

# ***Interpreting Chassis Logs in Detail***

## ***(Revision 1.1)***

### **Printing history:**

- Revision 0.9      Original document created for N-Class
- Revision 1.0      Original document modified for L-Class. Most of the changes were to the “Reporting Entity Type = System Firmware” table where N-Class specific chassis codes were deleted and L-Class specific chassis codes were added. Located on EPSS CD ROM (A5191-10003) and at <http://docs.hp.com> under “Authorized HP Service Provider Information”
- Revision 1.1      Combined N-Class (rev 0.9) and L-Class (rev 1.0) into a single document (1.1). Replaced System Alert and chassis code examples with newer examples, added tables to allow manual decode of chassis codes, moved the “Reporting Entity Type = System Firmware” table for L-Class to Appendix A and included the same table for N-Class in Appendix B. As of 9/99, revision 1.1 only exists on the N-Class Specialist website as downloadable file.

## 1. Analyze the System Alert Summary

OR

## 2. Analyze the Detailed Chassis Log

1. Determine the Alert Level
2. Determine who is reporting the problem (*Reporting Entity Type, Reporting Entity ID*)
3. Determine what the reporting entity was doing at the time the log entry was made (*Caller Activity, Caller Subactivity, Activity Status*)
4. Determine what the problem was (*Source, Source Detail, Source ID, Problem Detail*)
5. Decode the data field for extra information
6. Decode Caller Subactivity if *Reporting Entity Type* = System Firmware
7. Decode Data 0 if *Reporting Entity Type* = HPUX

Chassis Logs provide an architected means to pass hardware failure data gathered by software, firmware and intelligent chassis hardware. The goal is to provide FRU isolation information.

**NOTE: This document describes chassis code definitions from an architectural perspective. Specific platforms will probably have not implemented everything described below.**

Below is a sample of an **L-Class** System Alert that occurred as a result of removing fan #2.

```
***** SYSTEM ALERT *****
SYSTEM NAME: fesrhapgsp
DATE: 09/29/1999 TIME: 18:06:00
ALERT LEVEL: 6 = Boot possible, pending failure - action required

REASON FOR ALERT
SOURCE: 6 = platform
SOURCE DETAIL: 3 = cabinet fan SOURCE ID: 2
PROBLEM DETAIL: 4 = fan failure

LEDs:  RUN      ATTENTION  FAULT      REMOTE     POWER
      FLASH    OFF        OFF        ON         ON

0x002000646302405F 00000000 00000000 - type 0 = Data Field Unused
0x582008646302405F 00006308 1D120600 - type 11 = Timestamp 09/29/1999 18:06:00
A: ack read of this entry - X: Disable all future alert messages
Anything else skip redisplay the log entry
->Choice:
*****
```

## 1. Analyze the System Alert Summary

The following is the System Alert Summary from the sample System alert above:

```
SYSTEM NAME: fesrhagosp      <- SYSTEM NAME reflects GSP SYSTEM NAME
DATE: 09/29/1999 TIME: 18:06:00
ALERT LEVEL: 6 = Boot possible, pending failure - action required
```

REASON FOR ALERT

SOURCE: 6 = platform

SOURCE DETAIL: 3 = cabinet fan SOURCE ID: 2

PROBLEM DETAIL: 4 = fan failure

```
LEDs:  RUN      ATTENTION  FAULT    REMOTE   POWER
       ON       FLASH      OFF     ON       ON
```

The System Alert Summary provides the following information:

- Which system the alert pertains to
- When the alert occurred
- The alert level
- The reason for the alert
- The state of the front panel LEDs

Interpreting the above example we get:

- The system with a GSP name of fesrhagosp generated the alert
- The alert occurred on September 29, 1999 at 18:06:00 GMT
- The reason for the alert was Fan #2 has failed. SOURCE ID provides FRU value.
- The front panel LEDs indicate that the system is in the Run State, the Attention LED is flashing (indicating this log entry has not been acknowledged as read), Fault and Remote are OFF and Power is ON. The flashing ATTENTION LED will go to OFF when this System Alert is acknowledged, by either typing A/a to the prompt at the end of the display or by reading the Error Log (GSP>SL, enter E for Error log).

## 2. Analyze the Detailed Chassis Log

Chassis code logs are displayed via the GSP>SL command and can be viewed in either text or hex format. The hex format is included as part of the text format. Chassis logs that are part of PIM are in hex format only.

Example of hex format chassis log:

```
Log Entry #    0 :  
  
0x002000646302405F 00000000 00000000  
0x582008646302405F 00006308 1D120600  
Type CR for next entry, Q CR to quit.
```

Below is the same log in text format. It provides much more detail. This information may be useful in identifying the failing FRU in certain failure situations.

```
Log Entry #    0 :  
SYSTEM NAME: fesrhaggs  
DATE: 09/29/1999 TIME: 18:06:00  
ALERT LEVEL: 6 = Boot possible, pending failure - action required  
  
SOURCE: 6 = platform  
SOURCE DETAIL: 3 = cabinet fan    SOURCE ID: 2  
PROBLEM DETAIL: 4 = fan failure  
  
CALLER ACTIVITY: 4 = monitor    STATUS: F  
CALLER SUBACTIVITY: 05 = fan  
REPORTING ENTITY TYPE: 2 = power monitor    REPORTING ENTITY ID: 00  
  
0x002000646302405F 00000000 00000000 type 0 = Data Field Unused  
0x582008646302405F 00006308 1D120600 type 11 = Timestamp 09/29/1999 18:06:00  
Type CR for next entry, Q CR to quit.
```

Web based tools exist for decoding N-Class chassis logs. As of 9/99, those tools have not been updated for L-Class. To manually decode the hex chassis code, refer to the info below.

```
63-----0 63-----0  
0x002000646302405F 00000000 00000000  
0x582008646302405F 00006308 1D120600  
-----  
Chassis Code          Data Field
```

Chassis codes follow Big Endian format. Bit 63 is the MSB and is the left most bit. Bit 0 is the LSB and is the right most bit.

**Figure 1 - Chassis Code Format**

63 62 61 60 59	58 57 56	55 54 53 52	51 50 49 48	47 46 45 44	43	42 41 40	39 38 37 36	35 34 33 32
Data Type	Rrsvd	Reporting Entity Type	Reporting Entity ID		E O M	Msg ID	Alert Level	Problem Detail

31 30 29 28	27 26 25 24	23 22 21 20 19 18 17 16	15 14 13 12	11 10 9 8 7 6 5 4	3 2 1 0
Source	Source Detail	Source ID	Caller Activity	Caller Subactivity	Activity Status

**Data Field Format** (Data Type dependent)

The information in the data field is interpreted differently depending on the Data Type (bits 63 – 59 of the chassis code) value. Refer to **Step 5. Decode the data field for extra information** for detailed information regarding how to interpret the data field.

**Table 1 - Chassis Code Field Descriptions**

Field	Description and Values(decimal)
Data Type	Type of data to be expected in the Data Field: 0 – Data Field Unused, 1 – Physical Address 2 – Expected Data, 3 – Actual data, 4 – Physical Location, 5 – Physical Location Extension,(untranslatable by system firmware) 6 – Tag, 7 – Syndrome, 8 – Code Address, 9 – ASCII Message (bit 7 to 0 is the first byte), 10 – POST Code, 11 – Timestamp, 12 – Device Status, 13 – Device Type, 14 – Problem Detail, 15 – Activity Level/Timeout (See format below), 16 – Serial Number, 17 – Revision Number, 18 – Interruption Information (See format below), 19 – Test Number, 20 – Major Changes in System State, 21 – Processor Deallocate (See format below used w/Alert level 1), 22 to 29 - Reserved, 30 – Reset Type and Cause, 31 – Legacy PA HEX Chassis Code,
Reporting Entity Type	The intelligence that generated the log entry during code execution 0 – System Firmware, 1 – Service Processor 2 – Power Monitor(‘Power Monitor’ appears in logs. FRU is ‘Platform Monitor for L-Class)

	3 – I/O Card Cage Controller, 4 – SPU Card Cage Controller, 5 – Cabinet Controller 6 – PDH Controller, 7 – Customer Engineer, 8 to 11 – Reserved, 12 – Reserved for Generic OS's, 13 – IA-64 NT, 14 – HP-UX, 15 – Off-line Diagnostics and Utilities,
Reporting Entity ID	Unique identifier of the hardware entity that generated the log entry during executing the instance of the code. For example, processors can have 0,1,2... in this field, so can the power monitors, etc. For processors, this should use the same numbering as the cpu_num reported through SAL_CPU (PDC_PAT_CPU) all. For other modules, TBD.
Message ID	Unique message ID provided by the caller to indicate the associativity among the log entries (0=no association). This field is combined with the reporting entity type, reporting entity ID, the caller activity and caller subactivity to form a unique identifier value to signal the association of the log entries. It is the caller's responsibility to provide correct associativity between the log entries.
EOM	End of Message marker, when set, is used to indicate that the log entries following the current one have no association with the current and all previous log entries.
Alert Level	Conveys what is to be done about the log entry without needing to deduce from the log data. 0- No failure detected, forward progress logs and time requests only, 1- Service processor alert, no failure detected, forward progress logs and timer requests only, 2- Non-urgent operator attention required, 3- System blocked waiting for operator input, 4- Unexpected configuration change detected, 5- Boot possible, environmental problem exists, 6- Boot possible, pending failure or environmental problem with action required (e.g., boot disk error rate above threshold, power failure, overtemp medium), 7- Reserved 8- Boot possible, performance impaired, 9- Reserved, 10- Boot possible, functionality lost, 11- Reserved, 12- Software failure, 13- System hand detected via timer popping, 14- Fatal power or environmental problem prevents operation, 15- Fatal hardware or configuration problem prevents operation.
Problem Detail	Specific information about the nature of the problem that is the subject of the log entry. This field is problem source detail dependent. Refer to the 'definitions of <i>Source</i> , <i>Source Detail</i> and <i>Problem Detail</i> ' table for definition.
Source	Field identifying the hardware FRU that is the subject of the log entry: 0- Unknown, no source stated, 1- Processor, 2- Processor Cache, 3- PDH, 4- Power, 5- Fabric Connector,

	6- Platform, 7- Memory, 8- I/O, 9- Cell, 10- Protection Domain, 11 to 15 – Reserved
Source Detail	Second level of detail about the hardware FRU that is the subject of the log entry. This field is problem source dependent. Refer to the 'definitions of <i>Source</i> , <i>Source Detail</i> and <i>Problem Detail</i> ' table for definition.
Source ID	Component below the source FRU (e.g., Elroy 2). This field is platform dependent. When there is no source ID specified, this field should be 0xFF. Possible L-Class values: For processor 0,1,2,3 For power supply 0,1,2 For PSM 0,1 For fans 0,1,2,3,4,5,6,7
Caller Activity	Field specified the activity being performed by the code reporting entity.
Caller Subactivity	Field specified in more detail about the activity being performed by the code reporting entity. This field may be implementation dependent.
Activity Status	Status of the caller activity/subactivity. This field is implementation dependent. Examples are start, bypass, complete, etc...

#### Analysis Steps:

1. Determine the Alert Level
2. Determine who is reporting the problem (*Reporting Entity Type*, *Reporting Entity ID*)
3. Determine what the reporting entity was doing at the time the log entry was made (*Caller Activity*, *Caller Subactivity*, *Activity Status*)
4. Determine what the problem was (*Source*, *Source Detail*, *Source ID*, *Problem Detail*)
5. Decode the data field for extra
6. Decode Caller Subactivity if *Reporting Entity Type* = System Firmware
7. Decode Data 0 if *Reporting Entity Type* = HPUX

### Step 1. Determine the Alert Level

The alert level conveys how serious the error is. It is used by the Service Processor (SP) to perform specific actions.

The example shows:

```
ALERT LEVEL: 6 = Boot possible, pending failure - action required
```

Without viewing any other information in the chassis log, we know we had a failure that requires action, but the system will boot.

Below is a list of the possible Alert Levels and their meaning:

<b><u>Alert Level</u></b>	<b><u>Description</u></b>
0	No failure detected, normal forward progress logs and timer requests only
1	Service processor alert, no failure detected, forward progress logs and timer requests only. Used by the SP to perform a specific action, such as changing the system state from Boot Start to Boot Complete.
2	Non-urgent operator attention required (example: Notification that a previous failed fan is now functioning).
3	System blocked waiting for operator input
4	Unexpected configuration change detected
5	Boot possible, environmental problem exists
6	Boot possible, pending failure or environmental problem with action required (i.e. Boot disk error rate above threshold, power failure, overtemp)
7	HPMC detected
8	Boot possible, performance impaired
9	Reserved
10	Boot possible, functionality lost
11	Reserved
12	Software failure (example: HPUX Panic)
13	System hang detected via timer popping (example: HPUX hung, SP will warmstart the system).
14	Fatal power or environmental problem prevents operation
15	Fatal hardware or configuration problem prevents operation

This information also appears in Table 1.



**Step 2. Determine who is reporting the problem (Reporting Entity Type, Reporting Entity ID)**

The example shows:

REPORTING ENTITY TYPE: 2 = power monitor      REPORTING ENTITY ID: 00

The *Reporting Entity Type* identifies the hardware or code that generated the log event.

The *Reporting Entity ID* identifies which of the *reporting entity types* generated the log entry. For example if System Firmware (PDC for PA-RISC systems) running on processor number 3 generated the log entry, the *Reporting Entity Type* would be System Firmware and the *Reporting Entity ID* would be 3.

In the above example, the *Reporting Entity Type* is type 2, which is defined as the Power Monitor. The *Reporting Entity ID* is 00, which indicates Power Monitor 0. L-Class does not have a Power Monitor FRU. References to Power Monitor in Chassis logs should be interpreted as Platform Monitor for L-Class.

The following is a list of the currently defined *Reporting Entity Types*:

<u>Entity Type</u>	<u>Description</u>
0	System Firmware
1	Service Processor
2	Power Monitor ('Platform Monitor' for L-Class)
3	I/O Card cage controller
4	SPU Card cage controller
5	Cabinet controller
6	PDH controller
7	Customer Engineer
8	Reserved
9	Reserved
10	Reserved
11	MPE
12	Reserved for generic OS's
13	IA-64 NT
14	HP-UX
15	Offline diagnostics and utilities

**Step 3. Determine what the reporting entity was doing at the time the log entry was made (Caller Activity, Caller Subactivity, Activity Status)**

The next set of information that is logged describes what the problem reporting entity was doing at the time it made the chassis log entry. This information is conveyed in the following fields:

- Caller Activity
- Caller Sub-Activity
- Status

The *Caller Activity* field specifies the activity being performed by the *reporting entity type*. Its purpose is to identify the large section of code that was executing on the *reporting entity type* when the log entry was created.

The *Caller Sub-Activity* field identifies the module of code was executing when the log entry was created. The *caller sub-activity* will always name submodules of the *caller activity*.

The *Status* field gives the status of the caller activity/subactivity. For example, for system firmware this could be start, bypass, complete, etc....

From the example above:

```
CALLER ACTIVITY: 4 = monitor    STATUS: F
CALLER SUBACTIVITY: 05 = fan
```

The *caller activity* is Monitor. The *caller sub-activity* is Fan. The *activity status* = F  
Based upon this information we know for this log entry, the power monitor was executing the Fan Monitoring code at the time the entry was made. The activity status is F, which is undefined for power monitor.

Below are the definitions of *Caller Activity/Subactivity/Status* and their relationship to *Reporting Entity Type*:

Reporting Entity Type	Caller Activity	Caller Subactivity	Activity Status
0 – System Firmware	0 – unspecified 1 – test 2 – config 3 – deconfig 4 – user interface 5 – IA-32 BIOS 6 – machine check 7 – INIT 8 – PMI 9 – utilities A – error handler B – LDB C – slave rendezvous D to F reserved	Implementation Dependant	TBD
1 – Guardian Service Processor	0 – test 1 – initialization	0 – unspecified 1 – self 2 – processor 3 – I/O bridge 4 – power conditioner 5 – high voltage power supply 6 – low voltage power supply	F – N/A

		7 – fan 8 – temperature sensor 9 – fabric connector 10 – platform internal interconnect 11 – front panel 12 – scan engine 13 to 255 – reserved	
	2 – operation	0 – unspecified 1 – idle 2 – platform internal interconnect communication 3 – console 4 – LAN access 5 to 255 – reserved	F – N/A
	3 – power on/off	0 – unspecified 1 – power conditioner 2 – high voltage power supply 3 – low voltage power supply 4 to 255 – reserved	F – N/A
	4 – monitor	0 – unspecified 1 – AC main 2 – power conditioner 3 – high voltage power supply 4 – low voltage power supply 5 – fan 6 – temperature sensor 7 – platform internal interconnect 8 – service processor 9 to 255 – reserved	F – N/A
	5 – config and deconfig	0 – unspecified 1 – protection domain 2 – SPU card cage 3 – processor 4 – memory 5 – I/O card cage 6 – I/O bridge 7 – I/O module 8 – high voltage power supply 9 – low voltage power supply 10 – fan 11 – fabric connector 12 – platform internal interconnect 13 – service processor 14 to 255 – reserved	F – N/A
	6 – scan test	0 – unspecified 1 – reset scan controller 2 – prepare for scan operation 3 – read/write scan ring 4 – change scan state 5 to 255 – reserved	F – N/A
	7 – utility	0 – unspecified 1 – firmware update 2 to 255 – reserved	F – N/A

	8 – initiate system boot	0 – unspecified 1 to 255 – reserved	F – N/A
	9 to F – reserved		
2 – Platform Monitor 3 – I/O card cage controller 4 – SPU card cage controller 5 – cabinet controller 6 – PDH controller	0 – test 1 – initialization	0 – unspecified 1 – self 2 – processor 3 – I/O bridge 4 – power conditioner 5 – high voltage power supply 6 – low voltage power supply 7 – fan 8 – temperature sensor 9 – fabric connector 10 – platform internal interconnect 11 – front panel 12 – scan engine 13 to 255 – reserved	F – N/A
	2 – operation	0 – unspecified 1 – idle 2 – platform internal interconnect communication 3 to 255 – reserved	F – N/A
	3 – power on/off	0 – unspecified 1 – power conditioner 2 – high voltage power supply 3 – low voltage power supply 4 to 255 – reserved	F – N/A
	4 – monitor	0 – unspecified 1 – AC main 2 – power conditioner 3 – high voltage power supply 4 – low voltage power supply 5 – fan 6 – temperature sensor 7 – platform internal interconnect 8 – service processor 9 to 255 – reserved	F – N/A
	5 – config and deconfig	0 – unspecified 1 – protection domain 2 – SPU card cage 3 – processor 4 – memory 5 – I/O card cage 6 – I/O bridge 7 – I/O module 8 – high voltage power supply 9 – low voltage power supply 10 – fan 11 – fabric connector 12 – platform internal interconnect 13 – service processor 14 to 255 – reserved	F – N/A

	6 – scan test	0 – unspecified 1 – reset scan controller 2 – prepare for scan operation 3 – read/write scan ring 4 – change scan state 5 to 255 – reserved	F – N/A
	7 – utility	0 – unspecified 1 – firmware update 2 to 255 – reserved	F – N/A
	8 to F – reserved		
7 – customer engineer	0 – repair	0 – unspecified 1 – single part 2 – multiple parts 3 – firmware update 4 to 255 – reserved	F – N/A
	1 to F – reserved		
8 to 11 – reserved			
12 – reserved for generic OS			
13 – IA-64 NT	TBD		
14 – HP-UX	0 to 6 – reserved 7 – Boot Loader 8 – SAL_PD (PDC_PAT_PD) activities 9 – SAL_EVENTS (PDC_PAT_EVENTS) activities A – SAL_IO (PDC_PAT_IO) activities B – system panic C – system initialization D – system shutdown E – system warning F – display_activity update	Implementation Dependant	TBD
15 – Offline diagnostics and utilities	TBD		

**Step 4. Determine what the problem was (Source, Source Detail, Source ID, Problem Detail)**

This step will help you determine the actual source of the problem that caused this log entry.

From the example we get:

SOURCE: 6 = platform  
 SOURCE DETAIL: 3 = cabinet fan SOURCE ID: 2  
 PROBLEM DETAIL: 4 = fan failure

The (Problem) *Source* field, along with the (Problem) *Source Detail* field and (Problem) *Source ID* identifies the hardware FRU that is the subject of the log entry.

A *Source ID* of FF = **No Source ID specified.**

The *Problem Detail* field provides specific information about the nature of the problem.

In the above example, the problem is with the SPU cabinet fan #2, and it has failed.

Below are the definitions of *Source*, *Source Detail* and *Problem Detail*:

Source	Source Detail	Problem Detail
0 – unknown, no source stated	0 – unknown, no source detail stated	0 – no problem detail 1 to F – reserved
1 – processor	0 – unknown, no source detail stated	0 – no problem detail 1 to F – reserved
	1 – processor general	0 – no problem detail 1 – overtemperature 2 – underspeed 3 – functional failure 4 – timeout 5 – performance impaired 6 – waiting for deconfigure 7 – added to configuration 8 – removed from configuration 9 – PAL incompatible A – orphan log entry follows B – failed log entry follows C – processor is installed D – processor is de-installed E – processor is BSP F – reserved
	2 – fan	0 – no problem detail 1 – overtemperature 2 – underspeed 3 – functional failure 4 – timeout 5 – performance impaired 6 to F – reserved
	3 – bus translator	0 – no problem detail 1 – system bus general error 2 – timeout on system bus 3 – system bus broadcast error detected 4 – system bus INIT signal detected

		5 – system bus address error 6 – system bus data bus error 7 – system bus control bus error 8 – processor bus general error 9 – timeout on processor bus A – processor bus broadcast error detected B – processor bus address error detected C – processor bus data bus error D – processor bus control bus error E – processor bus flush to I/O F – reserved
	3 to F – reserved	
2 – processor cache	0 – unknown, no source detail stated	0 – no problem detail 1 to F – reserved
	1 – I cache L0 2 – I cache L1 3 – I cache L2 4 – D cache L0 5 – D cache L1 6 – D cache L2	0 – no problem detail 1 – overtemperature 2 – single bit error 3 – double bit error 4 – timeout 5 – deallocation entry 6 – reserved 7 – added to configuration 8 – removed from configuration 9 – reserved A – ECC error B to F - reserved
	7 to F – reserved	
3 – PDH	0 – unknown, no source detail stated	0 – no problem detail 1 to F – reserved
	1 – semaphore registers	0 – no problem detail 1 – read error 2 – write error 3 – non-responding 4 – checksum error 5 – nested lock 6 – unable to obtain 7 to F - reserved
	2 – ROM 3 – scratch RAM 4 – NVM 5 – platform registers 6 – interconnect medium	0 – no problem detail 1 – read error 2 – write error 3 – non-responding 4 – checksum error 5 to F - reserved
	7 – configuration space	0 – no problem detail 1 – unable to allocate 2 to F - reserved
	8 – battery	0 – no problem detail 1 – battery low 2 to F – reserved
	9 to F – reserved	
4 – power	0 – unknown, no source detail stated	0 – no problem detail 1 to F – reserved

	1 – AC mains 2 – AC power conditioner 3 – low voltage DC power 4 – high voltage DC power 5 – housekeeping	0 – no problem detail 1 – supply overtemperature 2 – fan underspeed 3 – fan speed change 4 – output undervoltage 5 – output overvoltage 6 – output overcurrent 7 – illegal power supply type 8 – power on 9 – power off A – failed B – functioning C – redundant D – non-redundant E – power overloaded F – reserved
	6 to F – reserved	
5 – fabric connector	0 – unknown, no source detail stated	0 – no problem detail 1 to F – reserved
	1 – cross bar 2 – router	0 – no problem detail 1 – port in FE mode 2 to F – reserved
	3 to F – reserved	
6 – platform	0 – unknown, no source detail stated	0 – no problem detail 1 to 5 – reserved 6 – reflecting queue overflowed 7 – system failed to boot 8 to F – reserved
	1 – cabinet 2 – cardcage (I/O and Cell)	0 – no problem detail 1 – inlet overtemp 2 – inlet low air flow 3 – outlet overtemp 4 – outlet low air flow 5 – internal overtemp 6 – internal low airflow 7 to F – reserved
	3 – cabinet fan 4 – cardcage fan	0 – no problem detail 1 – reserved 2 – underspeed 3 – speed change 4 – fan failure 5 – functioning 6 – insufficient # of fans 7 to F – reserved
	5 – front panel	TBD
	6 – service processor	0 – no problem detail 1 – selftest result 2 – functional error 3 – software error 4 – battery failure 5 to F – reserved
	7 – power monitor	0 – no problem detail 1 – illegal system configuration 2 – schmoo enabled 3 – HW/FW mismatch



		4 – internal failure 5 to 9 – reserved A – orphan log entry follows B – failed log entry follows C to F – reserved
	8 – cell board	TBD
	9 – backplane	TBD
	A to F – reserved	
7 – memory	0 – unknown, no source detail stated	0 – no problem detail 1 to 3 - reserved 4 – timeout 5 to F – reserved
	1 – controller	0 – no problem detail 1 – overtemperature 2 – reserved 3 – function failure 4 – timeout 5 – address function 6 – memory function 7 – error function 8 – register data 9 to F – reserved
	2 – carrier 3 – bank 4 – SIMM or DIMM 5 – minimum memory 6 – physical memory 7 – user interface memory	0 – no problem detail 1 – overtemperature 2 – single bit error 3 – double bit error 4 – timeout 5 – incompatible 6 – page deconfigured 7 – added to configuration 8 – removed from configuration 9 – mismatch A – ECC error B – missing C – checksum error D – control address parity error E to F - reserved
	8 – page deallocation	0 – no problem detail 1 – disabled 2 – single bit error overwrite 3 – duplicate entry 4 – table access error 5 – table full 6 to F - reserved
	9 – system bus	0 – no problem detail 1 – general 2 – response bus error 3 – broadcast error detected 4 – bus INIT signal detected 5 – address bus error 6 – data bus error 7 to F - reserved
	A to F – reserved	
8 – I/O	0 – unknown, no source detail stated	0 – no problem detail 1 to F - reserved

	1- bus (e.g. PCI, SCSI, USB, etc.)	0 – no problem detail 1 – reserved 2 – reserved 3 – speed change 4 to 9 - reserved A – ECC error B – parity error C to F – reserved
	2 – system bus adapter 3 – local bus adapter 4 – expansion bridges 5 – I/O device adapter	0 – no problem detail 1 – unknown 2 – insufficient resource 3 – function failure 4 – timeout 5 – exceed max bus depth 6 – configuration error 7 – device disabled 8 to A - reserved B – parity error C to F – reserved
	6 – disk 7 – tape 8 – network 9 – serial A – parallel B – video C - audio	0 – no problem detail 1 – overtemperature 2 – data error 3 – functional failure 4 – timeout 5 – protocol error 6 – configuration error 7 – expected device missing 8 to F – reserved
	D to F – reserved	
9 - cell	0 – unknown, no source detail stated	0 – no problem detail 1 to F – reserved
	1 – cell controller	0 – no problem detail 1 – bad cell number 2 – reserved 3 – non-responding 4 – reserved 5 – reserved 6 – configuration error 7 to F – reserved
10 – protection domain	0 – unknown, no source detail stated	0 – no problem detail 1 to F – reserved
11 to 15 – reserved		

**Step 5. Decode the data field for extra information**

Along with the main detailed chassis log entry, extra information can be passed using data fields. There can be from 0 to N data fields associated with a log entry. Each data field is divided into two 32-bit words. There is always at least one data field sent with a log entry, although it may be unused.

Below are the Data Words from the example chassis log entry:

```
00000000 00000000 - type 0 = Data Field Unused
00006308 1D120600 - type 11 = Timestamp 09/29/1999 18:06:00
```

Here we see that one Data Field is unused while the other represents the timestamp.

Below are the Data Type definitions of the Data Fields:

Data Type	Data Type Name	Description
0	Unused	Data field unused
1	Physical address	The address value of a cache or memory error
2	Expected data	The expected data
3	Actual data	The actual data
4	Physical location	Used to describe the physical location of an FRU
5	Physical location ext.	Further describes the physical location of an FRU
6	Tag	The value of the cache tag
7	Syndrome	The ECC value
8	Code address	The address of the executing code
9	ASCII message	Used to pass an ASCII message with the log entry
10	POST code	Power-on Selftest error code
11	Timestamp	Used to timestamp to log entry
12	Device status	Conveys device status
13	Device type	Used to convey device type
14	Problem detail	Used to convey more problem detail
15	Activity level/timeout	Used to convey the current activity level. Also used to set the watchdog timeout value (1 or 3 minutes) that is used to detect system hangs.
16	Serial number	Conveys a serial number
17	Revision number	Conveys a revision number
18	Interrupt information	Used to convey internal or external interrupt information
19	Test number	Used by selftest or diagnostics to indicate the test number
20	Major change in system state	This data type has two uses: 1. Used to control the Run/Attn/Fault LED state 2. Used to inform the service processor of a major change in system state. For example, Boot Start system state change will cause the SP to open a Current Boot Log and a Boot complete system state change will cause the SP to close the Current Boot Log. Examples of other system states would be PANIC, HPMC, Shutdown, etc....
21	Processor deallocate	Used to inform the SP a specific processor has been deallocated.
22 – 29	Reserved	
30	Reset type and cause	Used to capture the type of reset and its cause
31	Legacy PA HEX chassis code	Used to pass a legacy PA Hex chassis code to the SP.

For **Data Type 4 (Physical Location)** the data field can represent either a physical **memory** or **I/O location**. Use the appropriate format to decode the data field.

**Memory Physical Location Format**

63 62 61 60 59 57 56 55	54 53 52 51 50 49 48 47	46 45 44 43 42 41 40	39 38 37 36 35 34 33 32			
Cabinet	Card Cage	Backplane	Cell			
31 30 29 28 27 26 25 24	23 22 21 20 19 18 17 16	15 14 13 12 11 10 9 8	7 6 5 4	3 2 1 0		
Extender	DIMM Slot	Reserved	Source=7	Detail		

Detail	Description
0	Unknown
1	Controller
2	Carrier
3	Bank
4	SIMM or DIMM
5	Minimum Memory
6	Physical memory
7	User Interface memory
8	Page Deallocation
9-15	Reserved

**I/O Device Physical Location Format**

63 62 61 60 59 57 56 55	54 53 52 51 50 49 48 47	46 45 44 43 42 41 40	39 38 37 36 35 34 33 32			
Cabinet	Card Cage	Backplane	Reserved			
31 30 29 28 27 26 25 24	23 22 21 20 19 18 17 16	15 14 13 12 11 10 9 8	7 6 5 4	3 2 1 0		
Reserved	I/O Slot	Reserved	Source=8	Detail		

Detail	Description
0	Unknown
1	Bus
2	System Bus Adapter
3	Local Bus Adapter
4	Expansion Bridge
5	I/O Device Adapter
6	Disk
7	Tape
8	Network
9	Serial
10	Parallel
11	Video
12	Audio
13-15	Reserved

**Data Type 11 - Timestamp**

63 62 61 60 59 57 56 55	54 53 52 51 50 49 48 47 46 45 44 43 42 41 40	39 38 37 36 35 34 33 32
Reserved	Years Since 1900	Months Since January

31 30 29 28 27 26 25 24	23 22 21 20 19 18 17 16	15 14 13 12 11 10 9 8	7 6 5 4 3 2 1 0
Day of the Month	Hours After 12:00am	Minutes after Hour	Seconds After Minute

**Data Type 21 – Processor Deallocate**

63 62 61 60 59 57 56 55	54 53 52 51 50 49 48 47 46 45 44 43 42 41 40	39 38 37 36 35 34 33 32

31 30 29 28 27 26 25 24	23 22 21 20 19 18 17 16	15 14 13 12 11 10 9 8	7 6 5 4 3 2 1 0
cpu_num (see SAL_CPU or PDC_PAT_CPU)			

**Data Type 31 – Legacy PA Hex Chassis Code**

63 62 61 60 59 57 56 55	54 53 52 51 50 49 48 47 46 45 44 43 42 41 40	39 38 37 36 35 34 33 32

31 30 29 28 27 26 25 24	23 22 21 20 19 18 17 16	15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 0
Legacy PA Chassis Log		

## **6. Decode Caller Subactivity if Reporting Entity Type = System Firmware**

When the *Reporting Entity Type* = System Firmware, the GSP does not format the *Caller Sub-Activity* and *Activity Status*.

The appropriate table (Appendix A for L-Class, Appendix B for N-Class) should be used to interpret these values:

1. Find the *Source* value of the Chassis Log Entry.
2. Find the *Source Detail* value that corresponds to the Source.
3. Find the *Caller Activity* value that corresponds to the Source Detail.
4. Find the *Caller Subactivity* value that corresponds to the Caller Activity.
5. Find the *Activity Status* value that corresponds to the Caller Subactivity.
6. The Definition field defines the System Firmware code that made the log entry.

*Reporting Entity ID* = Processor Number that the System Firmware was executing on.

## **7. Decode Data 0 if Reporting Entity Type = HP-UX**

If the *Reporting Entity Type* = HP-UX, it will report its chassis code as a Legacy PA chassis code, which was the old 4 Hex Digit codes used on systems prior to the N4000. It is reported in the Low Half of Data Word 0.

Here is an example:

```
Log Entry # 1 :
SYSTEM NAME: fesrhapgsp
DATE: 09/29/1999 TIME: 14:34:01
ALERT LEVEL: 0 = No failure detected, forward progress

SOURCE: 1 = processor
SOURCE DETAIL: 1 = processor general SOURCE ID: 0
PROBLEM DETAIL: 0 = no problem detail

CALLER ACTIVITY: C = system initialization STATUS: 0
CALLER SUBACTIVITY: FA = implementation dependent
REPORTING ENTITY TYPE: E = HP-UX REPORTING ENTITY ID: 00

0xF8E000001100CFA0 00000000 0000CFA0 type 31 = legacy PA HEX chassis-code
0x58E008001100CFA0 00006308 1D0E2201 type 11 = Timestamp 09/29/1999 14:34:01
Type CR for next entry, - CR for previous entry, Q CR to quit.
```

Here we see that Data Type ('type') is 31 = legacy PA Hex chassis code. The hex code is contained in the data field is CFA0.

You'll also notice that this Hex code is spread out to the following fields:

```
Caller Activity = C
Caller Subactivity = FA
Status = 0
```

The definitions of the legacy PA Hex chassis codes has not changed from previous versions of HP-UX.

## Appendix A: System Firmware Reporting Entity Type for L-Class

### Reporting Entity Type = System Firmware

Source	SrcDetail	CallerActivity	CallerSub	ActStatus	Definition
0x00	0x00	0x00	0x00	0x2	BOOT_RESET_BY_OS
0x00	0x00	0x00	0x50	0xb	MC_HPMC_STATE_DATA
0x00	0x00	0x00	0x60	0x3	BOOT_HALT_LED_DATA
0x00	0x00	0x00	0x60	0x3	BOOT_HALT_LED_DATA
0x00	0x00	0x00	0x71	0x0	BOOT_BOOT_START_DATA
0x00	0x00	0x01	0x00	0x3	OSTAT_IS_WARN
0x00	0x00	0x01	0x00	0x3	OSTAT_IS_FAIL
0x00	0x00	0x06	0x10	0x2	MC_UNKNOWN
0x00	0x00	0x06	0x11	0x2	MC_HPMC_FOUND
0x00	0x00	0x06	0x12	0x2	MC_TOC_FOUND
0x00	0x00	0x06	0x13	0x2	MC_LPMC_FOUND
0x00	0x00	0x06	0x23	0x2	MC_HPMC_PIM_OVERWRITE
0x00	0x00	0x06	0x24	0x2	MC_HPMC_INITIATED
0x00	0x00	0x06	0x25	0x2	MC_HPMC_DURING_TOC
0x00	0x00	0x06	0x26	0x2	MC_MULTIPLE_HPMCS
0x00	0x00	0x06	0x27	0x2	MC_NVM_PREV_NOT_LOGGED
0x00	0x00	0x06	0x28	0x2	MC_HPMC_NOT_LOGGED
0x00	0x00	0x06	0x29	0x2	MC_HPMC_MONARCH_SELECTED
0x00	0x00	0x06	0x40	0x2	MC_BR_TO_OS_HPMC_FAILED
0x00	0x00	0x06	0x41	0x2	MC_OS_HPMC_MISSING
0x00	0x00	0x06	0x42	0x2	MC_OS_HPMC_LEN_ERR
0x00	0x00	0x06	0x43	0x2	MC_OS_HPMC_ADDR_ERR
0x00	0x00	0x06	0x44	0x2	MC_OS_HPMC_CODE_ZERO
0x00	0x00	0x06	0x45	0x2	MC_OS_HPMC_CHECKSUM_ERR
0x00	0x00	0x06	0x46	0x2	MC_BR_TO_OS_HPMC
0x00	0x00	0x06	0x50	0x2	MC_TOC_FAILED
0x00	0x00	0x06	0x51	0x2	MC_TOC_INITIATED
0x00	0x00	0x06	0x52	0x2	MC_TOC_PIM_OVERFLOW
0x00	0x00	0x06	0x53	0x2	MC_BR_TO_OS_TOC
0x00	0x00	0x06	0x60	0x2	MC_OS_TOC_MISSING
0x00	0x00	0x06	0x61	0x2	MC_OS_TOC_ADDR_ERR
0x00	0x00	0x06	0x62	0x2	MC_OS_TOC_CODE_ZERO
0x00	0x00	0x06	0x63	0x2	MC_OS_TOC_CODE_UNALIGNED
0x00	0x00	0x06	0x64	0x2	MC_OS_TOC_CHECKSUM_ERR
0x00	0x00	0x06	0x70	0x2	MC_LPMC_UNDEFINED_TYPE
0x00	0x00	0x06	0x71	0x2	MC_OS_LPMC_TRANSFER_FAIL
0x00	0x00	0x06	0x72	0x2	MC_LPMC_INITIATED
0x00	0x00	0x06	0x73	0x2	MC_LPMC_PIM_OVERFLOW
0x00	0x00	0x06	0x74	0x2	MC_BR_TO_OS_LPMC_INITIATED
0x00	0x03	0x04	0xe2	0x03	BOOT_SER_NUM_DATA
0x01	0x00	0x00	0x00	0x0	PROCS_TEMP
0x01	0x00	0x00	0x00	0x5	CPU_STOP
0x01	0x00	0x00	0x10	0x0	PROCS_ENTRY_IN



Source	SrcDetail	CallerActivity	CallerSub	ActStatus	Definition
0x01	0x00	0x00	0x20	0x0	PROCS_ENTRY_OUT
0x01	0x00	0x01	0x00	0x0	CPU_TEST
0x01	0x00	0x01	0x02	0x0	BOOT_BAD_CPU_ORDER
0x01	0x00	0x01	0x10	0x0	EST_START
0x01	0x00	0x01	0x10	0x1	EST_SKIP
0x01	0x00	0x01	0x10	0xf	EST_EXIT
0x01	0x00	0x01	0x11	0x0	CPU_TEST_BASIC
0x01	0x00	0x01	0x11	0x3	CPU_Basic_Failure
0x01	0x00	0x01	0x12	0x0	CPU_ALU
0x01	0x00	0x01	0x12	0x3	CPU_ALU_Failure
0x01	0x00	0x01	0x13	0x0	CPU_Branch
0x01	0x00	0x01	0x13	0x3	CPU_Branch_Failure
0x01	0x00	0x01	0x14	0x0	CPU_Arithmetic_Conditions
0x01	0x00	0x01	0x14	0x3	CPU_Arithmetic_Conditions_Failure
0x01	0x00	0x01	0x15	0x0	CPU_Bit_Operations
0x01	0x00	0x01	0x15	0x3	CPU_Bit_Operations_Failure
0x01	0x00	0x01	0x16	0x0	CPU_Control_Registers
0x01	0x00	0x01	0x16	0x3	CPU_Control_Registers_Failure
0x01	0x00	0x01	0x17	0x0	CPU_External_Interrupts
0x01	0x00	0x01	0x17	0x3	CPU_External_Interrupts_Failure
0x01	0x00	0x01	0x18	0x0	CPU_Interval_Timer
0x01	0x00	0x01	0x18	0x3	CPU_Interval_Timer_Failure
0x01	0x00	0x01	0x19	0x0	CPU_Multi-media
0x01	0x00	0x01	0x19	0x3	CPU_Multi-media_Failure
0x01	0x00	0x01	0x1a	0x0	CPU_Shadow_Registers
0x01	0x00	0x01	0x1a	0x3	CPU_Shadow_Registers_Failure
0x01	0x00	0x01	0x1c	0x0	CPU_Diagnose_Registers
0x01	0x00	0x01	0x1c	0x3	CPU_Diagnose_Registers_Failure
0x01	0x00	0x01	0x1d	0x0	CPU_Remote_Diagnose_Registers
0x01	0x00	0x01	0x1d	0x3	CPU_Remote_Diagnose_Registers_Failure
0x01	0x00	0x01	0x20	0x0	LST_START
0x01	0x00	0x01	0x20	0x1	LST_SKIP
0x01	0x00	0x01	0x20	0xf	LST_EXIT
0x01	0x00	0x01	0x33	0x0	CPU_Cache_Byte
0x01	0x00	0x01	0x33	0x3	CPU_Cache_Byte_Failure
0x01	0x00	0x01	0x35	0x0	CPU_Instruction_Cache_Miss
0x01	0x00	0x01	0x35	0x3	CPU_Instruction_Cache_Miss_Failure
0x01	0x00	0x01	0x39	0x0	Coprocessor_Tests
0x01	0x00	0x01	0x39	0x3	Coprocessor_Tests_Failure
0x01	0x00	0x01	0x3a	0x0	Coprocessor_Registers
0x01	0x00	0x01	0x3a	0x3	Coprocessor_Registers_Failure
0x01	0x00	0x01	0x3b	0x0	Coprocessor_Instructions_Tests
0x01	0x00	0x01	0x3b	0x3	Coprocessor_Instructions_Tests_Failure
0x01	0x00	0x01	0x3c	0x0	Coprocessor_Traps_Test
0x01	0x00	0x01	0x3c	0x3	Coprocessor_Traps_Test_Failure
0x01	0x00	0x01	0x3d	0x0	Coprocessor_Misc.
0x01	0x00	0x01	0x3d	0x3	Coprocessor_Misc_Failure

Source	SrcDetail	CallerActivity	CallerSub	ActStatus	Definition
0x01	0x00	0x01	0x3e	0x0	Coprocessor_Bypass
0x01	0x00	0x01	0x3e	0x3	Coprocessor_Bypass_Failure
0x01	0x00	0x01	0x41	0x0	BOOT_MONARCH_SELECTED
0x01	0x00	0x01	0x42	0x0	BOOT_MONARCH_SLAVE_CHECK
0x01	0x00	0x01	0x43	0x0	BOOT_MONARCH_SLAVE_TEST
0x01	0x00	0x01	0x44	0x0	BOOT_MONARCH_SLAVE_TEST_END
0x01	0x00	0x01	0x46	0x0	BOOT_MONARCH_TEST
0x01	0x00	0x01	0x51	0x0	CPU_TLB_RAM
0x01	0x00	0x01	0x51	0x3	CPU_TLB_RAM_Failure
0x01	0x00	0x01	0x52	0x0	CPU_TLB_Translation
0x01	0x00	0x01	0x52	0x3	CPU_TLB_Translation_Failure
0x01	0x00	0x01	0x61	0x0	BOOT_SLAVE_BIG_ERROR
0x01	0x00	0x02	0x0e	0x0	BOOT_BOOT_ABDICATION
0x01	0x00	0x04	0x00	0x0	BCH_TEMP
0x01	0x00	0x04	0x10	0x0	BCH_DFLT_SS_INIT
0x01	0x00	0x04	0x20	0x0	BCH_DFLT_SS_FATAL
0x01	0x00	0x04	0x30	0x0	BCH_DFLT_SS_CHECK
0x01	0x00	0x07	0x01	0x0	CPU_INIT
0x01	0x00	0x0c	0x10	0x0	BOOT_CACHE_CPU_RENDEZVOUS
0x01	0x00	0x0c	0x17	0x0	BOOT_CPU_RENDEZVOUS
0x01	0x00	0x0c	0x40	0x0	BOOT_MEM_CPU_RENDEZVOUS
0x01	0x00	0x0c	0x4e	0x0	BOOT_OS_RENDEZVOUS
0x01	0x01	0x01	0x2d	0x0	BOOT_HVERSION_MISMATCH
0x01	0x01	0x01	0x45	0x0	BOOT_MONARCH_ST_FLT
0x01	0x01	0x01	0x62	0x0	BOOT_SLAVE_CPU_FAIL
0x01	0x01	0x01	0x63	0x0	BOOT_SLAVE_FAILED
0x01	0x01	0x01	0x66	0x0	BOOT_ST_WARNING
0x01	0x01	0x01	0x67	0x0	BOOT_TEST_CPU_CLOCKS
0x01	0x01	0x01	0x6b	0x0	BOOT_UNEXPECTED_INTERRUPT
0x01	0x01	0x01	0x6d	0x0	BOOT_BAD_CPU_NUMBER
0x01	0x01	0x02	0x16	0x0	BOOT_CPU_DECONFIG
0x01	0x01	0x06	0x30	0x2	MC_CPU_RUNWAY_PATH_ERR
0x01	0x01	0x06	0x31	0x2	MC_CPU_RUNWAY_TIMEOUT
0x01	0x01	0x06	0x32	0x2	MC_CPU_RUNWAY_BROAD_ERR
0x01	0x01	0x06	0x33	0x2	MC_CPU_RUNWAY_DIR_ERR
0x01	0x01	0x06	0x34	0x2	MC_CPU_RUNWAY_BUS_PAR_ERR
0x01	0x01	0x06	0x35	0x2	MC_CPU_RUNWAY_ILLEGAL_RESP
0x01	0x01	0x06	0x36	0x2	MC_CPU_RUNWAY_UNKNOWN_ERR
0x02	0x00	0x01	0x15	0x0	BOOT_CPU_CACHE_BAD
0x02	0x00	0x01	0x1a	0x0	BOOT_EARLY_BAD_CACHE_SIZE
0x02	0x01	0x01	0x00	0x0	I_CACHE_TEST
0x02	0x01	0x01	0x11	0x0	CPU_Instruction_Cache_RAM
0x02	0x01	0x01	0x11	0x3	CPU_Instruction_Cache_RAM_Failure
0x02	0x01	0x01	0x12	0x0	CPU_Instruction_Cache_Tags
0x02	0x01	0x01	0x12	0x3	CPU_Instruction_Cache_Tags_Failure
0x02	0x01	0x01	0x13	0x0	CPU_Instruction_Cache_Errors
0x02	0x01	0x01	0x13	0x3	CPU_Instruction_Cache_Errors_Failure

Source	SrcDetail	CallerActivity	CallerSub	ActStatus	Definition
0x02	0x04	0x01	0x00	0x0	D_CACHE_TEST
0x02	0x04	0x01	0x21	0x0	CPU_Data_Cache_RAM
0x02	0x04	0x01	0x21	0x3	CPU_Data_Cache_RAM_Failure
0x02	0x04	0x01	0x22	0x0	CPU_Data_Cache_Tags
0x02	0x04	0x01	0x22	0x3	CPU_Data_Cache_Tags_Failure
0x03	0x00	0x01	0x01	0x0	BOOT_BAD_CLOCKS
0x03	0x00	0x01	0x12	0x0	BOOT_CCP_DISABLED
0x03	0x00	0x01	0x13	0x0	BOOT_CCP_FOUND
0x03	0x00	0x01	0x49	0x0	BOOT_NO_CCP
0x03	0x00	0x01	0x6e	0x0	BOOT_READING_SPD_EEPROM
0x03	0x00	0x01	0x71	0x0	BOOT_INVALID_SPHYR_SETTINGS
0x03	0x00	0x01	0x72	0x0	BOOT_MISMATCH_CPU_ACT_SPEEDS
0x03	0x00	0x01	0x73	0x0	BOOT_MISMATCH_CPU_CAP_SPEEDS
0x03	0x00	0x01	0x74	0x0	BOOT_MISMATCH_CPU_ICACHE_SIZES
0x03	0x00	0x01	0x75	0x0	BOOT_MISMATCH_CPU_DCACHE_SIZES
0x03	0x00	0x01	0x76	0x0	BOOT_ERR_READING_SPD_EEPROM
0x03	0x00	0x02	0x2d	0x00	BOOT_HVERSION_MISMATCH
0x03	0x00	0x02	0x2f	0x0	BOOT_INIT_CCP
0x03	0x00	0x02	0x30	0x0	BOOT_INIT_CPU_CLOCKS
0x03	0x00	0x02	0x77	0x0	BOOT_CPUS_PRESENTL
0x03	0x00	0x02	0x78	0x0	BOOT_TIMESTAMP
0x03	0x00	0x02	0x79	0x00	BOOT_UNARCH_SS_WARNING
0x03	0x00	0x02	0x7a	0x00	BOOT_ARCH_SS_WARNING
0x03	0x00	0x02	0x7b	0x00	BOOT_SER_NUM_WARNING
0x03	0x01	0x01	0x19	0x0	BOOT_DISPLAY_SM4
0x03	0x02	0x01	0x56	0x0	BOOT_ROM_XSUM_ERR
0x03	0x02	0x01	0x57	0x0	BOOT_ROM_XSUM_INIT
0x03	0x02	0x01	0x58	0xf	BOOT_ROM_XSUM_TEST
0x03	0x03	0x01	0x59	0x0	BOOT_SCR_FATAL_ERR
0x03	0x03	0x01	0x60	0x0	BOOT_SCR_INIT
0x03	0x04	0x01	0x1e	0x0	BOOT_ERR_READING_NVM
0x03	0x04	0x01	0x23	0x0	BOOT_FATAL_ERR_READING_NVM
0x03	0x04	0x01	0x26	0x0	BOOT_FATAL_ERR_WRITING_NVM
0x03	0x04	0x01	0x32	0x0	BOOT_INIT_MANUF_DFLTS
0x03	0x04	0x01	0x55	0x0	BOOT_RETRIEVE_PATH_FAILED
0x03	0x04	0x01	0x64	0x0	BOOT_SS_ERROR
0x03	0x04	0x01	0x64	0x0	BOOT_SS_FATAL_ERROR
0x03	0x04	0x02	0x14	0x0	BOOT_CLEARING_NVM
0x03	0x04	0x06	0x01	0x2	MC_INIT_NVM_WR_FAIL
0x03	0x04	0x06	0x20	0x2	MC_NVM_ACCESS_FAILED
0x03	0x04	0x06	0x21	0x2	MC_NVM_READ_FAILED
0x03	0x04	0x06	0x22	0x2	MC_NVM_WRITE_FAILED
0x03	0x04	0x06	0x54	0x2	MC_TOC_NVM_RD_FAIL
0x03	0x04	0x06	0x55	0x2	MC_TOC_NVM_WR_FAIL
0x03	0x05	0x01	0x50	0x0	BOOT_PDH_CNTRL_ERR
0x03	0x05	0x01	0x52	0x0	BOOT_PDH_CNTRL_TEST
0x03	0x05	0x02	0x51	0x0	BOOT_PDH_CNTRL_INIT

Source	SrcDetail	CallerActivity	CallerSub	ActStatus	Definition
0x03	0x06	0x00	0x00	0x2	ICM_OVERFLOW
0x03	0x06	0x07	0x22	0x2	RALPH_RESET_REINIT
0x06	0x00	0x00	0x00	0x05	BOOT_SET_LEDS
0x06	0x00	0x01	0x0d	0x0	BOOT_BCH_MEM_FAILED
0x06	0x00	0x01	0x0f	0x0	BOOT_BOOT_FAILURE
0x06	0x00	0x01	0x25	0x0	BOOT_GET_DFLT_CONS
0x06	0x00	0x01	0x27	0x0	BOOT_GET_MANUF_DFLTS
0x06	0x00	0x01	0x28	0x0	BOOT_GET_MFG_SS_CONS
0x06	0x00	0x01	0x29	0x0	BOOT_GET_PRI_PATH
0x06	0x00	0x01	0x2a	0x0	BOOT_GET_SS_CONS
0x06	0x00	0x01	0x3c	0x0	BOOT_LAUNCH_IPL_OTHR
0x06	0x00	0x01	0x3d	0x0	BOOT_LAUNCH_IPL_PRI
0x06	0x00	0x01	0x3e	0x0	BOOT_LOAD_IPL_OTHR_PATH
0x06	0x00	0x01	0x3f	0x0	BOOT_LOAD_IPL_PRI_PATH
0x06	0x00	0x01	0x4d	0x0	BOOT_NO_PROCS_IN_MEM
0x06	0x00	0x01	0x6a	0x0	BOOT_TEST_SYSTEM_CLOCKS
0x06	0x00	0x01	0x6c	0x0	BOOT_UNKNOWN_LAUNCH_FLT
0x06	0x00	0x02	0x24	0x0	BOOT_FIND_CPUS
0x06	0x00	0x02	0x6f	0x0	BOOT_BOOT_START
0x06	0x00	0x02	0x70	0x0	BOOT_RESET
0x06	0x00	0x06	0x2a	0x2	MC_HPMC_STATE_CHANGE
0x07	0x00	0x07	0x02	0x0	MEM_RESET
0x07	0x00	0x02	0x10	0x0	MEM_DISCOVERY
0x07	0x00	0x02	0x10	0xf	MEM_DISCOVERY_EXIT
0x07	0x00	0x02	0x10	0x0	MEM_DISCOVERY_DATA
0x07	0x00	0x01	0x11	0x0	BOOT_CATASTROPHIC_MEM_ERR
0x07	0x00	0x02	0x13	0x0	MEM_SPD
0x07	0x00	0x02	0x13	0x1	MEM_WARN_SPD_BYPASS
0x07	0x00	0x02	0x13	0x2	MEM_SPD_BARGRAPH
0x07	0x04	0x02	0x14	0x2	MEM_SPD_DIMM_FOUND
0x07	0x00	0x02	0x15	0x0	MEM_MIN_MEM
0x07	0x00	0x02	0x16	0x2	MEM_MIN_LAST_SET_TEST
0x07	0x00	0x02	0x17	0x2	MEM_MIN_SET_CHANGE
0x07	0x00	0x02	0x18	0x0	MEM_MIN_SET_TEST
0x07	0x00	0x02	0x19	0x2	MEM_MIN_SET_SELECT
0x07	0x00	0x07	0x1d	0x0	MEM_INIT_SCR_TABLES
0x07	0x00	0x02	0x20	0x1	MEM_WARN_LOADING_ORDER_BYPASS
0x07	0x00	0x02	0x21	0x1	MEM_WARN_DISTRIBUTION_CHECK_BYPASS
0x07	0x00	0x02	0x22	0x1	MEM_WARN_SET_CHECK_BYPASS
0x07	0x00	0x02	0x23	0x4	MEM_WARN_USING_ALT_CONFIG
0x07	0x00	0x02	0x30	0x0	MEM_EXT_SPD
0x07	0x02	0x02	0x31	0x2	MEM_EXT_FOUND
0x07	0x00	0x02	0x40	0x0	MEM_CONFIG
0x07	0x00	0x02	0x40	0xf	MEM_CONFIG_EXIT
0x07	0x00	0x02	0x41	0x0	MEM_PHYSICAL_CONFIG_CHECK
0x07	0x00	0x02	0x42	0x0	MEM_RE_CONFIG_IN_PROGRESS
0x07	0x00	0x02	0x43	0x0	MEM_CONFIG_FROM_NVM

Source	SrcDetail	CallerActivity	CallerSub	ActStatus	Definition
0x07	0x00	0x02	0x44	0x0	MEM_MAIN_MEM
0x07	0x00	0x07	0x45	0x0	MEM_UPDATE_NVM_CONFIG
0x07	0x00	0x01	0x50	0x0	MEM_REGISTER_TEST
0x07	0x00	0x02	0x50	0x1	MEM_WARN_REG_TEST_BYPASS
0x07	0x00	0x02	0x80	0x0	MEM_CHECK
0x07	0x00	0x02	0x80	0xf	MEM_CHECK_EXIT
0x07	0x00	0x02	0xa0	0x0	MEM_GENERATE_INTERLEAVING
0x07	0x00	0x01	0xa1	0x0	MEM_DEST_TEST
0x07	0x00	0x02	0xa1	0x1	MEM_WARN_INIT_ONLY
0x07	0x00	0x01	0xa2	0x0	MEM_PAGE_ONE_TEST
0x07	0x00	0x01	0xa3	0x0	MEM_MEM_TEST
0x07	0x00	0x01	0xa4	0x0	MEM_TEST_WRITE
0x07	0x00	0x01	0xa4	0x2	MEM_TEST_WRITE_BARGRAPH
0x07	0x00	0x01	0xa5	0x0	MEM_TEST_READ_WRITE
0x07	0x00	0x01	0xa5	0x2	MEM_TEST_READ_WRITE_BARGRAPH
0x07	0x00	0x01	0xa6	0x0	MEM_TEST_READ
0x07	0x00	0x01	0xa6	0x2	MEM_TEST_READ_BARGRAPH
0x07	0x00	0x02	0xa7	0x0	MEM_WARN_LOOP_ON_DEST_TEST
0x07	0x00	0x07	0xa9	0x0	MEM_INIT
0x07	0x00	0x07	0xa9	0x2	MEM_INIT_BARGRAPH
0x07	0x00	0x02	0xb0	0x4	MEM_INTERLEAVE_CODE_FAILURE
0x07	0x00	0x02	0xb1	0x4	MEM_INTERLEAVE_RELO_CFG_ERR
0x07	0x00	0x02	0xb2	0x4	UNDEFINED_SMC_INTERLEAVE_ERR
0x07	0x00	0x02	0xb5	0x4	MEM_REFRESH_INTERVAL_ERR
0x07	0x01	0x02	0xba	0x3	MEM_REFRESH_REG_WR_FAILURE
0x07	0x00	0x02	0xc0	0x4	MEM_TEST_STATUS_BITS_INVALID
0x07	0x00	0x0a	0xc1	0x4	MEM_TEST_SUMMARY_BITS_INVALID
0x07	0x00	0x0a	0xc2	0x4	MEM_TEST_FWD_PROG_BITS_INVALID
0x07	0x00	0x0a	0xc3	0x4	MEM_TEST_HPMC_SUMMARY
0x07	0x00	0x06	0x06	0x2	ASTRO_ERR_STATUS
0x07	0x00	0x06	0x08	0x2	ASTRO_ERR_SUMMARY
0x07	0x00	0x0a	0xc4	0x4	MEM_TEST_ASTRO_ERR_STATUS
0x07	0x00	0x0a	0xc5	0x4	MEM_TEST_ASTRO_MEM_ADDR_REG
0x07	0x00	0x0a	0xc6	0x4	MEM_TEST_ASTRO_MEM_ADDR_CORR_REG
0x07	0x00	0x0a	0xc7	0x4	MEM_TEST_ASTRO_SYNDROME
0x07	0x02	0x06	0x12	0x3	ASTRO_ERR_MEM_ADDR_PAR_EXT
0x07	0x04	0x06	0x12	0x3	ASTRO_ERR_MEM_ADDR_PAR_DIMM
0x07	0x06	0x06	0x10	0x2	ASTRO_ERR_CORR_MEM
0x07	0x00	0x07	0x01	0x2	MEM_PLATFORM_INIT_FAILURE
0x07	0x07	0x07	0x03	0x4	MEM_ERR_LOG_CLEAR_WARNING
0x07	0x07	0x07	0x03	0x4	MEM_ERR_LOG_FAILED_TO_CLEAR
0x07	0x01	0x01	0x51	0x3	MEM_ADDRESS_REG_FAILURE
0x07	0x01	0x01	0x52	0x3	MEM_MBAT_REG_FAILURE
0x07	0x01	0x01	0x53	0x3	MEM_MEMORY_REG_FAILURE
0x07	0x07	0x01	0x54	0x3	MEM_ERROR_REG_0_FAILURE
0x07	0x07	0x01	0x55	0x3	MEM_ERROR_REG_1_FAILURE
0x07	0x07	0x01	0x56	0x3	MEM_ERROR_REG_0_CLEAR_FAILURE

Source	SrcDetail	CallerActivity	CallerSub	ActStatus	Definition
0x07	0x07	0x01	0x57	0x3	MEM_ERROR_REG_1_CLEAR_FAILURE
0x07	0x02	0x02	0x10	0x3	MEM_NO_EXTENDERS_INSTALLED
0x07	0x02	0x02	0x13	0x2	MEM_EXTENDER_SPD_ERROR
0x07	0x02	0x02	0x20	0x4	MEM_EXT_DIMM_LOAD_ORD_ERR
0x07	0x04	0x02	0x04	0x4	MEM_64MB_DIMM_FOUND
0x07	0x04	0x02	0x10	0x2	MEM_DIMM_TYPE_MISMATCH
0x07	0x04	0x02	0x10	0x2	MEM_DIMM_TYPE_INCOMPATIBLE
0x07	0x04	0x02	0x10	0x3	MEM_NO_DIMMS_INSTALLED
0x07	0x04	0x02	0x13	0x2	MEM_DIMM_SPD_FATAL
0x07	0x04	0x02	0x13	0x2	MEM_DIMM_SPD_CHECKSUM
0x07	0x04	0x02	0x1c	0x2	DIMM_SPD_FRUID_CKSUM_ERR
0x07	0x04	0x0	0x21	0x4	MEM_DIMM_DISTRIBUTION_ERROR
0x07	0x04	0x02	0x24	0x3	MEM_DIMM_TYPE_TABLE_FULL
0x07	0x04	0x02	0x25	0xf	MEM_HP_DIMM_TYPE_ADDED
0x07	0x04	0x02	0x26	0xf	MEM_NON_HP_DIMM_TYPE_ADDED
0x07	0x05	0x01	0x10	0x2	MEM_MIN_MEM_FAILED
0x07	0x05	0x01	0x2b	0x0	BOOT_GOOD_MEM_FAILED
0x07	0x06	0x01	0x00	0x2	MEM_DIMM_MBE
0x07	0x06	0x02	0x10	0x3	MEM_NO_MEM_FOUND
0x07	0x06	0x01	0x46	0x2	MEM_GOOD_MEM_FAILED
0x07	0x06	0x01	0x47	0x2	MEM_MAIN_MEM_FAILED
0x07	0x06	0x01	0x4b	0x0	BOOT_NO_DRAMS
0x07	0x00	0x02	0xb4	0x4	MEM_RANK_ENTRY_NOT_FOUND
0x07	0x06	0x0a	0xb6	0x3	MEM_UNEXPECTED_HPMC
0x07	0x06	0x00	0xb7	0x3	MEM_ERR_ADDR_NOT_IN_MBAT
0x07	0x04	0x00	0xb8	0x3	MEM_MBE_IN_RANK
0x07	0x06	0x01	0xb9	0x3	MEM_MBE_BY_SBE_IN_RANK
0x07	0x04	0x00	0xbc	0x3	MEM_CORR_ERR
0x07	0x06	0x01	0xd1	0x3	MEM_CACHE_LINE_0_WR_RD_FAILED
0x07	0x06	0x01	0xd5	0x3	MEM_TEST_CODE_IN_PAGE0_CORRUPT
0x07	0x08	0x0a	0x00	0x2	MEM_PDT_SBE_OVRWRT
0x07	0x08	0x01a	0x00	0x2	MEM_PDT_DUP_ENTRY
0x07	0x08	0x02	0x00	0x3	MEM_PDT_DISABLED_HALT
0x07	0x08	0x0a	0x00	0x3	MEM_PDT_NVM_ERR
0x07	0x08	0x0a	0x00	0x3	MEM_PDT_TABLE_FULL
0x07	0x08	0x02	0x00	0x4	MEM_PDT_DISABLED_WARNING
0x07	0x00	0x02	0xb3	0x4	MEM_DMT_ENTRY_NOT_FOUND
0x07	0x09	0x06	0x01	0x3	ASTRO_ERR_ADRR_PAR
0x07	0x09	0x06	0x0b	0x3	ASTRO_ERR_MEM_RANGE
0x07	0x09	0x06	0x0c	0x3	ASTRO_ERR_CTRL_PAR
0x07	0x09	0x06	0x0d	0x2	ASTRO_ERR_PATH_ERR
0x07	0x09	0x06	0x0f	0x2	ASTRO_ERR_DATA_PAR
0x07	0x09	0x06	0x13	0x3	ASTRO_ERR_BROAD_ERR
0x08	0x00	0x07	0x01	0x0	IO_DISCOVERY_START
0x08	0x00	0x07	0x01	0xf	IO_DISCOVERY_DONE
0x08	0x00	0x01	0x04	0x0	IO_CONFIG_START
0x08	0x00	0x01	0x04	0xf	IO_CONFIG_DONE

Source	SrcDetail	CallerActivity	CallerSub	ActStatus	Definition
0x08	0x00	0x02	0x05	0x0	IO_FIXED_CONFIG_START
0x08	0x00	0x02	0x05	0xf	IO_FIXED_CONFIG_DONE
0x08	0x00	0x07	0x06	0xf	IO_FIXED_DISCOVERY_DONE
0x08	0x00	0x01	0x07	0x0	IO_CHECK_START
0x08	0x00	0x01	0x07	0xf	IO_CHECK_DONE
0x08	0x00	0x01	0x1b	0x0	BOOT_ENTRY_IO_ERR
0x08	0x00	0x01	0x1c	0x0	BOOT_ERR_EXEC_EINIT
0x08	0x00	0x01	0x1d	0x0	BOOT_ERR_EXEC_ETEST
0x08	0x00	0x01	0x1f	0x0	BOOT_ERR_READING_EINIT
0x08	0x00	0x01	0x20	0x0	BOOT_ERR_READING_EIO
0x08	0x00	0x01	0x21	0x0	BOOT_ERR_READING_ETEST
0x08	0x00	0x01	0x22	0x0	BOOT_ERR_READING_IODC_BYTES
0x08	0x00	0x01	0x3a	0x0	BOOT_INVALID_DEV_CLASS
0x08	0x00	0x02	0x2e	0x0	BOOT_INITIALIZE_IO
0x08	0x00	0x02	0x39	0x0	BOOT_INVALID_DEVICE
0x08	0x02	0x01	0x18	0x0	IO_ASTRO_TEST_TLB_START
0x08	0x02	0x01	0x18	0x3	IO_ASTRO_TEST_TLB_ERR
0x08	0x02	0x01	0x18	0xf	IO_ASTRO_TEST_TLB_DONE
0x08	0x02	0x01	0x19	0x0	IO_ASTRO_TEST_CACHE_START
0x08	0x02	0x01	0x19	0x2	IO_ASTRO_CACHE_TEST_SKIP_WARN
0x08	0x02	0x01	0x19	0x3	IO_ASTRO_TEST_ERR_EXP_DATA
0x08	0x02	0x01	0x19	0x3	IO_ASTRO_TEST_ERR_ACT_DATA
0x08	0x02	0x01	0x19	0x3	IO_ASTRO_TEST_CACHE_ERR
0x08	0x02	0x01	0x19	0xf	IO_ASTRO_TEST_CACHE_DONE
0x08	0x03	0x01	0x19	0x2	IO_ASTRO_CACHE_TEST_LOOPBACK
0x08	0x03	0x01	0x19	0x2	IO_ASTRO_CACHE_TEST_LOOPBACK_ERR
0x08	0x03	0x01	0x19	0x2	IO_ASTRO_CACHE_TEST_BAD_SLOT_ERR
0x08	0x02	0x06	0x20	0x0	IO_INVALID_PGZ_DEVICE
0x08	0x00	0x06	0x30	0x0	IO_ERROR_FULL_LOGGING_START
0x08	0x00	0x06	0x30	0xf	IO_ERROR_FULL_LOGGING_EXIT
0x08	0x00	0x06	0x31	0x0	IO_ERROR_SYS_BUS_LOGGING_START
0x08	0x00	0x06	0x31	0xf	IO_ERROR_SYS_BUS_LOGGING_EXIT
0x08	0x00	0x06	0x32	0x0	IO_ERROR_HOST_BRIDGE_LOGGING_START
0x08	0x00	0x06	0x32	0xf	IO_ERROR_HOST_BRIDGE_LOGGING_EXIT
0x08	0x00	0x06	0x36	0x0	IO_ERROR_REMAP_DUMP_DEVICES_START
0x08	0x00	0x06	0x36	0xf	IO_ERROR_REMAP_DUMP_DEVICES_EXIT
0x08	0x02	0x06	0x00	0x0	IO_SBA_ERR
0x08	0x02	0x06	0x00	0x4	IO_SBA_UNC_FUNCTION_ERR
0x08	0x02	0x06	0x00	0x2	IO_SBA_CORR_DATA_PARITY_ERR
0x08	0x02	0x06	0x00	0x4	IO_SBA_UNC_DATA_PARITY_ERR
0x08	0x02	0x06	0x00	0x2	IO_SBA_RECONFIG_FAILED_ERR
0x08	0x02	0x06	0x37	0x2	IO_SBA_REG_READ_OR_CLEAR_FAILED_ERR
0x08	0x02	0x06	0x11	0x2	IO_SBA_ROPE_RESET_FAILED_ERR
0x08	0x02	0x06	0x00	0x3	IO_SBA_FATAL_FUNCTION_ERR
0x08	0x02	0x06	0x00	0x3	IO_SBA_FATAL_TIMEOUT_ERR
0x08	0x02	0x06	0x00	0x3	IO_SBA_FATAL_PARITY_ERR
0x08	0x03	0x07	0x01	0x0	IO_LBA_FWD_PROGRESS

Source	SrcDetail	CallerActivity	CallerSub	ActStatus	Definition
0x08	0x03	0x07	0x02	0x2	IO_LBA_RESET_ERROR
0x08	0x03	0x02	0x04	0x0	IO_SLOT_POWER_ON_START
0x08	0x03	0x02	0x04	0x3	IO_SLOT_POWER_ON_ERROR
0x08	0x03	0x02	0x04	0xf	IO_SLOT_POWER_ON_DONE
0x08	0x03	0x02	0x10	0x4	IO_PHASE_DETECT_ERROR
0x08	0x03	0x02	0x11	0x4	IO_ROPE_RESET_ERROR
0x08	0x03	0x02	0x12	0x4	IO_SET_PCI_FREQ_ERROR
0x08	0x03	0x07	0x13	0x4	IO_SLOT_DECONFIG
0x08	0x03	0x02	0x14	0x4	IO_SLOT_RESET_NOT_ASSERTED_ERR
0x08	0x03	0x02	0x15	0x4	IO_CHECK_XTRA_LBA_FOUND_ERR
0x08	0x03	0x02	0x16	0x4	IO_CHECK_LBA_MISSING_ERR
0x08	0x03	0x02	0x17	0x4	IO_CHECK_ROPE_WIDTH_ERR
0x08	0x03	0x06	0x00	0x0	IO_LBA_ERR
0x08	0x03	0x06	0x00	0x4	IO_LBA_MISC_UNC_ERR
0x08	0x03	0x06	0x00	0x4	IO_LBA_UNC_FUNCTION_ERR
0x08	0x03	0x06	0x00	0x2	IO_LBA_CORR_TIMEOUT_ERR
0x08	0x03	0x06	0x00	0x4	IO_LBA_UNC_TIMEOUT_ERR
0x08	0x03	0x06	0x00	0x4	IO_LBA_UNC_PARITY_ERR
0x08	0x03	0x06	0x00	0x2	IO_LBA_PCI_LOG_FULL_ERR
0x08	0x03	0x06	0x00	0x2	IO_LBA_PCI_RESUME_FAILED_ERR
0x08	0x03	0x06	0x37	0x2	IO_LBA_REG_READ_OR_CLEAR_FAILED_ERR
0x08	0x03	0x06	0x11	0x2	IO_LBA_ROPE_RESET_FAILED_ERR
0x08	0x03	0x06	0x00	0x3	IO_LBA_MISC_FATAL_ERR
0x08	0x03	0x06	0x00	0x3	IO_LBA_FATAL_FUNCTION_ERR
0x08	0x03	0x06	0x00	0x3	IO_LBA_FATAL_TIMEOUT_ERR
0x08	0x03	0x06	0x00	0x3	IO_LBA_FATAL_PARITY_ERR
0x08	0x03	0x06	0x30	0x0	IO_ERROR_FATAL_ROPE_LOGGING_START
0x08	0x05	0x03	0x00	0x0	IO_PCI_BUS_DEPTH_EXCEEDED
0x08	0x05	0x03	0x00	0x0	IO_BOOT_PCI_CARD_UNSUPPORTED
0x08	0x05	0x03	0x00	0x3	IO_PCI_CARD_UNSUPPORTED
0x08	0x05	0x06	0x00	0x2	IO_DEV_ADAPTER_MISC_UNC_ERR
0x08	0x05	0x06	0x00	0x3	IO_DEV_ADAPTER_MISC_FATAL_ERR
0x08	0x06	0x01	0x03	0x0	BOOT_BAD_IPL_ADDR_OTHR
0x08	0x06	0x01	0x04	0x0	BOOT_BAD_IPL_ADDR_PRI
0x08	0x06	0x01	0x05	0x0	BOOT_BAD_IPL_CHECKSUM_OTHR
0x08	0x06	0x01	0x06	0x0	BOOT_BAD_IPL_CHECKSUM_PRI
0x08	0x06	0x01	0x07	0x0	BOOT_BAD_IPL_ENTRY_OTHR
0x08	0x06	0x01	0x08	0x0	BOOT_BAD_IPL_ENTRY_PRI
0x08	0x06	0x01	0x09	0x0	BOOT_BAD_IPL_SIZE_OTHR
0x08	0x06	0x01	0x0a	0x0	BOOT_BAD_IPL_SIZE_PRI
0x08	0x06	0x01	0x0b	0x0	BOOT_BAD_LIF_MAGIC_OTHR
0x08	0x06	0x01	0x0c	0x0	BOOT_BAD_LIF_MAGIC_PRI
0x08	0x06	0x01	0x18	0x0	BOOT_DEVICE_NOT_READY
0x08	0x06	0x01	0x2c	0x0	BOOT_HOT_SWAP_RETRY
0x08	0x06	0x01	0x48	0x0	BOOT_NO_BOOT_SELECTION
0x08	0x06	0x01	0x4f	0x0	BOOT_OTHR_IPL_FAULT
0x08	0x06	0x01	0x53	0x0	BOOT_PRI_IPL_FAULT



Source	SrcDetail	CallerActivity	CallerSub	ActStatus	Definition
0x08	0x06	0x01	0x54	0x0	BOOT_PRI_IPL_FAULT_FATAL
0x08	0x06	0x01	0x68	0x0	BOOT_TEST_OTHR_PATH
0x08	0x06	0x01	0x69	0x0	BOOT_TEST_PRI_PATH
0x08	0x06	0x02	0x34	0x0	BOOT_INIT_OTHR_PATH
0x08	0x06	0x02	0x35	0x0	BOOT_INIT_OTHR_PATH_FAILED
0x08	0x06	0x02	0x36	0x0	BOOT_INIT_PRI_PATH
0x08	0x06	0x02	0x37	0x0	BOOT_INIT_PRI_PATH_FAILED
0x08	0x06	0x06	0x20	0x0	IO_REINIT_PGZ_BOOT_DISK
0x08	0x06	0x06	0x20	0x0	IO_REINIT_PGZ_PATH_FAILED
0x08	0x06	0x06	0x36	0x0	IO_REMAP_DUMP_DEVICE_FAILED
0x08	0x09	0x01	0x47	0x0	BOOT_NO_BOOT_NO_CONS
0x08	0x09	0x01	0x4a	0x0	BOOT_NO_CONS_FOUND
0x08	0x09	0x01	0x4c	0x0	BOOT_NO_GO_SS_CONS
0x08	0x09	0x02	0x31	0x0	BOOT_INIT_DFLT_CONS
0x08	0x09	0x02	0x33	0x0	BOOT_INIT_MFG_SS_CONS
0x08	0x09	0x02	0x38	0x0	BOOT_INIT_SS_CONS
0x08	0x09	0x06	0x20	0x0	IO_REINIT_PGZ_CONS
0x08	0x09	0x06	0x20	0x0	IO_REINIT_PGZ_CONS_FAILED

## Appendix B: System Firmware Reporting Entity Type for N-Class

### Reporting Entity Type = System Firmware

Source	SrcDetail	CallerActivity	CallerSub	ActStatus	Definition
0x00	0x00	0x00	0x00	0x2	BOOT_RESET_BY_OS
0x00	0x00	0x00	0x41	0x0	BOOT_BOOT_START_DATA
0x00	0x00	0x00	0x50	0xb	MC_HPMC_STATE_DATA
0x00	0x00	0x01	0x00	0x3	OSTAT_IS_WARN
0x00	0x00	0x01	0x00	0x3	OSTAT_IS_FAIL
0x00	0x00	0x06	0x10	0x2	MC_UNKNOWN
0x00	0x00	0x06	0x11	0x2	MC_HPMC_FOUND
0x00	0x00	0x06	0x12	0x2	MC_TOC_FOUND
0x00	0x00	0x06	0x13	0x2	MC_LPMC_FOUND
0x00	0x00	0x06	0x23	0x2	MC_HPMC_PIM_OVERWRITE
0x00	0x00	0x06	0x24	0x2	MC_HPMC_INITIATED
0x00	0x00	0x06	0x25	0x2	MC_HPMC_DURING_TOC
0x00	0x00	0x06	0x26	0x2	MC_MULTIPLE_HPMCS
0x00	0x00	0x06	0x27	0x2	MC_NVM_PREV_NOT_LOGGED
0x00	0x00	0x06	0x28	0x2	MC_HPMC_NOT_LOGGED
0x00	0x00	0x06	0x29	0x2	MC_HPMC_MONARCH_SELECTED
0x00	0x00	0x06	0x40	0x2	MC_BR_TO_OS_HPMC_FAILED
0x00	0x00	0x06	0x41	0x2	MC_OS_HPMC_MISSING
0x00	0x00	0x06	0x42	0x2	MC_OS_HPMC_LEN_ERR
0x00	0x00	0x06	0x43	0x2	MC_OS_HPMC_ADDR_ERR
0x00	0x00	0x06	0x44	0x2	MC_OS_HPMC_CODE_ZERO
0x00	0x00	0x06	0x45	0x2	MC_OS_HPMC_CHECKSUM_ERR
0x00	0x00	0x06	0x46	0x2	MC_BR_TO_OS_HPMC
0x00	0x00	0x06	0x50	0x2	MC_TOC_FAILED
0x00	0x00	0x06	0x51	0x2	MC_TOC_INITIATED
0x00	0x00	0x06	0x52	0x2	MC_TOC_PIM_OVERFLOW
0x00	0x00	0x06	0x53	0x2	MC_BR_TO_OS_TOC
0x00	0x00	0x06	0x60	0x2	MC_OS_TOC_MISSING
0x00	0x00	0x06	0x61	0x2	MC_OS_TOC_ADDR_ERR
0x00	0x00	0x06	0x62	0x2	MC_OS_TOC_CODE_ZERO
0x00	0x00	0x06	0x63	0x2	MC_OS_TOC_CODE_UNALIGNED
0x00	0x00	0x06	0x64	0x2	MC_OS_TOC_CHECKSUM_ERR
0x00	0x00	0x06	0x70	0x2	MC_LPMC_UNDEFINED_TYPE
0x00	0x00	0x06	0x71	0x2	MC_OS_LPMC_TRANSFER_FAIL
0x00	0x00	0x06	0x72	0x2	MC_LPMC_INITIATED
0x00	0x00	0x06	0x73	0x2	MC_LPMC_PIM_OVERFLOW
0x00	0x00	0x06	0x74	0x2	MC_BR_TO_OS_LPMC_INITIATED
0x01	0x00	0x00	0x00	0x0	PROCS_TEMP
0x01	0x00	0x00	0x00	0x5	CPU_STOP
0x01	0x00	0x00	0x10	0x0	PROCS_ENTRY_IN
0x01	0x00	0x00	0x20	0x0	PROCS_ENTRY_OUT

Source	SrcDetail	CallerActivity	CallerSub	ActStatus	Definition
0x01	0x00	0x01	0x00	0x0	CPU_TEST
0x01	0x00	0x01	0x02	0x0	BOOT_BAD_CPU_ORDER
0x01	0x00	0x01	0x10	0x0	EST_START
0x01	0x00	0x01	0x10	0x1	EST_SKIP
0x01	0x00	0x01	0x10	0xf	EST_EXIT
0x01	0x00	0x01	0x11	0x0	CPU_Basic
0x01	0x00	0x01	0x11	0x3	CPU_Basic_Failure
0x01	0x00	0x01	0x12	0x0	CPU_ALU
0x01	0x00	0x01	0x12	0x3	CPU_ALU_Failure
0x01	0x00	0x01	0x13	0x0	CPU_Branch
0x01	0x00	0x01	0x13	0x3	CPU_Branch_Failure
0x01	0x00	0x01	0x14	0x0	CPU_Arithmetic_Conditions
0x01	0x00	0x01	0x14	0x3	CPU_Arithmetic_Conditions_Failure
0x01	0x00	0x01	0x15	0x0	CPU_Bit_Operations
0x01	0x00	0x01	0x15	0x3	CPU_Bit_Operations_Failure
0x01	0x00	0x01	0x16	0x0	CPU_Control_Registers
0x01	0x00	0x01	0x16	0x3	CPU_Control_Registers_Failure
0x01	0x00	0x01	0x17	0x0	CPU_External_Interrupts
0x01	0x00	0x01	0x17	0x3	CPU_External_Interrupts_Failure
0x01	0x00	0x01	0x18	0x0	CPU_Interval_Timer
0x01	0x00	0x01	0x18	0x3	CPU_Interval_Timer_Failure
0x01	0x00	0x01	0x19	0x0	CPU_Multi-media
0x01	0x00	0x01	0x19	0x3	CPU_Multi-media_Failure
0x01	0x00	0x01	0x1a	0x0	CPU_Shadow_Registers
0x01	0x00	0x01	0x1a	0x3	CPU_Shadow_Registers_Failure
0x01	0x00	0x01	0x1c	0x0	CPU_Diagnose_Registers
0x01	0x00	0x01	0x1c	0x3	CPU_Diagnose_Registers_Failure
0x01	0x00	0x01	0x1d	0x0	CPU_Remote_Diagnose_Registers
0x01	0x00	0x01	0x1d	0x3	CPU_Remote_Diagnose_Registers_Failure
0x01	0x00	0x01	0x20	0x0	LST_START
0x01	0x00	0x01	0x20	0x1	LST_SKIP
0x01	0x00	0x01	0x20	0xf	LST_EXIT
0x01	0x00	0x01	0x33	0x0	CPU_Cache_Byte
0x01	0x00	0x01	0x33	0x3	CPU_Cache_Byte_Failure
0x01	0x00	0x01	0x35	0x0	CPU_Instruction_Cache_Miss
0x01	0x00	0x01	0x35	0x3	CPU_Instruction_Cache_Miss_Failure
0x01	0x00	0x01	0x39	0x0	Coprocessor_Tests
0x01	0x00	0x01	0x39	0x3	Coprocessor_Tests_Failure
0x01	0x00	0x01	0x3a	0x0	Coprocessor_Registers
0x01	0x00	0x01	0x3a	0x3	Coprocessor_Registers_Failure
0x01	0x00	0x01	0x3b	0x0	BOOT_LATE_MONARCH_ST
0x01	0x00	0x01	0x3c	0x0	Coprocessor_Instructions
0x01	0x00	0x01	0x3c	0x3	Coprocessor_Instructions_Failure
0x01	0x00	0x01	0x3d	0x0	Coprocessor_Misc.
0x01	0x00	0x01	0x3d	0x3	Coprocessor_Misc_Failure
0x01	0x00	0x01	0x3e	0x0	Coprocessor_Bypass
0x01	0x00	0x01	0x3e	0x3	Coprocessor_Bypass_Failure

Source	SrcDetail	CallerActivity	CallerSub	ActStatus	Definition
0x01	0x00	0x01	0x41	0x0	BOOT_MONARCH_SELECTED
0x01	0x00	0x01	0x42	0x0	BOOT_MONARCH_SLAVE_CHECK
0x01	0x00	0x01	0x43	0x0	BOOT_MONARCH_SLAVE_TEST
0x01	0x00	0x01	0x44	0x0	BOOT_MONARCH_SLAVE_TEST_END
0x01	0x00	0x01	0x46	0x0	BOOT_MONARCH_TEST
0x01	0x00	0x01	0x51	0x0	CPU_TLB_RAM
0x01	0x00	0x01	0x51	0x3	CPU_TLB_RAM_Failure
0x01	0x00	0x01	0x52	0x0	CPU_TLB_Translation
0x01	0x00	0x01	0x52	0x3	CPU_TLB_Translation_Failure
0x01	0x00	0x01	0x61	0x0	BOOT_SLAVE_BIG_ERROR
0x01	0x00	0x02	0x0e	0x0	BOOT_BOOT_ABDICATION
0x01	0x00	0x04	0x00	0x0	BCH_TEMP
0x01	0x00	0x04	0x10	0x0	BCH_DFLT_SS_INIT
0x01	0x00	0x04	0x20	0x0	BCH_DFLT_SS_FATAL
0x01	0x00	0x04	0x30	0x0	BCH_DFLT_SS_CHECK
0x01	0x00	0x07	0x01	0x0	CPU_INIT
0x01	0x00	0x0c	0x10	0x0	BOOT_CACHE_CPU_RENDEZVOUS
0x01	0x00	0x0c	0x17	0x0	BOOT_CPU_RENDEZVOUS
0x01	0x00	0x0c	0x40	0x0	BOOT_MEM_CPU_RENDEZVOUS
0x01	0x00	0x0c	0x4e	0x0	BOOT_OS_RENDEZVOUS
0x01	0x01	0x01	0x2d	0x0	BOOT_HVERSION_MISMATCH
0x01	0x01	0x01	0x45	0x0	BOOT_MONARCH_ST_FLT
0x01	0x01	0x01	0x62	0x0	BOOT_SLAVE_CPU_FAIL
0x01	0x01	0x01	0x63	0x0	BOOT_SLAVE_FAILED
0x01	0x01	0x01	0x66	0x0	BOOT_ST_WARNING
0x01	0x01	0x01	0x67	0x0	BOOT_TEST_CPU_CLOCKS
0x01	0x01	0x01	0x6b	0x0	BOOT_UNEXPECTED_INTERRUPT
0x01	0x01	0x01	0x6d	0x0	BOOT_BAD_CPU_NUMBER
0x01	0x01	0x02	0x16	0x0	BOOT_CPU_DECONFIG
0x01	0x01	0x06	0x30	0x2	MC_CPU_RUNWAY_PATH_ERR
0x01	0x01	0x06	0x31	0x2	MC_CPU_RUNWAY_TIMEOUT
0x01	0x01	0x06	0x32	0x2	MC_CPU_RUNWAY_BROAD_ERR
0x01	0x01	0x06	0x33	0x2	MC_CPU_RUNWAY_DIR_ERR
0x01	0x01	0x06	0x34	0x2	MC_CPU_RUNWAY_BUS_PAR_ERR
0x01	0x01	0x06	0x35	0x2	MC_CPU_RUNWAY_ILLEGAL_RESP
0x01	0x01	0x06	0x36	0x2	MC_CPU_RUNWAY_UNKNOWN_ERR
0x01	0x03	0x06	0x00	0x3	DEW_ERR_AT
0x01	0x03	0x06	0x01	0x3	DEW_ERR_AU
0x01	0x03	0x06	0x02	0x2	DEW_ERR_1ST_FATAL_MERGED_NO_LOG

Source	SrcDetail	CallerActivity	CallerSub	ActStatus	Definition
0x01	0x03	0x06	0x03	0x2	DEW_ERR_1ST_FATAL_MERGED_OTHER
0x01	0x03	0x06	0x04	0x2	DEW_ERR_1ST_UNC_MERGED
0x01	0x03	0x06	0x05	0x2	DEW_ERR_1ST_CORR_MERGED
0x01	0x03	0x06	0x06	0x2	DEW_ERR_STATUS
0x01	0x03	0x06	0x07	0x2	DEW_ERR_OVERFLOW
0x01	0x03	0x06	0x08	0x2	DEW_ERR_SUMMARY
0x01	0x03	0x06	0x0b	0x2	DEW_ERR_RT
0x01	0x03	0x06	0x0c	0x3	DEW_ERR_RE
0x01	0x03	0x06	0x0d	0x2	DEW_ERR_HE
0x01	0x03	0x06	0x0e	0x2	DEW_ERR_IC
0x01	0x03	0x06	0x0f	0x2	DEW_ERR_IU
0x01	0x03	0x06	0x10	0x2	DEW_ERR_DC
0x01	0x03	0x06	0x11	0x2	DEW_ERR_DU
0x01	0x03	0x06	0x12	0x3	DEW_ERR_DE
0x01	0x03	0x06	0x13	0x3	DEW_ERR_BA
0x01	0x03	0x06	0x14	0x3	DEW_ERR_IA
0x01	0x03	0x06	0x30	0x3	DEW_ERR_TT
0x01	0x03	0x06	0x31	0x2	DEW_ERR_1ST_FATAL_RUNWAY_BRD_ERR
0x01	0x03	0x06	0x32	0x2	DEW_ERR_1ST_FATAL_RUNWAY_OTHER
0x01	0x03	0x06	0x33	0x2	DEW_ERR_1ST_UNC_RUNWAY
0x01	0x03	0x06	0x34	0x2	DEW_ERR_1ST_CORR_RUNWAY
0x01	0x03	0x06	0x38	0x3	DEW_ERR_RA
0x01	0x03	0x06	0x39	0x3	DEW_ERR_RC
0x01	0x03	0x06	0x3a	0x3	DEW_ERR_RD
0x01	0x03	0x06	0x3b	0x2	DEW_ERR_AD
0x01	0x03	0x06	0x3c	0x3	DEW_ERR_CE
0x01	0x03	0x06	0x3d	0x3	DEW_ERR_BR
0x01	0x03	0x06	0x3e	0x2	DEW_ERR_FI
0x01	0x03	0x06	0x3f	0x3	DEW_ERR_UR
0x02	0x01	0x01	0x00	0x0	I_CACHE_TEST
0x02	0x01	0x01	0x11	0x0	CPU_Instruction_Cache_RAM
0x02	0x01	0x01	0x11	0x3	CPU_Instruction_Cache_RAM_Failure
0x02	0x01	0x01	0x12	0x0	CPU_Instruction_Cache_Tags
0x02	0x01	0x01	0x12	0x3	CPU_Instruction_Cache_Tags_Failure
0x02	0x01	0x01	0x13	0x0	CPU_Instruction_Cache_Errors
0x02	0x01	0x01	0x13	0x3	CPU_Instruction_Cache_Errors_Failure
0x02	0x00	0x01	0x15	0x0	BOOT_CPU_CACHE_BAD
0x02	0x00	0x01	0x1a	0x0	BOOT_EARLY_BAD_CACHE_SIZE
0x02	0x04	0x01	0x00	0x0	D_CACHE_TEST
0x02	0x04	0x01	0x21	0x0	CPU_Data_Cache_RAM
0x02	0x04	0x01	0x21	0x3	CPU_Data_Cache_RAM_Failure
0x02	0x04	0x01	0x22	0x0	CPU_Data_Cache_Tags
0x02	0x04	0x01	0x22	0x3	CPU_Data_Cache_Tags_Failure
0x03	0x00	0x01	0x01	0x0	BOOT_BAD_CLOCKS

Source	SrcDetail	CallerActivity	CallerSub	ActStatus	Definition
0x03	0x00	0x01	0x12	0x0	BOOT_CCP_DISABLED
0x03	0x00	0x01	0x13	0x0	BOOT_CCP_FOUND
0x03	0x00	0x01	0x49	0x0	BOOT_NO_CCP
0x03	0x00	0x01	0x6e	0x0	BOOT_READING_SPD_EEPROM
0x03	0x00	0x01	0x71	0x0	BOOT_INVALID_SPHYR_SETTINGS
0x03	0x00	0x01	0x72	0x0	BOOT_MISMATCH_CPU_ACT_SPEEDS
0x03	0x00	0x01	0x73	0x0	BOOT_MISMATCH_CPU_CAP_SPEEDS
0x03	0x00	0x01	0x74	0x0	BOOT_MISMATCH_CPU_ICACHE_SIZES
0x03	0x00	0x01	0x75	0x0	BOOT_MISMATCH_CPU_DCACHE_SIZES
0x03	0x00	0x01	0x76	0x0	BOOT_ERR_READING_SPD_EEPROM
0x03	0x00	0x02	0x2f	0x0	BOOT_INIT_CCP
0x03	0x00	0x02	0x30	0x0	BOOT_INIT_CPU_CLOCKS
0x03	0x00	0x02	0x77	0x0	BOOT_CPUS_PRESENTL
0x03	0x00	0x02	0x78	0x0	BOOT_TIMESTAMP
0x03	0x01	0x01	0x19	0x0	BOOT_DISPLAY_SM4
0x03	0x02	0x01	0x56	0x0	BOOT_ROM_XSUM_ERR
0x03	0x02	0x01	0x57	0x0	BOOT_ROM_XSUM_INIT
0x03	0x02	0x01	0x58	0xf	BOOT_ROM_XSUM_TEST
0x03	0x03	0x01	0x59	0x0	BOOT_SCR_FATAL_ERR
0x03	0x03	0x01	0x60	0x0	BOOT_SCR_INIT
0x03	0x04	0x01	0x1e	0x0	BOOT_ERR_READING_NVM
0x03	0x04	0x01	0x23	0x0	BOOT_FATAL_ERR_READING_NVM
0x03	0x04	0x01	0x26	0x0	BOOT_FATAL_ERR_WRITING_NVM
0x03	0x04	0x01	0x32	0x0	BOOT_INIT_MANUF_DFLT
0x03	0x04	0x01	0x55	0x0	BOOT_RETRIEVE_PATH_FAILED
0x03	0x04	0x01	0x64	0x0	BOOT_SS_ERROR
0x03	0x04	0x01	0x64	0x0	BOOT_SS_FATAL_ERROR
0x03	0x04	0x02	0x14	0x0	BOOT_CLEARING_NVM
0x03	0x04	0x06	0x01	0x2	MC_INIT_NVM_WR_FAIL
0x03	0x04	0x06	0x20	0x2	MC_NVM_ACCESS_FAILED
0x03	0x04	0x06	0x21	0x2	MC_NVM_READ_FAILED
0x03	0x04	0x06	0x22	0x2	MC_NVM_WRITE_FAILED
0x03	0x04	0x06	0x54	0x2	MC_TOC_NVM_RD_FAIL
0x03	0x04	0x06	0x55	0x2	MC_TOC_NVM_WR_FAIL
0x03	0x05	0x01	0x50	0x0	BOOT_PDH_CNTRL_ERR
0x03	0x05	0x02	0x51	0x0	BOOT_PDH_CNTRL_INIT
0x03	0x05	0x01	0x52	0x0	BOOT_PDH_CNTRL_TEST
0x03	0x06	0x00	0x00	0x2	ICM_OVERFLOW

Source	SrcDetail	CallerActivity	CallerSub	ActStatus	Definition
0x03	0x06	0x07	0x22	0x2	RALPH_RESET_REINIT
0x06	0x00	0x01	0x0d	0x0	BOOT_BCH_MEM_FAILED
0x06	0x00	0x01	0x0f	0x0	BOOT_BOOT_FAILURE
0x06	0x00	0x01	0x25	0x0	BOOT_GET_DFLT_CONS
0x06	0x00	0x01	0x27	0x0	BOOT_GET_MANUF_DFLTS
0x06	0x00	0x01	0x28	0x0	BOOT_GET_MFG_SS_CONS
0x06	0x00	0x01	0x29	0x0	BOOT_GET_PRI_PATH
0x06	0x00	0x01	0x2a	0x0	BOOT_GET_SS_CONS
0x06	0x00	0x01	0x3c	0x0	BOOT_LAUNCH_IPL_OTHR
0x06	0x00	0x01	0x3d	0x0	BOOT_LAUNCH_IPL_PRI
0x06	0x00	0x01	0x3e	0x0	BOOT_LOAD_IPL_OTHR_PATH
0x06	0x00	0x01	0x3f	0x0	BOOT_LOAD_IPL_PRI_PATH
0x06	0x00	0x01	0x4d	0x0	BOOT_NO_PROCS_IN_MEM
0x06	0x00	0x01	0x6a	0x0	BOOT_TEST_SYSTEM_CLOCKS
0x06	0x00	0x01	0x6c	0x0	BOOT_UNKNOWN_LAUNCH_FLT
0x06	0x00	0x02	0x24	0x0	BOOT_FIND_CPUS
0x06	0x00	0x02	0x6f	0x0	BOOT_BOOT_START
0x06	0x00	0x02	0x70	0x0	BOOT_RESET
0x06	0x00	0x06	0x2a	0x2	MC_HPMC_STATE_CHANGE
0x07	0x00	0x01	0x01	0x2	MEM_PLATFORM_INIT_FAILURE
0x07	0x00	0x01	0x02	0x0	MEM_RESET
0x07	0x00	0x01	0x10	0x0	MEM_DISCOVERY
0x07	0x00	0x01	0x10	0xf	MEM_DISCOVERY_EXIT
0x07	0x00	0x01	0x10	0x0	MEM_DISCOVERY_DATA
0x07	0x00	0x01	0x11	0x0	BOOT_CATASTROPHIC_MEM_ERR
0x07	0x00	0x01	0x13	0x0	MEM_SPD
0x07	0x00	0x01	0x13	0x1	MEM_WARN_SPD_BYPASS
0x07	0x00	0x01	0x13	0x2	MEM_SPD_BARGRAPH
0x07	0x00	0x01	0x14	0x2	MEM_SPD_DIMM_FOUND
0x07	0x00	0x01	0x15	0x0	MEM_MIN_MEM
0x07	0x00	0x01	0x16	0x2	MEM_MIN_LAST_SET_TEST
0x07	0x00	0x01	0x17	0x2	MEM_MIN_SET_CHANGE
0x07	0x00	0x01	0x18	0x0	MEM_MIN_SET_TEST
0x07	0x00	0x01	0x19	0x2	MEM_MIN_SET_SELECT
0x07	0x00	0x01	0x1d	0x0	MEM_INIT_SCR_TABLES
0x07	0x00	0x01	0x20	0x1	MEM_WARN_LOADING_ORDER_BYPASS
0x07	0x00	0x01	0x21	0x1	MEM_WARN_DISTRIBUTION_CHECK_BYPASS
0x07	0x00	0x01	0x22	0x1	MEM_WARN_SET_CHECK_BYPASS
0x07	0x00	0x01	0x23	0x4	MEM_WARN_USING_ALT_CONFIG
0x07	0x00	0x01	0x30	0x0	MEM_EXT_SPD
0x07	0x00	0x01	0x31	0x2	MEM_EXT_FOUND
0x07	0x00	0x01	0x40	0x0	MEM_CONFIG
0x07	0x00	0x01	0x40	0xf	MEM_CONFIG_EXIT

Source	SrcDetail	CallerActivity	CallerSub	ActStatus	Definition
0x07	0x00	0x01	0x41	0x0	MEM_PHYSICAL_CONFIG_CHECK
0x07	0x00	0x01	0x42	0x0	MEM_RE_CONFIG_IN_PROGRESS
0x07	0x00	0x01	0x43	0x0	MEM_CONFIG_FROM_NVM
0x07	0x00	0x01	0x44	0x0	MEM_MAIN_MEM
0x07	0x00	0x01	0x45	0x0	MEM_UPDATE_NVM_CONFIG
0x07	0x00	0x01	0x50	0x0	MEM_REGISTER_TEST
0x07	0x00	0x01	0x50	0x1	MEM_WARN_REG_TEST_BYPASS
0x07	0x00	0x01	0x80	0x0	MEM_CHECK
0x07	0x00	0x01	0x80	0xf	MEM_CHECK_EXIT
0x07	0x00	0x01	0xa0	0x0	MEM_GENERATE_INTERLEAVING
0x07	0x00	0x01	0xa1	0x0	MEM_DEST_TEST
0x07	0x00	0x01	0xa1	0x1	MEM_WARN_INIT_ONLY
0x07	0x00	0x01	0xa2	0x0	MEM_PAGE_ONE_TEST
0x07	0x00	0x01	0xa3	0x0	MEM_MEM_TEST
0x07	0x00	0x01	0xa4	0x0	MEM_TEST_WRITE
0x07	0x00	0x01	0xa4	0x2	MEM_TEST_WRITE_BARGRAPH
0x07	0x00	0x01	0xa5	0x0	MEM_TEST_READ_WRITE
0x07	0x00	0x01	0xa5	0x2	MEM_TEST_READ_WRITE_BARGRAPH
0x07	0x00	0x01	0xa6	0x0	MEM_TEST_READ
0x07	0x00	0x01	0xa6	0x2	MEM_TEST_READ_BARGRAPH
0x07	0x00	0x01	0xa7	0x0	MEM_WARN_LOOP_ON_DEST_TEST
0x07	0x00	0x01	0xa9	0x0	MEM_INIT
0x07	0x00	0x01	0xa9	0x2	MEM_INIT_BARGRAPH
0x07	0x00	0x01	0xb0	0x4	MEM_INTERLEAVE_CODE_FAILURE
0x07	0x00	0x01	0xb1	0x4	MEM_INTERLEAVE_RELO_CFG_ERR
0x07	0x00	0x01	0xb2	0x4	UNDEFINED_SMC_INTERLEAVE_ERR
0x07	0x00	0x01	0xb5	0x4	MEM_REFRESH_INTERVAL_ERR
0x07	0x00	0x01	0xba	0x3	MEM_REFRESH_REG_WR_FAILURE
0x07	0x00	0x01	0xbb	0x4	MEM_TEST_EXCESS_HPMC_BITS
0x07	0x00	0x01	0xc0	0x4	MEM_TEST_STATUS_BITS_INVALID
0x07	0x00	0x01	0xc1	0x4	MEM_TEST_SUMMARY_BITS_INVALID
0x07	0x00	0x01	0xc2	0x4	MEM_TEST_FWD_PROG_BITS_INVALID
0x07	0x00	0x01	0xc3	0x4	MEM_TEST_HPMC_SUMMARY
0x07	0x00	0x01	0xc4	0x4	MEM_TEST_SMC_ERR_STATUS
0x07	0x00	0x01	0xc5	0x4	MEM_TEST_SMC_DERR_REG
0x07	0x00	0x01	0xc6	0x4	MEM_TEST_SMC_SYNDROME
0x07	0x00	0x01	0xc7	0x4	MEM_TEST_DEW_ERR_STATUS
0x07	0x00	0x06	0x05	0x2	SMC_ERR_STATUS
0x07	0x00	0x06	0x06	0x2	SMC_ERR_OVERFLOW
0x07	0x00	0x06	0x07	0x2	SMC_ERR_SUMMARY
0x07	0x01	0x01	0x03	0x4	MEM_ERR_LOG_CLEAR_WARNING
0x07	0x01	0x01	0x03	0x4	MEM_ERR_LOG_FAILED_TO_CLEAR
0x07	0x01	0x01	0x51	0x3	MEM_ADDRESS_REG_FAILURE
0x07	0x01	0x01	0x52	0x3	MEM_MBAT_REG_FAILURE
0x07	0x01	0x01	0x53	0x3	MEM_MEMORY_REG_FAILURE



Source	SrcDetail	CallerActivity	CallerSub	ActStatus	Definition
0x07	0x01	0x01	0x54	0x3	MEM_ERROR_REG_0_FAILURE
0x07	0x01	0x01	0x55	0x3	MEM_ERROR_REG_1_FAILURE
0x07	0x01	0x01	0x56	0x3	MEM_ERROR_REG_0_CLEAR_FAILURE
0x07	0x01	0x01	0x57	0x3	MEM_ERROR_REG_1_CLEAR_FAILURE
0x07	0x01	0x01	0xD2	0x3	MEM_ECC_SBE_DATA_FAIL
0x07	0x01	0x06	0x17	0x3	SMC_ERR_CF
0x07	0x02	0x01	0x10	0x3	MEM_NO_EXTENDERS_INSTALLED
0x07	0x02	0x01	0x13	0x2	MEM_EXTENDER_SPD_ERROR
0x07	0x02	0x01	0x20	0x4	MEM_EXT_DIMM_LOAD_ORD_ERR
0x07	0x02	0x01	0x27	0x4	MEM_EXT_DISTRIBUTION_ERROR
0x07	0x02	0x01	0x28	0x4	MEM_EXT_LOAD_ORD_ERR
0x07	0x02	0x06	0x12	0x3	SMC_ERR_AE_EXT
0x07	0x04	0x01	0x04	0x4	MEM_64MB_DIMM_FOUND
0x07	0x04	0x01	0x10	0x2	MEM_DIMM_TYPE_MISMATCH
0x07	0x04	0x01	0x10	0x2	MEM_DIMM_TYPE_INCOMPATIBLE
0x07	0x04	0x01	0x10	0x3	MEM_NO_DIMMS_INSTALLED
0x07	0x04	0x01	0x13	0x2	MEM_DIMM_SPD_FATAL
0x07	0x04	0x01	0x13	0x2	MEM_DIMM_SPD_CHECKSUM
0x07	0x04	0x01	0x1a	0x2	MEM_EXT_MPC940_MISMATCH
0x07	0x04	0x01	0x1b	0x2	MEM_EXT_MPC940_DATA_INVALID
0x07	0x04	0x01	0x1c	0x2	DIMM_SPD_FRUID_CKSUM_ERR
0x07	0x04	0x01	0x21	0x4	MEM_DIMM_DISTRIBUTION_ERROR
0x07	0x04	0x01	0x24	0x3	MEM_DIMM_TYPE_TABLE_FULL
0x07	0x04	0x01	0x25	0xf	MEM_HP_DIMM_TYPE_ADDED
0x07	0x04	0x01	0x26	0xf	MEM_NON_HP_DIMM_TYPE_ADDED
0x07	0x04	0x06	0x12	0x3	SMC_ERR_AE_DIMM
0x07	0x05	0x01	0x10	0x2	MEM_MIN_MEM_FAILED
0x07	0x05	0x01	0x2b	0x0	BOOT_GOOD_MEM_FAILED
0x07	0x06	0x01	0x00	0x2	MEM_DIMM_MBE
0x07	0x06	0x01	0x10	0x3	MEM_NO_MEM_FOUND
0x07	0x06	0x01	0x46	0x2	MEM_GOOD_MEM_FAILED
0x07	0x06	0x01	0x47	0x2	MEM_MAIN_MEM_FAILED
0x07	0x06	0x01	0x4b	0x0	BOOT_NO_DRAMS
0x07	0x06	0x01	0xb4	0x4	MEM_RANK_ENTRY_NOT_FOUND
0x07	0x06	0x01	0xb6	0x3	MEM_UNEXPECTED_HPMC
0x07	0x06	0x01	0xb7	0x3	MEM_ERR_ADDR_NOT_IN_MBAT
0x07	0x06	0x01	0xb8	0x3	MEM_MBE_IN_RANK
0x07	0x06	0x01	0xb9	0x3	MEM_MBE_BY_SBE_IN_RANK
0x07	0x06	0x01	0xbc	0x3	MEM_CORR_ERR
0x07	0x06	0x01	0xd0	0x3	MEM_ETEST_FAILED
0x07	0x06	0x01	0xd1	0x3	MEM_CACHE_LINE_0_WR_RD_FAILED

Source	SrcDetail	CallerActivity	CallerSub	ActStatus	Definition
0x07	0x06	0x01	0xd2	0x3	MEM_ESBE_DATA_TST_FAILED
0x07	0x06	0x01	0xd3	0x3	MEM_ESBE_ETST_FAILED
0x07	0x06	0x01	0xd4	0x3	MEM_EMBE_DATA_TST_FAILED
0x07	0x06	0x01	0xd5	0x3	MEM_TEST_CODE_IN_PAGE0_CORRUPT
0x07	0x06	0x06	0x10	0x2	SMC_ERR_DC_MEM
0x07	0x06	0x06	0x11	0x2	SMC_ERR_DU_MEM
0x07	0x08	0x01	0x00	0x2	MEM_PDT_SBE_OVRWRT
0x07	0x08	0x01	0x00	0x2	MEM_PDT_DUP_ENTRY
0x07	0x08	0x01	0x00	0x3	MEM_PDT_DISABLED_HALT
0x07	0x08	0x01	0x00	0x3	MEM_PDT_NVM_ERR
0x07	0x08	0x01	0x00	0x3	MEM_PDT_TABLE_FULL
0x07	0x08	0x01	0x00	0x4	MEM_PDT_DISABLED_WARNING
0x07	0x08	0x01	0xb3	0x4	MEM_DMT_ENTRY_NOT_FOUND
0x07	0x09	0x06	0x01	0x3	SMC_ERR_AF
0x07	0x09	0x06	0x04	0x3	SMC_ERR_CW
0x07	0x09	0x06	0x05	0x3	SMC_ERR_WT
0x07	0x09	0x06	0x06	0x3	SMC_ERR_DE
0x07	0x09	0x06	0x07	0x3	SMC_ERR_DP
0x07	0x09	0x06	0x08	0x3	SMC_ERR_UL
0x07	0x09	0x06	0x09	0x3	SMC_ERR_ST
0x07	0x09	0x06	0x0a	0x3	SMC_ERR_PT
0x07	0x09	0x06	0x0b	0x2	SMC_ERR_RT
0x07	0x09	0x06	0x0c	0x3	SMC_ERR_RE
0x07	0x09	0x06	0x0d	0x2	SMC_ERR_HE
0x07	0x09	0x06	0x0e	0x2	SMC_ERR_IC
0x07	0x09	0x06	0x0f	0x2	SMC_ERR_IU
0x07	0x09	0x06	0x10	0x2	SMC_ERR_DC_CC
0x07	0x09	0x06	0x11	0x2	SMC_ERR_DU_CC
0x07	0x09	0x06	0x13	0x3	SMC_ERR_BA
0x07	0x09	0x06	0x14	0x3	SMC_ERR_IA
0x07	0x09	0x06	0x15	0x3	SMC_ERR_LA
0x07	0x09	0x06	0x18	0x2	SMC_ERR_FC
0x07	0x09	0x06	0x19	0x2	SMC_ERR_FU
0x07	0x09	0x06	0x1a	0x2	SMC_ERR_SC
0x07	0x09	0x06	0x1b	0x2	SMC_ERR_SU
0x07	0x09	0x06	0x1c	0x3	SMC_ERR_DT
0x08	0x00	0x01	0x01	0x0	IO_DISCOVERY_START
0x08	0x00	0x01	0x01	0xf	IO_DISCOVERY_DONE
0x08	0x00	0x01	0x04	0x0	IO_CONFIG_START
0x08	0x00	0x01	0x04	0xf	IO_CONFIG_DONE
0x08	0x00	0x01	0x05	0x0	IO_FIXED_CONFIG_START
0x08	0x00	0x01	0x05	0xf	IO_FIXED_CONFIG_DONE
0x08	0x00	0x01	0x06	0xf	IO_FIXED_DISCOVERY_DONE

Source	SrcDetail	CallerActivity	CallerSub	ActStatus	Definition
0x08	0x00	0x01	0x07	0x0	IO_CHECK_START
0x08	0x00	0x01	0x07	0xf	IO_CHECK_DONE
0x08	0x00	0x01	0x1b	0x0	BOOT_ENTRY_IO_ERR
0x08	0x00	0x01	0x1c	0x0	BOOT_ERR_EXEC_EINIT
0x08	0x00	0x01	0x1d	0x0	BOOT_ERR_EXEC_ETEST
0x08	0x00	0x01	0x1f	0x0	BOOT_ERR_READING_EINIT
0x08	0x00	0x01	0x20	0x0	BOOT_ERR_READING_EIO
0x08	0x00	0x01	0x21	0x0	BOOT_ERR_READING_ETEST
0x08	0x00	0x01	0x22	0x0	BOOT_ERR_READING_IODC_BYTES
0x08	0x00	0x01	0x3a	0x0	BOOT_INVALID_DEV_CLASS
0x08	0x00	0x02	0x2e	0x0	BOOT_INITIALIZE_IO
0x08	0x00	0x02	0x39	0x0	BOOT_INVALID_DEVICE
0x08	0x00	0x06	0x20	0x0	IO_INVALID_PGZ_DEVICE
0x08	0x00	0x06	0x30	0x0	IO_ERROR_FULL_LOGGING_START
0x08	0x00	0x06	0x30	0xf	IO_ERROR_FULL_LOGGING_EXIT
0x08	0x00	0x06	0x31	0x0	IO_ERROR_SYS_BUS_LOGGING_START
0x08	0x00	0x06	0x31	0xf	IO_ERROR_SYS_BUS_LOGGING_EXIT
0x08	0x00	0x06	0x32	0x0	IO_ERROR_HOST_BRIDGE_LOGGING_START
0x08	0x00	0x06	0x32	0xf	IO_ERROR_HOST_BRIDGE_LOGGING_EXIT
0x08	0x00	0x06	0x36	0x0	IO_ERROR_REMAP_DUMP_DEVICES_START
0x08	0x00	0x06	0x36	0xf	IO_ERROR_REMAP_DUMP_DEVICES_EXIT
0x08	0x02	0x01	0x00	0x0	IO_SBA_FWD_PROGRESS
0x08	0x02	0x01	0x00	0x2	IO_SBA_ERROR
0x08	0x02	0x01	0x18	0x0	IO_IKE_TEST_TLB_START
0x08	0x02	0x01	0x18	0x3	IO_IKE_TEST_TLB_ERR
0x08	0x02	0x01	0x18	0xf	IO_IKE_TEST_TLB_DONE
0x08	0x02	0x01	0x19	0x0	IO_IKE_TEST_CACHE_START
0x08	0x02	0x01	0x19	0x2	IO_IKE_CACHE_TEST_SKIP_WARN
0x08	0x02	0x01	0x19	0x3	IO_IKE_TEST_CACHE_ERR_EXP_DATA
0x08	0x02	0x01	0x19	0x3	IO_IKE_TEST_CACHE_ERR_ACT_DATA
0x08	0x02	0x01	0x19	0x3	IO_IKE_TEST_CACHE_ERR
0x08	0x02	0x01	0x19	0xf	IO_IKE_TEST_CACHE_DONE
0x08	0x02	0x06	0x00	0x0	IO_SBA_ERR
0x08	0x02	0x06	0x00	0x2	IO_SBA_UNC_FUNCTION_ERR
0x08	0x02	0x06	0x00	0x2	IO_SBA_CORR_DATA_PARITY_ERR
0x08	0x02	0x06	0x00	0x2	IO_SBA_UNC_DATA_PARITY_ERR
0x08	0x02	0x06	0x00	0x2	IO_SBA_RECONFIG_FAILED_ERR
0x08	0x02	0x06	0x00	0x2	IO_SBA_REG_READ_OR_CLEAR_FAILED_ERR
0x08	0x02	0x06	0x00	0x2	IO_SBA_ROPE_RESET_FAILED_ERR
0x08	0x02	0x06	0x00	0x3	IO_SBA_FATAL_CONTROL_ERR
0x08	0x02	0x06	0x00	0x3	IO_SBA_FATAL_MAP_ERR
0x08	0x02	0x06	0x00	0x3	IO_SBA_UNKNOWN_ERR
0x08	0x02	0x06	0x00	0x3	IO_SBA_FATAL_FUNCTION_ERR
0x08	0x02	0x06	0x00	0x3	IO_SBA_FATAL_TIMEOUT_ERR

Source	SrcDetail	CallerActivity	CallerSub	ActStatus	Definition
0x08	0x02	0x06	0x00	0x3	IO_SBA_FATAL_CONTROL_PARITY_ERR
0x08	0x02	0x06	0x00	0x3	IO_SBA_FATAL_DATA_PARITY_ERR
0x08	0x02	0x06	0x00	0x3	IO_SBA_FATAL_PARITY_ERR
0x08	0x02	0x06	0x33	0x3	LOGGING_SYS_BUS_INTERFACE
0x08	0x02	0x06	0x34	0x3	LOGGING_ROPE_INTERFACE
0x08	0x02	0x06	0x37	0x3	READING_ERROR_REGS
0x08	0x03	0x01	0x01	0x0	IO_LBA_FWD_PROGRESS
0x08	0x03	0x01	0x02	0x2	IO_LBA_RESET_ERROR
0x08	0x03	0x01	0x04	0x0	IO_SLOT_POWER_ON_START
0x08	0x03	0x01	0x04	0x3	IO_SLOT_POWER_ON_ERROR
0x08	0x03	0x01	0x04	0xf	IO_SLOT_POWER_ON_DONE
0x08	0x03	0x01	0x19	0x2	IO_IKE_CACHE_TEST_LOOPBACK
0x08	0x03	0x02	0x10	0x4	IO_PHASE_DETECT_ERROR
0x08	0x03	0x02	0x11	0x4	IO_ROPE_RESET_ERROR
0x08	0x03	0x02	0x12	0x4	IO_SET_PCI_FREQ_ERROR
0x08	0x03	0x02	0x13	0x4	IO_SLOT_DECONFIG
0x08	0x03	0x02	0x14	0x4	IO_SLOT_RESET_NOT_ASSERTED_ERR
0x08	0x03	0x02	0x15	0x4	IO_CHECK_XTRA_LBA_FOUND_ERR
0x08	0x03	0x02	0x16	0x4	IO_CHECK_LBA_MISSING_ERR
0x08	0x03	0x02	0x17	0x4	IO_CHECK_ROPE_WIDTH_ERR
0x08	0x03	0x06	0x00	0x0	IO_LBA_ERR
0x08	0x03	0x06	0x00	0x2	IO_LBA_MISC_UNC_ERR
0x08	0x03	0x06	0x00	0x2	IO_LBA_UNC_FUNCTION_ERR
0x08	0x03	0x06	0x00	0x2	IO_LBA_CORR_TIMEOUT_ERR
0x08	0x03	0x06	0x00	0x2	IO_LBA_UNC_TIMEOUT_ERR
0x08	0x03	0x06	0x00	0x2	IO_LBA_UNC_PARITY_ERR
0x08	0x03	0x06	0x00	0x2	IO_LBA_PCI_LOG_FULL_ERR
0x08	0x03	0x06	0x00	0x2	IO_LBA_PCI_RESUME_FAILED_ERR
0x08	0x03	0x06	0x00	0x2	IO_LBA_REG_READ_OR_CLEAR_FAILED_ERR
0x08	0x03	0x06	0x00	0x2	IO_LBA_ROPE_RESET_FAILED_ERR
0x08	0x03	0x06	0x00	0x3	IO_LBA_MISC_FATAL_ERR
0x08	0x03	0x06	0x00	0x3	IO_LBA_UNKNOWN_ERR
0x08	0x03	0x06	0x00	0x3	IO_LBA_FATAL_FUNCTION_ERR
0x08	0x03	0x06	0x00	0x3	IO_LBA_FATAL_TIMEOUT_ERR
0x08	0x03	0x06	0x00	0x3	IO_LBA_FATAL_PARITY_ERR
0x08	0x03	0x06	0x30	0x0	IO_ERROR_FATAL_ROPE_LOGGING_START
0x08	0x03	0x06	0x34	0x0	LOGGING_ROPE_INTERFACE
0x08	0x03	0x06	0x35	0x0	LOGGING_PCI_INTERFACE
0x08	0x03	0x06	0x37	0x0	READING_ERROR_REGS
0x08	0x05	0x03	0x00	0x0	IO_PCI_BUS_DEPTH_EXCEEDED
0x08	0x05	0x03	0x00	0x0	IO_BOOT_PCI_CARD_UNSUPPORTED
0x08	0x05	0x03	0x00	0x3	IO_PCI_CARD_UNSUPPORTED

Source	SrcDetail	CallerActivity	CallerSub	ActStatus	Definition
0x08	0x05	0x06	0x00	0x2	IO_DEV_ADAPTER_MISC_UNC_ERR
0x08	0x05	0x06	0x00	0x3	IO_DEV_ADAPTER_MISC_FATAL_ERR
0X08	0X05	0X06	0X38	0X3	SET_PCI_SCSI_AUTO_TERM
0x08	0x06	0x01	0x03	0x0	BOOT_BAD_IPL_ADDR_OTHR
0x08	0x06	0x01	0x04	0x0	BOOT_BAD_IPL_ADDR_PRI
0x08	0x06	0x01	0x05	0x0	BOOT_BAD_IPL_CHECKSUM_OTHR
0x08	0x06	0x01	0x06	0x0	BOOT_BAD_IPL_CHECKSUM_PRI
0x08	0x06	0x01	0x07	0x0	BOOT_BAD_IPL_ENTRY_OTHR
0x08	0x06	0x01	0x08	0x0	BOOT_BAD_IPL_ENTRY_PRI
0x08	0x06	0x01	0x09	0x0	BOOT_BAD_IPL_SIZE_OTHR
0x08	0x06	0x01	0x0a	0x0	BOOT_BAD_IPL_SIZE_PRI
0x08	0x06	0x01	0x0b	0x0	BOOT_BAD_LIF_MAGIC_OTHR
0x08	0x06	0x01	0x0c	0x0	BOOT_BAD_LIF_MAGIC_PRI
0x08	0x06	0x01	0x18	0x0	BOOT_DEVICE_NOT_READY
0x08	0x06	0x01	0x2c	0x0	BOOT_HOT_SWAP_RETRY
0x08	0x06	0x01	0x48	0x0	BOOT_NO_BOOT_SELECTION
0x08	0x06	0x01	0x4f	0x0	BOOT_OTHR_IPL_FAULT
0x08	0x06	0x01	0x53	0x0	BOOT_PRI_IPL_FAULT
0x08	0x06	0x01	0x54	0x0	BOOT_PRI_IPL_FAULT_FATAL
0x08	0x06	0x01	0x68	0x0	BOOT_TEST_OTHR_PATH
0x08	0x06	0x01	0x69	0x0	BOOT_TEST_PRI_PATH
0x08	0x06	0x02	0x34	0x0	BOOT_INIT_OTHR_PATH
0x08	0x06	0x02	0x35	0x0	BOOT_INIT_OTHR_PATH_FAILED
0x08	0x06	0x02	0x36	0x0	BOOT_INIT_PRI_PATH
0x08	0x06	0x02	0x37	0x0	BOOT_INIT_PRI_PATH_FAILED
0x08	0x06	0x06	0x20	0x0	IO_REINIT_PGZ_BOOT_DISK
0x08	0x06	0x06	0x20	0x0	IO_REINIT_PGZ_PATH_FAILED
0x08	0x06	0x06	0x36	0x0	IO_REMAP_DUMP_DEVICE_FAILED
0x08	0x09	0x01	0x47	0x0	BOOT_NO_BOOT_NO_CONS
0x08	0x09	0x01	0x4a	0x0	BOOT_NO_CONS_FOUND
0x08	0x09	0x01	0x4c	0x0	BOOT_NO_GO_SS_CONS
0x08	0x09	0x02	0x31	0x0	BOOT_INIT_DFLT_CONS
0x08	0x09	0x02	0x33	0x0	BOOT_INIT_MFG_SS_CONS
0x08	0x09	0x02	0x38	0x0	BOOT_INIT_SS_CONS
0x08	0x09	0x06	0x20	0x0	IO_REINIT_PGZ_CONS
0x08	0x09	0x06	0x20	0x0	IO_REINIT_PGZ_CONS_FAILED