11

Component Replacement: System Electronics Hardware

This chapter describes the replacement and maintenance procedures for the following system electronics components:

- Electronics box
- Power system
- Audio system

Overview

This chapter contains service and replacement procedures for the electronics box, power system, and audio system components.

Figure 11-1 and Figure 11-2 on page 11-3 show these component locations.
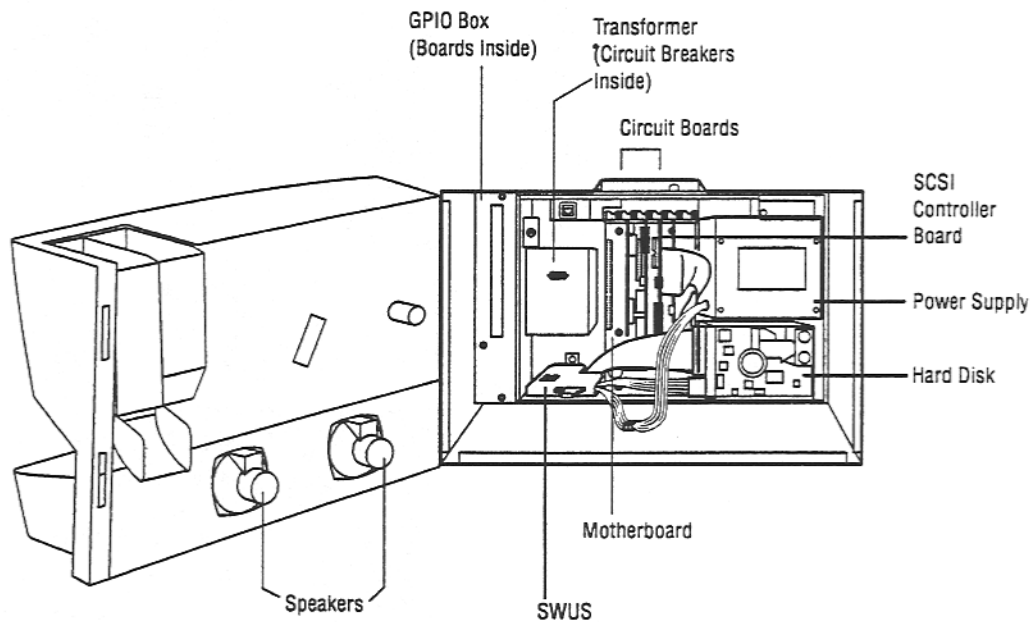
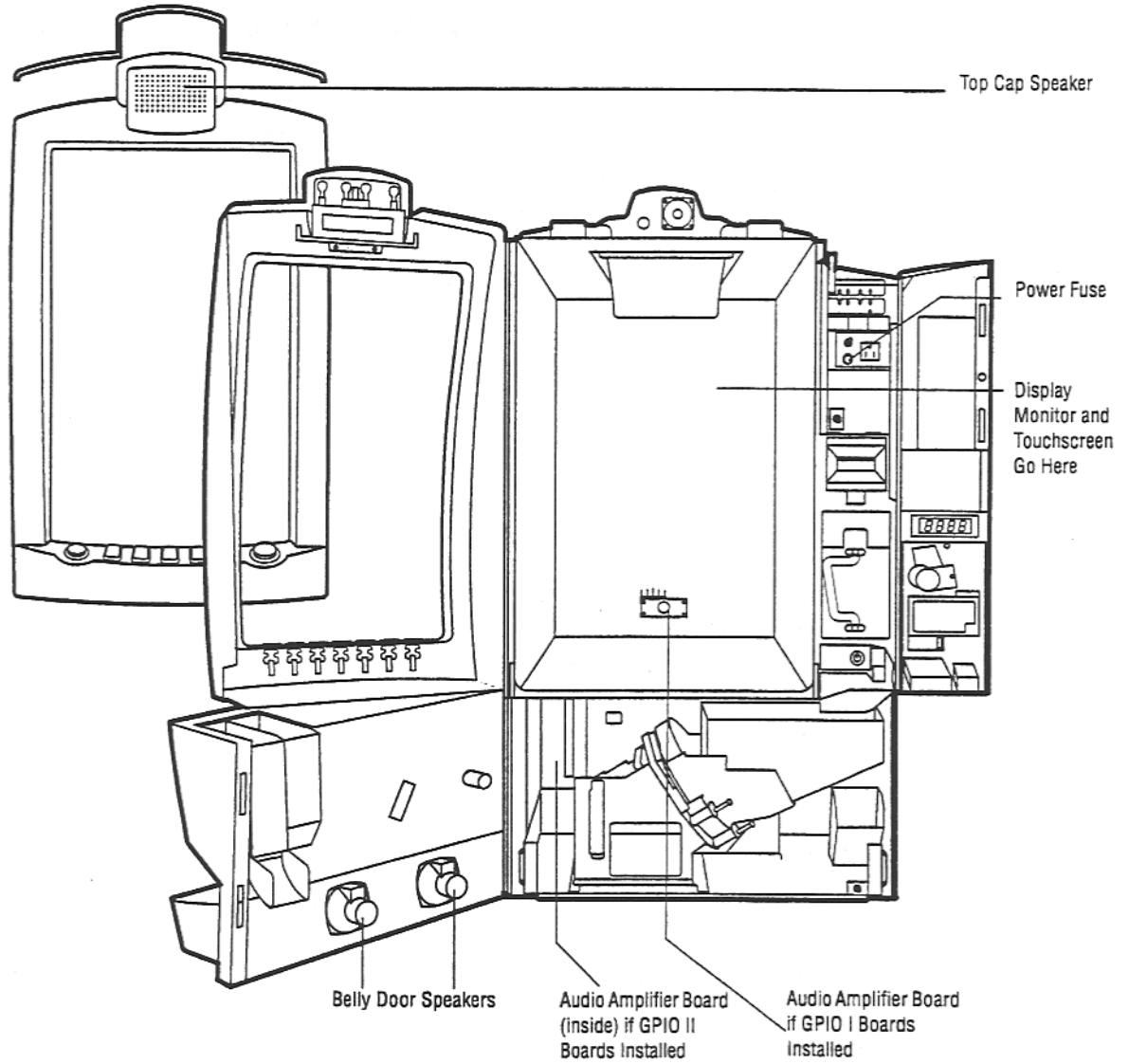*Figure 11-1*   **Electronics Components**

Figure 11-2   **Display Cavity with Monitor Removed**

Top Cap Speaker

Power Fuse

Display
Monitor and
Touchscreen
Go Here

Belly Door Speakers

Audio Amplifier Board
(inside) if GPIO II
Boards Installed

Audio Amplifier Board
if GPIO I Boards
Installed

To locate the peripheral memory board components, see "Replacing the PROM" on page 11-19.

The following table lists the procedures in this chapter.

Replacing a GPIO Board

The general purpose input/output (GPIO) boards provide the interfaces to mechanical devices (such as buttons and lights), input devices (buttons and coin validators), and output devices (meters and lights).

The GPIO system is inside the GPIO box, which is different for GPIO I and GPIO II systems. If the box has a handle, the box contains the GPIO II system, comprising a backplane board and a logic board. If there is no handle, the box contains a single GPIO I board. Replacement procedures differ for GPIO I and GPIO II boards.

Important: GPIO II boards are required for some jurisdictions.

The GPIO box and GPIO I board are not currently interchangeable with the GPIO box and GPIO II boards. Therefore, you must always replace GPIO I components with GPIO I components and GPIO II components with GPIO II components.
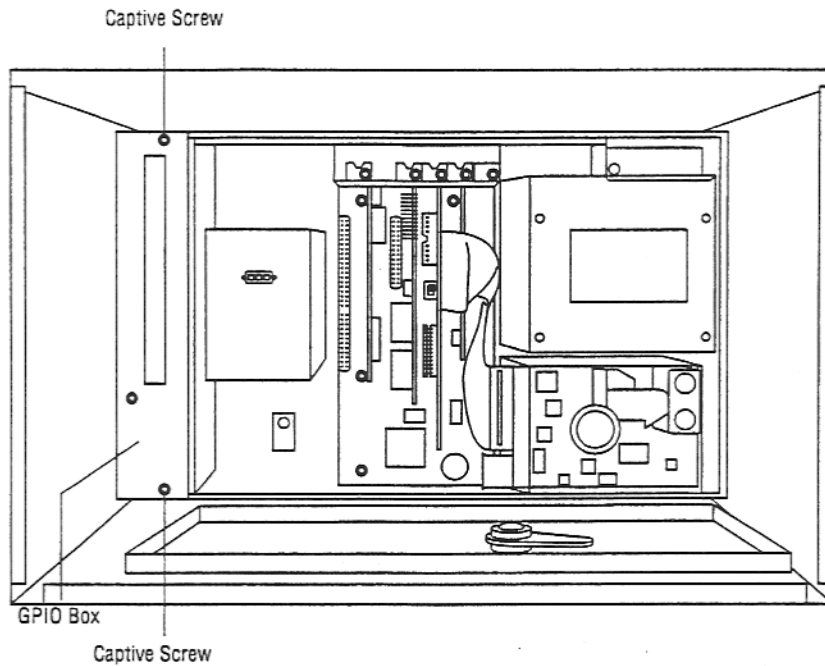
Note: A procedure for replacing GPIO I components with GPIO II components will be available at a later date.

Figure 11-3 on page 11-5 shows the electronics box in the lower cavity and the location of the GPIO box.

Figure 11-3   Location of GPIO Box in Electronics Box

The following table is a summary of the sections in this procedure. If you are familiar with the procedure, you may prefer to read the text in the indicated sections only when necessary.

Replacing a GPIO Board
Removing a GPIO Board
"Removing the Hopper Drawer" on page 2-9
"Determining the GPIO System" on page 11-6
"Disconnecting the Cables" on page 11-6
"Removing the GPIO I Board" on page 11-7
"Accessing the GPIO II Boards" on page 11-9
"Removing the GPIO Logic Board" on page 11-9
"Removing the GPIO Backplane" on page 11-10
Installing a GPIO Board
"Installing the GPIO I Board" on page 11-10
"Installing the GPIO II Boards" on page 11-12
"Connecting the Cables" on page 11-13
"Installing the Hopper Drawer" on page 2-10
"Verifying GPIO Board Operation" on page 11-13

Removing a GPIO Board

Before beginning the procedure, be sure to turn the power off.

To turn the power off, 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.

To remove any of the GPIO boards, you must remove the hopper drawer, determine the GPIO system, and disconnect the cables.

Removing the Hopper Drawer

Refer to "Removing the Hopper Drawer" on page 2-9.

Determining the GPIO System

Refer to Figure 11-3 on page 11-5 to find the GPIO box and determine whether it has a handle. If it does, the boards inside are GPIO II boards. If it does not, the board inside is a GPIO I board. The removal procedure for the two types of boards differs.

Disconnecting the Cables

To disconnect the cables, perform the following steps:

1. Disconnect cable connectors P1 through P5 from the GPIO box. Figure 11-5 on page 11-8 shows the locations of the connectors. If you will be removing GPIO II boards, disconnect cable connector P6, which is stacked with P5.

2. Disconnect the three-wire CPU power cable connector (P71) from Q6 on the front of the electronics box.

   ♪ *Note:* The P71 connector was previously named P6. It was renamed to avoid confusion with the P6 connector referenced in step 1.

3. Open the electronics door. Refer to "Opening the Electronics Box Door" on page 2-11.

4. For a GPIO II system, proceed to "Accessing the GPIO II Boards" on page 11-9. Otherwise, proceed to "Removing the GPIO I Board," below.

Removing the GPIO I Board

To remove the GPIO I board, refer to Figure 11-3 on page 11-5 and Figure 11-4 and perform the following steps:

1. Loosen the two captive screws from the top and bottom of the front cover of the GPIO box and pull out the box.

   Note: Four cables prevent you from pulling the box all the way out. Figure 11-4 shows the cable connectors.

Figure 11-4   **GPIO I Board Removed from GPIO box**
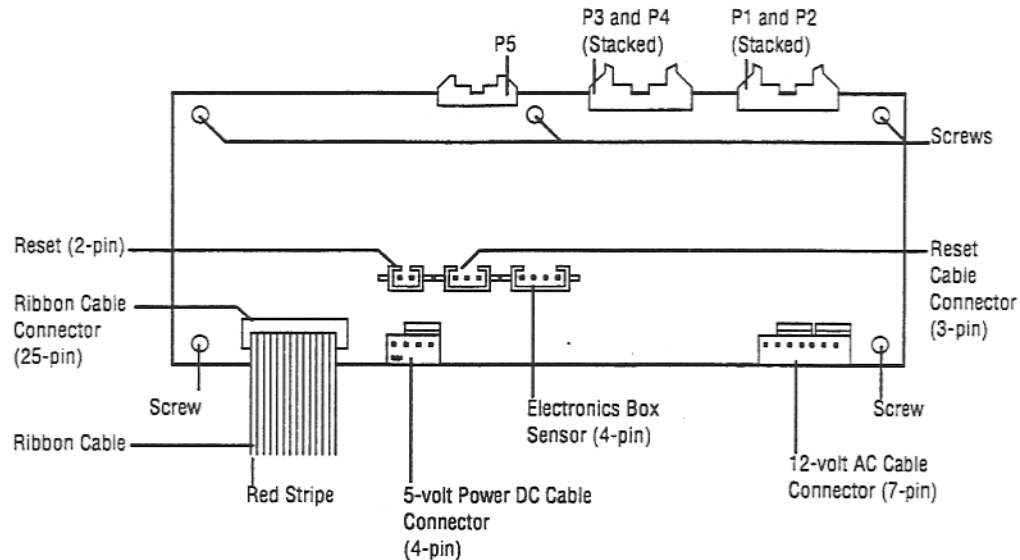
2. Disconnect the 25-pin connector on the ribbon cable coming from the parallel port of the electronics box.

3. Disconnect the 4-pin 5-volt power DC cable.

4. Disconnect the 3-pin reset cable.

5. Disconnect the 7-pin 12-volt AC cable.

6. Remove the GPIO box from the lower cavity.

7. Remove the five small screws that hold the two sections of the GPIO box together. Figure 11-5 shows the locations of three of the screws. The other two screws are on the left side and cannot be seen in the figure.

The GPIO box breaks into two sections.

Figure 11-5   **Screws in GPIO Box**
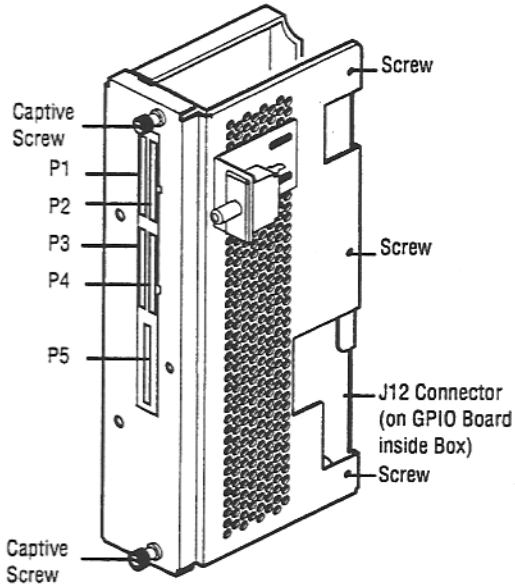
8. Remove the five screws that secure the GPIO board in the box. Figure 11-4 on page 11-7 shows the screw locations.

9. Two cables connect the GPIO board to the GPIO box. Disconnect the 2-pin reset cable and the 4-pin electronics box sensor cable from the board. Figure 11-4 on page 11-7 shows the locations of the cable connectors on the board.

10. Remove the GPIO board from the GPIO box.

11. Proceed to "Installing the GPIO I Board" on page 11-10.

Accessing the GPIO II Boards

To access the boards in a GPIO II system, refer to Figure 11-3 on page 11-5 and perform the following steps:

1. The GPIO box for the GPIO II system is an L-shaped cover that forms a box with the floor and wall of the electronics box. The large green board, called the GPIO II logic board, is attached to the cover. See Figure 11-6.

Figure 11-6   **GPIO II Cover and Electronics Box**

Electronics Box
GPIO Backplane
GPIO II Logic Board
GPIO Cover
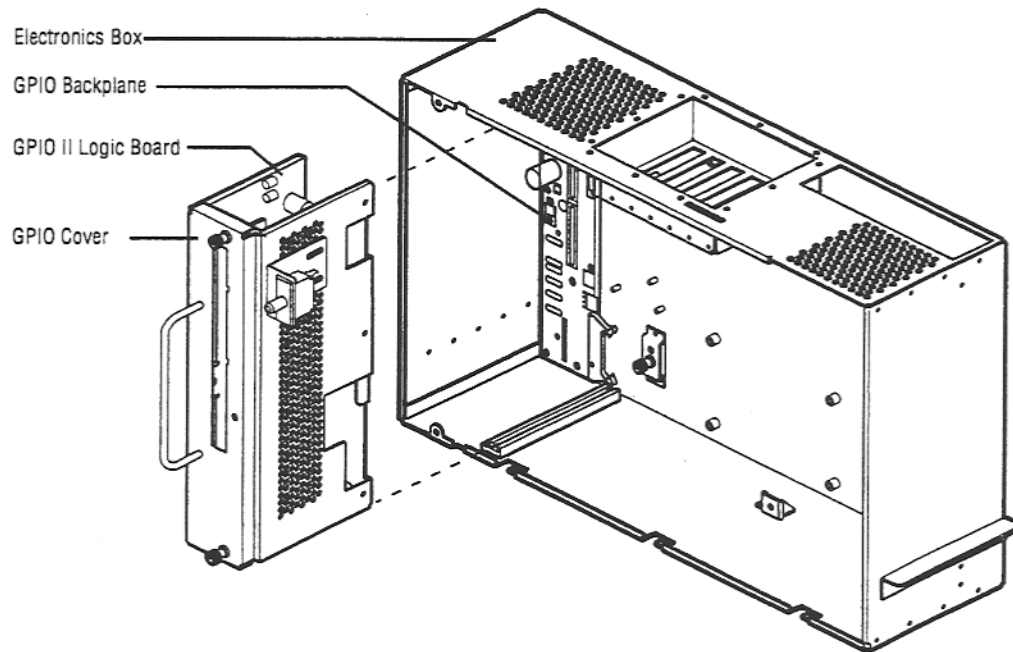
2. Loosen the two captive screws from the top and bottom of the GPIO cover, pull on the handle, and pull the cover off.

   The GPIO logic board comes off with the cover. On the floor of the electronics box is the smaller pink GPIO backplane.

Removing the GPIO Logic Board

To remove the GPIO logic board, perform the following steps:

1. Remove the six screws securing the board to the standoffs in the box cover and remove the board from the cover.

2. Two cables connect the GPIO logic board to the box. Disconnect the 2-pin reset cable and the 4-pin electronics box sensor cable from the board.

Removing the GPIO Backplane

To remove the GPIO backplane, refer to Figure 11-7 and perform the following steps:

1. Unplug the five connectors, J3 through J7, from the board.

2. Remove the nine screws securing the board to the standoffs.

3. Remove the two screws securing the audio amplifier board to the side of the electronics box.

4. Lift the board from the electronics box.

Figure 11-7   **GPIO Backplane**
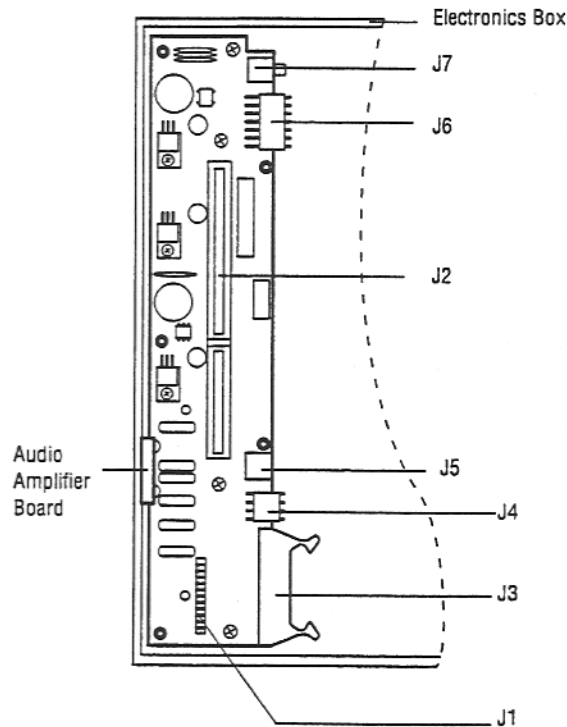
5. To install the new GPIO II boards, proceed to "Installing the GPIO II Boards" on page 11-12.

Installing a GPIO Board

Installation differs for the two GPIO systems.

Installing the GPIO I Board

To install the GPIO I board, perform the following steps:

1. If you have received only the GPIO I board (and not the GPIO box) as a replacement part, proceed to step 2. If you have received the GPIO box with the GPIO I board inside, proceed to step 9.

2. The GPIO box is in two sections. Select the section with no window and place it on a flat surface so that the long, narrow side is on your right, perpendicular to the flat surface.

3. Insert the new GPIO I board into this section of the GPIO box so that the P1 through P5 connectors are at the top, facing left. Figure 11-4 on page 11-7 shows the locations of these connectors on the board.

4. Secure the board to the first section of the box with five screws. Figure 11-4 on page 11-7 shows the screw locations.

5. The other section of the GPIO box is the cover. Lay the cover to the left of the first section. Refer to Figure 11-4 on page 11-7 and connect the two cables from the cover to the board as follows:

   a. Connect the 4-pin electronics box sensor cable to the 4-pin connector on the GPIO I board.

   b. Connect the 2-pin reset cable to the 2-pin reset connector on the board.

6. Place the first section and the cover of the GPIO box on or near the electronics box. Refer to Figure 11-4 on page 11-7 and plug the following four cables into the board:

   a. Connect the 7-pin AC cable to the 7-pin AC cable connector.

   Caution: Be sure the pins in the two connectors are exactly aligned with each other. If you offset one connector to the left or right, you can blow a fuse or transformer.

   b. Connect the 3-pin reset cable (coming from the electronics box reset jumper) to the 3-pin reset cable connector.

   c. Connect the 4-pin 5-volt power DC cable (coming from the power supply) to the 4-pin 5-volt power DC cable connector.

   d. Connect the 25-pin ribbon cable (coming from the transformer) to the 25-pin ribbon cable connector.

   Important: Be sure the cable is inserted into the connector so that the stripe on the cable is oriented as shown in Figure 11-4 on page 11-7.

7. Place the cover over the GPIO I board so that it forms a box with the first half of the box, and the P1 through P5 connectors show through the window in the box, as shown in Figure 11-5 on page 11-8.

8. Refer to Figure 11-5 on page 11-8. Insert the five screws into the GPIO box and secure the two sections of the box to each other. Skip the next step and proceed to step 10.

9. Refer to Figure 11-4 on page 11-7 and plug the following four cables into the board:

   a. Connect the 7-pin 12-volt AC cable to the 7-pin 12-volt AC cable connector.

   b. Connect the 3-pin reset cable (coming from the electronics box reset jumper) to the 3-pin reset cable connector.

   c. Connect the 4-pin 5-volt power DC cable (coming from the power supply) to the 4-pin 5-volt power DC cable connector.

   d. Connect the 25-pin ribbon cable (coming from the transformer) to the 25-pin ribbon cable connector.

10. Set the GPIO box in the left end of the electronics box so the window on the box faces you, as shown in Figure 11-5 on page 11-8.

11. Align the GPIO box with the two holes in the mounting bracket.

12. Secure the GPIO box to the electronics box with the two captive screws at the top and bottom of the cover of the GPIO box. Proceed to "Connecting the Cables" on page 11-13.

Installing the GPIO II Boards

To install the GPIO II boards, perform the following steps:

1. Refer to Figure 11-7 on page 11-10 and install the GPIO backplane as follows:

    a. Place the board in the electronics box so it lies on the floor of the box and the audio amplifier board is against the side wall of the electronics box.

    b. Secure the board to the standoffs in the electronics box, using nine screws.

    c. Secure the audio amplifier board to the side of the electronics box, using two screws.

    d. Plug in the following connectors:

    Plug the ribbon cable from the motherboard into J3.

    Plug the 4-pin CPU power supply connector into J4.

    Plug the reset cable from the motherboard into J5.

    Plug the 7-pin AC power connector from the transformer into J6.

    Plug the audio/phono jack into J7.

2. To install the GPIO logic board, perform the following steps:

    a. Connect the 2-pin reset cable and the 4-pin electronics box sensor cable to the board.

    b. Align the six screw holes in the board to the standoffs in the box cover, making sure the P1 through P6 connectors come through the cover.

    c. Secure the GPIO logic board to the cover, using six screws.

3. To install the cover, perform the following steps:

    a. Align the teeth of the GPIO logic board with the J2 connector in the GPIO backplane.

    b. Place the cover over the top and bottom edges of the electronics box so that the cover rests in the guides in the walls of the electronics box.

4. Push down on the cover until it snaps in place.

5. Tighten the two captive screws in the GPIO box cover.

Connecting the Cables

To connect the cables, perform the following steps:

1. Close the electronics door. Refer to "Closing the Electronics Box Door" on page 2-12.

2. Plug in the P1 through P5 connectors on the left cabinet wall to the P1 through P5 connectors in the GPIO box. Figure 11-5 on page 11-8 shows the placement of the connectors. If you installed GPIO II boards, plug in connector P6 (stacked with P5).

3. Plug the 3-wire CPU power cable connector (P71) into Q6 on the front of the electronics box.

   Note: The P71 connector was previously named P6. It was renamed to avoid confusion with the P6 connector referenced in step 2.

Installing the Hopper Drawer

Refer to "Installing the Hopper Drawer" on page 2-10.

Verifying GPIO Board Operation

To verify GPIO board operation, perform the following steps:

1. Flip the power switch for the slot machine to the On position.

2. Invoke the MMS and access the MMS **Diagnostics** page. Refer to "Invoking the MMS" on page 2-23.

3. Perform all diagnostics on the **Diagnostics** page.

4. Exit the MMS. Refer to "Exiting the MMS" on page 2-25.

5. Close the belly door. Refer to "Closing and Locking the Belly Door" on page 2-9.

6. Close the currency column door. Refer to "Closing and Locking the Currency Column Door" on page 2-9.

Replacing a Circuit Board

Figure 11-8 on page 11-14 shows the locations of the peripheral memory board, video controller board, and SCSI disk controller board. To access them, you must remove the door to the electronics box.
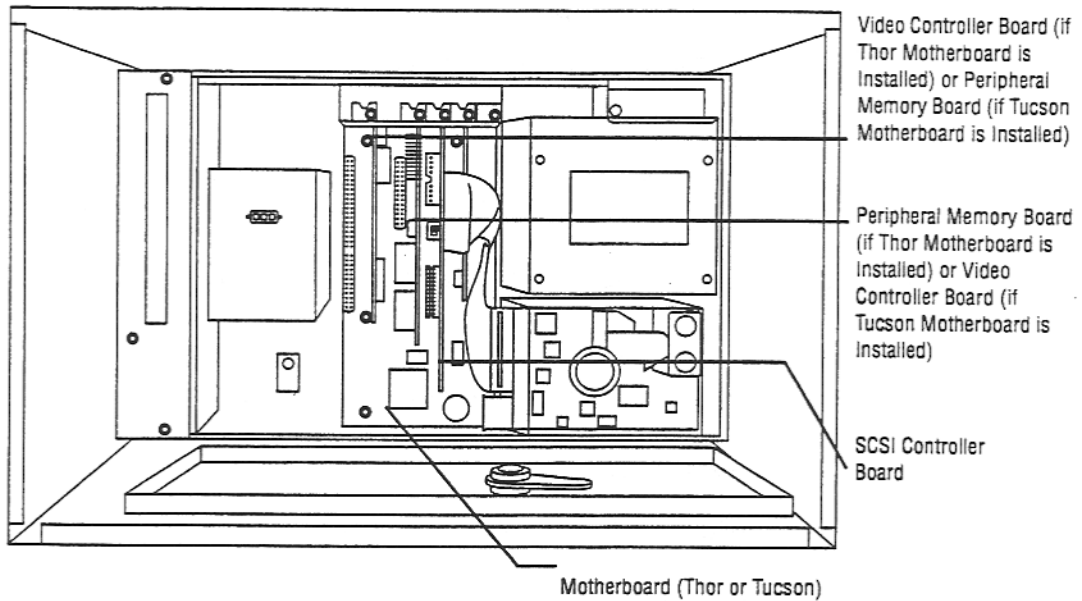
Important: Slot machines that are connected to a Wide Area Progressive System have a tamper-proof seal that prevents you from opening the door to the electronics box. Do not break the seal unless you are an authorized Silicon Gaming field engineer. To replace a component inside the electronics box, call 1-888-44-SLOTS.

Figure 11-8   **Circuit Boards and Motherboard**

Video Controller Board (if Thor Motherboard is Installed) or Peripheral Memory Board (if Tucson Motherboard is Installed)

Peripheral Memory Board (if Thor Motherboard is Installed) or Video Controller Board (if Tucson Motherboard is Installed)

SCSI Controller Board

Motherboard (Thor or Tucson)

> *Important:* The locations of the video controller board and the peripheral memory board are different on the Tucson motherboard and the Thor motherboard.

The following table is a summary of the sections in this procedure. Perform those sections indicated for the board you are replacing. If you are familiar with the procedure, you may prefer to read the text in the indicated sections only when necessary.

Replacing a Circuit Board	Video Controller Board	Peripheral Memory Board	SCSI Controller Board
Removing a Circuit Board			
"Removing the Hopper Drawer" on page 2-9	X	X	X
"Removing the Electronics Box and Disconnecting the Video Cable" on page 11-15	X		
"Removing the Video Controller Board" on page 11-15	X		
"Removing the Peripheral Memory Board" on page 11-16		X	
"Removing the SCSI Controller Board" on page 11-16			X
Installing a Circuit Board			
"Installing the Video Controller Board" on page 11-17	X		
"Installing the Peripheral Memory Board" on page 11-17		X	
"Installing the SCSI Disk Controller Board" on page 11-18			X
"Installing the Electronics Box and Connecting the Video Cable" on page 11-18	X		
"Installing the Hopper Drawer" on page 2-10	X	X	X
"Verifying Circuit Board Operation" on page 11-18	X	X	X

Removing a Circuit Board

Before beginning the procedure, be sure to turn the power off.

To turn the power off, 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.

To access the circuit boards, you must remove the hopper drawer and open the door to the electronics box.

Removing the Hopper Drawer

To remove the hopper drawer, perform the following steps:

1. Open the belly door. Refer to "Opening the Belly Door" on page 2-9.

2. Refer to "Removing the Hopper Drawer" on page 2-9.

3. If you are replacing the video controller board, proceed to "Removing the Electronics Box and Disconnecting the Video Cable," below.

   If you are replacing the peripheral memory board, proceed to "Removing the Peripheral Memory Board" on page 11-16.

   If you are removing the SCSI controller board, proceed to "Removing the SCSI Controller Board" on page 11-16

Removing the Electronics Box and Disconnecting the Video Cable

◈ *Warning:* To save the motherboard from electrostatic discharge damage, use a grounding strap or touch the metal on the power supply before touching components in the electronics box.

To remove the electronics box and disconnect the video controller cable, refer to "Removing the Electronics Box" on page 2-12.

Removing the Video Controller Board

To remove the video controller board, refer to Figure 11-8 on page 11-14 to locate the board, and perform the following steps:

1. Loosen the board from the bracket by gently wiggling it.

2. Pull the board straight out of its plug-in connector on the motherboard and place the board on a nonstatic surface.

3. Proceed to "Installing the Video Controller Board" on page 11-17

Removing the Peripheral Memory Board

To remove the peripheral memory board, refer to Figure 11-8 on page 11-14 to locate the board, and perform the following steps:

1. Remove the screw from the bracket above the board.

2. Loosen the board from the bracket by gently wiggling it.

3. Pull the board straight out of its plug-in connector on the motherboard and place the board on a nonstatic surface.

4. Proceed to "Installing the SCSI Disk Controller Board" on page 11-18.

Removing the SCSI Controller Board

To remove the SCSI controller board, refer to Figure 11-8 on page 11-14 to locate the board, and perform the following steps:

1. Remove the screw from the bracket above the board.

2. Disconnect the SCSI ribbon cable from the board.

3. Loosen the board from the bracket by gently wiggling it.

4. Pull the board straight out of its plug-in connector on the motherboard and place the board on a nonstatic surface.

Installing a Circuit Board

Important: Be sure you install the circuit board in the correct location, as described in the following sections.

As you install each board, be sure to keep the boards from touching each other

Figure 11-9 and Figure 11-10 on page 11-17 show the locations for the circuit boards on a Thor and on a Tucson motherboard.

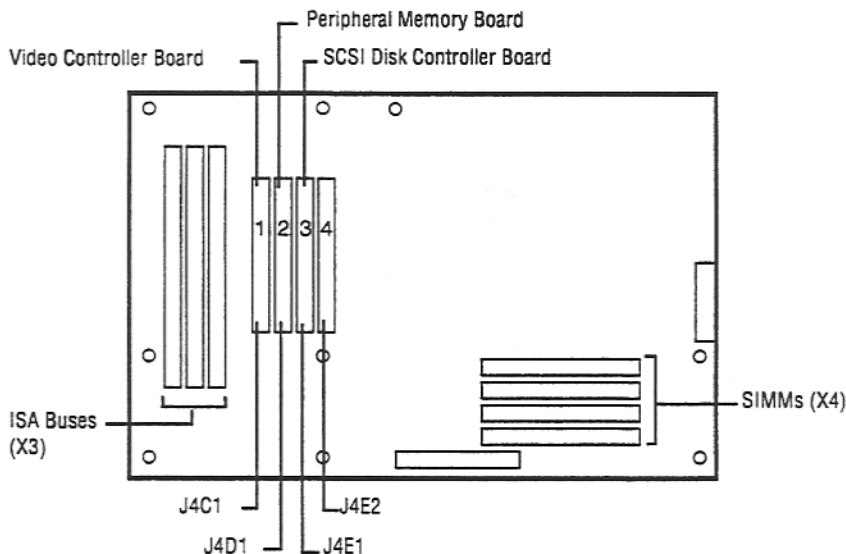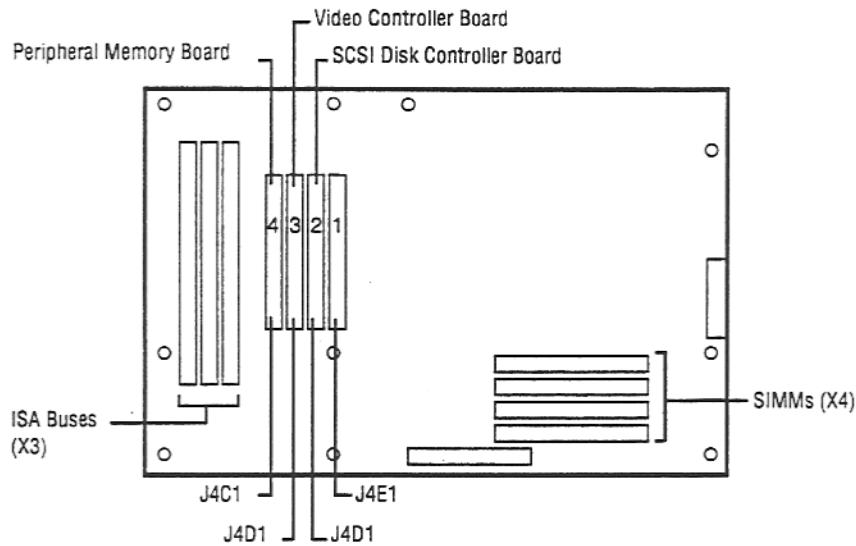*Figure 11-9*   **Locations for Circuit Boards on Thor Motherboard**

Figure 11-10   **Locations for Circuit Boards on Tucson Motherboard**

Installing the Video Controller Board

To install the video controller board in the motherboard, refer to Figure 11-9 on page 11-16 or Figure 11-10 and perform the following steps:

1. Insert the teeth of the board between the connector pins for the video controller board.

2. Press on the top and both ends of the board to secure it in the connector.

3. Secure the board to the bracket above the board with a screw.

4. Proceed to "Installing the Electronics Box and Connecting the Video Cable" on page 11-18

Installing the Peripheral Memory Board

To install the peripheral memory board in the motherboard, refer to Figure 11-9 on page 11-16 or Figure 11-10 and perform the following steps:

1. Insert the teeth of the board between the connector pins for the peripheral memory board. Press on the top and both ends of the board to secure it in the connector.

2. Perform a full clear of SRAM, as described in "Performing a SafeClear" on page 2-25.

    Important: If you do not clear SRAM, you may experience software problems because of machine and game data still stored on the replacement board.

3. Proceed to "Installing the Hopper Drawer" on page 11-22.

Installing the SCSI Disk Controller Board

To install the SCSI disk controller board in the motherboard, refer to Figure 11-9 on page 11-16 or Figure 11-10 on page 11-17 and perform the following steps:

1. Insert the board between the connector pins for the SCSI disk controller board on the motherboard. Press on the top and both ends of the controller board.

2. Secure the controller board to the bracket with a screw.

3. Connect the SCSI ribbon cable, coming from the hard disk, to the controller board.

4. Proceed to "Installing the Hopper Drawer" on page 11-22.

Installing the Electronics Box and Connecting the Video Cable

To install the electronics box and connect the video controller cable, refer to "Installing the Electronics Box" on page 2-15.

Installing the Hopper Drawer

Refer to "Installing the Hopper Drawer" on page 2-10.

Verifying Circuit Board Operation

To verify circuit board operation, perform the following steps:

1. Flip the power switch for the slot machine to the On position.

2. To test the peripheral memory board, activate a game. If the game does not activate, the board may be faulty or you may have installed it incorrectly.

3. To test the video controller board and the SCSI disk controller boards, perform the following steps:

   a. Insert the MMS key in the keyswitch on the right side of the machine.

   b. Turn the key clockwise for a moment to invoke the MMS. The **Game Play Monitor** page is displayed. If it is not displayed, either board may be faulty or you may have installed it incorrectly.

   c. Exit the MMS. Refer to "Exiting the MMS" on page 2-25.

4. Close the belly door. Refer to "Closing and Locking the Belly Door" on page 2-9.

5. Close the currency column door. "Closing and Locking the Currency Column Door" on page 2-9.

Replacing the PROM

Whenever you upgrade a slot machine, you must replace from one to three PROMs on the peripheral memory board. You may also need a new Field-Programmable Gate Array (FPGA).

🏈 *Important:* If you need to upgrade the FPGA, you do not replace it with a new one. Instead, you replace the peripheral memory board. See "Replacing a Circuit Board" on page 11-13.

To access the PROMs, you must remove the door to the electronics box.

🏈 *Important:* Slot machines that are connected to a Wide Area Progressive System have a tamper-proof seal that prevents you from opening the door to the electronics box. Do not break the seal unless you are an authorized Silicon Gaming field engineer. To replace a component inside the electronics box, call 1-888-44-SLOTS.

The location of the PROMs depends on whether the machine contains a peripheral memory board I or a peripheral memory board II. You can tell a board I from a board II by the DIP switches, which are located on the flat surface of board I and on the edge of board II. (You cannot see the DIP switches on board I until you remove it from the motherboard.)

The following table is a summary of the sections in this procedure. If you are familiar with the procedure, you may prefer to read the text in the indicated sections only when necessary.

Replacing the PROM
Removing the PROMs
"Removing the Hopper Drawer" on page 2-9
"Removing the Peripheral Memory Board" on page 11-16
"Removing the PROM" on page 11-20
Installing the PROMs
"Installing a PROM" on page 11-21
"Installing the Peripheral Memory Board" on page 11-17
"Installing the Hopper Drawer" on page 2-10
"Verifying PROM Operation" on page 11-22

Removing the PROMs

Before beginning the procedure, be sure to turn the power off.

To turn the power off, 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.

To replace the PROMs, you must remove the hopper drawer and the peripheral memory board.

Removing the Hopper Drawer

Refer to "Removing the Hopper Drawer" on page 2-9.

Removing the Peripheral Memory Board

Refer to "Removing the Peripheral Memory Board" on page 11-16.

Removing the PROM

The peripheral memory board contains three PROMs called OS, BIOS, and configuration EEPROM. Figure 11-11 shows the board locations for the PROMs on a peripheral memory board I.
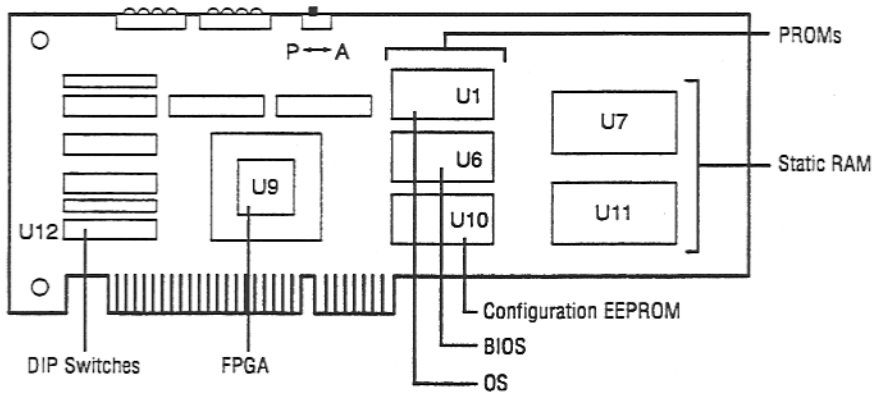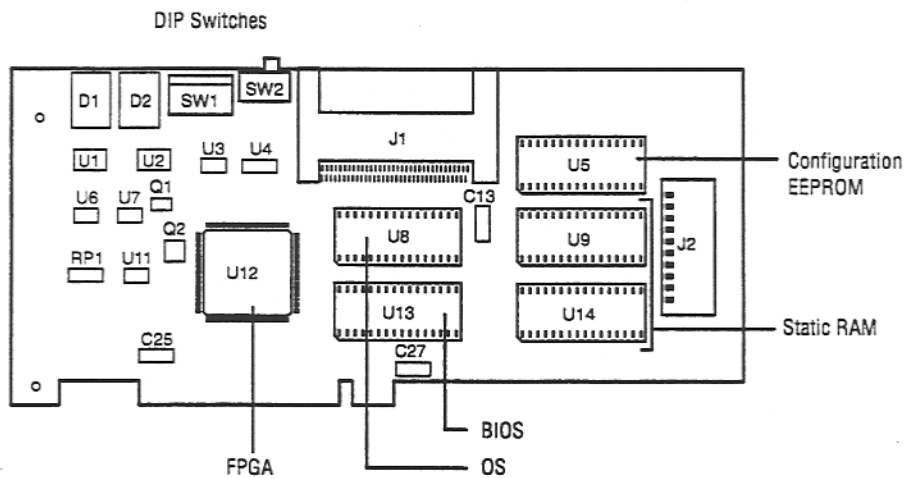
Figure 11-11   **Peripheral Memory Board I**

Figure 11-12 shows PROMs on a peripheral memory board II.

Figure 11-12   **Peripheral Memory Board II**

You can remove the PROM in either of the following ways:

♦ Carefully insert a screwdriver under the left edge of the chip.

   Caution: Be careful not to harm other board components.

   Wiggle the screwdriver until the PROM loosens. Then insert the screwdriver under the right edge of the chip and wiggle the screwdriver until the PROM loosens. Remove the PROM from the board.

♦ Insert the teeth of an IC remover between the socket and the right edge of the PROM.

   Caution: Do not push down on the IC remover or you can harm other board components.

   Pull the IC remover up until the PROM is free from the socket.
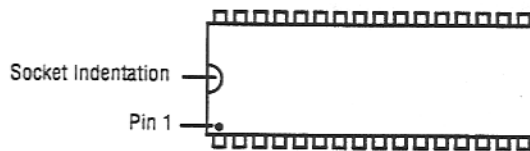
Installing the PROMs

The PROMs are not interchangeable. Each PROM has a unique part number and a unique location on the peripheral memory board. The location for each PROM is marked on the board.

Installing a PROM

To install a PROM, perform the following steps:

1. Refer to Figure 11-13 and hold the PROM so that pin 1 is in the bottom-left corner.

   Figure 11-13 **Pin 1 Marking on PROMs and Static Ram**

   Socket Indentation
   Pin 1

2. Place the PROM over the socket in the correct board location, as indicated in Figure 11-11 on page 11-20 or Figure 11-12 on page 11-20.

   Important: If you install the PROMs in the wrong sockets, the slot machine will not power up.

3. Install the PROM by pressing down until it is secure in the socket.

Installing the Peripheral Memory Board

Install the peripheral memory board back onto the motherboard. Refer to "Installing the Peripheral Memory Board" on page 11-17.

Important: Be sure to perform a SafeClear. Game data may still be stored on the replacement board, and if you do not clear SRAM, software problems may occur.

Installing the Hopper Drawer

To install the hopper, perform the following steps:

1. Refer to "Installing the Hopper Drawer" on page 2-10.

2. Close the currency column door. Refer to "Closing and Locking the Currency Column Door" on page 2-9.

Verifying PROM Operation

Flip the power switch for the slot machine to the On position. The Game Menu or a game is displayed on the monitor.

Replacing Static Random-Access Memory (SRAM)

To access the two static RAM chips, you must open the door to the electronics box.

Important: Slot machines that are connected to a Wide Area Progressive System have a tamper-proof seal that prevents you from opening the door to the electronics box. Do not break the seal unless you are an authorized Silicon Gaming field engineer. To replace a component inside the electronics box, call 1-888-44-SLOTS.

Figure 11-11 on page 11-20 shows the locations of the two static RAM chips.

The following table is a summary of the sections in this procedure. If you are familiar with the procedure, you may prefer to read the text in the indicated sections only when necessary.

Replacing Static Random-Access Memory (SRAM)
Removing Static RAM
"Removing the Hopper Drawer" on page 2-9
"Removing the Peripheral Memory Board" on page 11-20
"Removing the Static RAM Chips" on page 11-23
Installing Static RAM
"Installing the Static RAM Chips" on page 11-23
"Installing the Peripheral Memory Board" on page 11-21
"Performing a SafeClear" on page 11-24
"Installing the Hopper Drawer" on page 2-10
"Verifying Static RAM Operation" on page 11-24

Removing Static RAM

Before beginning the procedure, be sure to turn the power off.

To turn the power off, 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.

To remove the static RAM chips, you must remove the hopper drawer and the peripheral memory board.

Removing the Hopper Drawer

Refer to "Removing the Hopper Drawer" on page 2-9.

Removing the Peripheral Memory Board

Refer to "Removing the Peripheral Memory Board" on page 11-16.

Removing the Static RAM Chips

Refer to Figure 11-11 on page 11-20 to locate the static RAM chips on the peripheral memory board. You can remove the chip in either of the two following ways:

♦   Carefully insert a screwdriver under the left edge of the chip.

   Caution: Be careful not to harm other board components.

   Wiggle the screwdriver until the chip loosens. Then insert the screwdriver under the right edge of the chip and wiggle the screwdriver until the chip loosens. Remove the chip from the board.

♦   Insert the teeth of an IC remover between the socket and the right edge of the chip.

   Caution: Do not push down on the IC remover or you can harm other board components.

   Pull the IC remover up until the chip is free from the socket.

Installing Static RAM

You install both of the chips in the same way.

Installing the Static RAM Chips

To install static RAM, perform the following steps:

1.   Refer to Figure 11-13 on page 11-21 and hold the static RAM so that pin 1 is in the bottom left corner.

2.   Place the static RAM over the correct socket in the peripheral memory board. The two sockets are labeled U7 and U11 on the board. The static RAM fits the same on each socket.

3.   Refer to Figure 11-13 on page 11-21 and ensure that the socket indentation is to the left.

4.   Install the static RAM by pressing down until it is secure in the socket.

Installing the Peripheral Memory Board

Install the peripheral memory board back into the motherboard. Refer to "Installing the Peripheral Memory Board" on page 11-17.

Performing a SafeClear

Important: Game data may still be stored on the replacement board. Refer to "Performing a SafeClear" on page 2-25.

Installing the Hopper Drawer

To install the hopper drawer, perform the following steps:

1. Refer to "Installing the Hopper Drawer" on page 2-10.

2. Close the currency column door. Refer to "Closing and Locking the Currency Column Door" on page 2-9.

Verifying Static RAM Operation

Flip the power switch for the slot machine to the On position. The Game Menu or a game icon animation should be displayed on the monitor. If the screen is blank, one or both of the static RAM chips have been installed incorrectly and the LED diagnostics display provides an error code. Use the table below to determine the location of the problem chip on the peripheral memory board.

Error Code	Location of Problem Static RAM
2	U7
3	U11
4	U7 and U11
12	U7 and U11

Replacing the Motherboard

The motherboard is in the electronics box, located behind the belly door, toward the rear of the slot machine. It is behind the video controller board, the peripheral memory board, and the SCSI disk controller board.

Important: Slot machines that are connected to a Wide Area Progressive System have a tamper-proof seal that prevents you from opening the door to the electronics box. Do not break the seal unless you are an authorized Silicon Gaming field engineer. To replace a component inside the electronics box, call 1-888-44-SLOTS.

The slot machine contains either a Thor motherboard or a Tucson motherboard. If you are replacing a defective Thor motherboard, you must replace it with a Tucson motherboard.

If the slot machine does not have a video patch cable, you must remove the display monitor chassis from the display cavity. To do so, you may want to move the slot machine from the casino floor. To move the machine, you need a dolly and help from another person.

Note: You can tell whether a machine has a video patch cable once you remove the hopper drawer.

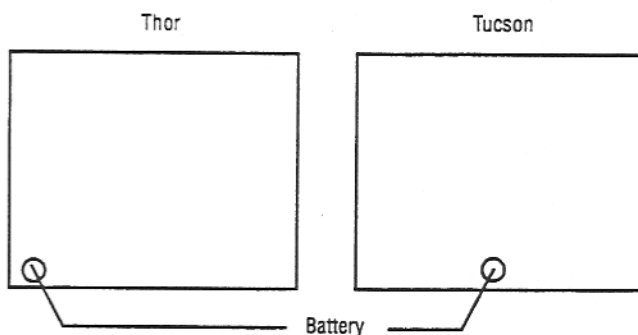*Warning:* An explosion may occur if the lithium battery on the motherboard is not replaced with the same or equivalent type recommended by the manufacturer.

Figure 11-14 shows the location of the battery on the Thor and Tucson motherboards.

Figure 11-14   **Battery Location on Thor and Tucson Motherboards**

Thor   Tucson

Battery

Dispose of used batteries according to the manufacturer's instructions.

The following table is a summary of the sections in this procedure. If you are familiar with the procedure, you may prefer to read the text in the indicated sections only when necessary.

Replacing the Motherboard
Removing the Motherboard
"Removing the Hopper Drawer" on page 2-9
"Removing the Display Monitor Chassis" on page 2-16
Note: Perform only if the machine has no video patch cable
"Removing the Electronics Box" on page 2-12
"Removing the Circuit Boards" on page 11-27
"Removing the Ethernet Board" on page 11-27
Note: Perform if the slot machine is in a WAPS network
"Removing the Hard Disk" on page 11-28
"Removing the Power Supply Bracket" on page 11-29
"Removing the Motherboard from the Electronics Box" on page 11-29
"Removing and Installing the Pentium Chip" on page 11-30
"Removing and Installing the SIMMs" on page 11-31

Replacing the Motherboard
Installing the Motherboard
"Verifying Jumper Locations" on page 11-31
"Installing the Motherboard in the Electronics Box" on page 11-33
"Connecting the Cables and Installing the Power Supply Bracket" on page 11-34
"Installing the Hard Drive" on page 11-35
"Installing the Circuit Boards" on page 11-35
"Connecting the Power and Video Cables and Installing the Electronics Box" on page 11-36
"Installing the Ethernet Board" on page 11-36
Note: Perform if the slot machine is in a WAPS network
"Connecting the GPIO and CPU Power Cables" on page 11-36
"Installing the Display Monitor Chassis" on page 2-20
Note: Perform if you have removed the display monitor chassis
"Calibrating the Touchscreen" on page 11-37
"Installing the Hopper Drawer" on page 2-10
"Verifying System Operation" on page 11-37

Removing the Motherboard

Before beginning the procedure, be sure to turn the power off.

To turn the power off, 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.

To remove the motherboard, you must remove the hopper drawer, display monitor chassis (possibly), the electronics box, circuit boards, Ethernet board (possibly), hard disk, and power supply bracket. Then you must remove and install the SIMMs and Pentium chip.

Removing the Hopper Drawer

Refer to "Removing the Hopper Drawer" on page 2-9.

Removing the Display Monitor Chassis

If the machine does not have a video patch cable, you must remove the display monitor chassis to access the cables beneath the monitor. Refer to "Removing the Display Monitor Chassis" on page 2-16.

   ✦ *Tip:* The machine has a video patch cable if the cable from the video controller board, shown in Figure 11-8 on page 11-14, goes to the underside of the socket farthest to the right in the three sockets under the display monitor.

If the machine has a video patch cable, disconnect it from the socket under the display monitor.

Removing the Electronics Box and the Video Cable

Refer to "Removing the Electronics Box" on page 2-12.

Removing the Circuit Boards

To remove the circuit boards, perform the following steps:

1. To remove the video controller board, refer to "Removing the Video Controller Board" on page 11-15.

2. To remove the peripheral memory board, refer to "Removing the Peripheral Memory Board" on page 11-16.

3. To remove the SCSI controller board, refer to "Removing the SCSI Controller Board" on page 11-16.

Removing the Ethernet Board

If the slot machine is in a WAPS network, it has an Ethernet board, which you must also remove.

To remove the Ethernet board, refer to Figure 11-15 and perform the following steps:

*Figure 11-15*   **Electronics Box Inside Cabinet**
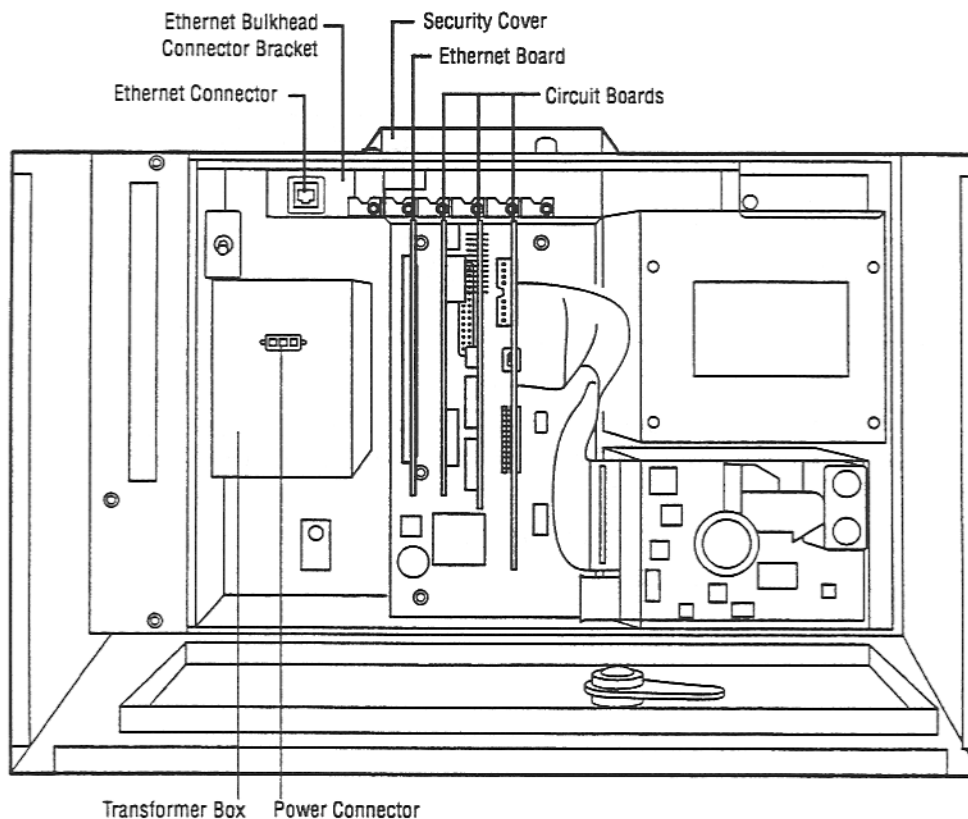
1. Remove the screw second from the left on the bracket.

2. Loosen the board from the bracket by gently wiggling it.

3. Pull the board straight out of its plug in the connector on the motherboard.

4. Allow the board to hang from its cable so you have access to the Ethernet connector on the top of the board

5. Push in the flanges on the connector and remove the connector from the board.

Removing the Hard Disk

To remove the hard disk, perform the following steps:

1. The power supply and the hard disk are secured in the electronics box by the power supply bracket. Figure 11-16 shows the screws. Captive screw 1 secures the drive to the bracket and captive screws 2, 3, and 4 secure the bracket to the electronics box.

*Figure 11-16*   **Hard Disk and Captive Screws**
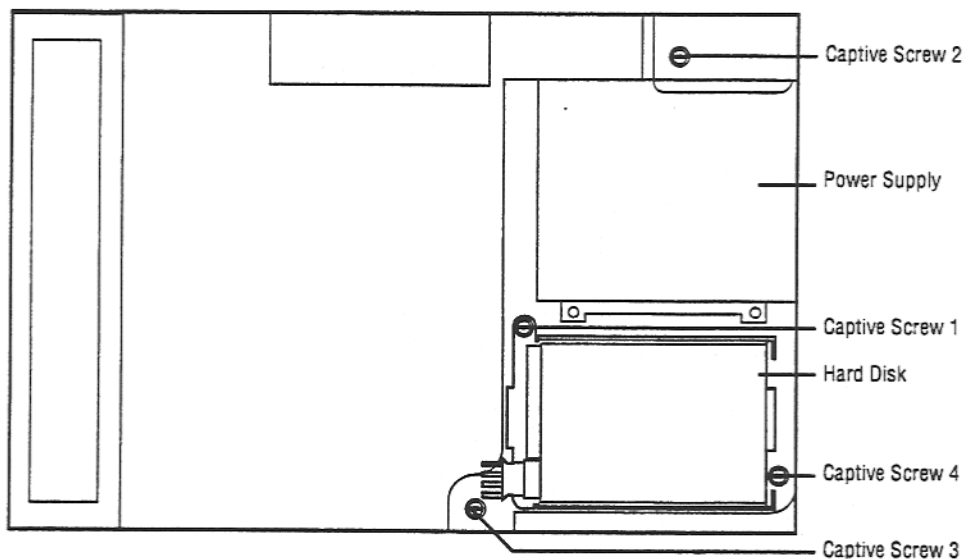
The drive contains a hook on the left edge of the back side of the drive and a tab on the right. Figure 11-17 on page 11-29 shows a top view of the drive and the locations of the hook and tab.

Slide the drive to the left to disengage the hook and the tab.

2. Pull the drive out of the electronics box.

Figure 11-17   **Hard Disk Hook and Tab Locations**
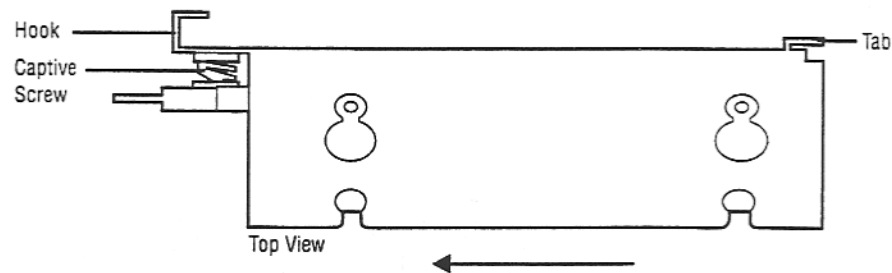

Removing the Power Supply Bracket

To remove the power supply bracket from the electronics box, perform the following steps:

1. Remove captive screws 2, 3, and 4 that secure the bracket to the electronics box. Figure 11-16 on page 11-28 shows the screw locations.

2. Disconnect the power harness from the motherboard.

3. Remove the bracket and power supply from the electronics box as one unit and set it on a flat surface.

Removing the Motherboard from the Electronics Box

To remove the motherboard from the electronics box, refer to Figure 11-18 and perform the following steps:
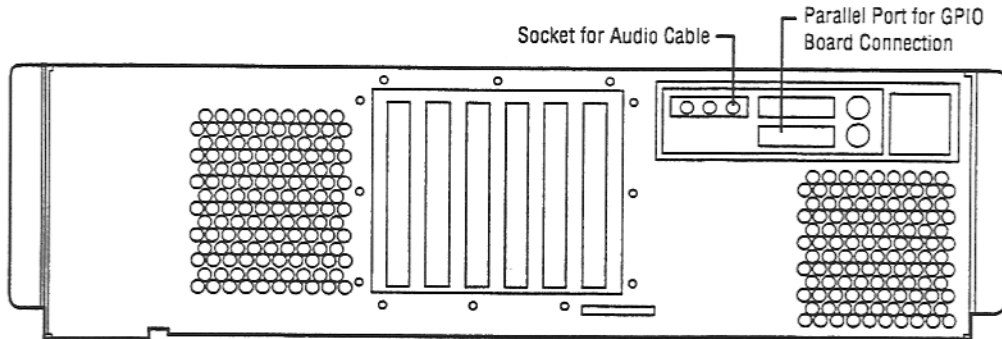
Figure 11-18   **Motherboard and Screw Locations**
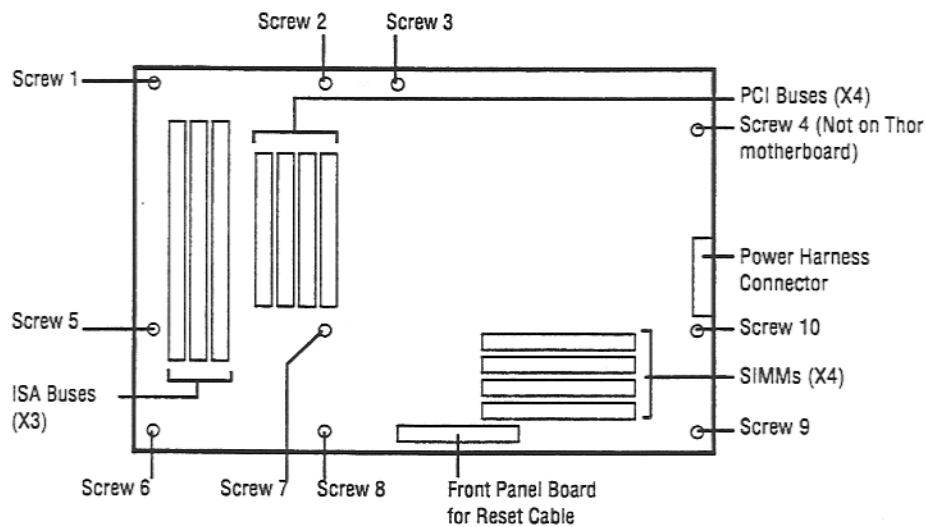
1. Disconnect the reset cable from the motherboard by removing the screw and pulling out the cable. (The reset cable is a two-wire cable that connects the GPIO board to the motherboard.)

2   Remove the two screws that connect the parallel ribbon cable from the GPIO
    board to the parallel port on the electronics box and disconnect the cable.
    Figure 11-19 shows the location of the parallel port.

Figure 11-19   **Top View of Electronics Box Standing Upright**

3   Remove the screws that hold the motherboard in its bracket. The labels 1 through
    10 in Figure 11-18 on page 11-29 show the screw locations.

    Note: Screw location 4 is not on the Thor motherboard. Screw 5 may be
    missing from the Tucson motherboard.

4   Lift the motherboard by the outer edges or grasp it by the PCI buses, shown in
    Figure 11-18 on page 11-29.

    Important: Do not grasp the motherboard by the SIMMs.

5   Pull the motherboard out of the bracket and out of the electronics box.

6   Place the motherboard on a flat surface.

Removing and Installing the Pentium Chip

To remove and install the Pentium chip, perform the following steps:

1. On the old motherboard, carefully pull the arm of the chip to the side and up.

2   Lift the chip from the board with your fingers.

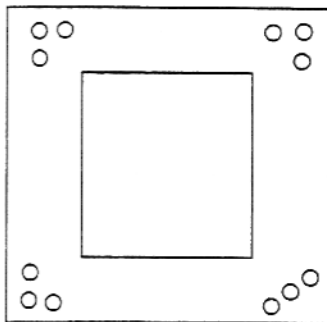3. On the new motherboard, line up the pins in the chip with the holes in the socket.

    Note: One corner has holes that do not form a square corner. See Figure 11-20.

Figure 11-20   **Holes in Pentium Socket**

4.   Lock the socket in place by pulling the handle down.

Removing and Installing the SIMMs

To remove and install the SIMMs, perform the following steps:

1.   On the old motherboard, use your fingers to pull the spring-loaded clip out from each end of the SIMM socket.

2.   Tilt the SIMM forward and remove it from the socket.

3.   On the new motherboard, place the SIMM in the socket and tilt it forward.

4.   Pull the SIMM upright while pulling out the spring-loaded clips from each end of the socket.

5.   Snap the SIMM in place.

Installing the Motherboard

After verifying jumper locations, you can install the motherboard and the other components you removed.

Verifying Jumper Locations

If you are installing a Tucson board, verify that the jumpers at J5K1, J9A1, and J10C1 are at the locations on the Tucson motherboard shown in Figure 11-22 on page 11-32 and Table 11-1 on page 11-32. Figure 11-21 shows a jumper.
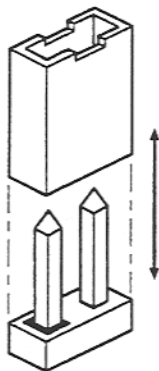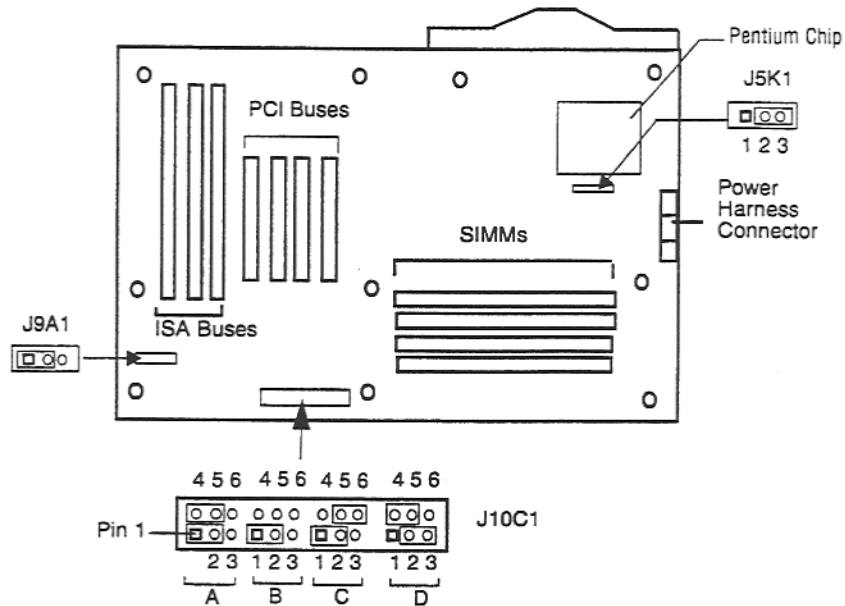
Figure 11-21   **Jumper**

Figure 11-22   **Tucson Motherboard Jumper Locations**

@ **Note:** The boxes inside J5K1, J9A1, and J10C1 indicate the jumpers.

@ *Important:* For motherboards with a Pentium 166 MHz chip, the jumper at J5K1 must be on locations 1 and 2, instead of 2 and 3. The electronics box revision number indicates whether a Pentium 166 MHz chip is on the motherboard. The revision number is on the transformer box, below the AC power connector. To find these components, refer to Figure 11-15 on page 11-27. Revision T indicates a Pentium 166 MHz chip. Revision letters less than *T* indicate a Pentium 133 MHz chip.

Table 11-1 indicates the placement of the jumpers.

Table 11-1   **Jumper Settings on Tucson Motherboard**

Function	Jumper	Configuration
Password clear	J10C1-A	1-2 Password enabled (default
CMOS clear	J10C1-A	4-5 Keep (default)
Setup access	J10C1-B	1-2 Access allowed (default)
Microprocessor speed ratio	J10C1-C	1-2 Microprocessor frequency 133 Mhz
		5-6 Microprocessor frequency 133 Mhz
Host bus speed	J10C1-D	2-3 Host bus frequency 66 Mhz
(Note: These jumpers also set the PCI and ISA clock speeds)		4-5 Host bus frequency 66 Mhz
Processor voltage	J5K1	2-3 Standard voltage (default)
		See *Important* note on page 11-32.
BIOS recovery	J9A1	1-2 Normal operation (default)

Installing the Motherboard in the Electronics Box

🏈 *Important:* Do not handle the SIMMs.

To install the motherboard in the electronics box, perform the following steps:

1. Tilt the motherboard so the top edge is higher than the bottom edge as it faces you.

2. Slide the motherboard into the bracket, aligning the screw holes on the motherboard with those on the bracket.

3. Secure the motherboard to the bracket with the screws from the old motherboard. In Figure 11-23, the screw holes are numbered 1 through 7 and 9 and 10.

   🍒 *Note:* The Thor motherboard requires nine screws. The Tucson motherboard requires ten. If you are replacing a Thor motherboard with a Tucson motherboard and are missing one screw, leave screw hole 5 empty.

Figure 11-23   **Motherboard and Screw Locations**
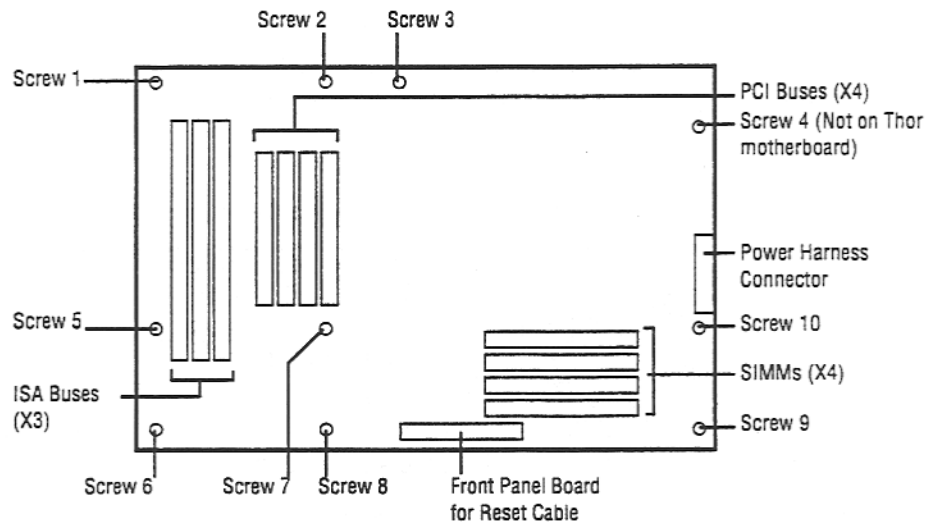
Connecting the Cables and Installing the Power Supply Bracket

To connect the cables and install the power supply bracket, perform the following steps:

1. Connect the reset cable to the motherboard in the location shown in and Figure 11-24. (The reset cable is a two-wire cable that connects the GPIO board to the motherboard. The cable is labeled on the motherboard.)

Figure 11-24   **Front Panel Board for Reset Cable**
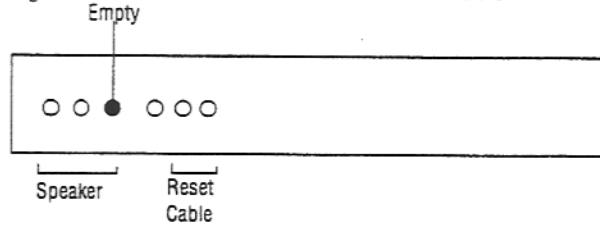
2. Use a screw at screw location 8, shown in Figure 11-23, to secure the reset cable under the tie down near the screw location.

3. Connect the parallel cable (coming from the GPIO board) to the parallel port on the electronics box. Figure 11-25 shows the location of the parallel port.

Figure 11-25   **Parallel Port on Top of Electronics Box** ·
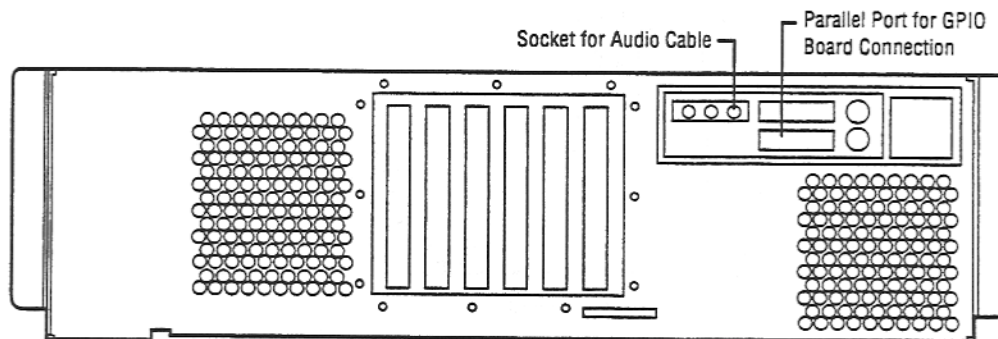
4. Secure the cable with two screws.

5. Refer to Figure 11-26 on page 11-35 and place the power supply bracket with the power supply into the right side of the electronics box.

Figure 11-26   Placement of Bracket with Power Supply in Electronics Box

- Captive Screw 2
- Power Supply
- Captive Screw 1
- Hard Disk
- Captive Screw 4
- Captive Screw 3
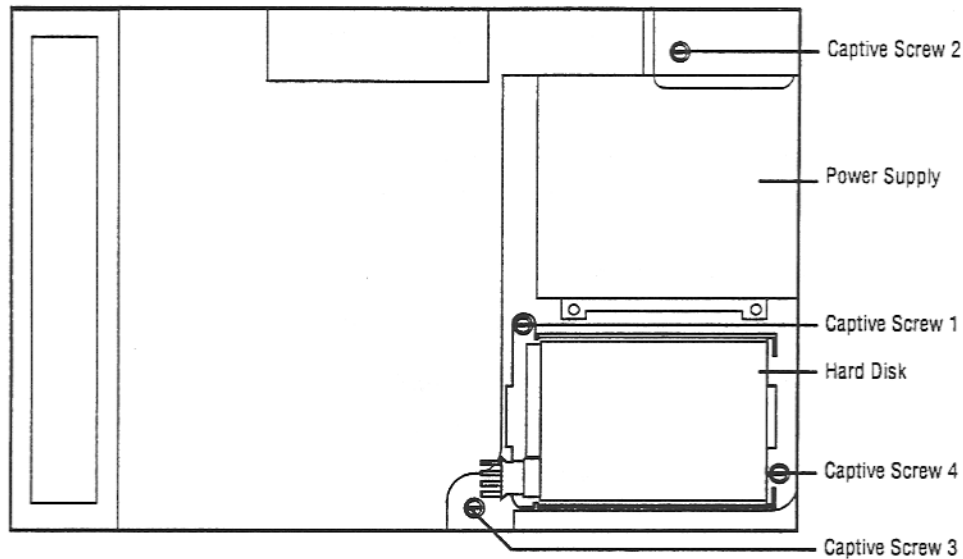
6. Connect the power cable (coming from the power supply) to the power harness connector on the motherboard, shown in Figure 11-23 on page 11-33.

7. Tighten captive screws 2, 3, and 4, shown in Figure 11-26, which secure the bracket to the electronics box.

Installing the Hard Drive

To install the hard drive in the power supply bracket, refer to Figure 11-26 on page 11-35 and perform the following steps:

1. Place the drive in the power supply bracket, in the location shown in the figure.

2. Slide the drive to the right so the hook and tab each engage, holding the drive in place. Figure 11-17 on page 11-29 shows the locations of the hook and tab.

3. Tighten captive screw 1.

Installing the Circuit Boards

To install the circuit boards, perform the following steps:

1. To install the video controller board, refer to "Installing the Video Controller Board" on page 11-17.

2. To install the peripheral memory board, refer to "Installing the Peripheral Memory Board" on page 11-17.

3. To install the SCSI disk controller board, refer to "Installing the SCSI Disk Controller Board" on page 11-18.

Connecting the Power and Video Cables and Installing the Electronics Box

To connect the power and video cables and install the electronics box, perform the following steps:

1. Plug the power cable (from the power supply) into the hard disk.

2. Install the electronics box and connect the video cable. Perform "Installing the Electronics Box" on page 2-15 through step 8.

Installing the Ethernet Board

If you removed the Ethernet board, you must install it now.

To install the Ethernet board, perform the following steps:

1. Plug the connector for the Ethernet board into the top of the board.

2. Insert the teeth of the board between the connector pins in the ISA bus slot closest to the circuit boards. Figure 11-27 shows the location on the motherboard.

Figure 11-27   **Location for Ethernet Board**
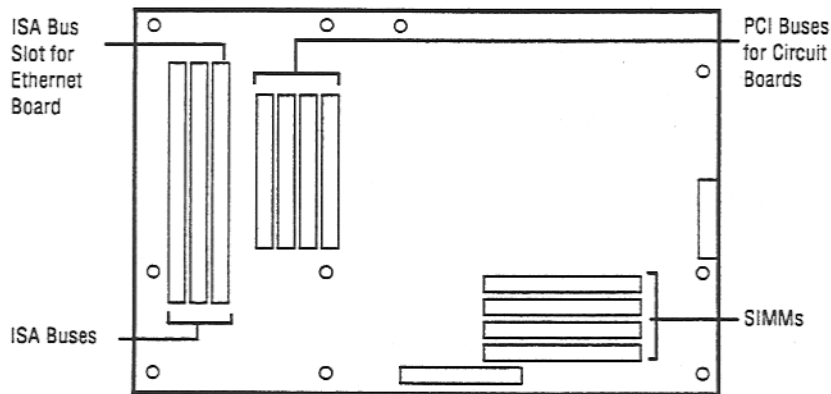
3. Push the board into the slot until it is secure.

4. Secure the board to the bracket with a screw in the screw hole second from the left on the bracket.

Connecting the GPIO and CPU Power Cables

To close the electronics box door and connect the cables, perform the following steps:

1. Install the door on the electronics box. Refer to "Installing the Electronics Box Door" on page 2-12.

2. Close and lock the door on the electronics box. Refer to "Closing the Electronics Box Door" on page 2-12.

3. Connect the GPIO and CPU power cables as follows:

   a. Plug connector P1 through P5 on the left cabinet wall into the P1 through P5 connectors in the GPIO box. Figure 11-5 on page 11-8 shows the placement of the connectors.

b. If you have unplugged the P6 connector from the GPIO board, plug it back into the board next to the P5 connector.

c. Plug the CPU power cable (P71) into the Q6 connector.

> *Note:* The P71 connector was previously named P6. It was renamed to avoid confusion with the P6 connector referenced in step b.

Installing the Display Monitor Chassis

If you removed the display monitor, re-install it. Refer to "Installing the Display Monitor Chassis" on page 2-20.

If you did not remove the display monitor, plug the cable coming from the video controller board into the underside of the socket farthest to the right of the three sockets under the display monitor.

Calibrating the Touchscreen

Refer to "Calibrating the Touchscreen" on page 9-40.

Installing the Hopper Drawer

Refer to "Installing the Hopper Drawer" on page 2-10.

Verifying System Operation

To verify system operation, perform the following steps:

1. Flip the power switch for the slot machine to the On position. The Game Menu or a game icon animation is displayed.

2. Launch a game by touching an icon on the screen. If the game is displayed, installation is successful.

3. Close and lock the belly door. Refer to "Closing and Locking the Belly Door" on page 2-9.

4. Close the currency column door. Refer to "Closing and Locking the Currency Column Door" on page 2-9.

> *Warning:* If you moved the slot machine, be sure to degauss it after you return it to its location on the casino floor.

Replacing the Hard Disk

The replacement hard disk contains pre-loaded software. To access the hard disk, you must open the door to the electronics box.

> *Important:* Slot machines that are connected to a Wide Area Progressive System have a tamper-proof seal that prevents you from opening the door to the electronics box. Do not break the seal unless you are an authorized Silicon Gaming field engineer. To replace a component inside the electronics box, call 1-888-44-SLOTS.

Figure 11-28 on page 11-38 shows the location of the hard disk.

Figure 11-28   **Hard Disk in Lower Cavity**
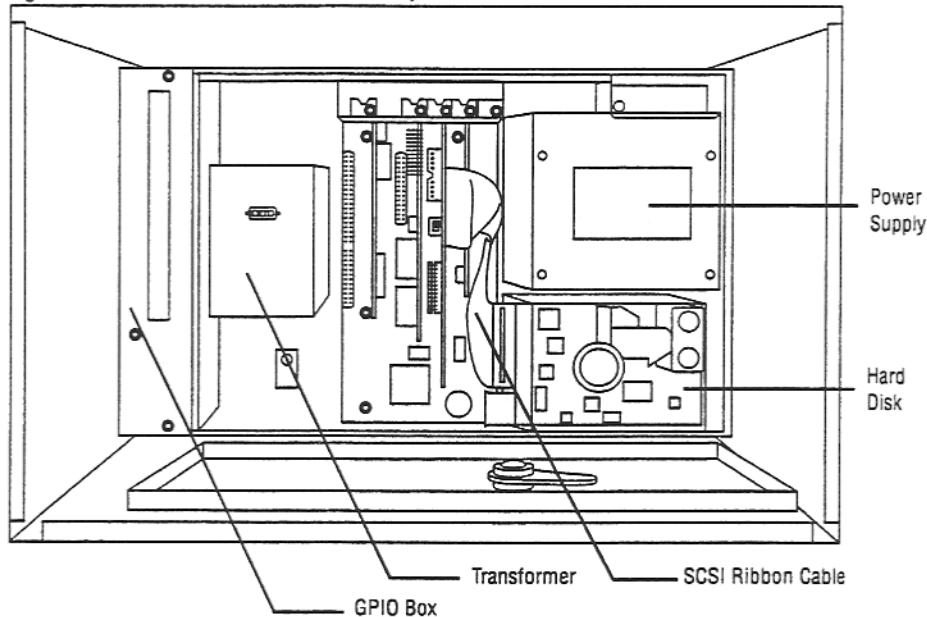
Power Supply

Hard Disk

Transformer   SCSI Ribbon Cable

GPIO Box

The following table is a summary of the sections in this procedure. If you are familiar with the procedure, you may prefer to read the text in the indicated sections only when necessary.

Replacing the Hard Disk
Removing the Hard Disk
"Removing the Hopper Drawer" on page 2-9
"Removing the Hard Disk from the Hard Disk Mount" on page 11-39
Installing the Hard Disk
"Installing the Hard Disk on the Hard Disk Mount" on page 11-40
"Installing the Hopper Drawer" on page 2-10
"Verifying System Operation" on page 11-40

Removing the Hard Disk

Before beginning the procedure, be sure to turn the power off.

To turn the power off, 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.

To remove the hard disk, you must remove the hopper drawer, disconnect the power cable and open the electronics box door.

Removing the Hopper Drawer

Refer to "Removing the Hopper Drawer" on page 2-9

Removing the Hard Disk from the Hard Disk Mount

To remove the hard disk, perform the following tasks:

1. Open the electronics door. Refer to "Opening the Electronics Box Door" on page 2-11.

2. Refer to Figure 11-28 on page 11-38 to locate the hard disk.

3. Disconnect the SCSI ribbon cable and power supply from the disk.

4. Loosen the captive screw above the upper-left corner of the hard disk, shown in Figure 11-29.

Figure 11-29   **Hard Disk and Captive Screw**
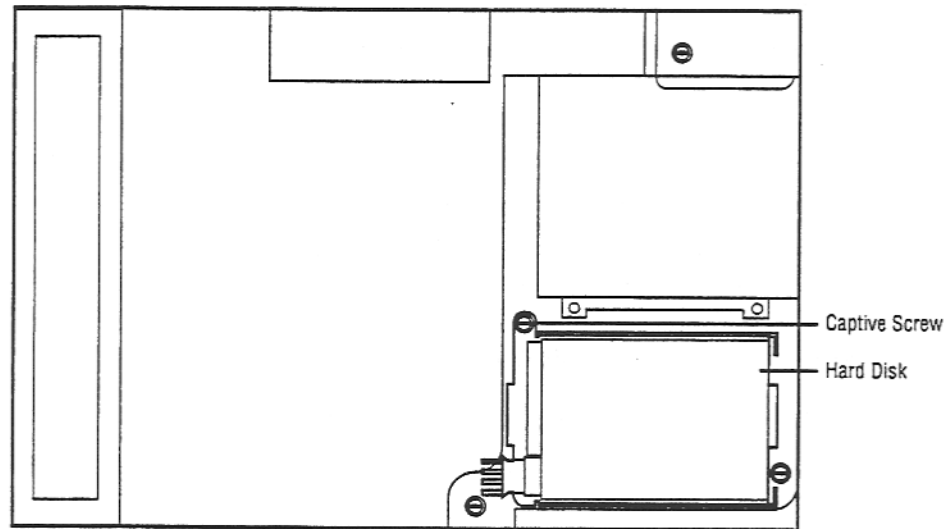
The disk contains a hook on the left edge of the back side of the drive and a tab on the right, as shown in Figure 11-30.

5. Slide the disk to the left to disengage the hook and the tab.

Figure 11-30   **Hard Disk Hook and Tab Locations**
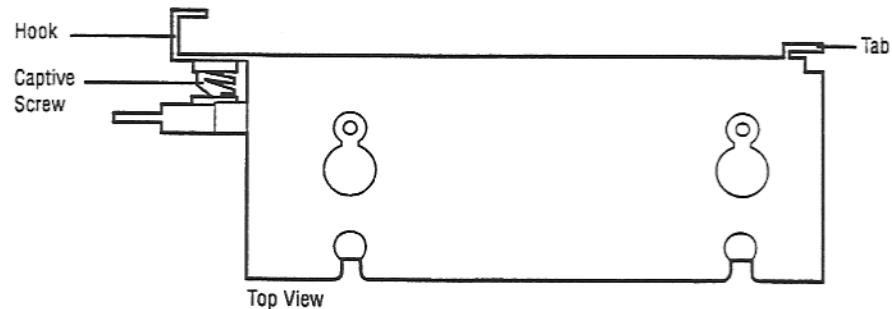
6. Pull the disk out of the electronics box.

7. Remove the disk from the hard disk mount by removing the two screws on top of the mount and the two on the bottom.

Installing the Hard Disk

After installing the hard disk, you must install the hopper drawer.

Installing the Hard Disk on the Hard Disk Mount

To install the hard disk, refer to Figure 11-29 on page 11-39 and perform the following steps:

1. Secure the disk to the hard disk mount with two screws on the top of the mount and two on the bottom.

2. Stand the drive up and push the drive into the lower-right corner of the electronics box.

3. Slide the drive to the right so that the hook and the tab each engage, holding the drive in place.

4. Secure the drive by tightening the captive screw, shown in Figure 11-29 on page 11-39.

5. Connect the SCSI ribbon cable and the power supply cable to the drive.

6. Close and lock the door on the electronics box. Refer to "Closing the Electronics Box Door" on page 2-12.

Installing the Hopper Drawer

To install the hopper drawer, perform the following steps:

1. Install the hopper drawer in the lower cavity. Refer to "Installing the Hopper Drawer" on page 2-10.

2. Close the belly door. Refer to "Closing and Locking the Belly Door" on page 2-9.

Verifying System Operation

To verify system operation, perform the following steps:

1. Flip the power switch for the slot machine to the On position. The Game Menu or game icon animation is displayed on the monitor.

2. Close the currency column door. Refer to "Closing and Locking the Currency Column Door" on page 2-9.

Replacing the Software Update Support (SWUS) Module

The SWUS is a component that allows you to update the software on the hard disk without removing the disk from the slot machine. Figure 11-31 shows the location of the SWUS inside the electronics box.

Figure 11-31   **SWUS in Electronics Box**
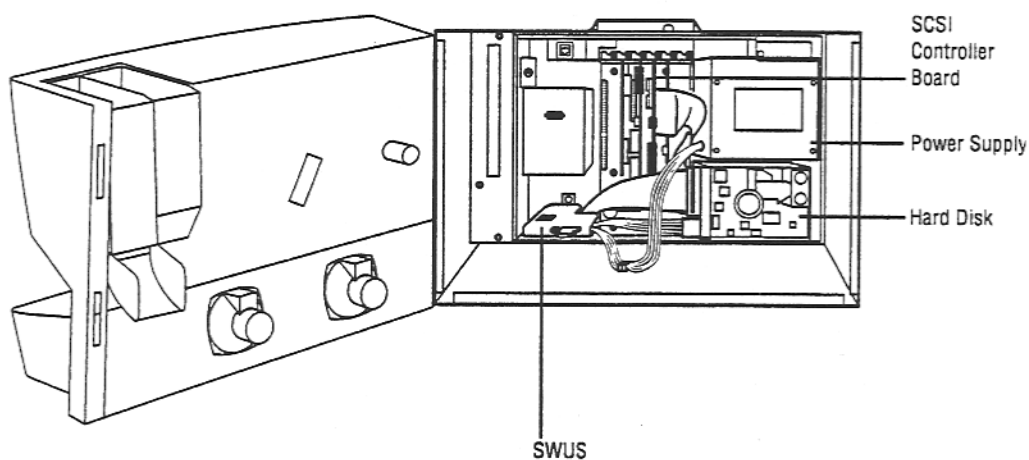
Important: Slot machines that are connected to a Wide Area Progressive System have a tamper-proof seal that prevents you from opening the door to the electronics box. Do not break the seal unless you are an authorized Silicon Gaming field engineer. To replace the SWUS, call 1-888-44-SLOTS.

This procedure describes how to install a SWUS in an electronics box that has no SWUS and also how to replace a defective SWUS.

The following table is a summary of the sections in this procedure. If you are familiar with the procedure, you may prefer to read the text in the indicated sections only when necessary.

Replacing the Software Update Support (SWUS) Module
Removing the SWUS
"Removing the Hopper Drawer" on page 2-9
"Removing the Electronics Box and Door" on page 11-42
"Disconnecting the Cables" on page 11-43
"Removing the Hard Disk Mount" on page 11-44
"Removing the SWUS from the Electronics Box" on page 11-44 *Note:* Perform only if no SWUS is currently in the machine
Installing the SWUS
"Installing the SWUS in the Electronics Box" on page 11-44
"Replacing the Write-Protect Jumper" on page 11-45
"Installing the Hard Disk and Hard Disk Mount" on page 11-45
"Connecting the Cables to the Power Supply and Hard Disk" on page 11-46
"Connecting the SCSI Cable" on page 11-46
"Setting the SWUS Switches" on page 11-46
"Verifying SWUS Operation" on page 11-47
Finishing Up
"Installing the Electronics Box Door and Door" on page 11-47
"Installing the Hopper Drawer" on page 2-10

Removing the SWUS

Before beginning the procedure, be sure to turn the power off.

To turn the power off, 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.

To access the screws that attach the SWUS to the electronics box, you must remove the electronics box. You must also remove the hopper drawer, electronics box door, and hard disk.

Removing the Hopper Drawer

Refer to "Removing the Hopper Drawer" on page 2-9.

Removing the Electronics Box and Door

Refer to "Removing the Electronics Box" on page 2-12 and "Removing the Electronics Box Door" on page 2-12.

Disconnecting the Cables

To disconnect the cables when a SWUS is installed, refer to Figure 11-32 and perform the following tasks:

1. Disconnect the power cable coming from the power supply by unplugging the end of the cable that goes to the SWUS.

2. Disconnect the 12V DC power cable coming from the hard disk by unplugging the end of the cable that goes to the hard disk.

3. Disconnect the SCSI ribbon cable from the following places:

   ♦ The SCSI controller board

   ♦ The hard disk

Figure 11-32   **Cable Connections When a SWUS Is Installed**
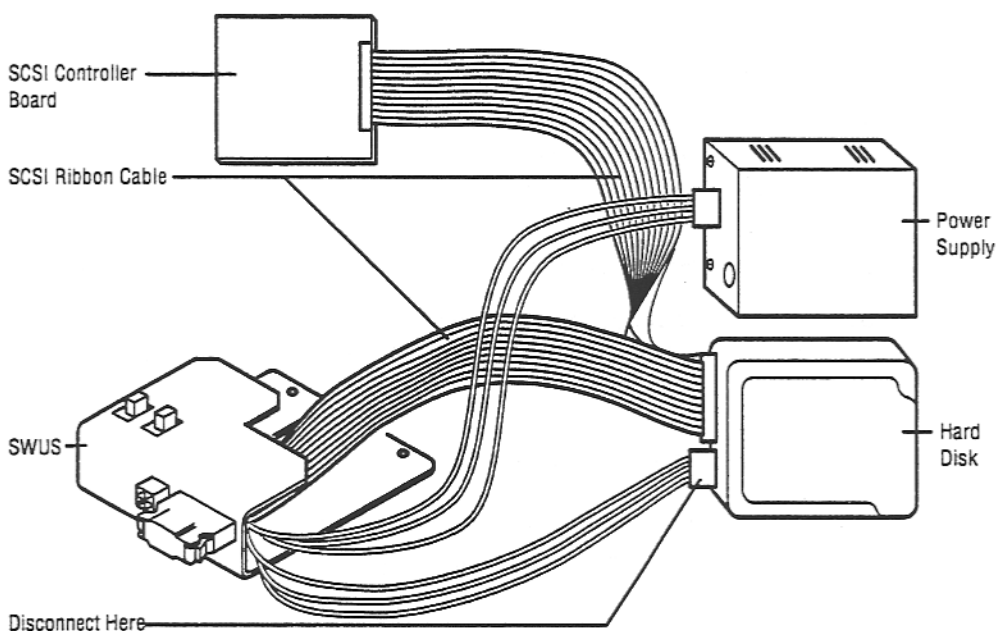
To disconnect the cables when no SWUS is installed, refer to Figure 11-33 on page 11-44 and perform the following steps:

1. Disconnect the 12V DC power cable coming from the power supply by disconnecting the end that goes to the hard disk.

2. Disconnect the SCSI ribbon cable from the SCSI controller board and from the hard drive.

Figure 11-33   Cable Connections When No SWUS Is Installed

Removing the Hard Disk

To access the write-protect jumper, you must remove the hard disk from the hard disk mount. Remove the disk from the mount by removing the two screws on the top of the mount and the two on the bottom.
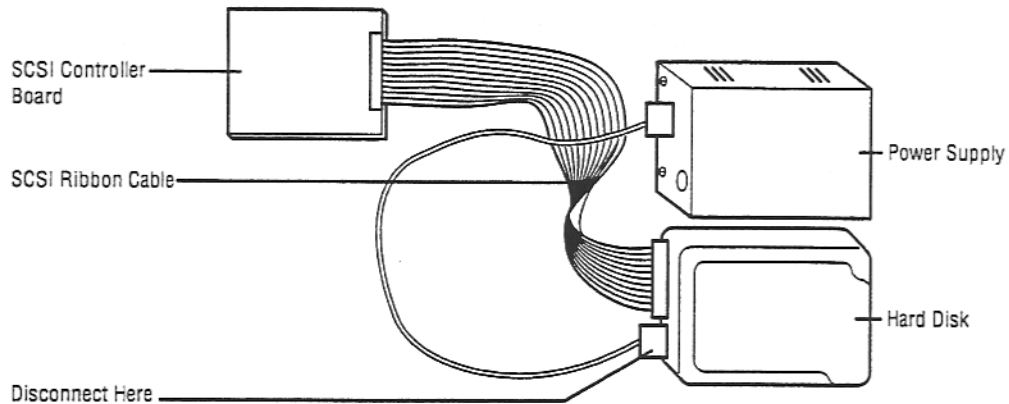
Removing the Hard Disk Mount

Remove the hard disk mount from the power supply mounting shelf by loosening the captive screw on the mount. The screw is to the left of the upper right corner of the disk.

Removing the SWUS from the Electronics Box

To remove the SWUS, perform the following steps:

1. If you are installing a SWUS in a machine that has none, remove the tie down that secures the cable bundle to the floor of the electronics box.

2. Remove the SWUS by removing the two screws that come through the bottom of the electronics box, as the box lies flat on a table.

Installing the SWUS

To install the SWUS, you must replace the write-protect jumper, connect the cables, install the hard disk and set the SWUS switches.

Installing the SWUS in the Electronics Box

To install the SWUS, perform the following steps:

1. Push aside the wires on the floor of the electronics box to make room for the SWUS.

2. Place the SWUS into the electronics box to the left of SCSI controller board, so that the legs of the SWUS touch the back wall of the electronics box. Figure 11-31 on page 11-41 shows the position.

Important: Be careful not to cut or pinch any wiring. Also, ensure that the SCSI terminator does not prevent the door to the electronics box from closing.

3. Insert two screws from the bottom side of the electronics box (as it lies flat), into the pem nuts in the SWUS, securing the SWUS to the floor of the electronics box. Figure 11-34 shows the pem nuts.

4. Thread the wires in the electronics box through the SWUS. See Figure 11-34.

Figure 11-34 **SWUS**
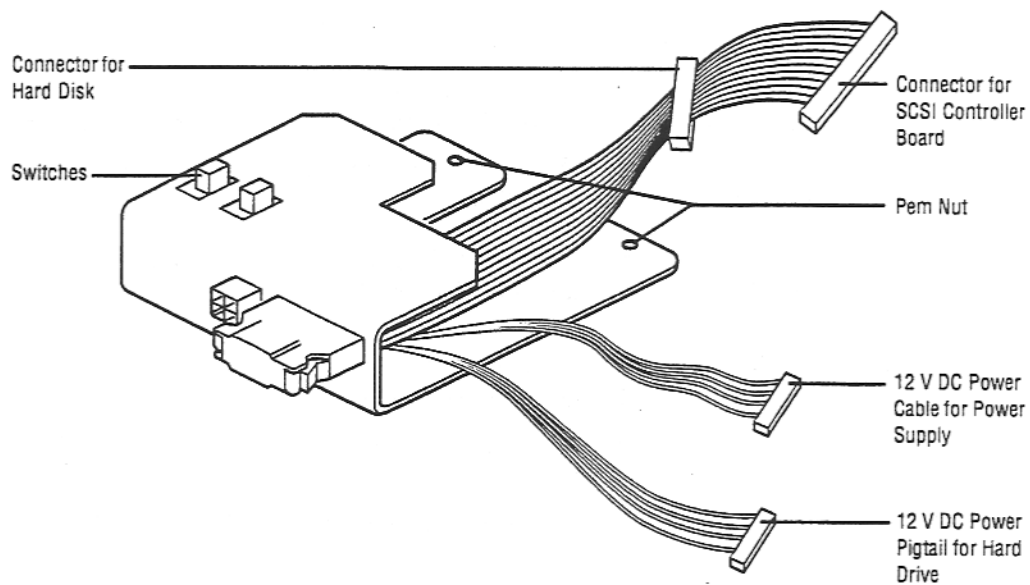
Replacing the Write-Protect Jumper

To replace the write-protect jumper on the hard disk, perform the following steps:

1. Remove the write-protect jumper from the hard disk, being careful to note which pins the jumper is on.

    Tip: On a Barracuda hard disk, the write-protect jumper is on the left side of the disk, near the power connector. On a Quantum hard disk, it is on the back side of the disk.

2. Insert the two-wire lead (coming from the SWUS) onto the pins vacated by the jumper.

    Important: Be sure the lead is on the correct pins.

Installing the Hard Disk and Hard Disk Mount

To install the hard disk, perform the following steps:

1. Attach the hard disk to the hard disk mount with two screws on the top of the mount and two on the bottom.

    Important: Be careful not to disconnect the new write-protect lead coming from the SWUS.

2.   Attach the hard disk mount to the power supply mounting shelf by tightening the captive screw above the upper-left corner of the hard disk.

Connecting the Cables to the Power Supply and Hard Disk

To connect the cables when you are replacing a SWUS, refer to Figure 11-32 on page 11-43, Figure 11-33 on page 11-44, and Figure 11-34 on page 11-45, and perform the following steps:

1.   Plug the 12V DC power cable (in the power supply harness) into the shortest power cable coming from the SWUS.

> Tip: The connector on the wire bundle that contains the 12V DC power cable (coming from the power supply) is close to the SWUS power connector.

2.   Plug the 12V DC power cable (coming from the hard disk) into the longer 12V DC power cable coming from the SWUS.

To connect the cables when you are installing a SWUS in a machine that has none, refer to Figure 11-32 on page 11-43 and Figure 11-34 on page 11-45, and perform the following steps:

1.   Take the 12V DC power cable (coming from the power supply) and plug it into the shortest power cable coming from the SWUS.

> Note: This is the cable that was originally plugged into the hard disk.

2.   Plug the longest 12V DC power cable coming from the SWUS into the connector on the hard disk.

Connecting the SCSI Cable

The SWUS comes with its own SCSI cable.

To connect the SCSI cable coming from the SWUS, refer to Figure 11-34 on page 11-45, and perform the following steps:

1.   Plug the middle connector into the connector in the top-left corner of the hard disk.

2.   Plug the free end into the SCSI board.

3.   Tuck all wires away from the door to the electronics box door so they will not be pinched when the door is shut.

Setting the SWUS Switches

Set the SWUS switches by pushing them toward the back of the electronics box. This setting is the write-protected/internal power setting or normal operating position for the Odyssey slot machine.

> Note: To use the SWUS for a software upgrade, the switches must be set forward to a write-enabled/external powered position.

Verifying SWUS Operation

SGI field service personnel can verify SWUS operation by performing a software upgrade. Refer to the *ServicePoint User's Guide*.

Finishing Up

Finish up by installing the electronics box door, the electronics box, and the hopper drawer.

Installing the Electronics Box Door and Door

Refer to "Installing the Electronics Box" on page 2-15, "Installing the Electronics Box Door" on page 2-12, and "Closing the Electronics Box Door" on page 2-12.

Installing the Hopper Drawer

To install the hopper drawer, perform the following steps:

1. Refer to "Installing the Hopper Drawer" on page 2-10.

2. Close the belly door. Refer to "Closing and Locking the Belly Door" on page 2-9.

3. Close the currency column door. Refer to "Closing and Locking the Currency Column Door" on page 2-9.

Replacing the Power Fuse

The power fuse is below the power switch.

The following table is a summary of the sections in this procedure. If you are familiar with the procedure, you may prefer to read the text in the indicated sections only when necessary.

Replacing the Power Fuse
"Removing and Installing the Fuse" on page 11-47
"Verifying Power Fuse Operation" on page 11-48

Removing and Installing the Fuse

Before beginning the procedure, be sure to turn the power off.

To turn the power off, 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.

To replace a power fuse, perform the following steps:

1. Remove the fuse from the fuseholder, located just below the power switch.

   ◆ *Warning:* For continued protection against risk of fire, replace the fuse only with a 250 V 50/60 Hz 5-amp fuse.

2. Insert the new fuse into the fuseholder.

Verifying Power Fuse Operation

To verify power fuse operation, perform the following steps:

1. Flip the power switch for the slot machine to the On position.

2. Verify that the system boots and that a picture is displayed on the monitor.

3. Close the currency column door. Turn the door key counter-clockwise until it stops and remove the key.

Replacing the Transformer

The transformer converts currents and voltages in the slot machine circuits. To access the transformer, you must open the door to the electronics box.

🖉 *Important:* Slot machines that are connected to a Wide Area Progressive System have a tamper-proof seal that prevents you from opening the door to the electronics box. Do not break the seal unless you are an authorized Silicon Gaming field engineer. To replace a component inside the electronics box, call 1-888-44-SLOTS.

See Figure 11-3 on page 11-5 for the location of the transformer.

The following table is a summary of the sections in this procedure. If you are familiar with the procedure, you may prefer to read the text in the indicated sections only when necessary.

Replacing the Transformer
Removing the Transformer
"Removing the Hopper Drawer" on page 2-9
"Disconnecting the AC Power Supply" on page 11-49
"Removing the Transformer Cover" on page 11-50
"Removing the Ground Lugs and Transformer" on page 11-50
Installing the Transformer
"Installing the Ground Lugs and Transformer" on page 11-51
"Installing the Transformer Cover" on page 11-52
"Connecting the AC Power Supply" on page 11-52
"Installing the Hopper Drawer" on page 2-10
"Verifying Transformer Operation" on page 11-52

Removing the Transformer

Before beginning the procedure, be sure to turn the power off.

To turn the power off, 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.

To remove the transformer, you must remove the hopper drawer, disconnect the power supply, and remove the transformer cover and ground lugs.

Removing the Hopper Drawer

Refer to "Removing the Hopper Drawer" on page 2-9.

Disconnecting the AC Power Supply

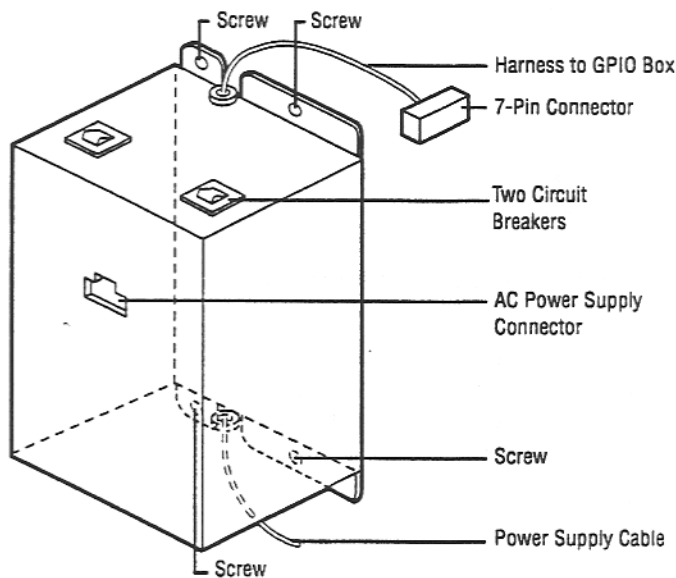Unplug the AC power supply harness from the AC power supply connector shown in Figure 11-35.

   ◆ *Warning:* Failure to unplug the AC power supply connector before removing the transformer can cause personal injury and damage to equipment.

Figure 11-35   **Transformer Cover**

Removing the Transformer Cover

To remove the transformer cover, perform the following steps:

1. Remove the door to the electronics box. Refer to "Removing the Electronics Box Door" on page 2-12.

2. Free the transformer cover from the electronics box as follows:

   a. Remove the four screws securing the transformer cover to the electronics box. Figure 11-35 on page 11-49 shows the screw locations.

   b. Loosen the transformer cover from the electronics box.

   c. Figure 11-35 on page 11-49 shows the AC power supply connector on the front of the transformer cover. Push the connector through the hole so it is free from the cover.

   d. Remove the transformer cover from the electronics box.

Removing the Ground Lugs and Transformer

1. Figure 11-36 shows the locations of the two ground lugs for the green wires. The green wire on the top of the transformer is part of the GPIO harness. The green wire on the bottom of the transformer goes to the power supply.

   Disconnect the two ground lugs from the ground lug posts.

Figure 11-36   **Top of Transformer**
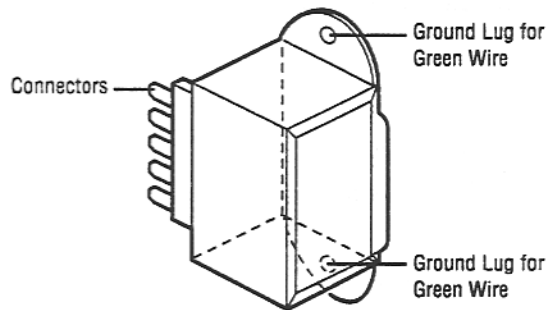
2. Using a 5/16" nut driver, remove the two nuts that secure the transformer to the electronics box.

3. On the left side of the transformer are two sets of connectors: five on top and five on the bottom. The view of the transformer shown in Figure 11-36 indicates the five connectors aligned on the top. The connectors on top are 6 through 10. The connectors on the bottom are 1 through 5.

The following table shows the colors of the wires for each connector.

Connector Location	Connector	Wire Color
Bottom	1	White
	2	-
	3	-
	4	-
	5	Black
Top	6	Red
	7	Black
	8	Yellow
	9	Orange
	10	Violet

Unplug connectors 1 and 5 from the bottom of the transformer and connectors 6 through 10 from the top of the transformer.

4. Save the harnesses for the transformer installation procedure.

Installing the Transformer

⬦ *Warning:* Correct wiring of the transformer is crucial. Incorrect wiring can cause personal injury and damage to the GPIO board.

Installing the Ground Lugs and Transformer

To install the ground lugs and transformer, perform the following steps:

1. Ensure the slot machine is still unplugged from the wall.

2. Place the transformer on the two screws protruding from the back of the electronics box, ensuring the connectors on the transformer are on the left. Secure the transformer to the electronics box, using two nuts and a 5/16" nut driver.

3. Refer to Figure 11-36 on page 11-50 and install the ground lugs as follows:

   a. Using a nut and a 5/16" nut driver, secure the ground lug on the green wire in the GPIO harness to the ground post on the top of the transformer.

   b. Using a nut and a 5/16" nut driver, secure the ground lug on the green wire coming from the power supply to the ground post on the bottom of the transformer.

4. Place your hand inside the transformer cover and push the AC power supply connector into the hole in the cover, keeping the connector tab pointing up. See Figure 11-35 on page 11-49. Ensure that the connector is secure in the cover.

5. Plug connectors 1 and 5 and 6 through 10 into the transformer, as indicated in the table that follows.

Connector Location	Connector	Wire Color
Bottom	1	White
	2	-
	3	-
	4	-
	5	Black
Top	6	Red
	7	Black
	8	Yellow
	9	Orange
	10	Violet

Installing the Transformer Cover

Place the transformer cover over the transformer, ensuring the black power supply cable and the harness to the GPIO box are between the screw tabs on the transformer, as shown in Figure 11-35 on page 11-49.

Connecting the AC Power Supply

Plug the AC power harness into the AC power supply connector shown in Figure 11-35 on page 11-49.

Installing the Hopper Drawer

To install the hopper drawer, perform the following steps:

1. Install the door on the electronics box. Refer to "Installing the Electronics Box Door" on page 2-12.

2. Close and lock the door on the electronics box. Refer to "Closing the Electronics Box Door" on page 2-12.

3. Install the hopper drawer in the lower cavity. Refer to "Installing the Hopper Drawer" on page 2-10.

Verifying Transformer Operation

To verify transformer operation, perform the following steps:

1. Check and recheck the wiring. Flip the power switch for the slot machine to the On position. The Game Menu is displayed on the monitor.

2. Close the belly door. Refer to "Closing and Locking the Belly Door" on page 2-9.

3. Close the currency column door. Refer to "Closing and Locking the Currency Column Door" on page 2-9.

Replacing a Circuit Breaker

The circuit breakers are located on the red and yellow wires on the transformer. To access them, you must open the door to the electronics box.

Important: Slot machines that are connected to a Wide Area Progressive System have a tamper-proof seal that prevents you from opening the door to the electronics box. Do not break the seal unless you are an authorized Silicon Gaming field engineer. To replace a component inside the electronics box, call 1-888-44-SLOTS.

The following table is a summary of the sections in this procedure. If you are familiar with the procedure, you may prefer to read the text in the indicated sections only when necessary.

Replacing a Circuit Breaker
Removing a Circuit Breaker
"Removing the Hopper Drawer" on page 2-9
"Disconnecting the AC Power Supply" on page 11-53
"Removing the Transformer Cover" on page 11-50
"Removing the Circuit Breaker from the Transformer" on page 11-54
Installing a Circuit Breaker
"Installing the Circuit Breaker in the Transformer" on page 11-54
"Installing the Transformer Cover" on page 11-55
"Connecting the AC Power Supply" on page 11-55
"Installing the Hopper Drawer" on page 2-10
"Verifying Circuit Breaker Operation" on page 11-55

Removing a Circuit Breaker

Before beginning the procedure, be sure to turn the power off.

To turn the power off, 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.

To remove a circuit breaker, you must remove the hopper drawer, disconnect the power supply, and remove the transformer cover.

Removing the Hopper Drawer

To remove the Hopper Drawer, perform the following steps:

Refer to "Removing the Hopper Drawer" on page 2-9.

Disconnecting the AC Power Supply

Unplug the AC power supply harness from the AC power supply connector shown in Figure 11-35 on page 11-49.

◊ *Warning:* Failure to unplug the AC power supply connector before removing the transformer can cause personal injury and damage to equipment.
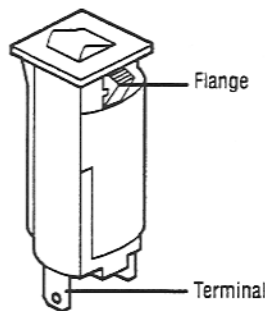
Removing the Transformer Cover

Refer to "Removing the Transformer Cover" on page 11-50.

Removing the Circuit Breaker from the Transformer

To remove the circuit breaker, perform the following steps:

1. Figure 11-36 on page 11-50 shows the locations of the circuit breakers on top of the transformer. Remove the two red wires from the terminals of one circuit breaker and the two yellow wires from the terminals of the other circuit breaker.

2. Remove each of the two circuit breakers from the transformer cover as follows:

    a. Place your hand inside the transformer cover and push in the two flanges on each side of the circuit breaker. Figure 11-37 shows the flanges.

    Figure 11-37   **Circuit Breaker**

    b. Push the circuit breaker through the top of the transformer cover and remove it from the cover.

Installing a Circuit Breaker

After installing the circuit breaker, you must install the transformer cover, power supply, and hopper drawer.

Installing the Circuit Breaker in the Transformer

To install a circuit breaker, perform the following steps:

1. One circuit breaker breaks the circuit in the red wire and the other breaks the circuit in the yellow wire. Slip the quick connects on the two red wires over the two terminals of one circuit breaker and slip the quick connects on the two yellow wires over the terminals of the other circuit breaker.

2. Push each circuit breaker through one of the two holes in the transformer cover until it stops and is secure in the cover.

3. Place your hand inside the transformer cover and push the AC power supply connector into the hole in the cover, keeping the connector tab pointing up, as shown in Figure 11-35 on page 11-49. Ensure that the connector is secure in the cover.

Installing the Transformer Cover

Place the transformer cover over the transformer, ensuring the black power supply cable and the harness to the GPIO box are between the screw tabs on the transformer, as shown in Figure 11-35 on page 11-49.

Connecting the AC Power Supply

Plug the AC power supply harness into the AC power supply connector shown in Figure 11-35 on page 11-49.

Installing the Hopper Drawer

To install the hopper drawer, perform the following steps:

1. Install the door on the electronics box. Refer to "Installing the Electronics Box Door" on page 2-12.

2. Close and lock the door on the electronics box. Refer to "Closing the Electronics Box Door" on page 2-12.

3. Install the hopper drawer in the lower cavity. Refer to "Installing the Hopper Drawer" on page 2-10.

Verifying Circuit Breaker Operation

To verify circuit breaker operation, perform the following steps:

1. Flip the power switch for the slot machine to the On position. The Game Menu or a game icon animation is displayed on the monitor.

2. Close the belly door. Refer to "Closing and Locking the Belly Door" on page 2-9.

3. Close the currency column door. Refer to "Closing and Locking the Currency Column Door" on page 2-9.

Replacing the Power Supply

Figure 11-38 shows the location of the power supply. To access it, you must open the door to the electronics box.

Figure 11-38   **Power Supply in Lower Cavity**
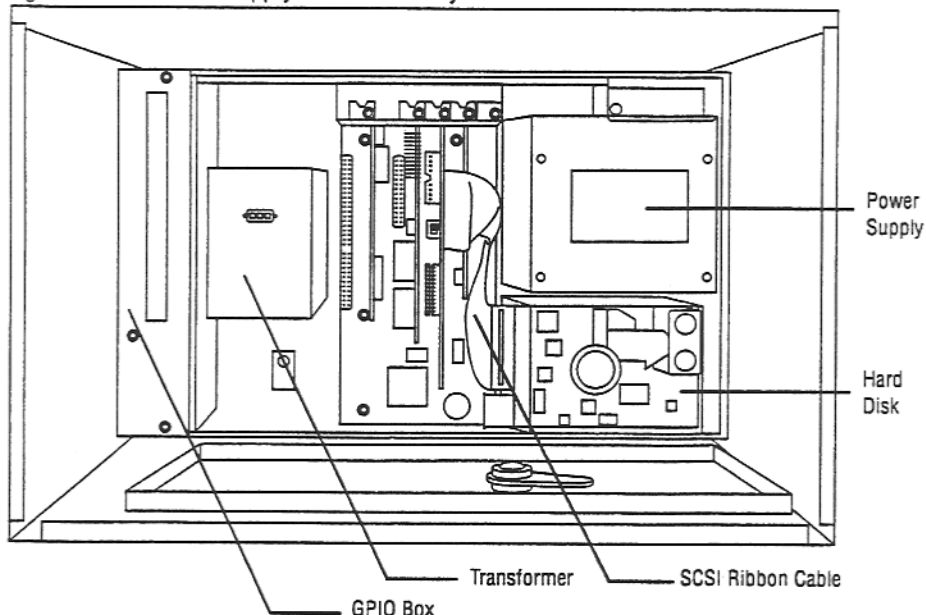
Important: Slot machines that are connected to a Wide Area Progressive System have a tamper-proof seal that prevents you from opening the door to the electronics box. Do not break the seal unless you are an authorized Silicon Gaming field engineer. To replace a component inside the electronics box, call 1-888-44-SLOTS.

The following table is a summary of the sections in this procedure. If you are familiar with the procedure, you may prefer to read the text in the indicated sections only when necessary.

Replacing the Power Supply
Removing the Power Supply
"Removing the Hopper Drawer" on page 2-9
"Removing the Electronics Box Door" on page 2-12
"Removing the Hard Disk from the Hard Disk Mount" on page 11-39
"Removing the Mounting Shelf and the Power Supply" on page 11-57
Installing the Power Supply
"Installing the Mounting Shelf and Power Supply" on page 11-58
"Installing the Hard Disk on the Hard Disk Mount" on page 11-40
"Installing the Electronics Box Door" on page 2-12
"Installing the Hopper Drawer" on page 2-10
"Verifying System Operation" on page 11-59

Removing the Power Supply

Before beginning the procedure, be sure to turn the power off.

To turn the power off, 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.

To remove the power supply, you must remove the hopper drawer, display monitor chassis, and the electronics box.

Removing the Hopper Drawer

Refer to "Removing the Hopper Drawer" on page 2-9.

Removing the Electronics Box Door

Refer to "Removing the Electronics Box Door" on page 2-12.

Removing the Hard Disk Mount

Refer to "Removing the Hard Disk from the Hard Disk Mount" on page 11-39.

Removing the Mounting Shelf and the Power Supply

To remove the mounting shelf and power supply, perform the following steps:

1. To remove the power supply mounting shelf from the electronics box, refer to Figure 11-39 and loosen captive screws A, B, and C.

   Figure 11-39   **Screws Securing Mounting Shelf to Electronics Box**
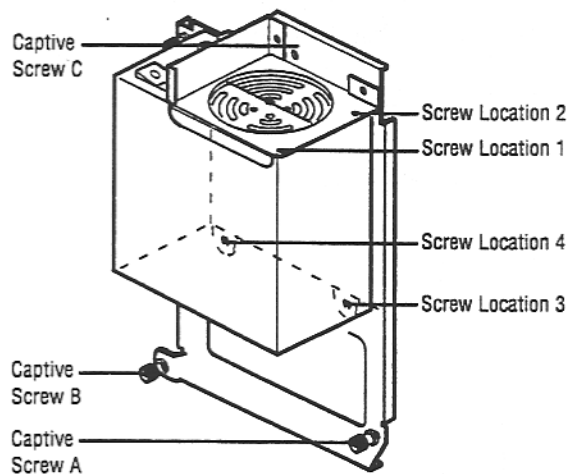
2. Disconnect the power supply's 4-pin cable that connects to the GPIO box.

3. Disconnect the black 110-volt AC power cable (coming from the transformer) from the power supply.

4. Disconnect the power cables connected to the J5M1 connector on the motherboard.

5. To remove the power supply from the mounting shelf, refer to Figure 11-39 on page 11-57 and perform the following steps:

   a. Remove screws 1 through 4.

      Note: Screw 3 may be missing.

   b. Pull the power supply from the mounting shelf.

Installing the Power Supply

Important: Before mounting the new power supply, verify that its 115/220 V switch is set for the AC line voltage of the casino and that its power switch is turned on. (The power switch is not easily accessible once the power supply is installed.)

Installing the Mounting Shelf and Power Supply

To connect the cables and install the power supply, perform the following steps:

1. Refer to Figure 11-39 on page 11-57 and align screw holes 1 through 4 in the power supply with those in the power supply mounting shelf.

2. Secure the power supply to the shelf, using screws in screw locations 1 through 4.

   The revision letter of the electronics box and the brand of the motherboard determine whether to secure the power supply to the shelf at screw location 3.

   Check the sticker on the transformer to determine the revision of the electronics box. Figure 11-38 on page 11-56 shows the location of the transformer.

   If the revision is M or greater, do not insert a screw at screw location 3. For revisions less than M, you must identify wheather the machine is using a Tuscon or Thor motherboard. To identify whether the electronics box contains a Thor or a Tucson motherboard, refer to Figure 11-40. A Thor motherboard has the battery in the lower left corner of the board. A Tucson mother board has the battery in the middle of the lower edge.

Figure 11-40   **Battery Location on Thor and Tucson Motherboards**
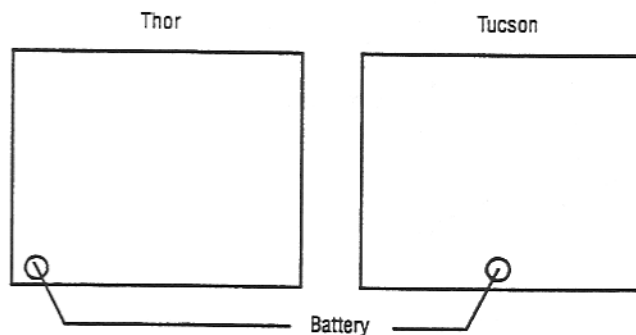
If the revision is less than M and the electronics box contains a Thor motherboard, secure the power supply to the mounting shelf with a screw at location 3.

If the revision is less than M and the electronics box contains a Tucson motherboard, do not insert a screw at screw location 3. If you find a pem nut at screw location 3, remove it as follows: From the underside of the mounting shelf, insert a #8-32 x 1/2" machine screw into the pem nut and screw it in a few turns. Using a pair of vise grips, remove the nut with a bending motion.

Important: Removal of the pem nut will keep it from rubbing against the Tucson motherboard.

3. Connect the motherboard power connector to the J5M1 connector on the motherboard.

4. Connect the black 110-volt AC power cable (coming from the transformer) to the power supply.

5. Attach the power supply shelf to the electronics box by aligning the captive screws A through C, shown in Figure 11-39 on page 11-57, with those in the electronics box and securing the shelf to the box.

6. Connect the power supply's 4-pin cable to the GPIO box via the 4-pin D-shell connector that extends from J12 of the GPIO box.

Installing the Hard Disk Mount

Refer to "Installing the Hard Disk on the Hard Disk Mount" on page 11-40.

Installing the Electronics Box Door

Refer to "Installing the Electronics Box Door" on page 2-12.

Installing the Hopper Drawer

Refer to "Installing the Hopper Drawer" on page 2-10.

Verifying System Operation

To verify system operation, perform the following steps:

1. Flip the power switch for the slot machine to the On position. The Game Menu is displayed on the monitor.

2. Close the currency column door. Refer to "Closing and Locking the Currency Column Door" on page 2-9.

Replacing the Audio Amplifier Board

The audio amplifier board amplifies the sound generated by the signal sent from the motherboard. If a GPIO I system is installed in the GPIO box, then the audio amplifier board is attached to the back wall of the cabinet, inside the display cavity. To replace it, you must remove several assemblies, including the display monitor and chassis. You may want to move the slot machine from the casino floor. To move the machine, you need a dolly and help from another person.

If a GPIO II system is installed, the audio amplifier is attached to the GPIO backplane board inside the GPIO box.

This procedure shows you how to determine the location of the audio amplifier and how to replace it.

The following table is a summary of the sections in this procedure. Perform those sections indicated for the GPIO system installed in the machine. If you are familiar with the procedure, you may prefer to read the text in the indicated sections only when necessary.

Replacing the Audio Amplifier Board	If GPIO I Is Installed	If GPIO II Is Installed
Removing the Audio Amplifier Board		
"Removing the Hopper Drawer" on page 2-9	X	X
"Removing the GPIO Backplane" on page 11-61		X
"Removing the Display Monitor Chassis" on page 2-16	X	
"Removing the Audio Amplifier Board from the Cabinet Wall" on page 11-62	X	
Installing the Audio Amplifier Board		
"Installing the GPIO Backplane and GPIO Cover" on page 11-63		X
"Installing the Audio Amplifier Board on the Cabinet Wall" on page 11-63	X	
"Installing the Display Monitor Chassis" on page 2-20	X	
"Installing the Hopper Drawer" on page 2-10	X	X
Verifying Audio System Operation		
"Testing the Audio System" on page 11-64	X	X
"Degaussing the Display Monitor" on page 2-22	X	X

Removing the Audio Amplifier Board

Before beginning the procedure, be sure to turn the power off.

To turn the power off, 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.

Removing the Hopper Drawer

To determine whether GPIO I or GPIO II boards are installed in the machine, you must remove the hopper drawer.

To remove the drawer and determine the type of GPIO board, perform the following steps:

1. Refer to "Removing the Hopper Drawer" on page 2-9.

2. Refer to Figure 11-41 on page 11-61 to find the GPIO box and determine whether it has a handle. If it does, the audio amplifier board is inside the GPIO box on the GPIO backplane. Proceed to "Removing the GPIO Backplane" on page 11-61.

3. If the GPIO box has no handle, the audio amplifier board is on the back wall of the display cavity. Proceed to "Removing the Display Monitor Chassis" on page 11-62.

Figure 11-41   **Location of GPIO Box in Electronics Box**
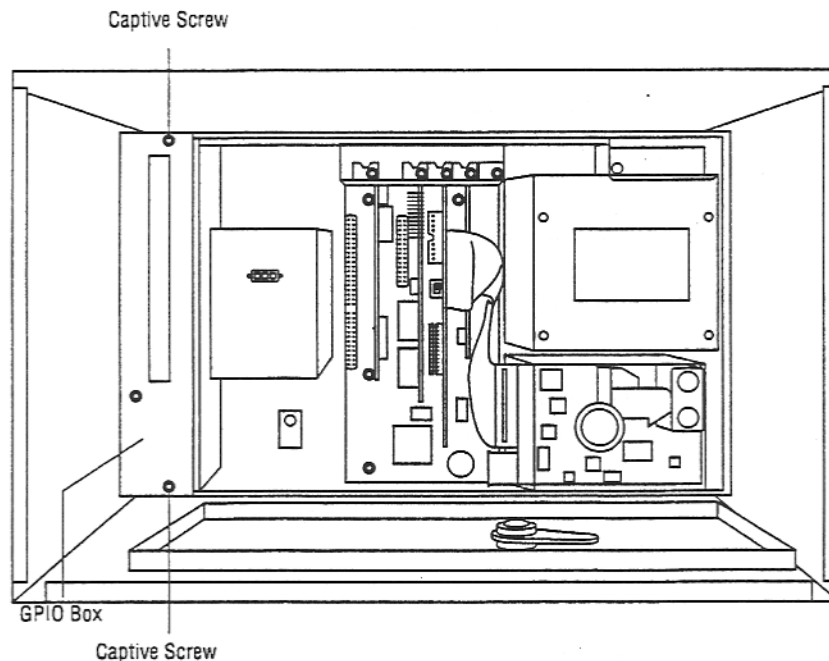

Removing the GPIO Backplane

To remove the GPIO backplane, refer to Figure 11-42 on page 11-62 and perform the following steps:

1. Unplug the five connectors, J3 through J7, from the board.

2. Remove the nine screws securing the board to the standoffs.

3. Remove the two screws securing the audio amplifier board to the side of the electronics box.

4. Lift the board from the electronics box.

5. Proceed to "Installing the Audio Amplifier Board" on page 11-62.

Figure 11-42   GPIO Backplane
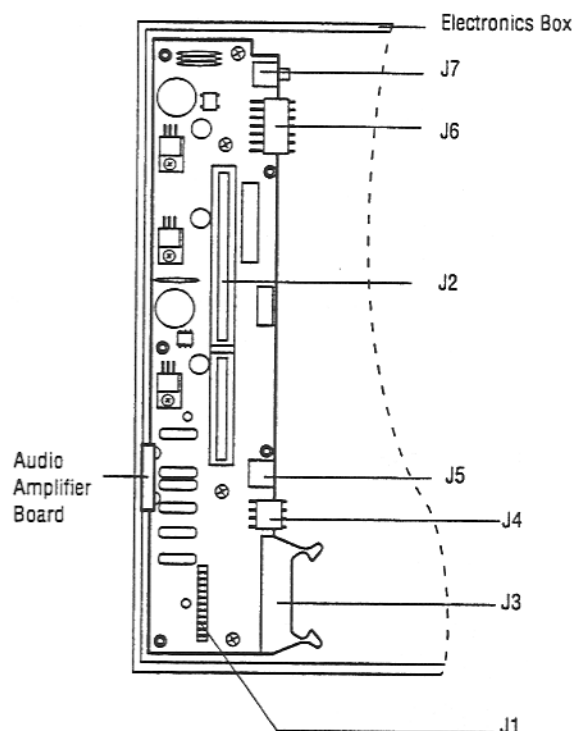
Removing the Display Monitor Chassis

To remove the display monitor chassis, perform the following tasks:

1. Recruit someone to help move the slot machine. Unplug the machine from the wall. Using a dolly, move the machine to a service area away from the casino floor.

2. To access the audio amplifier board, you must remove the coin guard and the display monitor chassis. Refer to "Removing the Display Monitor Chassis" on page 2-16.

Removing the Audio Amplifier Board from the Cabinet Wall

To remove the audio amplifier board, perform the following steps:

1. Disconnect the wiring cable connected to the audio amplifier board and the wiring cable going to the speaker.

2. Remove the four mounting screws securing the audio board to the back wall of the cabinet.

3. Remove the board from the wall.

Installing the Audio Amplifier Board

If the audio amplifier board was inside the GPIO box, proceed to "Installing the GPIO Backplane and GPIO Cover" on page 11-63. Otherwise, proceed to "Installing the Audio Amplifier Board on the Cabinet Wall" on page 11-63.

Installing the GPIO Backplane and GPIO Cover

To install the GPIO II boards, refer to Figure 11-42 on page 11-62 and perform the following steps:

1. Place the board in the electronics box so it lies on the floor of the box and the audio amplifier board is against the side wall of the electronics box.

2. Secure the board to the standoffs in the electronics box, using nine screws.

3. Secure the audio amplifier board to the side of the electronics box, using two screws.

4. Plug in the following connectors:

   a. Plug the ribbon cable from the motherboard into J3.

   b. Plug the 4-pin CPU power supply connector into J4.

   c. Plug the reset cable from the motherboard into J5.

   d. Plug the 7-pin AC power connector from the transformer into J6.

   e. Plug the audio/phono jack into J7.

To install the GPIO box cover, perform the following steps:

1. Align the six screw holes in the board to the standoffs in the box cover, making sure the P1 through P6 connectors come through the cover.

2. Secure the GPIO logic board to the cover, using six screws.

3. Align the teeth of the GPIO logic board with the J2 connector in the GPIO backplane.

4. Place the cover over the top and bottom edges of the electronics box so that the cover rests in the guides in the walls of the electronics box.

5. Push down on the cover until it snaps in place.

6. Tighten the two captive screws in the GPIO box cover.

7. Proceed to "Installing the Hopper Drawer" on page 11-63.

Installing the Audio Amplifier Board on the Cabinet Wall

To install the audio amplifier board, perform the following steps:

1. Align the replacement audio amplifier board with its mounting holes on the inside wall of the display cavity and secure it to the wall, using four screws.

2. Connect the cable to the audio amplifier board and the cable going to the speaker. The connectors are on the right end of the board. Plug in the 4-pin connector above the 6-pin connector.

Installing the Display Monitor Chassis

Refer to "Installing the Display Monitor Chassis" on page 2-20.

Installing the Hopper Drawer

Refer to "Installing the Hopper Drawer" on page 2-10.

Verifying Audio System Operation

Next you must test the audio system and degauss the display monitor.

Testing the Audio System

To verify audio system operation, perform the following steps:

1. Invoke the MMS and access the MMS **Diagnostics** page. Refer to "Invoking the MMS" on page 2-23.

2. Touch the *Test Audio* button.

3. When you hear the brief sound of a voice, adjust the volume by touching the round button below the *Test Audio* button and dragging it to the right and to the left. Verify clear sound.

   Note: Adjusting the volume in this way has no effect on the normal audio volume produced by the machine. To change the audio volume setting for the machine, see "Setting the Volume" on page 4-7.

4. Exit the MMS. Refer to "Exiting the MMS" on page 2-25.

5. Close the display cavity bezel. Refer to "Closing the Display Cavity Bezel" on page 2-9.

6. Close the currency column door. Refer to "Opening the Currency Column Door" on page 2-8.

Degaussing the Display Monitor

If you moved the slot machine from the casino floor, return it to its location and degauss the display monitor, as described in "Degaussing the Display Monitor" on page 2-22.

Replacing the Top Cap Speaker

Two speakers are on the back of the belly door and a third is outside and on top of the display cavity, below the service candle lamps.

This procedure describes replacement of the speaker on top of the display cavity. For information on replacing the speakers on the back of the belly door, see "Replacing a Belly Door Speaker" on page 11-67.

The following table is a summary of the sections in this procedure. If you are familiar with the procedure, you may prefer to read the text in the indicated sections only when necessary.

Removing the Top Cap Speaker

Before beginning the procedure, be sure to turn the power off.

To turn the power off, 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.

To remove the top cap speaker, you must remove the candle lens cover, the top cap, and the speaker enclosure.

Removing the Candle Lens Cover

To remove the candle lens cover from the candle lens, remove the single screw at the top of the lens cover; then remove the cover.

Removing the Top Cap

Refer to "Removing the Top Cap" on page 2-16.

Removing the Speaker Enclosure and Speaker

To remove the speaker enclosure and speaker from the top of the machine, perform the following steps:

1. Open the currency column door. Refer to "Opening the Currency Column Door" on page 2-8.

2. To access the inside of the service candle, open the display cavity bezel. Refer to "Opening the Display Cavity Bezel" on page 2-9. The audio speaker is mounted below the candle lamp assembly.

3. Remove the speaker enclosure by removing the two screws that fasten the enclosure to the top cap.

4. The speaker harness extension is an orange and green cable that has two lugs on one end. Remove the small harness lug from the negative tab on the speaker and the large harness lug from the positive tab on the speaker.

5. Remove the four screws surrounding the speaker hole in the speaker enclosure.

6. Remove the speaker.

Installing the Top Cap Speaker

Next, you install the speaker, the speaker enclosure, top cap, and candle lens cover.

Installing the Speaker and Speaker Enclosure

To install the speaker and speaker enclosure on top of the machine, perform the following steps:

1. Refer to Figure 11-43 and thread the speaker harness extension through the holes in the speaker enclosure as follows:

Figure 11-43   **Speaker Enclosure**
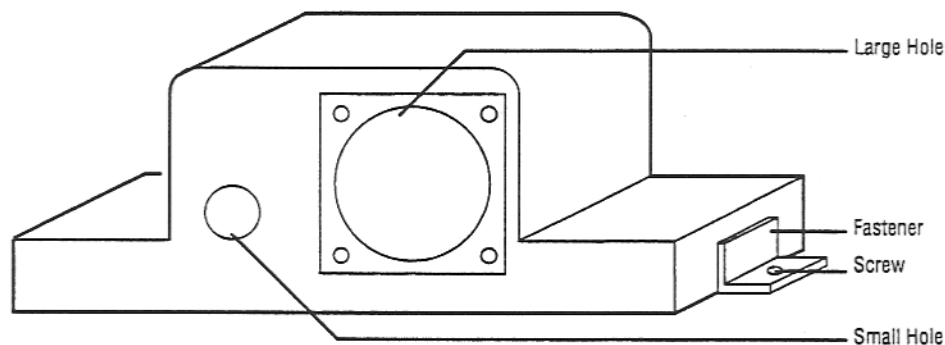
a. Thread the end of the harness that has the lugs through the small hole of the speaker enclosure.

b. Reach inside the large hole and retrieve the end with the lugs.

c. Attach the small lug to the negative tab on the speaker.

d. Attach the large lug to the positive tab on the speaker.

To install the speaker in the speaker enclosure, perform the following steps:

1. Insert the speaker into the large hole in the speaker enclosure so the speaker faces out.

2. Attach the speaker to the speaker enclosure by aligning the four corners of the speaker to those in the enclosure and securing with four screws.

3. Hand-tighten the screws.

4. Attach the speaker enclosure to the top cap by aligning the holes in each fastener with the hole in the top cap and securing with a screw in each fastener.

Installing the Top Cap

Refer to "Installing the Top Cap" on page 2-16.

Installing the Candle Lens Cover

Install the candle lens cover on the candle lens by placing it over the candle lamps and securing it to the candle lamp bracket from the top with one screw.

Verifying Top Cap Speaker Operation

To verify speaker operation, refer to "Verifying Audio System Operation" on page 11-64.

Replacing a Belly Door Speaker

Two audio speakers are located on the back of the belly door and a third is on top of the display cavity, below the service candle lamps.

This procedure describes replacement of the speakers on the back of the belly door. For information on replacing the speaker on top of the display cavity bezel, see "Replacing the Top Cap Speaker" on page 11-64.

The following table is a summary of the sections in this procedure. If you are familiar with the procedure, you may prefer to read the text in the indicated sections only when necessary.

Replacing a Belly Door Speaker
"Removing a Belly Door Speaker" on page 11-67
"Installing a Belly Door Speaker" on page 11-68
"Verifying Audio System Operation" on page 11-64

Removing a Belly Door Speaker

Before beginning the procedure, be sure to turn the power off.

To turn the power off, 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.

The audio speakers are on the back side of the belly door weldment.

To remove each speaker, perform the following steps:

1. Disconnect the two wire connectors (on the ends of the wires coming from the speaker) from the two connectors on the wires going to the audio amplifier board.
2. Remove the four screws and four kep nuts that hold the speaker to its mounting bracket.

3. Remove the cup on each speaker.

4. Remove the speaker.

Installing a Belly Door Speaker

To install the speaker, perform the following steps:

1. Place the speaker on the belly door casting, in the location shown in Figure 11-2 on page 11-3.

2. Secure the speaker to the mounting bracket with four screws and four kep nuts.

3. Plug the lugs from the green wires of the harness to the side of the speaker marked with a plus sign (+).

4. Plug the lugs from the orange wires to the side of the speaker marked with a minus sign (-).

5. Place the holes in the speaker cup over the screws coming through the casting.

6. Secure the speaker cup to the casting using four kep nuts.

Verifying Audio Speaker Operation

To verify speaker operation, refer to "Verifying Audio System Operation" on page 11-64.