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MMC R2 Hardware Alarm Management Operation
and Maintenance

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1 OVERVIEW

This document details the MMC system Release 2 Operation and Maintenance for Alarm Management. It includes how to identify the alarm sources and how to clear the alarms.

Note All IP addresses used in the document are examples. For true IP addresses, please refer to site-specific information.

2 PREREQUISITES

The following requirements must be met:

- Must know the IP address for RMS, SERVERS, TS.
- The software LOMlite2 must be installed.
- The software patch 110208-09 or higher must be installed.

3 PROCEDURE

3.1 HARDWARE ALARM DEFINITIONS

The hardware alarms that identify a power supply as faulty are slightly different for different servers. The alarms issued depend on the type and number of power sources used.

There are two types of power sources for DS, MS, and RS: AC power supply sources (three power supplies), and DC power supply sources.

DS, MS and RS Servers have three power supplies each. MMCP and OM Servers have one power supply each.

3.1.1 AC POWER SUPPLY ALARM

As shown in *AC Power Inputs of MS, DS, and RS Servers*, there are three AC power supplies for MS, DS, and RS servers. If one supply is faulty, a Minor alarm (alarm2) will be generated, but the servers will still be in operation. If any two (2) power supplies are faulty, a Major alarm (alarm1 and alarm3) is generated. Although the system is halted, the lom port is still functional. From the lom port, an lom command can be used to check the system status.

If all power supplies are faulty, the system and lom port will be out of service, but Alarm3 and Alarm2 will be open. Due to the Normal-Close aspect of the relay output, it will generate an alarm in the RMS. The Major and Minor alarms will be activated.

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Table 1 AC Power Inputs of MS,DS, and RS Servers

Cat#	Number of Power Supply Faulty	Alarm Type	Description
1	1	Minor	Minor Alarm System still in operation
2	2	Major	Major Alarm System Halt lom port still functional
3	3	Major	Major Alarm System Power Losses

For MMCP and OM Server, Cat# 3, major alarm is generated when the power supply fails because there is only one power supply.

3.1.2 DC POWER SUPPLY ALARM

As shown in *DC Power Inputs of servers*, there are three DC power supplies for the DS, MS, and RS servers. From Cat#4, #5 and #6, the alarms generated for one, two, or three faulty power supplies are almost the same as for the AC option (Cat #1, #2 and #3), except that when one of the Input Power Supply Sources (-48V, INA or INB) is faulty, all three power supplies are considered faulty and a Major Alarm (Alarm 1) is generated. However, the system will still be in operation. (See Cat#7).

Table 2 DC Power Inputs of servers

Cat#	Number of Faulty Power Supply	Alarm Type	Description
4	1	Minor	Minor Alarm System still in operation
5	2 (Any 2 P/S Faulty)	Major	Major Alarm System Halt lom port still functional

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Cat#	Number of Faulty Power Supply	Alarm Type	Description
6	3 (All 3 P/S Faulty)	Major	Major Alarm System Power Losses
7	3 (Lost either INA or INB Power)	Major	Major Alarm System Still Running

Note For servers with single power supplies (Cat# 6 or 7), a Major alarm is generated when the power supply fails.

3.1.3 FAN ALARM

There are three or four internal Fans for the DS, MS, and RS servers. The hardware fan alarm is generated when one or more fans are faulty. If there is one faulty fan, it causes a Minor alarm. If two or more fans are faulty, a Major alarm (alarm2) will be generated instead. Refer to *Fan Alarm of Servers*.

Table 3 Fan Alarm of Servers

Cat#	Number of Fan Faulty	Alarm Type	Description
8	1	Minor	Minor Alarm System still in operation
9	More Than 2	Major	Major Alarm System still in operation lom port still functional

3.1.4 WATCH-DOG ALARM

When the Watch-dog Alarm of the DS, MS, and RS servers is generated, a hardware alarm3 (shown on the lom report) will be turned on. This alarm is mapped to Alarm1 as a Major alarm, which is also output to RMS as a Hardware alarm.

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Table 4 Watch-dog Alarm of SERVERS

Cat#	Faulty	Alarm Type	Description
10	Watch-dog Alarm	Major	Major Alarm System still in operation ? Halt?

3.2 SERVERS FRONT PANEL LED INDICATION

The alarms #1-#10, described in the Hardware alarm section above, are indicated with two (2) extra LEDs for the DC sources versions of the servers. LED SUPPLY_A & SUPPLY_B are used to indicate DC Power Supply Sources Input. See the table below for a detailed breakdown.

When the Watchdog Alarm is generated, the FAULTY LED and Alarm2 LED will be ON. The System LED setting (On or Off) depends on the internal software execution of the servers.

Table 5 Servers Front Panel LED Indication V.S. Alarm Type

Cat#	Sys-tem Type	Alarm Type	Fault	Alarm1	Alarm2	Supply A	Supply B	Power	System
1	AC	Minor	Flash	OFF	ON	(No led)	(No led)	ON	ON
2	AC	Major	Flash	ON	X	(No led)	(No led)	ON	OFF
3	AC	Major	Flash	ON	X	(No led)	(No led)	OFF	OFF
4	DC	Minor	Flash	OFF	ON	ON	ON	ON	ON
5	DC	Major	Flash	ON	X	ON	ON	ON	OFF
6	DC	Major	Flash	ON	X	ON	ON	OFF	OFF
7a	DC	Major	Flash	ON	X	ON	OFF	ON	OFF
7b	DC	Major	Flash	ON	X	OFF	ON	ON	OFF
8	DC/AC	Minor	Flash	OFF	ON	ON	ON	ON	ON
9	DC/AC	Major	Flash	ON	OFF	ON	ON	ON	OFF
10	DC/AC	Major	ON	ON	OFF	ON	ON	ON	ON?

Note X indicates that the entry does not affect the situation.

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3.2.1 START/STOP LOM AND VERIFY THE SOFTWARE LOM AND LOMSET

1. At the prompt, type the command to start lom after system reboots, or the lom processor is stopped.

```
[root@MMC-MS.EMX.ERICSSON.SE] />> /etc/init.d/rc.lom start
```

2. At the prompt, type the command to stop lom for maintenance purposes, if necessary.

```
[root@MMC-MS.EMX.ERICSSON.SE] />> /etc/init.d/rc.lom stop
```

3.2.2 VERIFY THE SOFTWARE LOM AND LOMSET ARE RUNNING.

1. At the prompt, type the command:

```
[root@MMC-MS.EMX.ERICSSON.SE] />> ps -ef | grep lom <enter>
```

```
root      10      1      0          Jul 30 ?          0:00      /bin  
/usr/bin/lomset
```

```
root      980     31      0      10:14:00 ?          0:00      grep  
lomset
```

2. At the prompt, type the following command to check the configuration information of lom.

```
root@MMC-MS.EMX.ERICSSON.SE] />> lom -c <enter>
```

LOMlite configuration settings:

```
alarm3 mode=watchdog  
firmware version=2.2  
firmware checksum=c9b2  
product revision=0.0  
product ID=Netra t140x
```

3. Establish and collect IP and related information for all servers of the completed MMC system. (See *MMC Alarm and LOMlite Wiring Diagram* for connection).

Note

An IP table of all components of the system is required in order to manage the alarms for the MMC system. The Internal O&M LAN is isolated from the Maintenance LAN. The operator workstation may be connected on the Maintenance LAN. It is possible to connect to RMS00, RMS01 and RMS02 via telnetting directly to their IPs. All servers can be connected via Terminal Server (T/S) with specific port number 20xx (where xx is the port number which is the serial port or LOM connected to.)

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Table 6 IP Table for MMC System

Server	Maintenance Lan	INT O&M LAN	SerA	SerA/LOM or LOM
MP00	N/A		N/A	
IW00	N/A		N/A	
MR00	N/A			
DS00	N/A			
MS00	N/A			
OM00	N/A		N/A	
MC00	N/A		N/A	
MP01	N/A		N/A	
IW01	N/A		N/A	
MR01	N/A			
DS01	N/A			
MS01	N/A			
OM01	N/A		N/A	
MC01	N/A		N/A	
RMS00		N/A	N/A	N/A
RMS01		N/A	N/A	N/A
RMS02		N/A	N/A	N/A
Tsvr		N/A	N/A	N/A
MR02	N/A			
MR03	N/A			

Note IP address –assigned by network operator and management.
Configure the system IP per assignment.

Note IP address for SerA and LOM ports – refer to document number
1/1541-CRH_109_248 & 3/1531-CRH_109_248.

Figure 1 MMC Alarm and LOMlite Wiring Diagram

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3.3 HOW TO CONNECT TO CONSOLE AND LOM PORT OF SERVERS

1. The console port (serA) of the servers is connected to Terminal Server T/S. It allows operators to connect via a telnet connection from a local workstation. To connect, type:

```
telnet A.B.C.D 20xy <enter>
```

If the connection is denied, the T/S port xy (range foe xy – 01 to 32) is used by other telnet connection. To release the line connection before it can be used:

```
telnet A.B.C.D <enter> <= telnet to T/S
```

```
root <enter> <= login ID
```

```
dbps<enter> <= password of T/S
```

```
kill xy <enter> <= release port "xy" for re-use
```

```
exit <enter> <= exit T/S, after it is done.
```

The T/S port xy is released. It can be reused by telnet in:

```
telnet A.B.C.D 20xy <enter> <= == Reconnect to the port xy.
```

2. The lom port of the servers is connected to Terminal Server T/S. It allows operators to connect via a telnet connection from a local workstation. To connect, type:

```
telnet A.B.C.X2 20 xy <enter> ==> connect to lom port of SERVERS
```

```
<enter> ==> press return again to get lom> prompt.
```

Note Use the same procedure as described above to release the occupied T/S ports, if the connection is denied. Command set:

```
lom>help <== to display command set
```

The following commands are supported:

Table 7

Command	Description
alarmon	to turn on Alarm, alarmon x
alarmoff	to turn off Alarm, alarmoff x
check	to check current faulty

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Command	Description
console	(not used for SERVERS)
environment	to display all alarms, env
faulton	to turn on fault LED
faultoff	to turn off fault LED
help	help command
poweron	to turn on System
poweroff	to turn off System
reset	to reset system
show	to show the history of log
version	to check version of lom

WARNING

Do not use poweron, poweroff or reset commands unless absolutely necessary.
They will interrupt the operation of the system.

3. If the serA and LOM are combined on a server which is using either Netra T1 or Netra T4, such as MP, IW, MC CONSOLE MODE prompt to the LOM prompt, and command <console> at the lom prompt is used to switch lom mode back to the CONSOLE prompt.

3.4

TO ACKNOWLEDGE AN ALARM

Any Fan or Power Supply fault from SERVERS will trigger an alarm on RMS. The Buzzer will sound ON, Warning LED on the front panel (See Front Control Panel of Rack Monitor System (RMS)) will be ON (if the warning indication is configured), and the alarm will be shown on the display.

In the following example, it is assumed that a major alarm (F7 MMCmajor) has been triggered.

Note F7 means filter 7 (refer to the Installation manual, *Setting the Filter*).

Figure 2 Front Control Panel of Rack Monitor System (RMS)

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The Faulty Alarm warning message will also be shown on the Console (serA) port of the server (see How to Connect to a serA for details). This warning message will be shown every 60 seconds (the time parameter can be programmed in lomset script, as discussed in *MMC HA Hardware Alarm Management Installation*, until the fault is resolved.

Example warning messages are shown below:

Example 1

```
Warning: Critical Major Alarm -- Power Supply Faulty, command <lom -p> for details
Warning: Critical Major Alarm -- Fan Faulty, command <lom -f> for details
Warning: Critical Major Alarm -- Power Supply and Fan Faulty, command <lom -a> for details
Warning: Minor Alarm -- Power Supply Faulty, command <lom -p> for details
Warning: Minor Alarm -- Fan Faulty, command <lom -f> for details
Warning: Minor Alarm -- Power Supply and Fan Faulty, command <lom -a> for details
```

3.4.1

Acknowledge Alarm from Front Panel.

Note The following example shows the major/minor alarms from cabinet #A.

Once the alarm is triggered, the DISPLAY will display:

```
F7 !MMCAmajor
```

4. Press **Enter**, to acknowledge the alarm. The buzzer and warning LED should go off, and display:

```
F7 *MMCAmajor
```

The alarm will be triggered again if the Reactivation option is enabled. The display will be shown again once the alarm is re-triggered.

3.4.2

To Disable the Current Alarm Before it is served:

1. Press **Menu** until **Network** appears in the display.
2. Use right or left arrows (< or >) to scroll the display to **Filter**.
3. Press **Enter** so the display shows F1 xxxx.
4. Use right or left arrows (< or >) to scroll the display:

```
F7 !MMCAmajor
```

5. Press **Enter**, to disable the Filter which displays:

```
F7 XMMCAmajor
```

Now, the alarm is disabled for services.

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- After the alarm is cleared, the repeat procedures and press **Enter** , until the display shows:

F7 MMCAmajor

The alarm will be enabled again.

3.4.3 Acknowledge Multiple Alarms

If multiple alarms appear, use the following procedures to acknowledge and disable the alarms for services.

- Press Menu until Network appears in the display.
- Use the right or left arrows (< or >) to scroll the display to Confirm.
- Press Enter so the display shows:

F1 xxxxxx

- Use right or left arrows (< or >) to scroll the display to show:

F7 !MMCAmajor

or

F7 *MMCAmajor

- Press Enter, to confirm. Continue to use the right and left arrows (< or >) to scroll the display to show more alarms.
- Use the same procedure as described in the section *To disable the current alarm before it is served:* above to disable the Filter for service.

3.4.4 Acknowledge Alarm Via Telnet In

- Locate the IP address of RMS00 (the following example is shown alarm in cabinet #A) from *IP Table for MMC System* (A.B.C.D) and telnet from a workstation.

```
telnet A.B.C.D
```

```
rms <== login id
```

```
rms <== password
```

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Example 2 Main Menu of RMS

```
RMS Version 1.4b3 H2-14 (1999/03/16-15:43)
                                Name: Knuerr RMS
                                Serial: 00106c000ba6
[N] Network Configuration      >
[S] System Configuration and Update  >
[U] User Administration        >
[I] I/O Configuration          >
[F] Filter Configuration       >
[M] Message Log                >

[?] Help
[Q] Quit Session
```

2. Select F for Filter Configuration.

Example 3 Filter Configuration

Filter Selection

```

      No  Description      State  Result  ReactTime  Confirmed  Disabled
-->  1  temperature      off   off      0 s
      2  humidity        off   off      0 s
      3  mains           off   off      0 s
      4  smoke/vibration  off   off      0 s
      5  ups             off   off      0 s
      6  infrared        off   off      0 s
      7  MMCAmajor       act   on       10 s
      8  MMCAmajor       act   off      10 s
      9  unused          off   off      0 s
     10  maximum alarm duration off   off      0 s
     11  upper threshold  off   off      0 s
     12  lower threshold  off   off      0 s

[D] Disable                  [-] Previous Filter
[C] Confirm Filter           [+] Next Filter
[F] Filter Configuration    >

[?] Help
[Q] Quit
```

3. Press +, move the cursor to MMCAmajor.

4. In the State and Result columns of MMCAmajor, it read act and on to indicate the alarm category and sources.

5. Press C, until * appears in the Confirmed column of MMCAmajor.

6. Press C again to toggle the Confirmed state.

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The *State* and *Result* columns become *off* and *off* after the Confirmed setting is changed. If the Reactivation option is enabled, the confirmed state is cleared when the ReactTime timer is timed out, and the alarm is re-triggered.

7. To disable the alarm, press D. The *Disabled* column shows an X for item 7. Press D again to toggle the Disabled state.

Example 4 Filter Configuration

Filter Selection

	No	Description	State	Result	ReactTime	Confirmed	Disabled
	1	temperature	off	off	0 s		
	2	humidity	off	off	0 s		
	3	mains	off	off	0 s		
	4	smoke/vibration	off	off	0 s		
	5	ups	off	off	0 s		
	6	infrared	off	off	0 s		
-->	7	MMCAmajor	off	off	10 s	*	
	8	MMCAminor	act	off	10 s		
	9	unused	off	off	0 s		
	10	maximum alarm duration	off	off	0 s		
	11	upper threshold	off	off	0 s		
	12	lower threshold	off	off	0 s		

3.4.5 To Find Out the Alarm Source

1. Return to RMS main menu.
2. Press / to show the I/O configuration.

Example 5 I/O Configuration

I/O Configuration

```
[0] Digital Outputs      >
[I] Digital Inputs      >
[T] Temperature Inputs  >
[H] Humidity Inputs     >
[M] Mains Monitoring    >
[A] AUX                 >

[?] Help
[Q] Quit Without Saving
[Return] Quit With Saving
```

3. Press I for Digital Inputs.

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Example 6 I/O Configuration

Digital Inputs

No	Description	State	Changes	Last Change
--> D 1	MR00major (alarm 1)	off	1	12 days 17:54:51
D 2	MR00minor (alarm 2)	on	1	12 days 17:54:51
D 3	DS00major (alarm 1)	on	1	12 days 17:54:51
D 4	DS00minor (alarm 2)	on	1	12 days 17:54:51
D 5	MS00major (alarm 1)	on	0	12 days 17:55:09
D 6	MS00minor (alarm 2)	on	0	12 days 17:55:09
D 7	MC00major (alarm 1)	on	0	12 days 17:55:09
D 8	MC00minor (alarm 2)	on	0	12 days 17:55:09
A 1	OM00major (alarm 1)	on	0	12 days 17:55:09
A 2	OM00minor (alarm 2)	on	0	12 days 17:55:09
A 3	INVamajor (alarm 1)	on	0	12 days 17:55:09
A 4	INVaminor (alarm 2)	on	0	12 days 17:55:09
U 1	(not used)	off	0	12 days 17:55:09
U 2	(not used)	off	0	12 days 17:55:09

[D] Description [-] Previous Input
[R] Reset Alert In [+] Next Input
[?] Help
[Q] Quit

- Check lines #D1 through #D8, and #A1 through #A4 to make sure that the State is set to on for each item. If any off state appears, it is the alarm source. From the above listing, the alarm source is:

MR00major (alarm 1)

3.4.6 To Locate the Alarm Source from Servers

- Get the IP address of the lom port and telnet port of the server for the alarm. See *IP Table for MMC System*.

Table 8 IP Addresses

Component	Maintenance LAN	INT O&M LAN	SerA	serA/LOM or LOM
MR00				
OM00				

If the Workstation is located at INT O&M LAN

Example: MR00major (alarm1) – Faulty alarm.

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2. Telnet directly to the server that issued the alarm:

```
telnet 192.168.229.81
```

3. Enter the appropriate login ID and password.
4. Enter the lom command at the Solaris prompt; for example,

```
SunOS 5.8
```

```
login: root
```

```
Password:
```

Example 7 Workstation at INT O&M LAN

```
Last login: Fri Aug 3 14:05:30 from pc207063.emx.eri
Sun Microsystems Inc. SunOS 5.8 Generic February 2000
You have mail.
[root@MMC-MS.EMX.ERICSSON.SE] />> lom -f
Fans:
1 OK speed 66%
2 OK speed 67%
3 OK speed 65%
4 OK speed 63%
[root@MMC-MS.EMX.ERICSSON.SE] />> lom -p
PSUs:
1 InB failed
2 InB failed
3 InB failed
[root@MMC-MS.EMX.ERICSSON.SE] />>
```

In the list above, command lom -f is used to display the fan status; and lom -p is used for PSU status. The result shows the alarm was generated due to PSU InB failure.

3.4.7

If the Workstation is located at Maintenance LAN.

Example: MR00major (alarm1) – Faulty alarm.

1. Telnet to the lom port of the server that issued the alarm.

```
telnet A.B.C.D 20xy
```

2. Log in and enter the password.
3. Switch to LOM mode if necessary.
4. The lom command set as shown in *How to connect to Console and lom Port of SERVERS* is used to display the status of the FAN and Power Supply. If a problem occurs, check if the lom is free. If the port is not free,

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release the lom port as described in *How to connect to Console and lom Port of SERVERS*.

Example:

```
lom>env <enter>
```

Example 8 Workstation at Maintenance LAN

```
Fault OFF
Alarm1 ON
Alarm2 OFF
Alarm3 OFF
```

```
Fans:
1 OK speed 66%
2 OK speed 67%
3 OK speed 65%
4 OK speed 63%
```

```
PSUs:
1 InB failed
2 InB failed
3 InB failed
lom>
```

In the example above the alarm was generated due to PSU InB failed messages.

3.5 FIX THE FAULTY CAUSE AND RE-ENABLE RMS

1. Follow the Maintenance Manual of SUN DS, MR (Netra 1400/1405), to replace fan or power supply units, if necessary.
2. Enable the RMS alarm, if it was disabled earlier for service.

The system is back to normal operation.

4 REFERENCES

- 1 DIGI Terminal Server Installation
3/1531-CRH 109 248 Uen Rev D
- 2 MMC System Release 2 Alarm Management Installation
1/1531-CRH 109 248 Uen Rev E

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MMC R2 SA DC System Cable Interconnection

1/19311-APX 901 30+ Uen Rev B
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MMC R2 SA AC System Cable Interconnection

1/19311-APX 901 29+ Uen Rev A