

Statistical Analysis and Reporting System
User Guide
Version 1.0 - 29 November 1999

Note!

Before using this information and the product it supports, be sure to read the general information under "Notices" on page 49.

First Edition (November 1999)

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Contents

Figures	v
Preface	vii
Related Information	vii
3494 Tape Library	vii
3590 Tape Subsystem	vii
AIX	vii
AS/400	vii
MVS	vii
RS/6000	viii
Tivoli Storage Manager (formerly ADSM)	viii
Transaction Processing Facility (TPF)	ix
VM/ESA	ix
VSE/ESA	ix
Additional Information	ix
Organization	x
How to Send Your Comments	x
Chapter 1. Introduction to the Statistical Analysis and Reporting System (SARS)	1
What is SARS?	1
What Kinds of Information Does SARS Report?	2
Why Should I Enable SARS?	2
What Should I Know Before I Enable SARS?	2
How Do I Configure SARS?	2
SIM Severity Codes	3
MIM Severity Codes	3
What Is a Service Information Message (SIM)?	4
What Are the SIM Message Codes?	5
What Is a Media Information Message (MIM)?	6
What Are the MIM Message Codes?	7
How Do My Operating System and Software Relate to SARS Reporting?	7
What Should I Do When a Tape Drive Posts SIMs and MIMs?	8
Chapter 2. Working with SARS Information from Your Host	9
Message Presentation	9
Tivoli Storage Manager (formerly ADSM)	9
Tivoli Storage Manager SIM Presentation	9
Tivoli Storage Manager MIM Presentation	9
OS/390 (MVS) SIM Presentation	10
OS/390 (MVS) MIM Presentation	11
VM/ESA [®] SIM/MIM Presentation (3490 Emulation Mode)	12
VM/ESA [®] SIM Presentation (3590 Native Mode)	12
VM/ESA MIM Presentation (3590 Native Mode)	13
VSE/ESA [™] SIM/MIM Presentation (3490 Emulation Mode)	15
VSE/ESA SIM Presentation (3590 Native Mode)	17
VSE/ESA MIM Presentation (3590 Native Mode)	17
Transaction Processing Facility (TPF) SIM/MIM Presentation (3490 Emulation Mode)	18
TPF SIM Presentation (3590 Native Mode)	18
TPF MIM Presentation (3590 Native Mode)	19
S/390 Service Director/2 (SD/2) SIM Presentation (3490 Emulation Mode)	19
S/390 SD/2 SIM Presentation (3590 Native Mode)	20

S/390 SD/2 MIM Presentation (3590 Native Mode)	20
Platforms	21
Using ES/9000 with 3490 Emulation Mode.	21
Using ES/9000 with 3590 Native Mode	26
Using the RS/6000 System (AIX)	35
Using the AS/400 System (OS/400)	39
Using the Sun System	42
Using the HP-UX System	42
Using the Windows NT System	42
Chapter 3. Interpreting the SARS Report	43
Obtaining 3590 Drive Error Information at the Host	43
SIM Exception Messages	43
SIM Service Messages	44
SIM Severity Codes	44
MIM Exception Messages	45
MIM Severity Codes	45
Chapter 4. SARS SIMs and MIMs on Virtual Tape Servers	47
Automatic Read Only Recovery (ROR) Operation in VTS	47
Interaction of ROR with Other VTS Operations	48
SARS Impact on ROR	48
Notices	49
Trademarks	50
Index	51
Readers' Comments — We'd Like to Hear from You	53

Figures

1.	SIM Format	4
2.	MIM Format	6
3.	AIX TAPEUTIL and DIAG Commands SIM Error Log Example	36
4.	AIX TAPEUTIL and DIAG Commands MIM Error Log Example	36
5.	Error Log Example of SIM	38
6.	Error Log Example of MIM	39
7.	AS/400 Example Error Log of SIM (CISC Processor)	40
8.	AS/400 Example Error Log of SIM (RISC Processor)	41
9.	AS/400 Example Error Log of SIM (RISC Processor - Additional Information).	42

Preface

This publication contains user information for the Statistical Analysis and Reporting System (SARS).

Related Information

3494 Tape Library

For information about the 3494 tape library, see:

- *Magstar 3494 Tape Library Introduction and Planning Guide*, GA32-0279
- *Magstar 3494 Tape Library Operator Guide*, GA32-0280

3590 Tape Subsystem

For information about the 3590 tape subsystem, see:

- *Magstar 3590 Tape Subsystem Introduction and Planning Guide*, GA32-0329
- *Magstar 3590 Tape Subsystem User's Guide*, GA32-0330
- *Magstar 3590 Tape Subsystem Hardware Reference*, GA32-0331
- *IBM 3590 Tape Subsystem Guide*, SG24-2506
- *IBM Magstar 3590 Tape Subsystem: Multiplatform Implementation*, SG24-2549

AIX

For information about AIX systems and software, see:

- *AIX Parallel and ESCON Channel Tape Attachment/6000 Installation and User's Guide*, GA32-0311
- *AIX for RISC System/6000 General Concepts and Procedures*, GC23-2202
- *AIX/ESA System Planning Guide*, GC23-3061
- *IBM SCSI Tape Drive, Medium Changer, and Library Device Drivers: Installation and User's Guide*, GC35-0154
- *AIX for RISC System/6000 Installation Guide*, SC23-2341
- *AIX/ESA Diagnosis Guide*, SC23-3079
- *AIX/ESA Device Driver Developer's Guide*, SC23-3085

AS/400

For information about the AS/400 systems and software, see:

- *AS/400 Physical Planning Guide and Reference*, GA41-9571
- *IBM Application System/400 Control Language Reference*, SC41-0030
- *AS/400 Automated Tape Library Planning Guide - V3R6 Documentation*, SC41-3309
- *IBM Application System/400 Security Concepts and Planning*, SC41-8083

MVS

For information about MVS systems and software, see:

- *MVS/ESA Storage Management Library: Storage Management Reader's Guide*, GC26-3122
- *DFSMS/MVS General Information Library Guide*, GC26-4900
- *DFSMS/MVS Guide and Master Index*, GC26-4904

- *MVS/ESA Planning: Installation and Migration for MVS/ESA System Product Version 4*, GC28-1077
- *Multiple Virtual Storage/Enterprise System Architecture Library Guide for System Product*, GC28-1601
- *MVS/ESA Conversion Notebook for MVS/ESA System Product Version 4*, GC28-1608
- *MVS/ESA System Data Set Definition*, GC28-1628
- *MVS/ESA Command Reference*, GC28-1826
- *JES3 Command Reference*, SC23-0063
- *DFSMS/MVS Object Access Method Planning, Installation, and Storage Administration Guide for Tape Libraries*, SC26-3051
- *DFSMS/MVS Object Access Method Application Programmer's Reference*, SC26-4917
- *DFSMS/MVS Planning for Installation*, SC26-4919
- *Basic Tape Library Support User's Guide and Reference*, SC26-7016
- *DFSMS/MVS Implementing and Customizing DFSMSHsm*, SH21-1078

RS/6000

For information about RS/6000 systems and software, see:

- *RISC System/6000 Getting Started: Using RISC System/6000*, GC23-2377
- *RISC System/6000 Getting Started: Managing RISC System/6000*, GC23-2378
- *RISC System/6000 System Overview*, GC23-2406
- *RISC System/6000 Planning for System Installation*, GC23-2407
- *RISC System/6000 Problem Solving Guide*, SC23-2204

Tivoli Storage Manager (formerly ADSM)

For information about the Tivoli Storage Manager, see:

- For V3R1: *Tivoli ADSM V3R1 Messages*, GC35-0271
- For V3R7: *Tivoli Storage Manager Messages*, GC35-0382
- *Tivoli Storage Manager for AS/400 Administrator's Guide*, GC35-0315
- *Tivoli Storage Manager for AS/400 Administrator's Reference*, GC35-0316
- *Tivoli ADSM V3R1 VM Administrator's Guide*, GC35-0352
- *Tivoli ADSM V3R1 VM Administrator's Reference*, GC35-0353
- *Tivoli Storage Manager for AIX Administrator's Guide*, GC35-0368
- *Tivoli Storage Manager for AIX Administrator's Reference*, GC35-0369
- *Tivoli Storage Manager for HP-UX Administrator's Guide*, GC35-0371
- *Tivoli Storage Manager for HP-UX Administrator's Reference*, GC35-0372
- *Tivoli Storage Manager for Sun Solaris Administrator's Guide*, GC35-0374
- *Tivoli Storage Manager for Sun Solaris Administrator's Reference*, GC35-0375
- *Tivoli Storage Manager for MVS and OS/390 Administrator's Guide*, GC35-0377
- *Tivoli Storage Manager for MVS and OS/390 Administrator's Reference*, GC35-0378
- *Tivoli Storage Manager for Windows NT Administrator's Guide*, GC35-0380
- *Tivoli Storage Manager for Windows NT Administrator's Reference*, GC35-0381

Transaction Processing Facility (TPF)

For information about TPF systems and software, see:

- *TPF V4R1 Messages*, SH31-0156

VM/ESA

For information about VM/ESA systems and software, see:

- *Virtual Machine/Enterprise System Architecture Library Guide and Master Index for System/370*, GC24-5436
- *Virtual Machine/Enterprise System Architecture Library Guide and Master Index*, GC24-5518
- *Virtual Machine/Enterprise System Architecture General Information*, GC24-5550
- *VM/ESA: DFSMS/VM Installation and Customization*, SC26-4704
- *VM/ESA: DFSMS/VM Messages and Codes*, SC26-4707
- *VM/ESA: DFSMS/VM Removable Media Services User's Guide and Reference*, SC35-0141

VSE/ESA

For information about VSE/ESA systems and software, see:

- *Magstar 3494 Tape Library User's Guide: Library Control Device Driver for VSE/ESA*, GC35-0176
- *VSE/ESA V2R1.0 Extended Addressability*, SC33-6621
- *VSE/ESA V2R4.0 Operation*, SC33-6706

Additional Information

For additional information you may need to use with this publication, see:

- *Environmental Record Editing and Printing Program (EREP) User's Guide and Reference*, GC28-1378

Organization

The information in this publication is presented as follows:

- “Chapter 1. Introduction to the Statistical Analysis and Reporting System (SARS)” on page 1 provides an introduction to the Statistical Analysis and Reporting System.
- “Chapter 2. Working with SARS Information from Your Host” on page 9 discusses accessing and reading SARS information from a host system.
- “Chapter 3. Interpreting the SARS Report” on page 43 discusses interpreting the SARS report.
- “Chapter 4. SARS SIMs and MIMs on Virtual Tape Servers” on page 47 discusses SARS SIMs and MIMs on Virtual Tape Servers.
- “Index” on page 51 includes keywords and terms to help retrieve information in this publication.

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Chapter 1. Introduction to the Statistical Analysis and Reporting System (SARS)

What is SARS?

The Statistical Analysis and Reporting System (SARS) analyzes and reports on tape drive and tape cartridge performance to help you:

- Determine whether the tape cartridge or the hardware in the tape drive is causing errors
- Determine if the tape media is degrading over time
- Determine if the tape drive hardware is degrading over time

The 3590 tape drive microcode contains a Volume SARS (VSARS) algorithm and a Hardware SARS (HSARS) algorithm. SARS reports the results of its analysis in the form of Service Information Messages (SIM) and Media Information Messages (MIM). These messages are the means by which SARS communicates problems in order to improve tape library productivity.

The SARS algorithms are executed in the 3590 just before a tape is unloaded. To distinguish error patterns and trends, the SARS *volume* algorithms require the tape to be mounted on different drives. The SARS *hardware* algorithms require different tapes to be mounted on one drive. If a tape drive performs poorly with different tape volumes, cleaning and service repair messages or error codes are presented. Similarly, if tape volumes continue to perform poorly on different drives, rewrite or discard-media messages are presented.

There are other SARS algorithms in the 3590 tape drive. A part of SARS has been running on base 3590 tape drives since the first drive shipment in 1995; it requests drive cleaning when necessary and does some checking of hardware performance. SARS has been enabled in base 3590 tape drives that were shipped after January 1999. New 3590 tape drives are being shipped with SARS enabled in the microcode.

Another algorithm in the tape drive is concurrent SARS. This algorithm is run when errors occur in the drive or when some diagnostic tests are run. Concurrent SARS is used to help isolate a problem between the drive and the media.

You can find additional information about SIMs and MIMs in the *Magstar 3590 High Performance Tape Subsystem Introduction and Planning Guide* and the *Magstar 3590 High Performance Tape Subsystem User's Guide*. You can access online versions of these documents at one of the following Web sites:

- <http://www.storage.ibm.com/hardsoft/tape/pubs/pubs3590.html>
- <http://snjInt03.sanjose.ibm.com/rmss/home.nsf/product/main>

What Kinds of Information Does SARS Report?

SARS reports the following kinds of information:

- Degraded media (MIM)
- Bad media (MIM)
- Degraded drive (SIM)
- Bad drive (SIM)
- Preventive maintenance actions needed, such as drive cleaning (SIM)

Why Should I Enable SARS?

SARS messages are helpful in media management, which allows you to remove marginal tape cartridges from the library. SARS messages also indicate degrading tape drive hardware performance, which allows a hardware repair action before the hardware actually fails. This results in improved library performance and higher reliability of the tape subsystem.

What Should I Know Before I Enable SARS?

You need to be aware of the following before you enable SARS by installing the updated 3590 drive microcode:

- SARS is designed to detect the gradual degradation of the performance of media and hardware.
- MIMs from the tape drives are recommendations. It is the responsibility of the software or the customer to take action on the messages. The 3590 drive will not actually write-protect the tape cartridge when a read-only message is presented. VTS and Tivoli Storage Management (formerly ADSTM) products are exceptions to this; they mark the tape as read-only.
- The number of tape cartridges recommended for read-only in VTS and Tivoli Storage Management products may increase temporarily (indicated by an increase in the number of MIM message codes 60).
- As you remove tape cartridges that are performing marginally from the library, the number of read/write errors will decrease. The rate of removal will depend on the tape cycle in the library.
- When a tape cartridge is recommended for read-only status, you will continue to be able to access the data on it.
- You will need to copy the data from read-only tape cartridges, then eject them from the library.
- You will need to follow existing vendor warranty procedures for evaluation and possible replacement of tape cartridges that SARS has marked read-only. For warranty information about IBM tape cartridges, call 1-800-IBM-MEDIA.

How Do I Configure SARS?

SIMs and MIMs can be reported multiple times. A drive configuration option allows SARS to report the same SIM or MIM more than once. The time between repeat SIMs and MIMs is eight hours. A SIM will be reported when an error occurs, and it will be repeated eight hours later. Then it will be repeated for the last time eight hours later. The default option is to not repeat SIMs and MIMs.

The SARS reporting of SIMs and MIMs can be disabled if your host software does not support SIMs and MIMs.

Depending on your software, you may be able to select the SIMs and MIMs that you want SARS to report. For example, you may want to see only the *acute severity* SIMs and MIMs, or you may prefer to see all SIMs and MIMs that SARS sends to the host. Software configuration options and drive configuration allow you to filter SIMs and MIMs by *severity code*.

SIM Severity Codes

The SIM severity codes are:

- Severity 0 code indicates that the tape drive requires service, but normal operation is not affected.
- Severity 1 code indicates that the problem is moderate. The tape drive is operating in a degraded condition.
- Severity 2 code indicates that the problem is serious. The tape drive is operating in a degraded condition.
- Severity 3 code indicates that the problem is acute. The tape drive requires immediate service attention.

MIM Severity Codes

The MIM severity codes are:

- Severity 1 code indicates that *high temporary read or write* errors occurred (moderate severity).
- Severity 2 code indicates that *permanent read or write* errors occurred (serious severity).
- Severity 3 code indicates that *tape directory* errors occurred (acute severity).

What Is a Service Information Message (SIM)?

A SIM alerts you that an abnormal operational condition in a 3590 or 3570 tape drive requires service attention. Information in the SIM identifies the affected drive, the failing component, the severity of the fault condition, and the expected operational impact of the pending service action. A SIM is a SCSI Log Sense page (see Figure 1 for a graphic view of the SIM format). This information helps you to initiate and expedite the appropriate recovery and service procedures in order to restore normal operation with maximum efficiency and minimal disruption.

A SIM contains the machine type, machine serial number, and Field Replaceable Unit (FRU), which allows the dispatch of the appropriate service personnel, along with the replacement parts required to correct the machine fault. This improves service response time and reduces the time required for machine repair. A SIM also contains a severity code, which allows you to determine the urgency of the problem and a service message, which advises you of the service impact.

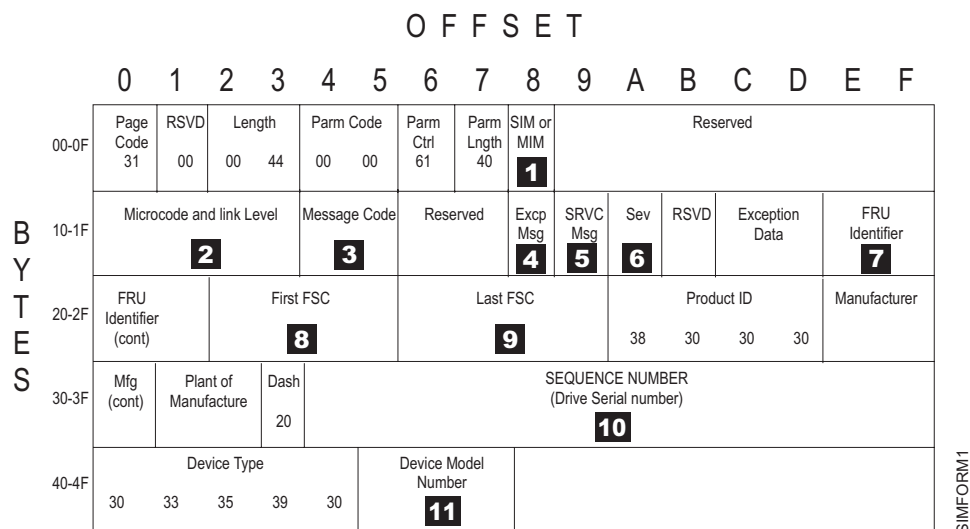


Figure 1. SIM Format

- **1** SIM or MIM: 00 = No SIM or MIM present, 01 = **SIM** present, 02 = MIM present
- **2** Microcode and Link Level
- **3** Message Code: See Table 1 on page 5.
- **4** Excp Msg (Exception Message): See “SIM Exception Messages” on page 43.
- **5** SRVC Msg (Service Message): See “SIM Service Messages” on page 44.
- **6** Sev (Severity): See “SIM Severity Codes” on page 3.
- **7**, **8**, and **9** are presented in hex. Use the conversion chart in Table 17 on page 36.
- **10** SEQUENCE NUMBER (Drive Serial Number)
- **11** Device Model Number: 423141 = B1A (No ACF), 423131 = B11 (ACF), 443141 = E1A (No ACF), 443131 = E11 (ACF)

What Are the SIM Message Codes?

Table 1 shows the hex and ASCII forms and a description of the SIM message codes.

Table 1. SIM Message Code Descriptions

Message Code (Hex)	Message Code (ASCII)	Description
3030	00	No Message: This is the default message indicating that the device does not have an error to report.
3430	40	Operator Intervention Required: An operator action is required at the device. For example, a magazine is full and needs to be replaced or emptied. Check the device error log for possible repair action.
3431	41	Device Degraded: The device is performing in a degraded state but can be used. A FID is displayed with the error message. Check the device error log for possible repair action.
3432	42	Device Hardware Failure: The device can not be used. A FID is displayed with the error message. Check the device error log for possible repair action.
3433	43	Service Circuits Failed, Operations not Affected: This error does not affect the performance of the device. The failure affects only circuits used for non-operational testing. A FID is displayed with the error message. Check the device error log for possible repair action.
3535	55	Clean Device: Load a cleaning cartridge in the device. The drive returns the cleaning cartridge following the cleaning procedure.
3537	57	Device has been cleaned: A cleaning cartridge has cleaned the drive.

What Is a Media Information Message (MIM)?

A MIM alerts you that an abnormal condition in a media (tape) volume requires your attention. Information in the MIM identifies the tape that has the abnormal condition. A MIM is a SCSI Log Sense page (see Figure 2 for a graphic view of the MIM format).

A MIM contains the volume serial number of the *bad* tape and specifies what is wrong with the tape. This allows you to do maintenance within the tape library and to prevent unnecessary service calls due to the tape.

		O F F S E T															
		0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
B Y T E S	00-0F	Page Code 31	RSVD 00	Length 00 44	Parm Code 00 00	Parm Ctrl 61	Parm Lngth 40	SIM or MIM 1		Reserved							
	10-1F	Microcode and link Level 2			Message Code 3	Engineering Data		Excp Msg 4	SRVC Msg 5	Sev 6	Reserved			First FSC 7			
	20-2F	First FSC (cont)	VOLSER (Volume Serial Number) 8				Valid Flag 9	RSVD	Product ID 38 30 30 30			Manufacturer					
	30-3F	Mfg (cont)	Plant of Manufacture	Dash 20	SEQUENCE NUMBER (Drive Serial number) 10												
	40-4F	Device Type 30 33 35 39 30				Device Model Number 11											

MIMFORMAT

Figure 2. MIM Format

- **1** SIM or MIM: 00 = No SIM or MIM present, 01 = SIM present, 02 = **MIM** present
- **2** Microcode and Link Level
- **3** Message Code: See Table 2 on page 7.
- **4** Excp Msg (Exception Message): See “MIM Exception Messages” on page 45.
- **5** SRVC Msg (Service Message)
- **6** Sev (Severity): See “MIM Severity Codes” on page 3.
- **7** First FSC: Engineering data
- **8** VOLSER (Volume Serial Number)
- **9** Valid Flag: 00 = VOLSER not valid, 01 = VOLSER valid
- **10** SEQUENCE NUMBER (Drive Serial Number)
- **11** Device Model Number: 423141 = B1A (No ACF), 423131 = B11 (ACF), 443141 = E1A (No ACF), 443131 = E11 (ACF)

What Are the MIM Message Codes?

Table 2 shows the hex and ASCII forms and a description of the MIM message codes.

Table 2. MIM Message Code Descriptions

Message Code (Hex)	Message Code (ASCII)	Description
3630	60	Bad Media, Read-Only Permitted: The tape drive will not actually write-protect the cartridge when this message code is presented. If you want to write to the data on this tape, it is recommended that you first copy the data to another tape cartridge. Then, remove this tape cartridge from the library.
3631	61	Rewrite Data if Possible: The data on the tape cartridge is degraded. Attempt to copy the data to a new tape cartridge or rewrite the data.
3632	62	Read Data if Possible: The tape directory is degraded. Attempt to read the tape to rebuild the tape directory.
3634	64	Bad Media, Cannot Read or Write: Remove the tape cartridge from the library. Data is likely lost without special tools to recover it.
3732	72	Replace Cleaner Cartridge: Order a new cleaner cartridge (3570 drives only).

How Do My Operating System and Software Relate to SARS Reporting?

Table 3 shows the relationship of SARS to the various operating systems.

Table 3. SARS Reporting

Operating System	SIM/MIM Detection	SIM/MIM Logging	Customer Messages
VM, VSE, MVS (3490 Emulation Mode)	Yes	ERA 48	Customer Console Messages
VM, VSE, MVS (3590 Native Mode)	Yes	Sense Format 70 and 71	Customer Console Messages
RS/6000®	Yes ¹	Yes ²	Available with Tivoli Storage Manager
AS/400®	Yes/No ³	No	Available with Tivoli Storage Manager
Sun	No	No	
HP-UX	No	No	
Windows NT	Yes ¹	No	Available with Tivoli Storage Manager

1. With IBM® Device Driver
2. The Atape 4.6.2.0 device driver logs the SIM and MIM codes when an application, such as Tivoli Storage Manager, issues the Log Sense *ioctl*.
3. New versions of AS/400 tape device driver do not support SIM and MIM.

What Should I Do When a Tape Drive Posts SIMs and MIMs?

When a tape drive posts SIMs and MIMs, do the following:

1. Record the SIM or MIM that the tape drive posted.
2. When the tape drive posts a MIM, do not eject the tape cartridge during a production run; the time required for the copy and eject process could adversely affect your library's performance depending upon utilization.
3. If the tape drive posts a SIM, call your service representative. If the tape drive posts a MIM, use the MIM message to determine the appropriate action.

For example, in the case of a MIM message code, you may be advised to find the code in Table 2 on page 7 and take the action shown under **Description**.

Example of a MIM

```
09.36.07 *IEA486E 1B90,TVOL,SERIOUS ALERT,VOLUME=CS5643, S=D, MC=F0,  
E=7,RC=6033-0130-23
```

Chapter 2. Working with SARS Information from Your Host

Message Presentation

Tivoli Storage Manager (formerly ADSM)

There are different messages publications for different releases of Tivoli Storage Manager. For V3R1, refer to *Tivoli ADSM V3R1 Messages*. For V3R7, refer to *Tivoli Storage Manager Messages*.

Tivoli Storage Manager will issue to its console window and to its “activity log” the messages ANR8830E, ANR8831W, and ANR8972E only if the drive diagnostic tests report certain SIM or MIM codes. You can specify how long to retain the activity log. Tivoli Storage Manager will issue the above messages only for storage pool volumes. Follow the recommendations in the user response sections for the messages.

For more information on messages ANR8830E, ANR8831W, and ANR8972E, refer to the publications referenced above. Alternatively, at the Tivoli Storage Manager command prompt, type **help <message number>**.

Refer to the Tivoli Storage Manager Administrator's Guide or Administrator's Reference for your platform (see “Tivoli Storage Manager (formerly ADSM)” on page viii) for more information on how to manage and query the Tivoli Storage Manager activity log, how to move data to another volume, and how to properly check out cartridges from the Tivoli Storage Manager.

This information is valid for the Tivoli Storage Manager server on the AIX® and Windows NT platforms. This information is not valid for the Tivoli Storage Manager server on the SUN and HP-UX platforms. The Tivoli Storage Manager servers on the AS/400, MVS, VM, and VSE platforms do not interface with the devices directly.

Tivoli Storage Manager SIM Presentation

This is an example of a 3590 SIM on the Tivoli Storage Manager console window:

ANR8972E Unrecoverable drive failures on drive RMTxxx; drive is now taken offline.

Tivoli Storage Manager MIM Presentation

These are examples of 3590 MIMs on the Tivoli Storage Manager console window:

ANR8830E Internal 3590 drive diagnostics detect excessive media failures for volume XXXXX. Access mode is now set to “read-only”.

ANR8831W Because of media errors for volume XXXXX, data should be removed as soon as possible.

OS/390 (MVS) SIM Presentation

The following text is the message format for a 3590 drive SIM console message:

IEA480E dddd, TAPE, type-mod, severity ALERT, SER=mmpp-ssss, MC=F2, ES=es, ID=id, REF=60ff-eeee-eeee, UM=uuuu-uuuu-uuuu, (CLEAN, CLEAN/SERVICE, CLEANED), REPEATED.

Table 4 defines the lower case fields of the console message.

Table 4. ESCON® Device SIM

Message Code Abbreviation	Description
dddd	Device number from subchannel
type-mod	DEV TYPE/MODEL
severity	SEVERITY: SERVICE, MODERATE, SERIOUS, ACUTE
mmpp-ssss	Drive serial number
es	EXCEPTION MESSAGE CODE, SERVICE MESSAGE CODE
id	Identifier of the SIM in the control unit internal SIM log
ff	FID code for service organization
eeee-eeee	Engineering data for service organization
uuuu-uuuu-uuuu	Engineering data for service organization
CLEAN, CLEAN/SERVICE, CLEANED	Displayed if device requested a clean for usage reasons, a clean for performance reasons, or if a cleaner tape was processed
REPEATED	Displayed if the SIM was reported previously

This is an example of a device SIM console message for a 3590 High Performance Cartridge Tape with 128 tracks:

```
07.19.24 *IEA480E 1B91,TAPE,3590-B11,ACUTE ALERT SER=0113-00018,
MC=F2,ES=77, ID=25, REF=60E4-3630-3335 UM=32D5-19CF-8001
```

OS/390 (MVS) MIM Presentation

The following text is the message format for a MIM console message:

IEA486E dddd, TVOL, severity ALERT, VOLUME=valid, S=s, MC=F0, E=e, RC=mcee-mmmm-tt, REPEATED.

Table 5 defines the lower case fields of the console message.

Table 5. ESCON MIM

Message Code Abbreviation	Description
dddd	Device number from subchannel
severity	SEVERITY: SERVICE, MODERATE, SERIOUS, ACUTE
valid	Volume serial number (if available)
s	Valid source
e	EXCEPTION MESSAGE CODE
mc	MIM message code (see Table 2 on page 7)
ee	Engineering data
mmmm	Set to 0130 for 3590 High Performance Cartridge Tape
tt	Set to 23 for 128-track tapes; set to 24 for 256-track tapes
REPEATED	Displayed if the MIM was reported previously

This is an example of a MIM console message for a 3590 High Performance Cartridge Tape with 128 tracks:

```
09.36.07 *IEA486E 1B90,TVOL,SERIOUS ALERT,VOLUME=CS5643, S=D, MC=F0, E=7,RC=6033-0130-23
```

VM/ESA[®] SIM/MIM Presentation (3490 Emulation Mode)

Tape devices in 3490 emulation mode do not get system messages. SIMs and MIMs are only logged in logrec. Use EREP to find the associated sense data. Use the “Using ES/9000 with 3490 Emulation Mode” on page 21 section to interpret the EREP data.

VM/ESA[®] SIM Presentation (3590 Native Mode)

In VM/ESA, SIMs are presented as HCP6359I messages. To view the message content, log on to VM, then on the VM command line, type **help <message number>**, where xxxx is the message number.

The following text is the message format for a VM/ESA SIM:

HCP6359I dddd, TAPE, typ-mod, severity ALERT, SER=mmpp-sssss, MC=F2, ES=es, REF=60ff-eeee-eeee

This message indicates that the tape storage subsystem has detected an abnormal operational condition in a tape drive, which requires service attention.

Table 6 defines the lower case fields of the SIM.

Table 6. VM/ESA SIM

Message Code Abbreviation	Description
dddd	The device reporting this condition
typ-mod	Determined from common sense format, byte 31: machine type and model number (ttt-mmm); if there is only one model, the hyphen (-) and the model field (mod) may not be shown.
severity	Determined from sense format 70, byte 9 (0–1): SERVICE, MODERATE, SERIOUS, or ACUTE. The interpretation of <i>severity</i> is given in the note below.
mmpp-sssss	Determined from common sense format, bytes 25–29: manufacturer (mm), plant of manufacture (pp), and machine sequence number (sssss).
es	Determined from sense format 71, byte 8 (0–3): exception message code (e), and byte 8 (4–7): service message code (s). These fields are displayed as hexadecimal digits.
ff	FID code for service organization.
eeee-eeee	Engineering data for service organization. These fields are displayed as hexadecimal digits.

Note: The interpretation of *severity* is:

SERVICE

No performance impact

MODERATE

Degraded operation, high temporary error rate

SERIOUS

Degraded operation, no loss of device accessibility

ACUTE

Loss of device accessibility

System Action: System operation continues.

Operator Response: Record all of the information displayed in this message and contact your system support personnel.

Programmer Response: Examine the EREP records (OBR) for additional details of the failure. Refer to the hardware System Reference Library (SRL) manuals for sense data formats and descriptions. If a hardware problem is indicated, contact the appropriate hardware service representative and provide the information displayed in this message.

VM/ESA MIM Presentation (3590 Native Mode)

In VM/ESA, MIMs are presented as HCP6357I messages. To view the message content, log on to VM, then on the VM command line, type **help <message number>**, where xxxx is the message number.

The following text is the message format for a VM/ESA MIM:

HCP6357I dddd, TVOL, severity ALERT, VOLUME=valid, MC=F0, ES=es, RC=ee-mmmm-tt

This message indicates that the tape storage subsystem has detected an abnormal operational condition in a tape cartridge, which requires service attention.

Table 7 defines the lower case fields of the MIM.

Table 7. VM/ESA MIM

Message Code Abbreviation	Description
dddd	The device reporting this condition
severity	MODERATE, SERIOUS, or ACUTE. The interpretation of <i>severity</i> is given in the note below.
valid	Determined from sense format 70, bytes 16–21, volume ID. This field may be all blanks when the volume ID is unknown to the I/O system.
es	EXCEPTION MESSAGE CODE, SERVICE MESSAGE CODE
ee	Engineering data
mmmm	Set to 0130 for 3590 High Performance Cartridge Tape
tt	Set to 23 for 128-track tapes; set to 24 for 256-track tapes

Note: The interpretation of *severity* is:

MODERATE

High temporary read/write errors detected

SERIOUS

Permanent read/write errors detected

ACUTE

Block 0 error (possible VOL1 label error), length error, or severe Volume Control Region error

System Action: System operation continues.

Operator Response: Record all of the information displayed in this message and contact your system support personnel.

Programmer Response: Examine the EREP records (OBR) for additional details of the failure. Find the associated sense format 70 message. Use the “Using ES/9000 with 3590 Native Mode” on page 26 section to interpret the EREP report. Follow the recommended action for the MIM.

VSE/ESA™ SIM/MIM Presentation (3490 Emulation Mode)

In VSE/ESA where 3590 drives emulate 3490 drives, SIMs and MIMs are presented as 0P20xx messages. Use the reported SNS data and Table 11 on page 21 or Table 12 on page 24 to interpret the SIM or the MIM. Also, use EREP to create SIM and MIM reports as needed.

0P20t o RECOVY ERR

Explanation: VSE was not able to execute normal error recovery procedures. The system encountered the error condition during device recovery. Possible causes include:

- A program page needed for error recovery is not in storage.
- An I/O error occurred during an operation that an error-recovery routine started.

If this message occurs during tape error recovery (but not during OPEN processing), the status and sense information shows the error that caused the tape-error recovery procedure to be started. If the message occurs while tape recovery was needed for OPEN processing, the status and sense information may show a second failure. This is probably a device error.

Programmer Response: Check your program for a PFREE macro issued too early when using EXCP without CCW translation by the system. If the message recurs, contact your service representative.

Operator Response: If the SNS data indicates a SIM or a MIM, use Table 11 on page 21 or Table 12 on page 24 to interpret the SIM or the MIM. Also, run an EREP report for the SIM or MIM as needed.

Table 8 defines the operator and system actions, which depend on the type (“t”) and operator (“o”) code contained in the message.

Table 8 also lists possible combinations of type (“t”) and operator (“o”) codes for 0Pxx messages. Table entries refer to explanatory notes, as applicable.

Table 8. 0Pxxx Operator and System Information

Type Code (t)	Operator Code (o)	For An Operator Response Of			
		RETRY	IGNORE	CANCEL	END/ENTER
A	_ (Note 1)	Invalid	Invalid	Invalid	Invalid
I	P (Note 2)	Invalid	Invalid	Invalid	Invalid
I	C (Note 3)	Invalid	Invalid	Invalid	Invalid
I	I (Note 4)	Invalid	Invalid	Invalid	Invalid
I	R (Note 5)	Invalid	Invalid	Invalid	Invalid
D	I	Invalid	Note 6	Note 6	Invalid
D	IR	Notes 6, 7	Note 6	Note 6	Note 7
D	R (Note 4)	Notes 6, 7	Invalid	Note 6	Note 7

Notes:

1. Perform the recovery procedure appropriate for the error condition, then make the device ready. If this is unsuccessful, use CANCEL cuu as described in *VSE/ESA V2R4.0 Operation*.
2. The error is posted to the program and processing continues. The task may request a CANCEL due to the posted error.

3. The job is canceled.
4. The error occurred after the requesting task had been posted, thus the task is missing this error information. No recovery action is initiated.
5. The operation causing the error is retried.
6. System actions depend on the task and processing options set in the CCB (or IORB). A reply of IGNORE causes the error to be ignored; the error data is posted to the program, and processing continues. IGNORE may leave destructed data. A reply of CANCEL will either cause the task to be canceled or a Disaster Error will be posted to the task.
7. A reply of RETRY or END/ENTER causes the operation to be retried.

Additional Machine Information: For most 0Pxxt messages, more machine information prints immediately following. Below you see an example of this information, and the information fields are listed and explained.

```
BG 0P15D R SEEK CHECK SYS011=132 CCSW=3110007A100E000005 CCB=0079C0
SK=0000015C000E SNS=00080040
```

This message occurred in cylinder X'015C' (which is 348 decimal) and in head X'000E' (which is 14 decimal).

SYSxxx=nnn

xxx is the logical unit, and nnn is the cuu address of the involved I/O device. If the CCB (or IORB) is not accessible, the system prints SYSXXX. The system prints SYSCTL or SYSLIB when it either dynamically assigns a logical unit to execute an I/O command, or when it uses physical addressing.

CCSW=channel status word

This is a hexadecimal character string whose first two characters are the command code of the failing CCW. These characters are 00 if the CCW address is no longer accessible. If the CCW address in the CSW is 0 and the CCB address is not 0, then the error occurred in a CCW that was pre-chained to the user's channel program by the supervisor.

CCB=command control block address

This is the hexadecimal address of the affected CCB or IORB in the affected program. This value is zero if no address is available due to the task having been posted.

SK=seek address

This is the hexadecimal seek address in the form 0000CCCCHHHH of the track where the error occurred if a CKD disk device was involved. This value is unpredictable if no CCB (or IORB) is available. In the seek address, CCCC represents the cylinder number and HHHH represents the head number.

SNS=sense bytes

This is the (hexadecimal) sense information returned by the erroneous device in case a unit check occurred. No bytes are shown if no sense information was present at the time of the error. The number of sense bytes varies according to the device type.

For a virtual disk, bytes 22 and 23 may display a fault symptom code. These codes are described in the Appendix section of *VSE/ESA V2R1.0 Extended Addressability*.

PAGE=page count

This is the IBM 3800 page backup count, the decimal equivalent of the values in sense bytes 20 and 21, indicating how many pages the system

must back up to recover all pages in the page buffer, on the drum, and in the paper line between the transfer and fuser stations. Each full page from the system increases this count by one. As the last copy of a page passes the fuser, the count decreases by one. Increase this count by the number of pages to be recovered (for example, those that might wrap around the hot roll).

PBN=physical block number

This is the four-byte hexadecimal number of the block causing the error on an FBA disk device. This value is zeros if no block number can be retrieved.

VSE/ESA SIM Presentation (3590 Native Mode)

0P64I o MAINT REQD

In VSE/ESA, SIMs are presented as **0P64I o** messages.

Explanation: The device has detected that it, or the subsystem containing it, requires maintenance. The device continues to be operational but possibly with reduced performance or reliability. The problem may affect multiple devices or all the devices in the subsystem. If the device indicated in the message is a TPA tape or disk device, it reported this via a Service Information Message (SIM) unit check.

Programmer Response: Schedule maintenance for the affected subsystem. Have EREP reports available. If the device is a TPA tape or a disk device, the Service Information Messages report contains the required information about this problem.

Operator Response: Record all of the information displayed in this message and contact your system support personnel.

VSE/ESA MIM Presentation (3590 Native Mode)

0P65I o MEDIA ERR

In VSE/ESA, MIMs are presented as **0P65I o** messages.

Explanation: If the device indicated in the message is a tape device, one of the following has occurred:

- If the device indicated in the message is a TPA tape, a MIM has been presented from the control unit. MIMs are used to indicate the need to perform certain media-maintenance procedures.
- The device has detected defective media on the volume just unloaded. This may cause reduced performance and reliability in the future. You may be able to solve the problem by copying the data to another volume. For a more detailed description of the condition, refer to the sense data and the related device manuals.
- The volume just loaded cannot be used safely because it contains too little or too much tape. If it contains too little tape, the device may rip the tape from the hub. If it contains too much tape, the take-up reel in the device may not hold all the tape and thus cause damage to the volume or to the device. The device will not allow writing on this tape but will allow reading at the user's risk.

This message is purely informational. No I/O device has failed.

Programmer Response: If the device indicated in the message is a tape device:

- If the device indicated in the message is a TPA tape device, have EREP reports available. The MIM report contains the required information about this problem.
- In the case of another device, you may want to copy the data on the volume just loaded or unloaded to another volume. Further, you may want to discard the volume on which the error occurred. Refer to the device manuals for more information.

Operator Response: None. No job has been affected.

Transaction Processing Facility (TPF) SIM/MIM Presentation (3490 Emulation Mode)

Tape devices in 3490 emulation mode do not get system messages. SIMs and MIMs are only logged in logrec. Use EREP to find the associated sense data. Use the “Using ES/9000 with 3490 Emulation Mode” on page 21 section to interpret the EREP data.

TPF SIM Presentation (3590 Native Mode)

Note: To access the complete message explanation, see *TPF V4R1 Messages*, “Chapter 3. Online Messages”.

The following MIM messages can appear, depending on the severity of the MIM:

CEFR0354I *CP* nnnn DEVICE SERVICE INFORMATION MESSAGE FOR DEVICE cuu
SEVERITY - SERVICE. REFERENCE CODES - rc1 - rc2 - rc3

CEFR0355W *CP* nnnn DEVICE SERVICE INFORMATION MESSAGE FOR DEVICE cuu
SEVERITY - MODERATE. REFERENCE CODES - rc1 - rc2 - rc3

CEFR0356W *CP* nnnn DEVICE SERVICE INFORMATION MESSAGE FOR DEVICE cuu
SEVERITY - SERIOUS. REFERENCE CODES - rc1 - rc2 - rc3

CCEFR0357E *CP* nnnn DEVICE SERVICE INFORMATION MESSAGE FOR DEVICE cuu
SEVERITY - ACUTE. REFERENCE CODES - rc1 - rc2 - rc3

Table 9 defines the lower case fields of the SIM.

Table 9. TPF SIM

Message Code Abbreviation	Description
nnnn	The subsystem user (SSU) name or the basic subsystem (BSS) name
cuu	The device address
rc1 - rc2 - rc3	The reference codes that specify which actions to take

Explanation: A hardware or licensed internal code error, incompatibility condition, or required maintenance condition has been detected for the specified device. Service severity indicates that there is no impact to performance. Moderate severity indicates degraded operation because of a high temporary error rate. Serious severity indicates that although device operation has been degraded, both the cartridge and the data are still accessible. Acute severity indicates that the cartridge and the data are no longer accessible.

System Response: The I/O operation ends with a permanent error.

Operator Response: Call your service representative and provide the indicated reference codes to determine which actions, if any, you must take.

TPF MIM Presentation (3590 Native Mode)

Note: To access the complete message explanation, see *TPF V4R1 Messages*, “Chapter 3. Online Messages”.

The following MIM messages can appear, depending on the severity of the MIM:

CEFR0347W *CP* nnnn MEDIUM INFORMATION MESSAGE FOR VOLUME ON DEVICE cuu
SEVERITY - MODERATE. REFERENCE MEDIA MAINTENANCE PROCEDURE - mm

CEFR0348W *CP* nnnn MEDIUM INFORMATION MESSAGE FOR VOLUME ON DEVICE cuu
SEVERITY - SERIOUS. REFERENCE MEDIA MAINTENANCE PROCEDURE - mm

CEFR0349E *CP* nnnn MEDIUM INFORMATION MESSAGE FOR VOLUME ON DEVICE cuu
SEVERITY - ACUTE. REFERENCE MEDIA MAINTENANCE PROCEDURE - mm

Table 10 defines the lower case fields of the MIM.

Table 10. TPF MIM

Message Code Abbreviation	Description
nnnn	The subsystem user (SSU) name or the basic subsystem (BSS) name
cuu	The device address
mm	The media maintenance procedure to which to refer

Explanation: A medium error or exception has been detected for the volume loaded on the specified device. Moderate severity indicates that a high number of temporary read errors, write errors, or both were detected. Serious severity indicates that permanent read errors or write errors were detected. Acute severity indicates that a VOL1 label, length, or severe volume control region error was detected.

System Response: The I/O operation ends with a permanent error.

Operator Response: Use EREP to find the associated sense format 70 message. Find the MIM Message Code in the sense data using Table 16 on page 33 and follow the recommended action.

S/390 Service Director/2 (SD/2) SIM Presentation (3490 Emulation Mode)

Note: When the drive is in 3490 emulation mode, the service director supports only SIMs.

From the SD/2 main menu, do the following:

1. Select the **Events** option.
2. Select the **3480/3490** option.
3. Select the **Events** option.
4. Select the **3480/3490 Events** option.
5. Select the **SIMs** option.
6. Select the desired SIM from the listing.
7. Double click the left mouse button for a detailed display.

S/390 SD/2 SIM Presentation (3590 Native Mode)

Note: When the drive is in 3590 native mode, the service director for MVS, VM, and VSE supports both SIMs and MIMs.

From the SD/2 main menu, do the following:

1. Select the **Events** option.
2. Select the **3590** option.
3. Select the **Hardware** option.
4. Select the **Events** option.
5. Select the desired SIM from the listing.
6. Double click the left mouse button for a detailed display.

S/390 SD/2 MIM Presentation (3590 Native Mode)

Note: When the drive is in 3590 native mode, the service director for MVS, VM, and VSE supports both SIMs and MIMs.

From the SD/2 main menu, do the following:

1. Select the **Events** option.
2. Select the **3590** option.
3. Select the **Media** option.
4. Select the **MIMs** option. All available information is displayed.

Platforms

Using ES/9000 with 3490 Emulation Mode

The following applies to OS/390, VM/ESA, VSE/ESA.

Logrec is the repository of information. Use the EREP tool to access the information. See *Environmental Record Editing and Printing Program (EREP) User's Guide and Reference* for more detailed information.

ES/9000® EREP Reports for ERA 48

SIM Sense Bytes: For SIM sense bytes (sense format 71), use byte 11 to obtain the SIM Message Code. Then, perform the recommended action.

Table 11 shows the meaning of the SIM sense bytes.

Table 11. SIM Sense Bytes

0-7 Common Sense Bytes													
Byte	Meaning												
0	Flags 0												
1	Flags 1												
2	<table><thead><tr><th>Bit</th><th>Description</th></tr></thead><tbody><tr><td>0-1</td><td>Basic Recovery Action (BRAC) 1 Continue 2 Reissue</td></tr><tr><td>2-4</td><td>Logging Code (LC) 3 A3</td></tr><tr><td>5</td><td>VLF active</td></tr><tr><td>6</td><td>Synchronous transfer mode</td></tr><tr><td>7</td><td>Medium positioning</td></tr></tbody></table>	Bit	Description	0-1	Basic Recovery Action (BRAC) 1 Continue 2 Reissue	2-4	Logging Code (LC) 3 A3	5	VLF active	6	Synchronous transfer mode	7	Medium positioning
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3	Error Recovery Action (ERA) 48 Unsolicited informational data												
4-5	Reason Code (RC) – Reason Qualifier Code (RQC) 11-01 I/O-Subsystem SIM 11-02 Device SIM												
6	Message Code (MC) F1 I/O-Subsystem SIM F2 Device SIM												
7	Sense Format 71 SIM Sense												

Table 11. SIM Sense Bytes (continued)

8-22 Format Dependent Sense Bytes																																																																																																								
Byte	I/O-Subsystem SIM Sense (Message Code=F1) Meaning	Device SIM Sense (Message Code=F2) Meaning																																																																																																						
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6	DV exception on tape path																																																																																																							
7	DV exception in drive																																																																																																							
8	DV preventive maintenance required																																																																																																							
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8-9	Report Severity																																																																																																							
0	Service																																																																																																							
1	Moderate																																																																																																							
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15	Message Data Flag																																																																																																							

Table 11. SIM Sense Bytes (continued)

10–12	<p>Message Data Reserved, set to X'000000'</p>	<p>Byte</p> <p>10 Exception Data xx 11 SIM Message Code</p> <p>Value (ASCII)</p> <table border="1"> <thead> <tr> <th>Value</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>00</td> <td>No message</td> </tr> <tr> <td>41</td> <td>Device degraded, call for service</td> </tr> <tr> <td>42</td> <td>Device hardware failure, call for service</td> </tr> <tr> <td>43</td> <td>Service circuits failed, operations not affected, call for service</td> </tr> <tr> <td>55</td> <td>Drive needs cleaning: load cleaning cartridge</td> </tr> <tr> <td>57</td> <td>Drive cleaning complete: cleaning cartridge ejected</td> </tr> </tbody> </table> <p>12 Reserved, set to X'00'</p>	Value	Description	00	No message	41	Device degraded, call for service	42	Device hardware failure, call for service	43	Service circuits failed, operations not affected, call for service	55	Drive needs cleaning: load cleaning cartridge	57	Drive cleaning complete: cleaning cartridge ejected
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57	Drive cleaning complete: cleaning cartridge ejected															
13	<p>SIM Identifier This field contains the same value when a SIM is presented more than once and can be used in interactions with the product during maintenance activities.</p>	<p>SIM Identifier This field contains the same value when a SIM is presented more than once and can be used in interactions with the product during maintenance activities.</p>														
14–15	<p>Unit Modifier Reserved, set to X'0000'</p>	<p>Unit Modifier Expert Systems Data from Log Page 31, bytes 16–19 (ASCII->HEX)</p>														
16–17	<p>REF Code 1</p> <table border="1"> <thead> <tr> <th>Bit</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>0–2</td> <td>SIM Type B'000' Hardware, non-encoded SRN (HDWE) B'001' Hardware, encoded POST error (EPOST) (future) B'111' Microcode-detected error (MDE)</td> </tr> <tr> <td>3–15</td> <td>Reserved (used for encoded POST errors in the future)</td> </tr> </tbody> </table>	Bit	Description	0–2	SIM Type B'000' Hardware, non-encoded SRN (HDWE) B'001' Hardware, encoded POST error (EPOST) (future) B'111' Microcode-detected error (MDE)	3–15	Reserved (used for encoded POST errors in the future)	<p>REF Code 1</p> <table border="1"> <thead> <tr> <th>Bit</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>0–2</td> <td>SIM Type B'011' Device SIM</td> </tr> <tr> <td>3–7</td> <td>Reserved</td> </tr> <tr> <td>8–15</td> <td>FRU Identifier (FID)</td> </tr> </tbody> </table>	Bit	Description	0–2	SIM Type B'011' Device SIM	3–7	Reserved	8–15	FRU Identifier (FID)
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18–19	<p>REF Code 2</p> <table border="1"> <thead> <tr> <th>HDWE SIM Type</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td></td> <td>Bits 0–7 are set to X'00'; bits 8–15 are set to the first two digits of SRN.</td> </tr> <tr> <th>MDE SIM Type</th> <th>Description</th> </tr> <tr> <td></td> <td>Bits 0–15 are set to the CU MDE code.</td> </tr> </tbody> </table>	HDWE SIM Type	Description		Bits 0–7 are set to X'00'; bits 8–15 are set to the first two digits of SRN.	MDE SIM Type	Description		Bits 0–15 are set to the CU MDE code.	<p>REF Code 2 For device SIMs, this value will be set to the first FSC code reported from the device.</p>						
HDWE SIM Type	Description															
	Bits 0–7 are set to X'00'; bits 8–15 are set to the first two digits of SRN.															
MDE SIM Type	Description															
	Bits 0–15 are set to the CU MDE code.															
20–21	<p>REF Code 3</p> <table border="1"> <thead> <tr> <th>HDWE SIM Type</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td></td> <td>Bits 0–15 are set to the last four digits of SRN.</td> </tr> <tr> <th>MDE SIM Type</th> <th>Description</th> </tr> <tr> <td></td> <td>Bits 0–15 contain CU MDE supporting data.</td> </tr> </tbody> </table>	HDWE SIM Type	Description		Bits 0–15 are set to the last four digits of SRN.	MDE SIM Type	Description		Bits 0–15 contain CU MDE supporting data.	<p>REF Code 3 For device SIMs, this value will be set to the last FSC code reported from the device.</p>						
HDWE SIM Type	Description															
	Bits 0–15 are set to the last four digits of SRN.															
MDE SIM Type	Description															
	Bits 0–15 contain CU MDE supporting data.															
22	Reserved	Reserved														

Table 11. SIM Sense Bytes (continued)

23–31 Common Sense Bytes	
Byte	Meaning
23	Flags 3
24	Flags 4
25–26	Product Identifier (MM-PP) (per 3590 specifications in all cases)
27–29	Product Serial (SSSSS) (per 3590 specifications in all cases)
30	CU/Library Type-Model
31	Device Type-Model

MIM Sense Bytes: For MIM sense bytes (sense format 70), use byte 10 to obtain the MIM Message Code. Then, perform the recommended action.

Table 12 shows the meaning of the MIM sense bytes.

Table 12. MIM Sense Bytes

0–7 Common Sense Bytes																			
Byte	Meaning																		
0	Flags 0																		
1	Flags 1																		
2	<table border="0"> <thead> <tr> <th>Bit</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>0–1</td> <td>Basic Recovery Action (BRAC)</td> </tr> <tr> <td>1</td> <td>Continue</td> </tr> <tr> <td>2</td> <td>Reissue</td> </tr> <tr> <td>2–4</td> <td>Logging code (LC)</td> </tr> <tr> <td>3</td> <td>A3</td> </tr> <tr> <td>5</td> <td>VLF active</td> </tr> <tr> <td>6</td> <td>Synchronous transfer mode</td> </tr> <tr> <td>7</td> <td>Medium positioning</td> </tr> </tbody> </table>	Bit	Description	0–1	Basic Recovery Action (BRAC)	1	Continue	2	Reissue	2–4	Logging code (LC)	3	A3	5	VLF active	6	Synchronous transfer mode	7	Medium positioning
Bit	Description																		
0–1	Basic Recovery Action (BRAC)																		
1	Continue																		
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3	A3																		
5	VLF active																		
6	Synchronous transfer mode																		
7	Medium positioning																		
3	Error Recovery Action (ERA)																		
48	Unsolicited informational data																		
4–5	Reason Code (RC) – Reason Qualifier Code (RQC)																		
11–00	MIM																		
6	Message Code (MC)																		
F0	MIM																		
7	Sense Format																		
70	MIM Sense																		

Table 12. MIM Sense Bytes (continued)

8–22 Format Dependent Sense Bytes																																													
8–9	<p>Message Modifier</p> <table border="0"> <thead> <tr> <th style="text-align: left;">Bit</th> <th style="text-align: left;">Description</th> </tr> </thead> <tbody> <tr> <td>0–3</td> <td>Exception Message Code</td> </tr> <tr> <td> 0–1</td> <td>Reserved</td> </tr> <tr> <td> 2</td> <td>Data degraded</td> </tr> <tr> <td> 3</td> <td>Data degraded in partition yyyy</td> </tr> <tr> <td> 4</td> <td>Medium degraded</td> </tr> <tr> <td> 5</td> <td>Medium degraded in partition yyyy</td> </tr> <tr> <td> 6</td> <td>Block 0 error</td> </tr> <tr> <td> 7</td> <td>Medium exception</td> </tr> <tr> <td> 8–F</td> <td>Reserved</td> </tr> <tr> <td></td> <td>Where italicized fields are determined as follows:</td> </tr> <tr> <td></td> <td><i>yyyy</i> Determined from sense format 70, bytes 14–15</td> </tr> <tr> <td>4–7</td> <td>Reserved</td> </tr> <tr> <td>8–9</td> <td>Report severity</td> </tr> <tr> <td> 0</td> <td>Reserved</td> </tr> <tr> <td> 1</td> <td>Moderate</td> </tr> <tr> <td> 2</td> <td>Serious</td> </tr> <tr> <td> 3</td> <td>Acute</td> </tr> <tr> <td>10</td> <td>Repeated Report Presentation: set to 1 if this MIM was reported previously.</td> </tr> <tr> <td>11</td> <td>Message To Operator (MTO): set to 1 if this MIM should be reported to the operator console.</td> </tr> <tr> <td>12–14</td> <td>Reserved</td> </tr> <tr> <td>15</td> <td>Message Data Flag</td> </tr> </tbody> </table>	Bit	Description	0–3	Exception Message Code	0–1	Reserved	2	Data degraded	3	Data degraded in partition yyyy	4	Medium degraded	5	Medium degraded in partition yyyy	6	Block 0 error	7	Medium exception	8–F	Reserved		Where italicized fields are determined as follows:		<i>yyyy</i> Determined from sense format 70, bytes 14–15	4–7	Reserved	8–9	Report severity	0	Reserved	1	Moderate	2	Serious	3	Acute	10	Repeated Report Presentation: set to 1 if this MIM was reported previously.	11	Message To Operator (MTO): set to 1 if this MIM should be reported to the operator console.	12–14	Reserved	15	Message Data Flag
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15	Message Data Flag																																												
10	MIM Message Code (see “What Are the MIM Message Codes?” on page 7 for the meaning).																																												
11	Engineering data																																												
12–13	Medium Identifier (MID) X'0120–013F' Half-inch cartridge tapes																																												
14–15	Medium partition																																												
16–21	Valid This field contains the volume id, in EBCDIC, associated with the reported condition. If the valid is not known or is not reliable, then this field will contain EBCDIC blanks (X'40').																																												
22	Format Identifier X'23' 16X8 (128) track X'24' 16X16 (256) track																																												
23–31 Common Sense Bytes																																													
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Using ES/9000 with 3590 Native Mode

The following applies to OS/390, VM/ESA, VSE/ESA.

Logrec is the repository of information. Use the EREP tool to access the information. See *Environmental Record Editing and Printing Program (EREP) User's Guide and Reference* for more detailed information.

ES/9000 EREP Reports

An example of a SIM EREP report is shown below, as well as a table describing the entries.

See "JCL for Formatting and Printing Formats 70 and 71" on page 30 for an example of JCL input that will cause the Format 70 and 71 reports shown.

SIM EREP Report (Format 71):

```

      1          2
TAPE SERVICE INFORMATION MESSAGES          REPORT DATE 008 99
                                           3
                                           PERIOD FROM 363 98
*****
      4          5          6          7          8
DEVICE-0860 S/N 0113-07780 DATE-007/99 TIME-12:23:58:70 ID=1F
      9          10          11          12          13          14
* ACUTE ALERT D/T-UNKNOWN REF1-60B0 REF2-305D REF3-305D UM-2268
      15
* DV EXCEPTION IN DRIVE
      16
* REPAIR WILL DISABLE ACCESS TO DV

DEVICE-0815 S/N 0113-00094 DATE-007/99 TIME-01:44:53:87 ID=97
* ACUTE ALERT D/T-3590-A00 REF1-E000 REF2-30B7 REF3-0000 UM-0913
* EFFECT OF FAILURE IS UNKNOWN
* REPAIR IMPACT IS UNKNOWN

DEVICE-0860 S/N 0113-07780 DATE-006/99 TIME-08:39:59:40 ID=6C
* SERVICE ALERT D/T-3590-A00 REF1-E000 REF2-8083 REF3-0000 UM-0000
* CU EXCEPTION - NO PERFORMANCE IMPACT
* REPAIR WILL NOT IMPACT CU PERFORMANCE

DEVICE-0864 S/N 0113-03800 DATE-007/99 TIME-08:09:15:67 ID=1B
* SERVICE ALERT D/T-3590-B11 REF1-60FF REF2-C559 REF3-C559 UM-160F
* DV PREVENTIVE MAINTENANCE COMPLETED
* DV CLEANING COMPLETE

DEVICE-0864 S/N 0113-03800 DATE-007/99 TIME-08:11:40:63 ID=19
* SERIOUS ALERT D/T-3590-B11 REF1-60F6 REF2-7038 REF3-7038 UM-160F
* DV PREVENTIVE MAINTENANCE REQUIRED
* SERVICE B
```

DEVICE-0864 S/N 0113-03800 DATE-006/99 TIME-09:12:29:10 ID=1A
* MODERATE ALERT D/T-3590-B11 REF1-60FF REF2-7036 REF3-7036 UM-160F
* DV PREVENTIVE MAINTENANCE REQUIRED
* CLEAN DV

DEVICE-0864 S/N 0113-03800 DATE-008/99 TIME-01:31:18:13 ID=23
* SERIOUS ALERT D/T-3590-A00 REF1-0000 REF2-0089 REF3-0109 UM-0913
* EFFECT OF FAILURE IS UNKNOWN
* REPAIR IMPACT IS UNKNOWN

DEVICE-0865 S/N 0113-03800 DATE-007/99 TIME-16:51:25:88 ID=21
* ACUTE ALERT D/T-3590-B11 REF1-60E5 REF2-9999 REF3-DECC UM-160F
* DV EXCEPTION IN DRIVE
* REPAIR WILL DISABLE ACCESS TO DV

DEVICE-0866 S/N 0113-03800 DATE-007/99 TIME-13:41:18:85 ID=1F
* SERIOUS ALERT D/T-3590-B11 REF1-6004 REF2-305C REF3-305C UM-17BF
* DV EXCEPTION IN DRIVE
* REPAIR WILL DISABLE ACCESS TO DV

DEVICE-0867 S/N 0113-03800 DATE-007/99 TIME-05:31:00:66 ID=1D
* ACUTE ALERT D/T-3590-B11 REF1-60A8 REF2-0053 REF3-0053 UM-17BF
* DV EXCEPTION IN DRIVE
* REPAIR WILL DISABLE ACCESS TO DV

DEVICE-0892 S/N 0113-DD*02 DATE-007/99 TIME-03:52:39:74 ID=69
* SERVICE ALERT D/T-3590-B1A REF1-60B9 REF2-311A REF3-311A UM-27BF
* DV EXCEPTION IN DRIVE
* REPAIR WILL DISABLE ACCESS TO DV

DEVICE-1746 S/N 0113-00052 DATE-007/99 TIME-09:45:46:50 ID=0D
* SERIOUS ALERT D/T-3590-B1A REF1-6004 REF2-305C REF3-305C UM-27BF
* DV EXCEPTION IN DRIVE
* REPAIR WILL DISABLE ACCESS TO DV

Table 13 shows an explanation of each of the numbered fields shown in “SIM EREP Report (Format 71)” on page 26.

Table 13. ESCON Service Information Message (SIM) Format Description

Numbered Fields	Field Explanation
1	Type of EREP report - SIM
2	Julian date on which the report ran
3	Julian date of the earliest record
4	The four hexadecimal digits of the control unit address
5	Plant of manufacture and the machine sequence number
6	Date of failure: ddd yy
7	Time of failure: hh:mm:ss.01
8	SIM identifier. Contains the same value when presented more than once
9	Severity: Moderate, Serious, Acute, or Service
10	Machine type and model number
11	Reference code 1 from bytes 16 and 17 in format 71 sense.
12	Reference code 2 from bytes 18 and 19 in format 71 sense.
13	Reference code 3 from bytes 20 and 21 in format 71 sense.
14	Unit modifier for Expert System Data from bytes 14 and 15
15	Exception Message from byte 8, bits 0–3
16	Service Message from byte 8, bits 4–7

MIM EREP Report (Format 70):

```

1
TAPE MEDIA INFORMATION MESSAGES
2
REPORT DATE 008 99
3
PERIOD FROM 363 98
TO 008 99

*****
4 5 6 7
VOLUME-CON007 DEVICE-1746 DATE-006/99 TIME-07:35:16:89
8 9
* D/T-3590-B1A S/N 0113-00052
10 11 12 13
* MODERATE ALERT REFCODE-6157 MEDIA IDENTIFIER-0130 IDENTIFIER-23

Note: Refcode 61 = MIM Message Code (see “What Are the MIM Message
Codes?” on page 7), 57=Engineering Data

14
* DATA DEGRADED
14
* REFERENCE MEDIA MAINTENANCE PROCEDURE 57

VOLUME-CS5643 DEVICE-0816 DATE-006/99 TIME-09:52:09:64
* D/T-3590-B1A S/N 0113-00094
* MODERATE ALERT REFCODE-6103 MEDIA IDENTIFIER-0002 IDENTIFIER-01
* MEDIUM EXCEPTION
* REFERENCE MEDIA MAINTENANCE PROCEDURE 03

```

VOLUME-CON007 DEVICE-1741 DATE-007/99 TIME-08:39:17:01
 * D/T-3590-B1A S/N 0113-00053
 * MODERATE ALERT REFCODE-6157 MEDIA IDENTIFIER-0130 IDENTIFIER-23
 * DATA DEGRADED
 * REFERENCE MEDIA MAINTENANCE PROCEDURE 57

VOLUME-CON069 DEVICE-174B DATE-007/99 TIME-13:48:28:76
 * D/T-3590-B1A S/N 0113-00067
 * MODERATE ALERT REFCODE-6155 MEDIA IDENTIFIER-0130 IDENTIFIER-23
 * BLOCK 0 ERROR
 * REFERENCE MEDIA MAINTENANCE PROCEDURE 55

VOLUME-CON069 DEVICE-174B DATE-007/99 TIME-13:48:30:52
 * D/T-3590-B1A S/N 0113-00067
 * MODERATE ALERT REFCODE-6157 MEDIA IDENTIFIER-0130 IDENTIFIER-23
 * DATA DEGRADED
 * REFERENCE MEDIA MAINTENANCE PROCEDURE 57

Table 14 shows an explanation of each of the numbered fields shown in “MIM EREP Report (Format 70)” on page 28.

Table 14. ESCON Media Information Message (MIM) Format Description

Numbered Fields	Field Explanation
1	Type of report - Media Information Messages (MIM)
2	Julian date on which the report ran
3	Julian date of the earliest record and latest record
4	The void from bytes 16–21 in format 70 sense
5	The 3590 drive the tape was on when the failure occurred
6	Julian date on which the MIM was sent to the host
7	Time that the failure occurred
8	Device type
9	Machine sequence number
10	Severity: High number of temporary R/W errors , Serious permanent R/W errors , or Acute block 0, cartridge type, or volume level errors were detected
11	Reference code taken from bytes 10 and 11 of format 70 sense. Byte 10 is the MIM Message Code (see “What Are the MIM Message Codes?” on page 7).
12	Media identifier taken from bytes 12 and 13 of format 70 sense indicates the type of media (0130 is 3590 standard length)
13	Format identifier taken from byte 22 of format 70 sense; 23 is 3590 128-track format, 24 is 3590 256-track format
14	Informational message for problem correction

JCL for Formatting and Printing Formats 70 and 71:

```
//ERE3590 JOB MSGLEVEL=(1,1),MSGCLASS=H,PERFORM=7,CLASS=B
//*JOBPARM SYSAFF=*
//STEP1 EXEC PGM=IFCEREPI,REGION=4096K,PARM='CARD'
//SYSABEND DD SYSOUT=*
//SYSPRINT DD SYSOUT=*
//ERE3590 DD SYSOUT=*,DCB=BLKSIZE=133
//TOURIST DD SYSOUT=*,DCB=BLKSIZE=133
//DIRECTWK DD UNIT=SYSDA,SPACE=(CYL,50,,CONTIG)
//SERLOG DD DUMMY
//ACCIN DD DSN=SYSDOC.LOGREC(0),DISP=SHR
//SYSIN DD *
SYSEXN
HIST
ACC=N
TABSIZ=512K
DEV=(3590)
ENDPARM
//
```

Format of Sense 71 and 70

SIM Sense Bytes: For SIM sense bytes (sense format 71), use byte 11 to obtain the SIM Message Code. Then, perform the recommended action.

Table 15 shows the meaning of the SIM sense bytes.

Table 15. SIM Sense Bytes

0-7 Common Sense Bytes																			
Byte	Meaning																		
0	Flags 0																		
1	Flags 1																		
2	<table border="0"> <tr> <td>Bit</td> <td>Description</td> </tr> <tr> <td>0-1</td> <td>Basic Recovery Action (BRAC)</td> </tr> <tr> <td>1</td> <td>Continue</td> </tr> <tr> <td>2</td> <td>Reissue</td> </tr> <tr> <td>2-4</td> <td>Logging Code (LC)</td> </tr> <tr> <td>3</td> <td>A3</td> </tr> <tr> <td>5</td> <td>VLF active</td> </tr> <tr> <td>6</td> <td>Synchronous transfer mode</td> </tr> <tr> <td>7</td> <td>Medium positioning</td> </tr> </table>	Bit	Description	0-1	Basic Recovery Action (BRAC)	1	Continue	2	Reissue	2-4	Logging Code (LC)	3	A3	5	VLF active	6	Synchronous transfer mode	7	Medium positioning
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3	<table border="0"> <tr> <td>Error Recovery Action (ERA)</td> </tr> <tr> <td>C0 Unsolicited informational data</td> </tr> </table>	Error Recovery Action (ERA)	C0 Unsolicited informational data																
Error Recovery Action (ERA)																			
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4-5	<table border="0"> <tr> <td>Reason Code (RC) – Reason Qualifier Code (RQC)</td> </tr> <tr> <td>11-01 I/O-Subsystem SIM</td> </tr> <tr> <td>11-02 Device SIM</td> </tr> </table>	Reason Code (RC) – Reason Qualifier Code (RQC)	11-01 I/O-Subsystem SIM	11-02 Device SIM															
Reason Code (RC) – Reason Qualifier Code (RQC)																			
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11-02 Device SIM																			
6	<table border="0"> <tr> <td>Message Code (MC)</td> </tr> <tr> <td>F1 I/O-Subsystem SIM</td> </tr> <tr> <td>F2 Device SIM</td> </tr> </table>	Message Code (MC)	F1 I/O-Subsystem SIM	F2 Device SIM															
Message Code (MC)																			
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7	<table border="0"> <tr> <td>Sense Format</td> </tr> <tr> <td>71 SIM Sense</td> </tr> </table>	Sense Format	71 SIM Sense																
Sense Format																			
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Table 15. SIM Sense Bytes (continued)

8-22 Format Dependent Sense Bytes																																																																																																										
Byte	I/O-Subsystem SIM Sense (Message Code=F1) Meaning	Device SIM Sense (Message Code=F2) Meaning																																																																																																								
8-9	<p>Message Modifier</p> <table border="0"> <tr> <td>Bit</td> <td>Description</td> </tr> <tr> <td>0-3</td> <td>Exception Message Code</td> </tr> <tr> <td>0</td> <td>Reserved</td> </tr> <tr> <td>1</td> <td>Effect of failure is unknown</td> </tr> <tr> <td>2</td> <td>CU exception, no performance impact</td> </tr> <tr> <td>3-F</td> <td>Reserved</td> </tr> <tr> <td>4-7</td> <td>Service Message Code</td> </tr> <tr> <td>0</td> <td>Reserved</td> </tr> <tr> <td>1</td> <td>Repair impact is unknown</td> </tr> <tr> <td>2</td> <td>Repair will not impact CU performance</td> </tr> <tr> <td>3-F</td> <td>Reserved</td> </tr> <tr> <td>8-9</td> <td>Report Severity</td> </tr> <tr> <td>0</td> <td>Service</td> </tr> <tr> <td>1</td> <td>Moderate</td> </tr> <tr> <td>2</td> <td>Serious</td> </tr> <tr> <td>3</td> <td>Acute</td> </tr> <tr> <td>10</td> <td>Repeated Report Presentation: set to 1 if this SIM was reported previously.</td> </tr> <tr> <td>11</td> <td>Message To Operator (MTO): set to 1 if this SIM should be reported to the operator console.</td> </tr> <tr> <td>12-14</td> <td>Reserved</td> </tr> <tr> <td>15</td> <td>Message Data Flag</td> </tr> </table>	Bit	Description	0-3	Exception Message Code	0	Reserved	1	Effect of failure is unknown	2	CU exception, no performance impact	3-F	Reserved	4-7	Service Message Code	0	Reserved	1	Repair impact is unknown	2	Repair will not impact CU performance	3-F	Reserved	8-9	Report Severity	0	Service	1	Moderate	2	Serious	3	Acute	10	Repeated Report Presentation: set to 1 if this SIM was reported previously.	11	Message To Operator (MTO): set to 1 if this SIM should be reported to the operator console.	12-14	Reserved	15	Message Data Flag	<p>Message Modifier</p> <table border="0"> <tr> <td>Bit</td> <td>Description</td> </tr> <tr> <td>0-3</td> <td>Exception Message Code</td> </tr> <tr> <td>0</td> <td>Reserved</td> </tr> <tr> <td>1</td> <td>Effect of failure is unknown</td> </tr> <tr> <td>2</td> <td>DV exception, no performance impact</td> </tr> <tr> <td>3</td> <td>DV exception on interface <i>xx</i></td> </tr> <tr> <td>4</td> <td>DV exception on ACF</td> </tr> <tr> <td>5</td> <td>DV exception on operator panel</td> </tr> <tr> <td>6</td> <td>DV exception on tape path</td> </tr> <tr> <td>7</td> <td>DV exception in drive</td> </tr> <tr> <td>8</td> <td>DV preventive maintenance required</td> </tr> <tr> <td>9-F</td> <td>Reserved</td> </tr> </table> <p>Where italicized fields are determined as follows:</p> <table border="0"> <tr> <td>xx</td> <td>Format 71, byte 10</td> </tr> <tr> <td>4-7</td> <td>Service Message Code</td> </tr> <tr> <td>0</td> <td>Reserved</td> </tr> <tr> <td>1</td> <td>Repair impact is unknown</td> </tr> <tr> <td>2-6</td> <td>Reserved</td> </tr> <tr> <td>7</td> <td>Repair will disable access to DV</td> </tr> <tr> <td>8</td> <td>Repair will disable message display <i>ids</i> on DV</td> </tr> <tr> <td>9</td> <td>DV cleaning required</td> </tr> <tr> <td>A</td> <td>DV cleaning complete</td> </tr> <tr> <td>B</td> <td>DV cleaning for performance</td> </tr> <tr> <td>C-F</td> <td>Reserved</td> </tr> <tr> <td>8-9</td> <td>Report Severity</td> </tr> <tr> <td>0</td> <td>Service</td> </tr> <tr> <td>1</td> <td>Moderate</td> </tr> <tr> <td>2</td> <td>Serious</td> </tr> <tr> <td>3</td> <td>Acute</td> </tr> <tr> <td>10</td> <td>Repeated Report Presentation: set to 1 if this SIM was reported previously.</td> </tr> <tr> <td>11</td> <td>Message To Operator (MTO): set to 1 if this SIM should be reported to the operator console.</td> </tr> <tr> <td>12-14</td> <td>Reserved</td> </tr> <tr> <td>15</td> <td>Message Data Flag</td> </tr> </table>	Bit	Description	0-3	Exception Message Code	0	Reserved	1	Effect of failure is unknown	2	DV exception, no performance impact	3	DV exception on interface <i>xx</i>	4	DV exception on ACF	5	DV exception on operator panel	6	DV exception on tape path	7	DV exception in drive	8	DV preventive maintenance required	9-F	Reserved	xx	Format 71, byte 10	4-7	Service Message Code	0	Reserved	1	Repair impact is unknown	2-6	Reserved	7	Repair will disable access to DV	8	Repair will disable message display <i>ids</i> on DV	9	DV cleaning required	A	DV cleaning complete	B	DV cleaning for performance	C-F	Reserved	8-9	Report Severity	0	Service	1	Moderate	2	Serious	3	Acute	10	Repeated Report Presentation: set to 1 if this SIM was reported previously.	11	Message To Operator (MTO): set to 1 if this SIM should be reported to the operator console.	12-14	Reserved	15	Message Data Flag
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Table 15. SIM Sense Bytes (continued)

10–12	<p>Message Data Reserved, set to X'000000'</p>	<p>Byte</p> <p>10 Exception Data xx 11 SIM Message Code</p> <p>Value (ASCII)</p> <table border="1"> <thead> <tr> <th>Value</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>00</td> <td>No message</td> </tr> <tr> <td>41</td> <td>Device degraded, call for service</td> </tr> <tr> <td>42</td> <td>Device hardware failure, call for service</td> </tr> <tr> <td>43</td> <td>Service circuits failed, operations not affected, call for service</td> </tr> <tr> <td>55</td> <td>Drive needs cleaning: load cleaning cartridge</td> </tr> <tr> <td>57</td> <td>Drive cleaning complete: cleaning cartridge ejected</td> </tr> </tbody> </table> <p>12 Reserved, set to X'00'</p>	Value	Description	00	No message	41	Device degraded, call for service	42	Device hardware failure, call for service	43	Service circuits failed, operations not affected, call for service	55	Drive needs cleaning: load cleaning cartridge	57	Drive cleaning complete: cleaning cartridge ejected								
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14–15	<p>Unit Modifier Reserved, set to X'0000'</p>	<p>Unit Modifier Expert Systems Data from Log Page 31, bytes 16–19 (ASCII->HEX)</p>																						
16–17	<p>REF Code 1</p> <table border="1"> <thead> <tr> <th>Bit</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>0–2</td> <td>SIM Type</td> </tr> <tr> <td>B'000'</td> <td>Hardware, non-encoded SRN (HDWE)</td> </tr> <tr> <td>B'001'</td> <td>Hardware, encoded POST error (EPOST) (future)</td> </tr> <tr> <td>B'111'</td> <td>Microcode-detected error (MDE)</td> </tr> <tr> <td>3–15</td> <td>Reserved (used for encoded POST errors in the future)</td> </tr> </tbody> </table>	Bit	Description	0–2	SIM Type	B'000'	Hardware, non-encoded SRN (HDWE)	B'001'	Hardware, encoded POST error (EPOST) (future)	B'111'	Microcode-detected error (MDE)	3–15	Reserved (used for encoded POST errors in the future)	<p>REF Code 1</p> <table border="1"> <thead> <tr> <th>Bit</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>0–2</td> <td>SIM Type</td> </tr> <tr> <td>B'011'</td> <td>Device SIM</td> </tr> <tr> <td>3–7</td> <td>Reserved</td> </tr> <tr> <td>8–15</td> <td>FRU Identifier (FID)</td> </tr> </tbody> </table>	Bit	Description	0–2	SIM Type	B'011'	Device SIM	3–7	Reserved	8–15	FRU Identifier (FID)
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18–19	<p>REF Code 2</p> <table border="1"> <thead> <tr> <th>HDWE SIM Type</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td></td> <td>Bits 0–7 are set to X'00'; bits 8–15 are set to the first two digits of SRN.</td> </tr> <tr> <th>MDE SIM Type</th> <th>Description</th> </tr> <tr> <td></td> <td>Bits 0–15 are set to the CU MDE code.</td> </tr> </tbody> </table>	HDWE SIM Type	Description		Bits 0–7 are set to X'00'; bits 8–15 are set to the first two digits of SRN.	MDE SIM Type	Description		Bits 0–15 are set to the CU MDE code.	<p>REF Code 2 For device SIMs, this value will be set to the first FSC code reported from the device.</p>														
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20–21	<p>REF Code 3</p> <table border="1"> <thead> <tr> <th>HDWE SIM Type</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td></td> <td>Bits 0–15 are set to the last four digits of SRN.</td> </tr> <tr> <th>MDE SIM Type</th> <th>Description</th> </tr> <tr> <td></td> <td>Bits 0–15 contain CU MDE supporting data.</td> </tr> </tbody> </table>	HDWE SIM Type	Description		Bits 0–15 are set to the last four digits of SRN.	MDE SIM Type	Description		Bits 0–15 contain CU MDE supporting data.	<p>REF Code 3 For device SIMs, this value will be set to the last FSC code reported from the device.</p>														
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22	Reserved	Reserved																						

Table 15. SIM Sense Bytes (continued)

23–31 Common Sense Bytes	
Byte	Meaning
23	Flags 3
24	Flags 4
25–26	Product Identifier (MM-PP) (per 3590 specifications in all cases)
27–29	Product Serial (SSSSS) (per 3590 specifications in all cases)
30	CU/Library Type-Model
31	Device Type-Model

MIM Sense Bytes: For MIM sense bytes (sense format 70), use byte 10 to obtain the MIM Message Code. Then, perform the recommended action.

Table 16 shows the meaning of the MIM sense bytes.

Table 16. MIM Sense Bytes

0–7 Common Sense Bytes																			
Byte	Meaning																		
0	Flags 0																		
1	Flags 1																		
2	<table border="0"> <thead> <tr> <th>Bit</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>0–1</td> <td>Basic Recovery Action (BRAC)</td> </tr> <tr> <td>1</td> <td>Continue</td> </tr> <tr> <td>2</td> <td>Reissue</td> </tr> <tr> <td>2–4</td> <td>Logging Code (LC)</td> </tr> <tr> <td>3</td> <td>A3</td> </tr> <tr> <td>5</td> <td>VLF active</td> </tr> <tr> <td>6</td> <td>Synchronous transfer mode</td> </tr> <tr> <td>7</td> <td>Medium positioning</td> </tr> </tbody> </table>	Bit	Description	0–1	Basic Recovery Action (BRAC)	1	Continue	2	Reissue	2–4	Logging Code (LC)	3	A3	5	VLF active	6	Synchronous transfer mode	7	Medium positioning
Bit	Description																		
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3	A3																		
5	VLF active																		
6	Synchronous transfer mode																		
7	Medium positioning																		
3	Error Recovery Action (ERA) C0 Unsolicited informational data																		
4–5	Reason Code (RC) – Reason Qualifier Code (RQC) 11–00 MIM																		
6	Message Code (MC) F0 MIM																		
7	Sense Format 70 MIM Sense																		

Table 16. MIM Sense Bytes (continued)

8–22 Format Dependent Sense Bytes																													
8–9	<p>Message Modifier</p> <table border="0"> <thead> <tr> <th>Bit</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>0–3</td> <td>Exception Message Code</td> </tr> <tr> <td>0–1</td> <td>Reserved</td> </tr> <tr> <td>2</td> <td>Data degraded</td> </tr> <tr> <td>3</td> <td>Data degraded in partition yyyy</td> </tr> <tr> <td>4</td> <td>Medium degraded</td> </tr> <tr> <td>5</td> <td>Medium degraded in partition yyyy</td> </tr> <tr> <td>6</td> <td>Block 0 error</td> </tr> <tr> <td>7</td> <td>Medium exception</td> </tr> <tr> <td>8–F</td> <td>Reserved</td> </tr> </tbody> </table> <p>Where italicized fields are determined as follows: yyyy Determined from sense format 70, bytes 14–15</p> <p>4–7 Reserved</p> <p>8–9 Report severity</p> <table border="0"> <tbody> <tr> <td>0</td> <td>Reserved</td> </tr> <tr> <td>1</td> <td>Moderate</td> </tr> <tr> <td>2</td> <td>Serious</td> </tr> <tr> <td>3</td> <td>Acute</td> </tr> </tbody> </table> <p>10 Repeated Report Presentation: set to 1 if this MIM was reported previously.</p> <p>11 Message To Operator (MTO): set to 1 if this MIM should be reported to the operator console.</p> <p>12–14 Reserved</p> <p>15 Message Data Flag</p>	Bit	Description	0–3	Exception Message Code	0–1	Reserved	2	Data degraded	3	Data degraded in partition yyyy	4	Medium degraded	5	Medium degraded in partition yyyy	6	Block 0 error	7	Medium exception	8–F	Reserved	0	Reserved	1	Moderate	2	Serious	3	Acute
Bit	Description																												
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7	Medium exception																												
8–F	Reserved																												
0	Reserved																												
1	Moderate																												
2	Serious																												
3	Acute																												
10	MIM Message Code (see “What Are the MIM Message Codes?” on page 7 for the meaning).																												
11	Engineering data																												
12–13	<p>Medium Identifier (MID)</p> <p>X'0120–013F' Half-inch cartridge tapes</p>																												
14–15	Medium partition																												
16–21	<p>Valid</p> <p>This field contains the volume id, in EBCDIC, associated with the reported condition. If the valid is not known or is not reliable, then this field will contain EBCDIC blanks (X'40').</p>																												
22	<p>Format Identifier</p> <p>X'23' 16X8 (128) track</p> <p>X'24' 16X16 (256) track</p>																												
23–31 Common Sense Bytes																													
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Using the RS/6000 System (AIX)

IBM device drivers for the RS/6000 system log MIMs and SIMs when an error occurs on the 3590 drive.

RS/6000 Error Log Analysis

The AIX Tape and Medium Changer Device Driver for the RS/6000 provides logging to the system error log for a variety of errors. You can view the error log in various formats by using one of the following AIX commands:

- **tapeutil** command on page 35
- **diag** command on page 35
- **smit** command on page 37
- **errpt** command on page 37

Use the Hex to ASCII conversion in Table 17 on page 36. Examples of the different error log formats are shown following this text.

Note: The **tapeutil** command gives you a detailed report by device only.

To use the **tapeutil** command:

1. On the AIX command line, enter **tapeutil**.
2. Select **Tape Drive Service Aids** (listed under General Commands) from the menu.
3. Select **Error Log Analysis** from the Service Aid menu.
4. Select the device from the Drive Selection menu, then press PF7 to commit. The error log will be displayed.
5. You can scroll through the log by pressing the Enter key.

To use the **diag** command:

Notes:

1. You must have root authority to run the AIX **diag** command.
2. The **diag** command gives you a detailed report by device only.
 1. On the AIX command line, enter **diag**.
 2. Select **Service aids** from the Diagnostic Function Selection menu.
 3. Select **IBM Tape Drive Service Aids** from the Service Aid Selection menu.
 4. Select **Error Log Analysis** from the Service Aid menu.
 5. Select the device from the Selection menu and press PF7 to commit. The error log will be displayed.
 6. You can scroll through the log by pressing the Enter key.

As you scroll through the error log, look for **SIM/MIM DATA** (see Figure 3 on page 36 and Figure 4 on page 36). See Figure 1 on page 4 and Figure 2 on page 6 to interpret the message.

```

IBM Tape Device Error Log Analysis

NAME: rmt1  LOCATION: 00-02-01-20  DEVICE TYPE: 3590

DATE: 09/30/99 07:33:21  SEQUENCE #203274  ERROR ID: 3590 SIM/MIM PAGE

SIM/MIM DATA:
310000440000614001303030303030303144383634313030373732303030303045383338
3039333830393830303049424D31332D303030303030303030303331353033353930423131

Press ENTER for additional entries...

F3=Cancel          F10=Exit          Enter

```

Figure 3. AIX TAPEUTIL and DIAG Commands SIM Error Log Example

```

IBM Tape Device Error Log Analysis

NAME: rmt1  LOCATION: 00-02-01-20  DEVICE TYPE: 3590

DATE: 09/30/99 07:33:21  SEQUENCE #203274  ERROR ID: 3590 SIM/MIM PAGE

SIM/MIM DATA:
310000440000614002303030303030303235384136313535363031303030334132415051
5239353001303830303049424D31322D30303030303054513331353033353930423141

Press ENTER for additional entries...

F3=Cancel          F10=Exit          Enter

```

Figure 4. AIX TAPEUTIL and DIAG Commands MIM Error Log Example

Table 17. Hex to ASCII Conversion

Hex	ASCII	Hex	ASCII	Hex	ASCII	Hex	ASCII	Hex	ASCII
00	Null	30	0	41	A	4A	J	54	T
20	Space	31	1	42	B	4B	K	55	U
		32	2	43	C	4C	L	56	V
		33	3	44	D	4D	M	57	W
		34	4	45	E	4E	N	58	X
		35	5	46	F	4F	O	59	Y
		36	6	47	G	50	P	5A	Z
		37	7	48	H	51	Q	5F	-
		38	8	49	I	52	R		
		39	9			53	S		

Note: All codes are not shown.

Using SMIT/ERRPT Commands:

Note: The **smit** command has various ways to format the error log.

To use the **smit** command:

1. On the AIX command line, enter **smit**.
2. Select **Problem Determination** on the System Management window.
3. Select **Error Log** on the Problem Determination window.
4. Select **Generate Error Report** on the Error Log window.
5. Select **filename**, then select **no** from the Single Select list.
6. From the Generate Error Report menu, you can select the type of reports you want to view, then press the **Do** icon.
7. You can scroll through the log by using the up or down icons on the menu.

To use the **errpt** command:

1. On the AIX command line, select **errpt | pg**. The summary report will be displayed.
2. You can scroll through the log by pressing the Enter key for the next page.
3. You can type **q** to quit the error log at any time.

Or,

1. On the AIX command line, enter **errpt -a | pg**. The detailed report will be displayed.
2. You can scroll through the log by pressing the Enter key for the next page.
3. You can type **q** to quit the error log at any time.

As you scroll through the error log, look for **SIM_MIM_RECORD** (see Figure 5 on page 38 and Figure 6 on page 39). See Figure 1 on page 4 and Figure 2 on page 6 to interpret the message.

```

ERROR LABEL:  SIM_MIM_RECORD_3590
ERROR ID:     2E2EFDDE

Date/Time:   Tue Oct 26 07:33:21
Sequence Number: 203274
Machine ID:  000003243700
Node ID:     kitt
Error Class: H
Error Type:  UNKN
Resource Name: rmt1
Resource Class: tape
Resource Type: 3590
Location:    00-02-01-20
VPD:
  Manufacturer.....IBM
  Machine Type and Model.....03590B1A
  Serial Number.....000000000315
  Device Specific . (FW) .....B58A

Error Description
UNDETERMINED ERROR

Probable Causes
TAPE DRIVE
TAPE CONTROL UNIT

Failure Causes
TAPE DRIVE

Recommended Actions
REFER TO PRODUCT DOCUMENTATION FOR ADDITIONAL INFORMATION

Detailed Data
DIAGNOSTIC EXPLANATION
3100 0044 0000 6140 0130 3030 3030 3030 3235 3841 3432 3030 3737 3330 3030 3030
3937 3530 3031 3530 3031 3830 3030 4942 4D31 322D 3030 3030 3030 3058 5858 5858
3033 3539 3042 3141

```

HEX	ASCII	Description
01		01= SIM 02=MIM
3235 3841	258A	Model and Microcode level
3432	42	Message code (See Table 1 on page 5)
33	3	FID severity (See "SIM Severity Codes" on page 44)
3937	97	FID (FRU identification number)
3530 3031	5001	First FSC (fault symptom code)
3530 3031	5001	Last FSC (fault symptom code)
3033 3539 30	03590	Machine Type
42 3141	B1A	Model

Figure 5. Error Log Example of SIM


```

ERROR LABEL:  SIM_MIM_RECORD_3590
ERROR ID:     2E2EFDDE

Date/Time:   Tue Oct 26 07:33:21
Sequence Number: 203274
Machine ID:  000003243700
Node ID:     kitt
Error Class: H
Error Type:  UNKN
Resource Name: rmt1
Resource Class: tape
Resource Type: 3590
Location:    00-02-01-20
VPD:
  Manufacturer.....IBM
  Machine Type and Model.....03590B1A
  Serial Number.....000000000315
  Device Specific . (FW) .....5B8A

Error Description
UNDETERMINED ERROR

Probable Causes
TAPE DRIVE
TAPE CONTROL UNIT

Failure Causes
TAPE DRIVE

Recommended Actions
REFER TO PRODUCT DOCUMENTATION FOR ADDITIONAL INFORMATION

Detailed Data
DIAGNOSTIC EXPLANATION
3100 0044 0000 6140 0230 3030 3030 3030 3235 3841 3631 3535 3630 3130 3030 3341
3241 5051 5239 3530 0130 3830 3030 4942 4D31 322D 3030 3030 3030 3058 5858 5858
3033 3539 3042 3141

```

HEX	ASCII	Description
02		01=SIM 02=MIM
3235 3841	258A	Model and Microcode level
3631	61	Message code (See Table 2 on page 7)
31	1	MIM severity (See "MIM Severity Codes" on page 3)
5051 5239 3530	PQR950	VOLSER (volume serial number)
3033 3539 30	03590	Machine Type
42 3141	B1A	Model

Figure 6. Error Log Example of MIM

Using the AS/400 System (OS/400)

AS/400 Error Log Analysis

To gain access to the AS/400 problem logs and error logs, sign on at any available workstation using the QSRV logon and its security password (QSRV). After sign on, the proper access authorizations will be granted, and the AS/400 Main Menu will be displayed.

The version and release of OS/400® you are running will determine which of the two error log analysis procedures you will use.

AS/400 System with CISC Processor:

1. Type STRSST (the Start System Service Tools command) on the command entry line on the AS/400 Main Menu, then press Enter.

2. Select **Start a service tool**.
3. Select **Error log utility**.
4. Select **Analyze error log**.
5. Specify the time period for searching the error log, then select **Magnetic media**.
6. On the Select Analysis Report Options menu, specify a device type of 3590, then press Enter. Leave all other options at their default value.
7. Select the **Display report** option to display the desired error log entry.
8. The following figure is a sample AS/400 Error Log display screen showing the 3590 error log data.

```

                                Display Detail Report for Resource
Resource      Type      Model      Serial      Address
TAP02        3590      B11       13-10063    0270-1700FFFF

Error log ID . . . . . : 004602D2      Sequence . . . . . : 178324
Date . . . . . : 09/23/99      Time . . . . . : 11:38:02
Reference code . . . . . : 9350      Error code . . . . . : 00000000
Table ID . . . . . : 35900B11      IPL source . . . . . : B
Error type . . . . . : Permanent
Description . . . . . :
Tape unit failure
SIM/MIM message . . . . . : 00000000137E420077300000B0311531
                          1580000B013000000000007503590B11

Press Enter to continue.

F3=Exit                      F6=Display hexadecimal report
F10=Display previous detail report      F12=Cancel

```

Hex	Description
137E	Model and Microcode Level
42	Message Code (see Table 1 on page 5)
B0	FID (FRU Identifier)
3115	First FSC (fault symptom code)
3115	Last FSC (fault symptom code)
0000000075	Sequence Number (drive serial number)
03590B11	Device Type and Model Number

Figure 7. AS/400 Example Error Log of SIM (CISC Processor)

AS/400 System with RISC Processor:

1. Type STRSST (the Start System Service Tools command) on the command entry line on the AS/400 Main Menu, then press Enter.
2. Select **Start a service tool**.
3. Select **Product activity log**.
4. Select **Analyze log**.
5. Specify the time period for searching the error log, then select **Magnetic media**.
6. On the Select Analysis Report Options window, specify a device type of 3590, then press Enter. Leave all other options at their default values.
7. Use the Log Analysis Report window to display the desired error log entry.

Note: You may use the PF11 function key, which will give you a brief description of the error log entry. This could be helpful when scanning the error logs.

8. The following figure is a sample AS/400 Error Log display screen showing the 3590 error log data.

```

                                Display Detail Report for Resource
Name          Type      Model      Serial      Resource
TAP02         3590     B11       13-10063    TAP34

Error log ID . . . . . : 004602D2      Sequence . . . . . : 178324
Date . . . . . : 09/23/99      Time . . . . . : 11:38:02
Reference code . . . . . : 9350      Secondary code . . . : 00000000
Table ID . . . . . : 35900B11      IPL source/state . . : B/3

Class . . . . . : Permanent
System Ref Code . . . . . : 35909300
Tape unit failure
SIM/MIM message . . . . . : 00000000137E420077300000B0311531
                               1580000B013000000000007503590B11

Press Enter to continue.

F3=Exit          F4=Additional Information      F6=Hexadecimal report
F9=Address Information  F10=Previous detail report  F12=Cancel

```

Hex	Description
137E	Model and Microcode Level
42	Message Code (see Table 1 on page 5)
B0	FID (FRU Identifier)
3115	First FSC (fault symptom code)
3115	Last FSC (fault symptom code)
0000000075	Sequence Number (drive serial number)
03590	Device Type
B11	Device Model Number

Figure 8. AS/400 Example Error Log of SIM (RISC Processor)

9. Press F4 to display additional information. See the example in Figure 9 on page 42.

Display Additional Information for Resource				
Name	Type	Model	Serial Number	Resource Name
TAP02	3590	B11	13-10063	TAP34
SIM/MIM message :				
			00000000137E420077300000B0311531	
			1580000B01300000000007503590B11	

Hex	Description
137E	Link and Microcode Level
42	Message Code (see Table 1 on page 5)
B0	FID (FRU Identifier)
3115	First FSC (fault symptom code)
3115	Last FSC (fault symptom code)
0000000075	Sequence Number (drive serial number)
03590	Device Type
B11	Device Model Number

Figure 9. AS/400 Example Error Log of SIM (RISC Processor - Additional Information)

Using the Sun System

Obtaining Error Information from a Sun (Solaris) Host System

The Sun system does not log SIMs or MIMs.

See *IBM SCSI Tape Drive, Medium Changer, and Library Device Drivers: Installation and User's Guide* for additional information about Sun service and diagnostic aids.

Using the HP-UX System

Obtaining Error Information from an HP-UX Host System

The HP-UX system does not log SIMs or MIMs.

See *IBM SCSI Tape Drive, Medium Changer, and Library Device Drivers: Installation and User's Guide* for additional information about HP-UX service and diagnostic aids.

Using the Windows NT System

Obtaining Error Information from a Windows NT Host System

The Windows NT system does not log SIMs or MIMs.

See *IBM SCSI Tape Drive, Medium Changer, and Library Device Drivers: Installation and User's Guide* for additional information about Windows NT service and diagnostic aids.

Chapter 3. Interpreting the SARS Report

Obtaining 3590 Drive Error Information at the Host

IBM device drivers for the RS/6000 and AS/400 systems log SIMs and MIMs when an error occurs on the 3590 drive.

Note: Sun, HP-UX, and Windows NT systems do not log SIMs or MIMs. ES/9000 platforms log SIMs and MIMs and can be configured to obtain console messages.

The SIM includes the following error information:

- The drive to which the SIM refers
- The FRU identifier (FID) code and FID severity for drive errors
- The message code presented (see Table 1 on page 5)
- The first FSC, second FSC or flag bytes, model and microcode link level, which may be requested by your service organization

This information is used to service the 3590 drive and can also be obtained directly from the drive display.

The MIM includes the following error information:

- The message code presented (see Table 2 on page 7)
- The volser of the tape cartridge that is having a problem

SIM Exception Messages

Table 18 describes the SIM Exception Messages. You can obtain action information from the **SIM Message Code** and **FID** contained in the reported SIM.

Table 18. SIM Exception Message Descriptions

Exception Message (Hex)	Exception Message (ASCII)	Description
30	0	Reserved
31	1	Effect of failure unknown
32	2	Device Exception - No performance impact
33	3	Device Exception on Interface
34	4	Device Exception on ACF
35	5	Device Exception on Operator Panel
36	6	Device Exception on Tape Path
37	7	Device Exception in Drive
38	8	Device Preventive Maintenance Required
39	9	Device Preventive Maintenance Completed
41–46	A–F	Reserved

SIM Service Messages

Table 19 describes the SIM Service Messages. You can obtain action information from the **SIM Message Code** and **FID** contained in the reported SIM.

Table 19. SIM Service Message Descriptions

Service Message (Hex)	Service Message (ASCII)	Description
30	0	Reserved
31	1	Repair impact is unknown
32–36	2–6	Reserved
37	7	Repair will disable access to device
38	8	Repair will disable message display ids on device
39	9	Device cleaning is required
41	A	Device cleaning is complete
42	B	Device cleaning for performance reasons is required
43–46	C–F	Reserved

SIM Severity Codes

Table 20 describes the SIM Severity Codes. You can obtain action information from the **SIM Message Code** and **FID** contained in the reported SIM.

Table 20. SIM Severity Code Descriptions

SIM Severity (Hex)	SIM Severity (ASCII)	FID Severity Algorithm	FID Severity Displayed on Oper. Panel	Description
33	3	4–3=1	1	Acute: Device requires immediate attention. Device is not usable.
32	2	4–2=2	2	Serious: Device is usable but is seriously degraded.
31	1	4–1=3	3	Moderate: Device is usable but is running degraded.
30	0	4–0=4	4	Service: Device needs scheduled maintenance but is usable.

MIM Exception Messages

Table 21 describes the MIM Exception Messages. You can obtain action information from the **MIM Message Code** contained in the reported MIM.

Table 21. MIM Exception Message Descriptions

Exception Message (Hex)	Exception Message (ASCII)	Description
32	2	Data Degraded
34	4	Medium Degraded
36	6	Block 0 Error
37	7	Medium Exception

MIM Severity Codes

“MIM Severity Codes” on page 3 describes the MIM Severity Codes. You can obtain action information from the **MIM Message Code** contained in the reported MIM.

Chapter 4. SARS SIMs and MIMs on Virtual Tape Servers

Virtual Tape Servers (VTS) connect to ES/9000 platforms using 3490 emulation. SARS SIMs and MIMs are reported in the form described in “Using ES/9000 with 3490 Emulation Mode” on page 21.

When a tape drive in a VTS creates a MIM with a message code of 60 or 61 (see “What Are the MIM Message Codes?” on page 7), the VTS marks the tape volume associated with the MIM as Read Only.

Automatic Read Only Recovery (ROR) Operation in VTS

Note: Most volumes marked as Read Only are marked because of permanent write errors, the Tivoli Storage Manager database not fitting on the tape, or because of a high SARS error count.

In BC17.10 and above code, automated Read Only Recovery (ROR) is set as the default mode of operation. This means that, if the system detects a physical volume that is identified as Read Only, then the system will copy (or attempt to copy) all the stacked volumes off that physical volume and back into cache as logical volumes. Then, these logical volumes will be normally migrated back out to tape, just as all volumes are today. This operation is accomplished by loading the physical volume onto a physical drive, and, one by one, reading each stacked volume into cache, where it again becomes a logical volume.

In most cases, when a Read Only volume is identified, a message is immediately sent to the LM console indicating that the volume has been marked Read Only. Sometimes Tivoli Storage Manager can mark a cartridge Read Only and will not send a host console message. For example, when there is a recall failure on a tape, Tivoli Storage Manager marks the cartridge Read Only but does not send a console message. The job requesting the recall will fail, and the customer will know that there could be a problem with the tape.

When a Read Only volume is identified and automated ROR is enabled, then any and all Read Only volumes would become eligible for recovery at the top of the second hour after their creation. For example, a Read Only volume created at 8:55 AM would be started to recover no earlier than at 10:00 AM. However, there are things that could delay the ROR.

With ROR enabled, there is no host intervention when the Read Only volume is created or when the recovery is started. Instead, the system starts the ROR when it can. As described above, the ROR consists of loading the physical volume on a drive and reading all valid stacked volumes on that tape into cache. There is only one ROR in process at any given time. ROR also cannot occur while an “eject volume” command is underway or while reclamation is occurring.

When all stacked volumes on the Read Only tape have been read into cache and the tape ejects to the I/O station, then the ROR was successful, and the following intervention is sent to the host: “A Read Only status stacked volume xxxxxx has been ejected”.

If all stacked volumes could not be read into cache (an unsuccessful ROR), the tape still ejects to the I/O station. Then the following intervention is posted to the host: “A VTS attempted unsuccessfully to eject a damaged stacked volume

(xxxxxxx)". And, for each logical volume remaining on the stacked volume, an intervention is posted saying words to the effect of: "Logical Volume xxxxxxx could not be recovered".

Note: An unsuccessful ROR would occur only after three separate attempts to read each volume off the tape. It is highly likely at this point that no additional number of attempts would result in reading the data, hence, the action of removal from the VTS is completed.

In summary, with ROR enabled, the user does not typically know when the ROR is underway but does get one host message (or more, if all the data could not be recovered) for each tape ejected into the I/O station. In most cases, the ROR tapes are "bad" tapes, which should not be re-used in the VTS.

Interaction of ROR with Other VTS Operations

In so far as possible, the VTS ROR code has been designed to minimize the number of drives involved in Import, Export, ROR, or Disaster Recovery operations, so that normal processing has resources available. For example:

- ROR will not begin with an Export operation in progress (an Export operation requires two drives)
- An Export operation starting would cancel an automatic ROR, once the file (logical volume) currently being recovered into cache has been stored in cache.
- Forced Eject will not start until ROR is complete (the error message "A Forced Eject is in progress" would surface). There is no queueing of multiple Forced Eject commands. The customer would have to re-initiate the Forced Eject at a later time. If the customer has automated ROR enabled, then the need to use a Forced Eject would be greatly reduced.

SARS Impact on ROR

The SARS information on previously-written tapes will be accessed to identify the tapes that should be considered Read Only. The VTS has always had a number of conditions it would use to mark a tape Read Only (for example, a permanent write error or the data base not fitting on the tape). SARS is another source of Read Only tapes that will surface: those that had a high number of temporary errors or some other occurrence that causes SARS data to be high.

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Index

Numerics

3590 drive
error information 43

A

AS/400
error log analysis 39
problem determination 39
service aid programs 39
ASCII conversion, hex 36

E

error
3590 drive 43
information, HP-UX system 42
information, Sun 42
information, Windows NT system 42
log analysis
AS/400 39
RS/6000 35
ERRPT commands 37
ES/9000
EREK reports 26
for ERA 48 21
MIM 11
SIM 10

H

hex conversion, ASCII 36
HP-UX system
error information 42

M

messages
MIM code descriptions 7
MIM exception, description 45
MIM severity codes, description 45
MVS
MIM 11
SIM 10
obtain from HP-UX system 42
obtain from Sun system 42
obtain from Windows NT system 42
OS/390
MIM 11
SIM 10
Service Director/2
MIM (3590 native mode) 20
SIM (3490 emulation mode) 19
SIM (3590 native mode) 20
SIM code descriptions 5
SIM exception, description 43
SIM service, description 44

messages (*continued*)
Tivoli Storage Manager
MIM 9
SIM 9
TPF
MIM (3590 native mode) 19
SIM (3590 native mode) 18
SIM/MIM (3490 emulation mode) 18
VM/ESA
MIM (3590 native mode) 13
SIM (3590 native mode) 12
SIM/MIM (3490 emulation mode) 12
VSE/ESA
MIM (3590 native mode) 17
SIM (3590 native mode) 17
SIM/MIM (3490 emulation mode) 15

MIM
definition 6
exception messages 45
message codes 7
on VTS 47
severity codes, description 3, 45
what to do 8

MVS
MIM 11
SIM 10

O

OS/390
MIM 11
SIM 10

P

platforms
AS/400 (OS/400) 39
HP-UX 42
RS/6000 (AIX) 35
S/390 (3490 emulation mode)
ES/9000 EREP reports for ERA 48 21
S/390 (3590 native mode)
ES/9000 EREP reports 26
format of sense 71 and 70 30
Sun 42
Windows NT 42

R

read only recovery (ROR) in VTS
description 47
interaction with other VTS operations 48
RS/6000
error log analysis 35
error logs, description 35
problem determination 35

S

SARS

- before enabling 2
- definition 1
- host information, working with 9
- how do I configure? 2
- impact on read only recovery 48
- introduction 1
- kinds of information 2
- relation to operating system and software 7
- SIMs and MIMs on VTS 47
- why enable? 2

Service Director/2

- MIM (3590 native mode) 20
- SIM (3490 emulation mode) 19
- SIM (3590 native mode) 20

SIM

- definition 4
- exception messages 43
- message codes 5
- on VTS 47
- service messages 44
- severity codes, description 3, 44
- what to do 8

SMIT commands 37

Sun system

- error information 42

T

tapeutil program, RS/6000

- data, RS/6000 35

Tivoli Storage Manager

- levels of 9
- MIM 9
- SIM 9

TPF

- MIM (3590 native mode) 19
- SIM (3590 native mode) 18
- SIM/MIM (3490 emulation mode) 18

U

utilities

- RS/6000 tapeutil 35

V

VM/ESA

- MIM (3590 native mode) 13
- SIM (3590 native mode) 12
- SIM/MIM (3490 emulation mode) 12

VSE/ESA

- MIM (3590 native mode) 17
- SIM (3590 native mode) 17
- SIM/MIM (3490 emulation mode) 15

W

Windows NT system

- error information 42

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