

8

Diagnostics and Troubleshooting

This chapter provides the following information to help you determine the cause of a machine malfunction and to fix the problem:

- ◆ Troubleshooting tables
- ◆ Tilt code table
- ◆ Procedures to verify the switch configuration on the peripheral memory board
- ◆ Troubleshooting using the diagnostic features on the Hubble network translator board


Overview

During game play, stoppage entertainment is invoked in response to the following events:

- ◆ Hopper fill
- ◆ Jackpot (hand-pay award)
- ◆ Coin jam (includes currency jams/cheats)
- ◆ Hopper jam/hopper runaway/hopper overpay
- ◆ Tilt event

When these events or a machine malfunction occurs, the system plays stoppage entertainment and activates the service candle.

As part of the Machine Management System (MMS), the slot machine provides an online **Diagnostics** page that allows you to perform tests that verify system functionality in the event of a machine malfunction. The slot machine provides two levels of diagnostics; use both, as needed, to diagnose the cause of a problem.

- ◆ *Active* diagnostics continually monitor many software-related functions and, in the event of a problem, indicate the applicable tilt code on the diagnostics display. This display is mounted on the inside of the currency column door.
 - ◆  *Note:* This level of diagnostics does not detect all problems that can occur on the machine.
- ◆ *Passive* diagnostics refer to the MMS **Diagnostics** page options that you can use to perform system integrity checks and low-level diagnostics. You can also use these options to calibrate hardware components such as the touchscreen and monitor.

The following sections describe how to troubleshoot a problem. If you are unable to resolve a problem, contact Silicon Gaming at 1-888-44-SLOTS.

Troubleshooting Procedure

To troubleshoot a machine malfunction, refer to Figure 8-1, "Troubleshooting Flowchart - Part 1," on page 8-3 and Figure 8-2, "Troubleshooting Flowchart - Part 2," on page 8-4. For more detail, refer to the procedure that follows the flowcharts.

Figure 8-1 Troubleshooting Flowchart - Part 1

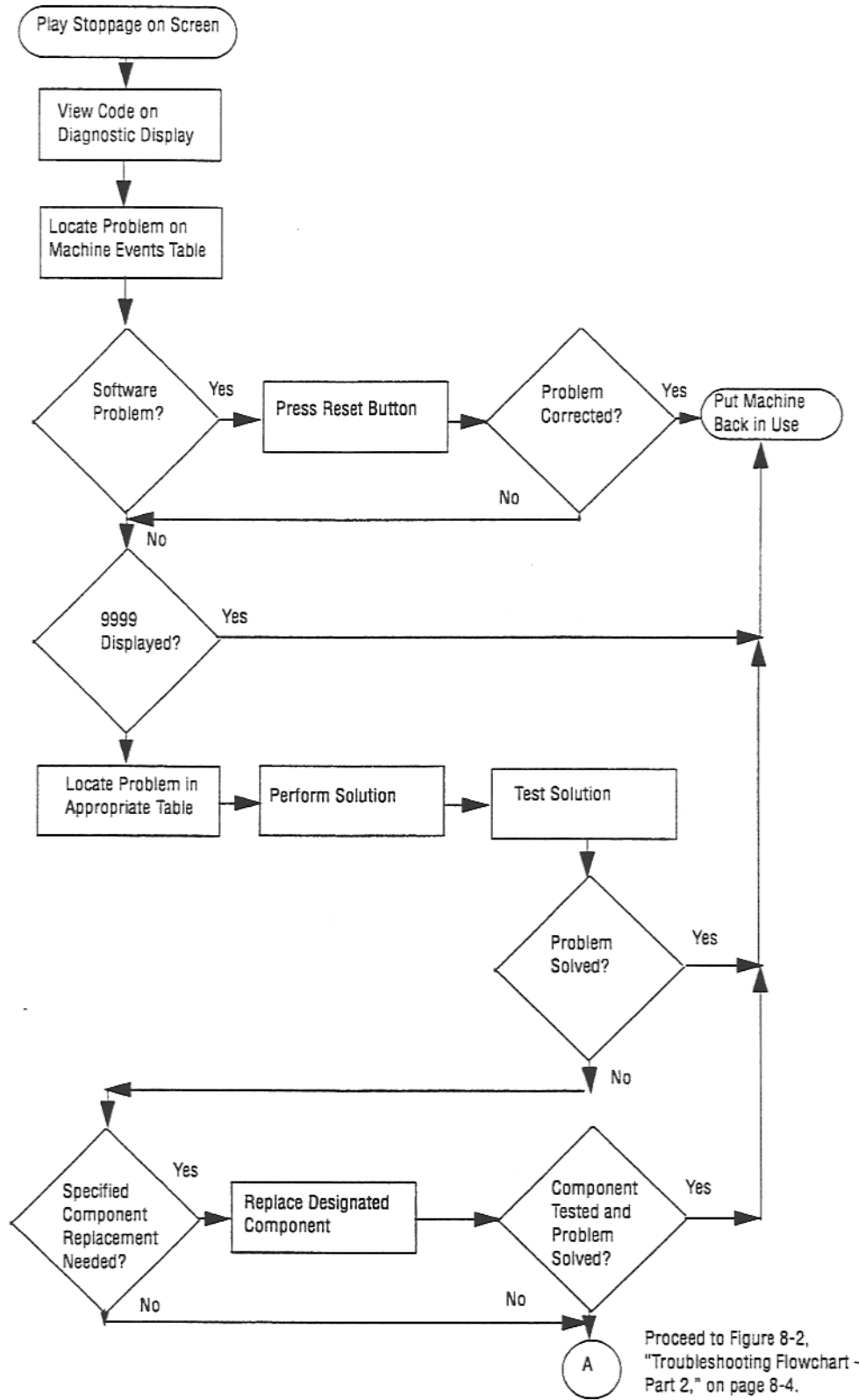
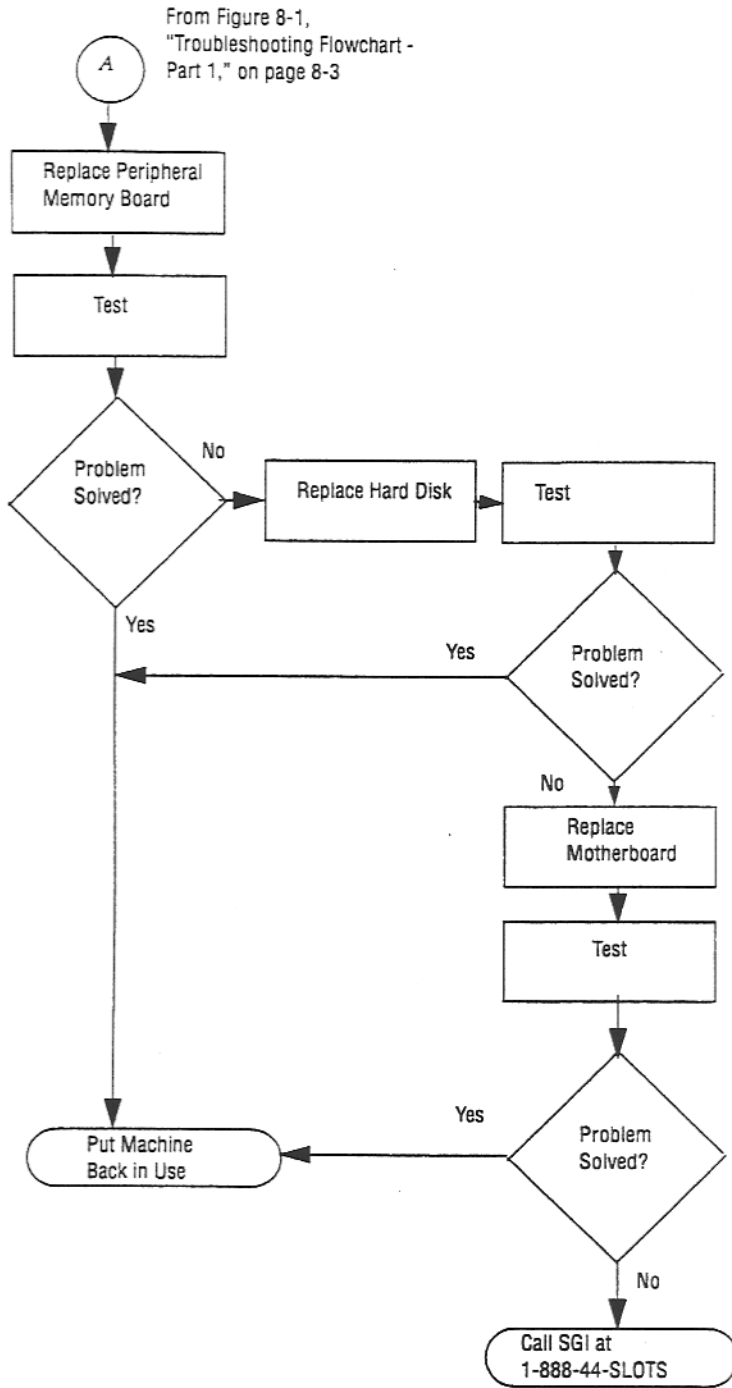



Figure 8-2 Troubleshooting Flowchart - Part 2




To troubleshoot a malfunction, perform the following steps:

1. Open the currency column door. Refer to "Opening the Currency Column Door" on page 2-8.
2. Note the number on the diagnostics display. Then, find the number and its description in Table 8-1, "Machine Events and Action(s) Required to Clear Them," on page 8-6.
3. If the problem is software-related perform the following steps:
 - a. Note the problem.
 - b. Reset the machine.
 -  **Note:** The machine reset button is mounted on the connector panel in front of the GPIO board. The GPIO board is located on the far left side of the electronics chassis.
 - c. If the problem is corrected, troubleshooting is finished. Put the machine back in use.
4. If the number 9999 is displayed, it indicates the boot was completed without errors. Troubleshooting is finished. Put the machine back in service.
5. If 9999 is not displayed, perform the following steps:
 - a. identify the applicable troubleshooting table from the table below.
 - b. Refer to the designated table.
 - c. Note the probable cause.
 - d. Perform the specified diagnostic test.

Problem Detected	See the Following Table
Can't get the machine to boot	Table 8-2, "Power Problems," on page 8-13
Problem with the service candle	Table 8-3, "Service Candle Problems," on page 8-13
No discernible audio from machine	Table 8-4, "Sound Problems," on page 8-14
No picture displayed on monitor	Table 8-5, "Picture Problems," on page 8-14
Machine control(s) don't perform as expected	Table 8-6, "Control Problems," on page 8-14
Game(s) don't perform as expected	Table 8-7, "Game Problems," on page 8-15
Problem with money handling hardware	Table 8-8, "Money Handling Problems," on page 8-15
Problem with machine security devices	Table 8-9, "Security Problems," on page 8-15

6. To verify that you have corrected the problem, perform the following steps:
 - a. Perform steps 1 through 3 in "Verifying Hardware Functionality" on page 3-32.
 - b. If the machine passes the test, troubleshooting is finished. Put the machine back in use.
7. If you need to replace a component, perform the following steps:
 - a. Refer to Chapter 9 thru Chapter 13 to perform the appropriate replacement procedure and test that it operates correctly.
 - b. Perform steps 1 through 3 in "Verifying Hardware Functionality" on page 3-32.

- c. If the machine passes the test, troubleshooting is finished. Put the machine back in use.

 **Note:** In most cases, more than one component can cause the same problem. Therefore, it may be necessary to replace several components before the defective one can be identified.

8. If the solutions suggested in the troubleshooting tables do not correct the problem, try replacing the following components, one by one and testing the machine after each component replacement:
- ◆ peripheral memory board
 - ◆ hard disk
 - ◆ motherboard
9. If the problem persists, call Silicon Gaming at 1-888-44-SLOTS.

Using the Diagnostics Display

The diagnostics display, mounted on the inside of the currency column door behind the credit meter, provides tilt event information that you can use to evaluate system problems. Table 8-1 describes the tilt events and actions required to clear them. If you encounter a tilt that requires additional assistance from SGI, call 1-888-44-SLOTS.

Table 8-1 Machine Events and Action(s) Required to Clear Them

No.	Description	Action Required
Motherboard-Related Hardware Errors: 0100 – 0199		
0100	Boot-up diagnostic code	Replace OS ROM on peripheral memory board. If this error happens again, troubleshoot to determine if peripheral memory board or motherboard needs to be replaced.
0101	Timer initialization	Replace OS ROM on peripheral memory board. If this error happens again, troubleshoot to determine if peripheral memory board or motherboard needs to be replaced.
0110	Insufficient memory to run OS	Replace bad memory SIMMs on the motherboard.
0120	Anchor application detected OS mismatch	Upgrade operating system to revision 43 (or later) and reboot machine.
SRAM Hardware Errors: 0200 – 0299		
0200	Checksum error on both SRAM copies	Reboot machine. If this error happens again, replace SRAMs on peripheral memory board.
0201	Read last boot's panic information	Reboot machine. If this error happens again, replace SRAMs on peripheral memory board.
0202	Bad or uninitialized SRAM	Reboot machine. If this error happens again, replace SRAMs on peripheral memory board.
0203	SafeStore corrupt	Reboot machine. If this error happens again, replace SRAMs on peripheral memory board.
0204	General SafeStore error	Report software error, then reboot machine. If this error happens again, troubleshoot to determine if SRAMs on peripheral memory board or board itself needs to be replaced.
0205	Checksum error on SRAM 0	Report software error, then reboot machine. If this error happens again, troubleshoot to determine if SRAMs on peripheral memory board or board itself needs to be replaced.

Table 8-1 Machine Events and Action(s) Required to Clear Them (Continued)

No.	Description	Action Required
0206	Checksum error on SRAM 1	Report software error, then reboot machine. If this error happens again, troubleshoot to determine if SRAMs on peripheral memory board or board itself needs to be replaced.
0207	Crash during upgrade procedure, 0 from 1	Report software error, then reboot machine. If this error happens again, troubleshoot to determine if SRAMs on peripheral memory board or board itself needs to be replaced.
0208	Crash during upgrade procedure, 1 from 0	Report software error, then reboot machine. If this error happens again, troubleshoot to determine if SRAMs on peripheral memory board or board itself needs to be replaced.
0209	Crash during replacement procedure (1)	Report software error, then reboot machine. If this error happens again, troubleshoot to determine if SRAMs on peripheral memory board or board itself needs to be replaced.
0210	Crash during replacement procedure (2)	Report software error, then reboot machine. If this error happens again, troubleshoot to determine if SRAMs on peripheral memory board or board itself needs to be replaced.
0211	Crash during replacement procedure	Report software error, then reboot machine. If this error happens again, troubleshoot to determine if SRAMs on peripheral memory board or board itself needs to be replaced.
0212	Improper replacement procedure	Report software error, then reboot machine. If this error happens again, troubleshoot to determine if SRAMs on peripheral memory board or board itself needs to be replaced.
0213	Soft meters reset	Indicates soft meters were cleared by a SafeClear. Reboot machine to clear the code.
Peripheral Memory Board Errors: 0300 – 0399		
0300	No peripheral memory board present (as primary)	Check peripheral memory board switches. If this error happens after switches are reconfigured, replace peripheral memory board.
0301	Read additional IP information	Report software error, then replace EEPROM on peripheral memory board.
0302	Initialize IP address	Report software error, then replace peripheral memory board.
SCSI Device Errors: 0400 – 0499		
0400	Time-out getting thread semaphore	Replace SCSI controller board, then reboot machine. If error happens again, replace hard disk.
0401	SCSI controller hung	Replace SCSI controller board, then reboot machine.
0410	Load initial anchor application	Replace SCSI disk.
0411	SCSI initialization	Reboot machine. If this error happens repeatedly, replace SCSI disk.
0412	Mount disk volume 1	Reboot machine. If this error happens repeatedly, replace SCSI disk.
0413	Mount disk volume 2	Reboot machine. If this error happens repeatedly, replace SCSI disk.
0414	Mount disk volume 3	Reboot machine. If this error happens repeatedly, replace SCSI disk.
0415	Mount disk volume 4	Reboot machine. If this error happens repeatedly, replace SCSI disk.
0416	Failure reading master boot record	Reboot machine. If this error happens repeatedly, replace SCSI disk.

Table 8-1 Machine Events and Action(s) Required to Clear Them (Continued)

No.	Description	Action Required
Serial Cable Errors: 0500 – 0599		
0500	Console (RS-232) initialization	Check serial cables, then reboot machine.
0501	Com1 initialization	Check serial cables, then reboot machine.
0502	Ethernet initialization	Check Ethernet board (demo software only), then reboot machine.
Coin Handling Errors: 0600 – 0699		
0600	Coin-in jam	Cleared by slot attendant.
0601	Coin-in cheat	Cleared by slot attendant.
0602	Hopper jam	Cleared by slot attendant.
0603	Hopper overpay	Cleared by slot attendant.
0604	Hopper runaway	Cleared by slot attendant.
0605	Hopper empty	Cleared by slot attendant.
0606	Hopper appears to be disconnected	Check cable connections to hopper.
0620	Inappropriate coin-in	Software returns coin(s) to player or applies coins to credits.
0640	Unable to enable coin acceptor	Reboot machine, then run MMS coin path diagnostics.
0641	Unable to disable coin acceptor	Reboot machine, then run MMS coin path diagnostics.
0642	Unable to change coin diverter position	Reboot machine, then run MMS coin path diagnostics.
Bill Handling Errors: 0700 – 0799		
0700	Bill acceptor detected a user cheat	Cleared by slot attendant.
0702	Bill stacker cannot accept more bills	Empty bill stacker.
0720	Bill acceptor jam	Check bill acceptor head for possible jammed bill. If problem continues, replace bill acceptor head.
0721	Stacked bill was not posted	Report software error, then reboot machine. Check bill acceptor head for possible jammed bill.
0722	Stacked bill denomination SafeStore conflict	Report software error, then reboot machine. Check bill acceptor head for possible jammed bill.
0723	Bill rejected too many times	Replace bill acceptor head.
0724	Bill stacker failure	Report software error, then reboot machine. Check bill acceptor head for possible jammed bill.
0730	Unable to enable bill acceptor	Reboot machine, then run MMS bill acceptor diagnostics.
0731	Unable to disable bill acceptor	Reboot machine, then run MMS bill acceptor diagnostics.
0736	Bill acceptor CRC verification test failed	Verify CRC value in MMS bill acceptor configuration is correct. If not, either update bill acceptor firmware or change the current reference CRC value. (CRC values are supplied by SGI with updated bill acceptor firmware).
0737	Bill acceptor country mismatch	Verify the bill acceptor model installed is correct for the country's currency. If not, replace the bill acceptor.
Configuration Errors: 0800 – 0899		
0800	Corrupt critical configuration value	Reboot machine, then go to MMS and verify all configurable values using online Configuration pages.
0801	Missing critical configuration item	Reboot machine, then go to MMS and verify all configurable values using online Configuration pages.
0802	Bill acceptor was set out of service	Run MMS bill acceptor diagnostics.

Table 8-1 Machine Events and Action(s) Required to Clear Them (Continued)

No.	Description	Action Required
0803	Invalid SafeStore revision detected	Reboot machine. If this error happens again, clear SafeStore.
0804	Machine denomination not configured	Following a full SafeClear, set machine denomination in MMS Money Configuration page.
0805	No games enabled	Following a full SafeClear, enable games in MMS Game Configuration page.
Jurisdiction and License Manager Configuration Errors: 0900 – 0999		
0900	Could not determine JM data file path	Call SGI representative to reload data file.
0901	Could not locate or open JM data file	Call SGI representative to reload data file.
0902	Could not load data from JM data file	Call SGI representative to reload data file.
0903	JM data file did not pass RSA check	Call SGI representative to reload data file.
0904	Critical field not found in JM data file	Call SGI representative to reload data file.
0905	A JM data field value was not valid	Call SGI representative to reload data file.
0906	Action not allowed in jurisdiction	Call SGI representative to reload data file.
0950	Could not determine LM data file path	Call SGI representative to reload data file.
0951	Could not locate or open LM data file	Call SGI representative to reload data file.
0952	Could not load data from LM data file	Call SGI representative to reload data file.
0953	LM data file did not pass RSA check	Call SGI representative to reload data file.
0954	Critical field not found in LM data file	Call SGI representative to reload data file.
0955	A LM data field value was not valid	Call SGI representative to reload data file.
0956	General/other licensing problem	Call SGI representative to reload data file.
System Security Errors: 1000 – 1099		
1000	Found a bad RSA signature for a file	Reboot machine. If this error happens again, replace hard disk.
1001	Bad read return code on file being verified	Reboot machine. If this error happens again, troubleshoot SCSI "chain," that is, the SCSI cable, controller, and hard disk
1002	Found corrupt in-RAM code	Report error, then reboot machine. If this error happens again, replace RAM SIMMS on motherboard.
1003	Application too large to execute	Call SGI representative.
1004	Hard disk write-protect test failed	Check hard disk write protect jumper and reboot machine. If this error happens again, call SGI representative.
1005	BIOS and OS ROM tests failed	Replace ROMs with valid ROMs.
1006	Configuration EEPROM check failed	Replace EEPROM on peripheral memory board.
1007	File found on disk that is not in approved disk directory	Report error, then replace hard disk.
1015	Out of service condition detected	Place machine back in service.
1017	RNG seeding in progress	Following a SafeClear, continue using MMS to seed the RNG.
1018	Set out-of-service by background	Wait for background out of service condition to end or change the time when the condition is enabled in the MMS.
Player Tracking Errors: 1100 – 1199		
1100	Insufficient queue space to run player tracking	Ensure player tracking hardware is installed correctly.
1101	Hubble has the wrong protocol EPROM	Check slot accounting network configuration and protocol EPROM ID on Hubble.
Device Related Errors: 1200 – 1299		
1200	Printer paper jammed	Clear paper jam.
1201	Printer out of ink	Replace printer ribbon cartridge.
1202	Printer out of paper	Replace printer paper roll.

Table 8-1 Machine Events and Action(s) Required to Clear Them (Continued)

No.	Description	Action Required
1203	Printer error	Reboot printer.
1210	Ethernet card is not responding	Ensure Ethernet card is present. If problem continues, replace card.
Network Errors: 1300 – 1399		
1300	WAPS network link down	Contact Silicon Gaming Network Operations Center.
1301	Local area network link down	Contact Silicon Gaming Network Operations Center.
Boot Sequence Codes: 4000 – 4099		
4000	SafeStore cleared via DIP switches	Reset DIP switches to original position and reboot machine.
4001	Power-on switch flipped (pseudo tilt)	No action required.
Software Errors: 5000 – 5099		
5000	(Apparently) corrupt transaction entry	Report software error, then reboot machine.
5001	Too many (n > MAX_TRANSACTION_ENTRIES) entries	Report software error, then reboot machine.
5002	Invalid parameter to SAFE_MeterSet	Report software error, then reboot machine.
5003	Invalid or un-installed game-id	Report software error, then reboot machine.
5004	Invalid parameters to SAFE_CoinStatSet	Report software error, then reboot machine.
5005	Invalid BILL_LOG in SafeStore	Report software error, then reboot machine.
5006	Invalid callback pointer	Report software error, then reboot machine.
5007	Error launching application from Event Manager	Report software error, then reboot machine.
5008	Called function shouldn't have returned	Report software error, then reboot machine.
5009	Can't allocate memory to read from SafeStore	Report software error, then reboot machine.
5010	RNG seed went to zero while running	Report software error, then reboot machine.
5011	SafeStore object is too large to store	Report software error, then reboot machine.
5012	pSOS queue creation error	Report software error, then reboot machine.
5013	SafeStore structure is too large for SRAM	Report software error, then reboot machine.
5014	Can't create SafeStore semaphore	Report software error, then reboot machine.
5015	Can't create SafeStore transaction semaphore	Report software error, then reboot machine.
5016	Can't lock SafeStore semaphore	Report software error, then reboot machine.
5017	Can't unlock SafeStore semaphore	Report software error, then reboot machine.
5018	Can't lock SafeStore transaction semaphore	Report software error, then reboot machine.
5019	Can't unlock SafeStore transaction semaphore	Report software error, then reboot machine.
5020	Can't read SafeStore transaction area	Report software error, then reboot machine.
5021	Can't write SafeStore transaction area	Report software error, then reboot machine.
5022	Can't update BLOB from TRX area	Report software error, then reboot machine.
5023	RNG couldn't return a number	Report software error, then reboot machine.
Cash Manager Errors: 5100 – 5199		
5100	Cash/Credit button registration failed	Report software error, then reboot machine.
5101	Hopper event registration failed	Report software error, then reboot machine.
5102	Hopper event registration failed	Report software error, then reboot machine.
5103	Coin acceptor registration failed	Report software error, then reboot machine.
5104	Bill acceptor registration failed	Report software error, then reboot machine.
5105	Application out-of-sync condition detected	Report software error, then reboot machine.
5106	Application normal callback function was invalid	Report software error, then reboot machine.
5107	Application out-of-sync function was invalid	Report software error, then reboot machine.

Table 8-1 Machine Events and Action(s) Required to Clear Them (Continued)

No.	Description	Action Required
5108	Application provided Cash Manager with an invalid application handle	Report software error, then reboot machine.
5109	Invalid request to disconnect Cash Manager devices	Report software error, then reboot machine.
5110	Invalid request to reconnect Cash Manager to devices	Report software error, then reboot machine.
5111	Application ID was requested before application registered	Report software error, then reboot machine.
5112	Invalid meter increment value	Report software error, then reboot machine.
5113	Initialization failed	Report software error, then reboot machine.
5114	Application component unable to register	Report software error, then reboot machine.
5115	Application component unable to un-register	Report software error, then reboot machine.
5116	System component unable to register	Report software error, then reboot machine.
5117	Application unable to set app-specific data	Report software error, then reboot machine.
5118	Application-requested state change failed	Report software error, then reboot machine.
5119	Application-requested award set-up failed	Report software error, then reboot machine.
5120	Application-requested award start payment failed	Report software error, then reboot machine.
5121	Added credits beyond credit limit	Report software error, then reboot machine.
5122	Subtracted more than the available credits	Report software error, then reboot machine.
5123	Attempted transition to invalid next state	Report software error, then reboot machine.
5124	Semaphore lock/unlock/or ID error	Report software error, then reboot machine.
5125	App-requested award complete payment failed	Report software error, then reboot machine.
5126	App-requested record game outcome failed	Report software error, then reboot machine.
5127	No hand pay is in progress	Report software error, then reboot machine.
5128	Cash Manager couldn't post callback	Report software error, then reboot machine.
5129	Cash Manager has internal problems with SafeStore	Report software error, then reboot machine.
5130	Cash Manager internal error	Report software error, then reboot machine.
5131	Jackpot handpay	Cleared by attendant.
5132	Cashout handpay	Cleared by attendant.
5133	Tax limit handpay	Cleared by attendant.
5134	Force cashout	Cleared by attendant.
Event Manager Errors: 5200 – 5299		
5200	Event Manager strangle during enter sequence failed	Report software error, then reboot machine.
5201	Event Manager push during enter sequence failed	Report software error, then reboot machine.
5202	Event Manager re-initialization during enter sequence failed	Report software error, then reboot machine.
5203	Event Manager unstrangle during enter sequence failed	Report software error, then reboot machine.
5204	Event Manager strangle during exit sequence failed	Report software error, then reboot machine.
5205	Event Manager re-initialization during exit sequence failed	Report software error, then reboot machine.
5206	Event Manager push during exit sequence failed	Report software error, then reboot machine.
5207	Event Manager unstrangle during exit sequence failed	Report software error, then reboot machine.

Table 8-1 Machine Events and Action(s) Required to Clear Them (Continued)

No.	Description	Action Required
Jurisdiction Manager Errors: 5300 – 5399		
5300	Could not create Jurisdiction Manager data semaphore	Report software error, then reboot machine.
License Manager Errors: 5400 – 5499		
5400	Could not create License Manager data semaphore	Report software error, then reboot machine.
Game Errors: 5500 – 5599		
5500	Couldn't load application resource file	Report software error, then reboot machine.
5501	Couldn't load application resource element	Report software error, then reboot machine.
5502	Couldn't create audio stream element	Report software error, then reboot machine.
5503	Couldn't create audio track element	Report software error, then reboot machine.
5504	Application is out of date with system software	Report software error, then reboot machine.
5505	SafeStore didn't install game in SRAM	Report software error, then reboot machine.
5506	Couldn't create application semaphore	Report software error, then reboot machine.
5507	Couldn't get application semaphore	Report software error, then reboot machine.
5508	Other semaphore error	Report software error, then reboot machine.
5509	Couldn't create queue	Report software error, then reboot machine.
5510	Queue error	Report software error, then reboot machine.
5511	Couldn't create thread	Report software error, then reboot machine.
5512	Application thread error	Report software error, then reboot machine.
5513	Application queue (message loop queue) full	Report software error, then reboot machine.
5514	Application value out of range	Report software error, then reboot machine.
5515	System returned bad application data	Report software error, then reboot machine.
5516	Global data is corrupted, can't recover	Report software error, then reboot machine.
5517	Function called with invalid value	Report software error, then reboot machine.
5518	Application out of memory	Report software error, then reboot machine.
5519	Invalid user data	Report software error, then reboot machine.
5520	System call returned invalid data	Report software error, then reboot machine.
5521	Application data is corrupt	Report software error, then reboot machine.
5522	Application overflowed some data structure	Report software error, then reboot machine.
5523	Pay table file had invalid data in it	Report software error, then reboot machine.
5524	Application initialization failed	Report software error, then reboot machine.
5525	Cash Manager out-of-sync condition detected	Report software error, then reboot machine.
5526	Cash Manager returned error	Report software error, then reboot machine.
Machine Management System Errors: 5600 – 5699		
5600	MMS couldn't allocate a resource	Report software error, then reboot machine.
5601	MMS couldn't allocate a hotspot	Report software error, then reboot machine.
5602	MMS couldn't allocate memory	Report software error, then reboot machine.
5603	MMS has too many backgrounds	Report software error, then reboot machine.
5604	MMS had trouble dealing with hardware	Report software error, then reboot machine.
5605	MMS tried to use a widget that wasn't ready	Report software error, then reboot machine.
5606	MMS tried to use an out-of-range value	Report software error, then reboot machine.
5607	MMS couldn't use the null pointer	Report software error, then reboot machine.
Doors and Device Signals: 6000 - 6100		
6000	Belly door open	Close door. If condition continues, replace door switch.

Table 8-1 Machine Events and Action(s) Required to Clear Them (Continued)

No.	Description	Action Required
6001	Currency column door open	Close door. If condition continues, replace door switch.
6002	Currency cartridge unlocked	Lock cartridge. If condition continues, replace switch.
6003	Electronics box door open	Close door. If condition continues, replace door switch.
6004	SCSI door open	Close door. If condition continues, replace door switch.
6005	Drop box door open	Close door. If condition continues, replace door switch.
6006	Currency cartridge removed	Replace cartridge. If condition continues, replace switch.
CPU Interrupts: 9000 – 9999		
9000-9256	Spurious interrupts	Subtract 4000 from tilt code to determine interrupt number. Report interrupt, then reboot machine.
9999	Boot sequence completed without errors	No action required. Machine operating normally.

Using the Troubleshooting Tables

To help you identify the cause of a problem, the troubleshooting tables include, where applicable, the diagnostic test to perform using the options on the MMS Diagnostics page. If a component needs to be replaced, see Chapters 9 through 13 for the procedure.

Table 8-2 Power Problems

Problem	Probable Cause	Diagnostic Test	Solution
Machine doesn't power on.	Power switch turned off.	None.	Turn on power switch.
	Blown circuit fuse.	None.	Replace circuit fuse.
	Casino circuit breaker may have tripped.	None.	Check circuit breaker.
Machine powers on, but no picture, sound, or any lit lamps.	Power switch turned off on power supply.	None.	Turn on power switch on power supply. Also confirm proper position of 115 V - 220 V switch.
	Electronic chassis power supply bad.	None.	Replace power supply.

Table 8-3 Service Candle Problems

Problem	Probable Cause	Diagnostic Test	Solution
Candle lamp(s) not lit.	Candle lamp bad.	Test Candle.	Replace candle lamp.
	GPIO board bad.	Test Candle.	Replace GPIO board.

Table 8-4 Sound Problems

Problem	Probable Cause	Diagnostic Test	Solution
No sound or distorted sound, but has picture.	Volume set too low.	No test.	Adjust volume on Game Play Monitor page.
	Audio amp board bad.	Test Audio.	If GPIO I boards are installed, replace audio amplifier board. If GPIO II boards are installed, replace GPIO backplane. If GPIO logic board is damaged, replace GPIO logic board as well as GPIO backplane.
	Audio speaker(s) bad.	Test Audio.	Replace speaker(s).
	Audio codec IC bad.	Test Audio.	Replace motherboard.

Table 8-5 Picture Problems

Problem	Probable Cause	Diagnostic Test	Solution
No picture or distorted picture, but has sound.	Video controller board bad.	Test Display.	Replace video controller board.
	Display monitor bad.	Test Display.	Replace display monitor.
Machine power is on, but no picture or sound.	Power switch turned off on power supply.	None.	Turn on power switch on power supply.
	Electronic chassis power supply bad. See also Table 8-7, "Game Problems," on page 8-15.	None.	Replace power supply.

Table 8-6 Control Problems

Problem	Probable Cause	Diagnostic Test	Solution
Cannot select game by touching the monitor.	Touchscreen bad or calibration required.	Touchscreen calibrate.	Replace touchscreen if unable to calibrate.
Button(s) below display monitor don't work.	Button bad.	Observe pictorial while pressing button.	Replace button.
	GPIO board bad.		Replace GPIO board.
Credit display not lit.	Credit display bad.	Test Credit Display.	Replace credit LED board.
Change or credit/cash button doesn't work.	Button bad.	Observe pictorial while pressing button.	Replace button.
	GPIO board bad.		Replace GPIO board.

Table 8-7 Game Problems


Problem	Probable Cause	Diagnostic Test	Solution
One or more games do not operate properly. <i>Important:</i> Recycle main power and try game again before changing components. (It could have been a software glitch.)	SCSI disk controller board bad.	Check Table 8-1 on page 8-6 for possible cause of problem.	Replace SCSI disk controller board.
	Peripheral memory board bad.		Replace peripheral memory board.
	SCSI hard disk bad.		Replace SCSI hard disk.
	Motherboard RAM bad.		Replace motherboard RAM chips.
	Motherboard CPU bad.		Replace motherboard CPU chip.

Table 8-8 Money Handling Problems

Problem	Probable Cause	Diagnostic Test	Solution
Won't accept bills.	Bill acceptor dirty.	Bill Acceptor.	Clean/calibrate bill acceptor.
	Bill acceptor bad.	Bill Acceptor.	Replace bill acceptor.
	GPIO board bad.	Bill Acceptor.	Replace GPIO board.
Won't accept coins.	Coin comparator bad.	Coin Acceptor.	Replace coin acceptor.
	Coin optics board bad.	Coin Acceptor.	Replace coin optic board.
	GPIO board bad.	Coin Acceptor.	Replace GPIO board.
Won't drop coins in tray.	Coin hopper bad.	Hopper.	Replace coin hopper.
	GPIO board bad.	Hopper.	Replace GPIO board.

Table 8-9 Security Problems

Problem	Probable Cause	Diagnostic Test	Solution
<i>Door open</i> message is displayed, but door is closed.	Door sensor bad or out of adjustment.	Open and close door while observing message on page.	Adjust or replace door sensor.
ID card doesn't work.	Card reader bad.	None.	Replace card reader.
<i>Bill stacker missing</i> message is displayed.	Bill stacker sensor bad or out of adjustment.	Insert and pull out bill stacker while observing message.	Adjust or replace bill stacker sensor.

 **Note:** For information on troubleshooting Hubble-related problems, see "Hubble Troubleshooting" on page 8-20.

Verifying Peripheral Memory Board Configuration

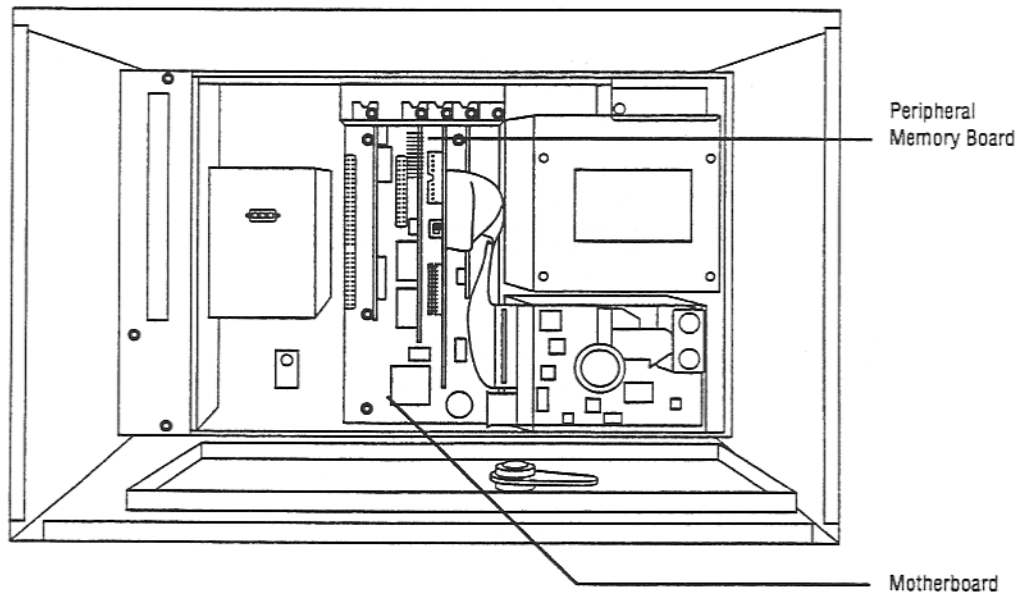
To verify the peripheral memory board configuration, you must access the DIP switch and memory mapping bypass switch by removing the hopper and opening the electronics box door. The DIP switch and memory mapping bypass switch are on the peripheral memory board, located within the electronics box.

To verify that peripheral memory board switch settings are correct, perform the following steps:

1. Open the currency column door. Refer to "Opening the Currency Column Door" on page 2-8.
2. Flip the power switch to the Off position.

- Warning:** Failure to turn off the machine can result in personal injury or damage to equipment.
- 3. Open the electronics box door. For instructions, see "Opening the Electronics Box Door" on page 2-11.
- Caution:** Before touching any component in the electronics box, touch the metal part of the power supply or machine chassis first to reduce the risk of damage to the motherboard.
- 4. Remove the peripheral memory board from the slot machine. For the procedure, see "Removing a Circuit Board" on page 11-15. Figure 8-3 shows the location of the peripheral memory board in the electronics box.
 - Caution:** The location of the peripheral memory board in the motherboard PCI backplane is different, depending on whether the slot machine is configured with a Pentium Thor or Tucson motherboard. In the Thor configuration, the peripheral memory board is in slot #2 (J4D1). In the Tucson configuration, the PCI slot numbers on the board are in reverse order. The peripheral memory board is in slot #4 (J4C1).

Figure 8-3 Peripheral Memory Board Location, Thor Motherboard Configuration



- 5. On the peripheral memory board, locate the DIP switch. (Refer to Figure 8-4 on page 8-17 or Figure 8-5 on page 8-17 for switch location and Table 8-10 on page 8-17 for settings.) Verify that the switches, labeled 1-8, are set as shown.
- 6. Locate the Memory Mapping Bypass switch, positioned along the top side of the board. Verify that the switch is set to the P (primary) position.
 - Important:** If the bypass switch is not set to the P position, the system cannot recognize the game software on the machine and will not boot.

Figure 8-4 Peripheral Memory Board I SafeClear Switch Locations

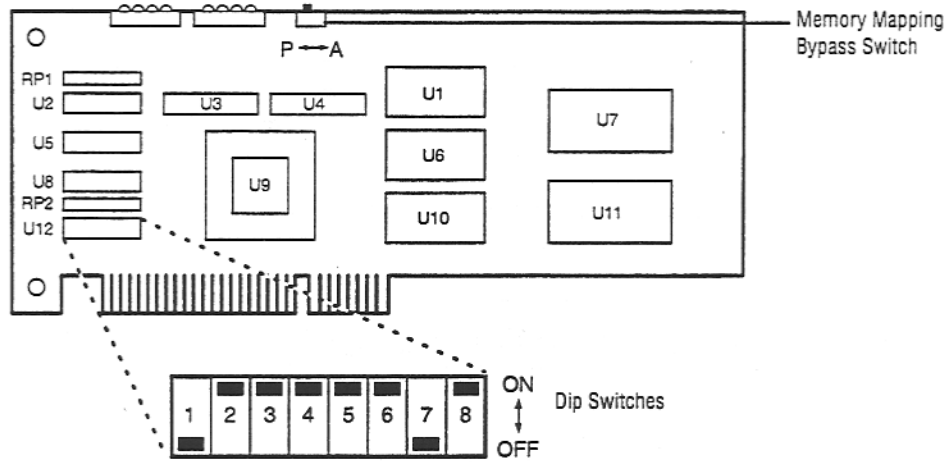


Figure 8-5 Peripheral Memory Board II SafeClear Switch Locations

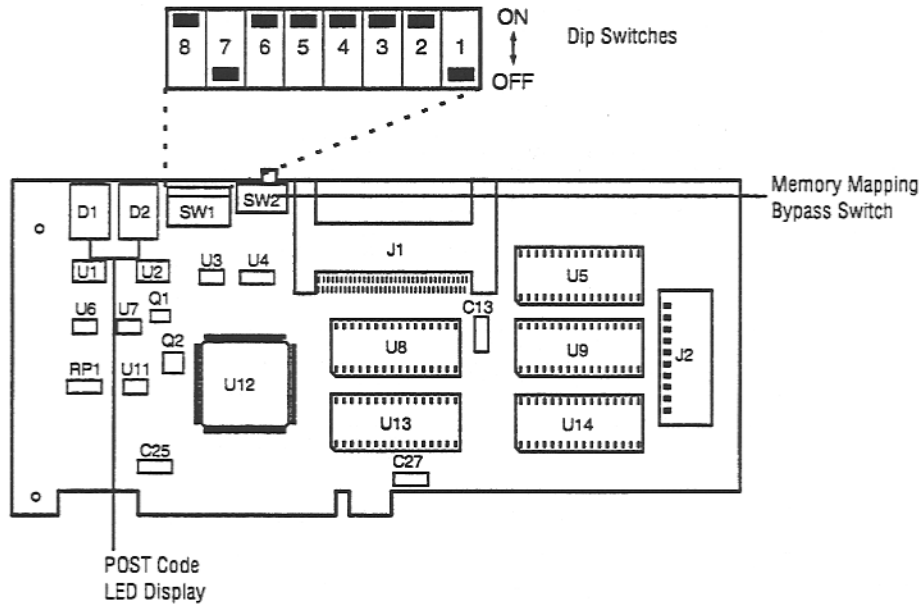


Table 8-10 Peripheral Memory Board DIP Switch Settings

Switch	Description	Setting
1	ROM Type	OFF = EPROM (default); ON = Flash
2	Reserved	Always ON
3	Reserved	Always ON
4	Full SafeClear	OFF = Yes; ON = No (default)
5	Reserved	Always ON
6	Partial SafeClear	OFF = Yes; ON = No (default)
7	Reserved	Always OFF
8	Reserved	Always ON

7. Re-install the peripheral memory board and hopper drawer and reconnect all cables. For the procedure, see "Installing a Circuit Board" on page 11-16.

Power On Self-Test Display

The peripheral memory board II provides an LED display (D1 and D2) showing the power-on self-test (POST) codes. The POST code indicates the status of the self test performed by the system when it is turned on and the BIOS begins to register. POST codes, listed in Table 8-11, are displayed in hexadecimal. The letters *B* and *D* display in lower case as *b* and *d*, respectively.


 **Note:** Once hard disk activity begins, values shown on the LED reflect DMA values and not BIOS codes.

Table 8-11 POST Code Descriptions

Code	Description
00	Cold start, output EDX register to I/O ports 85h, 86h, 8Dh, 8Eh for later use
01	Initialize any custom keyboard controller, disable CPU cache, cold initialize onboard I/O chipset, size & test RAM, size cache
02	Disable critical IO (monitor, DMA, FDC, I/O ports, speaker, NMI)
03	Checksum the BIOS ROM
04	Test page registers
05	Enable A20 Gate, issue 8042 SelfTest
06	Initialize ISA I/O
07	Warm initialize custom keyboard controller, warm initialize onboard I/O chipset
08	Refresh toggle test
09	Test DMA Master registers, test DMA Slave registers
0A	Test first 64 KB of base memory
0B	Test Master 8259 mask, test Slave 8259 mask
0C	Test 8259 Slave, interrupt range, initialize interrupt vectors 00 - 77h, init keyboard buffer variables.
0D	Test Timer0, 8254 channel0
0E	Test 8254 Ch2, speaker channel
0F	Test RTC, CMOS RAM read/write test
10	Turn on monitor, show any possible error messages
11	Read and checksum the CMOS
12	Call video ROM initialization routines, show display sign-on message, show ESC delay message
13	Set 8 MHz AT-Bus
14	Size and test the base memory, stuck NMI check
15	No KB and PowerOn: Retry KB init
16	Size and test CPU cache
17	Test A20 OFF and ON states
18	Size and test external memory, stuck NMI check
19	Size and test system memory, stuck NMI check
1A	Test RTC time
1B	Determine serial ports
1C	Determine parallel ports
1D	Initialize numeric coprocessor
1E	Determine floppy diskette controllers
1F	Determine IDE controllers
20	Display CMOS configuration changes
21	Clear screens
22	Set/reset Numlock LED, perform security functions
23	Final determination of onboard serial/parallel ports
24	Set keyboard typematic rate
25	Initialize floppy controller
26	Initialize ATA discs

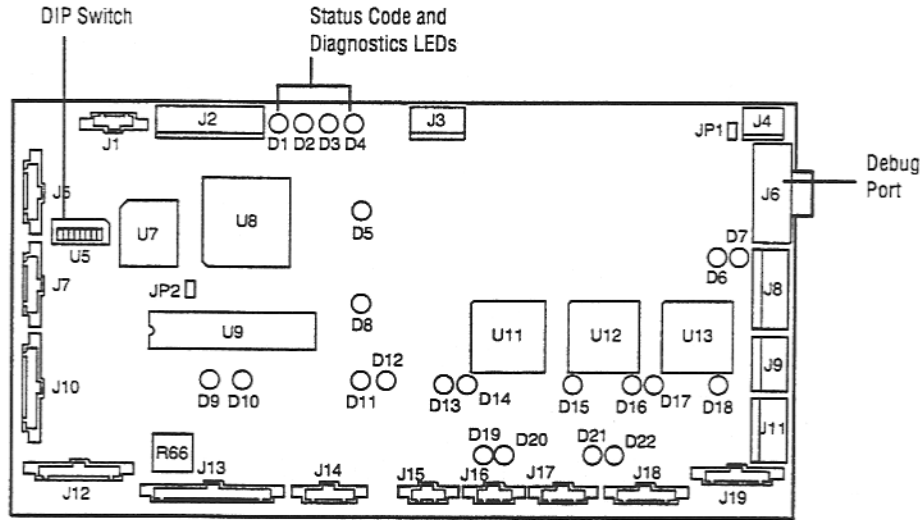
Table 8-11 POST Code Descriptions

Code	Description
27	Set the video mode for primary adaptor
28	Cyrix WB-CPU support, Green PC: purge 8259 Slave, relieve any trapped IRRs before enabling PwrMgmt, set 8042 pins, Ctrl-Alt-Del possible now, enable CPU features
29	Reset A20 to Off, install adapter ROMs
2A	Clear primary screen, convert RTC to system ticks, set final DOS timer variables
2B	Enable NMI and latch
2C	Reserved
2D	Reserved
2E	Fast A20: Fix A20
2F	Purge 8259 slave; relieve any trapped IRRs before enabling Green-PC; pass control to INT 19 boot
32	Test CPU burst
33	Reserved
34	Determine 8042, set 8042 warm-boot flag STS.2
35	Test HMA wrap, verify A20 enabled via F000:10 HMA
36	Reserved
37	Validate CPU: CPU Step NZ, CPUID check; disable CPU features
38	Set 8042 pins (Hi-Speed, Cache-off)
39	PCI Bus: Load PCI; Processor Vector init'd, BIOS Vector init'd, OEM Vector init'd
3A	Scan PCI bus
3B	Initialize PCI bus with intermediate defaults
3C	Initialize PCI OEM with intermediate defaults, OEM bridge
3D	PCI bus or PLUGnPLAY: Initialize AT Slotmap from AT-Bus CDE usage
3E	Find phantom CDE ROM PCI-cards
3F	PCI Bus: final Fast-Back-to-Back state
40	OEM POST Initialization, Hook Audio
41	Allocate I/O on PCI-Bus, logs-in PCI-IDE
42	Hook PCI-ATA chips
43	Allocate IRQs on the PCI Bus
44	Allocate/enable PCI memory/ROM space
45	Determine PS/2 mouse
46	Map IRQs to PCI Bus per user cmos, Enable ATA IRQs.
47	PCI-ROM install, note user CMOS
48	If Setup conditions: execute setup utility
49	Test F000 Shadow integrity, Transfer EPROM to Shadow-RAM
4A	Hook VL ATA Chip
4B	Identify and spin-up all drives
4C	Detect Secondary IRQ, if VL/AT-Bus IDE exists but its IRQ not known yet, then autodetect it
4D	Detect/log 32-bit I/O ATA devices
4E	Atapi drive M/S bitmap to Shadow-RAM, Set INT13 Vector
4F	Finalize Shadow-RAM variables
50	Chain INT 13
51	Load PnP, Processor Vector init'd, BIOS Vector init'd, OEM Vector init'd
52	Scan PLUGnPLAY, update PnP Device Count
53	Supplement IRQ usage--AT IRQs
54	Conditionally assign everything PnP wants
58	Perform OEM custom boot sequence just prior to INT 19 boot
59	Return from OEM custom boot sequence; pass control to INT 19 boot
5A	Display MR BIOS logo
88	Dead motherboard and/or CPU and/or BIOS ROM
FF	BIOS POST finished

Hubble Troubleshooting

The Hubble network translator board, located under the top cap of the machine, provides diagnostic features that can help you troubleshoot casino network problems. The diagnostic components are identified in Figure 8-6. If you need to identify the connectors on the board, see Figure 3-7 on page 3-10.

Figure 8-6 Hubble Diagnostic Components



Refer to Table 8-12 to diagnose and solve problems that may occur with Hubble.

Table 8-12 Casino Network, Player Tracking, or Hubble Problems

Problem	Probable Cause	Diagnostic Test	Solution
Player tracking LCD display is off.	Network is down.	Check if other units on the network have the same problem.	May be a system-wide network failure.
		Verify cables connected to Hubble.	Re-seat cables or replace bad cables.
	Hubble is down.	Verify third-party board is operational. Check that Hubble LEDs are flashing properly. See "Troubleshooting LEDs" on page 8-21.	Replace third-party board. Reset Hubble. Replace Hubble if necessary.
Machine is communicating with Hubble, but there is no communication with the network.	Misconfiguration of network parameters.	Verify configuration in MMS.	Change MMS Network Configuration parameters.
Hubble is communicating with the network, but information from machine is not correct or nonexistent.	Protocol translation error.	Check the network log in MMS.	Change MMS Network Configuration parameters.
		Reproduce the problem while tracing communication using the debug port.	Forward problem to SGI technical support.

Troubleshooting LEDs

Table 8-13 lists the LEDs provided on Hubble (D1 to D22) that indicate board and network status. Yellow LEDs indicate signals received by Hubble. Green LEDs indicate signals transmitted by Hubble.

Table 8-13 Hubble LEDs

Signal Received or Transmitted by Hubble	LED Location	Description
Unused	D1	Not applicable
ESSP Network Ready	D2	Hubble is ready to accept ESSP network information from the casino back end. The machine configuration is set for an ESSP network, and Hubble is communicating with the slot machine.
Network Ready	D3	Hubble is ready to accept SAS network information from the casino back end. The machine configuration is set for an SAS network, and Hubble is communicating with the slot machine.
Heartbeat	D4	Hubble is functional and active. This light begins flashing within seven seconds of when Hubble is initialized.
Power AC/DC	D8/D5	Power is being supplied to Hubble.
Debug port Rx/Tx	D6/D7	Reports port activity if the port is enabled. Lights flash when port is communicating data.
GPIO port Rx/Tx	D9/D10	Reports port activity if the port is enabled. Lights flash when port is communicating data.
IGT Rx/Tx	D11/D12	Reports port activity if the port is enabled. Lights flash when port is communicating data.
Bally Rx/Tx	D13/D14	Reports port activity if the port is enabled. Lights flash when port is communicating data.
Spare serial port Rx/Tx	D18/D15	Reports port activity if the port is enabled. Lights flash when port is communicating data.
Mikohn Type 10 Rx/Tx	D16/D17	Reports port activity if the port is enabled. Lights flash when port is communicating data.
CDS Rx/Tx	D19/D20	Reports port activity if the port is enabled. Lights flash when port is communicating data.
Acres DCN Rx/Tx	D21/D22	Reports port activity if the port is enabled. Lights flash when port is communicating data.

To verify Hubble is operating and communicating properly, check the LEDs in the following order:

1. Power (D5 and D8)
2. Heartbeat (D4)
3. Network Ready (D3 or D2)
4. GPIO port receive and transmit (D9 and D10)
5. Communication port receive and transmit (D11 to D22, port dependent)

Resetting Hubble

In the event of communication errors, perform the following steps:

1. Reset the Hubble board by setting the eighth switch on the 8-bit DIP switch (U5) to the On position
2. Wait for the power LED to go off (D5).

3. To return to its normal operating mode, set the switch back to the Off position.

If this fails, you can do the following:

1. Also disconnect the wiring harness connector from J4 on the Hubble
2. Wait for the power LED to go off (D5)
3. Reconnect the wiring harness connector to J4.

Reading the Network Log

The *Network Log* option in the MMS **Network Accounting** page shows a log of the last 25 messages in C3 protocol transmitted between Hubble and the slot machine.

To access the network log, perform the following steps:

1. Invoke the MMS. Refer to "Invoking the MMS" on page 2-23.
2. Open any machine door. Refer to "Opening and Closing the Cabinet Doors" on page 2-8.
3. Touch the **Accounting** tab and select the **Network** page.
4. Touch the *View* button for the *Network Log* option.
5. If there is a network type enabled, the network log is displayed on the bottom of the page. The syntax of the log is described in Table 8-14.

Table 8-14 Network Log Syntax

Date	Date of event.												
Time	Time of event.												
<--	C3 command sent from Hubble to the slot machine. The command is in the format of <ww><xx><yy><data><zz zz> where: <table border="1"> <thead> <tr> <th>Byte</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>ww</td> <td>C3 command code</td> </tr> <tr> <td>xx</td> <td>Number of data bytes</td> </tr> <tr> <td>yy</td> <td>Message number</td> </tr> <tr> <td>data</td> <td>Data being transferred (can be more than one byte)</td> </tr> <tr> <td>zz zz</td> <td>16-bit (2-byte) CRC value</td> </tr> </tbody> </table>	Byte	Description	ww	C3 command code	xx	Number of data bytes	yy	Message number	data	Data being transferred (can be more than one byte)	zz zz	16-bit (2-byte) CRC value
Byte	Description												
ww	C3 command code												
xx	Number of data bytes												
yy	Message number												
data	Data being transferred (can be more than one byte)												
zz zz	16-bit (2-byte) CRC value												
->	C3 command sent from the slot machine to Hubble. The command is in the format of <ww><xx><yy><data><zz zz> where: <table border="1"> <thead> <tr> <th>Byte</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>ww</td> <td>C3 command code</td> </tr> <tr> <td>xx</td> <td>Number of data bytes</td> </tr> <tr> <td>yy</td> <td>Message number</td> </tr> <tr> <td>data</td> <td>Data being transferred (can be more than one byte)</td> </tr> <tr> <td>zz zz</td> <td>16-bit (2-byte) CRC value</td> </tr> </tbody> </table>	Byte	Description	ww	C3 command code	xx	Number of data bytes	yy	Message number	data	Data being transferred (can be more than one byte)	zz zz	16-bit (2-byte) CRC value
Byte	Description												
ww	C3 command code												
xx	Number of data bytes												
yy	Message number												
data	Data being transferred (can be more than one byte)												
zz zz	16-bit (2-byte) CRC value												

The following are two ways to use the log to identify problems:

- ◆ Check to see whether the arrows ("->" or "<--") only point in one direction. This condition indicates that commands are only being sent one way and are not acknowledged with a response. The condition indicates errors in communication.
- ◆ Examine the log to see that messages are being sent properly.

Using the Hubble Debug Port

For low-level hardware debugging purposes, the Hubble board provides a DB-9 serial port (J6) to trace communications between the slot machine, Hubble, and the casino network.

To use the debug port, perform the following steps:

1. Remove the top cap to access the Hubble board. For instructions, see "Removing the Top Cap" on page 2-16.
2. Enable the debug port by setting the first switch on the 8-bit DIP switch (U5) to the On position.
3. Connect a straight-through RS-232 serial cable between the debug port (J6) and your computer terminal serial port.
4. Run the terminal application on your computer with communication settings configured for 9600 baud, 8 data bits, no parity, and 1 stop bit. Communications should be established with the serial port directly.
5. In the terminal window, press *ENTER* to display allowed commands.

