is one possible cause of abnormal data scanning.

When service problems appears to be unrelated to overload conditions, check with maintenance to see if there has been a recent software load. If this is the case, you can use the software monitoring system (DMSMON) to compare the performance of the new software release with the previous version in your office. The functions and use of DMSMON are described in the section "software monitoring system" in the chapter "Tools for monitoring service indicators." For more information on problems associated with a software load, see also the section "Troubleshooting with OMs" in the chapter, "Analyzing service data." The use of OMs is reviewed in the next section.

Operational measurements and logs

The information that you need to monitor the service provided by the switch is obtained from operational measurements. The OM system organizes the collection, recording, and display of OM data for hardware and software resources in the DMS. Data is collected for individual pieces of equipment (such as attendant consoles), on a group basis (such as for trunk groups), or for

an entire DMS office. OMs are widely used in the administration and maintenance of the DMS system.

You can define OMs that will routinely monitor particular characteristics of calls, such as type, duration, and completion status. You can also obtain details of switch performance in regular reports produced through the log system.

Data accumulation

Data is gathered through constant monitoring of events in the DMS system. The results are entered into registers in the DMS data store. The OM registers are organized into OM groups, each group containing only OM registers that relate to a particular DMS component. For example OM group TRK contains registers for trunks, and OM group LMD contains registers for lines.

Many register names begin with letters indicating the source of the call. For example, ORIG for line-originated calls, and IN for incoming trunk calls. Similarly, the endings of many register names reflect the call's destination. For example, TRM if terminating to lines, and OUT if outgoing to trunks.

Some of the registers in the data store are used to record the number of times that a specific kind of event has occurred. Others monitor and record the amount of time used by events. The measurement of a single event is called a peg count, while measurements taken at scanning intervals are called usage counts. Both can be used as indicators of the service levels of a switch.

OM measurement classes

Because OM information is useful only if it can be related to a consistent time period, all measurements are collected in time intervals called measurement classes. The classes are active, holding, and accumulating.

OMs are stored first in a series of active registers, which are updated whenever new data is entered. At regular intervals, say every 30 minutes, data is transferred to holding registers, and the active registers are cleared to begin new counts for the next period. When the next transfer occurs, the holding registers are cleared to make way for new data.

Accumulating registers are used to store data for longer periods than the intervals between the transfer of data from active to holding registers. Data from the holding registers is copied into the accumulating registers following each transfer from the active registers. Any active or holding register can be assigned to an accumulating class. So if you need a report for OM registers that monitor trunks, you should assign OM group TRK to the accumulating class.

There are 32 available OM classes, of which 30 are user definable accumulating classes. The other two are the active and holding classes. Every OM group in the DMS system is included in these two classes. However, it is

the accumulating classes that are used by administration and maintenance to monitor customer service and system performance. Accumulating classes are named and defined in table OMACC.

Note: Excessive OM accumulations use up DMS data store and real time and could eventually affect switch performance. Each OM class you create for service monitoring should have a specific purpose and have only necessary OM groups and fields associated with it.

There are two NTPs that explain the OM system. *Basic Administration Procedures*, 297–1001–300, provides an introduction to the system with detailed procedures. The *Operational Measurements Reference Manual* contains a cross–reference of all OM registers and their related OM groups.

OMs to monitor

The following OMs can be viewed as general purpose tools for the prediction and analysis of service problems, and should be monitored regularly:

- ATTAMA
- PM
- PMTYPE
- TRMTCM
- TRMTER
- TRMTFR
- TRMTRS

The treatment (TRM) OMs determine why a call received a particular treatment as a result of call blockage or failure. For example, OM group TRMTRS_TRSNBLH measures the number of call attempts that are blocked in the networks and sent to tone or to announcement.

The measurements PM and PMTYPE indicate equipment failures that may impact on grade of service, and can be used to determine if a particular failure caused a load service curve impact.

You may also want to monitor the following OMs regularly to determine the usage of various features.

Table 1-1 (Sheet 1 of 2)

CALLFWD	CFBATT	call forwarding MDC
CALLFWD	CFDATT	call forwarding MDC
CALLFWD	CFUATT	call forwarding MDC

Table 1-1 (Sheet 2 of 2)

CALLWAIT	CWDATT	call waiting MDC
CALLWAIT	CWOATT	call waiting MDC
CALLWAIT	CWTTATT	call waiting MDC
CFWPOTS	CFWPATT	call forwarding POTS
CPICKUP	CPUATT	call pick-up
CWTPOTS	CWTPATT	call waiting POTS
RCF	RCFOFFRD	remote call forwarding
SCPOTS	SCPAATT	speed calling POTS
SCPOTS	SCPFATT	speed calling POTS
SPEEDCALL	SCLATT	speed calling MDC
SPEEDCALL	SCSATT	speed calling MDC
TWCIBM	TWCATT	3-way calling MDC
TWCPOTS	TWCPATT	3-way calling POTS

For more detailed information on monitoring operational measurements for service problem analysis, refer to the section "Troubleshooting with OMs" in the chapter "Analyzing service data."

Log reports

All significant events that occur during operation of the DMS are recorded by the log system. Log reports include status and activity reports, reports on hardware or software faults, test results, changes in state, and other events or conditions likely to affect the performance of the switch. Some reports are produced automatically by the system, others are created as a result of specific requests. Log reports are stored in the data store, and can be routed to output devices such as printers or terminals.

For more information on the log system, see the section "Service monitoring program" in this chapter; also refer to the *Log Reports Reference Manual*.

Grade of service delay

In any configuration with multiple links, a customer attempting to place a telephone call encounters one of three conditions: completion, delay, or blockage. Completion is when the caller is connected without delay to the number dialed, or receives an indication that the line is busy. Delay occurs when no equipment is immediately available to handle the call, so that the call

must wait in a queue until a server is free. Blockage results from a shortage of servers or of paths to servers such that the call is not completed.

Grade of service is the term used to describe the quality of service the switch provides to its users, measured in terms of calls completed, delayed, or blocked. It refers to the percentage of calls that experience some degree of difficulty in being processed. Problems may be encountered in two areas:

- originating calls—problems occurring from the time the customer picks up the phone (goes off-hook) and is either waiting for dial tone or waiting for the number dialed to be processed
- terminating calls—problems occurring while the customer is waiting to be connected to the called number

This section reviews the tools available for measuring delays in originating and terminating calls.

Originating calls

The DMS-100 offers two features for monitoring and measuring the frequency of significant delays in originating calls: dial tone speed recording (DTSR) and receiver attachment delay recorder (RADR). Although both measure the delay encountered by originating calls, their application is different. DTSR tests only the delay for originating lines. RADR measures the delay for originating lines and for trunks if they need receivers to originate.

DTSR

A delay in receiving dial tone of less than three seconds is generally considered acceptable by most operating companies. More than three seconds is considered unacceptable. Grade of service indicates the maximum permissible percentage of calls with dial tone delay of more than three seconds. During the average busy season busy hour (ABSBH) the limit is 1.5 percent, but during the high day busy hour (HDBH) the limit rises to 20 percent of calls.

The DTSR feature obtains data by simulating calls on line modules (LM), and by observing actual calls on line concentrating modules (LCM). DTSR activity is reflected in OM groups DTSR and SITE, which record the following information:

- line types available
- number of calls recorded during the accumulation period
- number of calls delayed more than three seconds

From this it is a simple matter to calculate the percentage of delayed calls and compare the results with the acceptable grade of service.

OM group DTSRPM records dial tone speed for each peripheral module.

RADR

RADR measures incoming start-to-dial delay (ISDD)—the delay experienced in attaching a receiver to an incoming trunk or originating line once the customer has dialed a number. Unlike DTSR, which is preset to record all delays of more than three seconds, the delay threshold for RADR is definable. The delay threshold is defined in table RADR, where you can also define the receiver type to be monitored. Calls delayed by more than the specified time are recorded in OM group RADR.

Note: Activating RADR for line receivers may affect OM groups DTSR and SITE, and cause dial tone delay for customers. Because both DTSR and RADR require receivers for testing, they may compete for the same receivers if they are both active at the same time.

The following table provides a side-by-side comparison of these two features, summarizing their similarities and their differences.

Table 1-2 Comparison of DTSR and RADR

Purpose	Systematic testing for originating delay to: speech link block, junctor block, lack of receivers, lack of call processing resources.	
Application	DTSR	RADR
	Measures delay only from originating lines whether a receiver is needed or not.	Measures delay from any originating line or trunk that requires any type of receiver.
Strategy	Use DTSR to measure all delays from originating lines.	Use RADR to measure delays from incoming MF trunks.
Number of test calls per hour	On LMs, 900 (1 call from each type of phone every 4 s); on LCMs, the number of actual calls.	Machine-definable up to 1800
Registers pegged	After 3 seconds delay in receiving dial tone.	After either of two user-definable thresholds in table RADR.

Terminating calls

Once the customer has received dial tone and the called number information has been processed, the switch attempts to establish a network path to the idle terminating line or trunk, but it is still possible for the call to be blocked. The balance between the cost of providing terminating service and the quality of

service is expressed as a percentage. This percentage is the maximum acceptable number of calls that can be lost due to the lack of terminating equipment.

Terminating matching loss

A shortage of junctor paths or available speech links can make it impossible to connect the call even though the terminating line or trunk is idle. At this stage the call may be delayed or actually lost as a result of shortage of shared equipment or other problems. This type of blockage is known as terminating matching loss (TML).

There are two types of matching loss when terminating to an idle *line*:

- incoming matching loss (IML) is the system's failure to set up a network connection from an incoming trunk to a line after the system has verified that the line is idle
- intra-office matching loss (IAML) is the system's failure to set up a network connection from an originating line to a terminating line after the system has verified that the line is idle

In addition, there are two types of matching loss when terminating to an idle *trunk*:

- outgoing matching loss (OML) is the system's failure to set up a network connection from an originating line to an outgoing trunk when at least one trunk in the group is available
- tandem matching loss (TAML) is the system's failure to set up a network connection from an incoming trunk to an outgoing trunk when at least one trunk in the group is available

The telephone industry has developed the following time-consistent busy hour measurement criteria for matching loss.

Table 1-3 Measurement criteria for matching loss

Type	ABSBH	HDBH
IML	2%	20%
IAML	2%	20%
OML	1%	20%
TAML	0.5%	2%

Information on terminating matching loss is recorded by the OM system

- If the blockage occurs in the network, the TRS_NBLH register is pegged. Use OM group TS to determine which network is causing the problem.
- If the blockage occurs in a peripheral module, the TRS_NBLN (TRMTRS_TRSNBLN) register is pegged. Use OM register LMD_TERMBLK to determine which line PM is the problem.

Refer to the *Operational Measurements Reference Manual* for detailed OM group and register descriptions. You can also find more information on service and performance measurements, in the *Capacity Administration Guide*, 297–1001–304, and the *Loading Administration Guide*, 297–1001–306.

Tools for service monitoring

Operational measurements and log reports are the basic tools in the DMS system for monitoring customer service and switch performance. But with hundreds of OMs and log reports, it can be difficult even for an experienced analyst to digest and use effectively the huge amount of information available.

Any monitoring program can be made a great deal more efficient and effective, however, by using some of the specialized tools that are available to aid in focussed analysis. These tools are available in feature packages that may be installed on your DMS system. In the chapter, "Tools for monitoring service analysis" the purpose and functions of several of these feature packages are reviewed. They are:

- **Switch Performance Monitoring System–feature package NTX738AB.** This system is designed as an aid for service, maintenance, and provisioning. The system monitors all areas of switch operation and outputs regular reports on performance based on a wide range of standardized index values computed from OMs. The system provides 36 service–related indexes to measure switch performance from the caller's point of view.
- **Real–time Performance Indicators–feature package NTX291AA.** This facility uses the Activity tool to provide information on the amount of traffic being handled, CPU occupancy for various types of system activities, grade of service, overload protection, and dial tone speed. Measurements for each activity are taken over a one minute sampling period and are output as logs.
- **CPStatus Tool–feature package NTX291.** This tool indicates switch performance according to the switch's capacity threshold, or engineering level. It does this by measuring all CPU occupancies and calculating the remaining CPU time available for call processing. CPStatus information is available at any level of the MAP.
- **Service Analysis–feature package NTX065AA.** This system provides what is commonly called service observing, with the added advantage that

it combines both human and machine monitoring of service. The analyst observes randomly selected calls and monitors the quality of service to the customer. At the same time the switch automatically monitors the call to provide the analyst with non-subjective data and cumulative timing.

- **DMS monitoring system (DMSMON).** This feature enables you to monitor software performance and to compare the performance of a new software release in your office with the earlier version. Printouts provide a wide range of information about the system configuration and operation over a specified period. DMSMON is available on all DMS-100 Family systems.

Service monitoring program

The primary goal of a service monitoring program is to identify switch problems, analyze the cause, and initiate remedial action *before* they develop to the point where the customers are affected. Using tools such as those described above, in combination with the special reports described in the chapter, "Special reports," you can prepare a program that will meet this goal. This section offers some general guidelines.

Data collection

Step one is to develop a data collection plan. Your plan should identify which OM classes you will be using and specify which OM groups are assigned to each class. It should also specify the time periods over which the class will accumulate data.

How you decide which OM classes are necessary and what OMs to assign to each will depend on how your company operates and should be discussed with your colleagues in administration, maintenance, and provisioning. Some suggestions are included in the Section, "Troubleshooting with OMs," in the chapter, "Analyzing service data".

For information on setting up OM groups and classes, refer to *Basic Administration Procedures*, 297-1001-300.

Documentation

Document your plan and ensure that all service personnel are aware of it. Keep a trouble log—by documenting problems as they occur, and how they were resolved, you can save valuable time when a similar problem occurs in the future. Know where to find the information you need in the appropriate Northern Telecom Publications (NTP).

Communication

Establish channels of communication within administration and maintenance so that you can communicate quickly when urgent problems arise. Keep other interested groups informed of the results of day-to-day troubleshooting.

1-14 What is service problem analysis?

2 Tools for monitoring service indicators

DMS monitoring system

A product CM load (PCL) is a DMS-100 Family software upgrade. The DMS monitoring system (DMSMON) provides you with information about hardware and software configurations, as well as reporting a wide range of data that you can use to assess the performance of the PCL release in your office, and identify areas of concern before they become service-affecting problems.

You can also use DMSMON to compare your current software with the previous version. Each PCL contains new features as well as changes to existing features. These changes in the software that runs the system may affect service indicators, and unless you are aware of the differences, your service monitoring plan may produce skewed results even though there is nothing wrong with the switch. To ensure the continued accuracy of your reports (and to avoid possible hours of troubleshooting non-existent problems), you can manually compare the new software with the previous version using DMSMON.

This section provides a summary of the DMSMON feature. For additional information, refer to *DMS-100 Family Commands Reference Manual*, 297-1001-822, and to the *DMS-100 Family Command Interface Reference Manual*, 297-8991-824.

DMSMON features

DMSMON displays information about patches, restarts, switch downtime, memory usage, high water mark values, and counts of logs, traps, software errors, and mismatches. If required, you can also obtain reports on the configuration of peripherals, the types and numbers of memory cards, and counts of hardware and other fixed items in your office.

With a single command you can produce an office performance report (OPR) that monitors switch performance and highlights potential trouble areas. If the switch performance monitoring system (SPMS) feature is present in your

system, DMSMON includes SPMS data in office performance reports. SPMS is described in an earlier section of this chapter.

To obtain counts of events, DMSMON polls the software registers used for OMs and transfers the data it obtains into special accumulating registers. These registers continue to accumulate until either they are reset manually or a system reload restart occurs. The data obtained over fixed periods of time can be printed out to enable you to compare DMSMON data on a range of parameters with data obtained from monitoring the previous PCL.

DMSMON operation

Access the DMS monitoring system from the CI level by entering the command DMSMON. Once you have entered the DMSMON level, the commands can be entered directly.

The commands available at the DMSMON level are summarized in the following table and are described in more detail in the rest of this section.

Table 2-1 DMSMON command summary (Sheet 1 of 3)

Command	Description
DUMPALL	Dumps the following information: <ul style="list-style-type: none">• counts of major OMs• log counts• number of restarts and associated downtime• traps, software error, and mismatches• configuration of PMs• equipment counts• memory usage• PM loads on the switch• new patches• high water CP occupancy• high water mark for office parameters• digit block counts
OMS	Counts major OMs
LOGCOUNT	Counts log occurrences
RESTARTINFO	Reports number of restarts and associated downtime
Note: Enter the reset commands in the form: RESET [PARAMETER], for example, RESET OMS.	

Table 2-1 DMSMON command summary (Sheet 2 of 3)

Command	Description
LOGBUFFER	Dumps the TRAP, SWERR and MISC buffers
PMCONFIG	Displays the office PM configuration
EQPCOUNTS	Displays the office equipment counts
MEMORY	Displays memory usage
PMLOADS	Displays the PM loads currently available
ASSESS	Displays normalized peg counts
HIGHPARMS	Displays the high water marks for office parameters
COUNT	Executes the count procedures
NEWPATCH	Lists the new patches applied to the switch
HIGHLOGS	Displays the 20 logs most frequently issued
HIGHCPOCC	Displays high water CP occupancy
OPR	Creates an office performance report
DBLOCKS	Displays digit block counts
RESET	Can be entered with any of the following parameters:
ALL	Resets OMs, log counts, and restarts to zero, and sets the new patch date to the current date
(Note)	
OMS	Resets the OMs to zero
(Note)	
LOGCOUNT	Resets the log counts to zero
(Note)	
RESTARTINFO	Resets the number of restarts to zero
(Note)	
NEWPATCH	Sets the new patch date to the current date
(Note)	
Note: Enter the reset commands in the form: RESET [PARAMETER], for example, RESET OMS.	

Table 2-1 DMSMON command summary (Sheet 3 of 3)

Command	Description
IBNEXPCT	Finds the number of free tuple spaces available in the four internal tuple expansion tables for table IBNXLA
QUIT	Quits the DMSMON level
Note: Enter the reset commands in the form: RESET [PARAMETER], for example, RESET OMS.	



CAUTION

Loss of data

When you use the RESET command all accumulated data in the specified DMSMON registers are permanently deleted.

DUMPALL

The DUMPALL command dumps all the data in the DMS monitoring system since the counts were last reset to zero, either manually with the RESET parameter or automatically following a system reload restart.

OMS

The OMS command uses information obtained from the operational measurements system to produce a printout of event information. Only OMs for which at least one event was recorded are displayed. Following is a sample of a partial report obtained with the OMS command.

Figure 2-1 OMS report display

```
Office CLLI:
BCS Release:
Polled from 1991/05/28 01:45 to 1991/05/28 04:11
Duration: 0 days 02 hr. 26 min.
*****
* Major Oms *
*****
AVN$ORIG =5 AVN$TERM =1 AVN$NOUT =1 CMC$ERRR =12
CMC$LERR =4 CP1$LPOV =123 CP1$ODEN =12 CP1$CCB0 =5
CP1$WAKO =44 CPU$MTCH =51 CPU$SYNC =12 CPU$WARM =53
CPU$COLD =13 EXT$OVFL =29 NMC$MERRR =11 NMC$SERR =24
NMC$SFLT =86 OFZ$ORIG =460 OFZ$OTRM =289

LCM

PMT$ERRR =5 PMT$FULT =7 PMT$SBPM =1 PMT$SBTO =2 PMT$PSER =9
PMT$RGER =1 PMT$RGTF =1
```

The counts of events are based on information obtained from the OM system. Each item consists of a prefix representing the name of the OM group associated with the register, and a suffix representing the associated OM field. The dollar (\$) sign serves as a separator. The number following the equals (=) sign indicates the number of events recorded during the monitoring period.

The first block consists of items that are not associated with PMs. The subsequent sections are counts based on OM registers associated with individual PMs. They are grouped according to the type of PM, for example LCM, MTM, SCM.

LOGCOUNT

The LOGCOUNT command produces a complete list of log reports output since the last restart or reset, sorted by report type and report number, as in the following example.

Figure 2-2 Log report counts display

```

*****
*      Log Report Counts      *
*****

Last reset:   1991/05/28  00:00
Date dumped:  1991/05/28  01:54

SOS..105: 1  LOST..101: 3  CC...115: 4  CC...116: 4  CC...107: 1
CMC..100: 2  IOD..304: 3  IOD..305: 6  IOD..306: 6  IOD..308: 3

```

To interpret the information in this example, SOS represents the name of the log report subsystem, the periods (..) serve as separators, 105 is the number of the log report, and 1 is the number of reports of this type accumulated since the date indicated at the top of the report. SWER.000 reports the number of PROTOLOGS, which includes SWERR, TRAP and INIT.

RESTARTINFO

The RESTARTINFO command provides a breakdown of the number and type of restarts - system or manual, warm or cold - since the last reload restart or reset command. The printout also indicates total downtime.

LOGBUFFER

The LOGBUFFER command produces a report indicating the number and type of traps, software errors, and mismatches that have been recorded since the last reload restart, or reset. The following example shows a partial printout.

Figure 2-3 Log buffer report display

```
*****
*      Traps, SWERRs, and MM buffers      *
*****

*****
*              Traps              *
*****

Trap number 282, Write to Protected Data Store
At 52536A=FTRPCEVT.AQ01:FTR_PCCONF#00EE
PTA= 40B5D5=FTRUTLUI.AQ01:MAKECONN#072D
PROCID= #211F #C003: IOANP, Entry Module: IOANP SSTI: #034B
Current count of this trap type: 13
Traceback:
 2608CA=IOANP.DI01:RTS_ROUT#00B0
 260613=IOANP.DI01:IOAN_PRO#0077
 01D6C1=MODULES.BX22:INITIALIZEP#0009
 001C0B=PROCS.EB04:LIVEANDD#0007

DS hold register: 000061 (No Owner)
FIR= #0004
TRAP on active CPU.
CPU number 1, CMC 0 OFFLINE, CMC 1 ONLINE

*****
*              SWERRs              *
*****

SWER  MAY28 01:38:55 7300 DATA
REASON=0000, PROCID= #6102 #8003: ABEL, TEXT=LOG: PROC 1
03C12D=LOGS.DT05:BIND_PRO#0029
AF3BC4=TCAPTSTD.AG01:TCAPTST_#03BC
0200B7=SYSINIT.EC19:ABELCODE#00B7
007EDC=ABEL.AC01:ABELPROC#0006
01D6C1=MODULES.BX22:INITIALIZEP#0009
011C0B=PROCS.EB04:LIVEANDD#0007

*****
*              Mismatches              *
*****

Log Buffer Empty.
```

In this example, the “Traps” section is identical to the information contained in the CC subsystem number 103 log reports. For more information on traps refer to the *Log Reports Reference Manual*. The “SWERRs” section displays the current contents of the SWERR logs buffer. The “Mismatches” section displays the contents of the MM log buffer.

PMCONFIG

The PMCONFIG command prints out the configuration of the following equipment in your office:

- line trunk controllers (LTC)
- line group controllers (LGC)
- remote switching centres (RSC)
- line concentrating modules (LCM)

EQPCOUNTS

The EQPCOUNTS command provides a complete listing of all the peripherals, other hardware and fixed items, including the various types of lines, trunks, and receivers in the office. For peripherals, the counts indicate whether each is in-service or commissioned, as in the following example. For a complete list of equipment counts, and the CI commands required to display each individual count, refer to Appendix A, Equipment Counts.

Figure 2-4 Peripheral list display

Number of MTM PMs:	Insv:	4	Comm:	0
Number of STM PMs:	Insv:	10	Comm:	0
Number of LGC PMs:	Insv:	0	Comm:	1

MEMORY

The MEMORY command provides information on each card in the SuperNode, as in the following partial example.

Figure 2-5 Card list display

```

*****
*           Memory           *
*****

CPU 0:

+++++++
CARD  EQP   SHLF   SLOT  EQPEC  RELEASE  MODULES  MEGS   MEGS  SPARE  FAULTY
NO.    NO.                PER CARD  PER MOD  MODS   OR  ISTB
0      NO    0      19    -      -        -      -     -     -     -
1      YES   0      16    9X14DA  20      3      8     24    1     NO
2      YES   0      15    9X14BB  21      3      2     6     3     NO
3      YES   0      14    9X14BB  21      3      2     6     2     NO
4      YES   0      13    9X14BB  21      3      2     6     0     NO

```

The complete printout includes information about the cards in both CPUs (CPU 0 and CPU 1), as well as the total amount of memory used and the amount of memory still available.

PMLOADS

The PMLOADS command prints out a list of PM loads in the office.

ASSESS

The ASSESS command produces a printout of performance peg counts, including all PM types, that have been normalized per 10 000 calls.

HIGHPARMS

The HIGHPARMS command prints out tables of daily usage for critical office parameters indicating high water marks for the previous 30 days. The reports are printed in reverse order, starting with the previous day's figures. If there is no data for a particular parameter on any day, it is not displayed.

COUNT

The COUNT command counts various switch equipment.

NEWPATCH

The NEWPATCH command displays all patches that have been applied to the switch since either the initial program load, the last reload restart, or the last time the RESET NEWPATCH command was entered.

HIGHLOGS

The HIGHLOGS command displays the 20 logs that have occurred most often in the switch since the last time the RESET LOGCOUNT command was entered, or since the last reload restart. Knowing which logs are occurring most frequently often provides an early indication of potential trouble areas in the switch.

HIGHCPOCC

Using a scan rate of 60 times per hour, the HIGHCPOCC command provides the hourly peak percentage of time that the control component (CC) spent on call processing (CP) and input/output (I/O) for each of the past 30 days. The following example shows a partial printout.

Figure 2-6 High water CP occupancy display

```

*****
*      High Water CP Occupancy      *
*****

Scan Rate:  1 / minute

TIME
DATE          0-1    1-2    2-3    3-4    4-5    5-6    6-7
1991/05/20    15     23     13     16     18     12     24.
1991/05/19    23     17     15     19     14     17     21
1991/05/18    19     24     23     12     17     20     19
1991/05/17    26     14     11     17     20     17     23
1991/05/16    29     28     14     13     15     21     24
.
.
.
1991/04/21    23     17     15     19     14     17     21

```

This information can be used to monitor the daily CP and I/O usage of the switch.

OPR

The OPR command provides a quick and simple way to obtain a comprehensive report on overall office performance. If you have the SPMS feature package installed on your switch, the OPR command will produce a report comprising the following information:

- overall office configuration, including
 - equipment counts
 - total memory available
 - restart history
 - new patches applied
- overall office performance using SPMS data
- unacceptable SPMS indices (below 80%) based on the month-to-date field
- unsatisfactory SPMS indices (between 80% and 90%) based on the month-to-date field
- high runner logs

If the SPMS feature package is not present in your switch, the report will not include SPMS results.

DBLOCKS

The DBLOCKS command displays the digit block counts for various digilator2 tables.

The display provides the following information:

- the table name
- the pool number indicates the exact digilator2 pool
- the number of digit blocks being used
- the number of digit blocks allocated
- the percent used
- and the percent available

This information helps you determine how many digilator or digilator2 blocks are left in certain critical tables.

Figure 2-7 DBLOCKS display

```
Number of digit blocks being used by DNINV:Pool 0: 151
Number of digit blocks allocated for DNINV:Pool 0: 32766
Percent Used: 0.5      Percent Available: 99.5

Number of digit blocks being used by DNINV:Pool 1: 155
Number of digit blocks allocated for DNINV:Pool 1: 32766
Percent Used: 0.5      Percent Available: 99.5

Number of digit blocks being used by DNINV:Pool 2: 180
Number of digit blocks allocated for DNINV:Pool 2: 32766
Percent Used: 0.6      Percent Available: 99.4

Number of digit blocks being used by DNINV:Pool 3: 186
Number of digit blocks allocated for DNINV:Pool 3: 32766
Percent Used: 0.6      Percent Available: 99.4
>
```

RESET

The RESET command resets the specified parameter(s) to zero, and permanently deletes all accumulated data in the process. The following parameters can be used with the RESET command:

- ALL resets the OM, log, and restart counts to zero, and sets the new patch date to the current date.
- OMS resets the OM counts to zero.
- LOGCOUNT resets the log counts to zero.
- RESTARTINFO resets the restart count to zero.
- NEWPATCH resets the new patch date to the current date.

IBNEXPCT

The IBNEXPCT command finds the number of free tuple spaces in each of the four internal tuple expansion tables for table IBNXLA. The IBNEXPCT

command does not change existing data. Use this command to get statistical information about the use of the internal tuple expansion tables for table IBNXLA. Refer to the following table for an example of the IBNEXPCT command.

Figure 2-8 Example of the DMSMON subcommand IBNEXPCT

```

>IBNEXPCT

-----
The number of free tuple spaces available in the internal
expanded tables of table IBNXLA
-----
Tuple expansion table corresponding to 10-digit digilator
pool1:12
Tuple expansion table corresponding to 10-digit digilator
pool2:10
Tuple expansion table corresponding to 12-digit digilator
pool :21
Tuple expansion table corresponding to 16-digit digilator
pool :20

```

QUIT

The QUIT command quits the DMSMON level.

CI Command DNINVCI

In addition to using the DMSMON command to display system information, you can use the CI command DNINVCI to:

- force the allocation of a terminating office number (TOFCNO) tree to a selected digilator2 pool
- allow the system to distribute the TOFCNO trees evenly over the four digilator2 pools
- display all area code-office code combinations belonging to a specified digilator2 pool

Examples

The following are examples of the DNINVCI command functions.

Subcommand SETPOOL

Use the DNINVCI subcommand SETPOOL to force a new area code-office code combination to a specified digilator2 pool and set the OVERFLOW option. When the OVERFLOW option is set to yes, new areacode-officecode entries can overflow to the next available pool when the current pool reaches it's maximum allocation. The following example shows the input required to select digilator2 pool 3, set overflow to ON, and the system response.

Figure 2-9 Example of the DNINVC I command subcommand SETPOOL

```
>DNINVC I SETPOOL 3 YES
DIGILATOR2 POOL ASSIGNMENT IS SET TO FIXED
THE CURRENT DIGILATOR2 POOL IS NOW 3
OVERFLOW OPTION IS ON
>
```

If the specified pool is 99% full, the following system message appears.

```
>DNINVC I SETPOOL 3 YES
POOL 3 IS NINETY-NINE PERCENT FULL, PLEASE SELECT
ANOTHER POOL
>
```

Subcommand DISTRIBUTE

Use the DNINVC I subcommand DISTRIBUTE to override the SETPOOL option and distribute the TOFCNO trees evenly over the four digilator2 pools. The following example shows the input required to distribute digilator2 pool assignment and the system response.

Figure 2-10 Example of the DNINVC I command subcommand DISTRIBUTE

```
>DNINVC I DISTRIBUTE
CURRENT DIGILATOR2 POOL ALLOCATION IS NOW "DISTRIBUTED"
>
```

Subcommand QPOOL

Use the DNINVC I subcommand QPOOL to display all the area code-office code combinations held in a specified digilator2 pool. The following example shows the input required to display all areacode-officecode combinations held in digilator2 pool 3 and the system response.

Figure 2-11 Example of the DNINVC I command subcommand QPOOL

```

>DNINVC I QPOOL 3
THE FOLLOWING AREACODE-OFCCODE COMBINATIONS BELONG TO POOL 3:
416 463
416 333
613 663
TOTAL: 3 areacode-ofccode combinations IN POOL3
>

```

Subcommand QTOFCNAME

Use the DNINVC I subcommand QTOFCNAME to display the pool to which an areacode-officecode combination belongs. If the areacode-officecode is not allocated, it will show the next available pool. These examples show the input required to display the pool number that holds areacode-officecode combination 416 463, and the different system responses.

Figure 2-12 shows the 416 463 areacode-officecode assigned to pool 3.

Figure 2-12 Example of the DNINVC I subcommand QTOFCNAME

```

>DNINVC I QTOFCNAME 416 463
>
THE 416 463 COMBINATION IS IN POOL 3
>

```

Figure 2-13 shows

- 416 463 areacode-officecode is not assigned
- digilator2 blocks available

Figure 2-13 Example of the DNINVC I subcommand QTOFCNAME

```

>DNINVC I QTOFCNAME 416 463
>
THE 416 463 COMBINATION HAS NOT BEEN ALLOCATED, THE NEXT
AVAILABLE POOL IS 2
>

```

2-14 Tools for monitoring service indicators

Figure 2-14 shows

- allocation method is **FIXED** or **OVERFLOW** is not allowed
- 416 463 areacode-officecode is not assigned
- no digilator2 blocks available

Figure 2-14 Example of the DNINVC I subcommand QTOFCNAME

```
>DNINVC I QTOFCNAME 416 463
>
  THE 416 463 COMBINATION HAS NOT BEEN ALLOCATED, THERE ARE NO
MORE DIGILATOR2 BLOCKS AVAILABLE FOR NEW AREACODE-OFCCODE.
PLEASE TRY "DISTRIBUTED" ALLOCATION METHOD.
>
```

Figure 2-15 shows

- allocation method is **DISTRIBUTED** or **OVERFLOW** allowed
- 416 463 areacode-officecode is unassigned
- no digilator2 blocks available

Figure 2-15 Example of the DNINVC I subcommand QTOFCNAME

```
>DNINVC I QTOFCNAME 416 463
>
  THE 416 463 COMBINATION HAS NOT BEEN ALLOCATED, THERE ARE NO
MORE DIGILATOR2 BLOCKS AVAILABLE FOR NEW AREACODE-OFCCODE.
>
```

Prompts

The system prompts for the DNINVC command are shown in the following table.

Table 2-2 Input prompts for the DNINVC command

Prompt	Value	Definition
SETPOOL	0, 1, 2, or 3	Force a DN using a new areacode-officecode combination to the Pool number specified.
	YES or NO	Enter YES to allow the current pool to overflow to the next available pool. Enter NO to stop pool overflow.
QPOOL	0, 1, 2, or 3	Display all areacode-officecode combinations held in the pool specified. areacode-officecode combinations appear as they are datafilled in table TOFCNAME.
QTOFCNAME	areacode-ofccode	Display the pool number assigned to the areacode-officecode combination specified.
DISTRIBUTE		Override the SETPOOL option and distribute digilator2 trees evenly over all digilator2 pools.

3 Features that affect service

Many of the features that are available for the DMS switch will have some measurable impact on service indicators. In some cases the effects are minor, in others they are drastic. This chapter describes some of these features, the situations in which they are likely to be used, and what effects they have on service and performance.

Network management controls

Network management (NWM) controls are typically used to limit or alter traffic during a severe overload situation or when other adverse conditions threaten switch performance. They are supplementary tools, used to enhance the throughput of the switch and the completion of network traffic only if internal controls are unable to cope with traffic conditions satisfactorily.

Some NWM controls are automatic, triggered by traffic loads exceeding pre-set thresholds. Others are activated manually or by using variable thresholds. The use of controls may also be pre-planned for anticipated high network traffic days, such as Mother's Day or national holidays. In an unplanned situation—such as that resulting from an earthquake, major electrical power failure, or other natural or man-made disaster—the overload may be so extreme that grade of service and throughput are significantly affected and NWM controls will be implemented.

In any of these situations, grade of service measurements and other basic service indicators will be key factors in determining if and when to implement NWM controls. These controls measure, monitor, and manipulate the flow of traffic. Once controls have been implemented, their use will affect a range of service indicators and will show up in your monitoring program.

Most of the NWM controls are contained in feature packages Network Management (NTX060AB) and Network Management Enhanced (NTX060BB). You access the NWM controls through a series of menus by entering the NWM command at the CI level of the MAP display. Most NWM features are optional, and are ordered by the operating company for each office as required. It may be that not all the features described in this section are installed in any given office.

The focus in this section is on the impact that these controls have on service indicators. Following is a brief description of the relevant NWM controls.

The following are automatic controls (AutoCtrl):

Dynamic overload control (DOC) DOC controls automatically apply NWM signals in response to an external signal or an overload condition detected in the switch. There are two DOC components in the NWM feature package: IDOC and PPLN, also called RDOC.

Internal dynamic overload control (IDOC) This auto control scans traffic conditions once a minute and reacts when it detects internal congestion above or below its pre-set thresholds. Information on IDOC activity is recorded by OM group MACHCONG, and registers MCCPUCT and MCU.

Preplanned control (PPLN) An auto control that applies DOC in response to an external signal from a connecting office. Also known as remote DOC (RDOC).

Automatic out-of-chain reroute (AOCR) Automatically checks for idle capacity in out-of-chain routes and provides extended routing for calls that overflow their in-chain final trunk groups. AOCR overrides any other auto control that is active.

The following are group controls (GrpCtrl):

Directional reservation equipment (DRE) This group control gives priority to incoming traffic when it is applied to selected two-way trunk groups. Originating traffic is skip-routed (this technique is also known as route-advance). OM groups TRK (register DEFLDCA) and NWMTGCNT (registers NWMTGAFF and NWMTGATT) record DRE activity. Log NWM100 is generated when DRE is activated or deactivated for a trunk group.

Protective reservation equipment (PRE) Similar to DRE, but acts only on alternate routed (AR) traffic. Direct routed (DR) traffic is allowed full access. OM groups TRK (register DEFLDCA) and NWMTGCNT (registers NWMTGAFF and NWMTGATT), record PRE activity. Log NWM101 is generated when PRE is activated or deactivated for a trunk group.

Selective trunk reservation (STR) This control is an extension of DRE and PRE to include hard-to-reach (HTR) codes, for example, a phone number used for a radio phone-in show. OM groups TRK (register DEFLDCA) and NWMTGCNT (registers NWMTGAFF, NWMTGATT) record STR activity. Log NWM106 is generated when STR is activated or deactivated for a trunk group.

Cancel to (CANT) This control blocks a set percentage of the AR and DR traffic offered to a particular traffic group and reroutes it to treatment NCA, EA1, or EA2. OM groups TRK (register DEFLDCA) and NWMTGCNT (registers NWMTGAFF, NWMTGATT) record CANT activity. Log NWM102 is generated when CANT is activated or deactivated for a trunk group.

Cancel from (CANF) Diverts the overflow traffic from selected trunk groups from continuing to the next group within the route list of trunks. Similar to CANT in that it blocks a set percentage of both AR and DR traffic. OM groups TRK (register DEFLDCA), and NWMTGCNT (registers NWMTGAFF and NWMTGATT) record CANF activity. Log NWM103 is generated when CANF is activated or deactivated for a trunk group.

Skip (SKIP) Skip routes a set percentage of the traffic of a specified outgoing trunk group to the next trunk group in the routing chain. OM groups TRK (register DEFLDCA) and NWMTGCNT (registers NWMTGAFF and NWMTGATT) record SKIP activity. Log NWM104 is generated when SKIP is activated or deactivated for a trunk group.

Incoming trunk busy (ITB) Restricts incoming attempts by selectively making busy (removing from service) a percentage of those trunks that have remote-make-busy capability. Log NWM105 is generated when ITB is activated or deactivated for a trunk group.

Selective incoming load control (SILC) Restricts incoming traffic to selected trunk groups according to set percentage or rate values, by routing calls to a tone to warn the caller that the call failed to complete. OM group NWMSILC, register TRKSILC, count calls that are blocked by SILC.

Flexible reroute (FRR) Allows dynamic rerouting of telephone traffic when needed for quick response to network traffic congestion and overload. Activation of FRR affects OM groups NWMFRRCT and NWMFRRTG. Log NWM107 is generated when flexible reroute control is applied to or removed from a two-way or outgoing trunk.

Bidirectional reservation control (BRC) This control is used only for Japanese Public Network Integrated Services Digital Network user part (JPN ISUP) two-way trunks. BRC employs the traffic equilibrium method to reserve a percentage of trunks for incoming calls and another percentage for outgoing calls. Incoming traffic is not blocked by BRC, only outgoing calls are rerouted if the percentages specified are exceeded.

Time assigned speech interpolation type B (TASI-B) This control sets up more calls than the number of wires would otherwise allow by multiplexing analog or digital voice channels on certain types of trunks. Used only on the DMS-300 international gateway switch, it is part of feature package

NTX308AA. OM groups TRK (register DEFLDCA) and NWMTGCNT (registers NWMTGAFF and NWMTGATT) record TASI activity. Log NWM108 is generated when TASI is activated or deactivated for a trunk group.

The following are code controls (CodeCtrl):

Code blocking (CBK) Blocks a set percentage (PCT) or rate (GAP) of traffic from entering the network, according to its destination code, and reroutes it to treatment NCA, EA1, or EA2. CBK is also an international code control (IntCCtrl). Activation of code blocking affects OM group CBK and pegs registers CBKCNT and CBKPASS. Log NWM 110 is generated when the PCT code block control is activated or deactivated. Log NWM 113 is generated when the GAP code block control is activated or deactivated.

Preroute peg (PRP) Used for studying traffic levels routed to specified destination codes, PRP pegs all calls to codes CCODE, ACODE, NAC, or PFX, but does not block any. Activation of PRP affects OM groups PRP and IPRP.

Hard-to-reach flag (HTRF) Allows NWM to flag certain codes as hard-to-reach (HTR). This control is used in conjunction with STR to control mass calling.

Hard-to-reach peg (HTRP) This international code control gives peg counts on suspected HTR destination codes. There is no blocking. The OM group is IHTRP

The following is a reroute control (RteCtrl):

Reroute (RRTE) Allows the rerouting of a set percentage of traffic from a designated route list to a different route list in the routing chain, known as out-of-chain routing. The register RRTCNT in OM group RRTE, records reroute activity

Operational measurements

A complete list of the operational measurements that are relevant to NWM features is provided in the following table. You can access these OMs from the CI level of the MAP display using the OMSHOW command. For a complete

description of OM groups, please refer to the *Operational Measurements Reference Manual*.

Table 3-1 OM groups monitoring NWM features (Sheet 1 of 2)

Group	Description
ANN	Recorded announcements
CBK	Code blocking
CP	Call processing
CP2	Call processing
CPUSTAT	Central processing unit status
DCRDEST	Dynamically controlled routing destination group
DCRLINK	Dynamically controlled routing link group
DCRMISC	Dynamically controlled routing miscellaneous group
DTSR	Dial tone speed recording
ESP	Essential service protection
EXT	Extension block
ICBK	International code block group
IHTRP	International hard-to-reach code point group
IPRD	International preroute point group
MACHACT	Machine activity
MACHCONG	Machine congestion group
NWMFRRCT	NWM flexible reroute counts group
NWMFRRTG	NWM flexible reroute trunk groups group
NWMSILC	NWM selective incoming load control group
NWMTGCNT	NWM trunk group count group
OFZ	Office traffic summary
OFZ2	Office traffic summary
OTS	Office traffic summary
PRP	Preroute point group

Table 3-1 OM groups monitoring NWM features (Sheet 2 of 2)

Group	Description
RADR	Receiver attachment delay recorder
RCVR	Receiver service circuits
RRTE	Reroute feature
SITE	Traffic and DTSR for remote sites
TRK	Trunk groups OM group

Other network controls

There are several other network control features not included in either the Network Management (NWM) feature package (NTX060AB) or the Enhanced Network Management (NWM) feature package (NTX060BB). The following features are of particular interest for service analysis:

- line load control (LLC)
- essential services protection (ESP)
- dynamically controlled routing (DCR)
- mass calling (MASSCALL)

Line load control

When activated, the LLC feature limits line traffic handled by the DMS by allowing only lines specifically designated as essential to originate calls. Other originating lines are routed to lockout. This control can only be implemented manually. When LLC is removed, all lines in the lockout state are returned to service. LLC has no effect on terminating calls.

LLC is included in feature package NTX902, which is not part of the network management (NWM) group of controls described in the previous sections. It is operated by a switch control that is applied from the MAP CI level, although it can also be applied or removed from an NWM menu.

All lines connected to a DMS switch can be designated as essential or non-essential. Service orders are used to designate essential line numbers (ELN) by entries in the field OPLIST of the table LENLINES. When LCC is activated, the central control allows only ELNs to originate calls. The effects of LLC will show up in registers monitoring call processing.

When the LLC feature is activated, a critical alarm is set, and log LLC100 is generated. Log LLC101 is generated when LLC is deactivated, and the system returns to a no-alarm state. The OM group LLC provides information on the activity of this feature. The associated registers are LLCA, LLCB, and LLCC.

Essential services protection

ESP is similar to LLC, providing preferential grade of service for users of ELNs. When ESP is active, calls originating from lines designated as essential are given priority in the queue over calls originating from other lines. Essential lines are designated in field OPTLIST of tables LENLINES and IBNLINES.

Callers on non-essential lines may experience dial tone delay when ESP is active. If all the originations in the queue are ELN lines, then essential lines may also be delayed. To avoid this situation, the number of ELNs in an office should never exceed the number of CCBs set by the parameter NCCBS of the table OFCENG.

Because the number of ELN lines affects dial tone speed, it is recommended that not more than 10 percent of all lines in an office, or on any one line concentrating device (LCD), be datafilled with ELNs. Exceeding this limit reduces the effectiveness of ESP and could result in excessive delays for ELN and non-ELN lines.

Activation of the ESP feature increments ELN activities in OM group ESP, (registers ESPORIG, ESPOVRD, ESPDELAY, ESPPMORIG, PMSTL, PMBLK, and PMCCO). It also causes changes to the incrementing of OM group DTSR.

Dynamically controlled routing

DCR reserves idle trunks in trunk groups so that it can provide routes for overflowing traffic that is separated by one or two links (offices) from an originating toll switch. Offices designated in the table DCROPT as members of the DCR network are referred to as DCR offices.

Each switch with the DCR feature send its idle trunk and trunk overflow data to a processor at 10 second intervals. The network processor (NP) takes a "snapshot" of the entire network of DCR offices, then uses this to calculate its recommendations for each call that overflows a trunk group. Calculations are based on

- detection of switch overload according to CPU usage
- detection of a dead system
- traffic volume according to OMs
- trunk group status as indicated by overflows
- fixed and alternative routes that are assigned in the DMS routing tables.

Some NWM controls affect the NP calculations if they are active at the same time as DCR. These controls are

Table 3-2

DRE	SILC	AOCR
CANT	RRTE	STR
CANF	PRE	SKIP

There are two modes of operation in a DCR office. When DCR is active, all calls become DCR calls (either tandem or non-tandem) with ensured routing. If DCR is suspended, the switch is automatically in fixed hierarchical routing (FHR) mode.

DCR activity is reflected in OM groups DCRDEST, DCR LINK, DCRICTRK, DCRMISC, EXT, and TRK. Log DCR100 and a minor alarm are generated when the switch is removed from the DRC network. Log DCR101 is generated when a DCR change of mode occurs.

Receiver attachment delay recorder (RADR)

The use of this feature is described in the chapter “Tools for monitoring service indicators” Activating RADR for line receivers may affect OM groups RADR, DTSR, and SITE.

Mass calling

The MASSCALL feature is a code control that limits the volume of traffic offered to specific directory numbers whenever an excessive number of calls is routed to it, as in the case of a radio talk show or a telethon. The mass calling number may be in the same system or from another switching system.

The use of mass calling involves several of the NWM controls described earlier in this chapter:

- CBK stops a percentage of traffic on the basis of called digits. Peg counts are provided on a per-code basis for calls that are blocked.
- STR specifies a number of trunks from a group to be reserved for non-mass calling codes.
- STR combined with HTR can be used to control mass calling.

The switch can accommodate up to 256 active code controls, each of which will produce OMs. When MASSCALL is activated, information related to the control is recorded in OM group CBK. The number of mass calls that are deflected or overflowed is pegged, but the number of successful calls is not pegged. You can use the commands OMSHOW HOLDING and OMSHOW ACTIVE to monitor the quantity of blocked calls while MASSCALL is active.

Removal of the control on a particular number results in its removal from OM group CBK. OM information from the time of the last transfer to the removal of the control is contained in log NWM110, which is output when the control is removed.

Emergency stand alone (ESA) central control (CC)

The ESA mode is an emergency service option of the remote cluster controller (RCC) or (RLCM) that provides limited call processing capabilities when communications between the host and the RCC or the RLCM are lost.

This feature enhances the existing PM171 log so that it will display the OMs for

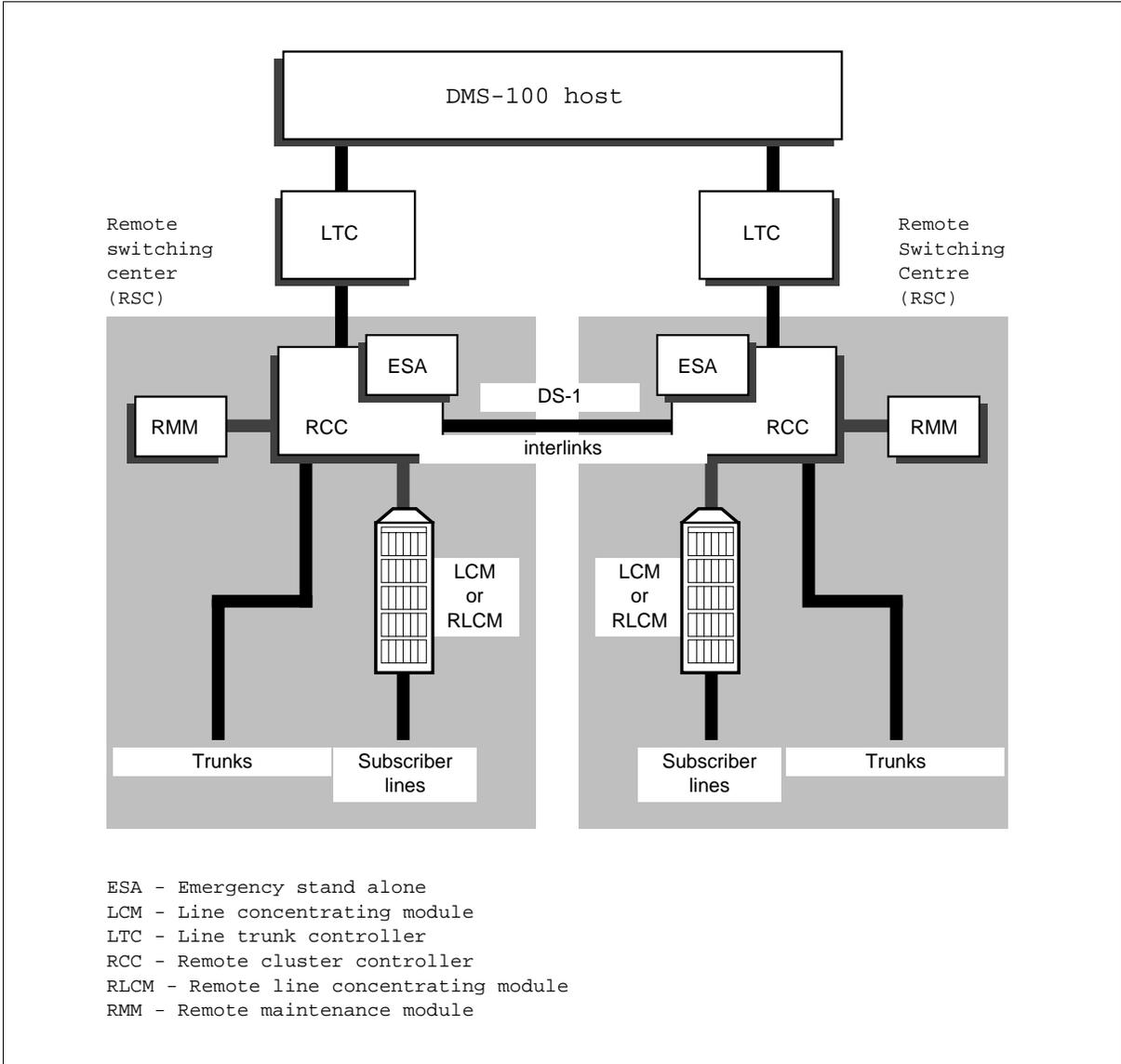
- intraswitched calls made on a single remote switching center (RSC)
- interswitched/intraswitched calls made on a dual RSC
- calls made on a remote line concentrating module (RLCM)

ESA mode uses the capabilities of interswitching and intraswitching already supported in non-ESA mode. Interswitching and intraswitching provide the capability of switching calls at an RCC without requiring transmission back to the host. An intraswitched call is a call in which the originator and terminator reside at the same RCC. An interswitched call is one in which the originator and terminator reside in two different RCCs connected in a dual RCC configuration.

The RCC or RLCM enters ESA mode due to a failure in the messaging links to the host or a failure of the host to provide call processing. When the RCC or RLCM enters ESA mode, the reason is stored. After the host DS-1 messaging links and C-side communications are restored and the RCC or RLCM exits ESA mode, the reason is printed as part of the PM171 log.

The figure below shows the dual RSC in ESA mode.

Figure 3-1 RCC ESA system diagram



ESA operational measurements

Since there is no communication between the RCC or RLCM and the central control (CC) while in ESA mode, OMs for ESA calls cannot be collected and output using normal OM reports. Instead, the RCC or RLCM stores call processing OMs which are forwarded to the host switch and printed as a PM171 log after the RCC or RLCM exits ESA mode.

Enhanced PM171 log report

The existing PM171 log prints OMs for line and trunk calls made on a single RCC while in ESA mode. It also prints the OMs for line calls made on an

RLCM while in ESA mode. This feature provides more information in the PM171 log for both intraswitched calls made on a single RCC or RLCM and interswitched or intraswitched calls made on a dual RCC. For the dual RCC, two PM171 logs are printed, one for each RCC. The counter name followed by a string "overflow" will be displayed if the value exceeds 32766.

PM171 LOG for single RCC

The following reports are examples of the enhanced PM171 log for intraswitched calls made on a single RCC while in ESA mode. A description of each operational measurement count can be found in the table at the end of this section.

Figure 3-2 Report output for RCC n, configured with lines only

```

PM171 JAN20 09:08:30 2741 INFO XPM_ESA_EXIT_OM_STATS
RCC n Unit m
ESA ENTER REASON : C_Side message links down, VALUE :      2
  ORIG_ATT_TOTAL 29
  ORIG_BLK      0, ORIG_ABAND      6, DIAL_ERR      0,
  ORIG_SB      0, XLA_ERR      0, DIALED_NUM_INV      3
IA_TERM_ATT_TOTAL 20
  IA_TERM_SUC      12, IA_TERM_BLK      2, IA_TERM_BSY      3,
  IA_TERM_SB      1, IA_TERM_NO_ANS      2
COIN_FLT 5, RING_BLK 4, TEST_REG      9,
CON_FAIL 4, PRE_TRIP 34, RING_TMO      23,
NO_IPC      8
PREFIX USAGE      0 0 0 0 0 0 0 0
                  0 0 0 0 0 0 0 0

```

Note 1: There are 6 additional OM counts being added into this PM171 log. They are ORIG_ABAND, DIAL_ERR, DIALED_NUM_INV, IA_TERM_BSY, IA_TERM_SB, IA_TERM_NO_ANS.

Note 2: ORIG_ATT_TOTAL is the total of the following counters (if the numbers do not add up then check for SWERRs and the additional peg counts-ORIG_BLK, DIAL_ERR, ORIG_SB, and XLA_ERR):

ORIG_ATT_TOTAL+ORIG_ABAND+DIALED_NUM_INV+IA_TERM_ATT_TOTAL

Figure 3-3 Report output for RCC n, configured with lines and trunks

```

PM171 JAN20 09:44:15 2741 INFO XPM_ESA_EXIT_OM_STATS
RCC n Unit m
ESA ENTER REASON : C_Side message links down, VALUE : 2
LINES:
  ORIG_ATT_TOTAL 36
  ORIG_BLK 0, ORIG_ABAND 6, DIAL_ERR 0
  ORIG_SB 0, XLA_ERR 0, DIALED_NUM_INV 3
  IA_TERM_ATT_TOTAL 21
  IA_TERM_SUC 13, IA_TERM_BLK 2, IA_TERM_BSY 1,
  IA_TERM_SB 0, IA_TERM_NO_ANS 5
  COIN_FLT 5, RING_BLK 4, TEST_REG 9,
  CON_FAIL 4, PRE_TRIP 34
TRUNKS:
  ORIG_ATT_TOTAL 16
  ORIG_BLK 0, ORIG_ABAND 0, ORIG_SB 0,
  XLA_ERR 0, DIALED_NUM_INV 13
  IA_TERM_ATT_TOTAL 9
  IA_TERM_SUC 6, IA_TERM_BLK 3, IA_TERM_BSY 0,
  IA_TERM_SB 0, IA_TERM_NO_ANS 0
COMBINED:
RING_TMO 23, NO_IPC 24
PREFIX USAGE 0 0 0 0 0 0 0 0
              0 0 0 0 0 0 0 0
HNPA USAGE 0 0 0 0 0 0 0 0
            0 0 0 0 0 0 0 0
  
```

Note 1: ORIG_ABAND, DIAL_ERR, DIALED_NUM_INV, IA_TERM_SUC, IA_TERM_BSY, IA_TERM_SB, IA_TERM_NO_ANS.

Note 2: ORIG_ATT_TOTAL of LINES and TRUNKS are the total of the following counters (if the numbers do not add up then check for SWERRs and the additional peg counts

-ORIG_BLK, DIAL_ERR, ORIG_SB, and XLA_ERR):
 ORIG_ATT_TOTAL of LINES + ORIG_ATT_TOTAL of TRUNKS
 = (ORIG_ABAND + DIALED_NUM_INV + IA_TERM_ATT_TOTAL)
 of LINES
 + (ORIG_ABAND + DIALED_NUM_INV + IA_TERM_ATT_TOTAL)
 of
 TRUNKS

PM171 log for dual RCC

The following are examples of the enhanced PM171 log for interswitched/ intraswitched calls made on a dual RCC while in ESA mode. Two PM171 logs are printed, one for each RCC. In this document, only one example of the PM171 log is presented for each case. A PM171 log of the same format is expected for the inter-connected RCC, referred to as the spouse of RCC. Refer to the end of this chapter for the description of each operational measurement count in the table.

Figure 3-4 Report for RCC n, configured for lines only

```

PM171 JAN20 09:08:30 2741 INFO XPM_ESA_EXIT_OM_STATS
RCC n Unit m
ESA ENTER REASON : C_Side message links down, VALUE : 2
ORIG_ATT_TOTAL 48
  ORIG_BLK 0 , ORIG_ABAND 6, DIAL_ERR 0,
  ORIG_SB 0, XLA_ERR 0, DIALED_NUM_INV 3
INTRA:
  IA_TERM_ATT_TOTAL 19
    IA_TERM_SUC 11, IA_TERM_BLK 2, IA_TERM_BSY 1,
    IA_TERM_SB 3, IA_TERM_NO_ANS 2
INTER:
  IE_TERM_ATT_TOTAL 20
    IE_TERM_SUC 12, IE_NO_RESP 0, IE_TERM_BLK 2,
    IE_TERM_BSY 3, IE_TERM_SB 1, IE_TERM_UNAVAIL 0,
    IE_TERM_NO_ANS 2
COIN_FLT 5, RING_BLK 4, TEST_REG 9,
CON_FAIL 4, PRE_TRIP 34, RING_TMO 23,
NO_IPC 8
PREFIX USAGE 0 0 0 0 0 0 0 0
              0 0 0 0 0 0 0 0

```

Note 1: IE_TERM_ATT_TOTAL is the termination attempt total of interswitched calls that originate on RCC n and terminate on the spouse RCC. Thus, the PM171 log output for each RCC will completely describe all ESA activity originating on that RCC.

Note 2: ORIG_ATT_TOTAL of RCC n is the total of the following counters (if the numbers do not add up, then check for SWERRs and the additional peg counts-ORIG_BLK, DIAL_ERR, ORIG_SB, and XLA_ERR):

$$\text{ORIG_ATT_TOTAL} = \text{ORIG_ABAND} + \text{DIALED_NUM_INV} + \text{IA_TERM_ATT_TOTAL} + \text{IE_TERM_ATT_TOTAL}$$

Figure 3-5 Report output for RCC n, configured for both lines and trunks

```

PM171 JAN20 09:44:15 2741 INFO XPM_ESA_EXIT_OM_STATS
RCC n Unit m
ESA ENTER REASON : C_Side message links down, VALUE : 2
LINES:
  ORIG_ATT_TOTAL 28
    ORIG_BLK 0, ORIG_ABAND 6, DIAL_ERR 0,
    ORIG_SB 0, XLA_ERR 0, DIALED_NUM_INV 3
  INTRA:
    IA_TERM_ATT_TOTAL 16
      IA_TERM_SUC 11, IA_TERM_BLK 2, IA_TERM_BSY 1,
      IA_TERM_SB 0, IA_TERM_NO_ANS 2
  INTER:
    IE_TERM_ATT_TOTAL 20
      IE_TERM_SUC 12, IE_NO_RESP 0, IE_TERM_BLK 2,
      IE_TERM_BSY 3, IE_TERM_SB 1, IE_TERM_UNAVAIL 0,
      IE_TERM_NO_ANS 2
  COIN_FLT 5, RING_BLK 4, TEST_REG 9,
  CON_FAIL 4, PRE_TRIP 34
TRUNKS:
  ORIG_ATT_TOTAL 40
    ORIG_BLK 0, ORIG_ABAND 0, ORIG_SB 0,
    XLA_ERR 0, DIALED_NUM_INV 0
  INTRA:
    IA_TERM_ATT_TOTAL 12
      IA_TERM_SUC 7, IA_TERM_BLK 4, IA_TERM_BSY 1,
      IA_TERM_SB 0, IA_TERM_NO_ANS 0
  INTER:
    IE_TERM_ATT_TOTAL 11
      IE_TERM_SUC 6, IE_NO_RESP 0, IE_TERM_BLK 2,
      IE_TERM_BSY 3, IE_TERM_SB 0, IE_TERM_UNAVAIL 0,
      IE_TERM_NO_ANS 0
COMBINED:
  RING_TMO 23, NO_IPC 24
PREFIX USAGE 0 0 0 0 0 0 0 0
              0 0 0 0 0 0 0 0
HNPA USAGE 0 0 0 0 0 0 0 0
            0 0 0 0 0 0 0 0
  
```

Note 1: IE_TERM_ATT_TOTAL is the termination attempt total of interswitched calls that originate on RCC n and terminate on the spouse RCC. Thus, the PM171 log output for each RCC will completely describe all ESA activity originating on that RCC.

Note 2: ORIG_ATT_TOTAL of LINES and TRUNKS for RCC n are the total of the following counters (If the numbers do not add up then check for SWERRs and the additional peg counts - ORIG_BLK, DIAL_ERR, ORIG_SB, and XLA_ERR): ORIG_ATT_TOTAL of LINES + ORIG_ATT_TOTAL of TRUNKS

$$\begin{aligned}
 &= (\text{ORIG_ABAND} + \text{DIALED_NUM_INV} + \text{IA_TERM_ATT_TOTAL} \\
 &+ \text{IE_TERM_ATT_TOTAL}) \text{ of LINES} \\
 &+ (\text{ORIG_ABAND} + \text{DIALED_NUM_INV} + \text{IA_TERM_ATT_TOTAL} \\
 &+ \text{IE_TERM_ATT_TOTAL}) \text{ of TRUNKS}
 \end{aligned}$$

PM171 log for RLCM

The following is an example of the enhanced PM171 log for calls made on an RLCM while in ESA mode. Refer to the end of this section for a description of each operational measurement count in Table 3-3 on the following page.

Figure 3-6 Calls made on an RLCM while in esa mode

```

PM171 JAN20 09:08:30 2741 INFO XPM_ESA_EXIT_OM_STATS
LCM RLCM n m
ESA ENTER REASON : C_Side message links down, VALUE : 2
ORIG_ATT_TOTAL 29
  ORIG_BLK      0,  ORIG_ABAND    6,  DIAL_ERR        0,
  ORIG_SB       0,  XLA_ERR      0,  DIALED_NUM_INV  3
  IA_TERM_ATT_TOTAL 20
    IA_TERM_SUC  12,  IA_TERM_BLK    2,  IA_TERM_BSY    3,
    IA_TERM_SB   1,  IA_TERM_NO_ANS 2
  COIN_FLT     5,  RING_BLK      4,  TEST_REG       9,
  CON_FAIL     4,  PRE_TRIP     34,  RING_TMO      23,
  NO_IPC       8
  PREFIX USAGE 0 0 0 0 0 0 0 0
                  0 0 0 0 0 0 0 0

```

Note 1: There are 6 additional OM counts being added into this PM171 log. They are ORIG_ABAND, DIAL_ERR, DIALED_NUM_INV, IA_TERM_BSY, IA_TERM_SB, and IA_TERM_NO_ANS.

Note 2: ORIG_ATT_TOTAL is the total of the following counters (if the numbers do not add up, then check for SWERRs and the additional peg counts-ORIG_BLK, DIAL_ERR, ORIG_SB, and XLA_ERR):

$$\text{ORIG_ATT_TOTAL} = \text{ORIG_ABAND} + \text{DIALED_NUM_INV} + \text{IA_TERM_ATT_TOTAL}$$

The following table describes each operational measurement count.

Table 3-3 Description of operational measurement (OM) counts (Sheet 1 of 3)

Field	Description
ESA ENTER REASON ESA	enter reason description
VALUE	ESA enter reason id
ORIG_ATT_TOTAL	total origination attempts (received dial tone)
ORIG_BLK	resources unavailable for origination
ORIG_ABAND	call originator hung up without dialing any number or hung up before finishing dialing

Table 3-3 Description of operational measurement (OM) counts (Sheet 2 of 3)

Field	Description
DIAL_ERR	error in DT or DP dialing
ORIG_SB	originating facility goes system busy
XLA_ERR	translation error of the dialed number
DIALED_NUM_INV	the dialed number was not on the same RCC or the spouse RCC or a timeout occurred while dialing (took too long to dial number)
IE_TERM_ATT_TOTAL	termination attempts for interswitched calls
IE_TERM_SUC	termination successes for interswitched calls—number of calls answered
IE_NO_RESP	no response from spouse RCC (links down, etc.)
IE_TERM_BLK	interswitched calls blocked due to lack of resources
IE_TERM_BSY	interswitched calls whose terminations were non-idle (busy, system busy, abandoned, etc.)
IE_TERM_SB	interswitched calls whose terminations went system busy while processing the call (usually because of ring faults)
IE_TERM_UNAV	interswitched calls whose terminations were manually busy or unequipped (unavailable)
IE_TERM_NO_ANS	interswitched calls where there was no answer
Note: For line to trunk or trunk to trunk calls, this field will always be pegged unless the eventual terminator (line) answers the call. For example, suppose line 1 calls line 2 and the call is routed over a single trunk. Also suppose the line 1 to trunk part of the call is interswitched. If the line 1 to trunk aspect of the call is okay, but line 2 is busy, system busy, or unavailable, then this peg will be incremented.	
A_TERM_ATT_TOTAL	termination attempts for intraswitched calls
A_TERM_SUC	termination successes for intraswitched calls (number of calls answered)
IA_TERM_BLK	intraswitched calls blocked due to lack of resources
IA_TERM_BSY	intraswitched calls whose terminations were non-idle (busy, system busy, abandoned, etc.)

Table 3-3 Description of operational measurement (OM) counts (Sheet 3 of 3)

Field	Description
IA_TERM_SB	intraswitched calls whose terminations went system busy while processing the call (usually because of ring faults)
IA_TERM_NO_ANS	intraswitched calls where there was no answer (see Note in IE_TERM_NO_ANS above. The same applies to an intraswitched call to a trunk)
RING_TMO	ring time out
COIN_FLT	coin faults or failures
RING_BLK	ring blockage in ringing state
TEST_REG	test register failure in ringing state
CON_FAIL	continuity test fail while ringing
PRE_TRIP	ringing fault message count in talking state
NO_IPC	no Interperipheral Connection (IPC) buffer available
PREFIX USAGE	usage counts for up to 16 entries in the Plain Ordinary Telephone Services (POTS) Prefix table. If no POTS prefix entry has been defined then this field is blank.
HNPA USAGE	usage counts for up to 32 entries in the POTS Home Numbering Plan Area (HNPA) table. If no POTS HNPA entry has been defined then this field is blank.

4 Analyzing service data

The aim of service problem analysis is to be able to identify problems *before* they affect the level of service to the customer. No matter which tools you use to monitor service indicators, the key to maintaining the required level of service to the operating company's customers is accurate interpretation and analysis of the data you receive as a result of your monitoring program.

This chapter provides some techniques for analysis using the OM system and the logs system, as well as the specialized software tools described in the chapter “Tools for monitoring service indicators” A troubleshooting section provides interpretations of service-related OMs as well as suggested limits and a recommended course of action for each situation. In addition, the following table provides a comprehensive list of service indicators and associated measurements, with recommended limits for each category.

Software parameters

Another factor that can affect service performance is the size of the software parameters for call processing and special features. The sizes of software parameters (PARMS) are set in the tables OFCSTD, OFCOPT, OFCENG, and OFCVAR. Each table should be sized to accommodate the maximum number of call attempts for that particular software resource.

If PARMS are sized too small, blockage to calls or features occurs. If PARMS are set too large, data store memory will be excessive and may be exhausted prematurely. The key to parameter sizing is to find the correct balance between memory usage, especially in large applications, and the possibility of call or feature blockage.

The operational measurements (OM) needed to monitor parameter usage are CP, CP2, EXT, and FTRQ. If overflows develop, the associated PARM should be increased.

The extension blocks and feature blocks associated with call processing parameters have high water mark OMs. With the high water mark OM, parameters can be sized based on a one-time maximum level. An example of a high water mark OM is CP2_CCBHI, which specifies the highest number of

call condense blocks (CCB) in use during a given traffic interval. For more information on parameter sizing, refer to *Office Parameters Reference Manual*.

Service indicators

The two basic service indicators used to measure grade of service are dial tone delay and matching loss. These are most commonly the result of overloading somewhere in the system, and may normally occur at peak traffic periods, although overload situations can occur even when the average load is below the system's peak call-processing capacity.

The DMS is designed and configured to handle a defined amount of traffic with certain characteristics. If the designed load is exceeded, some of the traffic must be delayed or blocked. However, in a properly provisioned system, the excess load should be delayed or blocked in an orderly manner as the equipment is designed to operate at or near its rated capacity under heavy traffic loads. The processors will maintain system stability while maximizing call handling throughput.

Processor overload

Processor overload occurs when the traffic volume puts excessive demands on available hardware, software, or real time resources to the extent that service begins to deteriorate. Shortages of hardware- and software- engineered resources, speech paths, and processing capacity are all indications of an overload condition. You can assess the impact of an overload by monitoring the following six conditions, as discussed in the chapter “What is service problem analysis?”:

- dial tone delay
- incoming start dial delay
- receiver attachment delay
- matching loss
- call completion rate
- CPU status

These and other key grade of service indicators, and their representative OMs, are included in the following table.

Traffic overload

The level of traffic being serviced may cause an overload. Constraining factors that affect traffic include processor occupancy, peripheral channels, network channels, receivers, and software parameters. Exceeding the limits for any of these factors can lead to traffic overload conditions resulting in delays or blockages of call attempts that affect grade of service.

Even with overload controls, proper administration of resources is needed to limit the potential impact on customers during day-to-day operations. The systematic monitoring of traffic OMs, as listed in the following table, can help to ensure that the switch does not exceed the traffic load for which it is engineered.

Peripheral module overload

A PM128 log is generated whenever a peripheral module (PM) changes state to a peripheral-in-trouble condition. If the log indicates PM OVERLOADED, then calls have been denied. Use the Query PM FLT command to determine the cause of the trouble. A PM126 log tells you when the PM changes its state from in-service trouble (INST) to in-service (INSV). This indicates that calls are no longer being denied.

Lack of resources can cause problems for peripheral modules (PM), resulting in degradation of service to the customer. However, PMs should remain stable in active overload, and overloads due to traffic should never take the PM completely out of service. System busy conditions are typically caused by faults other than capacity utilization.

The specific reason(s) for any peripheral controller going into overload will vary depending on the individual configuration. The likely causes include

- hardware failure on the P-side
- hardware failure on the C-side
- the line concentrating moduel (LCM) or several LCMs, sending a large number of originations and on-hooks to the XPM in a short period of time
- datafill changes resulting in extensive messaging to the peripheral
- peak traffic load on the peripheral above high day busy hour (HDBH)
- the central controller (CC) has flooded the XPM with supervision, sending either processor into a real time limited condition

Flow control is used to minimize the impact on service to the customer when a peripheral goes into overload. The system is designed to control the load being sent to the signaling processor (SP) and in turn to the master processor (MP). The objective is to reduce load in an orderly manner by giving call processing functions priority over terminations, and terminations priority over originations.

Using OMs for analysis

Using OMs, logs and customer service reports, as well as the special tools available to you, you can evaluate conditions that lead to overload or other service-related problems.

The first step in using OMs for trouble analysis is validation of the traffic data. The traffic related OMs are listed in the following table. OMs can be set with thresholds to trigger a "trouble printout" if set tolerances are exceeded. Refer to the *Basic Administration Guide*, 297–1001–300 for more information.

The next step is to correlate traffic load and load-service relationships to determine if a problem is caused by overload, by equipment faults, or by equipment being out of service. You should also check system made-busy (SBU) OMs and man made-busy (MBU) OMs to determine if an excessive amount of "busied-out" equipment could be contributing to for service problems.

For example, there should be little or no dial tone delay (DTD) when the system is operating under low traffic loads in off-peak conditions. Excessive DTD encountered under these conditions indicates a probable maintenance problem. Problems in most load-service relationships should be directed to Network Maintenance.

The following formula can be used to obtain DTD measurements:

$$\%DTD = \frac{DTSR_DELAY}{DTSR_TOTAL} \times 100\%$$

Delay also occurs in the form of incoming start-to-dial delay (ISDD). The following formula can be used to obtain ISDD measurements:

$$\%ISDD = \frac{ISDD_DELAY}{ISDD_TOTAL} \times 100\%$$

The figure below illustrates a sample OM report for group DTSR.

Figure 4-1 Sample DTSR OM report

```

DTSR
CLASS: ACCUMULATING
START: 1990/02/17 21:00:00 MON; STOP: 1990/02/17 22:00:00 MON;

SLOWSAMPLES:      36 ; FASTSAMPLES      360 ;
  KEY (DTSR_KEY)
  TOTAL      TOTAL_2      DELAY      DELAY_2
0 LMDP
  900          0          10          0
1 LMDT
  900          0          9          0
2 LCMDP
 1226         0          9          0
3 LCMDT
 1531         0          23         0
4 LCMKS
  621         0          3          0
5 DLMKS
  0           0          0          0

```

The column headed "KEY" lists the line type for which testing is possible. In this example they are

- dial pulse phones in line modules (LMDP)
- Digitone phones in line modules (LMDT)
- dial pulse phones in line concentrating modules (LCMDP)
- Digitone phones in line concentrating modules (LCMDT)
- key-driven sets in line concentrating modules (LCMKS)
- data line module key sets (DLMKS)

The column headed "TOTAL" shows the number of test calls (or in the case of LCMs, actual calls) that were recorded during the one-hour accumulation period. Any delays in either test calls or actual calls are displayed in the "DELAY" column. In the example, a total of 54 of the 5,178 calls experienced dial tone delay of more than three seconds. This represents 1.04 percent, which is within the acceptable range for ABSBH.

Blockage, or matching loss, is described in some detail in the chapter "What is service problem analysis?" The following formulas can be used to calculate the percentages of the various types of matching loss in your office:

$$\% \text{IML or IAML} = \frac{\text{OFZ_TRMMFL}}{\text{OFZ_TRMNWAT}} \times 100\%$$

$$\text{OFZ_OUTMFL}$$

4-6 Analyzing service data

$$\%OML \text{ or } TAML = \frac{\text{-----}}{OFZ_OUTNWAT} \times 100\%$$

$$\%TML = \frac{OFZ_TERMBLK}{OFZ_TRMNWAT} \times 100\%$$

To assist in your analysis, the following table lists the service indicators and expectations at maximum engineered load. The service indicators are grouped into the following three categories:

- grade of service
- traffic
- operations

Table 4-1 Service indicators and guidelines (Sheet 1 of 5)

Indicator	Source	Guideline
Grade of service		
Dial tone delay	DTSR_DELAY	20% HDBH
	DTSR_TOTAL	
	ACT100_OAVGDE	1000-1500 ms
	ACT100_95% OLIM	3000 ms
Receiver attachment delay	RADR_RADLPLYP	20% HDBH
	RADR_RADTESTC	
Incoming start dial delay	BCS24 and above	20% HDBH
Terminating matching loss	OFZ_TRMMFL	20% HDBH
	OFZ_TRMNWAT	
	TRS_NBLH (TRMTRS_TRSNBLH)	
	TRS_NBLN (TRMTRS_TRSNBLN)	
	LMD_TERMBLK	
Outgoing matching loss	OFZ_OUTRMFL	2% HDBH (toll)
	OFZ_OUTNWAT	1% HDBH (local)
	TRS_NBLH (TRMTRS_TRSNBLH)	

Table 4-1 Service indicators and guidelines (Sheet 2 of 5)

Indicator	Source	Guideline
Call completion	OFZ_ORIGABDN	<40% abandon
	OFZ_NORIG	
	OFZ_INABNM	<10% abandon
	OFZ_INABNC	
	OFZ_NIN	
	ACT100-COMP	>70%
Traffic		
Office call attempts	OFZ_NIN	Site engineered
	OFZ_NORIG	
	ACT100-CALLS/HOUR	Site engineered
CPU overload controls	CP_ORIGDENY	<10% of O+I (high load) >10% of O+I (overload)
	CP_LOOVFL	0
Engineered S/W/parameters	EXT_XXX_EXTOVFL	0
	CP_CCBOVFL	0
	CP_ORIGDENY	<10% of O+I (high load) >10% of O+I (overload)
	CP_WAITDENY	0
	CP_CPLOOVFL	0
	CP_CPLPOVFL	0
	CP_OUTBOVFL	0
	CP_MULTOVFL	0
	CP_WAKEOVFL	0
	Line peripherals	LMD OMs
OFZ_TRMMFL		20% HDBH
OFZ_TRMWAT		
TRS_NBLN (TRMTRS_TRSNBLN)		
DTSR_DELAY		20% HDBH
DTSR_TOTAL		

Table 4-1 Service indicators and guidelines (Sheet 3 of 5)

Indicator	Source	Guideline
Trunk peripherals	TRK OMs	Trunk group engineered
	OFZ_OUTRMFL	2% HDBH
	OFZ_OUTNWAT	
Remote lines	SITE OMs	Site engineered
PM overload controls	PMOVLД_PORGDENY	0
	PMOVLД_PTRMDENY	0
	PM128	0
	PM180	0
	PM120	0
	LOST III	0
Receivers	RCVR OMs	Site engineered
	UTR OMs	Site engineered
	RADR_RADLDYP	5% HDBH
	RADR_TADTESTC	
	DTSR_DELAY	
	DTSR_TOTAL	
Networks	TS OMs	Site engineered
	OFZ_TRMMFL	20% HDBH
	OFZ_TRMNWAT	
	OFZ_OUTRMFL	2% HDBH
	OFZ_OUTNWAT	
	TRMT1_NBLH	
	(TRMTRS_TRSNBLH)	
Operations		

Table 4-1 Service indicators and guidelines (Sheet 4 of 5)

Indicator	Source	Guideline
Line peripherals	FM101 log	0
	PMTYP_PMX_PMERR	2/10,000 calls
	PMTYP_PMX_PMFLT	0
	PMTYP_PMX_PMMSBU	0
	PMTYP_PMX_PMUSBU	0
	PMTYP_PMX_PMMMB	0
	U	0
	PMTYP_PMX_PMUMBU	See focus maintenance.
	LINE LOGS PM LOGS	
Trunk peripherals	PMTYP_PMX_PMERR	2/10,000 calls
	PMTYP_PMX_PMFLT	0
	PMTYP_PMX_PMMSBU	0
	PMTYP_PMX_PMUSBU	0
	PMTYP_PMX_PMMMB	0
	U	0
	PMTYP_PMX_PMUMBU	
KT100 LOG	No trunks > thresholds	
	TRK LOGs	See focus maintenance.
	PM LOGs	2/10,000 calls

Table 4-1 Service indicators and guidelines (Sheet 5 of 5)

Indicator	Source	Guideline
Networks	NMC_NMCERR	1/10,000 calls
	NMC_NMCFLT	0
	NMC_NMMSGFL	1/10,000 calls
	NMC_NMMSGER	3/10,000 calls
	NMC_NMSPCHFL	1/10,000 calls
	NMC_NMSPCHER	3/10,000 calls
	NMC_NMSBU	0
	NMCNMMBU	0
	NET LOGs	3/10,000 calls
	NETM LOGs	0
Central control	CPU_TRAPINT	0.2/10,000
	CPU_CPUFLT	0
	CPU_MTCHINT	0
	CPU_SYNCLOSS	0
	CP_CPTRAP	0.2/10,000
	CP_CPSUIC	0.2/10,000
	AUD LOGs	0.4/10,000
	AUDT LOGs	
	CC LOGs	0.4/10,000

Troubleshooting with OMs

This section is designed to assist you in using OMs to identify quickly many of the most common service-related problems associated with the DMS and to decide on the appropriate action in response to the problem. You may also want to use it to determine which OMs should be included in your monitoring program.

For each OM group and key field, recommendations are provided on threshold limits, monitoring frequency, purpose, and possible action(s) to be taken. The threshold limits are suggested as guidelines only, and should be tailored to the

needs of your own office. The monitoring frequency recommended is either periodic (Per) or near real time (NRT):

- Per—Establish a weekly routine to check scanning and DTS testing results at regular intervals, using whatever is the most convenient source.
- NRT—Arrange to review and analyze exceeded threshold limits as on as they are received in order to identify and react quickly to problems that affect service to the customer.

The OM groups have been divided into seven categories and are arranged alphabetically within each category as follows:

- OMs that are common to all DMS Family switches ANN, CP, CP2, EXT, OFZ, RADR, RCVR, TONES, STN, TRMTRS, UTR
- DMS–100 local applications CF3P, DTSR, DTSRPM, OFZ
- Remotes SITE, SITE2, DTSRPM
- Centrex (DMS–100 with IBN) CF6P
- DMS–200 toll applications AMA, ESUP, ONI
- TOPS OC host or Remote CF3P, TOPSQ, TOPSTRAF, TOPSVC, TOPSMISC
- Auxiliary operator service system (AOSS) AOSS

Table 4-2 Common OMs (all DMS family) (Sheet 1 of 7)

Group	Key field	Limit	Frequency
CP	ORIGDENY WAITDENY	0	NRT
<i>Description:</i>			
May signal build-up to a warm or cold start. ORIGDENY and WAITDENY are indications of calls delayed because the system is unable to accept originations due to limited call processing resources. Calls are ignored or lost.			
<i>Action:</i>			
1 Contact Network Maintenance. Is the CPU functioning normally (for example, has there been a restart or loss of synch)?			
ANN	ANNOVFL (total)	0	NRT
<i>Description:</i>			
Identifies situations where customers are not receiving announcements because tracks are overloaded or busied out.			

Table 4-2 Common OMs (all DMS family) (Sheet 2 of 7)

Group	Key field	Limit	Frequency
<p><i>Action:</i></p> <p>1 OMSHOW group ANN to isolate the announcement type. Check attempts (ANNATT) to see if they justify overflow. Reference: NTP 297–1001–450, section III.</p> <p>2 If YES, check the OM info field for # <i>max.conn.</i> associated with that particular announcement..</p> <ul style="list-style-type: none"> — If the value has been changed from its normal setting, it may have been changed in error on a recent load. Refer to Network Maintenance. — If the value is less than 30, check the traffic order. Refer any discrepancies to Provisioning or Translations. — If the value is 30 or higher, monitor to determine if broadcast should be increased. <p>Note: Increasing broadcast should be preceded by an investigation to determine if time switch capacities would be exceeded now or in the future, as this could result in an embargo on speech links to that time switch.</p> <p>3 If NO, is there a man busy or system busy usage (ANNMBU, ANNSBU)? Refer to Network Maintenance.</p> <p>4 If NO, OMSHOW groups TRMTxx to identify treatments causing overflows.</p> <p>5 Is there a one-time reason for the overflow, such as mass calling?</p> <p>6 Refer to Network Maintenance.</p>			
EXT	EXTOVFL (total)	0	NRT
<p><i>Description:</i></p> <p>EXT monitors the use of extension blocks, auxiliary software resources used in processing calls that involve CCF, CTX, TOPS, HPR, and special billing applications. Overflows are usually attributed to extensions or cutovers. They require immediate attention.</p> <p><i>Action:</i></p> <p>1 Has there been a restart? Check logs CC107 and CM120.</p> <p>2 If NO, was the problem load related? OMSHOW group EXT to isolate type of block encountering overflow. Compare the levels in fields EXTSEIZ and EXTHI with the block quantities in table OFCENG. References: NTP 297–1001–455 and NTP 297–1001–814.</p> <p>3 Do OFCENG values match the traffic order?</p> <p>4 Refer to Network Maintenance and/or Provisioning.</p>			
OFZ	INLKT	0	NRT

Table 4-2 Common OMs (all DMS family) (Sheet 3 of 7)

Group	Key field	Limit	Frequency
<i>Description:</i>			
This register counts incoming calls that fail and are routed to lock-out for reasons related to trunking, switching, or call-processing difficulties.			
<i>Action:</i>			
<ol style="list-style-type: none"> 1 If there is CP_WAITDENY, follow the action steps for that condition. 2 If not, refer to Network Maintenance. Are they aware of any incoming trunk problems? Related TRK log messages: 111, 113, 122, 123. 3 If required, further investigation can be done to isolate the troubled trunk group(s). OMSHOW group TRK for groups with INFAIL. 			
OFZ	INABDNM	0	NRT
<i>Description:</i>			
INABDNM counts incoming calls that are abandoned by the machine before being processed. This occurs when a call times out at the upstream office while waiting for a receiver, or because of equipment troubles.			
<i>Action:</i>			
<ol style="list-style-type: none"> 1 Are there MFR or UTR problems? 2 If NO, contact Network Maintenance. Are they aware of trunk or sender problems in an upstream office? Related TRK log messages: 114, 116, 162. 3 If required, isolate the trunk group. OMSHOW group TRK for routes with high PRERTEAB. 			
OFZ	INABDNC	*	NRT
<i>Description:</i>			
INABDNC counts incoming calls that are abandoned by the customer before being processed. This may be an indication of problems in an upstream office.			
*Normally this value is less than 0.5 percent of OFZ_NIN unless the office has a high number of incoming SXS groups. In this case, customer partial dials are also included, so threshold limits should be set accordingly.			
<i>Action:</i>			
<ol style="list-style-type: none"> 1 Are there MFR or UTR problems? 2 If NO, contact Network Maintenance. Are they aware of trunk or sender problems in an upstream office? Related TRK log messages: 114, 116, 162. 3 If required, isolate the trunk group. OMSHOW group TRK for routes with high PRERTEAB. 			

Table 4-2 Common OMs (all DMS family) (Sheet 4 of 7)

Group	Key field	Limit	Frequency
RADR	RADTESTC (for MFR)	900	Per
<p><i>Description:</i></p> <p>Attachment delay tests on MF receivers should be constant at 890 to 900 per hour. If they are higher they are placing unnecessary attempts on the receivers.</p> <p><i>Action:</i></p> <p>1 Check table RADR, field RADCALLR.</p> <p>2 Refer to Network Maintenance, Translations, or both if required.</p> <p>Note: Digitone receivers should <i>not</i> appear in group or table RADR because they are tested in DTS tests.</p>			
RADR	RADLDLY for MFR, UTR (total)	0	NRT
<p><i>Description:</i></p> <p>This register counts the number of calls that waited longer than the 3-second lower delay threshold to attach to a receiver. Fields RCVR_RADUDLYP and UTR_UTRUDLYP indicate more serious problems—calls waiting longer than the 7-second upper delay threshold.</p> <p><i>Action:</i></p> <p>1 Were there RCVRQOVFL (group RCVR) or UTRQOVFL (group UTR)?</p> <p>2 If YES, follow the action steps shown under those groups.</p> <p>3 If NO, refer to Network Maintenance.</p>			
RCVR	RCVRQOVFL (total)	0	NRT
<p><i>Description:</i></p> <p>This register is incremented by attempts that fail to enter the wait queue for a receiver because the queue is full, indicating an overload condition on MF, DGT, MCCS, or ATD receivers. Even in offices fully equipped with UTRs and new peripherals, this field will be the first warning sign if a software corruption removes UTRs from service. The small number of MF and DGT receivers will quickly be overloaded.</p>			

Table 4-2 Common OMs (all DMS family) (Sheet 5 of 7)

Group	Key field	Limit	Frequency
<i>Action</i>			
1 OMSHOW group RCVR to isolate the type.			
2 Are receivers busied out (RCVRSBU, RCVRMBU)?			
3 Does usage (RCVRTRU) warrant overflow? Check capacity.			
4 Determine the cause of the heavy load. For example, a radio contest, mass calling, activation of unauthorized touch-tone detection feature. Was there peakedness or a change in holding time?			
5 Report events to Network Maintenance, Provisioning, or both.			
6 If equipped with UTRs, OMSHOW group UTR. Are all UTR-equipped LGCs, LTCs, DTCs, and RCCs present? Consult your office map or tables LTCINV and RCCINV. Report any discrepancy to Network Maintenance immediately.			
TONES	TONEATT for NONT NONL NATO NABC	0	NRT
<i>Description:</i>			
If your office does not have the recommended tones and announcements, refer to the Translations group.			
<i>Action:</i>			
1 Attempts in these groups indicate problems in translations.			
2 List treatment control tables to determine which types of calls are routing to the particular tone.			
3 Verify against the actual values. OMSHOW groups TRMTRS, TRMTCU, TRMCU2, TRMTCM, TRMTER, and TRMTFR.			
4 Refer any discrepancies to the Translations group.			
TONES	TONEOVFL STNOVFL	0	NRT
STN			
<i>Description:</i>			
Overflow on other tones or on special tones can be evidence of routing, maintenance, or overload problems.			

Table 4-2 Common OMs (all DMS family) (Sheet 6 of 7)

Group	Key field	Limit	Frequency
<p><i>Action:</i></p> <ol style="list-style-type: none"> 1 OMSHOW group TONES or STN for tone type, attempt values, and STNMBU or STNSBU. 2 Refer to Network Maintenance. Is there any known cause? 3 If NO, and overflow continues, OMSHOW groups TRMTxx. 4 List treatment control tables to determine types of calls routing to this tone. 5 Refer to Network Maintenance, Provisioning, or Translations as required. 			
TRMTRS	TRSNBLH	0	NRT
<p><i>Description:</i></p> <p>TRSNBLH counts calls that are routed to network blockage heavy traffic treatment because no path through the network was available for various types of calls.</p>			
<p><i>Action:</i></p> <ol style="list-style-type: none"> 1 OMSHOW group TS to determine if one time switch is carrying higher usage. 2 OMSHOW group NMC for network module problems. 3 Whatever your findings in steps 1 and 2, refer to Network Maintenance. 4 % TML = (TRSNBLH + TRSNBLN) / OFZ_TERMNWAT. 			
TRMTRS	TRSNBLN	0	NRT
<p><i>Description:</i></p> <p>TRSNBLN counts calls that are routed to network blockage heavy traffic treatment when they are aborted because of failure to get a channel in the terminating peripheral module. This could be the first warning of trouble in a new peripheral-type remote, such as an RCC, because dial tone delay measurements may not be relayed to the host in a crisis.</p>			
<p><i>Action:</i></p> <ol style="list-style-type: none"> 1 OMSHOW group LMD. Check field TERMBLK to isolate the peripheral. 2 Was there dial tone delay? Groups DTSR or SITE. Calculate the percentage. 3 >Does load (LMTRU) warrant blockage and delay? 4 If YES, continue to monitor, and refer to Provisioning. 5 If NO, <ul style="list-style-type: none"> — for LMs or RLMs, determine if there was a mate takeover. Log PMI65, group LM or PMTYP for SBU/MBU. Check with Network Maintenance. — for new peripherals, suspect busied out speech links. Ask Network Maintenance to check that all channels are being accessed. 			

Table 4-2 Common OMs (all DMS family) (Sheet 7 of 7)

Group	Key field	Limit	Frequency
UTR	KEY INFO	–	NRT
<p><i>Description:</i></p> <p>UTRs can be deactivated on some or all peripherals by corrupted software. This could cause serious overloading of MF or DGT receivers and resulting degradation of service.</p> <p><i>Action:</i></p> <p>1 Periodically OMSHOW group UTR. Consult your office map, or tables LTCINV and RCCINV. Are all UTR-equipped LGCs, LTCs, DTCs, and RCCs present?</p> <p>2 Report any discrepancies to Network Maintenance immediately.</p>			
UTR	UTRQOVFL	0	NRT
<p><i>Description:</i></p> <p>This register is incremented when a UTR is denied a position in the wait queue because the queue is full. Dial tone delay or receiver attachment delay will result.</p> <p><i>Action:</i></p> <p>1 OMSHOW group UTR to isolate the troubled LGC, LTC, RCC or DTC.</p> <p>2 Does the usage warrant the overflow? Check capacity.</p> <p>3 Determine the cause of the heavy load. For example, a radio contest, mass calling, activation of unauthorized touch-tone detection feature. Was there peakedness or a change in holding time?</p> <p>4 Refer to Network Maintenance, Provisioning, or both.</p>			

Table 4-3 DMS-100 local applications (Sheet 1 of 4)

Group	Key field	Limit	Frequency
CF3P	CNFOVFL	0	NRT
<p><i>Description:</i></p> <p>This register counts requests for 3-port conference circuits that cannot be met because all circuits are busy. Three-way call attempts fail and receive treatments.</p> <p><i>Action:</i></p> <p>1 OMSHOW group CF3P.</p> <p>2 Does the usage (CNFTRU) warrant the overflow? Check capacity.</p> <p>3 Check group EXT for overflows on associated extension blocks.</p> <p>4 Refer to Network Maintenance, Provisioning, or both.</p>			

Table 4-3 DMS-100 local applications (Sheet 2 of 4)

Group	Key field	Limit	Frequency
DTSR	DTS tests: DTSTESTC for LMDP LMDT TOTAL + TOTAL 2 for LCMDP LCMDT LCMKS0	0 900 900 equal to total originations	Per
<i>Description:</i>			
Dial tone speed testing is automatically deactivated in some overload situations. It can also be deactivated manually. Periodic checks will ensure reportable results.			
<i>Action:</i>			
1 Report any improper testing to Network Maintenance.			
DTSR	DTSDLYPC (total) for LMDP LMDT DELAY+ DELAY 2 for LCMDP LCMDT LCMKS	0	NRT
<i>Description:</i>			
Dial tone delay indicates degradation of customer service.			

Table 4-3 DMS-100 local applications (Sheet 3 of 4)

Group	Key field	Limit	Frequency
<i>Action:</i>			
1 OMSHOW group DTSRPM to determine if more than one bay is affected.			
2 If NO, proceed to step 4.			
3 If YES, calculate the percentage of dial tone delay on the affected bay(s). Proceed to step 6.			
4 For DP delays without DT, suspect a measurement problem, especially in old peripherals. Refer to Network Maintenance and Line Support.			
5 For DT delays without DP, suspect a receiver problem and follow the steps under RCVR or UTR.			
6 If dial tone delay is spread relatively evenly among DT, DP, and KS, follow the steps under group TRMTRS field NBLN.			
7 If there are no KS delays, but there are customer reports of no dial tone, suspect the KS set itself, since it gives dial tone.			
DTSRPM	DPLDLY DGTDLY KSDLY (totals)	0	NRT
<i>Description:</i>			
Same as DTSR. This group includes all line peripherals in the DMS, so it could also replace groups SITE and SITE2.			
<i>Action:</i>			
1 Same as DTSR, SITE, SITE2.			
OFZ	ORIGLKT	0	NRT
<i>Description:</i>			
This condition often accompanies call processing or receiver overloads. It can also signal mate takeovers in old peripherals or peripheral messaging problems.			

Table 4-3 DMS-100 local applications (Sheet 4 of 4)

Group	Key field	Limit	Frequency
<p><i>Action:</i></p> <p>1 If there were values in fields CP_ORIGDENY, WAITDENY, or RCVR_RCVRQOVFL, follow the steps for these situations described previously.</p> <p>2 Was there a mate takeover? Check log PMI65. Follow the steps given under DTSR and TRMTRS_TRSNBLN.</p> <p>3 OMSHOW group LMD. Do one or more bays have abnormal data on fields ORIGFAIL, NORIGATT, ORIGBLK, TERMBLK? This is sometimes more noticeable in a 24-hour class. Report to Network Maintenance.</p> <p>4 Could be due to peripheral messaging problems. Check log PM115. Refer to Network Maintenance.</p>			
OFZ	ORIGABDN	10–15%	NRT
<p><i>Description:</i></p> <p>Because customer partial dials are included in this count, the monitoring threshold should be set slightly above the highest normal value, which is usually 10 to 15 percent of total originations. Investigation is required when this value is significantly exceeded.</p> <p><i>Action:</i></p> <p>1 OMSHOW group LMD to determine if one peripheral has abnormally high NORIGATT and ORIGABDN.</p> <p>2 If YES, suspect a carrier, cable, or line card problem.</p> <p>3 Refer to Network Maintenance. Programs can be run to isolate the problem.</p>			

Table 4-4 Remotes (Sheet 1 of 2)

Group	Key field	Limit	Frequency
SITE	DTS tests:	0	NRT
	DPTESTC		
	DTTESTC	900	
	or		
	LMDP_T	900	
	LMDT_T for		
	RLM		
	and		
	LCMDP_T+T2	equal to all	
	LCMDT_T+T2	originations	
	LCMKS_T+T2		
<i>Description:</i>			
Dial tone speed testing is automatically deactivated in some overload situations. It can also be deactivated manually. RLM extensions often cause incorrect test results. Periodic checks will ensure reportable results.			
<i>Action:</i>			
1 Report any incorrect test results to Network Maintenance.			
SITE	DPDELAY	0	NRT
	DTDELAY or		
	LMDP_D		
	LMDT_D for RLM		
	and		
	LCMDP_D+D2		
	LCMDT_D+D2		
	CMKS_D+D2		
	(totals)		
	<i>Description:</i>		
Dial tone delay indicates degradation of customer service.			

Table 4-4 Remotes (Sheet 2 of 2)

Group	Key field	Limit	Frequency
<p><i>Action:</i></p> <p>1 OMSHOW group DTSRPM to determine if more than one bay is affected.</p> <p>2 If NO, proceed to step 4.</p> <p>3 If YES, calculate the percentage of dial tone delay on the affected bay(s). Proceed to step 6.</p> <p>4 For DP delays without DT, suspect a measurement problem, especially in old peripherals. Refer to Network Maintenance and Line Support.</p> <p>5 For DT delays without DP, suspect a receiver problem and follow the steps under RCVR or UTR.</p> <p>6 If dial tone delay is spread relatively evenly among DT, DP, and KS, follow the steps under group TRMTRS field NBLN.</p> <p>7 If there are no KS delays, but there are customer reports of no dial tone, suspect the KS set itself, since it gives dial tone.</p>			
SITE2	<p>Tests:</p> <p>RCUDP_T+T2</p> <p>RCUDT_T+T2</p> <p>RCUDP_D+D2</p> <p>RCUDT_D+D2</p>	<p>equal to all originations</p>	Per
<p><i>Description:</i></p> <p>These groups contain OMs for remote carrier urban sites (RCU)</p>			
<p><i>Action:</i></p> <p>1 Same as SITE.</p>			
DTSRPM	<p>DPLDLY</p> <p>DGTDLY</p> <p>KSDLY</p> <p>(totals)</p>	0	NRT
<p><i>Description:</i></p> <p>Same as SITE and SITE2. This group includes all line peripherals in the DMS, so it could also replace group DTSR.</p>			
<p><i>Action:</i></p> <p>1 Same as DTSR, SITE, and SITE2.</p>			

Table 4-5 Centrex (DMS-100s with IBN)

Group	Key field	Limit	Frequency
CF6P	CF6QOVFL	0	NRT
<p><i>Description:</i></p> <p>This register counts requests for conference circuits that encounter a circuit queue full condition.</p> <p><i>Action:</i></p> <p>1 OMSHOW group CF6P.</p> <p>2 Does the usage warrant the overflow? Check capacity.</p> <p>3 Check group EXT for overflows on associated extension blocks.</p> <p>4 Refer to Network Maintenance, Provisioning, or both.</p> <p>Note 1: If you identify Centrex problems, OMSHOW groups IBNGRP and IBNSG for analysis. Reference: NTP 297-1001-814 for field descriptions.</p> <p>Note 2: Monitor group EXT for Centrex offices.</p>			

Table 4-6 DMS-200 toll applications (Sheet 1 of 2)

Group	Key field	Limit	Frequency
AMA	AMAROUTE AMAFREE	0	NRT
<p><i>Description:</i></p> <p>These registers peg AMA calls to TOPS or free-of-charge due to a shortage of recording units or other trouble.</p> <p><i>Action:</i></p> <p>1 OMSHOW group AMA to calculate the percentage.</p> <p>2 Refer to Network Maintenance.</p>			
ESUP	DESOVFL	0	NRT
<p><i>Description:</i></p> <p>DESOVFL does not indicate a blocked call, but may indicate a lack of echo suppressors, which can result in poor transmission.</p> <p><i>Action:</i></p> <p>1 Refer to Network Maintenance, Provisioning, or both.</p>			

Table 4-6 DMS-200 toll applications (Sheet 2 of 2)

Group	Key field	Limit	Frequency
ONI	ONIQOVFL ONIQABDN	0	NRT
<p><i>Description:</i></p> <p>These registers indicate calls that are routed to no service circuit treatment because the maximum CAMA call waiting queue length has been exceeded, and calls that are abandoned by the customer while waiting in the queue.</p> <p><i>Action:</i></p> <ol style="list-style-type: none"> 1 OMSHOW group ONI. 2 Does the usage warrant the overflow? 3 Refer to Translations, Network Maintenance, or Provisioning as required. 			

Table 4-7 Tops OC host or remote (Sheet 1 of 2)

Group	Key field	Limit	Frequency
CF3P	TOPSOVFL	0	NRT
<p><i>Description:</i></p> <p>This register is incremented when a call trying to connect to a TOPS position is unable to obtain a conference circuit because the number of circuits assigned to TOPS calls in table OFCENG (TOPS_THRESHOLD) is already equal to or greater than the current threshold.</p> <p><i>Action:</i></p> <ol style="list-style-type: none"> 1 OMSHOW group CF3P to determine if usage justifies overflow. 2 Is there man busy or system busy usage (CNFSBUT or CNFMBUT)? 3 Refer to Network Maintenance, Provisioning, or both. 			
TOPSQ	QDEF QOFL	0	NRT
<p><i>Description:</i></p> <p>These registers indicate that customers are unable to connect to operators.</p> <p><i>Action:</i></p> <ol style="list-style-type: none"> 1 OMSHOW TOPS groups to calculate the percentage. 2 Follow up with Operator Services. 			

Table 4-7 Tops OC host or remote (Sheet 2 of 2)

Group	Key field	Limit	Frequency
TOPSQ	XFERQOFL1 XFERQOFL2	0	NRT
<i>Description:</i>			
Problems are occurring in transferring to another operator, possibly because the queue length has been exceeded.			
<i>Action:</i>			
1 Refer to Operator Services and Network Maintenance.			
TOPSTRAF	FLTFL	0	NRT
<i>Description:</i>			
Network blockage is causing difficulty in connecting to conference circuits.			
<i>Action:</i>			
1 See if TRMTRS_TRSNBLH is also scoring.			
2 Refer to Network Maintenance.			
TOPSVC	VCFL VCDEF	0	NRT
<i>Description:</i>			
These registers indicate problems with the virtual circuits for messaging between host and remote.			
<i>Action:</i>			
1 Refer to Network Maintenance.			
TOPSMISC	TOPRLOST	0	NRT
<i>Description:</i>			
This register indicates that messages are being lost.			

Table 4-8 Auxiliary operator service system

Group	Key field	Limit	Frequency
AOSS	AOSSQDEF AOSSQOV	0	NRT
<p><i>Description:</i> These registers indicate that operators are unable to handle the level of traffic.</p> <p><i>Action:</i> 1 Refer to Network Maintenance, Operator Services, or both. 2 OMSHOW group AOSS to check for busied out positions, high load, or both. 3 Refer to Operator Services and Network Maintenance.</p>			

5 Special reports

Special, or periodic, reporting is a DMS–100 switch feature controlled through OM table OMREPORT. The number of predefined tuples (entries) in table OMREPORT is 24. No additions are allowed.

Special reports are identified by the prefix OMRS (operational measurements report system) followed by the number selected for the report in table OMREPORT. OMRS reports contain register readings and calculations derived using both OMs and information fields as raw data. The format for each report is preset, with each report designed to accommodate a particular administrative need. Each of these reports is described in detail in this chapter.

The DMS–100 family of switches provides two kinds of special reporting. Special reports are generated by OMRS, and some feature packages generate special reports specific to their function. In addition, operating company personnel can use the operational measurement (OM) thresholding feature of the OM system to generate exception reports on specific OMs.

These special reports are explained in detail in this chapter.

OM thresholding

Any operational measurement may be selected and assigned a threshold, which, when exceeded during a pre–defined time frame, will cause a log report to be produced. This is set up using table OMTHRESH and is explained in detail in *Translations Guide*.

OMRS special reports

There are eight OMRS special reports, as follows:

- ACHGXREP—attempts per circuit per hour global exception report
- ACHREP—attempts per circuit per hour report
- CDSREP—call disposition summary report
- DTDDetect—Digitone detection report
- EATSMS—equal access traffic separation report

5-2 Special reports

- IBNTSMS—integrated business network traffic separation report
- PRDTKMTC—periodic trunk maintenance report
- TFCANA—traffic analysis summary report

The reports are stored in the log system against log name OMRS, and are numbered OMRS 000 through OMRS 0023.

Table OMREPORT

To obtain special reports, you must first enter report definition and scheduling information in table OMREPORT. The OMREPORT table is available in switches equipped with the Maintenance Assistance feature package, NTX053AA. In this table, you datafill the classes that are to be reported, the schedule for the reports, and the types of counts to be reported. The table can contain up to 23 entries. For a detailed description of the fields in table OMREPORT, refer to *Translations Guide*. The following table is a summary of the table entries.

Table 5-1 Table OMREPORT summary (Sheet 1 of 2)

Field	Entry
SCHEDNO	Enter a number from 0 to 23. This number identifies the report.
ACTIVE	Enter Y (yes) or N (no).
WHEN	Enter one of the following: AUTO, DAILY, DAYTIME, DEVDAY, DEVWEEK, HALFHOURLY, HOURLY, WEEKLY, MONTHLY to specify the time period covered by the report.
CLASS	Enter an OM measurement class—Active, Holding, or Accumulating.
CONTMARK	Enter a + sign, which is used to indicate when additional information is contained in the next record.
NAME	Enter one of the eight report names listed above.
DATA	For certain reports additional specifications are required, as follows:

Table 5-1 Table OMREPORT summary (Sheet 2 of 2)

Field	Entry
ACHGXREP1	L_LEN, line length. Enter S or L. U_UNIT, usage unit. Enter CCS or ERL. PCO_LIM, percentage overflow limit. Enter a number from 0 to 100. ACH_LIM, attempts per circuit hour limit. Enter a number from 0 to 255. CCH_LIM, calls connected per circuit hour limit. Enter a number from 0 to 255.
ACHREP	L_LEN, line length. Enter S or L. U_UNIT, usage unit. Enter CCS or ERL. THLD_NO, threshold number. Enter 1 or 2.
DTDETECT	CLEAR, clear directory number. Enter Y or N.
EATSMS	L_LEN, line length, enter S or L. SET_U, set-up usage required? Enter Y or N. CON_U, connect usage required? Enter Y or N. SUM_U, sum of set-up usage and connect usage required? Enter Y or N.
PRDTKMTC	L_LEN, line length. Enter S or L. U_UNIT, usage unit. Enter CCS or ERL.
TFCANA	L_LEN, line length. Enter S or L. SET_U, set-up usage required? Enter Y or N. CON_U, connect usage required? Enter Y or N. SUM_U, sum of set-up usage and connect usage required? Enter Y or N.

The following are detailed descriptions of the OMRS special reports.

Attempts per circuit per hour report (ACHREP)

This report presents information on attempts per circuit per hour (ACH) and completions per circuit per hour (CCH) for the trunk groups specified in table NWMCLLI. The report is generated through scheduling, or as a result of exceeding a performance threshold.

Report contents

The ACHREP report contains the following fields:

- REPORT NAME contains ACHREP to identify the report as an attempts per circuit per hour report.
- REASON indicates whether the report was generated because of scheduling or because a threshold was exceeded (EXCEPTIONED).
- CLASS contains the class name (ACTIVE, HOLDING, or ACCUMULATING) for the OM accumulating class or history class defined by the command interpreter (CI) OMCLASS commands.
- START contains the start time for the report.
- STOP contains the finish time for the report.
- SLOWSAMPLES are samples taken every 100 seconds. The number in this field is the number of samples taken in the reporting period.
- FASTSAMPLES are samples taken every 10 seconds. The number in this field is the number of samples taken in the reporting period.
- ELAPSED TIME contains the report period.
- DATA indicates the report line length (short or long) and the type of unit (CCS or ERL).
- CLLI NAME contains the common language location identifier (CLLI) of the trunk groups reported.
- ATTMPTS indicates the number of attempts during the reporting period.
- OVFL indicates the number of call attempts diverted to overflow.
- % OVFL indicates the percentage of call attempts diverted to overflow.
- % LIM contains the overflow threshold (as a percentage of call attempts).
- Usage = TRU + SBU + MBU

where

Tru

is Traffic busy usage*

SBU

is System Busy Usage*

MBU

is Maintenance Busy Usage*

- TRAFFIC is taken directly from the TRU field in OM group TRK.
- CCH indicates number of completed attempts per circuit per hour.
- CCH LIM contains the CCH threshold.
- ACH indicates number of attempts per circuit per hour.
- ACH LIM contains the ACH threshold.

* Field in OM group TRK.

Figure 5-1 Sample ACHREP report

```

OMRS002 AUG17 12:30:00: 6304 INF OM PERIODIC REPORT

REPORT NAME:  ACHREP          REASON:  EXCEPTIONED (See Note 1)

CLASS:  HOLDING
START:  1981/08/17 12:00:00 SUN:  STOP:  1981/08/17 12:30:00 SUN;
SLOWSAMPLES:          18; FASTSAMPLES:180;
ELAPSED TIME:    00/00 00:30:00

DATA:   L_LEN          = L
        U_UN          = CCS
=====

CLLI NAME      ATTMPTS  OVFL    OVFL    LIM  USAGE  TRAFFIC
OTWAON52CG02  4    0    .0      1      1    .4
LONDON4902T1  1    0    .0      1      4    .2
TERMBX02 1    0    .0    1    4      .2
      CCH      ACH
CCH LIM ACH LIM
8.0 1  2.0 1
2.0 1  2.0 1
2.0 1  2.0 1

                        END OF REPORT

```

Note 1: Note 1: This ACHREP is EXCEPTIONED because the data under the ACH and CCH headers has exceeded the limit values set in the corresponding fields of the NWMCLLI table (ACH and CCH respectively) Limit values for the % OVFL header are set in the PCO field of NWMCLLI.

Note 2: Note 2: Due to space limitations, this report is shown as having two rows of field headers. In an actual report, when L_LEN=L, the printout is a single row up to 132 characters in length.

Report definition and scheduling

The ACHREP report is defined and scheduled through datafill in tables NWMCLLI and OMREPORT. Trunk groups to be reported and reporting thresholds for overflow, attempts, and completions are datafilled in table

NWMCLLI. Scheduling options such as report frequency, reporting period, and report start time are datafilled in table OMREPORT. Datafill in table OMREPORT determines whether the ACHREP report is generated through scheduling or when thresholds are exceeded. For more information on datafill for the ACHREP report, see tables NWMCLLI and OMREPORT in *Translations Guide*.

An example of the datafill sequence for defining an ACHREP report in table NWMCLLI is shown below.

```

TABLE: NWMCLLI
EMPTY TABLE
>ADD
CLLI:
>OTWAON52CGO3
FINAL:
>N
PCO1:
>1
PCO2:
>2
CCH1:
>1
CCH2:
>2
ACH1:
>1
ACH2:
>2
TUPLE TO BE ADDED:
OTWAON52CGO3 N 1 2 1 2 1 2
ENTER Y TO CONFIRM, N TO REJECT OR E TO EDIT
>Y
TUPLE ADDED
WRITTEN TO JOURNAL FILE AS JF NUMBER ###
    
```

An example of datafill for the ACHREP report in table NWMCLLI is shown below. The example consists of two trunk groups: OTWAON52CGO3, which is a final route, and OTWAON52DAO0, which is not a final route. Each trunk group has the same thresholds for percentages of overflow (10), number of connections per circuit per hour (10) and number of attempts per circuit per hour (0), to generate an ACHREP report.

CLLI	Final	PCO1	PCO2	CCH1	CCH2	ACH1	ACH2
OTWAON52CGO3	Y	10	10	10	0	0	0
OTWAON52DAO0	N	10	10	10	0	0	0

In table OMREPORT, the ACHREP report schedule is defined through the designation of an OM accumulating class. An example of the datafill sequence for defining an OM class in table OMREPORT is shown below.

```

TABLE: OMREPORT
>POS 1
      1          N          *SPARE*          AUTO HOLDING
>CHA
ACTIVE: N
>Y
REP: AUTO
>
CLASS: HOLDING
>
NAME: *SPARE*
>ACHREP
L_LEN:
>S
U_UNIT:
>CCS
THLD_NO:
>1
TUPLE TO BE CHANGED:
      1          Y          AUTO HOLDING
          ACHREP L CCS 1
ENTER Y TO CONFIRM, NO TO REJECT OR E TO EDIT
>Y
TUPLE CHANGED
WRITTEN TO JOURNAL FILE AS JF NUMBER ###

```

An example of datafill for ACHREP in table OMREPORT is shown below. The schedule number is datafilled as 2 and is active. The report type is datafilled as AUTO (ACHREP report generated every time the holding or accumulating registers are updated). The class is datafilled as HOLDING. The report name is datafilled as ACHREP. The line length is datafilled as L (long). The unit type is datafilled as CCS (hundred call seconds). The threshold number is datafilled as 1.

SCHEDNO	ACTIVE	DATA	WHEN	CLASS
2	Y	ACHREP	AUTO CCS 1	HOLDING

Attempts per circuit hour global exception report (ACHGXREP)

This report presents ACH and CCH information as well as usage and peg count data for trunk groups in a switch. The trunk groups appearing in this report are any that exceed the preset thresholds for ACH, CCH, and PCO measurements.

A global exception (GX) is any exception to preset ACHREP data limits. This report type can be used in an office that does not have table NWMCLLI.

Report contents

The fields in the ACHGXREP report are identical to those in the ACHREP, with the following exceptions:

- The datafilled limits for ACH, CCH, and PCO are shown in the DATA field.
- The CCH and ACH exceptions are shown at the bottom of the report.

Note: See report ACHREP for a detailed description of the fields not described above.

The following is a sample ACHGXREP report. This report is an exception because the values under the ACH and CCH headers have exceeded the ACH_LIM and CCH_LIM specified in the DATA field.

Figure 5-2 Sample ACHGXREP report

```

OMRS002 AUG17 15:30:00: 6405 INFO OM PERIODIC REPORT

REPORT NAME:  ACHGXREP          REASON:  EXCEPTIONED

CLASS:  HOLDING
START:  1981/08/17 15:00:00 SUN: STOP:  1981/08/17 15:30:00 SUN;
SLOWSAMPLES:      18; FASTSAMPLES:      180;
ELAPSED TIME:    00/00 00:30:00

DATA:  L_LEN          = L      (Note)
       U_UNIT        = ERL
       PCO_LIM       = 1
       ACH_LIM       = 1
       CCH_LIM       = 1
=====
          CLL1 NAME      ATTMPTS  OVFL  OVFL  %      %OVF
          LONDON4902T1   7  0  .0   0   .4  .4
          ORIGBX60   15   0  .0   0   .2  .2
          ORIGBX70   15   0  .0   0   .2  .2

          ORIGBX80   14   0  .0   0   .0  .0
          TERMBX01    5   0  .0   0   .0  .0
          TERMBX02   13   0  .0   0   .0  .0
          TERMBX03   14   0  .0   0   .0  .0
          TERMBX04   14   4  18  .6   0  .4  .4
          TOPRTBDP1   1   0  .0   0   .0  .0

                          CCH      ACH
                          CCH      LIM      ACH      LIM
                          14.0     0      14.0     0
                          30.0     0      30.0     0
                          30.0     0      30.0     0
                          28.0     0      28.0     0
                          10.0     0      10.0     0
                          26.0     0      26.0     0
                          28.0     0      28.0     0
                          20.0     0      28.0     0
                          2.0      0       2.0     0
          END OF REPORT

```

Note: Note: Due to space limitations, this report is shown as having two rows of field headers. In an actual report when L_LEN=L, the printout is a single row up to 132 characters in length.

Report definition and scheduling

ACHGXREP report parameters are defined in table OMREPORT, as shown in the example below. It is not necessary for the trunk groups to appear in table NWMCLLI to be included in this report.

Figure 5-3 Example of defining an ACHGXREP report

```

TABLE: OMREPORT
>POS 2
      2          N          AUTO HOLDING
                        *SPARE*
>CHA
ACTIVE: N
>Y
REP: AUTO
>
CLASS: HOLDING
>
NAME: *SPARE*
>ACHGXREP
L_LEN:
>S
U_UNIT:
>CCS
PCO_LIM:
>2
ACH_LIM
>2
CCH_LIM:
>2
TUPLE TO BE CHANGED:
      2          Y          AUTO HOLDING
ACHGXREP S CCS 2  2  2

ENTER Y TO CONFIRM, NO TO REJECT OR E TO EDIT
>Y
TUPLE CHANGED
WRITTEN TO JOURNAL FILE AS JF NUMBER ###
    
```

An example of datafill for ACHGXREP in table OMREPORT is shown in the example below. The schedule number is datafilled as 2 and is active. The report type is datafilled as AUTO (ACHGXREP report generated every time the holding or accumulating registers are updated). The class is datafilled as HOLDING. The report name is datafilled as ACHGXREP. The line length is datafilled as S (short). The unit type is datafilled as CCS (hundred call seconds). The PCO, ACH, and CCH limits iare datafilled as 2.

SCHEDNO	ACTIVE	DATA	WHEN	CLASS
2	N	ACHGKREP S	AUTO 2 2	HOLDING 2

Call disposition summary report (CDSREP)

This report can only be scheduled on switches having feature NTX122AA. The CDS report is a machine performance report that provides information on the status of the switch. The six sections of the report, A through F, present data

on different aspects of switch performance: call disposition summary, call disposition detail, attempt reconciliation, restart call cutoffs, ineffective machine attempts (IMA), and traffic operator position system (TOPS).

Scheduling considerations

All OM groups from which data is obtained to compile the report must previously have been assigned to the class required for the report. The OM groups are CP, LMD, OFZ, OFZ2, ONI, RCVR, TRK, TRMTRS, TRMTCM, TRMTCU, TRMTER, and TRMTFR. The TOPS section of the report requires OM groups TOPSIPS, TOPSTRAF, and TOPSQ.

The CDSREP report as scheduled in table OMREPORT is:

SCHEDNO	ACTIVE	DATA	WHEN	CLASS
4	Y	CDSREP	AUTO	HOLDING

Description of report contents

Individual sections of the call disposition summary report (CDSREP) are described on the following pages. In each case, a sample of the report section is included.

Section A, call disposition—summary

This section of the report provides a brief summary of switch activity that can be scanned to determine if further analysis is required. The reported percentages are identical to those found in section B. This section is applicable to DMS-100, DMS-100/200, and DMS-200 offices.

A. CALL DISPOSITION -- SUMMARY

```

UNDETERMINED      XX.XX% OF TOTAL CALL BASE
OUTGOING          XX.XX% OF PRO_RATED CALL BASE - OUTGOING
TERMINATING      XX.XX% OF PRO_RATED CALL BASE _ TERM
UNACCOUNTED FOR  XX.XX% OF TOTAL CALL BASE

```

Definitions of the entries are as follows:

Undetermined.

The percentage of calls lost due to machine failures or resource shortages before the switch could determine if the calls were destined to be terminated in the switch or routed out.

Outgoing

The percentage of calls destined to be routed out of the office that were blocked due to machine failures or resource shortages.

Terminating

The percentage of calls that could not be terminated in the switch due to machine failures or resource shortages.

Unaccounted for

The percentage of calls that could not be accounted for as having failed, been routed out of the switch, or been terminated. It represents the percentage of data that did not validate. The OMs used to determine this value are detailed in Section C of the report.

Section B, call disposition—detail

This section shows the peg counts used in arriving at the total call base and calculates the total call bases, outgoing and terminating. It provides peg counts of lost calls due to machine failures and resource shortages by category of call destination, that is, undetermined, outgoing, or terminating. It also gives the percentage of the appropriate call base, as reported in Section A, that these peg counts represent.

While the section applies to DMS–100, DMS–100/200 and DMS–200 offices, not every line of this section applies to every switching machine. For example, DMS–200 switches do not have terminating traffic, and DMS–100 switches do not have intertoll measurements. In the following description, entries that are self–explanatory are not defined. Full descriptions of all OMs are found in the *Operational Measurements Reference Manual, 297–1001–814*.

B. CALL DISPOSITION -- DETAIL		
	PEG COUNT	% CALL BASE
TOTAL ATTEMPTS	nnnnnnnnnn	
LESS: PS/PD TREATMENTS (CUSTOMER)	nnnnnnnnnn	
LESS: PRE_ROUTE ABANDONS (CUSTOMER)	nnnnnnnnnn	
= CDS TOTAL CALL BASE	nnnnnnnnnn	
PRO-RATED: CALL BASE - OUTGOING	nnnnnnnnnn	
CALL BASE - TERMINATING	nnnnnnnnnn	
CDS CALL DESTINATION UNDETERMINED	nnnnnnnnnn	nnn.nn%
MACHINE FAILURES	nnnnnnnnnn	nnn.nn%
NO RESOURCE	nnnnnnnnnn	nnn.nn%
CDS CALL DESTINATION OUTGOING	nnnnnnnnnn	100.00%
NO CIRCUIT (TOTAL)	nnnnnnnnnn	nnn.nn%
= NCIT - INTERTOLL FINAL ROUTE	nnnnnnnnnn	nnn.nn%
NCTC - TOLL COMPL. FINAL ROUTE	nnnnnnnnnn	nnn.nn%
NCLT - EAS FINAL ROUTE	nnnnnnnnnn	nnn.nn%
NCRT - NWM CONTROLS IN EFFECT	nnnnnnnnnn	nnn.nn%
EMR1 - NWM CONTROLS IN EFFECT	nnnnnnnnnn	nnn.nn%
EMR2 - NWM CONTROLS IN EFFECT	nnnnnnnnnn	nnn.nn%
TOVD - NWM CONTROLS IN EFFECT	nnnnnnnnnn	nnn.nn%
RETRY NO SPEECH PATH	nnnnnnnnnn	nnn.nn%
RETRY SEIZE FAILURES	nnnnnnnnnn	nnn.nn%
CDS CALL DESTINATION TERMINATING	nnnnnnnnnn	nnn.nn%
NO SPEECH PATH	nnnnnnnnnn	nnn.nn%
RINGING FAILURES	nnnnnnnnnn	nnn.nn%

The methods used to calculate the statistics presented in the report follow:

Total attempts. This total is calculated from:

$$NIN + NORIG + 65536 \times (NIN2 + NORIG2) + CCBOVFL + CPLOOVFL$$

where

NIN= total number of incoming attempts from trunks that are recognized by the CC

NORIG= total number of originating attempts from lines that are recognized by the CC

Both NIN and NORIG attempts are pegged after getting a call condense block and seizing a call process. Therefore call condense block overflows (CCBOVFL) and call processing letter overflows (CPLOOVFL) must be added to obtain total attempts. These overflows are considered as lost calls under the No Resource entry in this section.

PS/PD treatments, customer-caused. This total is calculated from:

$$(TCMPSIG + TCMPDIL) - (PSGM + PDLM)$$

where

(TCMPSIG + TCMPDIL) = total number of permanent signal (PS) and partial dial (PD) calls, whether machine- or customer-caused. The machine-caused PS and PD calls are separated to allow the customer-caused PS and PD calls to be excluded from the CDS report, because they are not included as ineffective attempts. Partial dial abandons are not given treatment so are not included here.

(PSGM + PDLM) = the number of permanent signal and partial dial calls in OM group OFZ2 that were caused by equipment failure. These are subtracted from the total to obtain the customer-caused permanent signal and partial dial calls.

Preroute abandons, customer-caused. This total is calculated from:

$$INABNC + ORIGABDN - RCVQABAN - ONIQABAN$$

Preroute abandons are mostly partial dial abandons due to customer abandonment. The abandons in queue could be due to resource shortages and should therefore be separated from other abandons. Because the queue abandons are included in the Attempt Reconciliation, Section C of the report, they must be included in the call base. However, as TOPS queue abandons are not measured in ORIGABN or INABNC, they cannot be subtracted.

CDS total call base. This entry is calculated from total attempts minus PS/PD treatments minus preroute abandons, which have already been defined. The total call base is prorated into outgoing and terminating call bases. These prorated call bases are then used to calculate the percentage lost calls for the respective portions of office traffic as reported in the CDS call destination outgoing and call destination terminating entries.

Prorated call base-outgoing. This count is calculated from:

$$\frac{INOUT + ORIGOUT}{INOUT + ORIGOUT + INTRM + ORIGTRM} \times \text{CDS Total Call Base}$$

Prorated call base-terminating. This entry is calculated from:

$$\frac{INTRM + ORIGTRM}{INOUT + ORIGOUT + INTRM + ORIGTRM} \times \text{CDS Total Call Base}$$

CDS-call destination undetermined. This count is calculated from:

Machine Failures + No Resource

Machine failures. This count is calculated from:

INLKT+PSGM+PDLM+TERRODR+TERSYFL+CPTRAP
+CPSUIC-PERCLFL summed over all LCD(Line Concentrating Device) bays

where

CPTRAP + CPSUIC includes CPLP overflow and OUTBOVFL.

- INLKT = Calls routed to lockout prior to any other routing. There is a slight possibility that some calls scoring INLKT also score CPTRAP and CPSUIC, but this amount is negligible.
- TERSYFL does not include PERCLFL routed to the SYFL treatment. These counts are subtracted from this part of the report because they are accounted for under CDS Call Destination Terminating as Ringing Failures.
- PSGM are permanent signals generated due to equipment failures.
- PDLM are partial dials due to equipment failures.

No resource. This is calculated from:

CCBOVFL+CPLOOVFL+TRSNBLH+TRSNBLN+ORIGLKT+OFZNOSC
-(OUTRMFL+TRMMFL)

where

ORIGLKT counts are part of the no resource category because most events counted here are likely to be forced reoriginations due to lack of a path through the originating LCD.

OUTRMFL counts are subtracted because they are included in TRSNBLH. They are included under CDS call destination outgoing as retry no speech path.

TRMMFL counts are subtracted because they are included as part of TRSNBLH and TRSNBLN. They are accounted for under CDS call destination terminating as no speech path.

Call destination outgoing. This count is the sum of the entries no circuit, retry no speech path, and retry seize failures.

No circuit. This count is the sum of the following counts

- NCIT–intertoll final route
- NCTC–toll compl. final route
- NCLT–EAS final route
- TRSNCRT–NWM control in effect
- TRSEMR1–NWM control in effect
- TRSEMR2–NWM control in effect
- TRSTOVD–NWM control in effect

Retry no speech path This is the OUTRMFL count. This count is the number of outgoing calls that fail and get NBLH treatment due to second trial network match failures on an attempt to an outgoing or test trunk. The OUTRMFL count was subtracted from the TRSNBLH count under the no resource entry of call destination undetermined. The measurements OUTRMFL and TRSNBLH comprise the resource shortage category of call destination outgoing.

Retry seize failures This is the OUTROSF count. This count is the number of outgoing calls that fail and get SSTO treatment due to outgoing seize failures. This count represents the machine–failure category of call destination outgoing.

Call destination terminating This count is the sum of no speech path and ringing failures.

No speech path This is the TRMMFL count. This is the number of attempts to find a voice path to a terminating line that end in failure. Since this can happen only on calls destined to terminate in the office, these pegs are subtracted from the TRSNBLN count under the no resource entry of call destination undetermined. This constitutes the no resource portion of the terminating part of the report.

Ringing failures This count is PERCLFL summed over all LCD bays, where PERCLFL is the number of calls attempting to terminate on an LCD that fail and are given SYFL treatment because of inability to ring the terminating line properly. This event occurs only on calls attempting to terminate in the office, therefore they are subtracted from the TERSYFL count under the machine failures entry of call destination undetermined.

Section C, attempt reconciliation

This section (presented for DMS–100, DMS–100/200, and DMS–200 offices) validates the OMs upon which the CDS report is based by showing the percentage of attempts included in the CDS total call base that cannot be

accounted for. A validation problem is indicated if the unaccounted for entry A of the report is a significant amount. Definitions of the entries in this section of the report follow. For detailed descriptions of OMs, see the *Operational Measurements Reference Manual*.

C. ATTEMPT RECONCILIATION		PEG	COUNT	%	TOTAL
CALL BASE					
CDS TOTAL CALL BASE		nnnnnnnnnn		nnn	.nn
LESS: CDS - TOTAL		nnnnnnnnnn		nnn	.nn
VACANT, SCREENED, MACH. INCPT.		nnnnnnnnnn		nnn	.nn
CONNECTED - OUTGOING		nnnnnnnnnn		nnn	.nn
CONNECTED - TERMINATING		nnnnnnnnnn		nnn	.nn
ABANDONS IN QUEUE		nnnnnnnnnn		nnn	.nn
PRE_ROUTE ABANDONS (MACHINE)		nnnnnnnnnn		nnn	.nn
= DEFICIT (EXCESS) ACCOUNTED FOR		nnnnnnnnnn		nnn	.nn

The data presented in this report are derived as follows:

CDS total call base. This count is taken from Section B.

CDS total. This count is the sum of machine failures and no resource calls obtained by adding the call destination undetermined, call destination outgoing, and call destination terminating entries in section B

Vacant, screened, machine intercept. This count is the sum of the following:

TCMVACT, TCUMSCA, TFRBUSY, TCMTRBL, TCUMSLC, TCUUNCA, TCUNHPI, TCMUNDN, TCMBLDN, TCUUNOW, TCUTDND, TCUUNIN, TCUTORSS, TCUTES, TCMANCT, TCUDNTR and TCUNOCN.

Note: Translations must be analyzed as screened, and intercepted calls can be treated differently from office to office, therefore manual adjustments to this machine calculation may be necessary.

Connected-outgoing. This count is CONNECT in OM group TRK summed over all trunk groups

Connected-terminating. This count is calculated from:

TRMNWAT – TRMMFL – ringing failures (as calculated in Section B)

where

TRMNWAT is the number of attempts to find a voice path to a terminating line.

TRMMFL is the number of attempts to find a voice path to a terminating line that fail. This count is already included under no resource in Section B.

Abandons in queue. This count is calculated from:

RCVQABAN (summed over MF and DGT) + ONIQABAN + TOPSQABN +
CAMAQABN + XFRQABN1 + XFRQABN2

RCVQABAN and ONIQABAN were subtracted from INABNC + ORIGABDN under the entry preroute abandons, customer-caused in Section B of the report. They are not considered as actual call failures because, in most cases, the customer chose to abandon the call while waiting for service. Some of the abandons could be due to trunk timeouts or equipment troubles in the end office, but, these cannot be separated. In any case, the abandons are a good indication of a build-up of traffic and could indicate pending shortages that will eventually cause queue defects or queue overflows. The TOPS queue abandons are not measured in ORIGABN or INABNC.

Preroute abandons (machine) This is count INABNM from OM group OFZ. These are abandoned calls incoming from another switching machine rather than from a customer. They could be due to facility problems or a failure in the far-end machine. However, they could also be abandons caused by a customer served from the distant machine, and, therefore, cannot be categorized as machine failures in Section B of the report. They are a good indication of possible equipment failures

Deficit (excess) accounted for This count is calculated from:

(CDS total call base) - (CDS total) + (vacant, screened, machine intercept) +
(connected outgoings) + (Connected terminating) + (abandons in queue) +
(preroute abandons)

The resulting figure represents calls that could not be accounted for. An excessive positive or negative value indicates a data validation problem requiring further investigation. A negative figure is shown in parentheses—(nnnnnnnnnnn). An excessive positive or negative value indicates a data validation problem, which requires further investigation. The problem should be traced to its source by first determining which value or values are too high or too low in the preceding equation. If historical average percentages are available from previous reports, these can help identify the source of error. . The problem can then be traced to specific OM registers that provide the counts for the values. A solution usually emerges as a result of considering exactly how the switch provides the data that is being counted in each register. For example, the count of vacant, screened, and machine intercepted calls must often be manually adjusted for specific office configurations as explained on the previous page.

Section D, restart call cutoffs

D. RESTART CALL CUTOFFS	PEG COUNT	% TOTAL
CALL BASE		
WARM RESTART	nnnnnnnnnn	nnn . nn
COLD RESTART	nnnnnnnnnn	nnn . nn

This section gives the total number of calls that may have been affected by warm or cold starts. It is applicable to DMS-100, DMS-100/200, and DMS-200 offices.

Definitions of the entries in this section follow. Detailed descriptions of specific OMs are found in *Operational Measurement Reference Manual*.

Warm restart This is count WINITC in OM group CP. WINITC counts the number of calls that are in progress at the time of a warm restart and that have received confusion messages from a peripheral processor. The count may continue to increase slowly after a restart or as more lost calls are recognized.

Cold restart This is count CINITC in OM group CP. CINITC gives a count of all the call condense blocks (CCB) that were in use at the time of the cold restart. Since the CCB is the basic data block for a call, counting the active CCB gives a count of all calls that are in progress at that time.

Section E, ineffective machine attempts

E. INEFFECTIVE MACHINE ATTEMPTS (IMA)	PEG COUNT	PRO-RATED O/G CALL BASE
PRO-RATED CALL BASE - OUTGOING	nnnnnnnnnn	
NO CIRCUIT - INTERTOLL	nnnnnnnnnn	nnn . nn
NO CIRCUIT - TOLL COMPLETING	nnnnnnnnnn	nnn . nn
		% TOTAL CALL BASE
TOTAL CALL BASE	nnnnnnnnnn	
REORDER	nnnnnnnnnn	nnn . nn
NETWORK ACCESS	nnnnnnnnnn	nnn . nn
TOTAL	nnnnnnnnnn	nnn . nn

This section is designed for toll machines to provide the percentage of calls that are not completed due to equipment or trunk blockages and failures. The section provides empirical data for determining final service objectives for all DMS-100/200 and DMS-200 switching units. In combined local/toll offices, re-orders cannot always be split into local-caused or toll-caused instances. In the calculations given here, the assumption is made that total machine reorders minus true local reorders are equally attributable to local and toll calls. Similarly, local tandem calls cannot be extracted in this report from the outgoing call base without manual calculations.

The counts presented in this report are derived as follows:

Prorated call base-outgoing This is the same peg count as is shown against prorated call base-outgoing in Section B of the report. In a combined local/toll machine, the traffic terminating on lines has been removed. However, EAS traffic originating or EAS tandem traffic remains in the call base. The actual peg count of the call base provided allows manual adjustments, if required, to extract EAS traffic as applicable in each office.

No circuit-intertoll This count is the sum of OFZNCIT, TRSNCRT, TRSEMR1, and TRSEMR2. The percentage of the prorated call base outgoing is calculated. A high percentage indicates a shortage of intertoll trunks, or network congestion possibly due to facility failures.

No circuit toll completing This is the OFZNCTC count from OM group OFZ2. The actual peg count shown allows for manual intervention if required. The percentage of the prorated call base outgoing is calculated. A high percentage indicates a shortage of toll-completing trunks or possibly facility failures.

Total call base This is the CDS total call base calculated in Section B.

Reorder This count is the sum of the machine failures and retry seize failures as shown in Section B of the report.

Network access This count is the sum of the no resources and retry no speech path entries in Section B of the report

Total The peg count and percentage totals of no circuit intertoll, no circuit toll completing, reorder, and network access.

Figure 5-4 Section F, TOPS

F. T O P S	PEG COUNTS	% (POSIPS -CAMAIPS)
TOPS CALL	nnnnnnnnnn	
OPERATOR CALLS	nnnnnnnnnn	
OPERATOR ACTION		
OPERATOR FLOAT	nnnnnnnnnn	nnn.nn
CANCELLED CALLS	nnnnnnnnnn	
TRANSFER IC CALLS	nnnnnnnnnn	
% OP.FLOAT		
FLOAT FAILURE	nnnnnnnnnn	nnn.nn
QUEUE (REGULAR) OPERATOR CALL		
SUBSEQUENT POSITION SEIZURES	nnnnnnnnnn	nnn.nn
QUEUE DEFLECTION	nnnnnnnnnn	nnn.nn
QUE ABANDONS	nnnnnnnnnn	nnn.nn
CAMA ABANDONS	nnnnnnnnnn	nnn.nn
QUEUE OVERFLOW	nnnnnnnnnn	nnn.nn
QUEUE (TRANSFER 1)		% nFRIPS
TRANSFER INTIAL POSITION SEIZURES	nnnnnnnnnn	
TRANSFER SUBSEQUENT POSITION SEIZURES	nnnnnnnnnn	
TRANSFER QUEUE OVERFLOW	nnnnnnnnnn	nnn.nn
TRANSFER QUEUE ABANDONS	nnnnnnnnnn	nnn.nn
QUEUE (TRANSFER 2)		
TRANSFER INITIAL POSITION SEIZURES	nnnnnnnnnn	
TRANSFER SUBSEQUENT POSITION SEIZURES	nnnnnnnnnn	
TRANSFER QUEUE OVERFLOW	nnnnnnnnnn	nnn.nn
TRANSFER QUEUE ABANDONS	nnnnnnnnnn	nnn.nn
MCCS SERVICE	nnnnnnnnnn	
MCCS OPERATOR	nnnnnnnnnn	
MCCS ABANDONS	nnnnnnnnnn	
MCCS FAILURES	nnnnnnnnnn	
ACTS SERVICE	nnnnnnnnnn	
ACTS OPERATOR	nnnnnnnnnn	
ACTS ABANDONS	nnnnnnnnnn	
ACTS FAILURES	nnnnnnnnnn	
RONI SERVICE	nnnnnnnnnn	
OC SERVICE	nnnnnnnnnn	
CAMA SERVICE		
CAMA INITIAL POSITION SEIZURES	nnnnnnnnnn	
AMA CALL WAITING	nnnnnnnnnn	
OVERLOAD CONTROL		
EMERGENCY 3	nnnnnnnnnn	
EMERGENCY 4	nnnnnnnnnn	

This section provides a convenient summary of the traffic operator position system (TOPS) traffic handled in an office. TOPS operations can have a major impact on the overall switch performance; overloads can occur due to

insufficient operators or positions caused by peaking, emergency situations, or miscalculations in force adjusting.

Definitions of the entries in this section follow:

TOPS call This is count TOPSNIN in OM group TOPSTRAF. TOPSNIN is the number of calls requiring operator, ACTS, or MCCS services. System recalls are not included.

Operator calls This is count POSIPS in OM group TOPSIPS. POSIPS is the number of initial position seizures on TOPS. System recalls or operator-originated delay calls are not included.

Operator action Subsection heading.

Operator float This count is OPRFLT in OM group TOPSTRAF. OPRFLT is the number of times operators key POSITION RELEASE to establish a direct connection between the incoming and outgoing trunks. These trunks are connected to the TOPS Position via a 3-port conference circuit.

Canceled calls This is count TOPSCAN in OM group TOPSTRAF. TOPSCAN is the number of calls where a connection is established to an operator, but the call is canceled.

Transfer IC calls This is count XFRIC in OM group TOPSTRAF. XFRIC is the number of calls establishing a connection to an operator and then routed to an interexchange carrier.

Float failure This count is FLTFL in OM group TOPSTRAF. FLTFL is the number of times 3-port conference circuits cannot be released due to network blockage when operators attempt to float calls.

Queue (regular) Subsection heading

Subsequent position seizures This is count SPS in OM group TOPSIPS. SPS is the number of times recalls (notify, flash recall, coin overtime) are attached to TOPS positions. These calls have priority in the queue over initial TOPS calls.

Queue deflection This is count QDEF in OM group TOPSQS. QDEF is the number of times a call attempting to reach a TOPS operator is deflected by the system as a result of the queue overload threshold (as defined in Queue Length Threshold tables QTO to QT5) being exceeded. The current threshold is dependent on the number of occupied positions and average operator work time per call. 0-calls are deflected to EMR4; all others to EMR3.

Queue abandons This is count TOPSQABN in OM group TOPSQS. TOPSQABN is the number of times TOPS calls in queue for attachment to a TOPS operator are abandoned by the customer. These queue abandons can also be generated by Wannan selectors in a Class 5 end office. This count is part of the abandons in queue count in Section C of this report.

CAMA abandons This count is CAMAQABN in OM group TOPSQ. CAMAQABN is the number of CAMA and RONI calls in queue for attachment to a TOPS position that are abandoned by customers. These abandons could also be caused by end-office equipment problems.

Queue overflow This count is QOFL in OM group TOPSQS. QOFL is the number of calls attempting to reach TOPS operators that are deflected by the system because the assigned queue length is exceeded. This queue length is assigned as parameter TOPS_CALLS_WAITING_Q_SIZE in table OFCENG. All calls regardless of type are lost. For more information about table OFCENG, refer to *Office Parameters Reference Manual*.

Queue (transfer 1 and transfer 2) Subsection headings. Each TOPS office may have up to two transfer types as specified by parameter TOPS_NUM_TRANSFER_TYPES in table OFCENG (see *Office Parameters Reference Manual*). The information described in the next four paragraphs is supplied for each transfer type.

Transfer initial position seizures This is count XFRIPS1 or XFRIPS2 in OM group TOPSIPS. XFRIPS is the number of calls transferred by a regular operator and successfully connected to a transfer position.

Transfer subsequent position seizures This count is XFRSPS1 or XFRSPS2 in OM group TOPSIPS. XFRSPS is the number of recalls, such as notify, coin overtime, or flash, that are attached to a transfer position.

Transfer queue overflow This count is XFRQOFL1 or XFRQOFL2 in OM group TOPSQS. XFRQOFL is the number of recalls attempting to reach a transfer operator that are deflected by the system.

Transfer queue abandons This count is XFRQABN1 or XFRQABN2 in OM group TOPSQS. XFRQABN is the number of calls queued for attachment to a transfer position that were abandoned by customers.

MCCS service This is count MCCSATT in OM group CDMCCS, which is the number of times a customer dials a 0+ call and receives MCCS service. MCCS sequence calls are not included.

MCCS operator This is count MCCSOPR in OM group CDMCCS, which is the number of times a customer goes to an operator due to timeout or customer flash.

MCCS abandons This is count MCCSABN in OM group CDMCCS, which is the number of times a customer abandons the call while connected to the initial announcement message.

MCCS failures This is count MCCSFAIL in OM group CDMCCS, which is the number of times initial MCCS service cannot be provided. This may be due to hardware or availability problems with announcement or receiver circuits.

ACTS measurements The following measurements are associated with the automatic coin toll service (ACTS) and are found in OM group CDACTS.

- **ACTS service** This is count ACTSINI, which is the number of times a customer dials a 1+ call and receives ACTS service.
- **ACTS operator** This is count ACTSOPRI which is the number of times the customer flashes the switch-hook or times out during the initial recorded announcement.
- **ACTS abandons** This is count ACTSABN which is the number of times that a customer abandons while connected to the initial recorded announcement.
- **ACTS failure** This is count ACTSFAIL, which is the number of times initial ACTS service cannot be provided. This may be due to hardware or availability problems with the announcement or coin detection circuits.

RONI service This is count RONATT in OM group TOPSRON, which is the number of times a RONI (remote operator number identification) call is connected to an operator. RONI recalls are not included.

OC Service This is count OCINI in OM group TOPSOC, which is the number of calls in the OC (operator centralization) host switch that originate in the remote switch.

CAMA Service Subsection heading.

CAMA initial position seizures This count is CAMAIPS in OM group TOPSIPS. CAMAIPS is the number of times a CAMA call is attached to a TOPS position. This count is included in the TOPS call count (first item in Section F).

CAMA calls waiting This count is CAMACW in OM group TOPSQ. CAMACW is the sum of the number of CAMA calls in queue at each 10-second scan

CAMAIPS and CAMACW provide assistance in evaluating the need for assigned grade of service (parameter TOPS_AGS in table OFCVAR, *Office Parameters Reference Manual*) that is giving CAMA calls preference in queue

over all other types of TOPS calls, excluding recalls. They also provide a means of determining the effect of this feature on CAMA service.

Overload control Subsection heading

Emergency 3 This count is TRSEMR3 in OM group TRMTRS. TRSEMR3 is the number of calls given EMR3 treatment, that is, the treatment for a TOPS call, other than a 0 call, when the deflected call threshold for the queue is exceeded.

Emergency 4 This count is TRSEMR4 in OM group TRMTRS. TRSEMR4 is the number of calls given EMR3 treatment, that is, the treatment for a TOPS 0 call when the deflected call threshold for the queue is exceeded. Calling subscribers can, if they wish, remain on the line and enter the TOPS queue to wait for an operator

Digitone detection report (DTDETECT)

DTDETECT is the product of an optional feature (NTX206AA01) that identifies callers classed as dial pulse (DP) who are using Digitone (DT) receivers. It is intended as a cutover tool to identify these subscribers who previously had access to DT capabilities without operating company knowledge.

It is used as follows:

- DT receivers are allocated to all calls originating from DP class subscribers.
- If the DT receiver is used for digit collection, a record of the directory number is made.
- A listing of these directory numbers is output according to an operating company-defined schedule.

Additional DT receiver capacity is required for the time period during which this feature is in effect, however, if a Digitone receiver is not available immediately then the digits for DP calls are collected by the line card.

For multiparty lines on which all phones are classed as DP, all numbers on the line are reported. If any of the phones on the party line are DT, then those numbers are not reported.

Report scheduling considerations

The following activities are required to ensure receipt of DTDETECT reports:

- The feature must be enabled using the DTDETECT command at the MAP. If the feature is not enabled before the report is scheduled, the specification of report DTDETECT in table OMREPORT is not permitted.
- The report DTDETECT must be scheduled. This is done with the use of the TE commands in table OMREPORT (TE commands are described in *Input/Output System Reference Manual*, 297–1001–129, and table OMREPORT is described in *Translations Guide*, Section 041).
 - The DTDETECT feature must be enabled before the report is scheduled. If it is not, the specification of report DTDETECT in table OMREPORT will not be permitted.
 - The feature does not track the volume of unauthorized receiver usage. However, if the parameter CLEAR in Table OMREPORT is set to Y, then each report lists only the directory numbers using the Digitone capability since the last report.

Figure 5-5 Sample DTDETECT report

```

OMRS002  MAR06 04:00:17 3900 INFO OM PERIODIC REPORT

REPORT NAME:  DTDETECT          REASON:    SCHEDULED

CLASS:  HOLDING
START:1984/03/06 03:30:00 TUE: STOP: 1984/03/06 04:00:00 TUE;
SLOWSAMPLES:          18; FASTSAMPLES:          180 ;
ELAPSED TIME: 00/00 00:30:00
DATA:  CLEAR          =Y

=====
UNAUTHORISED SUBSCRIBERS USING DIGITONE RECEIVERS
DIRECTORY NUMBERS
-----
6211234          6211235          6212222
6225234          6221234          6229999          6222343
7761234
2211234          2213331
END OF REPORT
>QUIT

```

Equal access traffic separation report (EATSMS)

The equal access traffic separation measurement system is a subset of the features provided by the traffic separation measurement system (TSMS).

The reports produced contain information on the following traffic:

- IntraLATA–Intrastate
- IntraLATA–Interstate
- InterLATA–Intrastate
- InterLATA–Interstate

The EATSMS reports are grouped according to content. For report descriptions, content designation, and scheduling information, refer to the *Operational Measurements Reference Manual*.

Integrated business network traffic separation reports (IBNTSMS)

The IBNTSMS reports are generated by an extension of the capabilities of the traffic separation measurement system (TSMS). The reports present separation information on calls originating from or terminating on a specific network class of service (NCOS) within a specified IBN customer group.

IBNTSMS reports are grouped according to content. Report descriptions and information on scheduling and content specification are contained in the *Operational Measurements Reference Manual*.

Periodic trunk maintenance report (PRDTKMTC)

This report presents summarized performance information for the trunk groups in a DMS system. Key items from OM group TRK are reported.

Report contents

The PRDTKMTC report contains the following fields:

- REPORT NAME contains PRDTKMTC to identify the report.
- REASON SCHEDULED is not used.
- CLASS contains the class name (ACTIVE, HOLDING, or ACCUMULATING) for the OM accumulating class or history class defined by the command interpreter (CI) OMCLASS commands.
- START contains the start time for the report.
- STOP contains the finish time for the report.
- SLOWSAMPLES are samples taken every 100 seconds. The number in this field is the number of samples taken in the reporting period.
- FASTSAMPLES are samples taken every 10 seconds. The number in this field is the number of samples taken in the reporting period.
- ELAPSED TIME contains the report period.
- DATA indicates the report line length (short or long) and the type of unit (CCS or ERL).

- CLLI NAME contains the common language location identifier (CLLI) of the trunk groups reported.
- # CF TRK
- TOTAL INCATOT contains the number of incoming seizures on a trunk group.
- TOTAL INFAIL contains the number of incoming failures.
- TOTAL ABAN contains the number of attempts that are abandoned before routing is completed.
- TOTAL NATTMPT contains the number of outgoing calls routed to a trunk group
- TOTAL OUTFAIL contains the number of attempts to seize an outgoing trunk in a trunk group.
- TOTAL MTC USG = SBU + MBU

where

SBU

is System Busy Usage

MBU

is Maintenance Busy Usage

Note: Fields in OM group TRK.

- # TRK MTC BS
 - = no. of trunks currently manual busy
 - + no. of trunks currently system busy
 - + no. of trunks currently NWM busy
 - + no. of trunks currently remote busy
 - + no. of trunks currently PM busy
 - + no. of trunks currently in the deloaded state
 - + no. of trunks currently in the carrier fail state
- % TRK MTC BS
 - # TRK MTC BS divided by
 - (total no. of trunks - no. of trunks currently offline)x100

Figure 5-6 Sample PRDTKMTC report

```

OMRS001 AUG17 15:30:00: 6304 INF OM PERIODIC REPORT

REPORT NAME:  PRDTKMTC          REASON  SCHEDULED (See Note 1)

CLASS: HOLDING
START: 1981/08/17 15:00:00 SUN: STOP: 1981/08/17 15:30:00 SUN
SLOWSAMPLES:      16; FASTSAMPLES:      164;
ELAPSED TIME:    00/00 00:30:00

DATA:  L_LEN          = L
      U_UNIT          = CCS
=====
CLLI NAME      # CF   TOTAL   TOTAL   TOTAL   TOTAL   TOTAL
                TRK  INCATOT  INFALL  ABAN  NATTMPT  OUTFAIL
TERM1000       128    0         0        0        0         0
                TOTAL # TRK   % TRK
                MTC USG MTC BS  MTC BS
                0         0        0
END OF REPORT

```

Note 1: This PRDTKMTC is a normal report scheduled to be output every half hour, giving data for eight fields of a group of 128 trunks.

Note 2: Due to space limitations, this report is shown as having two rows of field headers. In an actual report, when L_LEN = L, the printout is a single row up to 132 characters in length.

Report definition and scheduling

The PRDTKMTC report is defined and scheduled through datafill in tables NWMCLLI and OMREPORT. Trunk groups to be reported are datafilled in table NWMCLLI. Scheduling options such as report frequency, reporting period, and report start time are datafilled in table OMREPORT. Datafill in table OMREPORT determines whether the PRDTKMTC report is generated through scheduling or when thresholds are exceeded. For more information on datafill for the PRDTKMTC report, see tables NWMCLLI and OMREPORT in *Translations Guide*.

The TE commands used for table access and manipulation are covered in *Basic Translations Tools Guide*, 297–1001–360.

An example of datafill for table OMREPORT is shown below. The schedule number for the PRDTKMTC report is datafilled as 1 and is active. The report type is datafilled as AUTO (PRDTKMTC report generated every time the holding or accumulating registers are updated). The class is datafilled as

HOLDING. The report name is datafilled as PRDTKMTC. The line length is datafilled as S (short). The unit type is datafilled ERL (erlangs).

Table 5-2

SCHEDNO	ACTIVE		WHEN	CLASS
		DATA		
1	Y		AUTO	HOLDING
	PRDTKMTC	S		

Traffic analysis report (TFCANA)

The TFCANA report is a product of the traffic separation measurements system (TSMS) providing traffic separation information on selected lines and trunks in a DMS system. The data can be used to support the establishment of tariffs for various service offerings, and revenue settlements with connecting companies. TSMS comprises feature packages NTX085AA (peg counts), NTX087AA (usage counts), and NTX088AA (summary report).

The following three components of a call can be separated and measured:

- point-to-point attempt peg count
- setup time
- point-to-point usage (connect time)

The counts are collected at source-traffic-separation and destination-traffic-separation intersections. In addition, data on originating calls can be broken down by call type: direct dial (DD), operator assisted (OA), or no prefix dialed (NP).

Sources and destinations are grouped according to the requirement of the operating company using the following categories:

- sources:
 - a line or group of lines
 - a trunk group or group of trunk groups
 - a network class of service (NCOS) associated with Meridian Digital Centrex (MDC) traffic.
- destinations:
 - a line or group of lines
 - a trunk group or group of trunk groups
 - an announcement or group of announcements
 - a tone or group of tones
 - NCOS associated with MDC traffic
 - generic destinations

Each source group and destination group is assigned a traffic separation number (TRAFSNO). This number is applied to all traffic to be included in that particular group. For example, when traffic is to be separated as a group of lines, trunks, or announcements, all traffic in each group is assigned the same TRAFSNO. Any number of lines, trunks, tones, special tones, or announcements can have the same TRAFSNO.

In addition, each source group is assigned its own source traffic separation number (STSN) from 0 to 127, and each destination group is assigned a destination traffic separation number (DTSN), also in the range from 0 to 127.

The TFCANA report is scheduled using table OMREPORT. The output format parameters are

- L_LEN line length; short (S), long (L)
- SET_U setup usage; yes (Y), no (N)
- CON_U connect usage; yes (Y), no (N)
- SUM_U setup and connect usage summed; yes (Y), no (N)

Figure 5-7 Sample TFCANA report

```
OMRS003 SEP02 10:00:00 8293 INFO OM PERIODIC REPORT

REPORT NAME:      TFCANA          REASON:      SCHEDULED
CLASS:      HOLDING
START:      1991/05/16 09:30:00 THU; STOP: 1991/05/16 10:00:00
THU;
SLOWSAMPLES:      18 ; FASTSAMPLES      180 ;
ELAPSED TIME: 00/00 00:30:00
DATA:      L_LEN      = L
SET_U      = N
CON_U      = N
SUM_U      = Y
-----
      REGNO      PEGS      SUM_U      REGNO      PEGS      SUM_U
      01077      10789      1      27      30
      265837      7762      3      '      '
      4      '      5      '      '
      '      '      '      '      '
      '      '      '      '      '

TOTALS: 1274328 97343

E N D   O F   R E P O R T
```

For more information on the use of TSMS to provide traffic separation data, refer to *Operational Measurements Reference Manual*. For more information on OM group TFCANA, refer to *Operational Measurements Reference Manual*.

Feature package special reports

There are two feature package special reports: real time performance indicator reports and killer trunk reports. Real time performance indicators are described in "Monitoring service indicators", chapter of this book. This section deals with killer trunk reports.

Killer trunk reporting feature

This feature provides for the detection and reporting of trunks with potential performance problems. It is available with feature package NTX053AA.

The killer trunk reporting feature, F6309, detects and reports trunks that have at least one of the following characteristics:

Killer trunk A trunk that is repeatedly seized but due to a malfunction is not held for an appreciable length of time. For example, bad transmission will cause the subscriber to drop the connection and reattempt the call. Within a group these trunks will have a higher-than-average attempt rate and lower than average holding time.

Slow release trunk A trunk that has a low attempt rate coupled with a fairly high usage. Malfunctioning supervisory equipment is typically the cause of this.

Always busy trunk A trunk that has zero attempts and is busy during the whole report interval. For example, if the report interval is one hour, then the usage is 36.0 hundred call seconds (ccs). Under-engineering of the group, normal high usage, and equipment malfunctions are all possible causes of this condition.

Always idle trunk A trunk that has a usage of zero ccs and zero attempts. Improper network management controls, over-engineering, and equipment malfunction are among the causes of this condition.

The following sections describe the major killer trunk reporting capabilities. For additional details, refer to

- *Translations Guide* for information about tables KTPATMS, KTGROU, and KTMINMAX.
- *DMS-100 Family Commands Reference manual*, 297-1001-822 for information about the KTREPORT, KTRBIND, and KTRUNBND command interpreter (CI) commands.
- *Log Reports Reference Manual* for information about the KTRK100 log report.

Instrumenting trunk groups

The killer trunk reporting feature provides three modes of operation for trunk instrumentation: AUTO, MANUAL, and SEMIAUTO.

In the AUTO mode, trunk circuits are instrumented on a rotational basis in order of trunk groups as defined in table TRKGRP. When the next report interval begins, the next set of 2,048 trunk circuits is instrumented, beginning with the next trunk group.

In MANUAL mode, trunk circuits are instrumented in order of the groups declared in table KTGROU. If the number of circuits defined by table KTGROU exceeds the 2048 maximum allowed, 2,048 will be instrumented. The same set will be repeatedly instrumented for each report interval as long as the MANUAL mode is enabled.

The SEMIAUTO mode is a combination of the MANUAL and AUTO modes. In SEMIAUTO mode, trunk circuits are instrumented according to the groups

defined in table KTGROUPE. All circuits defined within those groups are instrumented on a rotational basis.

Note: For all modes of operation, the maximum number of instrumented trunks is 2,048 circuits or 350 trunk groups, whichever comes first. Also, for all modes of operation, partial trunk groups are not instrumented.

Scheduling observations and reports

Tables KTPARMS, KTGROUPE, and KTMINMAX are used to define killer trunk criteria, to designate trunks to be instrumented, and to schedule observations and report intervals.

The three tables are described fully in Translations Guide. Their functions are

- KTPARMS controls the killer trunk process. Use this table to
 - enable the feature (ENABLE)
 - specify the rate at which trunk groups will be scanned for usage (SCANRATE)
 - specify start and stop times for killer trunk observation (START and STOP)
 - specify a report interval, which divides the period between the start and stop times into several intervals (REPORT)
 - set a killer trunk peg minimum threshold (KTPEGMIN)
 - set a killer trunk holding time maximum threshold (KTHTMAX)
 - set a slow release holding time minimum threshold (SRHTMIN)
 - set the mode of operation to AUTOMATIC, MANUAL, or SEMIAUTO (MODE)
 - specify whether or not a KTRK100 log report should be generated at the end of every report interval (GENKTLOG)
- KTGROUPE specifies the trunk groups to be instrumented when the killer trunk feature is in the MANUAL or SEMIAUTO mode, as set in KTPARMS
- KTMINMAX defines killer trunk criteria for peg counts and average holding time on a per trunk group basis. The criteria in this table can be used to analyze peg and usage data. The KTREPORT command with the ANALYSE and KTMINMAX parameters will use the criteria defined in table MINMAX instead of the default criteria defined in table KTPARMS

Reporting killer trunk data

The KTREPORT command produces reports on demand, and the KTRK100 log produces reports automatically (if specified in table KTPARMS).

The KTREPORT command uses data from a raw data report of a KT observation file, which contains usage and peg counts for trunks observed during a specified interval. Three types of reports can be produced. The first type of report displays all trunk groups under observation at the time the report executes. The second type of report displays a list of the available raw data reports contained in a KT observation file. The third type of report analyzes a raw data report and outputs a list of trunks exhibiting killer trunk properties.

The KTREPORT command uses the following criteria to determine if a trunk circuit exhibits a KT property:

- Always Idle: (Usage = 0) & (Peg = 0)
- Always Busy: (Usage >= Interval Duration – 1 scan rate) & (Peg = 0) & (trunk state at end of report interval was busy)
- Slow Release: HT > SRHTMIN
- Killer Trunk: (HT < KTHTMAX) & (Peg > KTPEGMIN)
- KT and SR: (HT < KTHTMAX) & (Peg > KTPEGMIN) & (HT > SRHTMIN)

Report format – KTREPORT ACTIVE

The following are examples of the KTREPORT ACTIVE report format:

Figure 5-8 KTREPORT sample, active format

```

KILLER TRUNK REPORT: Active Trunk Groups
Report Time: YY/MM/DD HH:MM:SS
-----
  CLI1
  CLI2
  .
  .
  .
  CLIn
TOTAL TRUNK GROUPS INSTRUMENTED = xxx
TOTAL TRUNKS INSTRUMENTED       = yyyy

```

Figure 5-9 KTREPORT FILEDIR sample report

```

KILLER TRUNK REPORT: Directory of file XXXXX
Report Time: YY/MM/DD HHMMSS
-----
Report Interval: XX Hrs XX Min

REPORT          INTERVAL
NO              START
1               HHMM .. YY/MM/DD
2               HHMM .. YY/MM/DD
.
.
.
n               HHMM .. YY/MM/DD
    
```

Figure 5-10 KTREPORT ANALYZE sample output

```

KILLER TRUNK REPORT: Analyze File XXXXX
Report Number: nn
Report Time: YY/MM/DD HH MM SS
Interval Start Time: YY/MM/DD HH MM SS
Accumulation Time: XX Hours XX Minutes
Instrumentation Mode: (Manual/Automatic/Semiauto)
Scan Rate: (Fast/Slow)

Reporting Criteria:
      PEG HT TROUBLE
1. > n1 < n2 Killer Trunk
   > n3 Slow Release
2. > n1 < n2 Killer Trunk
   > n3 Slow Release
.
.
n. > n1 < n2 Killer Trunk
   > n3 Slow Release
-----
GROUP      MEMBER      PEG USAGE      HT TROUBLE CRITERIA
CLLI      memid      nn nn nn      trbltext      n
-----
    
```

Generating log reports

Log report KTRK100 is generated at the end of every report interval if the GENKTLOG field in table KTPARMS is set to ON. The field REPTYPE in table KTPARMS does not affect the type of log produced.

Based on the criteria in table KTPARMS, the log report lists trunk groups that exhibited any of the killer trunk properties during the report interval. Only the last log generated can be viewed through LOGUTIL. The KTRK100 log is not accumulated in the usual fashion of circular buffers because of the large size of the log. Instead, the last log generated is stored in holding registers. That log is accessible only until the next log is generated, when the holding registers are overwritten with the contents of the new log.

A sample of the KTRK100 log report format is shown on page 40.

Figure 5-11 KTRK100 sample log report

```

KTRK100 mmmdd hh:mm:ss ssdd INFO KTRK_REPORT
-----
EXCEPTIONS
KTPARMS CRITERIA:          PEG              HT              TROUBLE
                        >ktpegmin          <kthtmax        KILLER TRUNK
                        >srhtmin          >srhtmin        SLOW RELEASE
-----
GROUP      MEMBER      PEG      USAGE      HT      TROUBLE
  clli     ext_trk     n1       n2         n3     trbl
-----
ACCUMULATION TIME:  n n

```

Measuring seizure and usage

To accumulate usage data for instrumented trunks, the killer trunk feature implements a separate process to scan trunks periodically and examine the trunk state. This scanning process collects usage data in step with report intervals.

When a circuit is found to be call processing busy, that is, any of trunk states call processing busy (CPB), call processing busy deload (CPD), lockout (LO), or remote make busy (RMB), a usage measure equal to the period of the scan is added to the accumulating register associated with the circuit.

To identify killer trunk properties, it is necessary to measure average holding time (HT) for trunk circuits. Average holding time is computed by dividing the circuit usage measured within a report interval by the number of trunk seizures (pegs) measured during the same interval:

$$HT = USAGE / PEGS$$

The feature measures pegs by updating accumulating registers from call processing upon origination or trunk selection.

Activating the killer trunk reporting feature

The following steps are needed to activate the killer trunk reporting feature:

1. Datafill table KTGROUP with valid CLLIs already defined in table TRKGRP and supported by this feature. The datafill in this table and in table TRKSGRP is necessary for the MANUAL and SEMIAUTO modes.
2. Datafill table KTMINMAX with peg and holding time criteria for specific supported trunk groups. The datafill in this table is necessary for the KTMINMAX option of the KREPORT ANALYZE command. The CLLIs entered in this table must be previously defined in table TRKGRP.

3. In table KTPARMS, set the ENABLE field to OFF, and datafill the table with the desired values for
 - scan rate
 - start and stop times
 - report interval
 - peg counts and holding times to be used as default values during report generation
 - mode
 - GENKTLOG
4. Set the ENABLE field in table KTPARMS to ON.

Verification sequence for killer trunk reporting feature

The following steps are needed to verify the operation of the killer trunk reporting feature:

1. Issue the KTREPORT command with the ACTIVE option. If the KT software is in MANUAL or SEMIAUTO mode, the report will contain a list of currently instrumented trunk groups from table KTGROUP.

Note: If the KT software is in AUTO mode, the report will list the currently instrumented trunk groups (up to 350) from table TRKGRP.

2. If the report displays the message "NO TRUNK GROUPS INSTRUMENTED AT THIS TIME," the KT software is not activated. Make sure that the ENABLE field in table KTPARMS is set to ON, and then issue the KTREPORT ACTIVE command again.

Note: Trunk groups are instrumented within 10 seconds after the ENABLE field is set to ON.

Appendix A Equipment counts

EQPCOUNTS

The EQPCOUNTS command provides the following switch equipment counts.

- nodes
- networks
- peripheral modules
- lines
- trunks
- station features

This appendix describes each count and provides the CI command string required to verify the count. Count descriptions are listed in the same order as they are output by the EQPCOUNT command. Note that the EQPCOUNTS output may not contain all the counts described.

EQPCOUNTS output

The following is an example of the output report of command EQPCOUNTS. For peripheral modules (PM), the count indicates if the module is "Insv:" (in service) or "Comm:" (commissioned and operational, but not yet in service). If individual usage or performance reports are required for selected hardware, refer to the *Switch Performance Monitoring System Application Guide Manual*, 297–1001–330.

Example of EQPCOUNTS output

```
>dmsmon
DMSMON:
>eqpcounts all

*****
*           Counts           *
*****

Number of nodes: 326
Number of networks: 20

Number of TM2 PMs:      Insv: 0      Comm: 1
Number of TM4 PMs:      Insv: 0      Comm: 1
Number of ATM PMs:      Insv: 0      Comm: 1
Number of TM8 PMs:      Insv: 0      Comm: 5
Number of MTM PMs:      Insv: 0      Comm: 12
Number of DCM PMs:      Insv: 0      Comm: 9
Number of OAU PMs:      Insv: 0      Comm: 1
Number of STM PMs:      Insv: 0      Comm: 2
Number of T8A PMs:      Insv: 0      Comm: 1
Number of TMA PMs:      Insv: 0      Comm: 0
Number of MTMA PMs:     Insv: 0      Comm: 0
Number of LM PMs:       Insv: 0      Comm: 4
Number of RSM PMs:      Insv: 0      Comm: 0
Number of TAN PMs:      Insv: 0      Comm: 1
Number of DES PMs:      Insv: 0      Comm: 1
Number of DSM PMs:      Insv: 0      Comm: 0
Number of DCM250 PMs:   Insv: 0      Comm: 0
Number of LGC PMs:      Insv: 0      Comm: 12
Number of LCM PMs:      Insv: 0      Comm: 60
Number of DTC PMs:      Insv: 0      Comm: 40
Number of MSB6 PMs:     Insv: 0      Comm: 0
Number of LTC PMs:      Insv: 0      Comm: 2
Number of SMR PMs:      Insv: 0      Comm: 2
Number of SMS PMs:      Insv: 0      Comm: 2
Number of SMU PMs:      Insv: 0      Comm: 1
Number of RCT PMs:      Insv: 0      Comm: 3
Number of MSB7 PMs:     Insv: 0      Comm: 5
Number of CSC PMs:      Insv: 0      Comm: 0
Number of RMM PMs:      Insv: 0      Comm: 3
Number of IDTC PMs:     Insv: 0      Comm: 0
Number of DCMT PMs:     Insv: 0      Comm: 0
Number of RCC PMs:      Insv: 0      Comm: 1
Number of RCS PMs:      Insv: 0      Comm: 4
Number of RCU PMs:      Insv: 0      Comm: 3
Number of ESA PMs:      Insv: 0      Comm: 1
Number of SVR PMs:      Insv: 0      Comm: 0
Number of ILGC PMs:     Insv: 0      Comm: 0
Number of ILTC PMs:     Insv: 0      Comm: 0
Number of RMSC PMs:     Insv: 0      Comm: 0
Number of PTM PMs:      Insv: 0      Comm: 1
Number of DLM PMs:      Insv: 0      Comm: 0
Number of ADTC PMs:     Insv: 0      Comm: 0
Number of PDTC PMs:     Insv: 0      Comm: 0
Number of PHN PMs:      Insv: 0      Comm: 20
Number of IAC PMs:      Insv: 0      Comm: 0
Number of SMSR PMs:     Insv: 0      Comm: 1
```

Number of ILCM PMs:	Insv: 0	Comm: 0
Number of LCMI PMs:	Insv: 0	Comm: 3
Number of TDTC PMs:	Insv: 0	Comm: 0
Number of TLGC PMs:	Insv: 0	Comm: 0
Number of TLTC PMs:	Insv: 0	Comm: 0
Number of ALGC PMs:	Insv: 0	Comm: 0
Number of VSR PMs:	Insv: 0	Comm: 0
Number of LIM PMs:	Insv: 0	Comm: 4
Number of LIU7 PMs:	Insv: 0	Comm: 4
Number of TRCC PMs:	Insv: 0	Comm: 0
Number of PLGC PMs:	Insv: 0	Comm: 0
Number of SPM PMs:	Insv: 0	Comm: 0
Number of SDM PMs:	Insv: 0	Comm: 0
Number of ELCM PMs:	Insv: 0	Comm: 0
Number of LRU PMs:	Insv: 0	Comm: 0
Number of TACC PMs:	Insv: 0	Comm: 0
Number of TMS PMs:	Insv: 0	Comm: 2
Number of LDT PMs:	Insv: 0	Comm: 1
Number of FRIU PMs:	Insv: 0	Comm: 2
Number of FRCC PMs:	Insv: 0	Comm: 0
Number of CFP PMs:	Insv: 0	Comm: 0
Number of TPC PMs:	Insv: 0	Comm: 2
Number of PND PMs:	Insv: 0	Comm: 0
Number of RCCI PMs:	Insv: 0	Comm: 1
Number of ARCC PMs:	Insv: 0	Comm: 0
Number of ALCM PMs:	Insv: 0	Comm: 0
Number of SMA PMs:	Insv: 0	Comm: 1
Number of FILP PMs:	Insv: 0	Comm: 1
Number of AP PMs:	Insv: 0	Comm: 1
Number of HSI PMs:	Insv: 0	Comm: 0
Number of HSI2 PMs:	Insv: 0	Comm: 0
Number of DTCI PMs:	Insv: 0	Comm: 1
Number of EIU PMs:	Insv: 1	Comm: 2
Number of IDT PMs:	Insv: 0	Comm: 3
Number of LCME PMs:	Insv: 0	Comm: 1
Number of DA PMs:	Insv: 0	Comm: 0
Number of ORDB PMs:	Insv: 0	Comm: 0
Number of ICP PMs:	Insv: 0	Comm: 0
Number of EXND PMs:	Insv: 0	Comm: 2
Number of HSLR PMs:	Insv: 0	Comm: 0
Number of PSP PMs:	Insv: 0	Comm: 0
Number of ELIU PMs:	Insv: 0	Comm: 0
Number of CFI PMs:	Insv: 0	Comm: 0
Number of IPE PMs:	Insv: 0	Comm: 0
Number of XLIU PMs:	Insv: 0	Comm: 2
Number of PRCC PMs:	Insv: 0	Comm: 0
Number of DTM PMs:	Insv: 0	Comm: 1
Number of ICRM PMs:	Insv: 0	Comm: 0
Number of APU PMs:	Insv: 0	Comm: 3
Number of RCC2 PMs:	Insv: 0	Comm: 1
Number of DFI PMs:	Insv: 0	Comm: 0
Number of SRU PMs:	Insv: 0	Comm: 0
Number of ITAC PMs:	Insv: 0	Comm: 0
Number of HLIU PMs:	Insv: 0	Comm: 0
Number of GSMP PMs:	Insv: 0	Comm: 0
Number of VPU PMs:	Insv: 0	Comm: 1
Number of SRCC PMs:	Insv: 0	Comm: 0
Number of HSIE PMs:	Insv: 0	Comm: 0
Number of NIU PMs:	Insv: 0	Comm: 2
Number of RCO2 PMs:	Insv: 0	Comm: 0
Number of STS PMs:	Insv: 0	Comm: 0

A-4 Equipment counts

Number of SPX PMs: Insv: 0 Comm: 0
Number of CTM PMs: Insv: 0 Comm: 1
Number of SMA2 PMs: Insv: 0 Comm: 1
Number of GPP PMs: Insv: 0 Comm: 0
Number of AMC PMs: Insv: 0 Comm: 0
Number of AIM PMs: Insv: 0 Comm: 0
Number of OSN PMs: Insv: 0 Comm: 0
Number of OSNM PMs: Insv: 0 Comm: 1
Number of OSAC PMs: Insv: 0 Comm: 0
Number of CAU PMs: Insv: 0 Comm: 0
Number of CIU PMs: Insv: 0 Comm: 0
Number of CAVU PMs: Insv: 0 Comm: 0
Number of ILD PMs: Insv: 0 Comm: 0
Number of TRLE PMs: Insv: 0 Comm: 0
Number of ACE PMs: Insv: 0 Comm: 0
Number of NIL_PMTYPE PM Insv: 0 Comm: 0

Number of LTC_ISDN PMs: Insv: 0 Comm: 2
Number of LGC_ISDN PMs: Insv: 0 Comm: 1
Number of SMU_ISDN PMs: Insv: 0 Comm: 1

Number of DATAFILLED lines: 19100
Number of DATAFILLED POTS lines: 14702
Number of DATAFILLED IBN/RES lines: 3555
Number of DP_POTS lines: 7353
Number of DGT_POTS lines: 7349
Number of DP IBN/RES lines: 1714
Number of DGT IBN/RES lines: 1841
Number of TOTAL_UNEQ lines: 11615
Number of TOTAL_OFFL lines: 9277

Number of PPHONE_STATION lines: 815
Number of DISPLAY_PPHONE_STATION lines: 2
Number of DATA_UNIT_STATION lines: 4
Number of POTS_DATA_UNIT_STATION lines: 0
Number of M2009_STATION lines: 0
Number of M2112_STATION lines: 0
Number of M2018_STATION lines: 0
Number of MADO_STATION lines: 0
Number of M5009_STATION lines: 9
Number of M5112_STATION lines: 2
Number of M5317_STATION lines: 0
Number of M5008_STATION lines: 0
Number of ISDN_STATION lines: 5
Number of M3000_STATION lines: 0
Number of M2317_STATION lines: 0
Number of M5209_STATION lines: 2
Number of M5312_STATION lines: 4
Number of M2008_STATION lines: 0
Number of M2616_STATION lines: 0
Number of M2016S_STATION lines: 0
Number of M2216A_STATION lines: 0
Number of M2216B_STATION lines: 0
Number of MPDA_STATION lines: 0
Number of M2006_STATION lines: 0
Number of NIL_STATION lines: 0
Number of ASR_STATION lines: 0
Number of M5212_STATION lines: 0
Number of ISLCKSET_STATION lines: 0
Number of M5208_STATION lines: 0
Number of M5216_STATION lines: 0

Number of M5316_STATION lines: 0
Number of MCA_STATION lines: 0

Number of DNs on keysets: 4038

Number of POTS lines with CSDDS option: 3
Number of POTS lines with Call Waiting Feature: 4333
Number of POTS lines with Call Forwarding Feature: 2012
Number of POTS lines with Remote Call Forwarding: 9
Number of POTS lines with Call Forwarding Busy: 0
Number of POTS lines with Call Forward Don't Answer: 0
Number of POTS lines with Speed Call Feature: 1692
Number of POTS lines with Three-Way Call Feature: 2891
Number of POTS lines with Three-Way Call Public Feature: 0
Number of IBN/RES lines with Call Waiting Feature: 322
Number of IBN/RES lines with Call Forwarding Feature: 2119
Number of IBN/RES lines with Three-Way Call Feature: 66
Number of IBN/RES lines with Three-Way Call Public Feature: 163
Number of IBN/RES lines with Speed Call Feature: 943
Number of KSET lines with Call Waiting Feature: 11
Number of KSET lines with Call Forwarding Feature: 798
Number of KSET lines with Three-Way Call Feature: 797
Number of KSET lines with Three-Way Call Public Feature: 0
Number of KSET lines with Speed Call Feature: 14
Number of HOTEL/MOTEL lines with register pulsing: 122
Number of INWATS lines: 2
Number of lines with TEEN service: 1
NUMBER OF DATAFILLED RES LINES: 1763
Number of RES lines with SMDI: 0
Number of RES lines with features: 956

RES feature:	COT	NO. OF LINES:	127
RES feature:	CFE	NO. OF LINES:	0
RES feature:	CFI	NO. OF LINES:	0
RES feature:	CFRA	NO. OF LINES:	2
RES feature:	CFK	NO. OF LINES:	0
RES feature:	CFB	NO. OF LINES:	0
RES feature:	CBI	NO. OF LINES:	0
RES feature:	CBE	NO. OF LINES:	0
RES feature:	CBU	NO. OF LINES:	0
RES feature:	CFD	NO. OF LINES:	0
RES feature:	CDI	NO. OF LINES:	0
RES feature:	CDE	NO. OF LINES:	0
RES feature:	CDU	NO. OF LINES:	0
RES feature:	SC1	NO. OF LINES:	0
RES feature:	SC2	NO. OF LINES:	350
RES feature:	SC3	NO. OF LINES:	176
RES feature:	CFU	NO. OF LINES:	178
RES feature:	SCS	NO. OF LINES:	0
RES feature:	CNDB	NO. OF LINES:	127
RES feature:	SMDI	NO. OF LINES:	0

Number of trunks: 15256
Number of unequipped trunks: 0
Number of offline trunks: 15212
Number of trunk groups: 500
Number of IBNTI trunks: 6
Number of IBNTO trunks: 3
Number of IBNT2 trunks: 5
Number of PRA IBNT2 trunks: 0
Number of SC trunks: 0
Number of OP trunks: 0

A-6 Equipment counts

Number of AOSS trunks: 0
Number of TOPS trunks: 0
Number of RONI trunks: 0

Number of RCVRMF receivers: 20
Number of RCVRDGT receivers: 16
Number of RCVRATD receivers: 0
Number of RCVRMCCS receivers: 0
Number of MF300 receivers: 0
Number of DGT300 receivers: 0
Number of KSR2OCVR receivers: 0
Number of KSR2ICVR receivers: 0
Number of RCVRCOIN receivers: 0
Number of RCVRATDA receivers: 0
Number of RCVATDUK receivers: 0
Number of RCVRDTUK receivers: 0
Number of RCVRCDC receivers: 0

Number of CF3 circuits: 6
Number of CF6 circuits: 1
Number of LTU's: 6
Number of TTU's: 3
Number of ATU's: 0
Number of DTU's: 0

Number of VDU's: 16

Number of ST connections: 4
Number of IPML connctions: 5
Number of nailed up CLLIs: 1

Number of customer groups: 29
Number of consoleless customer groups: 7
Number of members per customer group:

- Group: ASRDFLT
NO. OF MEMBERS: 0
- Group: PFDEFAULT
NO. OF MEMBERS: 0
- Group: POTSDATA
NO. OF MEMBERS: 0
- Group: PRAEFAULT
NO. OF MEMBERS: 0
- Group: COMIBN2
NO. OF MEMBERS: 3
- Group: GOC
NO. OF MEMBERS: 0
- Group: COMIBN3
NO. OF MEMBERS: 3
- Group: COMIBN6
NO. OF MEMBERS: 1
- Group: COMKODAK
NO. OF MEMBERS: 12
- Group: CENTESN
NO. OF MEMBERS: 0
- Group: GOC990
NO. OF MEMBERS: 4
- Group: COMIBN4
NO. OF MEMBERS: 1
- Group: COMIBN5
NO. OF MEMBERS: 1
- Group: COMIBN7

NO. OF MEMBERS: 0
Group: BRAMESN
NO. OF MEMBERS: 0
Group: LONDES
NO. OF MEMBERS: 0
Group: RES
NO. OF MEMBERS: 1760
Group: BCSLAB1
NO. OF MEMBERS: 0
Group: BCSLAB
NO. OF MEMBERS: 2586
Group: TESTGRP1
NO. OF MEMBERS: 0
Group: JONCUST
NO. OF MEMBERS: 1
Group: IBNGRP1
NO. OF MEMBERS: 24
Group: ISDN
NO. OF MEMBERS: 2
Group: LABTEST
NO. OF MEMBERS: 0
Group: PSTNACCESS
NO. OF MEMBERS: 0
Group: A
NO. OF MEMBERS: 0
Group: B
NO. OF MEMBERS: 0

Number of customer subgroups: 24
Number of attendant consoles: 2

Number of TOPS positions: 1
Number of OPERATOR positions: 1
Number of IN CHARGE positions: 0
Number of ASSISTANCE positions: 0
Highest operator number datafilled: 0

Number of AOSS Positions: 0
Highest AOSS team number: 0
Highest AOSS operator: 0

Number of CAMA Positions: 1

Number of Orig Rate Centres: 0
Maximum Orig Rate Centre: 0
Number of Term Rate Centres: 0
Maximum Term Rate Centre: 0

Number of MDC lines allocated: 1073741823
Number of ACD LINES allocated: 4000
Number of VL members: 2
Number of VIRT groups: 19
Number of hunt groups: 76
Number of UCD groups: 11
Number of ACD groups: 16
Number of ENHANCED ACD group: 2
Number of ENHANCED ACD agent: 0
Number of BASIC ACD group: 14
Number of BASIC ACD agent: 9
Number of CMS lines: 1763
Number of POTS COIN lines: 29

A-8 Equipment counts

```
Number of FGA lines: 188
Number of OUTWATS lines: 2
Number of MDC 2500 lines: 3555
Number of MDC MBS lines: 0
Number of SMDI lines: 0
Number of allocated TICS/LEAS DNs: 50000
Number of DATAPATH lines: 4
Number of DIALAN lines: 0
Number of total ISDN lines: 0
Number of ISDN FUNCT BRA lines: 3
Number of ISDN STIM BRA lines: 0
Number of ISDN BRA MFT lines: 2
Number of ISDN PRA trunks: 5
Number of datafilled CLASS lines: 1826
CLASS FEATURE:   ACB   NO. OF LINES: 128
CLASS FEATURE:  ACBAMA NO. OF LINES: 126
CLASS FEATURE:   AR   NO. OF LINES: 192
CLASS FEATURE:  ARAMA NO. OF LINES: 126
CLASS FEATURE:  CNDB  NO. OF LINES: 127
CLASS FEATURE: CNDBAMA NO. OF LINES: 126
CLASS FEATURE:  COT   NO. OF LINES: 128
CLASS FEATURE:  COTAMA NO. OF LINES: 126
CLASS FEATURE:  CND   NO. OF LINES: 879
CLASS FEATURE:  DDN   NO. OF LINES: 877
CLASS FEATURE:  SCRJ  NO. OF LINES: 876
CLASS FEATURE:  SCF   NO. OF LINES: 176
CLASS FEATURE:  SCA   NO. OF LINES: 876
CLASS FEATURE:  DRCW  NO. OF LINES: 875
```

```
SMDR is being used
record stop onto sfdev
```

Equipment counts

The following sections define the individual counts and the equivalent CI commands.

Number of nodes

To display the total number of nodes in the office, use the following CI command string.

Equivalent CI commands

The following MAP display represents the required CI command string.

```
>TABLE NNASST;BOT
```

Note: The node count displays the highest node number + 1. If a node that did not have the highest node number was deleted from the system, the display indicates the incorrect number of nodes.

Number of networks

To display the total number of networks in the office, use the following CI command string.

Equivalent CI commands

The following MAP display represents the required CI command string.

```
>ERASE A B C
>TABLE OFCOPT;POS NETWORK_ACTIVE
>ASSIGN PARMAVAL A
>((SUBSTR A ((STRSIZE A) - 4)4 ) = 'JNET') -> B
>IF B THEN (TABLE NETWORK;COUNT/2->C) ELSE
(TABLE ENVINV;COUNT->C)
>QUIT
>PRINT C
```

Number of Peripheral Modules

All peripheral module (PM) counts are output using a single count procedure. Each count output shows the following:

- the type of peripheral module
- the number of modules in the Insv: state—the number of modules that are in the 'system busy', 'c-side busy, inservice', 'OK', or 'inservice trouble' state
- the number of modules in the Comm: state—the number of modules in the 'unequipped', 'offline', or 'man busy state'

The following is an example of a typical PM listing.

Example of a PM listing

Number of TM2 PMs:	Insv: 5	Comm: 1
Number of TM4 PMs:	Insv: 0	Comm: 1
Number of ATM PMs:	Insv: 0	Comm: 1
Number of TM8 PMs:	Insv: 0	Comm: 5
Number of MTM PMs:	Insv: 66	Comm: 12
Number of DCM PMs:	Insv: 0	Comm: 9
Number of OAU PMs:	Insv: 3	Comm: 1
Number of STM PMs:	Insv: 0	Comm: 2
Number of T8A PMs:	Insv: 0	Comm: 1
Number of TMA PMs:	Insv: 0	Comm: 0
Number of MTMA PMs:	Insv: 0	Comm: 0
Number of LM PMs:	Insv: 9	Comm: 4
Number of RSM PMs:	Insv: 0	Comm: 0
Number of TAN PMs:	Insv: 0	Comm: 1
Number of DES PMs:	Insv: 0	Comm: 1
Number of DSM PMs:	Insv: 0	Comm: 0
Number of DCM250 PMs:	Insv: 0	Comm: 0
Number of LGC PMs:	Insv: 21	Comm: 12
Number of LCM PMs:	Insv: 83	Comm: 60
Number of DTC PMs:	Insv: 32	Comm: 4
Number of MSB6 PMs:	Insv: 0	Comm: 0
Number of LTC PMs:	Insv: 8	Comm: 2
Number of SMR PMs:	Insv: 12	Comm: 2
Number of SMS PMs:	Insv: 0	Comm: 2

Equivalent CI commands

The following MAP display represents the required CI command string.

```
>MAPCI;MTC;PM;STATUS
```

Number of datafilled lines

During the execution of `bcsmnimp::eqpcounts_proc` the total number of datafilled lines is calculated by adding the following internal counts.

```
$number_of_2500_lines[dp_pots]
+ $number_of_2500_lines[dgt_pots]
+ $number_of_2500_lines[dp_ibn]
+ $number_of_2500_lines[dgt_ibn]
+ $number_of_2500_lines[total_uneq]
+ $number_of_2500_lines[total_offl]
+ $number_of_gsf_dp_lines + $number_of_gsf_dgt_lines
+ $total_number_of_kset_lines
- $number_of_2500_lines[total_offl]
- $number_of_2500_lines[total_uneq]
```

Equivalent CI commands

The following MAP display represents the required CI command.

```
>DMSMON;EQPCOUNTS;QUIT
```

Number of working lines in the office

The total number of working lines in the office is the sum of the following counts listed in the EQUIPCOUNTS output.

Number of DP_POTS lines

Number of DGT_POTS lines

Number of DP_IBN/RES lines

Number of DGT_IBN/RES lines

Total number of tuples in table KSETINV

Equivalent CI commands

The following MAP display represents the required CI command strings.

```
>DMSMON;EQPCOUNTS;QUIT  
>TABLE KSETINV;COUNT;QUIT
```

Note: The dp_pots and dgt_pots dmsmon outputs include GSF line counts.

Number of datafilled POTS lines

During the execution of bcsmnimp::eqpcounts_proc the total number of datafilled POTS lines is calculated by adding the following internal counts.

```
$number_of_2500_lines[dp_pots]  
+ $number_of_2500_lines[dgt_pots]  
+ $number_of_gsf_dp_lines  
+ $number_of_gsf_dgt_lines
```

Number of working POTS lines in the office

The total number of working POTS lines in the office is the sum of the following counts listed in the EQUIPCOUNTS output.

Number of DP_POTS lines

Number of DGT_POTS lines

Equivalent CI commands

The following MAP display represents the required CI command string.

```
>DMSMON;EQPCOUNTS;QUIT
```

Note: The dp_pots and dgt_pots dmsmon outputs include GSF line counts.

Number of datafilled IBN/RES lines

During the execution of bcsmnimp::eqpcounts_proc the total number of datafilled IBN/RES lines is calculated by adding the following internal counts.

```
$number_of_2500_lines [dp_ibn]
```

```
$number_of_2500_lines [dgt_ibn]
```

Number of working IBN/RES lines in the office

The total number of working IBN/RES lines in the office is the sum of the following counts listed in the EQUIPCOUNTS output.

Number of DP IBN/RES lines

Number of DGT_IBN/RES lines

Equivalent CI commands

The following MAP display represents the required CI command string.

```
>DMSMON;EQPCOUNTS;QUIT
```

Number of DP_POTS lines

To display the total number of POTS lines with dial pulse signaling, use one of the following CI command strings.

Equivalent CI commands

If party lines are not in use, the following MAP display represents the required CI command.

```
>TABLE LENLINES  
>COUNT (SIGTYPE EQ 'DP')  
>QUIT
```

If party lines are in use, the following MAP display represents the required CI command string.

```
>TABLE LENLINES  
>ERASE A B C D  
>ASSIGN LEN A  
>ASSIGN SIGTYPE C  
>0->D  
>IF (C='DP') THEN (D+1->D);  
>WHILE (NEXT) (ASSIGN LEN B;ASSIGN SIGTYPE C;  
>IF ((A^=B) & (C='DP')) THEN (D+1->D);ASSIGN LEN A)  
>PRINT D  
>QUIT
```

Number of DGT_POTS lines

To display the total number of POTS lines with the DGT line option use one of the following command strings.

Equivalent CI command

If party lines are not in use, the following MAP display represents the required CI command string.

```
>TABLE LENLINES  
>COUNT (SIGTYPE EQ 'DT')  
>QUIT
```

If party lines are in use, the following MAP display represents the required CI command string.

```
>TABLE LENLINES
>ERASE A B C D
>ASSIGN LEN A
>ASSIGN SIGTYPE C
>0->D
>IF (C='DT') THEN (D+1->D);
>WHILE (NEXT) (ASSIGN LEN B;ASSIGN SIGTYPE C;
>IF ((A^=B) & (C='DP')) THEN (D+1->D);ASSIGN LEN A)
>PRINT D
>QUIT
```

Number of DP IBN/RES lines

To display the total number of IBN/RES lines with dial pulse signaling, use the following command string.

Equivalent CI commands

The following MAP display represents the required CI command string.

```
>TABLE IBNLINES
>FORMAT PACK
>ERASE A B C D
>ASSIGN LEN A
>ASSIGN RESULT C
>0->D
>IF (((SUBSTR C 0 2) = 'DP') & ((SUBSTR C 4 2) ^= 'AC')) THEN
(D+1->D)
>WHILE (NEXT) (ASSIGN LEN B;ASSIGN RESULT C;
>IF (((SUBSTR C 0 2) = 'DP') & (B^=A) & ((SUBSTR C 4 2) ^=
'AC')) THEN (D+1->);ASSIGN LEN A)
>PRINT D
>QUIT
```

Number of DGT IBN/RES lines

To display the total number of IBN/RES lines with the DGT option set, enter the following CI command string.

Equivalent CI commands

The following MAP display represents the required CI command string.

```
>TABLE IBNLINES
>FORMAT PACK
>ERASE A B C D
>ASSIGN LEN A
>ASSIGN RESULT C
>0->D
>IF (((SUBSTR C 0 2) = 'DT') & ((SUBSTR C 4 2) ^= 'AC')) THEN
(D+1->D);ASSIGN LEN A
>WHILE (NEXT)(ASSIGN LEN B;ASSIGN RESULT C;
>IF (((SUBSTR C 0 2) = 'DT') & (B^=A) & ((SUBSTR C 4 2) ^= 'AC'))
THEN (D+1->D);ASSIGN LEN A)
>PRINT D
>QUIT
```

Number of TOTAL UNEQ lines

To display the total number of line card slots that are not datafilled in table unequipped LNINV use the following procedure.

Procedure

List table LNINV. The number of unequipped lines on the switch is the number of non-contiguous or incomplete datafilled lines in table LNINV..

Number of TOTAL OFFL lines

To display the total number of lines that are in the IBN state, enter the following CI command string.

Equivalent CI command

```
>MAPIC NODISP;LNS;LTP
>POST S INB LIST
>QUIT
```

Note: Use of this command string may result in an incorrect count of total OFFL lines due to looping.

Number of keyset lines

The total number of keyset lines is the sum of the different types of keyset lines. To display the number of individual keyset lines, enter the following CI command string. Refer to the table that follows the CI command for the entries required to specify the keyset types.

Equivalent CI command

The following MAP display represents the required CI command string.

```
>TABLE table name
>ERASE A B
>0->A
>ASSIGN SETDATA B
>IF ((SUBSTR 'entry') = 'keyset type') THEN (A+1->A)
>WHILE (NEXT) (ASSIGN SETDATA B;
>IF ((SUBSTR 'entry') = 'keyset type') THEN (A+1->A))
>PRINT A
>QUIT
```

Example

The following MAP display is an example of the required CI command string for printing the total number of Data_Station in the system:

```
>TABLE IVDINV
>ERASE A B
>0->A
>ASSIGN SETDATA B
>IF ((SUBSTR B 53) = 'ATT') THEN (A+1->A)
>WHILE (NEXT) (ASSIGN SETDATA B;
>IF ((SUBSTR B 53) = 'ATT') THEN (A+1->A))
>PRINT A
>QUIT
```

Table A-1 (Sheet 1 of 2)

Keyset Type	Table Name	SUBSTR Entry	Keyset Type
DATA_STATION (Analog terminal adapter)	IVDINV	B 5 3	'ATT'
DATA_UNIT_STATION (Centrex unit station)	KSETINV	B 4 4	'DATA'
DISPLAY_PPHONE_STATION (P_Phone with display)	KSETINV	B 4 4	'DISP'
ISDN_STATION (ISDN STIMULUS terminal)	KSETINV	B 0 8	'ISDNKSET'
MADO_STATIONS (Meridian asynchronous data operation)	IVDINV	B 4 4	'MADO'
MCA_STATION (Meridian Communications Adapter)(IVD Aries 64Kbps sync data option)	IVDINV	B 5 3	'MAC'
MPDA_STATION (Meridian Programmable Data Adapter (IVD Aries async. data option)	IVDINV	B 4 4	'MPDA'
M2006_STATION (IVD Aries 6-key, 1 DN only set)	IVDINV	B 3 5	'M2006'
M2008_STATION (IVD Aries 8-key set)	IVDINV	B 3 5	'M2008'
M2009_STATIONS (Meridian 9-key set)	IVDINV	B 3 5	'M2009'
M2016S_STATION (Aries 16-key secure set)	IVDINV	B 2 6	'M2016S'
M2018_STATION (Meridian 18-key set)	IVDINV	B 3 5	'M2018'
M2112_STATION (Meridian 12-key set with H/F)	IVDINV	B 3 5	'M2112'
M2216A_STATION (IVD Aries 2216 ACD-A set)	IVDINV	B 2 6	'M2216A'
M2216B_STATION (IVD Aries 2216 ACD-B set)	IVDINV	B 2 6	'M2216B'
M2317_STATION (Meridian 17-key set with H/F & display)	IVDINV	B 3 5	'M2317'

Table A-1 (Sheet 2 of 2)

Keypad Type	Table Name	SUBSTR Entry	Keypad Type
M2616_STATION (Aries 16-key set with H/F optional)	IVDINV	B 3 5	'M2616'
M2616CT_STATION (IVD Aries 16-keys set cordless)	IVDINV	B 2 6	'2616CT'
M3000_STATION (Meridian 3000 touch set)	IVDINV	B 3 5	'M3000'
M5008_STATION (MBS II Phone Set)	KSETINV	B 3 5	'M5008'
M5009_STATION (9-key set)	KSETINV	B 3 5	'M5009'
M5112_STATION (12-key set + IHSF)	KSETINV	B 3 5	'M5112'
M5208_STATION (MBS II phone set)	KSETINV	B 3 5	'M5208'
M5209_STATION (9-key set plus display)	KSETINV	B 3 5	'M5209'
M5212_STATION (12-key set with display & headjacks)	KSETINV	B 3 5	'M5212'
M5216_STATION (MBS II phone set)	KSETINV	B 3 5	'M5216'
M5312_STATION (12-key set with IHSL & display)	KSETINV	B 3 5	'M5312'
M5316_STATION (MBS II phone set)	KSETINV	B 3 5	'M5316'
M5317_STATION (9-key set + 5 softkeys +3)	KSETINV	B 3 5	'M5317'
POTS_DATA_UNIT_STATION (POTs data unit)	KSETINV	B 3 5	'PDATA'
PPHONE_STATION (Standard P-Phones)	KSETINV	B 4 4	'PSET'

POTS lines with CSDDS

To display the total number of POTS lines with circuit switch digital data service (CSDDS) feature, enter the following CI command string.

Equivalent CI commands

The following MAP display represents the required CI command string.

```
>TABLE LENFEAT
>COUNT (DF EQ 'CSDDS')
>QUIT
```

POTS lines with call waiting feature

To display the total number of POTS lines with call waiting, enter the following CI command string.

Equivalent CI commands

The following MAP display represents the required CI command string.

```
>QLENWRK ALL ALL XXXX CWT S
```

where

XXXX is the call waiting class code 1FR, 1MR, 2FR, 4FR, 8FR, 10FR, or one of the coin phone codes.

POTS lines with call forwarding

To display the total number of POTS lines with a call forwarding feature, enter the following CI command string.

Equivalent CI commands

The following MAP display represents the required CI command string.

```
>TABLE CFW  
>ERASE A B  
>0->A  
>ASSIGN CFZINFO B  
>IF ((SUBSTR B 0 3) = 'LCL') THEN (A+1->A)  
>WHILE (NEXT) (ASSIGN CFZINFO B;  
>IF ((SUBSTR B 0 3) = 'LCL') THEN (A+1->A))  
>PRINT A  
>QUIT
```

POTS lines with call forwarding busy

To display the total number of POTS lines with the call forwarding busy line (CFBL) option, enter the following CI command string.

Equivalent CI commands

The following MAP display represents the required CI command string.

```
>QLENWRK ALL ALL NLCC CFBL S
```

POTS lines with call forwarding don't answer

To display the total number of POTS lines with the call forward don't answer line (CFDA) option, enter the following CI command string.

Equivalent CI commands

The following MAP display represents the required CI command string.

```
>QLENWRK ALL ALL NLCC CFDA S
```

POTS lines with remote call forwarding

To display the total number of POTS lines with remote call forwarding (RCF) option, enter the following CI command string.

Equivalent CI commands

The following MAP display represents the required CI command string.

```
>TABLE CFW
>ERASE A B
>0->A
>ASSIGN CFZINFO B
>IF ((SUBSTR B 0 3) = 'REM') THEN (A+1->A)
>WHILE (NEXT)(ASSIGN CFZINFO B;
>IF ((SUBSTR B 0 3) = 'REM') THEN (A+1->A))
>PRINT A
>QUIT
```

POTS lines with speed call

To display the total number of POTS lines with SC1 or SC2 speed call feature, enter the following CI command string.

Equivalent CI commands

The following MAP display represents the required CI command string.

```
>TABLE LENFEAT
>COUNT (DF EQ 'SC1')
>COUNT (DF EQ 'SC2')
>QUIT
```

Note: The total number of POTS lines with speed call is the sum of counts SC1 and SC2.

POTS lines with three-way calling

To display the total number of POTS lines with the three-way calling feature, enter the following CI command string.

Equivalent CI commands

The following MAP display represents the required CI command string.

```
>QLENWRK ALL ALL XXXX 3WC S
```

where

XXXXi is 1FR, 1MR, CCF, CDF, CSP, 2FR, 4FR, 8FR, OR 10FR.

Note: As CI command QLENWRK takes a long time to process, it is recommended that only class codes active in the office be checked.

POTS lines with three-way calling public feature

To display the total number of POTS lines with the three-way calling public feature, enter the following CI command string.

Equivalent CI commands

The following MAP display represents the required CI command string.

```
>TABLE LENFEAT
>COUNT (DF EQ '3WCPUB')
>QUIT
```

IBN/RES lines with call waiting

To display the total number of IBN/RES lines with call waiting feature, enter the following CI command string.

Equivalent CI commands

The following MAP display represents the required CI command string.

```
>QLENWRK ALL ALL IBN CWT S
>QLENWRK ALL ALL RES CWT S
```

Note: The total number of IBN/RES lines with call waiting, is the sum of the counts IBN CWT and RES CWT.

IBN/RES lines with call forwarding

To display the total number of IBN/RES lines with the call forwarding feature, enter the following CI command string.

Equivalent CI commands

The following MAP display represents the required CI command string.

```
>TABLE IBNFEAT
>COUNT (DF EQ 'CFX')
>QUIT
```

IBN/RES lines with three-way calling

To display the total number of IBN/RES lines with the three-way calling feature, enter the following CI command string.

Equivalent CI commands

The following MAP display represents the required CI command string.

```
>QLENWRK ALL ALL IBN 3WC S
>QLENWRK ALL ALL RES 3WC S
```

Note: The total number of IBN/RES lines with three-way calling is the sum of counts IBN 3WC and RES 3WC.

IBN/RES lines with three-way call public

To display the total number of IBN/RES lines with the three-way call public feature, enter the following CI command string.

Equivalent CI commands

The following MAP display represents the required CI command string.

```
>TABLE IBNFEBAT
>COUNT (DF EQ '3WCPUB')
>QUIT
```

IBN/RES lines with speed call

To display the total number of IBN/RES lines with the speed call feature, enter the following CI command string.

Equivalent CI commands

The following MAP display represents the required CI command string.

```
>TABLE IBNFEBAT
>COUNT (DF EQ 'SCS')
>COUNT (DF EQ 'SCL')
>QUIT
```

Note: The total number of IBN/RES lines with speed call is the sum of counts SCS and SCL.

Number of lines with voice mail easy access DN

To display the total number of IBN/RES lines with voice mail easy access DN, enter the following CI command string.

Equivalent CI commands

The following MAP display represents the required CI command string.

```
>TABLE IBNFEBAT
>COUNT (DF EQ 'VMEADN')
>QUIT
```

IBN/RES lines with busy lamp feature

To display the total number of IBN/RES lines with a busy lamp field, enter the following CI command string.

Equivalent CI command

The following MAP display represents the required CI command string.

```
>TABLE IBNFEBAT
>COUNT (DF EQ 'BLF')
>QUIT
```

Line feature counts

Number of DNs on keysets

This count is unavailable at this time.

Keyset lines with call waiting

To display the total number of keyset lines with call waiting, enter the following CI command string.

Equivalent CI command

The following MAP display represents the required CI commandstring.

```
>QLENWRK ALL ALL XXXX S
```

where

XXXX is the LCC for the different pphone types.

Note: As CI command QLENWRK takes a long time to process it is recommended that only class codes active in the office be checked.

Keyset lines with call forwarding

To display the total number of keyset lines with call forwarding, enter the following CI command string.

Equivalent CI commands

The following MAP display represents the required CI commandstring.

```
>TABLE KSETFEAT  
>COUNT (FEATURE EQ 'CFX')  
>QUIT
```

Keyset lines with three-way calling

To display the total number of keyset lines with three-way calling, enter the following CI command string.

Equivalent CI commands

The following MAP display represents the required CI command string.

```
>QLENWRK ALL ALL XXX 3WC S
```

where

XXX is the three way-calling line class code for the various types of P-phone.

Keyset lines with three way-calling public

To display the total number of keyset lines with three-way calling public feature, use the following CI command string.

Equivalent CI commands

The following MAP display represents the required CI command string.

```
>TABLE KEYSSETFEAT
>COUNT (FEATURE EQ '3WCPUB')
>QUIT
```

Keypad lines with speed calling

To display the total number of keypad lines with speed calling, enter the following CI command string.

Equivalent CI commands

The following MAP display represents the required CI command string.

```
>TABLE KSETFEAT
>COUNT (FEATURE EQ 'SCS')
>COUNT (FEATURE EQ 'SCL')
>QUIT
```

Note: The total number of keysets with speed calling is the sum of counts SCS and SCL.

Keysets with a busy lamp field

To display the total number of keysets with a busy lamp field, enter the following CI command string.

Equivalent CI commands

The following MAP display represents the required CI command string.

```
>TABLE KSETFEAT
>COUNT (FEATURE EQ 'BLF')
>QUIT
```

Keypad lines with voice mail easy access DN

To display the total number of keypad lines with voice mail easy access DN feature, enter the following CI command string.

Equivalent CI commands

The following MAP display represents the required CI command string.

```
>TABLE KEYSSETFEAT
>COUNT (FEATURE EQ 'VMEADN')
>QUIT
```

Number of Hotel/Motel lines with register pulsing

To display the total number of hotel/motel lines with register pulsing, enter the following CI command string.

Equivalent CI commands

The following MAP display represents the required CI command string.

```
>TABLE IBNFPEAT
>COUNT (DF EQ 'RMP')
>QUIT
>TABLE IBNFPEAT
>COUNT (DF EQ 'RMP')
>QUIT
```

Note: The total number of hotel/motel lines with register pulsing is the sum of the above two reports.

Number of INWATS lines

To display the total number of INWATS lines, enter the following CI command string.

Equivalent CI commands

The following MAP display represents the required CI command string.

```
>TABLE LINEATTR
>LIST ALL (LCC EQ 'INW')
>QUIT
Repeat the following CI command string for each line attribute
tuple displayed.
>TABLE LENLINES
>COUNT (LNATTIDX EQ 'XXXX')
>QUIT
```

where

XXXX is the line attribute tuple.

Note: The total number of INWATT lines is the sum of the two attribute tuples.

Number of Teen service lines

To display the total number of lines with teen service, enter the following CI command string.

Equivalent CI commands

The following MAP display represents the required CI command string.

```
>TABLE OPTCTL
>POS NTX219
>QUIT
```

Note: The value of the ACTCOUNT field in the tuples displayed should match.

Number of AIN lines

To display the total number of advance intelligent networks (AIN), enter the following CI command string.

Equivalent CI commands

The following MAP display represents the required CI command string.

```
>TABLE IBNFPEAT
>COUNT (DF EQ 'AIN')
>QUIT
```

Number of single party POTS lines

To display the total number of single party POTS lines, enter the following CI command string.

Equivalent CI commands

The following MAP display represents the required CI command string.

```
>TABLE LENLINES
>COUNT PTY EQ 'S')
>QUIT
```

Number of multiparty POTS lines

To display the total number of multiparty POTS lines, enter the following CI command string.

Equivalent CI commands

The following MAP display represents the required CI command string.

```
>TABLE LENLINES
>COUNT PTY NE 'S')
>QUIT
```

Number of VMEADENY lines

To display the total number of lines with the voice mail easy access deny option, enter the following CI command string.

Equivalent CI commands

The following MAP display represents the required CI command string.

```
>TABLE KSETFEAT
>COUNT (FEATURE EQ 'VMEADENY')
>QUIT
```

Number of GIC lines

To display the total number of lines with the group intercom option, enter the following CI command string.

Equivalent CI commands

The following MAP display represents the required CI command string.

```
>TABLE IBNFPEAT
>LIST ALL (DF EQ 'DIC')
>QUIT
>QLT xxxx yyyy
>QUIT
```

where

xxxx is the LTGRP and yyyy is the LTNUM.

Number of datafilled RES lines

To display the total number of data filled RES lines, enter the following CI command string.

```
>TABLE IBNLINES
>ERASE A B
>0->A
>ASSIGN RESULT B
>IF ((STRSIZE B) > 8) THEN (IF ((SUBSTR B 7 3) = 'RES') THEN
(A+1->A))
>WHILE (NEXT) (ASSIGN RESULT B;
>IF ((STRSIZE B) > 8) THEN (IF ((SUBSTR B 7 3) = 'RES') THEN
(A+1->A))
>PRINT A
>QUIT
```

Equivalent CI commands

The following MAP display represents the required CI commandstring.

Number of RES line with features

To display the total number of residential lines with one or more features, enter the nonres OPTCOUNT CI command COUNT command string as follows.

Equivalent CI commands

The following MAP display represents the required CI command string.

```
>COUNT  
>COT  
>CFF  
>CFI  
>CFRA  
>CFK  
>CFB  
>CBI  
>CBE  
>CBU  
>CFD  
>CDI  
>CDE  
>CDU  
>SC1  
>SC2  
>SC3  
>CFU  
>SCS  
>CNDB  
>SMI  
>$
```

Number of RES line with specified specified features

To display the number of residential lines with a specified feature, enter the following OPTCOUNT CI command COUNT command string. Refer to the table 6–1 that follows the CI COUNT command for the entry required to specify the desired RES features.

Equivalent CI commands

The following MAP display represents the required CI command string.

```
>COUNT  
>XXXX  
>XXXX  
>$
```

where

XXXX is the feature code. Enter one feature code per line. The count output lists the feature names and the number of lines that have the feature.

Example

The following example shows the command string required to display the the total number of residential lines with options CFF, CFRA, CFB, and SC2.

```
>COUNT
>CFF
>CFRA
>CFB
>SC2
>$
```

Table A-2 RES feature entry codes

RES line feature name	Entry XXXX
Customer originated trace	COT
Call forward fixed (IBN feature)	CFF
Call forward intragroup	CFI
Call forward remote access	CFRA
Call forward universal, per key (Keyset feature)	CFK
Call forward busy	CFB
Call forward busy exclude intragroup	CBE
Call forward busy intergroup (IBN feature)	CBI
Call forward busy unrestricted (IBN feature)	CBU
Call forward don't answer (IBN feature)	CFD
Call forward don't answer exclude intragroup (IBN feature)	CDI
Call forward don't answer intragroup (IBN feature)	CDE
Call forward don't answer unrestricted (IBN feature)	CDU
Speed call, short list (LEN feature)	SC1
Speed call, long list (LEN feature)	SC2
Speed call, long list (Residential lines)	SC3
Call forward universal (IBN feature)	CFU
Speed call, short list (IBN feature)	SCS
Calling number delivery blocking	CNDB
Simplified message desk interface for UCD lines	SMDI

Number of trunks

To display the total number of trunk in the switch, enter the following CI command string.

Equivalent CI commands

The following MAP display represents the required CI command string.

```
>TABLE TRKMEM  
>COUNT  
>QUIT
```

Number of unequipped trunk

This count is not implemented at this time.

Number of offline trunks

To display the total number of offline trunk on the switch, enter the following CI command string.

Equivalent CI commands

The following MAP display represents the required CI command string.

```
>MAPCI NODISP;MTC;TRKS;TTP  
>SEND SFDEV TEMP_FILE  
>POST A INB LIST  
>SEND PREVIOUS  
>QUIT MAPCI  
>LISTSF INFO
```

Subtract 2 from the number in the "recs" field listed beside the temp_file file. The resulting count is the number of INB trunks on the switch.

```
>ERASESF TEMP_FILE
```

Number of trunk groups

To display the total number of trunk groups on the switch, enter the following CI command string.

Equivalent CI commands

The following MAP display represents the required CI command string

```
>TABLE TRKGRP  
>COUNT  
>QUIT
```

Number of IBNTI trunks

The total number of IBNTI trunks on the switch is the sum of the trunks in all IBNTI trunk groups. To display the IBNTI trunk group data, enter the following CI command string.

Equivalent CLI commands

The following MAP display represents the required CI command string.

```
>TABLE TRKGRP
>ERASE A
>ASSIGN GRPINFO A
>IF ((SUBSTR A 4 5) = 'IBNTI') THEN (DIS)
>WHILE (NEXT) (ASSIGN GRPINFO A;
>IF ((SUBSTR A 4 5) = 'IBNTI') THEN (DIS))
>QUIT
```

The a list of all IBNTI trunk groups is printed. For each trunk group listed, enter the following CI commandstring.

```
>TABLE TRKMEM
>COUNT (CLLI EQ 'xxxx')
```

where

XXXX is the CLLI of the trunk group

```
>QUIT
```

To determine the total number of IBNTI trunks, sum all IBNTI trunks in all IBNTI trunk groups.

Number of IBNTIO trunks

The total number of IBNTIO trunks on the switch is the sum of the trunks in all IBNTI trunk groups. To display the IBNTIO trunk group data, enter the following CI command string.

Equivalent CLI commands

The following MAP display represents the required CI commandstring.

```
>TABLE TRKGRP
>ERASE A
>ASSIGN GRPINFO A
>IF ((SUBSTR A 4 5) = 'IBNTO') THEN (DIS)
>WHILE (NEXT) (ASSIGN GRPINFO A;
>IF ((SUBSTR A 4 5) = 'IBNTO') THEN (DIS))
>QUIT
```

A list of all IBNTO trunk groups is printed. For each trunk group listed, enter the following CI commandstring.

```
>TABLE TRKMEM
>COUNT (CLLI EQ 'xxxx')
```

where

xxxx is the CLLI of the trunk group

```
>QUIT
```

To determine the total number of IBNTO trunks, sum all IBNTO trunks in all IBNTO trunk groups.

Number of IBNT2 trunks

The total number of IBNTI2 trunks on the switch is the sum of the trunks in all IBNT2 trunk groups. To display the IBNT2 trunk group data, enter the following CI command string.

Equivalent CI commands

The following MAP display represents the required CI command string.

```
>TABLE TRKGRP
>ERASE A
>ASSIGN GRPINFO A
>IF ((SUBSTR A 4 5) = 'IBNT2') THEN (DIS)
>WHILE (NEXT) (ASSIGN GRPINFO A;
>IF ((SUBSTR A 4 5) = 'IBNT2') THEN (DIS))
>QUIT
```

A list of all IBNT2 trunk groups is printed. For each trunk group listed, enter the following CI commandstring.

```
>TABLE TRKMEM
>COUNT (CLLI EQ 'xxxx')
```

where

xxxx is the CLLI of the trunk group

```
>QUIT
```

To determine the total number of IBNT2 trunks, sum all IBN2trunks in all IBNT2 trunk groups.

Number of PRA IBNT2 trunks

For count of PRA IBNT2 refer to ISDN PRV count.

Number of SC trunks

The total number of super cama (SC) trunks on the switch is the sum of the trunks in all SC trunk groups. To display the SC trunk group data, enter the following CI command string.

Equivalent CI commands

The following MAP display represents the required CI command string.

```
>TABLE TRKGRP
>ERASE A
>ASSIGN GRPINFO A
>IF ((SUBSTR A 7 2) = 'SC') THEN (DIS)
>WHILE (NEXT) (ASSIGN GRPINFO A;
>IF ((SUBSTR A 7 2) = 'SC') THEN (DIS))
>QUIT
```

A list of all SC trunk groups is printed. For each trunk group listed, enter the following CI commandstring.

```
>TABLE TRKMEM
>COUNT (CLLI EQ 'xxxx')
```

where

xxxx is the CLLI of the trunk group

```
>QUIT
```

To determine the total number of SC trunks, sum all SC trunks in all SC trunk groups.

Number of OP trunks

The total number of operator (OP) trunks on the switch is the sum of the trunks in all OP trunk groups. To display the OP trunk group data, enter the following CI command string.

Equivalent CI commands

The following MAP display represents the required CI command string.

```
>TABLE TRKGRP
>ERASE A
>ASSIGN GRPINFO A
>IF ((SUBSTR A 7 2) = 'OP') THEN (DIS)
>WHILE (NEXT) (ASSIGN GRPINFO A;
>IF ((SUBSTR A 7 2) = 'OP') THEN (DIS))
>QUIT
```

A list of all OP trunk groups is printed. For each trunk group listed, enter the following CI command string.

```
>TABLE TRKMEM
>COUNT (CLLI EQ 'xxxx')
```

where

xxxx is the CLLI of the trunk group

```
>QUIT
```

To determine the total number of OP trunks, sum all trunks in all OP trunk groups.

Number of AOSS trunks

This count is not implemented at this time.

Number of TOPS trunks

The total number of TOPS trunks on the switch is the sum of the trunks in all TOPS trunk groups. To display the TOPS trunk group data, enter the following CI command string.

Equivalent CI commands

The following MAP display represents the required CI command string.

```
>TABLE TRKGRP
>ERASE A
>ASSIGN GRPINFO A
>IF ((SUBSTR A 5 4) = 'TOPS') THEN (DIS)
>WHILE (NEXT) (ASSIGN GRPINFO A;
>IF ((SUBSTR A 5 4) = 'TOPS') THEN (DIS))
>QUIT
```

A list of all TOPS trunk groups is printed. For each trunk group listed, enter the following CI commandstring.

```
>TABLE TRKMEM
>COUNT (CLLI EQ 'xxxx')
```

where

xxxx is the CLLI of the trunk group

```
>QUIT
```

To determine the total number of TOPS trunks, sum all trunks in all TOPS trunk groups.

Note: TOPS trunks in the in service busy state are not included in the trunk count.

Number of RONI trunks

The total number of remote operator number identification (RONI) trunks on the switch is the sum of the trunks in all RONI trunk groups. To display the RONI trunk group data, enter the following CI command string.

Equivalent CI commands

The following MAP display represents the required CI command string.

```
>TABLE TRKGRP
>ERASE A
>ASSIGN GRPINFO A
>IF ((SUBSTR A 5 4) = 'RONI') THEN (DIS)
>WHILE (NEXT) (ASSIGN GRPINFO A;
>IF ((SUBSTR A 5 4) = 'RONI') THEN (DIS))
>QUIT
```

A list of all RONI trunk groups is printed. For each trunk group listed, enter the following CI command string.

```
>TABLE TRKMEM
>COUNT (CLLI EQ 'xxxx')
```

where

xxxx is the CLLI of the trunk group

```
>QUIT
```

To determine the total number of RONI trunks, add all trunks in all RONI trunk groups.

Note: RONI trunks in the inservice busy state are not included in the trunk count.

Number of receivers

To display the total number of receivers on the switch, enter the following CI command string. Enter one receiver code per line. Refer to the table 6–2 that follows the CI COUNT command for the entry required to specify the desired receiver type.

Equivalent CI commands

The following MAP display represents the required CI commandstring.

```
>TABLE RECEIVER
>COUNT (RCVRKEY EQ 'XXXX *')
```

where

xxxx is the type of receiver listed in the table below.

```
>QUIT
```

The following example shows the command string required to list receiver types RCVRMF and RCVRDGT.

```
>TABLE RECEIVER
>COUNT (RCVRKEY EQ 'RCVRMF *')
>COUNT (RCVRKEY EQ 'RCVRDGT *')
>QUIT
```

Note: The total number of receivers is the sum of all individual receivers.

Table A-3 Receiver entry codes

Receiver type	Entry XXXX
MF receiver	RCVRMF
Digitone receiver	RCVRDGT
Audio tone detectors	RCVRATD
Digitone receiver dedicated to mechanized calling card feature	RCVRMCCS
MF receiver, but needs different peripheral execs.	RCVRMF300
Digitone receiver, but needs different peripheral execs.	RCVRDGT300
Coin phone receiver, digitone and coin detection circuit	RCVRCOIN
Same as RCVRCOIN but supports 5x29ab and 5x29ac	RCVRATDA
Same as RCVRCOIN but can also generate LAMA billing records by coin originated calls	RCVRCDC

Number of CF3 circuits

To display the total number of three port conference circuits (CF3), enter the following CI command string.

Equivalent CI commands

The following MAP display represents the required CI command string.

```
>TABLE CONF3PR
>COUNT
>QUIT
```

Number of CF6 circuits

To display the total number of six port conference circuits (CF6), enter the following CI command string.

Equivalent CI commands

The following MAP display represents the required CI command string.

```
>TABLE CONF6PR
>COUNT
>QUIT
```

Number of LTU's

To display the total number of line test units (LTU's), enter the following CI command string.

Equivalent CI commands

The following MAP display represents the required CI command string.

```
>TABLE TRKMEM
>COUNT (CLLI EQ 'LTU')
>QUIT
```

Number of TTU's

To display the total number of transmission test units (TTU's), enter the following CI command string.

Equivalent CI commands

The following MAP display represents the required CI command string.

```
>TABLE TRKMEM
>COUNT (CLLI EQ 'TTU')
>QUIT
```

Number of ATU's

To display the total number of automatic test unit circuits (ATU's), enter the following CI command string.

Equivalent CI commands

The following MAP display represents the required CI command string.

```
>TABLE TRKMEM
>COUNT (CLLI EQ 'ATU')
>QUIT
```

Number of DTU's

To display the total number of digital test unit circuits (DTU's), enter the following CI command string.

Equivalent CI commands

The following MAP display represents the required CI command string.

```
>TABLE TRKMEM
>COUNT (CLLI EQ 'DTU')
>QUIT
```

Number of VDU's

To display the total number of display devices, enter the following CI command string.

Equivalent CI commands

The following MAP display represents the required CI command string.

```
>TABLE TERMDEV  
>COUNT  
>QUIT
```

Note: The number of VDU's is the sum of all visual display units, printers and subscriber message desk interface devices.

Number of ST connections

To display the total number of signaling terminal (ST) connections, enter the following CI command string.

Equivalent CI commands

The following MAP display represents the required CI command string.

```
>TABLE STINV  
>COUNT  
>QUIT
```

Number of IPML connections

To display the total number of inter peripheral message link connections, enter the following CI command string.

Equivalent CI commands

The following MAP display represents the required CI command string.

```
>TABLE IPMLINV  
>COUNT  
>QUIT
```

Number of nailed CLLIs

To display the total number of nailed-up trunk circuits, enter the following CI command string.

Equivalent CI commands

The following MAP display represents the required CI command string.

```
>TABLE NLUPCLLI  
>COUNT  
>QUIT
```

Number of customer groups

To display the total number of Centrex customer groups, enter the following CI command string.

Equivalent CI commands

The following MAP display represents the required CI command string.

```
>TABLE CUSTENG
>COUNT
>QUIT
```

Number of consoleless customer groups

To display the total number of customer groups that will not support attendant consoles, enter the following CI command string.

Equivalent CI commands

The following MAP display represents the required CI commandstring.

```
>TABLE CUSTENG
>COUNT (CONSOLES EQ 'N')
>QUIT
```

Number of members per customer group

To display the total number of members in each customer groups, enter the following CI command string.

Repeat the CI command string for each SYMBOL field entry.

Equivalent CI commands

The following MAP display represents the required CI command string.

```
>ERASE TRIM
>COMMAND TRIM (SEND SINK;ERASE Y Z;0->Y;
>WHILE((SUBSTR @1 Y 1) = ' ') (Y+1->Y);
>(SUBSTR @1 Y ((STRSIZE @1) - Y))->Z;SEND PREVIOUS)
>TABLE KSETLINE
>FORMAT PACK
>ERASE A B C D
>ASSIGN DNRESULT B
>'ABCDEFGHIJKLMNQRS' -> C
>0->A
>TRIM (SUBSTR B 21 16)
>IF ((SUBSTR B 0 3) ^= 'GIC') THEN (IF (Z = 'xxxxx') THEN
(A+1->A))
>IF (A > 0) THEN (ASSIGN KSETKEY C)
>WHILE (NEXT) (ASSIGN DNRESULT B;ASSIGN KSETKEY D;
>IF ((SUBSTR C 0 17) ^= (SUBSTR D 0 17)) THEN (
>IF ((SUBSTR B 0 3) ^= 'GIC') THEN (
>TRIM (SUBSTR B 21 16);IF (Z = 'xxxxx') THEN (A+1->A;D->C))))
>PRINT A
```

Note the number displayed.

```
>QUIT
>TABLE ATTCONS
>COUNT (CUSTNAME EQ 'xxxxxx')
```

Note the number displayed.

```
>QUIT
>TABLE IBNLINES
>FORMAT PACK
>ERASE A B
>0->A
>ASSIGN RESULT B
>IF ((STRSIZE B > 42) THEN (IF ((SUBSTR B 7 3) = 'IBN') THEN(
>TRIM (SUBSTR B 26 16);IF (Z = 'xxxxxx') THEN (A+1->A)))
>WHILE (NEXT) (ASSIGN RESULT B;IF ((STRSIZE B) > 42) THEN (
>IF ((SUBSTR B 7 3) = 'IBN') THEN (
>TRIM (SUBSTR B 26 16);IF (Z = 'xxxxxx') THEN (A+1->A))))
>PRINT A
```

where

xxxxxx is equal to the entry in the symbol field of table CUSTNAME.

Note the number displayed.

```
>QUIT
```

The total number of members in each customer group is the sum of the three numbers noted above.

Number of customer subgroups

To display the total number of centrex customer subgroups, enter the following CI command string.

Equivalent CI commands

The following MAP display represents the required CI command string.

```
>TABLE SUBGRP
>COUNT
>QUIT
```

Number of attendant consoles

To display the total number of attendant consoles, enter the following CI command string.

Equivalent CI commands

The following MAP display represents the required CI command string.

```
>TABLE ATTCONS
>COUNT
>QUIT
```

Number of TOPS positions

To display the total number of TOPS positions, enter the following CI command string.

Equivalent CI commands

The following MAP display represents the required CI command string.

```
>TABLE TOPSPOS
>COUNT
>QUIT
```

Number of OPERATOR positions

To display the total number of operator TOPs positions, enter the following CI command string.

Equivalent CI commands

The following MAP display represents the required CI command string.

```
>TABLE TOPSPOS
>FORMAT PACK
>ERASE A B
>0->A
>ASSIGN POSAREA B
>IF ((SUBSTR B 1 3) = 'OPR') THEN (A+1->A)
>WHILE (NEXT) (ASSIGN POSAREA B;IF ((SUBSTR B 1 3) = 'OPR')
THEN (
>A+1->A))
>PRINT A
>QUIT
```

Number of the IN CHARGE positions

To display total the number of IN CHARGE TOPs positions, enter the following CI command string.

Equivalent CI commands

The following MAP display represents the required CI command string

```
>TABLE TOPSPOS
>FORMAT PACK
>ERASE A B
>0->A
>ASSIGN POSAREA B
>IF ((SUBSTR B 2 2) = 'IC') THEN (A+1->A)
>WHILE (NEXT) (ASSIGN POSAREA B;IF ((SUBSTR B 2 2) = 'IC'))
>THEN (A+1->A))
>PRINT A
>QUIT
```

Number of the ASSISTANCE position

To display the number of the assistance TOPs positions, enter the following CI command string.

Equivalent CI commands

The following MAP display represents the required CI command string.

```
>TABLE TOPSPOS
>FORMAT PACK
>ERASE A B
>0->A
>ASSIGN POSAREA B
>IF ((SUBSTR B 0 4) = 'ASST') THEN (A+1->A)
>WHILE (NEXT) (ASSIGN POSAREA B;IF ((SUBSTR B 0 4) = 'ASST'))
>THEN (A+1->A))
>PRINT A
>QUIT
```

The highest operator number datafilled

To display the highest logged in datafilled operator number, enter the following CI command string.

Equivalent CI commands

The following MAP display represents the required CI command string.

```
>TABLE OPRDAT
>BOT
>QUIT
```

Number of ACSS Positions

This count is not implemented at this time.

Highest AOSS team number

This count is not implemented at this time.

Highest AOSS operator

This count is not implemented at this time.

Number of CAMA positions

To display the total number of CAMA positions, enter the following CI command string.

Equivalent CI commands

The following MAP display represents the required CI command string.

```
>TABLE CPOS  
>COUNT  
>QUIT
```

Number of Orig Rate Centers

This count is not implemented at this time.

Maximum Orig Rate Centers

This count is not implemented at this time.

Number of Term Rate Centers

This count is not implemented at this time.

Maximun Term Rate Centers

This count is not implemented at this time.

Number of MDC lines

To display the total number of Meridian Digital Centrex lines, enter the following CI command string.

Equivalent CI commands

The following MAP display represents the required CI command string.

```
>SOC  
>SELECT OPTION MDC00058  
>QUIT
```

Note: For a correct count to be returned, the soc_monitored_flag boolean must be set to false.

Number of ACD lines allocated

To display the total number of ACD lines allocated, enter the following CI command string.

Equivalent CI commands

The following MAP display represents the required CI command string.

```
>TABLE OFCOPT  
>POS MAX_NUM_ACD_AGENTS_PER_SWITCH  
>QUIT
```

Number of VL members

To display the total number of voice link members, enter the following CI command string.

Equivalent CI commands

The following MAP display represents the required CI command string.

```
>TABLE VLMEM
>COUNT
>QUIT
```

Number of VIRT groups

To display the total number of virtual groups, enter the following CI command string.

Equivalent CI commands

The following MAP display represents the required CI command string.

```
>TABLE VIRTGRPS
>COUNT
>QUIT
```

Number of hunt groups

To display the total number of directory number (DNH), multiline (MLH) and distributed line (DLH) hunt groups, enter the following CI command string.

Equivalent CI commands

The following MAP display represents the required CI command string.

```
>TABLE HUNTGRP
>COUNT (GRPTYP EQ 'DNH')
>COUNT (GRPTYP EQ 'MLH')
>COUNT (GRPTYP EQ 'DLH')
>QUIT
```

Number of UCD groups

To display the total number of universal call distribution groups, enter the following CI command string.

Equivalent CI commands

The following MAP display represents the required CI command string.

```
>TABLE UCDGRP
>COUNT
>QUIT
```

Number of ACD groups

To display the total number of automatic call distribution groups, enter the following CI command string.

Equivalent CI commands

The following MAP display represents the required CI command string.

```
>TABLE ACDGRP
>COUNT
>QUIT
```

Number of enhanced ACD groups

To display the total number of enhanced ACD groups, enter the following CI command string.

Equivalent CI commands

The following MAP display represents the required CI command string.

```
>TABLE ACDGRP
>ERASE A
>(COUNT - (COUNT(ACDMIS EQ 'N')) -> A
>PRINT A
>QUIT
```

Number of enhanced ACD agents

To display the total number of enhanced automatic call distribution agents, enter the following CI command string.

Equivalent CI commands

The following MAP display represents the required CI command string.

```
>TABLE KSETLINE
>LIST ALL (FEATURE EQ 'ACD')
>QUIT
```

Check the group assigned to each line. Refer to table ACDGRP and determine if the group supports ACDMIS. If the group does not support ACDMIS, count the group. If ACDMIS is supported, do not count the group.

Number of basic ACD groups

To display the total number of basic automatic call distribution groups, enter the following CI command string.

Equivalent CI commands

The following MAP display represents the required CI command string.

```
>TABLE ACDGRP
>COUNT (ACDMIS EQ 'N')
>QUIT
```

Number of basic ACD agents

To display the total number of basic automatic call distribution agents, enter the following CI command string.

Equivalent CI commands

The following MAP display represents the required CI command string.

```
>TABLE KSETLINE
>LIST ALL (FEATURE EQ 'ACD')
>QUIT
```

Check the group assigned to each line. Refer to table ACDGRP and determine if the group supports ACDMIS. If the group supports ACDMIS, count the group. If ACDMIS is not supported, do not count the group.

Number of CMS lines

See Number of RES lines.

Number of POTS coin lines

To display the total number of POTS coin lines, enter the following CI command string.

Equivalent CI commands

The following MAP display represents the required CI command string.

```
>TABLE LINEATTR
>LIST ALL (LCC EQ 'xxxx')
```

Repeat for all valid xxxx coin phone line class codes. Note the line attributes listed.

```
>QUIT
>TABLE LENLINES
>COUNT ((LNATTIDX EQ 'x') | (LNATTIDX EQ 'y') | (LNATTIDX EQ 'z'))
```

where

x, y, and z are the line attributes noted. Repeat for att line attributes noted.

```
>QUIT
```

Number of FGA lines

To display the total number of lines with the feature group A terminating call records (FGA) option, enter the nonres OPTCOUNT CI command COUNT command string as shown below.

Equivalent CI commands

The following MAP display represents the required CI command string.

```
>COUNT FGA
>$
```

Note: This count is equal to the sum of the POTS lines class codes.

Number of OUTWATS lines

To display the total number of OUTWATS lines, enter the following CI command string.

Equivalent CI commands

The following MAP display represents the required CI command string.

```
>TABLE LINEATTR
>COUNT (FEATURE EQ 'OUTWT UNOW *')
>QUIT
```

Number of MDC 2500 lines

To display the total number of lines MDC 2500, enter the following CI command string.

Equivalent CI commands

The following MAP display represents the required CI command string.

```
>TABLE IBNLINES
>COUNT
>QUIT
>TABLE ATTCONS
>COUNT
>QUIT
```

Note the count displayed. To determine the number of MDC 2500 lines subtract three times the number of consoles (each console has three entries in table IBNLINES) from the count noted.

Number of MDC MBS lines

This count is not implemented.

Number of SMDI lines

To display the total number of POTS/RES/IBN lines with the simplified message interface (SMDI) option allocated, enter the following CI command string.

Equivalent CI commands

The following MAP display represents the required CI command string.

```
>TABLE LENFEAT
>COUNT (DF EQ 'SMDI')
>QUIT
>TABLE IBNFEAT
>COUNT (DF EQ 'SMDI')
>QUIT
```

Number of allocated TICS/LEAS DNs

To display the total number of allocated TICS/LEAS directory numbers, enter the following CI command string.

Equivalent CI commands

The following MAP display represents the required CI command string.

```
>TABLE OFCENG
>POS DNPIC_MAX_NUM_DN_TUPLES
>QUIT
```

Note the number displayed. The number of allocated TICS/LEAS directory numbers, is the number noted, multiplied by 10 000.

Number of DATAPATH lines

To display the total number of DATAPATH lines, enter the following CI command string.

Equivalent CI commands

The following MAP display represents the required CI command string.

```
>TABLE KSETINV
>ERASE A B
>0->A
>ASSIGN SETDATA B
>IF ((SUBSTR B 4 4) = 'DATA') THEN (A+1->A)
>WHILE (NEXT) (ASSIGN SETDATA B;
>IF ((SUBSTR B 4 4) = 'DATA') THEN (A+1->A))
>PRINT A
>QUIT
```

Number of DIALAN lines

To display the total number of DIALAN lines, enter the following CI command string.

Equivalent CI commands

The following MAP display represents the required CI command string.

```
>TABLE LNINV
>COUNT ((CARDCODE EQ '6X76AA') & (STATUS NE 'HASU'))
>COUNT ((CARDCODE EQ '6X76AB') & (STATUS NE 'HASU'))
>COUNT ((CARDCODE EQ '6X76AC') & (STATUS NE 'HASU'))
>COUNT ((CARDCODE EQ '6X76AD') & (STATUS NE 'HASU'))
>QUIT
```

Note: The total number of DIALAN lines is the sum of the counts displayed.

Number of total ISDN lines

This count is not implemented at this time.

Number of ISDN FUNCT BRA lines

To display the total number of ISDN lines using functional signaling and basic rate access, enter the following CI command string.

Equivalent CI commands

The following MAP display represents the required CI command string.

```
>TABLE LTDEF
>FORMAT PACK
>LIST ALL
>QUIT
```

For each tuple query the logical terminal displayed by entering the following command string.

```
QLT xxxx yyyy
```

where

xxxx is the LTGRP and yyyy is the LTNUM.

```
>QUIT
```

The total number of ISDN lines using functional signaling with basic rate access is the sum of all QLT counts that have a LTCLASS of BRAFS.

Number of ISDN STIM BRA lines

To display the total number of ISDN lines using stimulus signaling and basic rate access, enter the following CI command string.

Equivalent CI commands

The following MAP display represents the required CI command string.

```
>TABLE LTDEF
>FORMAT PACK
>LIST ALL
>QUIT
```

For each tuple query the logical terminal displayed by entering the following command string.

```
QLT xxxx yyyy
```

where

xxxx is the LTGRP and yyyy is the LTNUM.

```
>QUIT
```

The total number of ISDN lines using functional signaling with basic rate access is the sum of all QLT counts that have a LTCLASS of BRAKS.

Number of ISDN BRA MFT lines

To display the total number of ISDN lines using Meridan feature transparency signalling and basic rate access, enter the following CI command string.

Equivalent CI commands

The following MAP display represents the required CI command string.

```
>TABLE LTDEF
>FORMAT PACK
>LIST ALL
>QUIT
```

For each tuple query the logical terminal displayed by entering the following command string.

```
QLT xxxx yyyy
```

where

xxxx is the LTGRP and yyyy is the LTNUM.

```
>QUIT
```

The total number of ISDN lines using functional signaling with basic rate access is the sum of all QLT counts that have a LTCLASS of BRAMFT.

Number of ISDN PRA trunks

To display the total number of ISDN trunks with primary rate access, enter the following CI command string.

Equivalent CI commands

The following MAP display represents the required CI command string.

```
>TABLE TRKGRP
>ERASE A
>ASSIGN GRPINFO A
>IF ((SUBSTR A 6 3) = 'PRA') THEN (DIS)
>WHILE (NEXT) (ASSIGN GRPINFO A;
>IF ((SUBSTR A 6 3) = 'PRA') THEN (DIS))
>QUIT
```

For each trkgrp listed above, repeat the following:

```
>TABLE TRKMEM
>COUNT (CLLI EQ 'xxxx')
```

where

xxxx is the CLLI of the trunk group(s)

>QUIT

Number of datafilled CLASS feature

To display the number of IBN/RES lines with the specified class option, enter the OPTCOUNT CI command COUNT command string as shown. Refer to the table 6-3 that follows the CI COUNT command for the entry required to specify the desired RES class.

Equivalent CI commands

The following MAP display represents the required CI command string.

```
>COUNT
>XXXX
>XXXX
>$
```

The following example shows the command string required to list the number of residential lines with class options ACB, CNDB, COT, and SCF.

Example

```
>COUNT
>ACB
>CNDB
>COT
>SCF
>$
```

Table A-4 IBN/RES class codes (Sheet 1 of 2)

IBN/RES line CLASS feature	Entry XXXX
Automatic Call Back	ACB
Automatic Call Back with USP Billing	ACBAMA
Automatic Recall	AR
Automatic Recall with USP Billing	ARAMA
Calling Number Delivery Blocking	CNDB
Calling Number Delivery Blocking with USP Billing	CNDBAMA
Customer Originated Trace	COT
Customer Originated Trace with USP Billing	COTAMA

Table A-4 IBN/RES class codes (Sheet 2 of 2)

IBN/RES line CLASS feature	Entry XXXX
Calling Number Delivery	CND
Dialable Directory Number	DDN
Selective Call Rejection	SCRJ
Selective Call Forwarding	SCF
Selective Call Acceptance	SCA
Distinctive Ringing / Call Waiting	DRCW

Number of datafilled CLASS lines

To display the total number of residential (RES) lines with one or more class options, enter the nonres OPTCOUNT CI command COUNT command string as shown below.

Equivalent CI commands

The following MAP display represents the required CI command string.

```
>COUNT ACB ACBAMA AT ARAMA CNDB CNDBAMA COT COTAMA  
CND DDN SCRJ SCF SCA DRCW
```

Note: The resulting count is the total number of class options assigned to IBN/RES lines.

Number of SMDR units is/is not being used

To display the total number of station message detail recording (SMDR) units that is/is not being used, enter the following CI command string.

Equivalent CI commands

The following MAP display represents the required CI command string.

```
>TABLE IBNXLA  
>LIST ALL  
>QUIT
```

Note: If any tuple in table IBNXLA has the SMDR field set to true, then SMDR is being used.

List of terms

ABSBH	Average busy season busy hour
ACH	Attempts per circuit hour
AMA	Automatic message accounting
AOCR	Automatic out-of-chain reroute
AOSS	Auxiliary operator service system
AR	Alternate route
BCS	Batch change supplement
CAMA	Centralized automatic message accounting
CanF	Cancel from
CanT	Cancel to
CBK	Code blocking
CC	Central control; Cluster controller

CCH	Completions per circuit hour
CI	Command interpreter
CP	Call processing
CPU	Central processing unit
DCR	Dynamically controlled routing
DDD	Direct distance dialing
DDO	Direct dialing overseas
DGT	Digitone
DLMKS	Data line module key set
DNC	Dynamic network controller
DOC	Dynamic overload control
DR	Direct routed
DRE	Directional reservation equipment
DTC	Digital trunk controller
DTD	Dial tone delay
DTS	Dial tone speed

DTSR	Dial tone speed recording
ELN	Essential line
ESA	Emergency standalone
ESP	Essential services protection
FRR	Flexible reroute
HDBH	High day busy hour
HTR	Hard-to-reach
HTRF	Hard-to-reach flag
HTRP	Hard-to-reach peg
IAML	Intra-office matching loss
IDOC	Internal dynamic overload control
IML	Incoming matching loss
INST	In-service trouble
INSV	In-service
ISDD	Incoming start-to-dial delay
IT	Intertoll

ITB	Incoming trunk busy
LCD	Line concentrating device
LCM	Line concentrating module
LCMDP	Line concentrating module with dial pulse phone
LCMDT	Line concentrating module with Digitone phone
LCMKS	Line concentrating module with key-driven set
LGC	Line group controller
LLC	Line load control
LMDP	Line module with dial pulse phone
LMDT	Line module with Digitone phone
LTC	Line trunk controller
MAP	Maintenance and administration position
MCCS	Mechanized calling card service
MF	Multifrequency
MP	Master processor
NP	Network processor

NTP	Northern Telecom publication
NWM	Network management
OC	Operator centralization
OM	Operational measurement
OML	Outgoing matching loss
ONI	Operator number identification
PCM	Pulse code modulation
PCO	Percent overflow
PM	Peripheral module
PRE	Protective reservation equipment
PRP	Preroute peg (count)
RADR	Receiver attachment delay recorder
RCC	Remote cluster controller
RCU	Remote carrier urban
RDOC	Remote dynamic overload control
RLM	Remote line module

RONI	Remote operator number identification
SA	Service analysis
SILC	Selective incoming load control
SP	Signaling processor
SPMS	Switch performance monitoring system
STR	Selective trunk reservation
TAML	Tandem matching loss
TASI	Time assigned speech interpolation
TML	Terminating matching loss
TOPS	Traffic operator position system
TSMS	Traffic separation measurement system
UTR	Universal tone receiver
XMS	Microcomputer-based workstation with networking capability
XPM	XMS-based peripheral module

DMS-100 Family

Service Problem Analysis

Administration Guide

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