Critical Release Notice

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The content of this customer NTP supports the SN06 (DMS) software release.

Bookmarks used in this NTP highlight the changes between the baseline NTP and the current release. The bookmarks provided are color-coded to identify release-specific content changes. NTP volumes that do not contain bookmarks indicate that the baseline NTP remains unchanged and is valid for the current release.

Bookmark Color Legend

Black: Applies to new or modified content for the baseline NTP that is valid through the current release.

Red: Applies to new or modified content for NA017 that is valid through the current release.

Blue: Applies to new or modified content for NA018 (SN05 DMS) that is valid through the current release.

Green: Applies to new or modified content for SN06 (DMS) that is valid through the current release.

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Adobe® Acrobat® Reader™ 5.0 is required to view bookmarks in color.

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UCS DMS-250

SuperNode Operational Measurements (S/OM) Reference Manual

UCS08 Standard 04.02 August 1998

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Contents

About this document

When to use this document

This document describes the SuperNode operational measurements (S/OM) system as it relates to the UCS DMS-250 switch.

Intended audience

This document is intended for audiences familiar with the original operational measurements (OM) system. The document applies to UCS DMS-250 offices that have UCS05 (CSP04). Unless it is revised, it also applies to offices that have software releases greater than UCS05 (CSP04).

How this document is organized

The chapters in this document provide the following:

Chapter 1, Introduction

Chapter 1 provides an overview of the S/OM.

Chapter 2, SuperNode operational measurements setup and administration

Chapter 2 describes how to setup and administer the S/OM system.

Chapter 3, S/OM commands

Chapter 3 describes the S/OM command interpreter (CI) commands.

Chapter 4, Office parameters

Chapter 4 lists and describes the S/OM system-related office parameters and identifies the tables in which they reside.

Chapter 5, Data transfer and reporting

Chapter 5 describes the data transfer and report formats for the S/OM.

Chapter 6, S/OM log reports

Chapter 6 lists and describes the S/OM system log reports and briefly describes any actions required when the reports are issued.

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 rereleased 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.

This document is written for all DMS-100 Family offices. More than one version of this document may exist. To determine whether you have the latest version of this document 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:

- *DMS-100 Basic Administration Procedure,* 297-1001-300
- *DMS-100 Service Problem Analysis Administration Guide,* 297-1001-318
- *UCS DMS-250 Billing Server Application Guide*, 297-2621-320
- *UCS DMS-250 Office Parameters Reference Manual*, 297-2621-855
- *UCS DMS-250 Logs Reference Manual,* 297-2621-840
- *UCS DMS-250 Commands Reference Manual*, 297-2621-819
- *UCS DMS-250 Master Index*, 297-2621-001
- *Product Documentation Directory,* 297-8991-001

Introduction

Overview of operational measurements

Operational measurements (OM) provide information about the performance and activities of a UCS DMS-250 switch and its peripheral components. The OM information is gathered through periodic scans of equipment components and activities.

Peg counts versus usage counts

OM information is collected in two forms:

- event (peg) counts—Every time an event occurs, its corresponding register increments.
- usage counts—Peripheral equipment is scanned at regular intervals, and when a busy state for a particular peripheral is detected, the appropriate register increments.

OM application

OM information is an administration and maintenance tool for the UCS DMS-250 system. OM information may be used for

- traffic provisioning (main station or trunk), to forecast future equipment loads and corresponding equipment requirements
- service monitoring, to indicate service levels of a system
- accounting allocation, for traffic separation or allocation of revenues
- feature activation, to determine the need for additional equipment or capabilities
- line usage studies, to assess future equipment requirements

OM information can be displayed at a specific terminal or printer, or saved to tape or disk for further processing.

OM collection process

The OM information is collected, stored, and displayed according to predefined parameters.

The OM system gathers information and puts itinto a set of active registers. At the end of a transfer period, the information in the active registers is assigned to a set of holding registers. The holding registers maintain the data from the last transfer period (5, 15, or 30 minutes, as determined by the office parameters OMXFR and OMHISTORYON).

The holding data may be added to accumulating registers that are set up when operating company personnel define OM classes. The data in the OM group holding registers are added to the accumulating registers upon completion of a transfer period, if the OM group has been assigned to an accumulation class.

Scheduled OM reporting may also take place upon completion of a transfer period, depending upon datafill in the reporting tables OMDATA, OMPRT, OMTAPE, and OMREPORT.

OM classes

For OM information to be useful, it must be related to a consistent time period. Therefore, all OMs are collected in a series of predefined and adjustable time intervals, based on user needs. These intervals are called measurement classes. The following measurement classes are used in the collection of UCS DMS-250 switch OM information:

- Active—Measurement information is collected continuously in active registers, and then is transferred to holding registers at predefined 5-, 15-, or 30-minute intervals.
- Holding—Measurement information is held in the holding registers (for display or transmission) until the next transfer of information from active register to holding register.
- Accumulating—Measurement information is added from the holding registers to user-defined accumulating registers (after each active register to holding register transfer is complete), in time increments specified by operator command.
- History (optional)—Measurement information is collected in a series of user-defined time intervals (snapshots) of 5, 10, 15, 20, or 30 minutes. The measurement information is placed in a series of history registers (up to a maximum of six).

OM information output

OM output information is sent to a printer or terminal that is customer-defined through UCS DMS-250 software tables. The LOG system then controls report distribution.

Three types of OM reports exist. They are the OMPR, OMRS, and OM2 reports.

OMPR reports

OMPR reports contain raw register data. The report content and output schedule are defined in software tables. The OMPR command sends OMPR reports to a specified device (such as a MAP terminal or a printer) after buffering to disk. OMPR reports do not use the LOG system.

OMRS reports

OMRS reports contain register data and calculations that are derived using OM and information fields as raw data. Each report format is defined through software tables and accommodates a particular administrative need. The OMSHOW command generates an on-demand OM report to a MAP terminal.

OM2 reports

OM2 reports show the status of the OM system and the UCS DMS-250 switch. These reports are generated when the OM system detects trouble or when a report threshold is exceeded.

Note: For more detailed information on the current operation of the basic OM system, refer to the documents listed under "References in this document" in the "About this document" chapter.

Overview of SuperNode OM

Heavy call processing loads can deplete available UCS DMS-250 central processing unit time. When such a depletion occurs, crucial OMs can be lost. The SuperNode OM (S/OM) system provides an alternate facility for collecting OMs so they are not lost. The S/OM system collects accumulating and reporting data from multiple nodes and stores them on the node designated as the central collector.

The central collector

The central collector resides on the computing module (CM). All nodes on the switch that are configured for OM reporting transfer their OMs to the CM central collector at 5-, 15-, or 30-minute intervals, as specified by datafill. The CM central collector contains the following configuration information:

- group definitions for all reporting nodes
- accumulating class definitions
- report definitions
- report schedules
- databases for storing OM register data

Centralized accumulation and reporting

The accumulation and reporting processes are performed on the CM central collector. At the end of each transfer period, the contents of the local_holding registers on each node are sent to the system_holding registers on the central collector. The accumulation function adds the contents of user-defined system holding registers in accumulating classes to the accumulating registers.

The reporting functions on the CM central collector are the same as those that currently reside on the call processor in a non-distributed environment. Special reports datafilled in table OMREPORT are generated on the CM only.

Hardware requirements

S/OM can be configured for a SuperNode call processing switch communicating with SOS-based nodes functioning as reporting nodes [such as an application processor or a file processor (FP)]. For more information, refer to the *UCS DMS-250 Billing Server Application Guide*.

Data store requirements

S/OM requires the following data store capacities:

- for communication, approximately 2.9k of data on each node
- for table OMREPORT on the CM, approximately 6.4k of data when the CM is functioning as a reporting node (not required if the CM is the central collector)
- for a reporting node, approximately 7.1k of data to maintain information necessary to report OMs to the central collector

Table 1-1 lists the maximum data store requirements for the BNR reduced instruction computing (BRISC) processors when they are functioning as the central collector.

Table 1-1
BRISC maximum data store requirements

Storage category	BRISC requirements
system holding database	
master overhead	1008 words
Note: Assumes six snapshots in the HISTORY class.	
—continued—	

Table 1-1
BRISC maximum data store requirements (continued)

Storage category	BRISC requirements
each defined operational measurements group	267 words
each holding register	1 word
accumulation database	
accumulation overhead	1920 words
each empty class (see Note)	27,216 words
each group in the class (see Note)	2304 words
each register	1 or 2 words
reporting node database	
reporting node overhead	21,672 words
Note: Assumes six snapshots in the HISTORY class.	
—end—	

Table datafill requirements

No table control software changes have been made from the original OM system to the S/OM system. For more information about the original OM system, refer to the UCS DMS-250 *Operational Measurements Reference Guide*, 297-2621-814.

OM output

S/OM system OMs are sent to tape or disk for permanent storage and downstream processing. The software load and central collector node type determine the OM output destination for the S/OM system.

OM data output can be directed to CM input/output controller devices through OMTAPE. Also, OM output can be directed through the distributed recording manager to FP disks. However, the CM must be configured as the central collector and OMDATA, OMTAPE, OMPRT, and OMRS must be supported. Table OMDATA must be datafilled to send OM data output to FP disks. The OMDATA files are handled as if the OMTAPESUPPRESSION office parameter in table OFCENG is set to Y. For more information about OM output, refer to the UCS DMS-250 *Operational Measurements Reference Guide*, 297-2621-814.

S/OM backwards compatibility

The S/OM system achieves backward compatibility (with older software loads) by resolving an accurate list of group fields, based on the oldest software load version reported from any of the reporting nodes.

The oldest group field list presented by the reporting nodes is accepted as the current group field list.

Using the oldest group field list that has been reported provides the following:

- group field list backwards compatibility
- more efficient management of unused fields, and the 32-field limit
- greater predictability of group field list ordering

Feature Interactions

S/OM supports the UCS DMS-250 EADAS interface. The EADAS interface is fully compliant with Bellcore Specification TR-TSY-000740. EADAS interfaces to interwork with S/OM, so that S/OM may collect OM data from the CM node for EADAS processing. The CM node is the only SOS (Support Operating System) node supported by S/OM for EADAS processing. For more information refer to the *UCS07 and UCS08 Software Release Document*.

The billing server can be used to store S/OM data. Refer to the *UCS DMS-250 Billing Server Application Guide* for more information on Billing Server storage.

SuperNode operational measurements setup and administration

Setting up the S/OM system for the first time

Setting up the switch to receive operational measurement (OM) information requires the completion of a series of tasks, which include

- executing SuperNode OM (S/OM)-related commands
- datafilling S/OM-related tables
- setting S/OM-specific parameters in software tables in the switch

Tasks for S/OM setup and ongoing administration

The activities required to generate S/OM information include the following:

- general parameter definition
  - — General software tables in the UCS DMS-250 switch have S/OM-specific parameters that require definition. This information must be supplied before S/OM data collection can begin.
- measurement class definition
  - — Although all groups are assigned by default to the active and holding classes, the user must define the various optional measurement classes to which S/OM groups will be assigned.
- measurement class assignment
  - — S/OM groups may be assigned individually to one of the optional user-defined measurement classes.
- data scheduling
  - — Once all S/OM group measurement class assignments have been made, the data collection schedule may be defined for each of the classes. These schedules identify the data collection start and stop times, data transfer times, and report output times.
- periodic report scheduling
  - — The special purpose (OMRS series) reports require additional commands and software tables for their scheduling activities.

- output device assignment
  - — The output data requires assignment to a specific output device (terminal, printer, tape unit, or disk drive).
- report request
  - — Once data collection has started and the reports are scheduled, OM data may also be requested through commands entered at the destination input/output (I/O) device.

Table 2-1 lists these tasks, tables, and S/OM commands.

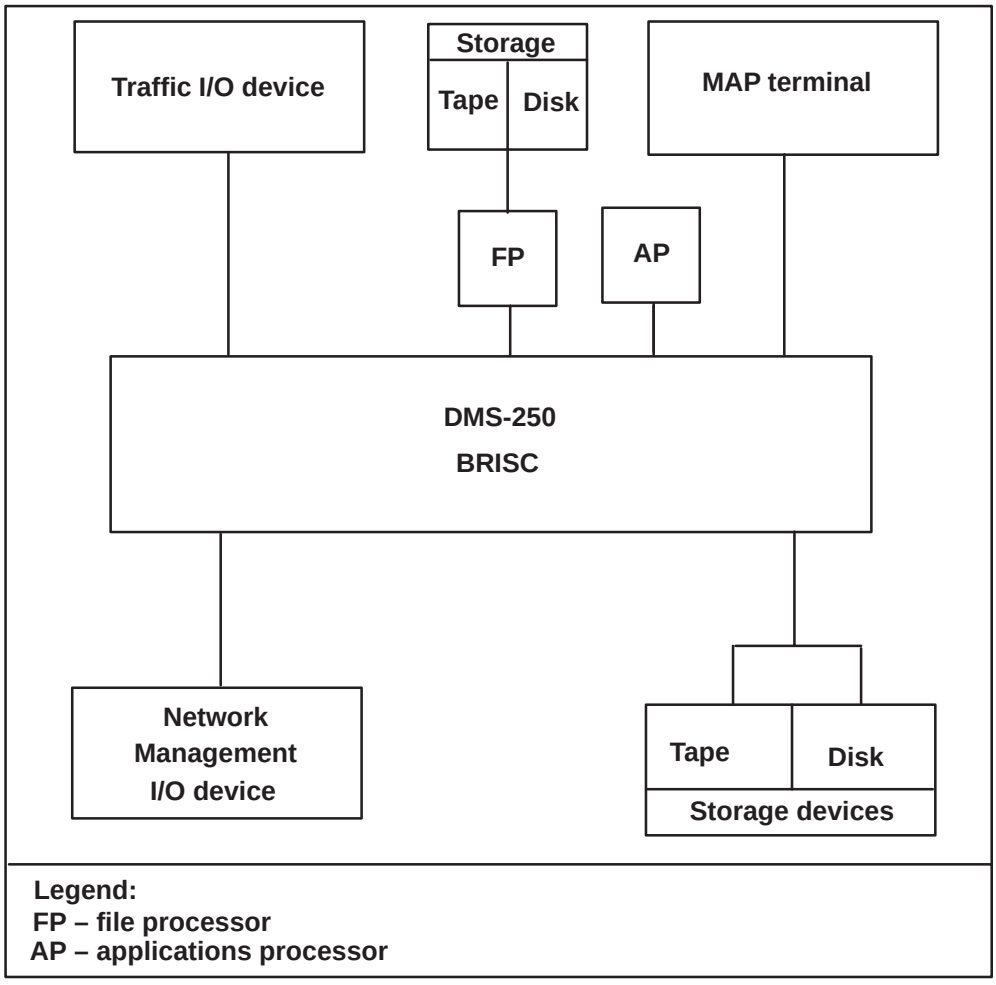
Table 2-1
S/OM system task, table, and command relationships

Task group	Task	Applicable table	Applicable command
1	general parameter definition	OFCENG OFCOPT OFCSTD OFCVAR	
2	measurement class definition	OMACC	OMCLASS
3	measurement class assignment	OMACC	OMACCGRP OMACCFLD OMDUMP OMTOTAL OMACCTOT OMACCKEY
4	data scheduling	OMACC OMDATA OMGRPORD OMPRT OMTAPE OMTHRESH	
5	periodic report scheduling	OMREPORT	
6	output device assignment	LOGCLASS LOGDEV OMDATA TERMDEV	
7	report request		OMBR OMSHOW

A sample office configuration

The sample office I/O device configuration illustrated in Figure 2-1 shows the configuration of the I/O devices mentioned in the S/OM set-up task descriptions.

Figure 2-1
Sample office I/O device configuration



Central collector configuration

Accumulation and reporting for the system take place on the computing module (CM) central collector. The system databases containing accumulation and reporting information also reside on the CM central collector (see Figure 2-2).

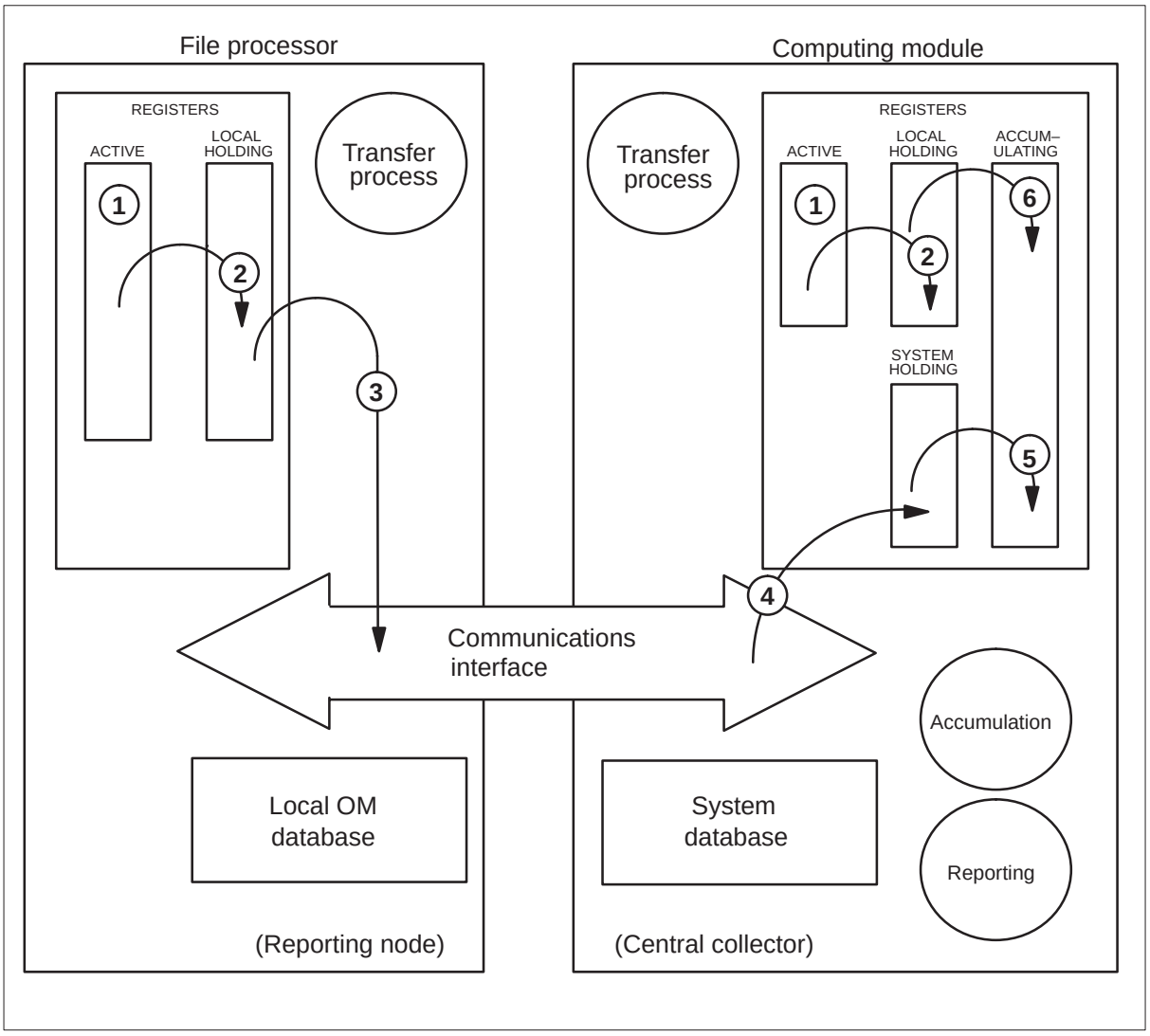
Note: Special reports datafilled in table OMREPORT are generated on the CM only.

S/OM functionality

Figure 2-2 illustrates S/OM functionality. The diagram represents a central collector and one reporting node.

Note: There can be up to 32 reporting nodes.

Figure 2-2
S/OM functionality



A reporting node pegs OMs, and upon expiration of the transfer period, sends them to the central collector via the communications interface. Table 2-2 describes the process.

Table 2-2
Data movement during a transfer period

Step	Action
1	OM data (event and usage counts) is collected on the OM reporting node and the central collector node every transfer period. Node data is stored in the active registers for that node (item 1, Figure 2-2). The active registers for a reporting node contain the counts for that node, and the active registers for the central collector contain the counts for the central collector and its attached peripherals.
2	The OM transfer process saves a snapshot of every transfer (XFR) period by moving the contents of the node's active registers to local_holding registers (item 2, Figure 2-2).
3	Data in the OM reporting node's local_holding registers is transmitted to the central collector by way of the communications interface (item 3, Figure 2-2).
4	Reporting nodes send local_holding messages to the central collector, which collects the data and stores it in system_holding registers (item 4, Figure 2-2).
5	Data from the system_holding registers on the central collector is added to the accumulating registers (item 5, Figure 2-2).
6	The data from the central collector's local_holding register is added to the accumulating registers (item 6, Figure 2-2).

S/OM commands

This chapter describes the operational measurement (OM) command interpreter (CI) commands that are executed on the central collector. Because these commands affect the accumulating class configuration and reporting aspects of the OM system, they can only be used on the central collector node.

All original OM system CI commands are supported in the SuperNode operational measurement (S/OM) system.

Note: All S/OM CI commands must be entered through the computing module (CM).

For details on these CI commands, see the following NTPs:

- *DMS-100 Basic Administration Procedures*
- *DMS-100 Service Problem Analysis Administration Guide*

Note: For descriptions of all interface commands for the UCS DMS-250 switch, see the list of related documentation in the "About this document" section.

Cautions and considerations

Note the following cautions and considerations before using the CI commands.

Using OMPRDUMP

For best interpretation of OMPRDUMP data, enable the office parameter OM_SOURCE_IDENTIFICATION. Refer to Chapter 4, "Office parameters," for details on this parameter.

With the S/OM system activated, the following output displays when using the OMPRDUMP command on a file created by OMTAPE:

- OMPRDUMP, OMDATA, and OMTAPE do not support OMACCFLD and OMACCKEY.
- OMPRDUMP can process only files written by the same IEC software release.

CI command descriptions

Table 3-1 lists and describes S/OM CI commands. For more information on these commands, see the *UCS DMS-250 Commands Reference Manual*.

CAUTION
Loss of Data

Do not use the following commands on classes that have been datafilled in table OMTAPE

- OMACCFLD
- OMACCKEY
- OMSHOW

Table 3-1
S/OM CI command descriptions

Command	Description
OMTOTAL	Toggles (on or off) the OM totalling feature for a specified OM group. When the OM totalling feature is turned on, the OMPR report and the OMSHOW report for the specified group include group total measurements. This command is not restricted to the central collector and is only applicable on the node from which it is executed. Execute on the CM only.
OMCLASS	Defines a new measurement class of accumulating registers and adds the corresponding tuples to table OMACC. After a new class has been defined, use the OMACCGRP command to assign one OM group or all OM groups to the named class. Use the OMACCFLD command to remove or reassign fields to the named class. Execute on the CM only. Once defined, a class can be renamed, but it cannot be deleted.
OMACCGRP	Assigns or deletes OM groups from classes previously defined by the OMCLASS command. Execute on the CM only.
OMACCFLD	Assigns or deletes individual fields from accumulating classes. Before using, designate an OM class and execute the OMACCGRP command to assign a group to the designated OM class. Execute on the CM only.

—continued—

Table 3-1
S/OM CI command descriptions (continued)

Command	Description
OMACCKEY	Executable only on the central collector. Adds or deletes (selects or deselects) tuples from a group within an accumulation class. The parameter list accepts a node name and an optional node number, allowing the function on a per-node/group basis. Execute on the CM only. ***Note:*** This command does not increase or decrease the amount of storage required for data. Data store levels are based on requirements of the applications. Both OMSHOW and OMTAPE ignore OMACCKEY commands.
OMACCTOT	Specifies that OM group totals are only required (or not required) for a particular OM group and class combination. Execute on the CM only. ***Note:*** Before using, designate an OM class and execute the OMACCGRP command to assign a group to the designated OM class. Also, OMTOTAL must already be activated for the group.
OMDUMP	Displays assignment information about selected OM groups and classes. Execute on the CM only.
OMBR	Specifies the output device control utility (OMBR system) for OM buffered reports. The following functions are available from within the OMBR system: • START—starts printing OM buffered reports • STOP—stops printing of OM buffered reports • REROUTE—stops and restarts the currently printing report • STATUS—displays OM buffering system status • PURGE—purges the currently stopped report • CREATE—creates the OM disk buffer • DELETE—deletes the OM disk buffer • RESETBUF—clears and resets the OM disk buffer • QUIT—exits the OMBR system

—continued—

Table 3-1
S/OM CI command descriptions (continued)

Command	Description
OMPRDUMP	Specifies the OMPRDUMP command environment. Other commands may be entered as required. The following functions are available from within the OMPRDUMP system: • OMGETGD—builds a group description database • OMPRSET—sets or queries time and date parameters for OMPRTREP • OMPRTREP—requests OMPRSPEC report • ZEROSUP—zero suppression option • SETDBDEV—assigns a disk device for storing KEY and INFO values • QUIT—exits the OMPRDUMP environment
OMSHOW	Accepts an optional node name (nodename) and node number (nodeno) in the parameter list. If the nodename and nodeno parameters are not used, register values are obtained from all nodes reporting that group. When a node name is specified, the system obtains the register values for the specified node. Also accepts string names for OM groups. This allows operating company personnel to query an OM group that is not defined on the local node. With merged-by-key OM groups, OMSHOW provides a system view of the OM data instead of a multi-nodal view. In a system view, the user views OM group holding data in a merged format having no differentiation as to which nodes the OM data is coming from. No node source identification is given. The OM data is presented as a summation of all the data for the group. Also, accumulation data is added in a merged format.
OMGROUPS	Displays a list of valid OM group names that exist on the master node (in a readable format). This command is only available if the S/OM system is activated.
	—end—

Office parameters

Table 4-1 lists and describes the operational measurements (OM) system-related office parameters and identifies the tables in which they reside. For more information on these office parameters, refer to the *UCS DMS-250 Office Parameters Reference Manual*.

Table 4-1
OM office parameters

Office parameter	Table	Description
OMTAPESUPPRESSION	OFCENG	Enables or disables suppression of zero data from the OMTAPE file. Valid inputs are • Y—zero data from the OM tape is suppressed • N—default, zero data from the OM tape is enabled When the parameter setting is changed, the activation of the change is immediate.
TAPEXLATE	OFCENG	Specifies the type of translation to be applied to the OM registers as they are written to tape. Valid inputs are • EBCDIC—character representation in EBCDIC • EBCDIC_BINARY—numeric representation in EBCDIC • ASCII—character representation in ASCII • ASCII_BINARY—numeric representation in ASCII ***Note:*** There is no automatic rotation when this parameter is changed, so a rotate must be performed, or the change is ignored. Perform a manual rotate from the device independent recording package (DIRP) level of the MAP terminal.

—continued—

Table 4-1
OM office parameters (continued)

Office parameter	Table	Description
OMHISTORYON	OFCOPT	Enables or disables the OM HISTORY class feature in the switch. Valid inputs are • Y—the feature is active, and the parameter OMXFR in table OFCENG is disabled. The OM transfer period is five minutes • N—default, the feature is inactive When the parameter setting is changed, a prompt indicates that a warm restart is required to activate the parameter change. ***Note:*** If the switch has the Engineering Administration Data Acquisition System, the parameter must be set to the default value of N.
OM_SOURCE_ IDENTIFICATION	OFCVAR	Enables or disables the ability to display the node from which an OM tuple was collected. Valid inputs are • ON—the source name reporting capability of the S/OM system is enabled • OFF—default, S/OM generates OM reports similar to those in the original OM system For merged-by-key OM groups, if this parameter is set to ON, holding and accumulation classes have a system default identifier. If this parameter is set to OFF, merged-by-key OM groups have a blank node identifier. ***Note:*** When performing a dump and restore or ONP, copy the existing value of the office parameter OM_SOURCE_IDENTIFICATION.
—end—		

Data transfer and reporting

Data transfer

At every operational measurements (OM) transfer period, the reporting node communicates the following information to the computing module (CM) central collector:

- new OM group definitions, if any
- new Key and Information field definitions, if any
- group size changes, if any
- key information changes, if any
- all registers

Thus, the Key and Information fields maintained by the central collector are only as up-to-date as the last transfer period.

Reporting processes

Reporting processes function the same in the SuperNode operational measurements (S/OM) system as they did in the original OM system. OM groups for all reporting nodes are maintained on the central collector.

Combined group reporting and source node generation allow operating company personnel to better interpret the data that are received.

Note: Source node identification is only possible when the OM_SOURCE_IDENTIFICATION office parameter in table OFCVAR is activated.

Common groups can come from multiple nodes. Therefore, OM group information must be collected from multiple nodes to provide a complete office view of a group. The external view of the group is dictated by the software load on the central collector.

The central collector combines all of the OM groups that are reported. Because of this, single-tuple OM groups that are defined on multiple nodes are reported as a multi-tuple group by the S/OM system. To differentiate

between tuples, activate the OM_SOURCE_IDENTIFICATION office parameter in table OFCVAR.

To identify the node from which each OM tuple was collected, a source node is reported. The ability to report the source node can be enabled or disabled with the OM_SOURCE_ IDENTIFICATION office parameter. The examples of OMTAPE, OMDATA, and OM register OMPR reports, shown later in this chapter, show the results of source node generation.

System view of OM group data

OM group information that has been reported from different OM reporting nodes can be merged to provide a system view of the activity for the OM group. With a system view, the merged format does not differentiate which nodes the OM data came from; that is, there is no node source identifier.

OM group data is merged based on unique keys for all tuples in the OM group. A unique key means that on a single node, an OM group must have distinctive keys for all tuples defined on that node.

The definition of a merged-by-key OM group is static. The group is allocated, collected, and reported as a merged group throughout its life on the switch.

An OM group must have one of these characteristics to be merged by key:

- The group has a single tuple.
- The group has unique keys for all tuples in the group.

Note: Merge by key functionality is not supported for active registers.

Report formats

S/OM supports various report formats.

The OMPR report format

The OMPR report contains raw register data. The report's content and output schedule are defined through tables OMTAPE and OMDATA. The format for the OMPR report includes a source node field. This enhancement applies only to the tuple number and the key and information formatting.

Note: The reporting processes may reside on a node other than the node where the data is stored. Access to active registers of remote nodes requires a large volume of messaging, possibly causing a degradation of other functions. Therefore, the scheduled reporting of active registers is not supported.

The OMPR report tuple number always appears on the output line preceding the register data. Table 5-1 shows the possible results when key and information fields are present.

Table 5-1
OMPR report information

Key	Information	Result
YES	YES	Tuple # Key Source Node Info REGISTER DATA
NO	YES	Tuple # Source Node Info REGISTER DATA
YES	NO	Tuple # Key Source Node REGISTER DATA
NO	NO	Tuple # Source Node REGISTER DATA

OMPR log reports include the source node from which an OM tuple was collected. The source node follows the Key and Information fields, as illustrated in Figure 5-1.

Figure 5-1
Example of an OMPR report

```
OMPR200 date time xxxx INFO OM REPORT
  CLASS     CMCCLASS
  START yyyy/mm/dd hh mm ss day; STOP yyyy/mm/dd/hh mm ss day;
  SLOWSAMPLES          x ; FASTSAMPLES           x ;
  CMC
      KEY ( CMC_INDEX )
         CMCLERR     CMCERR     CMCFLT     CMCDIAG
        CMCLKSBU   CMCLKMBU     CMCSBU     CMCMBU
CM
    0 CMC0
                0          0          0          0
                0          0          0          0

    1 CMC1
                0          0          0          0
                0          0          0          0
EIOC
    0 CMC0
                0          0          0          0
                0          0          0          0

    1 CMC1
                0          0          0          0
                0          0          0          0
```

The OMTAPE K-record format

The OMTAPE K-record format includes the source node and node number from which an OM tuple was collected. This capability can be disabled (if desired) by deactivating the OM_SOURCE_ IDENTIFICATION office parameter in table OFCVAR.

Note: The OMTAPESUPPRESSION parameter in table OFCENG must be set to Y.

Figure 5-2 shows the OMTAPE K-record format.

Figure 5-2
OMTAPE K-record format

```
K - Key and INFO Values Record
      Length increased from 91 to 106 characters.
    2 -         6    :    Record Number
    8 -         8    :    Record Selector - "K"
    10    -     14   :    Tuple Number
    16    -     55   :    Key Value
    57    -     64   :    INFO 1
    66    -     73   :    INFO 2
    75    -     82   :    INFO 3
    84    -     91   :    INFO 4
    93    -     100  :    Reporting Node Name (left-justified)
    102   -     106  :    Reporting Node Number (right-justified)
```

Note: For S/OM, only the OMTAPE K-record format has changed. All other record formats remain unchanged. Refer to the DMS-100 *Basic Administration Procedures*, 297-1001-300 for further details.

Figure 5-3 shows how a single-tuple group is formatted. The source node for the tuple in the OMTAPE K-record is also shown in this example.

Figure 5-3
OMTAPE K-record format example (single-tuple group)

```
00001 H 1989 05 01 11 00 EBCDIC        V00001 OMDATA0001.KK
00002 C 00001 HOLDING  X15
00003 G 00000 LOGS     00002 00004 00000
00004 F 00000 LOSTREC
00005 F 00001 SWERRCT
00006 F 00002 PMSWERCT
00007 F 00000 PMTRAPCT
00008 K 00000                                    CM
00009 K 00000                                    EIOC
00010 T 00001 AUTO
00011 E
00012 P 00001 1989 05 01 11 00 1989 05 01 11 15 00009  0000
00013 Q 00000 00002 00004
00014 D 00000 00001 00001 00001
00015 D 00000 00001 00000 00000
```

Note: Figure 5-3 is a condensed example of an OMTAPE K-record. It is not meant to be used for determining the character positions of individual fields. Refer to Figure 5-2 for the character positions of the individual fields in the OMTAPE K-record format.

When the OMTAPESUPPRESSION parameter in table OFCENG is set to Y, the K-record and D-record are linked. (The first K-record is for the first D-record, the second K-record is for the second D-record, and so on.)

The OMDATA file format

The format of most OMDATA records is the same as for OMTAPE files. However, the OMDATA header record (H) has been lengthened to 121 characters to support the longer file paths and file names used by the fault tolerant file system (FTFS).

The following sample shows a series of records for two OM groups, TRK (line 00002) and TS (line 00010). An examination of the sample shows the relationship between the office parameter records (lines 00000 through 00028) and the OM data records (lines 00029 through 00037).

Figure 5-4
Sample records for two OM groups

```
           1         2         3         4         5
12345678901234567890123456789012345678901234567890123456789012345678

 00000 H 1985 01 20 23 55 EBCDIC        OMDATA
 00001 C 00001 HOLDING  x30                        S YYNNN
 00002 G 00000 TRK      00004 00003 00002 TRKDIR  CHARS
 00003 F 00000 INCATOT
 00004 F 00001 PRERTEAB
 00005 F 00002 TRU
 00006 K 00000 PMBRON5201TO                          2W
 00007 K 00001 BENFCN5401TO                          2W
 00008 K 00002 SDBRON9701TO                          2W
 00009 K 00003 TORONTO101TO                          2W
 00010 G 00001 TS      00008 00009 00000
 00011 F 00000 TS0
 00012 F 00001 TS1

 Other type F and K records

 00025 K 00006
 00026 K 00007
 00027 T 00001 AUTO
 00028 E

 00029 P 00001 1985 01 21 00 00 1985 01 21 00 15 00009 000
 00030 Q 00000 00004 00003
 00031 D 01241 00605 00969
 00032 D 01692 00701 01273
 00033 D 01493 00593 01121
 00034 D 01501 00688 10421
 00035 Q 00001 00008 00008
 00036 D 00029 00031 00028 00027 00025 00026 00029 00027
 00037 D 00026 00028 00027 00027 00029 00029 00025 00026
```

Note: Due to horizontal space limitations, only the first 58 characters of each record are shown.

OMDATA definition records

The first set of records in each OMDATA file includes the following definition records:

- H is the header record.
- C is the class definition record.
- G is the group definition record.
- F is the field definition record.
- K is the key and information value record.
- T is the tape schedule record.
- E is the end of parameter definition record.
- M is the end of parameter modifications record.

After each rotate, these definition records are placed in the OMDATA file before any data records are added.

Header record The OMDATA header record (H) is described in Table 5-2.

Table 5-2
OMDATA header record

Char #	Description
1	Space
2–6	Record sequence number (00000 to 65535)
7	Space
8	Record type selector (H)
9	Space

—continued—

Table 5-2
OMDATA header record (continued)

Char #	Description
10–25	Time at which the recording device was mounted 10–13 (Year: 0 to 9999) 14 Space 15–16 (Month: 1 to 12) 17 Space 18–19 (Day: 1 to 31) 20 Space 21–22 (Hour: 0 to 23) 23 Space 24–25 (Minute: 0 to 59)
26	Space
27–39	Character code: ASCII, EBCDIC, ASCII_BINARY, and EBCDIC_BINARY
40	Space
41–72	Volume path and volume name (up to 30 characters)
73	Space
74–89	Office identifier (must be 16 characters)
90	Space
91–98	Office type (up to eight characters)
99	Space
100	Output format: R (regular) C (condensed—reserved for future use)
101	Space
102–119	Filename (up to 18 characters, left-justified)
120	Space
121	Y (OMDATA file assumes OMTAPESUPPRESSION set to Y)
	—end—

Class definition record The OMDATA class definition record (C) is described in Table 5-3.

Table 5-3
OMDATA class definition record

Char #	Description
1	Space
2–6	Record sequence number (00000 to 65535)
7	Space
8	Record type selector (C) Length varies with number of OM groups defined in the BCS/IEC load. Mount tape or disk for this record to output.
9	Space
10–14	Class number (of OM groups)
24	Space
25–50	Time specification (seven character sets) 25–32 (First character set) Selector: X15, X30, AUTO, MONTHLY, WEEKLY, DAILY, HOURLY, HALFHOUR, DEVDAY, DEVWEEK, DAYTIME, or HISTORY 33 Space 34–35 (Second character set) FROM day of week or month: 1 to 31. Used with MONTHLY, WEEKLY, DEVWEEK, and DAYTIME. Blank for other time specifications. 36 Space 37–38 (Third character set) FROM hour: 0 to 23. Blank for X15, X30, AUTO, HOURLY, HALFHOUR, and HISTORY 39 Space 40–41 (Fourth character set) FROM minute: 00, 15, 30, or 45. Blank for X15, X30, AUTO, and HISTORY 42 Space

—continued—

Table 5-3
OMDATA class definition record (continued)

Char #	Description
25–50 cont.	43–44 (Fifth character set) TO day of week or month: 1 to 31. Used with MONTHLY, WEEKLY, and DAYTIME. Blank for other time specifications. 45 Space 46–47 (Sixth character set) TO hour: 0 to 23. Used with MONTHLY, WEEKLY, DAILY, and DAYTIME. Blank for other time specifications. 48 Space 49–50 (Seventh character set) TO min: 00, 15, 30, or 45 Used with MONTHLY, WEEKLY, DAILY, and DAYTIME. Blank for other time specifications.
51	Space
52	Precision of data registers. Single (S), or Double (D).
53	Space
54–?	Yes (Y) or No (N) for each group listed in the type G records associated with the identified class.
	—end—

Group definition record The OMDATA group definition record (G) is described in Table 5-4.

Table 5-4
OMDATA group definition record

Char #	Description
1	Space
2–6	Record sequence number (00000 to 65535)
7	Space
8	Record type selector (G)
9	Space
	—continued—

Table 5-4
OMDATA group definition record (continued)

Char #	Description
10–14	Group number
15	Space
16–23	Group name
24	Space
25–29	Number of tuples, type D records in the named group (1 to 4000)
30	Space
31–35	Number of fields, type F records in the named group (1 to 32)
36	Space
37–41	The number of information fields in the named group (1 to 4)
42	Space
43–50	Name of the first information field in the group
51	Space
52–59	Type of first information field (NUMBER or CHARS.)
60	Space
61–68	Name of second information field (if needed)
69	Space
70–77	Type of second information field (NUMBER or CHARS.)
78	Space
79–113	Space allocated for third and fourth information field names and field types
	—end—

Field definition record The OMDATA field definition record (F) is described in Table 5-5.

Table 5-5
OMDATA field definition record

Char #	Description
1	Space
2–6	Record sequence number (00000 to 65535)
7	Space
8	Record type selector (F)
9	Space
10–14	Field position number (0 to 31)
15	Space
16–23	Field names

Key and information value record Table 5-6 describes the OMDATA key and information value record (K). This record identifies the key and information values for each of the tuples in an OM group. One record is written for each tuple.

Table 5-6
OMDATA key and information value record

Char #	Description
1	Space
2–6	Record number
7	Space
8	Record type selector (K)
9	Space
10–14	Tuple number (0 to 9999)
15	Space
16–55	Key values (if any)
56	Space
57–64	First information field value; (CHARS, left-justified); (NUMBER, right-justified)
65	Space

—continued—

Table 5-6
OMDATA key and information value record (continued)

Char #	Description
66–73	Second information field value
74	Space
75–82	Space allocated for third information field values
83	Space
84–91	Space allocated for fourth information field values
	—end—

Note: Enter type G, F, and K records until group names, field names, and tuples for all OM groups in the holding class are defined.

Tape schedule record The OMDATA tape schedule record (T) is described in Table 5-7.

Table 5-7
OMDATA tape schedule record

Char #	Description
1	Space
2–6	Record number
7	Space
8	Record type selector (T)
9	Space
10–14	Class number (same as in the type C record. This associates the tape schedule record with the named class.)
15	Space
16–41	TIMESPEC (same as characters 25–50 of type C record) or AUTO. (Output to tape occurs when transfer period or accumulative period associated with the named class is complete.)

End of parameter definition record Table 5-8 describes the OMDATA end of parameter definition record (E).

Table 5-8
OMDATA end of parameter definition record

Char #	Description
1	Space
2–6	Record number
7	Space
8	Record type selector (E) (Indicates the end of the parameter definitions, if not followed by a type [M] record.)

End of parameter modifications record Table 5-9 describes the OMDATA end of parameter modification record (M).

Table 5-9
OMDATA end of parameter modification record

Char #	Description
1	Space
2–6	Record number
7	Space
8	Record type selector (M) (Signals that a modification affecting G, F, and K type records has occurred since the last report.)

OMDATA data definition records

There are two OMDATA data definition records.

- class data header record
- group data header record

These data definition records contain OM data that has been collected and organized as specified in their associated parameter definition records. The association between OMDATA parameter definition records and OMDATA data definition records is achieved by matching the class and group numbers (characters 10 to 14) from C and G type parameter definition records with the corresponding class and group numbers (characters 10 to 14) in the P and Q type data definition records, as illustrated in Table 5-10.

Table 5-10
OMDATA parameter definition to data definition correlation

Parameter definition records	Data definition records
Class definition record (Type C)	Class data header record (Type P)
class # specified by characters 10–14	Class number specified by characters 10–14, corresponds to the class # (characters 10–14) in the Type C parameter definition record
Group definition record (Type G)	Group data header record (Type Q)
Group # specified by characters 10–14	Group number specified by characters 10–14, corresponds to the group # (characters 10–14) in the type G parameter definition record

Class data header record The OMDATA class data header record is described in Table 5-11.

Table 5-11
OMDATA class data header record

Char #	Description
1	Space
2–6	Record number (Continues sequentially from the end of the parameter definition records).
7	Space
8	Record type selector (P)
9	Space
10–14	Class number (Corresponds to the class number in the Type C parameter definition record).
15	Space
16–31	Start time
32	Space
33–48	Stop time
49	Space
50–54	Number of usage scans at the slow rate (LOSCAN)

—continued—

Table 5-11
OMDATA class data header record (continued)

Char #	Description
55	Space
56–60	Extension counter for HISCAN (characters 62–66). Each time the count in HISCAN exceeds 65536, HISCAN is reset to 0000 and the extension counter is incremented by 0001.
61	Space
62–66	Number of usage scans at the fast rate (HISCAN)
	—end—

Group data header record. The OMDATA group data header record is described in Table 5-12.

Table 5-12
OMDATA group data header record

Char #	Description
1	Space
2–6	Record number
7	Space
8	Record type selector (Q)
9	Space
10–14	Group number (Corresponds to the group number in the Type G parameter definition record, and identifies the data records to follow).
15	Space
16–20	Number of tuples (Corresponds to the value entered in characters 25–29 of the type G parameter definition record).
21	Space
22–26	Number of fields (Corresponds to the value entered in characters 31–35 of the type G parameter definition record).

OMDATA data records

The OMDATA data records are described in Table 5-13. There is one data record per tuple. The number of characters in each record is determined by

the number of fields and whether the the OM group belongs to an active, holding, history, or accumulating class.

The fields (Type P records) are specified by the appropriate characters of the group (Type G) parameter definition record.

Table 5-13
OMDATA data records

Char #	Description
1	Space
2–6	Record number
7	Space
8	Record type selector (D) (Indicates that the numbers contained in the next sets of characters are OM data records.)
9	Space
10–14	First data field (00000 to 65535) (Field name is defined in characters 16–23 of the Type F parameter definition record.)
15	Space
16–20	Second data field
21	Space
22–26	Third data field

Data register precision

The precision of data records (count capability) can be specified by the value set in character 52 of the OMDATA class definition record described in Table 5-3.

Single (S) precision. If a five-digit count capability (00000 to 65535) is sufficient, set character 52 of the OMDATA class definition record to (S) for single precision.

Double (D) precision. If a larger count capability is required, set character 52 of the OMDATA class definition record to (D) for double precision. This adds an extension register (five-digit) for each data field register (as shown in Table 5-14).

Table 5-14
Double precision data field extension registers

Char #	Description
10–14	Extension register for first data field
15	Space
16–20	First data field register
21	Space
22–26	Extension register for second data field
21	Space
22–26	Second data field register

Restart record

Table 5-15 describes the restart record produced when a restart occurs.

Table 5-15
Restart record

Char #	Description
1	Space
2–6	Record number (the next number in sequence at the time of restart)
7	Space
8	Record type selector (R)
9	Space
10–25	The date and time of recovery from the restart. The format is the same as characters 10–25 of the OMDATA header record described in Table 5-2.

Clock change record

Table 5-16 describes the clock change record produced when the system clock has been changed.

Table 5-16
Clock change record

Char #	Description
1	Space
2–6	Record number (the next number in sequence at the time of the clock change)
7	Space
8	Record type selector (X)
9	Space
10–25	The date and time of recovery from the restart. The format is the same as characters 10–25 of the header (type H) record described in Table 5-2.
26	Space
27–42	The date and time of the clock after the change. This format is the same as characters 10–25 of the header (type H) record described in Table 5-2. 27–30 (Year: 0 to 9999) 31 Space 32–33 (Month: 1 to 12) 34 Space 35–36 (Day: 1 to 31) 37 Space 38–39 (Hour: 0 to 23) 40 Space 41–42 (Minute: 0 to 59)

Periodic Trunk Maintenance, Attempts/Circuit/Hour, and Global Attempts/Circuit/Hour reports

These special reports, produced by the CM only, can access S/OM data when the CM is the master.

S/OM log reports

Table 6-1 lists and describes the SuperNode operational measurements (S/OM) system log reports and briefly describes any actions required when the reports are issued. For detailed information, refer to the *UCS DMS-250 Logs Reference Manual*.

Table 6-1
S/OM log report descriptions

Report	Description	Action required
Distributed operational measurements (DOM) 100 Communication Started	The DOM 100 log is generated by a reporting node when communication is established with the central collector.	None
DOM 102 Lost/Incomplete Transfer	The DOM 102 log is generated on the central collector. The software checks the system profile database when the time for local_holding register collection from reporting nodes has expired. If it encounters a node that has not completed transferring its holding registers, it generates a DOM 102 log. This log also informs the operating company personnel of the last OM group and tuple received.	Ensure that the time-of-day clocks for the node are synchronized, and that communication was not lost.

—continued—

Table 6-1
S/OM log report descriptions (continued)

Report	Description	Action required
DOM 200 Lost Communication	The DOM 200 log is generated by a reporting node when communication with the central collector is lost.	Analyze the reason communication with the central collector was lost, then determine whether recovery is possible, or if reconfiguration of the central collector is necessary. Ensure that the reporting node is up.
DOM 201 Transfer Period Mismatch	The DOM 201 log is generated when registration with the central collector occurs and there is a mismatch in the OM transfer periods.	Determine which node has the incorrect transfer period and make appropriate corrections. ***Note:*** A cold restart is required to change the OMXFR parameter (Table OFCENG) and at least a warm restart is required to change OMHISTORYON parameter (Table OFCOPT).
OM2 113 OMTAPE Recording Inactive	The OM2 113 log is an informational log generated to indicate the OMTAPE application has completed the output of OM data for a specified reporting period.	None
OM2 213 OMDATA Recording Inactive	The OM2 213 log is an informational log generated to indicate the OMDATA application has completed the output of OM data for a specified reporting period. This log is for engineering OMDATA reports. It displays how much of the OM reporting period was used for report generation.	None

—continued—

Table 6-1
S/OM log report descriptions (continued)

Report	Description	Action required
OM2 650 Late OM Pre-prepare Kickoff	The OM2 650 log is generated by a reporting node when the OM pre-prepare kickoff does not start within the allotted time period.	Analyze the reason that the pre-prepare kickoff was late, then determine whether recovery is possible or if reconfiguration of the central collector is necessary. Ensure that the reporting node is up.
SOM 103 OMMASTER Configuration	Accumulation class configuration data from one software load may not apply to the next software load. For example, particular keys, or even OM groups, may no longer exist. When this occurs, the SOM 103 log is generated to note which data did not apply. The SOM 103 log is generated within 3 to 6 minutes after the CM returns from the WARMSWACT that activates the new software load. The SOM 103 log is generated after every master move. These accumulation class definitions are the results of the following CI commands: OMCLASS OMACCGRP OMACCFLD OMACCKEY OMACCTOT OMTOTAL	Determine the action to take based on the information in the file name field. If the file name field contains the text string *** NONE ***, no action is necessary. The log is merely informational. If the file name field contains an actual SFDEV file name, verify that all S/OM capable nodes (CM, FP, AP) are functioning properly, then issue the following command: **>PRINT <file_name>**. This displays the contents of <file_name> (OM commands that did not apply at the new master). If the displayed commands should be applied at the new master, then issue the command: **>READ <file_name>**. The S/OM system attempts to apply the displayed commands at the new master. After the commands are applied, use the following command to **REMOVE <file_name>**.

—continued—

Table 6-1
S/OM log report descriptions (continued)

Report	Description	Action required
SOM 110 SFDEV Size Change	The SOM 110 log is generated during normal operations of the S/OM system. As changes are made to the accumulation class configuration, they are recorded in a protected file on SFDEV. If SFDEV is full, its maximum size is increased to make room for the new data.	Information only. No action required. ***Note:*** Sometimes, New Max Size may be too large. In this case, some SFDEV file maintenance may be required. Delete unnecessary files.
—end—		

List of terms

accumulating registers

These registers contain the information from the system_holding registers over a specified time period.

accumulation

The process of adding the information from the system_holding registers to the accumulating registers.

AP

applications processor

central collector

The computing module node on which accumulating and reporting functions and the system databases reside.

CI

command interpreter

class

An instance of operational measurement registers. Class can be associated with active, holding, and accumulating information. When associated with accumulation, class also refers to the time period for the accumulation of specific groups.

CMC

central message controller

CM

computing module

CPU

central processor unit

DIRP

device-independent recording package

DMS-Core

The 32-bit Motorola MC68020 microprocessor-based replacement for the NT40 based computing module. The DMS-Core is part of the SuperNode technology used to upgrade from a DMS-250 NT40 to a DMS-SuperNode. A Nortel trademark.

DRM

distributed recording manager

FP

file processor

FTFS

Fault tolerant file system. The FTFS is used for storage and retrieval on the file processor. It provides disk shadowing and copying of files to the DAT and nine-track tape.

group

A logical group of individual registers that have a common application.

holding registers

These registers maintain a record of the previous transfer period. In S/OM, holding is identified as local_holding and system_holding to indicate where the information is stored.

I/O

input/output

local_holding registers

These registers are the holding registers on an operational measurement reporting node.

OM

See operational measurement.

OM Reporting Node

Any node in the system that has the ability to collect OMs.

ONP

One Night Process. The procedure by which live switches upgrade from one software release to the next. This procedure is performed in a real-time environment.

operational measurement

Traffic data used by the DMS switch

register

A software location where counts are stored.

reporting node

Any node in the system that has the ability to collect OMs and communicate with the central collector.

S/OM

SuperNode Operational Measurement

SOS

support operating system

SWACT

switch of activity

system_holding registers

These registers reside on the central collector and contain the local_holding information for all reporting nodes.

transfer period

Periodic transfer of active registers into local_holding registers that can be scheduled for every 15 or 30 minutes.

transfer period version number

A number that is incremented every transfer period and assigned to a snapshot of the active to local_holding register exchange.

tuple

table update line entry

UCS

Universal Carrier Software

Ordering information

Use the following table for ordering Nortel NTPs (Northern Telecom Publications) and Product Computing-Module Loads (PCLs):

Type of product	Source	Phone	Cost
Technical documents (paper or CD-ROM)	Nortel Product Documentation	1-877-662-5669, Option 4 + 1	Yes
Individual NTPs (paper)	Merchandising Order Service	1-800-347-4850	Yes
Marketing documents	Sales and Marketing Information Center (SMIC)	1-800-4NORTEL (1-800-466-7835) * ESN 444-5930	No
PCL software	Nortel	Consult your Nortel sales representative * Employee	Yes

When ordering publications on CD

Please have the CD number and software version available, for example, **HLM-2621-001 02.03**.

When ordering individual paper documents

Please have the document number and name available, for example, **297-2621-001, UCS DMS-250 Master Index of Publications**.

When ordering software

Please have the eight-digit ordering code, for example, **UCS00007**, as well as the ordering codes for the features you wish to purchase. Contact your Nortel representative for assistance.

Digital Switching Systems

UCS DMS-250

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