CHAPTER 4

Troubleshooting the Initial Hardware Configuration

Your MGS or C chassis went through extensive testing and burn in before leaving the factory; however, if your system appears to have problems starting up, use the information in this chapter to help isolate the problem.

This chapter includes the following:

- Troubleshooting
  - Problem solving
  - Troubleshooting systems
- Running bootstrap diagnostic tests

Troubleshooting Overview

Typically, any problems encountered at startup will be related either to the chassis or to the network. Use the information in this chapter *only* to help isolate problems and to rule out the chassis as the source of the problem. For additional troubleshooting assistance, refer to the optional *Troubleshooting Internetworking Systems* publication.

Note Whether or not you can locate the problem, contact a customer service representative for information on how to proceed in resolving the problem you are having.

Before you call a customer service representative, have the following information ready:

- Chassis type and serial number
- Maintenance agreement or warranty information
- Type of software and version number
- Date you received the new chassis
- Brief description of the problem you are having
- Brief explanation of the steps you have taken to isolate the problem

Problem Solving

The key to problem solving in a system such as the MGS, CGS, or CPT is to try to isolate the problem to a specific subsystem. By comparing what the system is doing to what it should be doing, the task of isolating a problem can be greatly simplified.

Consider the following subsystems of the MGS and C chassis:

- Power system—This subsystem includes the power supply, the Multibus backplane and wiring, and the AC switch.
- Cooling system—This subsystem includes the fan (or fans in the case of the MGS chassis), the wiring to the backplane, and the wiring to the power supply. The fan will turn on when power is applied and will turn off if the power supply fails or the power is turned off. The fan is connected directly to the +12V power supply.
- System cards—This subsystem is the most difficult to troubleshoot. The light-emitting diodes (LEDs) on the different cards and appliques can be used to help identify a failure.

Note For complete information on reading interface card and applique LED indicators, refer to Appendix B, “Reading LED Indicators.”

- System cables—This subsystem includes all of the internal and external cables that interconnect the cards and their appliques, and that connect the system to the network.

The following troubleshooting sections discuss these subsystems in more detail.

Troubleshooting the Power and Cooling Systems

Check the following items to help isolate the problem:

- If the system does not come on with the AC switch on, check the 4 amp (A) fuse. (Refer to the section “Replacing the Fuse in the MGS and C Chassis” in Chapter 5.) If the fuse continues to blow, suspect a power supply problem.
- With the AC switch and power on, does the fan operate?
  - — If yes, the +12V power supply checks out.
  - — If no, suspect the AC input, AC source, chassis power switch, the fan, the power cable, or the +12V power supply.
- With the AC switch and power on and system LEDs lit, does the fan operate? If no, suspect the fan or the +12V power supply.
- Does the system shut down after being on a short time?
  - — Check the environmental requirements in Chapter 2, “Preparing for Installation,” and make certain that the chassis intake and exhaust vents are clear.
  - — Suspect a power supply failure.
- System partially boots, and LEDs do not light. If this happens, suspect a failure in the +12V and/or a +5V power supply.
- System does not boot and fans move slightly and then stop. If this happens, look for shorted or crimped wires to the power supply or directly to the fans.

Troubleshooting the System Cards and Cables

Check the following items to help isolate the problem:

- System will not boot properly or constantly/intermittently reboots.
  - Check the processor card connection to the backplane and the console cable.
  - Check the LED indicators. (See Appendix B.)
  - Suspect the processor card or software.
  - System boots with a particular card disconnected from the backplane; suspect the card.
  - System boots with a particular applique or cable disconnected; suspect the applique or cable.
- System will not boot from Flash memory (assuming software is preconfigured to do so).
  - Check the connection between the Flash card and the CSC-MCI, CSC-1R, CSC-2R, or CSC-ENVM card.
  - Check the configuration register on the processor card for the correct jumper setting for booting from Flash. (Refer to the section "General Configuration Register Settings" in Chapter 5.)
- System boots, but console screen is frozen.
  - Check the external and internal console connections.
  - Verify the console baud rate in the terminal's documentation.
- Card is not recognized by the system.
  - Check the card connection to the backplane.
  - Check the LEDs on the card and applique. (See "Reading LED Indicators.")
  - Check the card-numbering switch. (See "Maintenance.")
- Card is recognized, but interface port(s) will not initialize.
  - Check the internal interface cables for connection.
  - Check the external cables for connection.
  - Check DCE/DTE jumpers. (See "Maintenance.")
  - Check that the interface is not administratively shut down.

Timesaver In general, if a particular port will not initialize, and the LED indicator on the interface card is lit, the problem may be the applique or internal cabling; however, to save time during the troubleshooting process, check the more accessible interface card before checking the applique.

System Bootstrap Diagnostics

This section describes how to test for problems with system memory using the bootstrap program. This program can help you isolate or rule out hardware problems encountered when installing your chassis. The diagnostic tests for the MGS and C chassis help initialize the processor hardware and boot the main operating system software.

Caution Before proceeding, read through this procedure and the "Processor Card Configuration Register" section in Chapter 5. If you have any doubts about your ability to perform any part, contact a customer service representative for information on how to proceed.

If you remove the jumpers from the boot file number field (bits 3, 2, 1, and 0) of the configuration register, you can start the system in standalone bootstrap mode. The bootstrap mode prompt is an angle bracket (>). Once in bootstrap mode, enter **?** to display a list of available commands and options. Following is an example of a display from a system with a CSC/4 processor card. (The display is slightly different with a CSC/3.)

```
> ?
$ state      Toggle cache state (? for help)
B [filename] Bootload filename and start it
C [address]  Continue [optional address]
D /S M L V   Deposit value V of size S into location L with modifier M
E /S M L     Examine location L with size S with modifier M
G [address]  Start up execution
H            Offer help with commands
I            Initialize
K            Stack trace
L filename   Bootload filename, but do not start it
O            Show configuration register option settings
P            Set break point
S            Single step next instruction
T function   Test device (? for help)
Deposit and Examine sizes may be B (byte), L (long) or S (short).
Modifiers may be R (register) or S (byte swap).
```

Following are some of the most useful bootstrap commands:

- The **H** command prints a summary of the bootstrap commands.
- The **I** command causes the bootstrap program to reinitialize the hardware and clear the contents of memory.
- The **K** command runs a stack trace on the system hardware.
- The **B** command (with no argument) boots the default software from ROM, assuming there are no jumpers in the boot field portion of the configuration register. You can include an argument, *filename*, to specify a file to be booted over the network using Trivial File Transfer Protocol (TFTP). You can also include a second argument, *host*, which is the Internet address or name of a particular host on the network.
- The **T** command runs various diagnostic tests, but is not recommended.

  Enter **T ?** to display a list of the diagnostic tests:

```
M   Memory test
P   Probe IO/memory space
```

By default, the memory test examines onboard memory on the processor and memory cards. Use the *Probe IO/memory space* test to look at the mapped I/O space in the main memory and test for interface card responses. The test uses the probe increments to search for registers that can be read from and written to. (See the samples following.)

Running the Diagnostic Tests

Follow these steps to run the bootstrap diagnostics:

Step 1 Turn OFF power to the chassis and attach appropriate ESD protection.

Step 2 Remove the front access cover following the appropriate steps in the section "Opening the MGS and C Chassis" in Chapter 5.

Caution Before proceeding, read the section "Processor Card Configuration Register" in Chapter 5 to familiarize yourself with the configuration register jumpers on the processor card.

Step 3 Remove the jumpers from the boot file number field (bits 3, 2, 1, and 0) of the processor card configuration register. (Note jumper positions before removal.)

Note If you start the system with the Break disable (bit 8) jumper removed from the configuration register, you can press the Break key on the console terminal to force the system into bootstrap mode. Enter **c** to continue normal execution of the system software. If you disconnect the console cable when bit 8 is cleared to zero, a "break" is interpreted and the system is halted.

Step 4 Turn ON power to the chassis. Wait for the system to display the banner message and prompt you with an angle bracket (>).

Memory/Bus Diagnostics

To test memory, enter the following at the > prompt and then press the Return key:

```
t m
```

To use the default addresses and select the default tests, press the Return key after each prompt is displayed, as in the following sample of the memory/bus diagnostic on the CSC/4 processor card:

Caution If you want to preserve your NVRAM configuration files, use the following tests only between the default nonvolatile memory addresses because the test can overwrite the configuration files in NVRAM.

```
Memory/Bus diagnostic
Starting Address [1000]?
Ending Address [400000]?
Hex argument for variable tests [FFFF]?
Select Tests [all]?
Number of passes to run [2]?
Message Level (0=silence, 1=summary, 2=normal)[2]?
Testing addresses between 0x1000 and 0x400000
Begin pass 0, test 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15   End pass
Begin pass 1, test 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15   End pass
No errors during 2 passes
```

Note In the preceding test, all address values are in hexadecimal; do not use the prefix *0x* when entering a number. Running a single pass of this test takes only a few minutes. If the program encounters memory problems, it displays appropriate error messages on the console screen.

I/O Space Memory Probe

To test I/O space, enter the following, and press the Return key:

```
t p
```

The memory probe begins at address 2000000. You can specify probe increments. Table 4-1 lists the times taken to run the memory tests.

Table 4-1 Memory Test and Memory Probe Test Times

		Memory Probe Test Times	
Processor Card	**Memory Test Times**	**Probe Increment = 1**	**Probe Increment[1] = 10**
CSC/4	~11 minutes[2]	~20 seconds	~2 seconds
CSC/3	~8 minutes	~30 seconds	~1 seconds

1. In the probe test, increasing the value of the probe increment to 10 will decrease the time taken for the test, but will test in larger blocks of memory.
2. All time values are approximate (~).

The following example shows a test done with probe increments of 1:

```
IO/memory space probe
Starting address [2000000]?
Ending address [210FFFF]?
Probe increment (in shorts) [1]?
Probing from 0x2000000 to 0x210FFFF with interval 0x1
Region 0x210C000 to 0x210C07E exists (0K)
Done
>
```

The following example shows a test done with probe increments of 10:

```
IO/memory space probe
Starting address [2000000]?
Ending address [210FFFF]?
Probe increment (in shorts) [1]? 10
Probing from 0x2000000 to 0x210FFFF with interval 0x10
Region 0x210C000 to 0x210C060 exists (0K)
Done
>
```