Solving 1801 Errors

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xSeries Product Support
Documentation

Note: Before using this information and the product it supports, read the general information under Appendix A. Notices in this document.

Solving 1801 errors in xSeries 236, xSeries 260, xSeries 336, xSeries 346, xSeries 260, xSeries 366, and xSeries 460 servers

This document only applies to the xSeries 236 Type 8841, xSeries 260 Type 8865, xSeries 336 Type 8837, xSeries 346 Type 8840, xSeries 366 Type 8863, and the xSeries 460 Type 8872/8874 servers. For you to use the methods described in this document, xSeries 260, xSeries 366, and the xSeries 460 systems require that a Remote Supervisor Adapter II SlimLine be installed.

Background

System POST 1801 errors are caused by an over-subscription of limited Peripheral Component Interconnect read-only memory (PCI ROM) resource space. Specifically, the error message is: "A PCI adapter has requested memory resources that are not available." This space is limited by PC architecture to 128 KB. Any request that pushes the system beyond this limit cannot be serviced and generates this error message.

Steps for problem resolution:
- Understand the nature of the problem.
- Understand the base system ROM resources needed before option cards are added.
- Identify requirements for desired add-in elements (PCI, PCI-X, or PCI-e adapters).
- Identify failure point and list all desired ROM device requirements.
  A sample failing configuration is shown.
- Experiment on paper with alternative solutions. Try to formulate a working sequence.
  Three alternative solutions are given for the sample problem.
- Implement the above step in the system.
  Use any or all of the three alternative solutions to solve the problem.

Notes:
1. There are other potential configuration issues with PCI adapters. For example, 1802 errors are caused by "No more I/O space is available for a PCI adapter." Although similar in nature, these other errors are not as common and are not addressed here.
2. There are variables related to this issue. For example, code and firmware updates to certain devices can modify ROM space requirements. Also, the sequence in which devices are located makes a difference. An example is boot sequence. If a customer configures his Start Options to boot from a small computer system interface (SCSI) adapter in slot 2, the ROM scan sequence can produce different results. Thus it is difficult to provide blanket solutions to these problems.

Understanding read only memory (ROM) elements in xSeries systems

Certain devices commonly use optional ROMs as a method of running low level device commands during system operation. These elements typically use ROM space:
> Video
> SCSI/SAS/RAID
> Network

These elements typically do not use ROM space and do not affect this problem:
> Serial/Parallel ports
> USB
> CD drive, diskette drive, IDE devices
> System memory / DIMMs

The system BIOS searches for and runs these ROMs in a logical sequence. The sequence is important and can be understood by the following typical example:

Step 1: The onboard video device is located and enabled, and its ROM is activated.
> *This is needed to establish a video display for further system operation.*

Step 2: Likely boot devices must be located. Since xSeries systems are designed for rapid-deployment, the first boot device is preset to the network. The onboard network device is located, and its ROM is run.
> *This initializes the network chip and checks for a link to an attached boot server using the PXE protocol.*

Step 3: Other likely boot devices are located. This is preset to the onboard storage device. The onboard SCSI, SAS, or RAID ROM is then loaded and run.
> *A boot device is typically located at this time. However, system BIOS is not yet complete, and it must identify any additional devices.*

Step 4: PCI slots are scanned following a standard format. Any PCI card can or cannot request ROM space.
> *This is where an 1801 error is most likely encountered.*

Step 5: Assuming the successful completion of the above, system BIOS identifies all of the base system and add-in devices to the operating system, for driver installation and OS boot.

Runtime vs. POST Sizes

Certain devices have two different sizes for ROM code. When the ROM code for this type of device is run, the first step identifies the specific device and application present. Then, only the portions of ROM code that are relevant are activated, and others portions can be discarded. The result is that the initial (POST) ROM space requested, for example 64KB, is then reduced to a lower runtime number, such as 12 KB. This characteristic is important in solving some 1801 error conditions.

ROM sharing

Another complexity on some devices is ROM sharing. An example is a system with multiple ServeRAID™ 6M adapters installed. The ROM code on the first card searches for other 6M adapters installed in the system and, when they are found, takes over operation of the secondary cards, eliminating the need to load subsequent ServeRAID 6M ROMs.

Base ROM elements in system before PCI adapters are considered

To get started with tabulating the optional ROMs requires an understanding the ROMs that are loaded in the base system, without any additional adapters installed.

Each of following tables identifies the base ROM elements in each system type. The table contains six columns: the device, the order in which the device ROM is run, the POST and runtime size of each device, and then a sequential running total of the memory used in POST and runtime. The POST running total is obtained by using the runtime total from the previous entry and adding the current POST size. The maximum available option ROM space is 128 KB per PC architecture. If the POST running total ever exceeds 128 KB, an 1801 Error occurs.

Device	Default Scan Order	POST Size (KB)	Runtime Size (KB)	Running Total POST (KB)	Running Total Runtime (KB)
Video [1]	1	44	44	44	44
Ethernet ports 1 and 2	2	64	5	108	49
SCSI / ServeRAID 7k [2]	3	64 / 32	20 / 13	113 / 81	69 / 62
Remote Supervisor Adapter II SlimLine		0	0		
TOTALS					
Onboard SCSI				113	69
7k RAID				81	62

Table 1 xSeries 236 option ROM Characterization – system board devices, default settings

1 Video device ROM is contained within base system BIOS.
2 When installed, the 7k RAID adapter takes control of the SCSI controller on the system board. The 7k adapter is scanned in place of the SCSI controller on the system board.

Device	Default Scan Order	POST Size (KB)	Runtime Size (KB)	Running Total POST (KB)	Running Total Runtime (KB)
Video [1]	1	44	44	44	44
Ethernet ports 1 and 2	2	64	5	108	49
SCSI / ServeRAID 6i+ [2]	3	64 / 32	16 / 14	113 / 81	65 / 63
Remote Supervisor Adapter II SlimLine		0	0		
TOTALS					
Onboard SCSI				113	65
6i+ RAID				81	63

Table 2 xSeries 336 option ROM Characterization – system board devices, default settings

1 Video device ROM is contained within base system BIOS.
2 When installed, the 6i+ RAID adapter takes control of the SCSI controller on the system board. The 6i+ adapter is scanned in place of the SCSI controller on the system board.

Device	Default Scan Order	POST Size (KB)	Runtime Size (KB)	Running Total POST (KB)	Running Total Runtime (KB)
Video [1]	1	44	44	44	44
Ethernet ports 1 and 2	2	64	5	108	49
SCSI / ServeRAID 7k	3	50 / 32	39 / 13	99 / 81	88 / 62
Remote Supervisor Adapter II SlimLine		0	0		
TOTALS					
Onboard SCSI				99	88
7k RAID				81	62

Table 3 xSeries 346 option ROM characterization – system board devices, default settings

1 Video device ROM is contained within base system BIOS.
2 When installed, the 7k RAID adapter takes control of the SCSI controller on the system board. The 7k adapter is scanned in place of the SCSI controller on the system board.

Device	Default Scan Order	POST Size (KB)	Runtime Size (KB)	Running Total POST (KB)	Running Total Runtime (KB)
Video [1]	1	44	44	44	44
Ethernet ports 1 and 2	2	64	5	108	49
SAS / ServeRAID 8i [2,3]	3	64 / 32	20 / 16	113 / 81	69 / 65
Remote Supervisor Adapter II SlimLine		0	0		
TOTALS					
Onboard SAS				113	69
8i RAID				81	65

Table 4 xSeries 260/366/460 option ROM characterization – system board devices, default settings

1 Video device ROM is contained within base system BIOS.
2 When installed, the 8i RAID adapter takes control of the SAS controller on the system board. The 8i adapter is scanned in place of the SAS controller on the system board.
3 ServeRAID 8i BIOS is contained within the 8i update utility.

Considering PCI adapters

The next step in resolving 1801 errors is to identify the PCI slot device characteristics. The following table can be used to determine the extent of the problem.

Fill out the table below for the system configuration. View the entries under the IBM configuration / Setup Utility program at the time of the 1801 error. See the Reference section for how to do this. This function is available only if a Remote Supervisor Adapter II is installed.

Device	Default Scan Order	POST Size (KB)	Runtime Size (KB)	Running Total POST (KB)	Running Total Runtime (KB)
Base System w/8i TOTAL (Table 4)				81 [1]	65 [1]
Slot 1					
Slot 2					
Slot 3					
Slot 4					
Slot 5					
Slot 6					

Table 5. Example: xSeries 260/366/460 option ROM characterization – PCI devices

1 This number is taken from the base system configuration total, see Table 4.

Sample of problem configuration

This table is an example of a configuration that creates an 1801 error. Notice that the card information for each populated slot is filled out, and then the total scan/runtime values are calculated by using the previous run total and adding the POST/runtime sizes.

Device	Default Scan Order	POST Size (KB)	Runtime Size (KB)	Running Total POST (KB)	Running Total Runtime (KB)
System w/8i					65 [1]
Slot 1					
Slot 2					
Slot 3 – BCM 1000T dual port	4 [4]	12 [2]	8 [3]	77 [5]	73
Slot 4 – BCM 1000T dual port	6	12	8	89	81
Slot 5 – Emulex 10000E Fibre	7	48	0	129 **	81
Slot 6 – Emulex 10000E Fibre	8	48	0	129 **	81

Table 6. Example: xSeries 260/366/460 option ROM characterization – slot devices sample

1 This number is taken from the base system configuration total. See Table 4.
2 This POST number is taken from the BIOS utility with subject adapter plugged in. See Reference section.
3 This runtime number is taken from the BIOS utility with subject adapter plugged in. See Reference section.
4 This sequence number is taken as next consecutive number from base system (Table 4). Empty slots are not counted.
5 Math as follows:
       65 (previous total) + 12 (POST value this row) = 77
       65 (previous total) + 8 (RUNTIME value this row) = 73 this is the new total
** Notice that the entries for slots 5 and 6 exceed the 128 KB maximum and result in the 1801 errors. This can occur when either the POST or Runtime values exceed 128 KB.

Solution 1 - Sample problem solved by reducing base system ROM

The simplest solution to some 1801 errors is to reduce the base system ROM requirements to the minimum necessary. Typically, this can be achieved by disabling the PXE (network boot) ROM capability of the onboard Ethernet. Note that this does not disable the device in the operating system. It only disables its capability to perform a network boot.

Configuration sequence for disabling PXE (assumes default settings are loaded):

[Assumes default settings are loaded]

1. Start the server. At the prompt, press F1.
2. Select **Start Options** and press Enter.
3. Select **Planar Ethernet PXE/DHCP.**
4. Use the Right arrow key to set **Disable** (this disables PXE booting only for this device)
5. Press Esc to return to the main setup screen.
6. Select **Save Settings** and press Enter. Press Enter again to confirm.
7. Select **Exit Setup** and press Enter. Select **Yes** to confirm.

The following tables show the result.

Device	Default Scan Order	POST Size (KB)	Runtime Size (KB)	Running Total POST (KB)	Running Total Runtime (KB)
Video [1]	1	44	44	44	44
Ethernet ports 1 and 2	2	0 *	0 *	44	44
SAS / ServeRAID 8i	3	64 / 32	20 / 16	108 / 76	64 / 60
Remote Supervisor Adapter SlimLine		0	0		
TOTALS					
Onboard SAS				108	64
8i RAID				76	60

Table 7. Example: xSeries 260/366/460 option ROM characterization – system board devices, PXE disabled settings

* Device ROM disabled

Device	Default Scan Order	POST Size (KB)	Runtime Size (KB)	Running Total POST (KB)	Running Total Runtime (KB)
System w/8i (PXE Disabled)					60 [1]
Slot 1					
Slot 2					
Slot 3 – BCM 1000T dual port	4	12	8	72	68
Slot 4 – BCM 1000T dual port	5	12	8	80	76
Slot 5 – Emulex 10000E Fibre	6	48	0	124	76
Slot 6 – Emulex 10000E Fibre	7	48	0	124 **	76

Table 8. Example: xSeries 260/366/460 option ROM characterization – Solution 1 slot scan

1 This number is taken from the base system configuration total with PXE disabled. See Table 7.
** Notice that lowering the base system ROM requirement solves this error. The running total never exceeds 128 KB.

Solution 2 - Sample problem configuration solved by resequencing

This table shows by example how the same configuration as above was fixed, but with device resequencing. The same cards were used, but in a different slot sequence.

IBM Support Recommendations:

    1.) Change slot plugging order to the following:

        a. Slot 1 - Emulex 10000E Fibre
        b. Slot 2 - Emulex 10000E Fibre
        c. Slot 4 - Broadcom 1000T Ethernet
        d. Slot 5 - Broadcom 1000T Ethernet

Device	Default Scan Order	POST Size (KB)	Runtime Size (KB)	Running Total POST (KB)	Running Total Runtime (KB)
System w/8i					65 [1]
Slot 1 – Emulex 10000E Fibre	4	48	0 **	113	65
Slot 2 – Emulex 10000E Fibre	5	48	0	113	65
Slot 3 – reserved for future Emulex					
Slot 4 – BCM 1000T dual port	6	12	8	77	73
Slot 5 – BCM 1000T dual port	7	12	8	85	81
Slot 6 – reserved for future BCM					

Table 9. Example: xSeries 260/366/460 option ROM characterization – Solution 2 slot devices reordered

[1] This number is taken from the base system configuration total, see Table 4.
** Notice that placing the cards with 0 KB runtime size first in the scan order (lower slot numbers) solves this error.

Solution 3 - Sample problem configuration solved by slot ROM disable

This table shows by example how the same failing configuration was fixed with a different technique. Notice that the same cards were used, but ROMs on some cards are disabled.

IBM Support Recommendations:

    1.) Disable ROM devices on the following:

        a. Slot 3 NetXtreme BCM 1000T adapter.
        b. Slot 4 NetXtreme BCM 1000T adapter.

Device	Default Scan Order	POST Size (KB)	Runtime Size (KB)	Running Total POST (KB)	Running Total Runtime (KB)
System w/8i					65 [1]
Slot 1					
Slot 2					
Slot 3 – BCM 1000T dual port	4	0 *	0	65	65
Slot 4 – BCM 1000T dual port	5	0 *	0	65	65
Slot 5 – Emulex 10000E Fibre	6	48	0	113	65
Slot 6 – Emulex 10000E Fibre	7	48	0	113 **	65

Table 10. Example: xSeries 260/366/460 option ROM characterization – Solution 3, slot ROMs disabled

1 This number is taken from the base system configuration total. See Table 4.
* Device ROM disabled
** Notice that disabling the ROMs on the LAN adapters solves this error.

Comments on disabling slot ROMs

In general, LAN adapters do not require option ROMs unless the attached LAN is used for network boot. Disabling the ROM for the device does not affect LAN operation in the operating system. Other adapter types should have their ROMs disabled only under the consultation with the adapter supplier.

Summary – solving problem configurations

Steps for problem resolution:
- Understand base system ROM resources needed before option cards are added.
  Reduce base system requirements if possible (Solution 1)
- Identify requirements for desired add-in elements (PCI adapters)
- Identify failure point and list all desired ROM device requirements.
  Capture failing configuration information as shown.
- Experiment on paper with alternative solutions. Try to formulate a working sequence.
  Three alternative solutions shown. Solutions #2 and #3 apply to slot devices.
- Implement the above step in customer system.
  Use any or all of the three alternative solutions to solve the customer problem.

Reference information

To enable/disable option ROM settings on the xSeries 236, xSeries 336, and xSeries 346 servers

To access these options:
1. Start the server. At the prompt, press F1.
2. Select **Advanced Setup** and press Enter.
3. Select **PCI Bus Control** and press Enter.
4. Select **PCI ROM Control** and press Enter.
5. A list of slots is displayed. Toggle the **Enable/Disable** field for the desired slot.
6. Press Esc three times to return to the main screen.
7. Select **Save Settings** and press Enter. Press Enter again to confirm.
8. Select **Exit Setup** and press Enter. Select **Yes** to confirm.

Note: Device allocations can be modified by adapter firmware levels, and base system device allocations can be modified by system BIOS or other firmware updates.

To enable/disable option ROM settings on the xSeries 260, xSeries 366, and 460 servers

Note: Do not modify settings if you are uncertain about desired values and results.

IBM xSeries BIOS, when configured with an Remote Supervisor Adapter II, offers a PCI Device utility within the main setup utility.

To access and use the utility:
1. Start the server. At the prompt, press F1.
2. Select **Advanced Setup** and press Enter.
3. Select **PCI Slot/Device Information** and press Enter.
   a. **Select device to be modified (1-6)**
   b. Select **Slot #**.
   c. Observe the **Function #:** value from the screen.
   d. Highlight the **Next Device Select** line
   e. Press Enter to change Function # to 0 (zero).
   [Some PCI devices contain multiple functions, for instance multiple network ports]
   f. Use the Up and Down arrow keys to scroll through the various device settings.
   g. Record the information for option ROM space initial and runtime values into the table.
   h. Certain settings can be changed, for example **Option ROM Execution.**
   i. For example (do not do this unless instructed): Use the Down arrow key to select **Option ROM Execution**.
   j. Use the Right arrow key to select **Disabled.**
   k. Press Esc to return to PCI Slot/Device Information menu.
4. Repeat for other slots.
5. Press Esc to return to **Exit PCI Utility** screen.
6. Select **Yes, Save and exit PCI Utility ***
7. Press Esc three times to return to the main screen.
8. Select **Save Settings** and press Enter. Press Enter again to confirm.
9. Select **Exit Setup** and press Enter. Select **Yes** to confirm.

* This utility saves settings in a different location than traditional CMOS. You must save these PCI device setting changes explicitly from this menu.

Device fields shown follow the industry standard PCI Bus Specification.
Note: Device allocations can be modified by adapter firmware levels and base system device allocations can be modified by system BIOS or other firmware updates.

Characterization of Other Known PCI (X) Adapters

Device (option PN)	POST ROM	Runtime ROM	ROM Share	Max PCI Speed	Max PCIX Speed	Max PCIX2 Speed
FAStT FC2-133 Host Bus Adapter (24P0960)	44 K	10 K	Yes	66 MHz	133 MHz	
Single Channel Ultra320 SCSI Ctrl (13N2249) [2]	48 K	33.5K	Yes	66 MHz	133 MHz	
ServeRAID-6M Ultra 320 SCSI Controller (256M) (02R0988) [2]	32 K[1]	32 K[1]	Yes	66 MHz	133 MHz	
ServeRAID-6M Ultra 320 SCSI Controller (128M) (32P0033) [2]	32 K[1]	32 K[1]	Yes	66 MHz	133 MHz	
SeveRAID-8i (dedicated) (13N2227)	32 K	32 K				
NetXtreme 1000 SX Fiber Ethernet Adapter 2 (73P4001)	12 K	9 K	No	66 MHz	133 MHz	
NetXtreme 1000 T Ethernet Adapter 2 (73P4101)	12 K	9 K	No	66 MHz	133 MHz	
NetXtreme 1000 T Dual Port Ethernet Adapter 2 (73P4201)	12 K	9 K	No	66 MHz	133 MHz	
Intel™ Pro/1000 MT Server Ethernet Adapter (31P9601)	20 K	6 K	No	66 MHz	133 MHz	
Intel Pro/1000 MT Dual Port Server Ethernet Adapter (73P2701)	20 K	6 K	No	66 MHz	133 MHz	
IBM iSCSI Server Adapter GbE-iSCSI-TOE (73P3601)	0/12 K[3]	9 K	No	66 MHz	133 MHz	

Table 11. Other known adapter characteristics

1 The ServeRAID adapters require 32 KB of POST and runtime ROM. However; it drops to 0 KB if there is a previous initialized ServeRAID adapter.
2 Does not support control of internal SAS devices. Supports external SCSI devices only.
3 Used only if configured for boot operation.

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Appendix A. Notices

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Important notes

CD-ROM drive speeds list the variable read rate. Actual speeds vary and are often less than the maximum possible.

When referring to processor storage, real and virtual storage, or channel volume, KB stands for approximately 1000 bytes, MB stands for approximately 1 000 000 bytes, and GB stands for approximately 1 000 000 000 bytes.

When referring to hard disk drive capacity or communications volume, MB stands for 1 000 000 bytes, and GB stands for 1 000 000 000 bytes. Total user-accessible capacity may vary depending on operating environments.

Maximum internal hard disk drive capacities assume the replacement of any standard hard disk drives and population of all hard disk drive bays with the largest currently supported drives available from IBM.

Maximum memory may require replacement of the standard memory with an optional memory module.