L440GX+
System Event Log (SEL) Messages

Revision 0.40

4/15/99

Revision Information

Revision	Date	Change
0.40	4/15/99	Changed BIOS Events 0C EF E7 20, 0C EF E7 21 to 0C EF E7 40, 0C EF E7 41

Disclaimers

Table of Contents

List of Tables

List of Figures

1 Introduction

The System Event Log (SEL) Viewer is the user interface to the SEL. This interface can be accessed both from the Emergency Management Port (EMP) and the System Setup Utility (SSU). It extracts information from the SEL and presents it to the user in either a hex or verbose format. It also provides support for the user to save the current SEL data to a file for later use or to clear the current SEL records at the server.

This document is provided as a reference to the information displayed by the SEL Viewer on the Intel® L440GX+ boards and server systems. It provides a tabular description of the events that have been recorded in the SEL.

1.1 Document Organization

This document is primarily composed of tables containing possible conditions that occur in the SEL along with a definition of the SEL data.

Section 1 contains a brief introduction to the SEL and the SEL Viewer.

Section 2 contains a table of SEL information generated from the sensors in the Intel® L440GX+ platform.

Section 3 contains tables of SEL information generated from the Intel® L440GX+ BIOS.

Section 4 contains tables of SEL information generated from the Intel® L440GX+ POST.

1.2 Overview

The SEL is a non-volatile repository for system events. The SEL Viewer provides an interface for the server administrator to view the SEL. The administrator can use this information to:

- Monitor the server for both warnings, such as when the chassis door on a server has been opened, or potential critical problems, such as when a processor has failed or a temperature threshold has been crossed. In the L440GX+ server system, these events can be generated from the Baseboard Management Controller (BMC), Hot Swap Controller (HSC), and BIOS.
- Examine SEL records by sensor Type and Number in hex or verbose mode
- Examine SEL records by event Type in hex or verbose mode
- Examine SEL records from a previously stored binary file in hex or verbose mode.

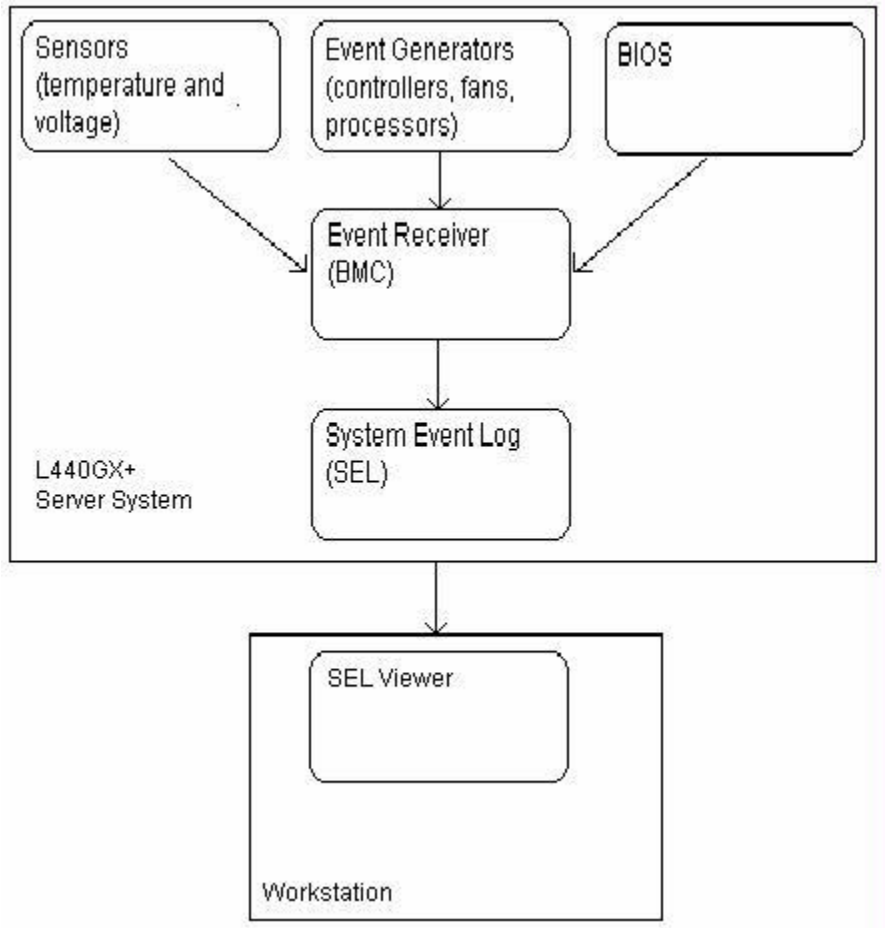


Figure 1-1: Event Message Flow

1.2.1 Sensors

The Intel® L440GX+ server system contains sensors that monitor System Health. For example, a management controller that scans temperatures and voltages provides an interface to this information as 'temperature sensors' and 'voltage sensors'.

In the event that a sensor reading exceeds the predefined range, an Event Message is generated. This Event Message is passed to the BMC. The BMC passes the event message to the SEL where it becomes available for querying by the System Event Log Viewer.

1.2.2 Event Receiver

The Event Receiver is the device that receives all Event Messages from system Event Generators. The BMC is the default Event Receiver on the L440GX+ server system. It acknowledges all events as received and then writes them to the SEL. The BMC takes no action based on the Events it receives.

1.2.3 Event Generator

Event Generators are system devices that recognize events and pass them to the Event Receiver for recording in the SEL. On the L440GX+ server system the HSC and the BIOS can be Event Generators. In this case the BMC is both the Event Generator and the Event Receiver.

1.2.4 BIOS

The system BIOS (Basic I/O System) serves many important roles in platform management. It loads and initializes the system management hardware interfaces so they can be accessed later by System Management Software and the Operating System. The BIOS works with the system hardware and management controllers during POST to implement checks of the system and management hardware.

1.2.5 System Event Log (SEL)

The System Event Log (SEL) is the repository for the Event Messages. The System Event Log is implemented as non-volatile storage to ensure that Critical Events entered into the SEL can be retrieved for 'post-mortem analysis' should a system failure occur. Because the platform's System Event Log is typically of limited size, it is important to clear the SEL periodically.

If the SEL becomes full it will not delete previous entries. This prevents the first event record, which may provide the most important information on a critical event, from being deleted before it can be viewed. If, however, management software such as Intel® Server Control (ISC) has been installed on the server system, it will manage the SEL. ISC will clear the SEL if it becomes full. Since ISC provides a variety of alerting capabilities for critical events it eliminates the need to retain older SEL entries until they are viewed.

1.2.6 Summary of the message flow

A management controller on the Intelligent Platform Management Bus (IPMB) such as the Hot Swap Controller (HSC) scans for events, such as the Backplane temperature. When an event occurs, an Event Message is sent via the IPMB to the designated event receiver, the Baseboard Management Controller (BMC). The BMC receives the Event Message and saves it to the System Event Log. The BMC also generates logs event Messages for its own internally detected events, such as Watchdog timeouts and Voltage Events.

1.2.7 SEL Viewer Screen

The SEL Viewer is the user interface to the SEL. This interface can be accessed both from the Emergency Management Port (EMP) and the System Setup Utility (SSU). It extracts information from the SEL and presents it to the user in either a hex or verbose format. It also provides support for the user to save the current SEL data to a file for later use or to clear the current SEL records at the server.

Note: If using SSU, the records can be cleared directly from the interface. If using EMP, clearing the log has to be done through the BIOS set up screens.

Figure 1-2 provides an idea of the type of information that can be gathered by looking at the SEL Viewer. For documentation purposes, the EMP interface is used here.

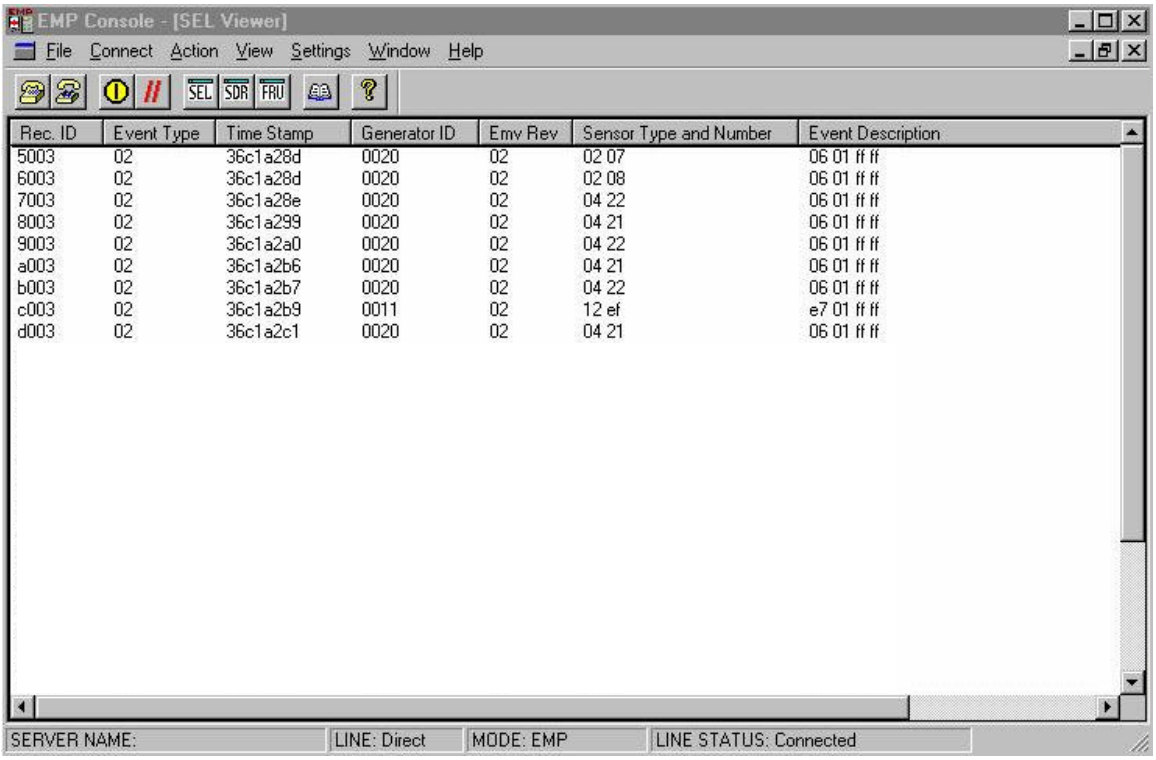


Figure 1-2: SEL Viewer Screen – Hex format

Rec. ID – A unique id that is generated for each event in the SEL.

Event Type – Indicates what the event pertains to. Currently holds the value of "System Event". This field is for future use.

Time Stamp – The time and the date that the error was generated (Pre_Init Timestamp means no timestamp was available during system POST.

Generator ID – This field identifies the device that generated the Event Message.

EmvRev. – This field is used to identify different revisions of the Event Message format. Currently holds the value of "#02". This field is for future use.

Sensor Type – Indicates the event class or type of sensor that generated the Event Message. See table 2-1 for the list of Sensor Types.

Sensor Number – A unique number (within a given sensor device) representing the 'sensor' within the management controller that generated the Event Message. Sensor numbers are used for both identification and access of sensor information, such as getting and setting sensor thresholds. See Table 2-1 for the list of Sensor Types.

Event Description – Short description of the event that generated the entry in the SEL Viewer.

2 Sensor Type Codes

The Sensor Type Code Table provides information regarding:

The type of sensor generating the SEL entry
The name of the sensor
The microcontroller which initiated the SEL entry
The warning or error which initiated the SEL entry

2.1 Using The System Event Log for Sensor Event Messages

This section uses an example SEL entry to explain the use of the Sensory System Event Log Table. For ease of reading and understanding the Event Messages, the verbose view is used. The differences between the verbose view and the hexadecimal view are explained where necessary.

The example on the following page uses Rec. ID 0x7003 (the third line of data) in Figure 2-1. This Event Message has been reported by the BMC against Fan sensor #22, otherwise known as Digital Fan 4. This was determined as follows:

1. Locate the Sensor Type and Sensor Number displayed in **the Sensor Type and Number** field in the SEL Viewer screen (Figure 2-1). This data displays as Fan #22. The Sensor Type (Fan) is displayed first, followed by the Sensor Number #22).

2. Use Table 2-1 to locate "Fan" in the Sensor Type (verbose) column.

   Note: If the example event in Figure 2-1 were displayed in the hexadecimal view instead of Fan #22," the Sensor Type and Number would display "04 22" (see Figure 1-2). It would be necessary to look for "04" in the Hex area of the Sensor Type column.

3. Locate Sensor Number "22" in the **Sensor Number** column of the table.

4. Use the **Sensor Name** column in the table to determine the sensor or component that caused the Event Message.

5. Use the **Generator ID** column to determine the BMC generated the SEL message.

6. The Event Description column of the SEL Viewer screen can be used to obtain more information regarding the event, in this case that a "performance lag" has occurred (a fan has slowed).

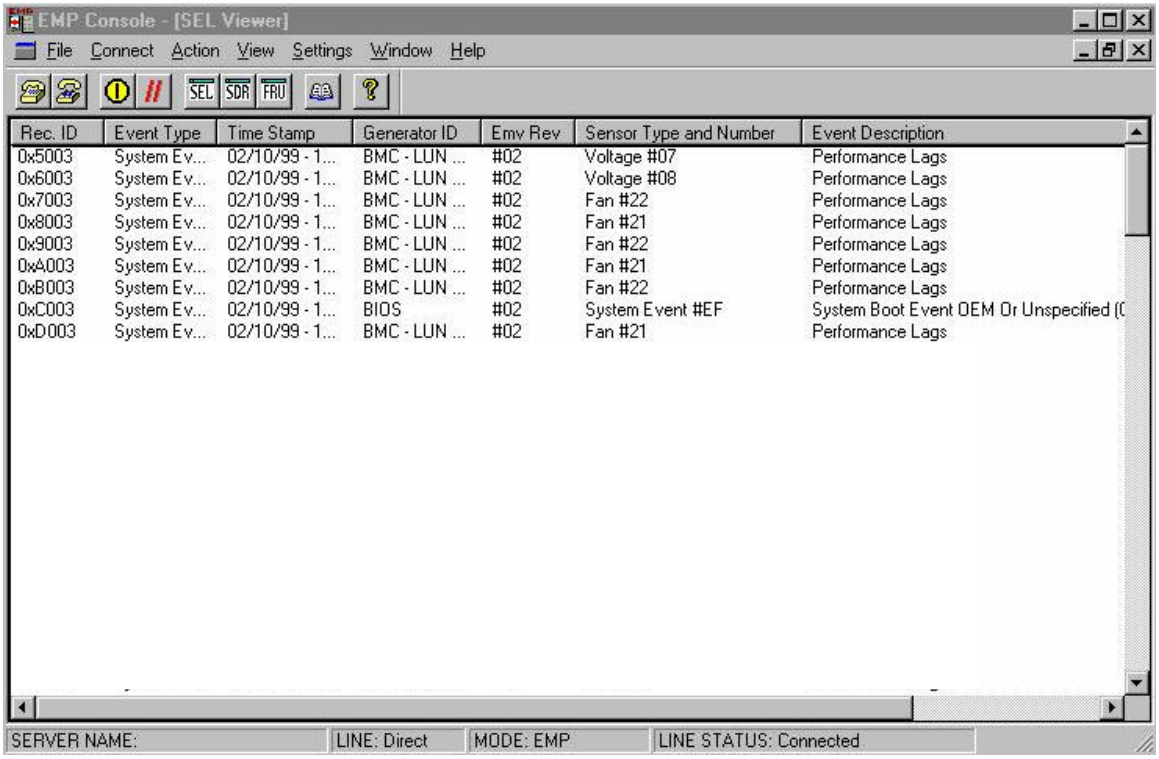


Figure 2-1: SEL Viewer Screen – Verbose format

Table 2-1: Sensor System Event Log Table

Sensor Type		**Sensor Number**	**Sensor Name**	**Generator ID**
Verbose	**Hex**			
Temperature	**01**			
		01	Backplane Temperature	HSC
		17	Primary Processor Temp	BMC
		18	Secondary Processor Temp	BMC
		19	Baseboard Temperature 1	BMC
		1A	Baseboard Temperature 2	BMC
Voltage	**02**			
		01	Baseboard 5V	BMC
		02	Baseboard 3.3V	BMC
		03	Primary Processor	BMC
		04	Secondary Processor	BMC
		05	Processor 2.5V	BMC
		06	5V Standby	BMC
		07	Baseboard SCSI-W LVDS Term1	BMC
		08	Baseboard SCSI-W LVDS Term2	BMC
		09	3V Standby (Wake On LAN)	BMC

Sensor Type		Sensor Number	Sensor Name	Generator ID
Verbose	**Hex**			
		0A	Baseboard -12V	BMC
		0B	Baseboard SCSI-W SGL Term	BMC
		0C	Processor 1.5V	BMC
		0D	Baseboard –5V	BMC
		0E	Baseboard +12V	BMC
Fan	**04**			
		0C	Backplane Fan 1	HSC
		0D	Backplane Fan 2	HSC
		0F	Baseboard Fan 0	BMC
		10	Baseboard Fan 1	BMC
		11	Processor Fan 0	BMC
		12	Processor Fan 1	BMC
		1F	Digital Fan 1[1]	BMC
		20	Digital Fan 2[1]	BMC
		21	Digital Fan 3[1]	BMC
		22	Digital Fan 4[1]	BMC
Physical Security	**05**			
		26	Chassis Intrusion	BMC
Secure Mode Sensor	**06**			
		27	EMP Password	BMC
		28	Secure Mode Sensor	BMC
Processor	**07**			
		1B	Primary Processor Status	BMC
		1C	Secondary Processor Status	BMC
Memory	**0C**			
		EF	See BIOS table	BMC
Drive Slot (Bay)	**0D**			
		02	Drive Slot 0 Status	HSC
		03	Drive Slot 1 Status	HSC
		04	Drive Slot 2 Status	HSC
		05	Drive Slot 3 Status	HSC
		06	Drive Slot 4 Status	HSC
		07	Drive Slot 0 Presence	HSC

Sensor Type		Sensor Number	Sensor Name	Generator ID
Verbose	**Hex**			
		08	Drive Slot 1 Presence	HSC
		09	Drive Slot 2 Presence	HSC
		0A	Drive Slot 3 Presence	HSC
		0B	Drive Slot 4 Presence	HSC
POST Error	**0F**			
		25	See POST table	
Watchdog	**11**			
		1D	BMC Watchdog	BMC
System Event	**12**			
		EF	See BIOS table	
Critical Interrupt	**13**			
		1E	Front Panel NMI	BMC

Note:

[1] Digital Fans and Tach fans will use the same header connections but will report events using distinct sensor numbers. Depending on the chassis used and the implementation, Tach fans or a combination of Tach and Digital fans may be installed. Events and Sensor Numbers are determined by the Sensor Data Record.

3 BIOS Error Messages

The BIOS is responsible for monitoring and logging certain System Events, Memory Errors and Critical Interrupts. The BIOS sends an event request message to BMC to log the event. Some errors such as the processor failure are logged during early POST.

3.1 Using The System Event Log for BIOS Event Messages

This section uses an example SEL entry to explain the use of the SEL Viewer with a BIOS Event Message. To fully interpret a BIOS Event Message, both verbose and hexadecimal views may need to be used. In this example, the verbose view is used and the differences between the verbose view and hexadecimal view are noted where necessary.

The example on the following page uses Rec. ID 0xC003 (the fourth line of data from the bottom) in Figure 3-1. This Event Message has been reported by the BIOS and indicates the system has been booted. This was determined as follows:

1. In the diagram below, the Sensor Type and Number is indicated as System Event #EF in Verbose mode. Under the Sensor Type and Sensor Number columns in Table 2-1, System Event EF indicates the BIOS table should be used for information. The Generator ID in both the diagram and in the table indicates the BIOS generated this Event Message.

2. In HEX format, the Sensor Type and Sensor Number are displayed as 12 EF and the Event Description is displayed as E7 01 FF FF (not pictured).

3. In Table 3-1, this event can be identified by first locating 12 EF in the Sensor Type and Sensor Number columns. Then locate E7 01 in the Event Description column beneath 12 EF. The -- -- indicate that only the first two bytes of the Event Description column are used to identify this Event Message.

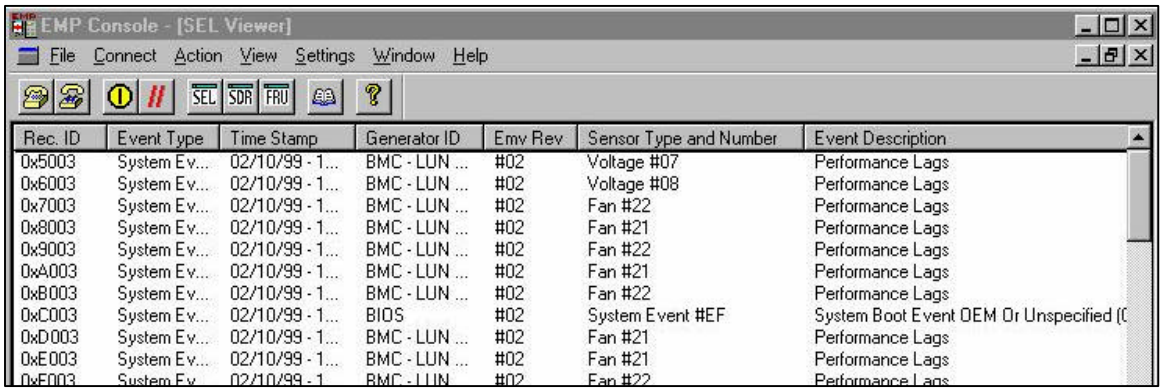


Figure 3-1 : BIOS Event indicated (Rec ID 0xC003)

Table 3-1: BIOS System Event Log Table

Sensor Type	Sensor Number	Event Description in hex	Event Type
12	**EF**		
		E7 01 -- --	System Boot Event
		E7 00 -- --	System Reconfiguration
0C	**EF**		
		E7 40 [DIMM#] --	Single Bit Memory Error
		E7 41 [DIMM#] --	Multi Bit Memory Error
		E7 02 -- --	Memory Parity Error
13	**28**		
		E7 00 -- --	Front Panel NMI
13	**EF**		
		E7 01 -- --	Bus Timeout
		E7 02 -- --	I/O CHK
		E7 03 -- --	Software NMI
		E7 04 -- --	PCI PERR

4 POST Event Messages

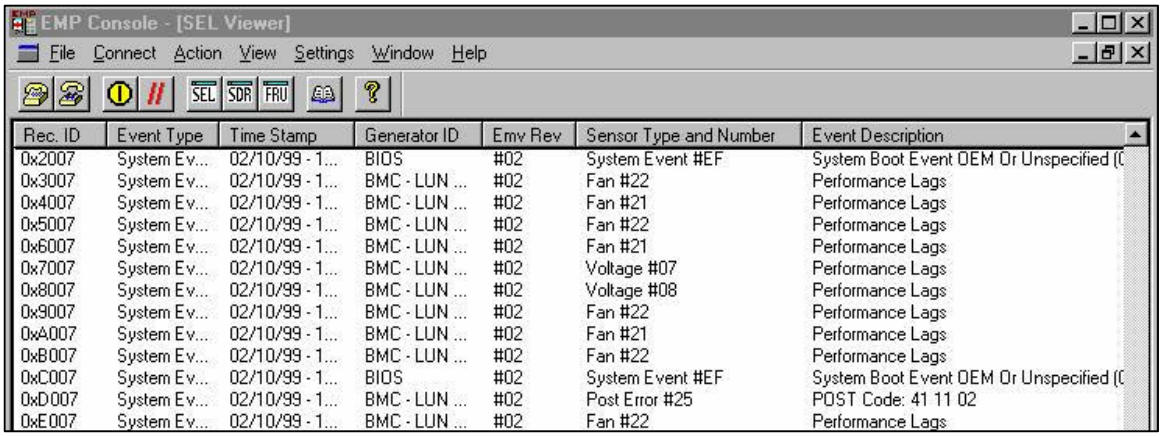
BIOS events that are generated in the pre boot period, such as clearing CMOS, are logged during early stage POST as Sensor Type “0F --“ (in hexadecimal view) under the Sensor Type and Number column. The “--“ here indicates the Sensor Number. This value will change, depending upon the nature of the Event Message.

4.1 Using the System Event Log for POST Event Messages

This section uses an example SEL entry to explain the use of the SEL Viewer with a POST Event Message. To fully interpret a POST Event Message, both verbose and hexadecimal views may need to be used. In this example, the hexadecimal view is used.

The example on the following page uses Rec. ID D007 (the second line of data from the bottom) in Figure 4-1. This Event Message has been reported by the POST and indicates “Keyboard Error.” This was determined as follows:

1. In the diagram below, the Sensor Type and Number is indicated as Post Error #25 in Verbose mode. Under the Sensor Type and Sensor Number columns in Table 2-1, Post Error 25 indicates the POST table should be used for information. The Generator ID in both the diagram and in the table indicates the BMC generated this Event Message.
2. As indicated by “-- --“in Table 4-1, only the last two bytes Event Description are used.
3. The last two bytes of the Event Description are 11 and 02.
4. The Event Explanation column indicates this event was caused by a keyboard error.



Rec. ID	Event Type	Time Stamp	Generator ID	Emv Rev	Sensor Type and Number	Event Description
0x2007	System Ev...	02/10/99 - 1...	BIOS	#02	System Event #EF	System Boot Event OEM Or Unspecified ((
0x3007	System Ev...	02/10/99 - 1...	BMC - LUN ...	#02	Fan #22	Performance Lags
0x4007	System Ev...	02/10/99 - 1...	BMC - LUN ...	#02	Fan #21	Performance Lags
0x5007	System Ev...	02/10/99 - 1...	BMC - LUN ...	#02	Fan #22	Performance Lags
0x6007	System Ev...	02/10/99 - 1...	BMC - LUN ...	#02	Fan #21	Performance Lags
0x7007	System Ev...	02/10/99 - 1...	BMC - LUN ...	#02	Voltage #07	Performance Lags
0x8007	System Ev...	02/10/99 - 1...	BMC - LUN ...	#02	Voltage #08	Performance Lags
0x9007	System Ev...	02/10/99 - 1...	BMC - LUN ...	#02	Fan #22	Performance Lags
0xA007	System Ev...	02/10/99 - 1...	BMC - LUN ...	#02	Fan #21	Performance Lags
0xB007	System Ev...	02/10/99 - 1...	BMC - LUN ...	#02	Fan #22	Performance Lags
0xC007	System Ev...	02/10/99 - 1...	BIOS	#02	System Event #EF	System Boot Event OEM Or Unspecified ((
0xD007	System Ev...	02/10/99 - 1...	BMC - LUN ...	#02	Post Error #25	POST Code: 41 11 02
0xE007	System Ev...	02/10/99 - 1...	BMC - LUN ...	#02	Fan #22	Performance Lags

Figure 4-1: POST Event indicated (Rec ID 0XD007)

Table 4-1. POST Code System Event Log Table

Event Description	Event Explanation
-- -- 00 02	Failure Fixed Disk
-- -- 00 81	processor 0 failed BIST
-- -- 01 04	Invalid System Configuration Data - run configuration utility
-- -- 01 06	Device configuration changed
-- -- 01 81	processor 1 failed BIST
-- -- 02 06	Configuration error - device disabled
-- -- 03 04	Resource Conflict
-- -- 04 04	Resource Conflict
-- -- 04 05	Resource Conflict
-- -- 04 81	processor 0 Internal Error (IERR) failure
-- -- 05 04	Expansion ROM not initialized
-- -- 05 05	Expansion ROM not initialized
-- -- 05 81	processor 1 Internal Error (IERR) failure
-- -- 06 04	Warning: IRQ not configured
-- -- 06 05	Warning: IRQ not configured
-- -- 06 81	processor 0 Thermal Trip failure
-- -- 07 81	processor 1 Thermal Trip failure
-- -- 08 81	Watchdog Timer failed on last boot, BSP switched.
-- -- 0A 81	processor 1 failed initialization on last boot.
-- -- 0B 81	processor 0 failed initialization on last boot.
-- -- 0C 81	processor 0 disabled, system in Uni-processor mode
-- -- 0D 81	processor 1 disabled, system in Uni-processor mode
-- -- 0E 81	processor 0 failed FRB Level 3 timer
-- -- 0F 81	processor 1 failed FRB Level 3 timer
-- -- 10 02	Stuck Key
-- -- 10 81	Server Management Interface failed to function

Event Description	Event Explanation
-- -- 11 02	Keyboard error
-- -- 12 02	Keyboard Controller Failed
-- -- 13 02	Keyboard locked - Unlock key switch
-- -- 20 02	Monitor type does not match CMOS - Run SETUP
-- -- 20 81	IOP sub-system is not functional
-- -- 30 02	System RAM Failed at offset:
-- -- 31 02	Shadow Ram Failed at offset:
-- -- 32 02	Extended RAM Failed at offset:
-- -- 50 02	System battery is dead - Replace and run SETUP
-- -- 50 81	NVRAM Cleared by Jumper
-- -- 51 02	System CMOS checksum bad - Default configuration used
-- -- 51 81	NVRAM Checksum Error, NVRAM cleared
-- -- 52 81	NVRAM Data Invalid, NVRAM cleared
-- -- 60 02	System timer error
-- -- 62 01	BIOS unable to apply BIOS update to processor 1
-- -- 63 01	BIOS unable to apply BIOS update to processor 2
-- -- 64 01	BIOS does not support current stepping for processor 1
-- -- 65 01	BIOS does not support current stepping for processor 2
-- -- 70 02	Real time clock error
-- -- 97 02	ECC Memory error in base (extended) memory test in Bank xx
-- -- B2 02	Incorrect Drive A type - run SETUP
-- -- B3 02	Incorrect Drive B type - run SETUP
-- -- D0 02	System cache error - Cache disabled
-- -- F5 02	DMA Test Failed
-- -- F6 02	Software NMI Failed

Appendix 1: Glossary

Term	Definition
BIOS	Basic Input Output System.
BMC	Baseboard Management Controller.
BSP	Boot Strap Processor.
Byte	An 8-bit quantity.
CMOS	In terms of this specification, this describes the PC/AT* compatible region of battery-backed 128 bytes of memory, which normally resides on the baseboard.
DIMM	Dual-inline Memory Module. Name for the plug in modules used to hold the system's DRAM (Dynamic Random Access Memory).
ECC	Error-correcting Code. Refers to a set of additional bits on system RAM that are used to provide a check code that is used to verify memory data integrity.
EEPROM	Electronically Erasable Programmable Read Only Memory
EMP	Emergency Management Port
EvMRev	Event Message Revision
FPC	Front Panel controller
FRB	Fault Resilient Booting. A term used to describe system features and algorithms that improve the likelihood of the detection of, and recovery from, processor failures in a multiprocessor system.
FRU	Field Replaceable Unit.
HSC	Hot-Swap Controller. Name for the microcontroller that implements the SAF-TE command set and controls the fault lights and drive power on an L440GX+ Backplane.
IERR	Internal Error. A signal from the Pentium® II Xeon™ processor indicating an internal error condition.
IPMB	Intelligent Platform Management Bus. Name for the architecture, protocol, and implementation of a special bus that interconnects the baseboard and chassis electronics and provides a communications media for system platform management information.
IPMI	Intelligent Platform Management Interface. This protocol is used for communication between microcontrollers, System Management Software, and other 'intelligent' devices on the IPMB.
ISC	Intel® Server Control
NMI	Non-maskable Interrupt. The highest priority interrupt in the system, after SMI. This interrupt has traditionally been used to notify the operating system fatal system hardware error conditions, such as parity errors and unrecoverable bus errors.
NVRAM	Non-Volatile RAM.
PERR	Parity Error. A signal on the PCI bus that indicates a parity error on the bus.
POST	Power On Self Test.
SAF-TE	SCSI Accessed Fault-tolerant Enclosure specification. Describes a set of SCSI commands whereby drive fault status can be sent to an enclosure for the purpose of presenting that fault information with external indicators, such as fault lights. Other commands are provided so certain management information about the enclosure, such as temperature, voltage, number of drive bays, power status, etc., can be retrieved.
SCU	System Configuration Utility. No longer in use. Replaced by SSU.
SDR	Sensor Data Record. A data record that provides platform management sensor type, locations, event generation, and access information.
SEEPROM	Serially Accessed EEPROM (see definition for EEPROM)
SEL	System Event Log. A non-volatile storage area and associated interfaces for storing system platform event information for later retrieval.
SERR	System Error. A signal on the PCI bus that indicates a 'fatal' error on the bus.
SSU	System Setup Utility. Replaces the SCU