Problem Determination Guide for xSeries 440 and 445

If someone is available local to the server, please try to obtain the following information before dispatching a service engineer and/or parts.

Obtain the Front LightPath Panel and Top Cover LED status. Record which LEDs are lit. This will help to confirm the information in the System Error (RSA Service Processor) Log.

Obtain the System Error Log. **This is important!!** You cannot perform accurate PD without this information.   The log can be obtained in the following ways:

1. Boot to F2 Diagnostics. Select "Hardware Information", "System Error Log". Press F3 to save to diskette.   Also boot to F1 Setup, select "System Information", "Product Data" and collect the Bios and ASM build levels. For x440, also get the "Hot-Plug" firmware level (must be 2.06 or higher!).

2. Run e-gatherer (Windows, Linux, Vmware 1.5.x). If the RSA or asm driver is loaded, e-gatherer will obtain the system error logs. E-gatherer will also obtain bios and RSA build levels as well as cpu, memory, adapter configuration and device driver information. **It is recommended to run e-gatherer even if the System Error Log is obtained.**

3. If the server cannot boot, or you cannot perform steps 1 or 2, and the RSA I/P address has been previously set:
   - Connect an ethernet cross-over cable from the laptop to the RSA adapter, or connect the laptop and RSA adapter to an existing network, and open a web browser to the RSA I/P address.
   - Log in using the following: Login = USERID, Password = PASSW0RD
        The word "password" is spelled with a zero, not the letter "O", and all is upper-case.
   - Select "event log" and save to diskette.
   - Select "vital product data" and collect:
        Post/bios VPD build level
        ASM VPD build level (multiple entries, but all should be the same)
        Integrated System Management Processor VPD firmware level (x440 **MUST** be at firmware level 44 or higher. If not, you MUST reflash the RSA using the "normal flash" option)

4. If the server cannot boot, or you cannot perform steps 1 or 2, and the RSA I/P address has **not** been set, then a service engineer or CE must be dispatched with:
        a laptop
        null-modem cable
        ethernet cross-over cable.
   - Connect the null-modem cable from the RSA to the laptop serial port (com1).
   - Open Hyperterminal. Set com1 to 57,600, 8-bits, 1-stop bit, no parity, no flow control.
   - Press <esc> for login screen. Log into the RSA same as step 3.
   - At the main menu, select "Settings", "Network Interfaces/Protocols", "Ethernet".
   - Make sure the interface is Enabled. Disable DHCP. Set the RSA ethernet port I/P address.
   - Save changes and press <esc> to return to the main menu.
   - Select "Restart ASM" from the main menu or reboot the machine.
   - Disconnect the null-modem and exit Hyperterminal.
   - Follow the procedures in step 3.

Current x440 and x445 build levels and versions

This information can also be found on the IBM internal site:
Http://ralfsapp.raleigh.ibm.com/webapp/oss/Codeinfo1.htm

Vigil x440	
BIOS build / version	RSA build / version
VIJT46A, 1.11	VIET53A, 1.14
	VIET51A, 1.13
VIJT44A, 1.10 (BAD!)	VIET49A, 1.12
VIJT43A, 1.09	VIET45A, 1.10
VIJT42A, 1.08	VIET38A, 1.09
VIJT35A, 1.07	VIET33A, 1.06
Vigil x440 16-way	
BIOS build / version	RSA build / version
VIJZ15A, 1.01	VIET46A, 1.11
VIJZ10A, 1.00A	
VIJZ08A, 1.00	
Ruthless x445 (8 or 16-way)	
BIOS build / version	RSA build / version
REJT27A, 1.05 (RSA 1)	REET19A, 1.02 (RSA 1)
REJT37A, 1.12 (RSA 2)	
REJT26A, 1.04 (RSA 1)	
REJT35A, 1.10 (RSA 2)	REE811A, 1.00 (RSA 2)
REJT26A, 1.04	REET17A, 1.01
REJT21A, 1.02	REET17A, 1.01
REJT18A, 1.01	REET13A, 1.00

Many problems have been corrected in the latest levels of code, so updating BIOS and RSA should be one of your first action plans.

x440 bios v1.10 has a serious bug which will cause system reboots.   If a customer is complaining of a reboot problem, and there are no errors in the system error log, check this first before going any further. If a customer has bios v1.10 installed, upgrade bios and RSA immediately.

Always try to match bios and RSA code levels. Many fixes applied to one new code release often rely on fixes applied to the other.

RSA firmware MUST ALWAYS be flashed using the "normal flash, all subsystems" option!!

Selecting the "Hardware Update" option will not update the Integrated Systems Management code. The Integrated Systems Management (i.e. the Drawer Management Controller or DMC) is located on the I/O board, not the RSA adapter.   If this code is corrupted or downlevel, the system will be unable to recognize or initialize many components on the machine. This can cause memory, cpu, and upper or lower smp board failures. You can find the Integrated Systems Management code level from the follow two methods:

1. Boot to the RSA flash diskette #1, select "Hardware Information and Status".
2. Log into the RSA via a web interface, select "Vital Product Data", and go to the bottom of the screen.

Checking the RSA System Error Log

Always read the system error log from bottom to top (refer to the date & time stamps on the entries). The first error indicated is always the most important since it can trigger cascading events which cause other errors to occur.

If you have the Front Panel and Top Cover LED status information, you can compare this with the entries in the system error log.   If you find LEDs and log entries that do not appear to match, contact your Level 2 or Back Office organization for advice and assistance.

Common error messages and recommended first action plans:

- Native I/O Machine Check or Native I/O signalled an error.

Actions:
Make sure that no Intel Pro 1000 XT or other non-ServerProven adapters are installed. If so, then the unsupported cards should be removed immediately.

Replace I/O board (MUST reflash BIOS and SP to the latest firmware levels on new board).

- Adapter in slots x or y signalled an error.

Actions:
Replace adapters in designated slots and the PCI-X board. Possibly the I/O board as well (see #1).

> 1. If adapters in slots 1 or 2 are called out, replace the I/O board, the PCI-X board, and the adapters in slots 1 and 2. (MUST reflash BIOS <u>and</u> RSA to the latest firmware levels.)

> 2. If adapters in slots 3, 4, 5, or 6 (or a combination) are called out, replace PCI-X board and adapters in the slots specified.

When PCI board is replaced, make sure that the Hot plug code is at version 2.06. Verify this by booting into F1 Setup, select "System Information", "Product Data" and go to the bottom of the screen. If less than 2.06, you MUST flash/update this code.   Hot-Plug firmware 2.06 is available on the IBM web

- PCI Card Machine Check

Actions:
Replace PCI-X board and PCI-X board VRM.

Make sure that Hot plug code on the replacement board is at version 2.06. You can find this by pressing F1 during POST, go under "System Information", "Product Data" and go to the bottom of the screen.

- Memory Multi-bit Errors

Actions:
Replace specified bank (four dimms in x440, two dimms in x445) of memory refered in the system error logs. **If failure occurs in x445, do not replace memory with Micron memory**.

Replace the designated SMP board.

- ## Lower and/or Upper CEC machine check.

SERVPROC	09/05/03 15:02:26	Lower CEC Machine Check, CYC_MCK2: [00][00][00][00][00][08][00][00]
SERVPROC	09/05/03 15:02:22	Lower CEC Scalability Controller Machine Check: [20][00][00][00][00][00][00][00], resetting system

or

SERVPROC	11/17/03 15:01:48	Resetting system due to an unrecoverable error
SERVPROC	11/17/03 15:01:48	Lower SMP Expansion Module Error.

Actions:
Make sure scalability cables are connected tightly. There should be no movement in the cable plugs when you pull on the scalability cable.

Replace memory VRMs and centerplane VRM (x440 only).
NOTE: memory VRM is simply a location-designator. This VRM is actually for the scalability ports.

Replace the smp board indicated (upper or lower).

- ## No POST, no video or 1 - 3 - 1 Beep codes and no POST on x445

Actions:
Remove any memory dimms located in slots 13 - 16 (maybe even 10 & 12).   If problem disappears, try to move memory to slots 1 - 8 in either CEC (must be installed in pairs, see HMM for locations). If unable to move memory because all other slots are full, follow the steps below to isolate the smp board.

If a one-CEC system, replace the smp board.

If a two-CEC system:

Remove the top CEC and see if problem continues.   If problem disappears, replace the top smp board.

If problem remains, remove the bottom CEC and install the top CEC, see if problem continues.   If problem disappears, replace the bottom smp board.

If problem remains after swapping CECs, replace both smp boards.

- ## Top Cover LEDs 1, 2, 4, and 6 are lit

Actions:
Replace the centerplane VRM, FRU 74P4343.

- Processor Machine Check

SERVPROC	06/21/03 13:56:24	PFA Alert, see preceding error in system error log.
SMI Hdlr	06/21/03 13:56:24	00151200 MCA: Unrecoverable Error DetectedProcID=02
SMI Hdlr	06/21/03 13:56:24	00151351 Processor MachineCheck Data b Address:00000000 0042ADC0 Timestamp:000217B3 4957E590
SMI Hdlr	06/21/03 13:56:24	00151350 Processor MachineCheck Data a reporting bank:0000 reporting APICID:0010 Status:CC000102 20140152 CR4:00000000

Actions:
Replace CPU and corresponding CPU VRM according to the table below:

APIC IDs 0,1	replace CPU 1	1 - 4 Bottom CEC
APIC IDs 10,11	replace CPU 2	
APIC IDs 2,3	replace CPU 3	
APIC IDs 12,13	replace CPU 4	
APIC IDs 20,21	replace CPU 5	5 - 8 Top CEC
APIC IDs 30,31	replace CPU 6	
APIC IDs 22,23	replace CPU 7	
APIC IDs 32,33	replace CPU 8	

Do not forget to order thermal grease (or thermal pads) for the cpu heatsinks.   The old thermal grease MUST be removed and new grease/pads applied before re-installing cpus & heatsinks. Otherwise, an overtemp condition could occur.

What to look for in an e-gatherer log

Windows & Linux:
Service Processor Information. The most important part of e-gatherer.

- Service Processor Error Logs. These are the same as "System Error Logs".
  This is where your problem determination begins!

- Service Processor Firmware VPD. This is the RSA firmware build level.
- Service Processor System VPD. This is the system bios build level.
- Memory DIMMS. The DIMM number indicates the slot (1-16 bottom CEC, 17-32 top CEC).
  Check for unknown brands or unknown/unrecognized sizes. Verify pairs or quads.   If memory is
  not showing up, verify in the SMBIOS Information log.

Windows:
SMBIOS Information

- Processor Information (speed, cache). Speed can differ, but not cache.

PCI Adapter Information

- What adapters are installed in what slots.
  NOTE: NetXtreme 1000T Dual-Port adapter cannot be installed alone in slots 3 or 4.
      Intel Pro1000XT adapter not supported in x440 or x445.
      IBM GammaGraphx 133Mhz adapter is a Serveraid 6M adapter.
      The x440 and RXE-100 cannot take more than two pci-x "bridge" adapters.
        The Serveraid 6M and Dual-Port Broadcom are examples of bridge adapters.

Device Manager Settings

- Computer.
    ACPI Multiprocessor. This indicates the HAL installed. **Should be 2.3 or higher**. If anything
    else, have customer download IBM HAL 2.3DS and install.
- Network Adapters. Check for Intel Pro1000XT adapters. If they exist, check to see if the service
  has been "Stopped".   If running, the adapters are installed and working. Inform customer that
  these adapters must be removed.

Device Drivers

- Verify the device drivers loaded on the system. Below are recommended versions:

B57W2K.SYS	Broadcom	6.67 or higher
IBMHPA.SYS & IBMHPF.SYS	Active PCI	5.0.4.1 or higher
IBMSPW.SYS & IBMCOMW.SYS	Asma/SP	5.16 (2.21b) or higher
S3GSAV4M.SYS	Video (x440 only)	6.13.10.8013-13.95.13 or higher

IBM Serveraid Information

- Serveraid Bios/firmware and device driver.   **MUST MATCH!!!!**   Various issues, such as reboots,
  hangs, NMIs, and other events can occur.
- Entries in the Device Event Log (soft, hard, parity columns). Entries in these columns could
  indicate failures within the harddrive itself, such as media, mechanical, or communications. The

Device Log should be examined as a whole. Entries in the Device Log across multiple devices may indicate failures on the backplane, cable, or adapter.

Retain Tips

Retain tips are being updated all the time.   New issues are captured and documented, often with a fix or work-around to assist in resolving customer issues.

RETAIN Tips are published on the following:

External e-Support:
Http://www.ibm.com/pc/support
Http://www-3.ibm.com/pc/support/site.wss/document.do?lndocid=MIGR-42424

Business Partner:
Http://www.pc.ibm.com/partner/infotips
requires a Logon ID

HelpCenter InfoTips:
Http://w3.pc.ibm.com/helpcenter/infotips

TSKBS: (I personally recommend this one !)
Http://dc7.watson.ibm.com/scadocs/qAD01030303.html

ViewBlue (Hone):
Http://w3.viewblue.ibm.com

Once on this page select the following to get to RETAIN Tips:
a) enter Serial Number and click "Logon" button,
   (this loads the "IBM Public Information and Services Main Menu")
b) Page down to "Technical, QASearch(WWQ&A) - Search technical and service databases ",
c) Click - "QASearch - Search technical and service databases",
   (this loads the "Search for Service and Support Information" page, you can enter a Record Number here, or continue...
d) Define the search as "Hardware".
   (this loads the "Search Hardware Problem Database" page)
e) enter query data as you would in RETAIN, e.g. "ca d/t8680" would yield a list of all ECAs for Device Type 8680.