Upright Slot Machine
Model 40X Service Manual

With Details on 1995 Machines

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Model 40X Upright Slot Machine
Service Manual (A-004336)

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NOTICE

- Binder part number: 20-9896-02
- Divider tabs part number: 16-003639
- Part number for spine and cover inserts, contents section (one shrink-wrapped package): 16-004337
- Part number for entire manual: A-004336
Chapter 1. Setup

Procedure

This chapter explains how to inspect and install a gaming device (GD). You’ll need these tools...

- 11/32” NUT DRIVER
- PHILLIPS SCREWDRIVER
- VOLTmeter
- ELECTRICAL OUTLET TESTER

1. Remove and set aside everything from the shipping container. Inspect the cabinet exterior for damage.

2. Unlock and open the front door.

3. Check major components to assure that they mount securely to the slot machine...
   - HOPPER
   - COIN ACCEPTOR
   - BILL VALIDATOR (BV)
   - UPPER/LOWER LAMP
   - POWER DISTRIBUTION UNIT

4. Base-Mounted Installation: Drill holes in the base to accommodate cables and the drop door connection. To assure proper hole placement, use drilling template 31-2230-00.

CAUTION

Don’t install machines closer than six inches (15.24 cm) apart.

Power Requirements

<table>
<thead>
<tr>
<th>Voltage</th>
<th>120 or 240 VAC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Line Freq</td>
<td>60 or 50 Hz</td>
</tr>
<tr>
<td>Current</td>
<td>4 amps max. at 120 VAC</td>
</tr>
<tr>
<td></td>
<td>2 amps max. at 240 VAC</td>
</tr>
</tbody>
</table>
5. **Base-Mounted Installation**: Attach the slot machine to the base with supplied bolts and nuts. Hold the carriage bolts on the slot machine's inside cabinet floor. Tighten the nuts from inside the drop stand.

6. **Base-Mounted Installation**: Attach the slot machine base to the floor with carriage bolts. Alternately, mount machines back to back on a common base. Or, mount machines on separate bases, but bolt the bases together from back to back.

7. **Operations with a Host System**: Install host communication cables according to recommendations of the communications system provider. Connect the communication cables to the backplane.

8. Attach the drop door connection to the drop door in the stand.

9. Unlock the card cage. Check for damaged or loose connectors. Don't force connectors! Close and lock the card cage.

**Machines That Require Special Jurisdiction Jumper Settings**...

10. See the table **I/O Board Jumper and DIP Switch Settings**. If your jurisdiction requires setting an I/O Board jumper, remove the I/O Board.

11. Find the SW1 jumper bank on the I/O Board. Connect the proper jumper according to the table.

12. Return the I/O Board to its slot in the card cage.

**All Slot Machines**...

13. Check circuit boards to be sure that they mount securely to the Backplane. (The Backplane Board is behind the card cage.)

14. Close and lock the Card Cage Door.

15. Use an outlet tester to measure your line voltage at the building outlet. Verify that the line voltage is nominal for your area (110 or 220 volts AC).

<table>
<thead>
<tr>
<th>I/O Board Jumper and DIP Switch Settings</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>DIP Bank</strong></td>
</tr>
<tr>
<td>-------------</td>
</tr>
<tr>
<td>1 (Jumper Pad)</td>
</tr>
<tr>
<td>New Jersey</td>
</tr>
<tr>
<td>Missouri</td>
</tr>
<tr>
<td>France</td>
</tr>
<tr>
<td>Delaware</td>
</tr>
<tr>
<td>Nevada</td>
</tr>
<tr>
<td>2 (Switch)</td>
</tr>
<tr>
<td>Disabled</td>
</tr>
</tbody>
</table>

**NOTICE**

**I/O JUMPERS.** If you change a jumper setting, you must perform a hard RAM clearance. See the Maintenance and Troubleshooting section.
16. Use an outlet tester to check for properly implemented ground, hot and neutral outlet wiring. Only use a grounded AC outlet. If the outlet checks okay, proceed. Otherwise, repair the outlet before proceeding.

17. Your slot machine may have a voltage range switch. You'll find this switch on the connector side of the PDU. Never change this switch's position with the line cord plugged in. Set the PDU voltage range switch to match the local line voltage range. Setting this switch incorrectly, or changing the switch position under power will cause damage.

18. Temporarily remove the hopper from the machine: Lift out the coin tray and pull the hopper straight out.

19. The hopper has a rotary type line frequency switch. Never adjust this switch with the line cord plugged in. Check this switch's setting to see that the factory setting matches the local line frequency. If not, set the switch to match the local power line frequency. You'll find the switch on the Hopper Control Board. Access the switch by sliding out the hopper. Look at the Hopper Control Board through the window, beneath and beside the hopper bowl. Notice the arrow on the switch face. This arrow points to either "110" or "220." (These switch labels have nothing to do with line voltage.)
   - In 60 Hz areas, the arrow should point to "110."
   - In 50 Hz areas, the arrow should point to "220."

To adjust the switch, insert a small screwdriver in the slot atop the switch. Turn the screwdriver to select the hopper line frequency.

20. Plug the female end of the line cord into the slot machine's Power Distribution Unit. You'll find the Power Distribution Unit on the lower left, inside cabinet wall. Drop the line cord through the base and out the lower hole.

21. Check the slot machine for loose or missing hardware. Missing hardware may have fallen into the hopper. Clean it out of there before the hopper jams! Replace the hardware.

22. Check the hopper: Before filling the hopper with coins, remove dust, dirt, loose hardware and other foreign matter.

23. See the table Hopper Probe Level. Adjust the hopper coin-level probe. Move the probe to a higher hole if the hopper will hold more coins. Move the probe to a lower hole if the hopper will hold fewer coins.

24. Return the hopper to the machine. Fill the hopper with coins of the proper denomination. See the table Hopper Probe Level. The table approximates the optimum number of coins for each coin-level probe hole.

---

Hopper Probe Level

<table>
<thead>
<tr>
<th>Probe Hole</th>
<th>U.S. $1</th>
<th>25¢</th>
<th>5¢</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>1,080</td>
<td>4,080</td>
<td>4,820</td>
</tr>
<tr>
<td>4</td>
<td>710</td>
<td>3,030</td>
<td>3,600</td>
</tr>
<tr>
<td>3</td>
<td>680</td>
<td>2,410</td>
<td>2,850</td>
</tr>
<tr>
<td>2</td>
<td>530</td>
<td>2,150</td>
<td>2,560</td>
</tr>
<tr>
<td>1</td>
<td>330</td>
<td>1,730</td>
<td>1,900</td>
</tr>
</tbody>
</table>

---

Back view of hopper, showing probe holes.

---

CAUTION

Take care when setting the hopper line frequency switch. Setting this switch incorrectly, or changing the switch position under power will cause damage.

---

WARNING

Install Electrical Outlets For GDs near the equipment. The outlets must be easily accessible. Otherwise, you may not be able to remove GD power. Working on a GD with power applied may expose you to hazardous line voltage. Switching off the PDU doesn't remove power from the interior of the GD. To eliminate this power, you must unplug the GD.
25. Install a typical coin of the proper denomination in the coin comparator. If you need to adjust the coin mechanism, refer to the Maintenance and Troubleshooting section.

26. Record starting cumulative totals. (Copy them off the mechanical meters.)

27. Be sure that boards and connectors seat properly. Check card cage boards and connectors on door, chassis and cabinet boards. Don't forget these connectors...
   - BILL VALIDATOR
   - PDU
   - REELS
   - BACKPLANE
   - METERS
   - DOOR SWITCHBOX
   - INLINE CONNECTORS
   Also check blind mating connectors: If the hopper operates, then its connector mates properly. If you hear the bong after power up, then the speaker connector mates properly.

28. Turn on the slot machine at the Power Distribution Unit (PDU) on/off switch. During a normal startup, these events occur...
   - Slot machine lamps come on
   - The reels spin and home
   - The bill validator whines as it undergoes a self test
   - The machine bongs once, indicating a nominal initialization

   If the lamps don't light and you don't hear the bong: Did you plug the slot machine into an active, unswitched AC outlet? If you hear more than one bong, troubleshoot the slot machine.

NOTE: If any I/O DIP switch settings have been changed, a full Hard RAM Clear must be performed. Refer to Section 2, Chapter 2 for the RAM Clear procedure.

29. Enter Administration Mode and set the machine protocol address. (Machine Protocol Address is Series 0, Sequence 1 of Administration Mode.) Also set the option sound, credit mode, reels, attract mode, bills and limits.

30. Run a diagnostic check of the software and hardware. Use the slot machine's built-in, diagnostic software.

31. Install the locks specified by your jurisdiction. (See Lock Specification Table.)

32. Lock the front door.
### SPECIFICATIONS FOR STANDARD LOCKS (INCHES)
Dimensions, Cam Mounting Hole: Diameter 0.28" x 0.22"

<table>
<thead>
<tr>
<th>Door/Type</th>
<th>Barrel Length</th>
<th>Double D Hole Size</th>
<th>Rotation to Unlock</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stacker</td>
<td>5/8&quot;</td>
<td>0.76&quot; x 0.64&quot;</td>
<td>CCW</td>
</tr>
<tr>
<td>Logic</td>
<td>5/8&quot;</td>
<td>0.76&quot; x 0.64&quot;</td>
<td>CW or CCW</td>
</tr>
<tr>
<td>Main</td>
<td>5/8&quot;</td>
<td>0.76&quot; x 0.64&quot;</td>
<td>CCW</td>
</tr>
<tr>
<td>Stacker Extract. Tool</td>
<td>5/8&quot;</td>
<td>0.76&quot; x 0.64&quot;</td>
<td>CCW</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Lock/Type</th>
<th>Barrel Length</th>
<th>Double D Hole Size</th>
<th>Rotation to Unlock</th>
</tr>
</thead>
<tbody>
<tr>
<td>NJ Extra Extract. Lk.</td>
<td>5/8&quot;</td>
<td>0.76&quot; x 0.64&quot;</td>
<td>CCW</td>
</tr>
<tr>
<td>Cam must rotate in the same direction as the lock.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NJ Extra Stacker Dr. Lk. 5/8&quot;</td>
<td>0.76&quot; x 0.64&quot;</td>
<td>Opposite of Bill Stacker</td>
<td></td>
</tr>
</tbody>
</table>

#### Barrel Lock Spacers
- P/N 02-4916-01: 1/16"
- P/N 02-4916-02: 1/8"
- P/N 02-4916-03: 3/16"
- P/N 02-4916-04: 1/4"

### SPECIFICATIONS FOR STANDARD LOCKS (METRIC)
Dimensions, Cam Mounting Hole: Diameter .71cm x .56cm

<table>
<thead>
<tr>
<th>Door/Type</th>
<th>Barrel Length</th>
<th>Double D Hole Size</th>
<th>Rotation to Unlock</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stacker</td>
<td>1.59cm</td>
<td>.19cm x .16cm</td>
<td>CCW</td>
</tr>
<tr>
<td>Logic</td>
<td>1.59cm</td>
<td>.19cm x .16cm</td>
<td>CW or CCW</td>
</tr>
<tr>
<td>Main</td>
<td>1.59cm</td>
<td>.19cm x .16cm</td>
<td>CCW</td>
</tr>
<tr>
<td>Stacker Extract. Tool</td>
<td>1.59cm</td>
<td>.19cm x .16cm</td>
<td>CCW</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Lock/Type</th>
<th>Barrel Length</th>
<th>Double D Hole Size</th>
<th>Rotation to Unlock</th>
</tr>
</thead>
<tbody>
<tr>
<td>NJ Extra Extract. Lk.</td>
<td>1.59cm</td>
<td>.19cm x .16cm</td>
<td>CCW</td>
</tr>
<tr>
<td>Cam must rotate in the same direction as the lock.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NJ Extra Stacker Dr. Lk. 1.59cm</td>
<td>.19cm x .16cm</td>
<td>Opposite of Bill Stacker</td>
<td></td>
</tr>
</tbody>
</table>

#### Barrel Lock Spacers
- P/N 02-4916-01: .16cm
- P/N 02-4916-02: .32cm
- P/N 02-4916-03: .48cm
- P/N 02-4916-04: .64cm
Slot Machine Base Dimensions

BACK

F R O N T

10.84”
27.54cm

8.50”
21.59cm

0.44”
1.12cm

16.89”
40.88cm

15.69”
39.81cm

0.40” SQ. (4)
1.02cm SQ. (4)

0.44”
1.12cm

21.13”
53.67cm

1.25”
3.18cm

10.75”
27.31cm

15.88”
40.33cm

10.68”
27.15cm

3.88”
9.84cm

1.63”
4.15cm

2.50”
6.35cm

2.50”
6.35cm

2.50”
6.35cm

Power Cable Hole

Drop Chute Hole

WMS Service Manual—Upright Slot
Wide Body Slot – Model 40S Series

<table>
<thead>
<tr>
<th>PART DESCRIPTION</th>
<th>TOP BOX HEIGHT</th>
<th>OVERALL HEIGHT</th>
</tr>
</thead>
<tbody>
<tr>
<td>9&quot; Topbox</td>
<td>9.88 (25.35)</td>
<td>15.88 (40.34)</td>
</tr>
<tr>
<td>9&quot; Topbox w/Cardreader</td>
<td>12.25 (31.12)</td>
<td>18.25 (46.36)</td>
</tr>
<tr>
<td>16&quot; Topbox</td>
<td>15.97 (40.56)</td>
<td>21.40 (54.36)</td>
</tr>
<tr>
<td>16&quot; Topbox w/Cardreader</td>
<td>18.34 (46.58)</td>
<td>23.77 (60.38)</td>
</tr>
<tr>
<td>Bonnet Topbox</td>
<td>15.97 (40.56)</td>
<td>21.20 (53.85)</td>
</tr>
<tr>
<td>Bonnet Topbox w/Cardreader</td>
<td>18.34 (46.58)</td>
<td>23.57 (59.87)</td>
</tr>
</tbody>
</table>

Flammability Classification Weights*

<table>
<thead>
<tr>
<th>Category</th>
<th>Lbs.</th>
<th>Kg.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Combustible</td>
<td>8.58</td>
<td>3.89</td>
</tr>
<tr>
<td>Total</td>
<td>241.14</td>
<td>109.38</td>
</tr>
</tbody>
</table>

*Including metal topbox, but without card reader

NOTICE

Measurements are in inches and in centimeters (parentheses).

NOTICE

To allow opening of the Bill Door, space games at least 6" (15.24 cm) apart.
Chapter 2. Diagnostic and Adjustment Software

Using Administration Mode

Your slot machine's game software includes facilities for diagnosing problems and verifying feature operation. This software also helps you to adjust game features and performance. You can access slot machine diagnostic and adjustment functions from the Administration Mode.

Slot machine software presents Administration Mode information as numeric codes on the LED displays. The software arranges the tests and setup features in series. A test series number appears on the Bet Display. The Credit and Win Meter displays convey information about each test series. See the display illustration below.

Administration Mode contains several series of test and setup options. (The Administration Mode table lists the series.) Each series contains numbered options. In some series, these options are tests or adjustments. In other series, the options are sequences of tests or adjustments.

Enter Administration Mode

1. You can enter Administration Mode while the machine operates in Game-Over Mode or Tilt Mode. (The slot machine enters Game-Over Mode between games. In this mode, no bet or jackpot is pending and the hopper is inactive. Tilt Mode means that a tilt prevents game play.) Unlock and open the machine's Main Door. The words, "door oPEn" appear on the Credit and Win Meter displays. The Bet Display is blank.

2. Press the DIAGNOSTIC button to select a test or setup series. You'll find this button inside the Main Door, on the front of the Card Cage Door. A zero appears on the Bet Display. This number identifies an Administration Mode test series. Typically, data for that series appears in the Credit and Win Meter displays.

3. Repeatedly press DIAGNOSTIC to advance through Administration Mode series. Continue until you find the desired test series. As in Step 2, series data usually appears on the other two displays.

NOTICE

You can't change Administration Mode selections from Tilt Mode. To change settings, you must be in Game-Over Mode. To enter Game-Over Mode, open and close the Main Door. Opening and closing the Main Door also clears most tilts.
Perform Test and Setup Functions

1. Turn the JACKPOT RESET KEY to select a test within a series or sequence. You'll find the JACKPOT RESET KEY switch near the SLOT HANDLE. Insert and turn the key.

2. Press the SPIN REELS button to initiate a test. SPIN REELS is on the player panel. The button lights up to remind you to start the test.

Exit Administration Mode

To exit Administration Mode, either...

- Close the Main Door (except during Door Switch Test, Series 1, Test 13).
- Repeatedly press DIAGNOSTIC until "door open" appears on the display. Displays that read this way indicate Door-Open Mode, one of many slot machine states. When a game reports a tilt condition, the LED displays indicate the tilt type ("coinJ," "HPrE," etc).

Administration Mode Displays

This chapter introduces an Administration Mode series or sequence with a highlighted table. (A test series may contain several test sequences.) Each table presents initial values for the Credit, Win Meter and Max Bet displays. These values document the way a typical display reads before you make adjustments. Sometimes, a series and its first sequence display identical values. In that case, a table appears only at the sequence. Take a look at the table for Series 0, Sequence 1 below...

Series 0. Host Communications, Sound Volume; Demo, Cash and Credit Modes, Reel Speed, Etc.

Series 0 includes 10 sequences... Sequences 1 and 2 deal with host communications protocol. Sequences 3 through 6 affect the sound system. Sequence 7 is Reel Speed. Sequences 9 and 10 enable special game modes.

Series 0 Host Communications Protocol is the first sequence in Administration Mode.
Sequence 1. Host Communications Protocol

Initial Display Values: Credit Win Meter Bet
NONE ON 0

The Credit Display provides a mnemonic for a host communications protocol. The Win Meter Display indicates whether this mnemonic represents the selected protocol. "On" identifies the selected protocol.

Your slot machine supports several protocols. See the table Supported Host Protocols.

Slot machines that use protocols with configurable addressing display Sequence 1.

• To view each protocol, turn the JACKPOT RESET KEY.

• To select a protocol, press SPIN REELS. If you aren’t using a host system, select “NONE.”

• To save settings, skip Sequence 2 and enter Sequence 3, press the DIAGNOSTIC button.

Sequence 2. Machine Protocol Address (SAS)

Initial Display Values: Credit Win Meter Bet
Addr 3-Digit No. 0

The Credit Display contains the expression, "Addr," the abbreviation for "Address." The Win Meter Display indicates the slot machine’s communication address. If you haven’t set the address yet, three zeros appear. You can vary this level from 0 to 127. The flashing digit indicates the first value to set.

• To change the flashing digit value, press SPIN REELS one or more times.

• To advance to the next digit, turn the JACKPOT RESET KEY. With each turn of the key, the flashing digit sequentially advances from right to left. Suppose that the flashing digit is the leftmost one: Return to the rightmost digit by turning the JACKPOT RESET KEY one more time.

• To delete a protocol and replace it with another one, turn the JACKPOT RESET KEY. Turn the key again, as necessary, until you locate the

NOTICE
Older machines use a CALL ATTENDANT button, instead of the CHANGE button shown.
desired new protocol. Set values at the new protocol, as above. The new protocol now replaces the previously set protocol.

- To save settings and enter Sequence 3, press the DIAGNOSTIC button.

**Manual Sound System**

Some game software includes a manual user interface for sound volume settings. Other game software incorporates an automated user interface. Your game software employs either interface, but not both. The interface type affects Series 0, sequences 3, 4 and 5. Your machine has either the manual or the automated version of these three sequences. This manual describes both versions. Here's how the manual sound user interface behaves...

**Sequence 3. Normal Sound Volume (Manual)**

Initial Display Values: Credit  Win Meter  Bet
Snd 1       3-Digit No.   0

Normal Sound Volume controls regular game sounds during normal game operation. (For example, credit bet and coin-in sounds, and most smaller awards tunes.) The Win Meter Display indicates the slot machine's sound volume setting. You can vary this level from 0 to 255. The flashing digit indicates the first value to set. During Sequence 3, you can toggle the sound on or off with the lit MAX BET button. Pressing MAX BET, you hear the credit/bet sound at the new volume level. Use this sound to determine the effect of your adjustment.

- To change the flashing digit value, press SPIN REELS one or more times.

- To advance to the next digit, turn the JACKPOT RESET KEY. With each turn of the key, the flashing digit sequentially advances from right to left. Suppose that the flashing digit is the leftmost one: Return to the rightmost digit by turning the JACKPOT RESET KEY one more time.

- To save settings and enter Sequence 4, press the DIAGNOSTIC button.

**Sequence 4. Large Hit Sound Volume (Manual)**

Initial Display Values: Credit  Win Meter  Bet
Snd 2       3-Digit No.   0

Large Hit Sound Volume controls volume during a large award payout. (How large is "large"? "Large" is game specific, but a rule of thumb applies: Usually a large hit exceeds 50 credits.) Typically, Large Hit Sound Volume is much louder than normal volume. Use Large Hit Sound Volume to draw attention to the machine during large wins. The Win Meter Display indicates the slot machine's sound volume setting. You can vary this level from 0 to
255. The flashing digit indicates the first value to set. You can toggle the sound on or off with the lit MAX BET button. Pressing MAX BET, you hear the large award tune at the new volume level. Use this sound to determine the effect of your adjustment.

- **To change the flashing digit value**, press SPIN REELS one or more times.

- **To advance to the next digit**, turn the JACKPOT RESET KEY. With each turn of the key, the flashing digit sequentially advances from right to left. Suppose that the flashing digit is the leftmost one: Return to the rightmost digit by turning the JACKPOT RESET KEY one more time.

- **To save settings and enter Sequence 5**, press the DIAGNOSTIC button.

**Sequence 5. Top Award Sound Volume (Manual)**

*Initial Display Values: Credit  Win Meter  Bet  
Snd 3  3-Digit No.  0*

*Top Award Sound Volume* controls volume when a player hits the top award. *(Typically, this award is a jackpot.)* Usually operators set this volume nearly wide open to draw attention to the machine. The Win Meter Display indicates the slot machine’s sound volume setting. You can vary this level from 0 to 255. The flashing digit indicates the first value to set. You can toggle the sound on or off with the lit MAX BET button. Pressing MAX BET, you hear the jackpot tune at the new volume level. Use this sound to determine the effect of your adjustment.

- **To change the flashing digit value**, press SPIN REELS one or more times.

- **To advance to the next digit**, turn the JACKPOT RESET KEY. With each turn of the key, the flashing digit sequentially advances from right to left. Suppose that the flashing digit is the leftmost one: Return to the rightmost digit by turning the JACKPOT RESET KEY one more time.

- **To save settings and enter Sequence 6**, press the DIAGNOSTIC button.

**Automated Sound System**

Some game software includes an automated user interface for sound volume settings. This automated interface operates differently than the manual interface already described. Automated versions of Sequences 3, 4 and 5 replace manual versions that we’ve described above. Here’s how the automated sound user interface behaves...

**Dotmation Display.** On Dotmation games (such as Winning Streak), settings and instructions appear in the Dotmation screen. *(See the illustrations Automatic Sound Screen 1 and Automatic Sound Screen 2.)* Instructions also appear on LED displays.
Sequence 3. Normal Sound Volume (Automated)

Initial Display Values:

<table>
<thead>
<tr>
<th></th>
<th>Credit</th>
<th>Win Meter</th>
<th>Bet</th>
</tr>
</thead>
<tbody>
<tr>
<td>Snd 1</td>
<td>3-Digit No.</td>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>

Normal Sound Volume controls regular game sounds during normal game operation. (For example, credit bet and coin-in sounds, reel spin and most smaller awards tunes.) The Win Meter Display indicates the slot machine's sound volume setting. You can vary this level from 0 to 63.

Auto Settings. The automated sound system includes “auto” settings for Snd 2 and Snd 3. These settings default to “on” for most games. (The default is “off” for Delaware games, due to the different volume settings in Delaware.) In “Auto,” the volume for any sound sequence is double that of the previous sequence. You must only change Snd 1 to make the game quieter or louder. This feature simplifies game setup.

Ordinarily, you can't set the value of Snd 3 lower than Snd 2. Similarly, you usually can't set Snd 2 to a lower value than Snd 1. What if you raise Snd 1 above the Snd 2 or Snd 3 value? Then Snd 2 and Snd 3 automatically set to the value of Snd 1.

- To play or mute the sound, press BET ONE. (BET ONE toggles the sound on and off.) Pressing BET ONE, you hear the credit/bet sound at the new volume level. Use this sound to determine the effect of your adjustment.
- To reduce sound volume, press SPIN REELS.
- To raise sound volume, press MAX BET SPIN.
- To turn “AUTO” settings on or off, press CASH and either SPIN or MAX BET. (Setting toggles between “auto on” and “auto off” functions.)
- To reduce Snd 2 or Snd 3 below Snd 1, turn JACKPOT RESET KEY. Simultaneously press MAX BET SPIN.
- To move the arrow in Sound Screen 2, press DIAGNOSTIC. (See the illustration Automatic Sound Screen 2.)
- To save settings and enter Sequence 4, press the DIAGNOSTIC button.

Sequence 4. Feature Sound Volume (Automated)

Initial Display Values:

<table>
<thead>
<tr>
<th></th>
<th>Credit</th>
<th>Win Meter</th>
<th>Bet</th>
</tr>
</thead>
<tbody>
<tr>
<td>Snd 2</td>
<td>3-Digit No.</td>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>

Feature Sound Volume controls volume during a large award payout. (How large is “large”? “Large” is game specific, but a rule of thumb applies: Usually feature sound exceeds 50 credits.) Typically, Feature Sound Volume is much louder than normal volume. Use Feature Sound Volume to draw attention to the machine during large wins. (For example, “feature” game
sounds, such as the Winning Streak Bonus Round.) The Win Meter Display indicates the slot machine's sound volume setting. You can vary this level from 0 to 63.

Auto Settings. The automated sound system includes “auto” settings for Snd 2 and Snd 3. These settings default to “on” for most games. (The default is “off” for Delaware games, due to the different volume settings in Delaware.) In “Auto,” the volume for any sound sequence is double that of the previous sequence. You must only change Snd 1 to make the game quieter or louder. This feature simplifies game setup.

Ordinarily, you can’t set the value of Snd 3 lower than Snd 2. Similarly, you usually can’t set Snd 2 to a lower value than Snd 1. What if you raise Snd 1 above the Snd 2 or Snd 3 value? Then Snd 2 and Snd 3 automatically set to the value of Snd 1.

- To play or mute the sound, press BET ONE. (BET ONE toggles the sound on and off.) Pressing BET ONE, you hear the large award tune at the new volume level. Use this sound to determine the effect of your adjustment.

- To reduce sound volume, press SPIN REELS.

- To raise sound volume, press MAX BET SPIN.

- To turn “AUTO” settings on or off, press CASH and either SPIN or MAX BET. (Setting toggles between “auto on” and “auto off” functions.)

- To reduce Snd 2 or Snd 3 below Snd 1, turn JACKPOT RESET KEY. Simultaneously press MAX BET SPIN.

- To move the arrow in Sound Screen 2, press DIAGNOSTIC. (See the illustration Automatic Sound Screen 2.)

- To save settings and enter Sequence 4, press the DIAGNOSTIC button.

- To change the flashing digit value, press SPIN REELS one or more times.

- To advance to the next digit, turn the JACKPOT RESET KEY. With each turn of the key, the flashing digit sequentially advances from right to left. Suppose that the flashing digit is the leftmost one: Return to the rightmost digit by turning the JACKPOT RESET KEY one more time.

- To save settings and enter Sequence 5, press the DIAGNOSTIC button.

Sequence 5. Top Award Sound Volume (Automated)

Initial Display Values:  
| Credit | Win Meter | Bet | Snd 3 | 3-Digit No. | 0 |

Top Award Sound Volume controls volume when a player hits the top award. (Typically, this award is a jackpot.) Usually operators set this volume nearly
wide open to draw attention to the machine. The Win Meter Display indicates the slot machine's sound volume setting. You can vary this level from 0 to 63.

**Auto Settings.** The automated sound system includes “auto” settings for Snd 2 and Snd 3. These settings default to “on” for most games. (The default is “off” for Delaware games, due to the different volume settings in Delaware.) In “Auto,” the volume for any sound sequence is double that of the previous sequence. You must only change Snd 1 to make the game quieter or louder. This feature simplifies game setup.

Ordinarily, you can’t set the value of Snd 3 lower than Snd 2. Similarly, you usually can’t set Snd 2 to a lower value than Snd 1. What if you raise Snd 1 above the Snd 2 or Snd 3 value? Then Snd 2 and Snd 3 automatically set to the value of Snd 1.

- **To play or mute the sound,** press BET ONE. (BET ONE toggles the sound on and off.) Pressing BET ONE, you hear the jackpot tune at the new volume level. Use this sound to determine the effect of your adjustment.

- **To reduce sound volume,** press SPIN REELS.

- **To raise sound volume,** press MAX BET SPIN.

- **To turn “AUTO” settings on or off,** press CASH and either SPIN or MAX BET. (Setting toggles between “auto on” and “auto off” functions.)

- **To reduce Snd 2 or Snd 3 below Snd 1,** turn JACKPOT RESET KEY. Simultaneously press MAX BET SPIN.

- **To move the arrow in Sound Screen 2,** press DIAGNOSTIC. (See the illustration Automatic Sound Screen 2.)

- **To save settings and enter Sequence 6,** press the DIAGNOSTIC button.

**Sequence 6. Jackpot Loop**

<table>
<thead>
<tr>
<th>Initial Display Values:</th>
<th>Credit</th>
<th>Win Meter</th>
<th>Bet</th>
</tr>
</thead>
<tbody>
<tr>
<td>LooP</td>
<td>inFin</td>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>

Choose the number of times that the jackpot tune plays after a jackpot win. Select any number of plays, from 1 to 254. Select 255 to put the machine into Infinite Loop Mode, the default setting. In Infinite Loop Mode, the jackpot tune repeats until the attendant resets the jackpot.

- **To change the flashing digit value,** press SPIN REELS one or more times.

- **To advance to the next digit,** turn the JACKPOT RESET KEY. With each turn of the key, the flashing digit sequentially advances from right to left.

**NOTICE**

Some jurisdictions require that the jackpot tune must play until the attendant resets the machine. Soldered jumpers on the I/O Board configure the machine for these jurisdictions. On boards configured that way, Sequence 6 only permits you to view the loop status. Also, you can’t select this option. A dark Spin Reels Lamp indicates this condition.
Suppose that the flashing digit is the leftmost one: Return to the rightmost digit by turning the JACKPOT RESET KEY one more time.

- **To save settings and enter Sequence 7**, press the DIAGNOSTIC button.

### Sequence 7. Reel Speed

*Initial Display Values:* Credit Win Meter Bet
SpEEd nnEd 0

Select the speed at which the reels spin. The Credit Display indicates the reel “SPEED” setting. The Win Meter Display indicates the selected speed.

- **To select a different speed**, press SPIN REELS. Options appear on the Reel Speed Adjustment Table.

- **To save settings and skip Sequence 8 and enter Series 1**, press the DIAGNOSTIC button.

- **To save settings and enter Sequence 8**, turn the JACKPOT RESET KEY.

#### Reel Speed Adjustment

<table>
<thead>
<tr>
<th>Credit Display</th>
<th>Reel Speed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Slow</td>
<td>Slow</td>
</tr>
<tr>
<td>nnEd</td>
<td>Medium</td>
</tr>
</tbody>
</table>

### Sequence 8. Special Operation Modes

*Initial Display Values:* Credit Win Meter Bet
crEd “on” or “OFF” 0

Operation modes determine much of slot machine behavior and performance. Your slot machine includes a number of these modes. Game Mode, Game-Over Mode and Administration Mode are three familiar modes. Software prohibits you from directly modifying Game Mode. But as this chapter illustrates, Administration Mode permits a broad variety of user adjustments. Other modes affect the slot machine in a much narrower sense. Sequence 8 includes three such modes...

- Mode 1. Cash and Credit Play
- Mode 2. Demo Mode
- Mode 3. Attract Mode

#### Mode 1. Credit and Cash Play

*Initial Display Values:* Credit Win Meter Bet
crEd “on” or “OFF” 0

**Cash or Credit Play**
Disable “crEd“ to permit the player to choose cash or credit play. In credit play, winnings accumulate as credits on the machine. In cash play, the slot machine immediately dispenses winnings. With CASH OR CREDIT off, if the player presses CASH/CREDIT, it lights. The lit button indicates Credit Mode.
Credit-Only Play
With "crEd" on, the player must cash out credits to get them off the machine. To do this, the player presses the flashing CASH/CREDIT button.

- To toggle the credit-only play on or off, press SPIN REELS. The Win Meter Display tracks feature status ("on" or "OFF"). The Credit Display indicates the mode ("crEd").

- To enter Mode 2, turn the JACKPOT RESET KEY.

- To enter Series 1, press the DIAGNOSTIC button.

Mode 2. Demo Mode
Initial Display Values: Credit dEno "on" or "OFF" 0

If you enable Demo Mode, games run in Demo Mode. In Demo Mode, the slot machine doesn't require coins, dispense cash or increment meters. Except for these changes, games play normally.

- To toggle the mode on or off, press SPIN REELS. The Win Meter Display tracks mode status ("on" or "OFF"). The Credit Display indicates the mode ("dEno").

- To enter Mode 3, turn the JACKPOT RESET KEY.

- To enter Series 1, press the DIAGNOSTIC button.

Mode 3. Attract Mode
Initial Display Values: Credit AtrAc "on" or "OFF" 0

You can enable Attract Mode, which operates when the machine is idle. In Attract Mode, panel LEDs may cycle in a pattern after a brief idle time. Some games with Attract Mode sounds periodically play a sound.

The Credit Display indicates the position of the Attract Mode toggle. The Win Meter Display indicates the option state ("on" or "OFF").

- To toggle Attract Mode on or off, press SPIN REELS.

- To reenter Mode 1, turn the JACKPOT RESET KEY.

- To enter Series 1, press the DIAGNOSTIC button.
Series 1. Input Tests

Initial Display Values: 
Credit: 
Win Meter: 
Bet: 3-Digit No. (Blank) 1

In the Credit Display, the left two digits represent the test number. The right digit is the current logic level of the selected input (0 or 1).

- To select a test, locate its number on the Input Tests table. Repeatedly press MAX BET until display numbers correspond to the table. (Instead, you may repeatedly turn the JACKPOT RESET KEY. But MAX BET is easier to actuate.)

- To test an input, activate the input and observe logic level changes. Inputs are either mechanical or opto switches. The optos are below the coin comparator. (Your slot machine uses a Coin Mechanisms Coin Comparator® brand coin comparator.) To activate a mechanical switch, close it. To activate an opto, block it with a coin.

- To enter Series 2, press the DIAGNOSTIC button.

**Test 10. Coin Comparator**
Dismount the coin comparator. Watch the Credit Display and drop a coin into the comparator. As the coin passes the comparator metal sensor, the zero logic level digit becomes one.

**Test 11. Top Coin Opto**
This test checks the response of the top opto. Drop a coin into the coin entry. As the coin breaks the detector beam, the zero logic level digit should become one. Any other result indicates that the opto needs service.

**Test 12. Bottom Coin Opto**
This test checks the response of the bottom opto. Drop a coin into the coin entry. As the coin breaks the detector beam, the zero logic level digit should become one. Any other result indicates that the opto needs service.

**Test 13. Door Switch**
When you close the Main Door, a zero appears on the Credit Display. When you open the Main Door, a one replaces the zero.

**Test 14. Hopper Coin Sensor**
Press the spring-loaded lever atop the hopper escalator. Initially zero, the logic level digit changes to one. During play, dispensed coins actuate the lever, closing contacts.

**Test 15. Hopper Probe**
Use a coin to ground the top hopper probe to the hopper bowl. Initially zero, the logic level digit changes to one. A grounded probe indicates a full hopper.
Test 16. SPIN REELS Button
Press SPIN REELS to test the button’s operation. Initially zero, the logic level digit changes to one.

Test 17. JACKPOT RESET KEY
Test the JACKPOT RESET KEY: Turn the key in the indicated direction, following these steps...

- 1. Turn the key CW: 17 1 appears on the Credit Display.
- 2. Turn the key CCW: 17 0 appears on the Credit Display.
- 3. Turn the key CW: 17 1 appears on the Credit Display.
- 4. Turn the key CCW: 17 0 appears on the Credit Display.
- 5. Turn the key CW: 18 (next test) appears.

(CW stands for clockwise. CCW stands for counterclockwise.)

Test 18. Slot Handle (Not applicable to slant top slots)
Pull the slot handle to test its top switch. Initially zero, the logic level digit changes to one.

Test 19. Slot Handle (Not applicable to slant top slots)
Release the slot handle to test its bottom switch. Initially one, the logic level digit changes to zero. The change occurs as the handle rises above the bottom of its travel.

Test 20. BET ONE Button
Press BET ONE to test the button’s operation. Initially zero, the logic level digit changes to one.

Test 21. MAX BET Button
Press MAX BET to test the button’s operation. Initially zero, the logic level digit changes to one.

Test 22. CASH/CREDIT Button
Press CASH/CREDIT to test the button’s operation. Initially zero, the logic level digit changes to one.

Test 23. CALL ATTENDANT Button
Press CALL ATTENDANT to test the button’s operation. Initially zero, the logic level digit changes to one.

Test 25. DIAGNOSTIC Button
Press DIAGNOSTIC to test the button’s operation. Initially zero, the logic level digit changes to one.

Test 26. Stacker Door
Open and close the Stacker Door to test door switch operation. Initially zero, the logic level digit changes to one.

Test 27. Logic Door
Open and close the Card Cage (Logic) Door to test door switch operation. Initially zero, the logic level digit changes to one.
Test 28. Bill Door
Open and close the Bill Door to test door switch operation. Initially zero, the logic level digit changes to one.

Test 29. Drop Door
Open and close the Cashbox (Drop) Door to test door switch operation. Initially zero, the logic level digit changes to one.

Test 30. b Serv (Not applicable to upright slots)
Open and close the Bill Jam Service Door to test door switch operation. Initially zero, the logic level digit changes to one.

Test 31. Hood (Not applicable to upright slots)
Open and close the Reel Hatch (Hood) to test door switch operation. Initially zero, the logic level digit changes to one.

Test 40. Reel #1 Opto
Test 40 checks the opto on Reel Mechanism 1. As you face the GD, this mechanism is the leftmost one. Notice the black opto fork at the base of the reel mechanism. Rotate the reel until the interrupter tab slides between the opto fork tines. Initially zero, the logic level digit changes to one.

Test 41. Reel #2 Opto
Test 41 checks the opto on the middle reel mechanism. Notice the black opto fork at the base of the reel mechanism. Rotate the reel until the interrupter tab slides between the opto fork tines. Initially zero, the logic level digit changes to one.

Test 42. Reel #3 Opto
Test 42 checks the opto on the reel mechanism nearest to the bill validator (BV). Notice the black opto fork at the base of the reel mechanism. Rotate the reel until the interrupter tab slides between the opto fork tines. Initially zero, the logic level digit changes to one.

Tests 70 through 75. Game-Specific Inputs
The factory reserves tests 70 through 75 for game-specific inputs. Tests for these inputs vary from machine to machine. Your machine’s software may not include tests 70 through 75.

Series 2. Output Tests
Series 2, Output Tests, includes three sequences: Solenoid and Lamp Tests, Sound Tests and a Display Digits Test.

Sequence 1. Solenoid and Lamp Tests
Initial Display Values: Credit Win Meter Bet
9 (Blank) 2

The left two Credit Display digits represent the test number.

<table>
<thead>
<tr>
<th>Test</th>
<th>Correct Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>09</td>
<td>Coins Played Meter Increments</td>
</tr>
<tr>
<td>10</td>
<td>Bill Dollars Meter Increments</td>
</tr>
<tr>
<td>11</td>
<td>Coins Out Meter Increments</td>
</tr>
<tr>
<td>12</td>
<td>Credits Hand Paid Meter Increments</td>
</tr>
<tr>
<td>13</td>
<td>Coins Drop Meter Increments</td>
</tr>
<tr>
<td>14</td>
<td>(Future Use)</td>
</tr>
<tr>
<td>18</td>
<td>All lamps Light</td>
</tr>
<tr>
<td>19</td>
<td>Payline Lamp 1 Lights</td>
</tr>
<tr>
<td>20</td>
<td>Payline Lamp 2 Lights</td>
</tr>
<tr>
<td>21</td>
<td>Payline Lamp 3 Lights</td>
</tr>
<tr>
<td>22</td>
<td>Payline Lamp 4 Lights</td>
</tr>
<tr>
<td>23</td>
<td>Payline Lamp 5 Lights</td>
</tr>
<tr>
<td>26</td>
<td>Bill Validator Accepts/Rejects Bill</td>
</tr>
<tr>
<td>31</td>
<td>Candle, Top Lights</td>
</tr>
<tr>
<td>32</td>
<td>Candle, Btm Lights</td>
</tr>
<tr>
<td>33</td>
<td>Coin Diverter Solenoid Energizes</td>
</tr>
<tr>
<td>34</td>
<td>Coin Lockout Solenoid Energizes</td>
</tr>
<tr>
<td>41</td>
<td>Insert Coin Lamp Lights</td>
</tr>
<tr>
<td>42</td>
<td>Coin Accepted Lamp Lights</td>
</tr>
<tr>
<td>44</td>
<td>MAX BET Button Lamp Lights</td>
</tr>
<tr>
<td>45</td>
<td>BET ONE Button Lamp Lights</td>
</tr>
<tr>
<td>46</td>
<td>CASH/CREDIT Btm Lamp Lights</td>
</tr>
<tr>
<td>47</td>
<td>SPIN REELS Button Lamp Lights</td>
</tr>
<tr>
<td>48</td>
<td>Press SPIN REELS, light Payline 1</td>
</tr>
<tr>
<td>49</td>
<td>Press SPIN REELS, light Payline 2</td>
</tr>
<tr>
<td>50</td>
<td>Press SPIN REELS, light Payline 3</td>
</tr>
<tr>
<td>70</td>
<td>Game-Specific Solenoid or Lamp</td>
</tr>
<tr>
<td>71</td>
<td>Game-Specific Solenoid or Lamp</td>
</tr>
<tr>
<td>72</td>
<td>Game-Specific Solenoid or Lamp</td>
</tr>
<tr>
<td>73</td>
<td>Game-Specific Solenoid or Lamp</td>
</tr>
<tr>
<td>74</td>
<td>Game-Specific Solenoid or Lamp</td>
</tr>
<tr>
<td>75</td>
<td>Game-Specific Solenoid or Lamp</td>
</tr>
</tbody>
</table>
• **To select a test**, find its number on the **Solenoid and Lamp Tests** table. Repeatedly press MAX BET until display numbers correspond to the table. (Instead, you may repeatedly turn the JACKPOT RESET KEY. But MAX BET is easier to actuate.)

• **To test an output**, press the SPIN REELS button. Observe that output. All output lamps should light. Output solenoids (mechanical meters, etc.) should energize.

• **To enable and latch an output**, press and hold SPIN REELS. While holding, press MAX BET once. The output remains activated until you exit the Output Tests series. (Meanwhile, the slot machine advances to the next output.)

• Output Tests 32, 33 and 34 require special operator action or produce special results. See the instructions on these tests below.

• **To enter Sequence 2 from any test**, press DIAGNOSTIC.

**Test 32. Bottom Candle**
Press SPIN REELS. With each press, the Candle toggles on and off. After you exit the test, the candle indicates an open door.

**Test 33. Coin Diverter Solenoid**
Press SPIN REELS to change the solenoid's state and engage the diverter. (We assume that the diverter isn't already engaged.) To disengage the diverter, release the button. Observe diverter motion beneath the coin detector. (Engaging the diverter sends coins to the dropbox. Disengaging the diverter sends coins to the hopper.)

**Test 34. Coin Lockout Solenoid**
Hold down SPIN REELS. Watch the coin path from the imprinted side of the coin mechanism. Deposit a coin. The coin should fall through the mechanism’s left chute. The slot machine should accept the coin.

**Tests 48, 49, 50. Payline Reel Lamps**
Press SPIN REELS to sequentially light each lamp. The lamps light from left (meter side) to right (BV side).

**Tests 70 through 75. Game-Specific Solenoids & Lamps**
The factory reserves tests 70 through 75 for game-specific solenoids or lamps. Tests for these devices vary from machine to machine. Your machine’s software may not include tests 70 through 75.

**Sound Tests**

<table>
<thead>
<tr>
<th>Test</th>
<th>Subject</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Jackpot Tune</td>
</tr>
<tr>
<td>2</td>
<td>Large Hit</td>
</tr>
<tr>
<td>3</td>
<td>Medium Hit</td>
</tr>
<tr>
<td>4</td>
<td>Small Hit</td>
</tr>
<tr>
<td>5</td>
<td>Very Small Hit</td>
</tr>
<tr>
<td>6</td>
<td>Signature Tune</td>
</tr>
<tr>
<td>7</td>
<td>Jackpot Loop Tune</td>
</tr>
<tr>
<td>101</td>
<td>Coin Deposited</td>
</tr>
<tr>
<td>102</td>
<td>Bill Accepted</td>
</tr>
<tr>
<td>104</td>
<td>Reel Spin</td>
</tr>
<tr>
<td>108</td>
<td>Hopper Coin</td>
</tr>
<tr>
<td>109</td>
<td>Bonus Coin</td>
</tr>
<tr>
<td>110</td>
<td>BET 1 Pressed</td>
</tr>
<tr>
<td>117</td>
<td>Coin Reject</td>
</tr>
<tr>
<td>118</td>
<td>Tilt</td>
</tr>
<tr>
<td>119</td>
<td>CASH/CREDIT Pressed</td>
</tr>
<tr>
<td>120</td>
<td>Button Turned Off</td>
</tr>
<tr>
<td>121</td>
<td>Credit Bang-Up Loop</td>
</tr>
<tr>
<td>122</td>
<td>Credit Bang-Up Loop End</td>
</tr>
</tbody>
</table>

**Sequence 2. Sound Tests**

*Initial Display Values:*  
  - Credit 1  
  - Win Meter (Blank)  
  - Bet (Blank)
The three left digits in the Credit Display represent a sound's test number.

- **To select a sound**, find its number on the *Sound Tests* table. Repeatedly turn the JACKPOT RESET KEY until display numbers correspond to the table.

- **To test a sound**, press the SPIN REELS button. Listen for sound effects.

- **To enter Sequence 3 from any sound test**, press the DIAGNOSTIC button.

### Sequence 3. Display Digits Tests

*Initial Display Values:*  
- Credit: 8.8.8.8.8.  
- Win Meter: 8.8.8.8.8.  
- Bet: 8.

Several lighted segments make up each display digit. The first test in this sequence checks all the display segments. In the second test, the I/O Board sends several digits to all displays. Each display should match the others.

- **To enter Series 3**, press DIAGNOSTIC after Test 2.

**Test 1. Segment ("All 8's") Test**

Test 1 lights all display segments in each digit (all 8’s). Dim or blank segments may indicate a bad display, driver or cable. Check for loose connectors. **To enter Test 2**, press DIAGNOSTIC.

**Test 2. Digits Test**

To check your slot machine’s ability to display digits, press DIAGNOSTIC. Numerical by numerical, each display should light the digit sequence 1–2–4–8–0. One digit progresses through the sequence. Then the digit holds a zero, and the next display goes through the sequence. A display may pass the Segment Test, but fail to reproduce this digit sequence. That symptom indicates an I/O Board logic fault.

### Series 3. Hopper Test

*Initial Display Values:*  
- Credit: 0  
- Win Meter: (Blank)  
- Bet: 3

Put at least 40 coins in the hopper for this test. During the test, the Credit Display counts coins paid out. *The Hopper Test checks the...*

- Hopper drive circuitry  
- Motor brake  
- Hopper motor  
- Opto coin-out sensor

The I/O Board enables the hopper driver, a solid state relay (SSR). The SSR switches on the hopper motor and releases the brake. The hopper dispenses 10 coins. A coin-out sensor detects each coin leaving the hopper. The sensor transmits this information back to the CPU Board. After the tenth...
coin leaves the hopper, the CPU Board disables the hopper SSR. The SSR switches off the hopper motor and engages the brake.

Normally, the coin-out count appears on the Credit Display. If the hopper fails to dispense coins after three attempts, the hopper stops. Meanwhile, the Credit Display reads "HPrE," indicating "Hopper Empty." You'll also notice that the TILT lamp comes on.

- To start or repeat the Hopper Test, or recover from an error, press SPIN REELS.
- To enter Series 4, press DIAGNOSTIC.

### Series 4. Paytable Test

**Initial Display Values:**

- **Credit Display (Game ID/Pctage)**
- **Win Meter Display (Top Awd/Protocol)**
- **Bet Display (Max Bet)**

The Paytable Test displays six lines of data. These lines itemize some 10 important facts about slot machine software.

Initially, the software program identification number appears on the slot machine's three displays. This number has five parts. (The illustration in the margin shows the parts, and which display digits each part occupies. The table below the illustration provides several examples.) Then, every two seconds, the Paytable Test displays different game data: The program identification number alternates with game, operating system, data and sound software release numbers. Next, the jurisdiction software type appears on the slot machine's three displays. The data messages cycle on the displays until you press SPIN REELS or DIAGNOSTIC.

Example messages should help to clarify the Paytable Test's six messages. Consider this set of six typical messages A through F...

<table>
<thead>
<tr>
<th>Credit Display</th>
<th>Win Meter Display</th>
<th>Bet Display</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. 07296</td>
<td>02000</td>
<td>4</td>
</tr>
<tr>
<td>B. S rE1</td>
<td>5.05</td>
<td></td>
</tr>
<tr>
<td>C. S SYS</td>
<td>5.05</td>
<td></td>
</tr>
<tr>
<td>D. S dAt</td>
<td>5.00</td>
<td></td>
</tr>
<tr>
<td>E. Sound</td>
<td>4.00</td>
<td>0</td>
</tr>
<tr>
<td>F. Jur</td>
<td>StAnd</td>
<td></td>
</tr>
</tbody>
</table>

**Message A.** Row A, in the table above, depicts an example of paytable data as described in earlier paragraphs. The legend, "07296" appears in the Credit Display. These numerals identify game ID 072, with a percentage of 96. The Win Meter designates a top award of $200, and game protocol "0." (none). A "4" in the Bet Display specifies a four-coin maximum bet game.

**Message B** declares Game Software Release ("S rE1") 5.05.
Message C reports Operating System Release ("S SYS") 5.05.

Message D stipulates Data ROM Release ("S dAt") 5.00.

Message E refers to Sound ROM Release ("Sound") 4.00.

Message F identifies the slot software jurisdiction. In our example, "StAnd" refers to standard jurisdiction software. See the nearby table Jurisdiction ROMs and Jumpers. Most jurisdictions use standard software. Special jurisdictions sometimes require their own software. In addition, special jurisdictions always employ unique jumper settings on the I/O Board. These settings appear later in this chapter.

- To check payable awards, press SPIN REELS once for each award. Each time that you press SPIN REELS, the test advances to the next award. The reels spin and stop on each winning combination. The stops reference on the center line. Maximum and minimum payable awards alternate in the Win Meter Display. (See the NOTICE in the margin.) Awards occupy all five digits of the display. (Note this difference: In the program identification number described above, awards occupy only four display digits.) The Credit Display indicates the award number. For instance, a "1" indicates the top award. After each test, the display indicates the award for that combination.

- To recover from the failure, press SPIN REELS.

- To continue the Paytable Test, press SPIN REELS again.

After displaying the last award in the paytable, the Paytable Test ends.

- To enter Series 5, press DIAGNOSTIC. Or press SPIN REELS after the last non-zero award combination.

### Series 5. Reel Strip Test

Initial Display Values: Credit Win Meter Bet  
(Blank) (Blank) 5

The Reel Strip Test enables you to check each strip for proper installation on its reel.

- To begin a reel strip test, press SPIN REELS. The reels spin and stop at the next symbol (reel stop) on the reel. The Credit Display indicates the symbol (reel stop) number.

- Repeatedly press SPIN REELS until you've checked all the symbols. Each time you press SPIN REELS, the reels advance one stop.

---

**NOTICE**

**CHECKING PAYTABLE AWARDS.** Any top award over 99,999 appears in special notation. In this notation, "t" stands for the phrase, "times 10,000, plus..."

<table>
<thead>
<tr>
<th>Number</th>
<th>Notation</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-99,999</td>
<td>Conventional</td>
</tr>
<tr>
<td>100,000-990,099</td>
<td>xxxt</td>
</tr>
</tbody>
</table>

- In the table, the character x represents a decimal number.
- Multiply numbers before the character "t" by 10,000.
- Add numbers after the character "t" to the product.

Examples:
- 9,000 = 9000
- 99,999 = 99999
- 100,000 = 10t00
- 990,099 = 99t99

### Jurisdiction ROMs and Jumpers

<table>
<thead>
<tr>
<th>Jurisdiction ROMs and Jumpers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Std ROM + No Jumpers</td>
</tr>
<tr>
<td>(Most Jurisdictions)</td>
</tr>
</tbody>
</table>

Note: "Std" = Standard; "Spcl" = Special. Install standard or special ROM at XU3 on CPU Board.
Simultaneously, the Credit Display increments the symbol number.

- To enter Sequence 1 from any reel strip test, press the DIAGNOSTIC button. Or press SPIN REELS after you've checked the last symbol.

**Sequence 1. Show Secure Device Type**

*Initial Display Values:*

<table>
<thead>
<tr>
<th>Credit</th>
<th>Win Meter</th>
<th>Bet</th>
</tr>
</thead>
<tbody>
<tr>
<td>SEcur</td>
<td>4-Digit No.</td>
<td>(Blank)</td>
</tr>
</tbody>
</table>

Sequence 1 is a read-only function. Use Show Secure Device Type to view the type number of your GD's secure EEPROM. (On machines without a security device, this number is zero.) The secure EEPROM resides at CPU Board location XU27.

- To enter Series 6, press the DIAGNOSTIC button.

**Series 6. Denomination Settings**

Series 6, Denomination Settings, includes two sequences: Show Slot Machine Denomination, and Set Bill Validator Denomination.

**Sequence 1. Describe Coin Mechanism**

*Initial Display Values:*

<table>
<thead>
<tr>
<th>Credit</th>
<th>Win Meter</th>
<th>Bet</th>
</tr>
</thead>
<tbody>
<tr>
<td>35</td>
<td>00 (varies)</td>
<td>0 25 (varies)</td>
</tr>
</tbody>
</table>

Sequence 1 is a read-only function. Use Describe Coin Mechanism to check which mechanism your GD uses. Describe Coin Mechanism also indicates what coin type the mechanism accepts. See the Coin Mech Description Tables (in the margin). These tables list coin mech configurations and their display codes.

The Credit Display’s first two digits indicate the slot machine model. The next two digits signify coin nationality. The first Win Meter digit displays a coin mechanism code. The next four digits denote the currency value that your slot machine accepts. (A slot machine only accepts one denomination.) The machine denomination in cents appears on the Win Meter Display.

**Message A.** Row A, below, depicts an example of coin mechanism data as described in previous paragraphs. The legend, “40 1” appears in the Credit Display. These numerals indicate a model 40X (upright), Canadian machine. The Win Meter specifies a type “1 25” coin mech, the code for NRI and 25¢. A “6” in the Bet Display refers to Series 6.
Following the basic coin mechanism message, the displays continue to flash additional coin information. (See example messages “B” through “F” above.)

**Message B** identifies the type of RAM clearance software used at slot machine initialization. In our example, “Stnd” refers to RAM clearance software for standard coins. Most jurisdictions use standard coin software. If your slot machine accepts custom tokens, then it requires special RAM clearance software.

**Message C** is the header for Jumper Setting 1 on the I/O Board.

**Message D** indicates the status of the eight, soldered jumpers for Setting 1. The Credit Display conveys the high four jumper bits. The Win Meter Display conveys the low four jumper bits. A “1” signifies a connected jumper. A “0” signifies an open jumper.

**Message E** is the header for DIP Switch Setting 2 on the I/O Board.

**Message F** indicates the status of the eight DIP switches for Setting 2. The Credit Display conveys the high four switch bits. The Win Meter Display conveys the low four switch bits. A “1” signifies a connected switch. A “0” signifies an open switch.

- **To enter Sequence 2**, press the DIAGNOSTIC button.

**Sequence 2. Set Bill Validator Denomination**

*Initial Display Values:*

<table>
<thead>
<tr>
<th>Credit</th>
<th>Win Meter</th>
<th>Bet</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>“on” or “OFF”</td>
<td>(Blank)</td>
</tr>
</tbody>
</table>

Use *Set Bill Validator Denomination* to specify which bill values that your slot machine accepts. A bill value appears on the Credit Display. The Win Meter display indicates whether the slot machine accepts that denomination. A Display of “on” means accept, and “OFF” means reject. The *Bill Settings* table lists available denominations and their display codes. Continue to select and accept or reject denominations until you’ve completed every denomination.

- **To select the next denomination**, turn the JACKPOT RESET KEY.

- **To accept or reject a denomination**, press SPIN REELS. Check the Win Meter Display. A display of “on” means accept, and “OFF” means reject.

- **To return to the first denomination**, advance to the last denomination. Then turn the JACKPOT RESET KEY once more.

- **To enter Series 7**, press the DIAGNOSTIC button.

### Bill Settings

<table>
<thead>
<tr>
<th>Coin/Bill</th>
<th>Display</th>
</tr>
</thead>
<tbody>
<tr>
<td>$100</td>
<td>100</td>
</tr>
<tr>
<td>$50</td>
<td>50</td>
</tr>
<tr>
<td>$20</td>
<td>20</td>
</tr>
<tr>
<td>$10</td>
<td>10</td>
</tr>
<tr>
<td>$5</td>
<td>5</td>
</tr>
<tr>
<td>$2</td>
<td>2</td>
</tr>
<tr>
<td>$1</td>
<td>1</td>
</tr>
</tbody>
</table>
Series 7. Maximum Hopper Payout

Initial Display Values:  
\[
\begin{array}{ccc}
\text{Credit} & \text{Win Meter} & \text{Bet} \\
\text{HoPr} & \text{4-Digit No.} & 7 \\
\end{array}
\]

Series 7 selects the maximum number of coins that the hopper dispenses at once. Series 7 doesn't affect the number of coins paid out for the top award. Here's how Series 7 works: A win that equals or exceeds the Maximum Hopper Payout triggers a hand-pay event. The hand pay equals the difference between the win and the partial hopper pay amount. (An attendant must pay the hand pay amount.)

At or above the Maximum Hopper Payout, the GD reacts in either of two ways...

- In Cash Mode, the machine pays the partial payout amount set at Series 8. Remaining winnings must be hand paid.

- In Credit Mode, the machine increments its Credit Display by the partial payout amount. Remaining winnings must be hand paid.

Normally, an operator sets Maximum Hopper Payout to accommodate hopper size. Of course, the machine must never cash out more than hopper capacity, emptying the hopper. To prevent that situation, the machine prohibits a credit accumulation beyond the Maximum Hopper Payout.

In Credit Mode...

- If a win exceeds the Maximum Hopper Payout: The hopper provides a partial payout and a hand pay provides the remainder.

- If a win plus credits on the machine equal or exceed the Maximum Hopper Payout: The partial pay amount comes out of the hopper.

- If a win plus credits exceed the Maximum Hopper Payout: The hopper pays the win.

- The slot machine rejects a bill that increases credits up to or beyond the Maximum Hopper Payout.

The Credit Display indicates the maximum payout setting. The flashing digit indicates the value to set.

- To increment the flashing digit value, press SPIN REELS.

- To proceed to the next digit, turn the JACKPOT RESET KEY. With each turn of the key, the flashing digit sequentially advances from right to left.

- To enter Series 8, press the DIAGNOSTIC button.
Series 8. Hopper Partial Payout Limit

*Initial Display Values:* Credit Win Meter Bet

PArt 4-Digit No. 8

Series 8 selects the partial payout amount during a hand payout or jackpot. Select “0000” to allow no partial payout. Your choice appears in the Credit Display.

The Credit Display indicates the current partial payout amount. The flashing digit indicates the value to set.

- *To change the flashing digit value,* press SPIN REELS.
- *To proceed to the next digit,* turn the JACKPOT RESET KEY. With each turn of the key, the flashing digit sequentially advances from right to left.
- *To enter Series 9,* press the DIAGNOSTIC button.

In a hand payout situation, the candle flashes and the machine dispenses the allowed payout. The Credit Display indicates the amount dispensed. The Win Meter Display indicates the amount to be hand paid.

**Series 9. Progressive ID and Level**

The slot machine supports an interface to progressive systems. To use this system, turn on I/O Board DIP Switch 8 of Bank 2. Then make two settings...

- **ID (Range 0 to 32).** The slot machine ID.
- **Level (Range 0 to 8).** The number of active progressive levels on the system.

**Set the DIP Switch and Check the Jurisdiction Jumper**

1. Unlock and open the Main Door.
2. Turn power off at the PDU switch.
3. Unlock and open the card cage.
4. The I/O Board is the top card in the card cage. To disengage a board, pull the inside of its white board ejector tabs toward you. Remove the board.
5. Set DIP Switch 8, Bank 2 to "ON." Check to see that your jurisdiction jumper is in the correct position. See the table *I/O Board Jumper and Dip Switch Settings.*
6. Place the I/O Board on a flat surface. Use a ballpoint pen or small, flatblade screwdriver to set switches as desired.
7. Slide the circuit board back into its card cage slot. Push the board in firmly, but *don't force the board in.* Each board is keyed, and *only fits the proper slot.* Push the white board ejector tabs toward the cage. This action engages the board with the blind mating connector.

**NOTICE**

The Hopper Partial Payout Limit *can't* exceed the Maximum Hopper Payout. Suppose that you attempt to set up the machine that way. The machine zeros any digit that produces an excessive amount.
8. Clear the RAM by following the procedure in the *Maintenance and Troubleshooting* book, Chapter 2.
9. Close and lock the card cage.
10. Turn power on at the PDU switch.
11. Close and lock the Main Door.

**Sequence 1. Set Progressive ID**

*Initial Display Values:*

<table>
<thead>
<tr>
<th>Credit ID</th>
<th>Win Meter 2-Digit No.</th>
<th>Bet</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>9</td>
</tr>
</tbody>
</table>

The ID specifies the Progressive Controller's input from this slot machine. For instance, suppose that you've plugged the slot machine into Progressive Input 1. Set the Progressive ID to 1. *Never* set an ID to zero (*an invalid setting*).

If your slot machine doesn't support progressive capabilities, the Win Meter display reads "null." In machines without progressive capabilities, Sequence 1 is a read-only feature.

- To increment the flashing digit value, press SPIN REELS.

---

**I/O Board Jumper and DIP Switch Settings**

<table>
<thead>
<tr>
<th>DIP Bank</th>
<th>Jurisdiction</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 (Jumper Pad)</td>
<td>Standard Off</td>
<td>Off</td>
<td>Off</td>
<td>Off</td>
<td>Off</td>
<td>Off</td>
<td>Off</td>
<td>Off</td>
<td>Off</td>
</tr>
<tr>
<td></td>
<td>New Jersey On</td>
<td>Off</td>
<td>Off</td>
<td>Off</td>
<td>Off</td>
<td>Off</td>
<td>Off</td>
<td>Off</td>
<td>Off</td>
</tr>
<tr>
<td></td>
<td>Missouri Off</td>
<td>On</td>
<td>Off</td>
<td>Off</td>
<td>Off</td>
<td>Off</td>
<td>Off</td>
<td>Off</td>
<td>Off</td>
</tr>
<tr>
<td></td>
<td>France On</td>
<td>On</td>
<td>Off</td>
<td>Off</td>
<td>Off</td>
<td>Off</td>
<td>Off</td>
<td>Off</td>
<td>Off</td>
</tr>
<tr>
<td></td>
<td>Delaware Off</td>
<td>Off</td>
<td>On</td>
<td>Off</td>
<td>Off</td>
<td>Off</td>
<td>Off</td>
<td>Off</td>
<td>Off</td>
</tr>
</tbody>
</table>

| 2 (Switch) | Progressive Enabled On | Off | Off | Off | Off | Off | Off | Off | Off |
|            | Disabled Off | Off | Off | Off | Off | Off | Off | Off | Off |


- To proceed to the next digit, turn the JACKPOT RESET KEY. Each turn of the key advances the flashing digit sequentially, from right to left.

- To enter Sequence 2, press the DIAGNOSTIC button.

Sequence 2. Set Progressive Level

Initial Display Values: Credit Win Meter Bet
LEUEL 1-Digit No. 9

The Level setting tells the machine how many progressive levels to respond to.

If your slot machine doesn’t support progressive capabilities, the Win Meter display reads “null.” In machines without progressive controllers, Sequence 2 is a read-only feature.

- If you select Level 0: The machine doesn’t trigger a progressive response.

- If you select Level 1: Only a maximum coin win on the paytable’s top win line triggers a progressive win.

- If you select Level 2: Hitting either Level 1 or Level 2 triggers a progressive win. When a player hits Line 2, he only wins the second line, Level 2. He’s still eligible to win Line 1 in the future. When a player hits Line 1, he only wins the first line, Level 1. He’s still eligible to win Line 2 in the future.

- If you select any Level ‘X’, which is greater than 2: A maximum coin win on the paytable’s top ‘X’ win line triggers a progressive win.

- To increment the flashing digit value, press SPIN REELS.

- To enter Series 10, press the DIAGNOSTIC button.

Series 10. Lamp Test

Initial Display Values: Credit Win Meter Bet
LAmp r7 c3 0

Series 10 provides a test of all the lamps in the slot machine. This test supplements the test at Series 2.

Initially, the slot machine displays row and column numbers for the Bet One Switch lamp. (Row and column numbers refer to the Lamp Matrix. All microprocessor-controlled lamps are wired into the rows and columns of this matrix.)

The program blinks one lamp at a time. Pressing MAX BET advances the test to the next lamp. As each lamp blinks, the Credit Display indicates its name. Meanwhile, the Win Meter Display indicates the lamp’s row and

Note PC sheets before setting the Progressive Level. Some games limit how high you can set the progressive level. The machine doesn’t prevent you from setting the level beyond these game limits. For instance, suppose that a game has five levels. The GD won’t prevent you from setting the Progressive Level to eight.

NOTICE
CUSTOM FEATURES. In some slot machines, the Lamp Test is Sequence 1 of Series 10. These machines also include a number of “CF” or custom feature sequences. (For example, a programmable user message on the Dotmation display.) These sequences, which are game-specific and non-standard, are beyond this manual’s scope.
column.

The test checks leftmost lamps first. Then the test progresses to lamps on the right side of the machine.

*Here’s the nominal test order...*

- Button lamps
- Tilt lamps
- “Insert Coin” lamps
- Denomination lamps
- “Coin Accepted” lamps
- Disclaimer/Payline lamps
- Reel 1 lamps
- Reel 2 lamps
- Reel 3 lamps
- Bill Validator lamps

Game-specific lamps appear either at the beginning or at the end of the test. (For example, the wheel in *Top Cat* or the *Winning Streak* marquee.)

- *To advance to the next lamp and test it,* press MAX BET.

- *Replace burned out bulbs.*

**Exit to Game Play Mode**

- *To exit Series 10 and Administration Mode,* close and lock the Main Door. The reels spin and recycle to their previous game positions.

- *To reenter Diagnostic Mode,* press the DIAGNOSTIC button. A zero appears in the Bet Display and three digits appear in the Credit Display.
Chapter 3. Bookkeeping Mode

During Game Play Mode, the microprocessor continuously updates game statistics. The system stores this data in the CPU Board's CMOS RAM. In Bookkeeping Mode, the software arranges data in series of data meters. Each meter provides game information on one topic. The software stores related topics in the same series.

The slot machine presents game data as numeric codes on three displays: The Win Meter, Credit and Bet displays. A data series number appears on the Bet Display. The Credit and Win Meter displays convey meter data. See the display illustration below.

The battery backed, static RAMs maintain data meters during power failures.

The Bookkeeping Meter Series table lists the eight data meter series that Bookkeeping Mode tracks. Each series contains several meters.

Using Bookkeeping Mode
Consult Bookkeeping Mode to record game information regularly and before repairing the machine.

Enter Bookkeeping Mode

1. You can enter Bookkeeping Mode while the machine operates in Game-Over Mode or Tilt Mode. (The slot machine enters Game-Over Mode between games. No bet or jackpot is pending and the hopper is inactive. Tilt Mode means that a tilt prevents game play.) Find the JACKPOT RESET KEY switch near the SLOT HANDLE. Insert the JACKPOT RESET KEY and turn it clockwise. The slot machine enters Series 1.

2. Repeatedly turn the JACKPOT RESET KEY to advance between Bookkeeping Mode series. (Pressing MAX BET serves the same function as turning the JACKPOT RESET KEY.) Continue until you find the desired series. The series name appears in the Credit and Win Meter displays. For instance, in the first series, the word "coin" appears in the Credit Display. The word "info" appears in the Win Meter Display.

<table>
<thead>
<tr>
<th>Meter Series</th>
<th>Credit Display</th>
<th>Win Display</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Coin Info Mtrs</td>
<td>coin</td>
<td>info</td>
</tr>
<tr>
<td>2. Play Info Mtrs</td>
<td>PLAY</td>
<td>info</td>
</tr>
<tr>
<td>3. Play Log</td>
<td>PLAY</td>
<td>Lo9</td>
</tr>
<tr>
<td>4. Door Info Mtrs</td>
<td>door</td>
<td>info</td>
</tr>
<tr>
<td>5. Tilt Info Meters</td>
<td>tlt</td>
<td>info</td>
</tr>
<tr>
<td>6. Bill Info Meters</td>
<td>bill</td>
<td>info</td>
</tr>
<tr>
<td>7. Bill Log</td>
<td>bill</td>
<td>Lo9</td>
</tr>
<tr>
<td>8. Bet Info Meters</td>
<td>bet</td>
<td>info</td>
</tr>
<tr>
<td>9. Cash Info Meters</td>
<td>CASH</td>
<td>info</td>
</tr>
<tr>
<td>10. Line Info Meters</td>
<td>LinE</td>
<td>info</td>
</tr>
<tr>
<td>11. Progr Info Mtrs</td>
<td>Prog</td>
<td>info</td>
</tr>
</tbody>
</table>
NOTICE
In this manual, switch or button names appear in CAPITAL letters. For example, this manual often instructs you to “press DIAGNOSTIC.” DIAGNOSTIC is the DIAGNOSTIC button behind the Main Door. See the table Bookkeeping Mode Controls for other common switch names.

NOTICE
You can enter Bookkeeping Mode with the Main Door open or closed.

NOTICE
You can’t enter Bookkeeping Mode from within Administration Mode.

3. Press the SPIN REELS button to advance inside a series and view the next meter. SPIN REELS is on the player panel. The button lights up to prompt you. For instance, suppose that the Credit and Win Meter displays indicate "coin info." You press SPIN REELS to advance to the first meter, Coins In.

4. Observe meter data by reading displays: The five most significant digits (5MSD) appear in the Credit Display. The five least significant digits (5LSD) of data appear in the Win Meter Display. The one-digit Bet Display indicates the meter number, by alternately flashing two digits. Suppose that you’re interested in Coin Meter 01, which indicates 1.7 million coins in. The displays look this way...
   - The Credit Display reads “00017”
   - The Win Meter Display reads “00000”
   - The Bet Display reads “0,” then “1,” then blank (for Meter 01, Coins In)

Exit Bookkeeping Mode
To exit Bookkeeping Mode, either...
   - Close the Main Door if it was open. Otherwise open and close the door.
   - Repeatedly turn the JACKPOT RESET KEY until you exit the last series. The reels home and game data reappears in the displays. This is Game-Over Mode, where players may initiate a game. (If you’ve left the door open, a "0" appears in the Credit Display. Game data doesn’t appear until you close the door. A tilted slot machine returns to Tilt Mode, instead of Game-Over Mode.)

Bookkeeping Mode Displays
This chapter introduces a Bookkeeping Mode series with a highlighted table. Each table presents initial values for the Credit, Win Meter and Max Bet displays. Take a look at the table for Series 1 below...
Series 1. Coin Info

*Initial Display Values:*

<table>
<thead>
<tr>
<th>Credit</th>
<th>Win Meter</th>
<th>Bet</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 MSD</td>
<td>5 LSD</td>
<td>flashes 0, then 1</td>
</tr>
</tbody>
</table>

See the *Coin Info* table. The meter number appears in the Bet Display. The display flashes the first digit of the code, followed by the second. Then the display blanks. The sequence repeats until you enter the next series.

*Examples...*

- “0,” then “1,” then blank = Meter 01
- “0,” then “5,” then blank = Meter 05

- *To step through the meters in this series,* push SPIN REELS.

- Find the meter number that you want to examine by watching the Bet Display. When you see the number that you're interested in, look at the Credit and Win Meter displays. The most significant five digits for that meter appear in the Credit Display. The least significant five digits appear from left to right in the Win Meter Display.

- *To enter Series 2,* turn the JACKPOT RESET KEY.

**Meter Definitions**

Some meter names in the Coin Info series don't fully define the meters. In the following discussion, the manual briefly explains each meter's function.

**Meter 01. Coins In**
The Coins In Meter tracks the number of played credits. This meter tracks the sum of coins and credits bet.

**Meter 02. Coins Out**
Coins Out adds two quantities...  
- The number of coins out of the hopper  
- Credits bet from winnings

**Meter 03. Coins Drop**
Coins Drop adds two quantities...  
- The number of coins sent to the drop box  
- Sometimes bill validator credits *(depending on jurisdiction rules)*

**Meter 04. Bill Dollars**
The Bill Dollars Meter stores the dollar value of accepted bills.

**Meter 05. Credits HandPay**
The Credits HandPay Meter adds the number of credits that the attendant paid by hand.

---

**NOTICE**

Some jurisdictions require different meter specifications. Soldered jumpers on the I/O Board configure the slot machine for these jurisdictions. Consult local gaming regulations.
**Meter 06. Total Coins In**
Sum of Meters 7, 8 and 9.

**Meter 07. Normal Coin In**
The Normal Coin In Meter stores the number of coins inserted during normal game play.

**Meter 08. Escrowed Coin In**
The Escrowed Coin In Meter records the number of coins accepted at inappropriate times. These coins may be in the slot machine due to a coin lockout relay malfunction. Game software doesn’t count these coins as a bet.

**Meter 09. Error Coin In**
Number of coins that produced a long coin error (attempted cheat). Game software doesn’t count these coins as a bet.

**Meter 10. Total Coins Out**
Sum of meters 11 through 14.

**Meter 11. Hopper Coin Out**
Number of coins out of the hopper during normal game play.

**Meter 12. Escrow Coin Out**
Number of coins returned from among the escrowed coins.

**Meter 13. Test Coin Out**
Number of coins paid out in the Hopper Test.

**Meter 14. Extra Coin Out**
Number of extra coins paid out.

**Meter 15. Total Electronic Transfer In**
Sum of meters 16 and 17.

**Meter 16. Card Credits In**
Number of electronic credits entered into the slot machine.

**Meter 17. Bonus Credits In**
Number of bonus credits awarded.

**Meter 18. Total Electronic Transfer Out**
Sum of meters 19 and 20.

**Meter 19. Card Credits Out**
Number of electronic credits removed from the slot machine.

**Meter 20. Bonus Credits Out**
Number of bonus credits removed.
Series 2. Play Info

Initial Display Values: Credit Win Meter Bet
5 MSD 5 LSD flashes 0, then 1

See the Play Info Meters table. The meter number appears in the Bet Display. The display flashes the first digit of the code, followed by the second. Then the display blanks. The sequence repeats until you enter the next series.

• To step through the meters in this series, push SPIN REELS.

• Find the meter number that you want to examine by watching the Bet Display. When you see the number that you're interested in, look at the Credit and Win Meter displays. The most significant five digits for that meter appear in the Credit Display. The least significant five digits appear from left to right in the Win Meter Display.

• To enter Series 3, turn the JACKPOT RESET KEY.

Meter Definitions

Some meter names in this series don’t fully define the meters. In the following discussion, the manual briefly explains each meter’s function.

Meter 05. Total Hand Pays
The Total Hand Pays Meter tracks the number of hand payouts by the attendant.

Meter 07. Player Count
The Player Count Meter estimates how many people have played the slot machine. After game play and 20 seconds of idle time, the machine counts one more player.

Meter 08. Average Time Played
The Average Time Played Meter reports average play time per player. Average time appears in seconds.

Series 3. Play Log

Initial Display Values: Credit Win Meter Bet
Game No. Blank Blank

See the Play Log Meters table. In the Play Log Meter series, the Bet Display acts differently than it does in the other meter series. Here, the Bet Display doesn’t flash the meter number. Instead, the number appears in the Credit Display. Meanwhile, the Win Meter and Bet displays blank. The game number alternates with game data in the three displays. Credits on the machine, Credits Won, and Credits Bet appear after the game number.
• To step through the meters in this series, push SPIN REELS.

• Find the game number that you want to examine by watching the Credit Display. The reels spin and stop at positions corresponding to that game. The LEDs indicate that game’s data. (The Play Log doesn't record information on Demo Mode games.)

• To enter Series 4, turn the JACKPOT RESET KEY.

### Series 4. Door Info

*Initial Display Values:*

<table>
<thead>
<tr>
<th>Credit</th>
<th>Win Meter</th>
<th>Bet</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 MSD</td>
<td>5 LSD</td>
<td>flashes 0, then 1</td>
</tr>
</tbody>
</table>

See the Door Info Meters table. The meter number appears in the Bet Display. The display flashes the first digit of the code, followed by the second. Then the display blanks. The sequence repeats until you enter the next series.

• To step through the meters in this series, push SPIN REELS.

• Find the meter number that you want to examine by watching the Bet Display. When you see the number that you're interested in, look at the Credit and Win Meter displays. The most significant five digits for that meter appear in the Credit Display. The least significant five digits appear from left to right in the Win Meter Display.

• To enter Series 5, turn the JACKPOT RESET KEY.

### Meter Definitions

Some meter names in this series don’t fully define the meters. In the following discussion, the manual briefly explains each meter’s function.

**Meter 01. Main Door Access**

Main Door Access signals entry into the slot machine’s Main Door.

**Meter 02. Bill Validator Stacker Access**

Bill Validator Stacker Access notifies you that someone has removed the validator’s internal stacker.

**Meter 03. Bill Validator Door (Stacker) Access**

Bill Validator Door Access signals entry into the bottom DBV door. This door allows access to the DBV stacker.

**Meter 04. Logic Door Access**

Logic Door Access notifies you of entry into the card cage.
Series 5. Tilt Info
Initial Display Values: Credit Win Meter Bet
5 MSD 5 LSD flashes 0, then 5

See the Tilt Info Meters table. The meter number appears in the Bet Display.
The display flashes the first digit of the code, followed by the second. Then
the display blanks. The sequence repeats until you enter the next series.
Detailed troubleshooting procedures usually begin with Tilt Info meter
displays. See the Maintenance and Troubleshooting section.

- To step through the meters in this series, push SPIN REELS.
- Find the meter number that you want to examine by watching the Bet Display. When you see the number that you're interested in, look at the Credit and Win Meter displays. The most significant five digits for that meter appear in the Credit Display. The least significant five digits appear from left to right in the Win Meter Display.
- To enter Series 6, turn the JACKPOT RESET KEY.

Bill Validator Fault
A bill validator fault condition takes the bill validator out of service. Bill validator faults also cause the bill validator's external (green) LEDs to extinguish. The slot machine continues to allow play, but only with coins. To restore the bill validator to operation, you must service it.

Series 6. Bill Info
Initial Display Values: Credit Win Meter Bet
5 MSD 5 LSD flashes 0, then 1

See the Bill Info Meters table. The meter number appears in the Bet Display.
The display flashes the first digit of the code, followed by the second. Then
the display blanks. The sequence repeats until you enter the next series.

Notice
The Bill Info Meter called “Bill Count” zeroes when you remove the bill stacker. Zeroing this meter promotes accurate bill accounting during a collection.

---

Series 5. Tilt Info Meters

<table>
<thead>
<tr>
<th>Mtr</th>
<th>Subject</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>Empty Hopper</td>
</tr>
<tr>
<td>02</td>
<td>Jammed Hopper</td>
</tr>
<tr>
<td>03</td>
<td>Hopper Extra Coin Error</td>
</tr>
<tr>
<td>04</td>
<td>Hopper Runaway Error</td>
</tr>
<tr>
<td>05</td>
<td>Coin Jam</td>
</tr>
<tr>
<td>06</td>
<td>Long Coin</td>
</tr>
<tr>
<td>07</td>
<td>Rejected Coin</td>
</tr>
<tr>
<td>08</td>
<td>Bill Jam Service Door Access</td>
</tr>
<tr>
<td>09</td>
<td>Bill Validator Communication Fault</td>
</tr>
<tr>
<td>10</td>
<td>Bill Validator Fault</td>
</tr>
<tr>
<td>11</td>
<td>Jammed Bill Validator</td>
</tr>
<tr>
<td>12</td>
<td>Reel Opto Not Seen Error</td>
</tr>
<tr>
<td>13</td>
<td>Reel Opto Seen at Invalid Time Error</td>
</tr>
<tr>
<td>14</td>
<td>Power On/Reset</td>
</tr>
<tr>
<td>15</td>
<td>Battery Low or Dead Error</td>
</tr>
<tr>
<td>16</td>
<td>Mechanical Meter Error</td>
</tr>
<tr>
<td>17</td>
<td>Progressive Link Down</td>
</tr>
<tr>
<td>18</td>
<td>No Prog Win Response Confirmation</td>
</tr>
<tr>
<td>19</td>
<td>Fault in Communicating w/ Panel LEDs</td>
</tr>
<tr>
<td>20</td>
<td>I/O Board FPGA Programming Fault</td>
</tr>
<tr>
<td>21</td>
<td>Successful Memory Clear</td>
</tr>
<tr>
<td>22</td>
<td>User Unsuccessful RAM Clr Attempt</td>
</tr>
<tr>
<td>23</td>
<td>Soft RAM Clear</td>
</tr>
<tr>
<td>24</td>
<td>Secure and Game Data Don't Match</td>
</tr>
<tr>
<td>25</td>
<td>Both Sig Copies Corrupt; Clear RAM</td>
</tr>
<tr>
<td>26</td>
<td>Corrupt Main Sig Copy</td>
</tr>
<tr>
<td>27</td>
<td>Corrupt Backup Sig Copy</td>
</tr>
<tr>
<td>28</td>
<td>Both Op Sys Copies Corrupt; Clr*</td>
</tr>
<tr>
<td>29</td>
<td>Corrupt Main Copy of Op Sys Data</td>
</tr>
<tr>
<td>30</td>
<td>Corrupt Backup Copy of Op Sys Data</td>
</tr>
<tr>
<td>31</td>
<td>Both Meter Data Copies Corrupt; Clr*</td>
</tr>
<tr>
<td>32</td>
<td>Corrupt Main Meter Copy</td>
</tr>
<tr>
<td>33</td>
<td>Corrupt Backup Meter Copy</td>
</tr>
<tr>
<td>34</td>
<td>Both GameLog Copies Corrupt; Clr*</td>
</tr>
<tr>
<td>35</td>
<td>Corrupt Main GameLog Copy</td>
</tr>
<tr>
<td>36</td>
<td>Corrupt Backup GameLog Copy</td>
</tr>
<tr>
<td>37</td>
<td>Corrupt Heap</td>
</tr>
<tr>
<td>38</td>
<td>Full Heap</td>
</tr>
<tr>
<td>39</td>
<td>Corrupt Random Number Gen Seed</td>
</tr>
<tr>
<td>40</td>
<td>Corrupt Progressive Data</td>
</tr>
<tr>
<td>41</td>
<td>Both GS* Data Copies Corrupt; Clr*</td>
</tr>
<tr>
<td>42</td>
<td>Corrupt Main Copy of GS* Data</td>
</tr>
<tr>
<td>43</td>
<td>Corrupt Backup Copy of GS* Data</td>
</tr>
<tr>
<td>44</td>
<td>Both PS* Data Copies Corrupt; Clr*</td>
</tr>
<tr>
<td>45</td>
<td>Corrupt Main Copy of PS* Data</td>
</tr>
<tr>
<td>46</td>
<td>Corrupt Backup Copy of PS* Data</td>
</tr>
<tr>
<td>47</td>
<td>Dotmation Communication Error</td>
</tr>
</tbody>
</table>

*NOTE: GS = Game-Specific  
PS = Protocol Specific  
Clr = Clear the RAM
• To step through the meters in this series, push SPIN REELS.

• Find the meter number that you want to examine by watching the Bet Display. When you see the number that you're interested in, look at the Credit and Win Meter displays. The most significant five digits for that meter appear in the Credit Display. The least significant five digits appear from left to right in the Win Meter Display.

• To enter Series 7, turn the JACKPOT RESET KEY.

Series 7. Bill Log

Initial Display Values: Credit Win Meter Bet
5 MSD 5 LSD flashes 0, then 1

See the Bill Log Meters table. The meter number appears in the Bet Display. The display flashes the first digit of the code, followed by the second. Then the display blanks. The sequence repeats until you enter the next series.

• To step through the meters in this series, push SPIN REELS.

• Find the meter number that you want to examine by watching the Bet Display. When you see the number that you're interested in, look at the Win Meter Display. The dollar value of the inserted bill appears in the Win Meter Display.

• To enter Series 8, turn the JACKPOT RESET KEY.

Series 8. Bet Info

Initial Display Values: Credit Win Meter Bet
5 MSD 5 LSD flashes 0, then 1

See the Bet Info Meters table. The meter number appears in the Bet Display. The display flashes the first digit of the code, followed by the second. Then the display blanks. The sequence repeats until you enter the next series.

• To step through the meters in this series, push SPIN REELS.

• Find the meter number that you want to examine by watching the Bet Display. When you see the number that you're interested in, look at the Credit and Win Meter displays. The most significant five digits for that meter appear in the Credit Display. The least significant five digits appear from left to right in the Win Meter Display.

• To enter Series 7, turn the JACKPOT RESET KEY.
Series 9. Cash Info

Initial Display Values: Credit Win Meter Bet
5 MSD 5 LSD flashes 0, then 1

See the Cash Info Meters table. Series 9 contains total quantities, not equalized quantities like the Coin Info series above. For example, if someone inserts a bill in the machine, but doesn’t play credits, the Series 9 CREDITSINBILL increments, but the COINSIN in Coin Info doesn’t.

Card Credits
Card Credits enter the machine electronically, usually through a host system. One source of these credits is player tracking or debit cards. The player inserts the card into an electronic card reader. This reader relays appropriate information to the central system. The central system orders the slot machine to accept credits.

Bonus Credits
The central system might decide to give the player a bonus. Bonus Credits enter the machine electronically, usually through a host system.

- To step through the meters in this series, push SPIN REELS.

- Find the meter number that you want to examine by watching the Bet Display. When you see the number that you’re interested in, look at the Credit and Win Meter displays. The most significant five digits for that meter appear in the Credit Display. The least significant five digits appear from left to right in the Win Meter Display.

- To enter Series 7, turn the JACKPOT RESET KEY.

Series 10. Line Info

Initial Display Values: Credit Win Meter Bet
5 MSD 5 LSD flashes 0, then 1

Line Info meters the number of events that produces a win line combination. The meter number appears in the Bet Display. The display flashes the first digit of the code, followed by the second. Then the display blanks. The sequence repeats until you exit Series 10.

The number of Line Info meters depends on the game’s pay table. For example, winning a “top award” increments Meter 1 by one. Winning with the second best award combination increments Meter 2 by one.

Win line combination reports don’t depend on the bet or payout. For example, John bets one credit and wins $100. Mary bets three and wins $300. In either case, three sevens appear on the payline. The slot machine reports each case as one event.
**Buy-a-pay games:** The slot machine *only* reports win line events that produce a payout.

Some games create many meters for a winning combination. For example, Mary wins with three matching bars. That combination produces meters for three “1” bars, three “2” bars, three “3” bars, etc.

- *To step through the meters in this series,* push SPIN REELS.

- Find the meter number that you want to examine by watching the Bet Display. When you see the number that you’re interested in, look at the Credit and Win Meter displays. The most significant five digits for that meter appear in the Credit Display. The least significant five digits appear from left to right in the Win Meter Display.

- *To enter Series 11,* turn the JACKPOT RESET KEY.

**Series 11. Prog Info**

*Initial Display Values:*  
Credit: 5 MSD  
Win Meter: 5 LSD  
Bet: flashes 0, then 1

Like Series 10, Series 11 contains a meter for each potential win line combination. But Series 11 meters only increment for a progressive win at the corresponding progressive level. (Progressive wins *only* occur on maximum coin bets. For example, suppose that a player only bets one coin. Then he wins the top award combination. Due to his one-coin bet, he can't win a progressive amount.)

- *To step through the meters in this series,* push SPIN REELS.

- Find the meter number that you want to examine by watching the Bet Display. When you see the number that you’re interested in, look at the Credit and Win Meter displays. The most significant five digits for that meter appear in the Credit Display. The least significant five digits appear from left to right in the Win Meter Display.

**Exit to Game Play Mode**

To return to Game Play Mode, close the Main Door. (If the door is already closed, open and close it.) Or turn the JACKPOT RESET KEY.
Chapter 1. Periodic Maintenance

Collection and Supply
Regular slot machine collection and supply includes...
- Collecting bills from the bill validator (BV)
- Collecting coins from the pedestal cashbox
- Reading electromechanical meters

- Collecting Bills from the JCM Bill Validator
  1. Open the BV access door with your key. You'll find this door near the slot handle. The key also unlocks the handle mechanism. With the mechanism unlocked, you can pull the handle down, for easy stacker access.
  2. Push a cassette extraction tool into the doorway.
  3. After the extraction tool mates with the bill cassette, slide out the extraction tool.
  4. Slide an empty bill cassette through the doorway and into the BV. Don't use the extraction tool with this empty bill cassette! Also, take care not to install the cassette upside-down. The empty cassette's open end should face upward.
  5. Close and lock the BV access door.

- Collecting Coins
  1. Open the pedestal door with your key.
  2. Slide out the cashbox.
  3. Empty the cashbox.
  4. Replace the cashbox.
  5. Lock the pedestal.

- Filling the Hopper
  1. Unlock and open the Main Door.
  2. Switch off slot machine power.
  3. To ease the job, you may lift up, disengage and remove the coin tray.
  4. Add coins as necessary to the hopper.
  5. Replace the coin tray.
  6. Switch on slot machine power.
  7. Close and lock the Main Door.

- Reading Electromechanical Meters
  Observe your jurisdiction's meter procedures. The slot machine includes up to six non-resettable, electromechanical meters. The illustration depicts the meters and provides typical labels. The actual meter labels depend on your jurisdiction's rules. Don’t confuse electronic (soft) meters with electromechanical meters.

Bill Validator
With proper handling and routine preventive maintenance, you can eliminate most bill validator malfunctions. The following procedures assure top performance from JCM® dollar bill validators.

NOTICE
Follow your jurisdiction's procedures for logging currency collection.

NOTICE
“GD” stands for gaming device.

NOTICE
Make a permanent record of the number value on the original meter. Refer to your jurisdiction's rules for recording meter readings.
Periodic Maint

Clearing BV Jams

- Open cover.
- Lift upper scanner.
- Remove bill.
- Also remove cartridge and check for crumpled bills.
- Clean reader.

Bill Validator Lamps
Over the bill validator, a lighted sign normally reads "INSERT BILL FACE UP." This sign also indicates the status of the bill validator. If you can read the sign, the bill validator is normal. If the sign's lamps go out, you won't be able to read the "INSERT BILL" message. In that case, the slot machine has probably shut down the bill validator. (Otherwise, the bottom two bill validator lamps have burned out. This situation is quite unlikely.) Routinely check the sign to see if you can read the sign. If you can't, then service the validator.

Cleaning
MAG SENSOR PARTS. Regular cleaning is imperative. Sometimes iron filings adhere to the magnetic head and head roller. Filings can prevent your validator from receiving bills.

LENSES. To function properly, the bill validator must have clean sensor lenses and optical reflectors. Periodically cleaning the validator interior can prevent bill jams. If your validator takes in fewer than 4,000 bills a week, clean it once a month.

What if the validator takes in over 4,000 bills per week? Clean the unit twice a month.

Cleaning Procedure
- 1. Unlock and open the Main Door.
- 2. Switch off GD power at the PDU.
- 3. Pull forward on the spring-loaded rod at the top of the unit. Open the cover.
- 4. Release the securing lever. Lift the upper scanner.
- 5. If a bill is jammed in the validator, remove the bill.
- 6. The reader with an internal sensor may be dirty. A dirty reader can cause jams or reduce bill validation accuracy. Regularly clean the inside of the validator. Use a soft, lint-free cloth or swab to clean sensor lenses. Soak the cloth or swab with isopropyl alcohol. Clean oil smudges and fingerprints off the optical reflector disc.

Reassembly
- 1. Lower the upper scanner. Reengage the securing lever.
- 2. Close the cover. Push back on the spring-loaded rod at the top of the unit.
- 3. Switch on GD power at the PDU.
- 4. Close and lock the Main Door.

Simple Repairs
OBSERVE OPERATION. To determine the cause of malfunctions and detect defective parts, routinely observe validator operation. Before replacing parts, check the connectors: Do they engage properly? If the harness appears worn or damaged, replace it.

CAUTION
- Never use an organic solvent such as paint thinner.
- Never use compressed air to clean the bill validator unit!

WARNING
Avoid electrical shocks! Before working on the bill validator, turn off slot machine power.
• If the Validator Jams...
  Follow the steps at Cleaning. If the jam is inside the validator, lift the sensor plate. Rotate the plate to the front. Remove the bill.

Coin Comparator and Chute
WMS slot machines employ CC-16 Coin Comparator® brand coin comparators by Coin Mechanisms®. The model that WMS Gaming uses has the “D12V inhibit” feature. A coin comparator electronically compares the incoming coin to a sample coin. The incoming coin passes through a magnetic field, creating a characteristic signal. The sample coin passes through an equal magnetic field.

The comparator electronically contrasts the incoming coin signal with the sample coin signal. If the two signals differ, the internal lockout solenoid remains inactive. The incoming coin diverts to the "reject" track. Like signals energize the lockout solenoid. The solenoid allows the incoming coin to enter the "accept" track.

• Checking Comparator Performance
  1. Switch on the slot machine. Close and lock the Main Door.
  2. Insert the correct coin in the coin slot. The coin comparator should accept the coin. Be sure that the unit functions consistently! Repeat this step several times. (You may also want to run Input Test 10.)

• Installing the Sample Coin
  1. Slide the sample coin retainer toward the right side of the comparator. The illustration shows where to place the sample coin.
  2. Slip a circulated coin of the proper denomination into the sample coin retainer. Gently release the retainer. The sample coin retainer should tightly secure the sample coin.

CAUTION
JCM Bill Validator DIP Switch Settings. Your JCM dollar bill validator has two DIP switch banks. One bank has eight switches, and the other has two. The factory setting for these JCM DIP switches is switch 8 on. All other switches are off. Don't change these settings! Changes can cause the bill validator to malfunction.
Periodic Maint

CAUTION

Prevent comparator or slot machine damage! Before turning on the machine, perform the following tests...

- Be sure that the comparator mounts securely to the coin chassis.
- Check entry chute alignment by inserting the correct coin or an alignment tool. Coins should fall easily through the comparator and exit the reject chute.
- Route and fasten harness wires away from moving parts (for example, the reels).

NOTICE

For coin denominations between 5¢ and 25¢, use a coin mechanism wedge.

WARNING

Avoid electrical shocks! Before working on the comparator, turn off slot machine power.

NOTICE

To find coin entry part numbers for each denomination, refer to Section 3, Parts.

### Coin Comparator Specs for CC-16 Model

<table>
<thead>
<tr>
<th>Pin</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Lockout Enable</td>
</tr>
<tr>
<td>2</td>
<td>&quot;Coin In&quot; Output Signal</td>
</tr>
<tr>
<td>3</td>
<td>Not Connected</td>
</tr>
<tr>
<td>4</td>
<td>Not Connected</td>
</tr>
<tr>
<td>5</td>
<td>+12 VDC</td>
</tr>
<tr>
<td>6</td>
<td>Ground</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Coin Diameter Range</th>
<th>Max. Coin Thickness</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.705-1.575&quot; (17.9-40mm)</td>
<td>0.100&quot; (2.54 mm)</td>
</tr>
</tbody>
</table>

### Game Denomination

<table>
<thead>
<tr>
<th>Coin Denomination</th>
<th>Dia (Inch)</th>
<th>Dia (mm)</th>
<th>Weight Range (g.)</th>
<th>Weight Range (oz.)</th>
<th>Thickness Range (In.)</th>
<th>Thickness Range (mm)</th>
<th>Comparator Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>• US 5¢</td>
<td>0.705-1.250</td>
<td>17.907-31.750</td>
<td>4.4-6.8</td>
<td>0.154-0.238</td>
<td>0.05-0.086</td>
<td>0.127-0.184</td>
<td>09-42000-1</td>
</tr>
<tr>
<td>• US 25¢</td>
<td>0.705-1.250</td>
<td>17.907-31.750</td>
<td>6.9-19.6</td>
<td>0.242-0.686</td>
<td>0.05-0.086</td>
<td>0.127-0.184</td>
<td>09-42000-3</td>
</tr>
<tr>
<td>• US 50¢</td>
<td>1.250-1.575</td>
<td>31.750-40.005</td>
<td>19.7</td>
<td>0.794</td>
<td>0.075-0.115</td>
<td>1.905-2.921</td>
<td>09-42000-2</td>
</tr>
<tr>
<td>• SA 1 Rand</td>
<td>0.705-1.250</td>
<td>17.907-31.750</td>
<td>2.2-4.3</td>
<td>0.077-0.151</td>
<td>0.05-0.086</td>
<td>0.127-0.184</td>
<td>09-42000-4</td>
</tr>
<tr>
<td>• SA 1 Rand</td>
<td>0.700-1.250</td>
<td>17.78-31.250</td>
<td>5.5-10.4</td>
<td>0.193-0.364</td>
<td>0.05-0.115</td>
<td>0.127-0.219</td>
<td>09-42000-6</td>
</tr>
<tr>
<td>• SA 1 Rand</td>
<td>0.700-1.250</td>
<td>17.78-1.250</td>
<td>2.0-3.0</td>
<td>0.07-0.105</td>
<td>0.05-0.085</td>
<td>0.127-0.159</td>
<td>09-42000-7</td>
</tr>
</tbody>
</table>

### Coin Comparator Table

- Positioning the Coin Entry for a Different Denomination

Slot machines manufactured after March, 1995 have a fixed coin comparator bracket. Installing a different coin comparator requires a realignment of the coin comparator and coin entry.

With proper entry-to-chute assembly, coin jams are quite rare. Follow this assembly procedure...

1. Follow disassembly instructions at Removing the Coin Comparator, in this chapter.
2. Remove the two Phillips screws that fasten the coin entry to the player panel.
3. Remove the coin entry from the player panel.
4. Remove two nuts that secure the mounting hole plate to its mounting studs. If your machine doesn't have a mounting plate, see the NOTICES in the margin.
5. Remove the plate from the two studs in the player panel.
Reassembly

1. Be sure that you have the right mounting hole plate for your coin comparator’s denomination. (Each coin denomination requires its own plate.) Position the plate over the two studs in the player panel. The plate should fit flush against the player panel. Don’t force the plate. It only goes on one way. If your machine doesn’t have a mounting plate, see the NOTICES in the margin.

2. Secure the mounting hole plate to its mounting studs with two KEPS nuts. After installation, the plate should cover all but two coin entry mounting holes.

3. Place the coin entry on the player panel, roughly in position.

4. Notice the screw holes beside the top two bracket mounting studs. Mount the coin entry with two Phillips screws in these holes.

5. Follow Reassembly instructions at Removing the Coin Comparator, in this chapter.

Removing the Coin Comparator

1. Unlock and open the Main Door.

2. Switch off slot machine power.

3. Remove the cable that connects the comparator and Opto Board: Grasp the plug and pull it off the jack.

4. Remove the coin comparator: Raise the coin comparator slightly. Pull the bottom out. Then pull the coin comparator down and out of the machine. Set it aside for reassembly.

Reassembly

1. Mount the comparator: Slide the top comparator stud upward, against the bracket. Engage the top comparator stud with the top bracket notch. Pivot and lower the comparator base until the comparator engages the bottom notch. Check to see that the comparator seats properly.

2. Replace the cable that connects the comparator and Opto Board.

3. Switch on slot machine power.

4. Close and lock the Main Door.

Removing Opto Board from GDs w/One Belly Fluorescent Lamp

1. Unlock and open the Main Door.

2. Switch off slot machine power.

3. The Opto Board has two parts, the Receiver Board and the Transmitter (LED) Board. Find the Receiver Board inside the door, on the back of the coin chute. Unplug the two Receiver Board connectors.

4. Support the belly glass. Inside the door, raise black metal latches at either side of the belly lamp tray. You’ll find these latches just below the back of the player panel (control panel).
5. Lower and remove the belly glass and frame.
6. Examine the lamp tray just above the single, belly fluorescent lamp. On the latch (right) side of the door, you'll notice two access holes. Insert a Phillips screwdriver into one of these holes. Remove one of the Phillips screws that fasten the Transmitter Board. Remove the other screw from the second access hole.
7. Inside the Main Door, unplug the two Receiver Board connectors. Remove Phillips screws that fasten the Receiver Board.
8. Remove the Transmitter Board and the Receiver Board.

Reassembly
1. Position the new Transmitter Board: Place it on the coin chute side that bolts to the lamp tray. Position the new Receiver Board on the opposite side of the coin chute. Each optotransistor should face an LED through a hole in the coin chute. Be sure that you don't mount the boards backwards! Otherwise, optos and LEDs won't align with their holes.
2. Inside the Main Door, replace Phillips screws that fasten the Receiver Board.
3. Engage a Phillips screw (removed earlier) on your Phillips screwdriver. Insert the screwdriver into one of the lamp tray access holes. Fasten down one side of the Transmitter Board with this screw. Replace the other Transmitter Board screw at the second access hole.
4. Replace and raise the belly glass and frame.
5. Support the belly glass. Inside the door, lower black metal latches at either side of the belly lamp tray. You'll find these latches just below the back of the player panel (control panel).
6. Plug in the two Receiver Board connectors.
7. Switch on slot machine power.
8. Close and lock the Main Door.

- Removing Opto Board from GDs w/Two Belly Fluorescent Lamps
  1. Unlock and open the Main Door.
  2. Switch off slot machine power.
  3. The Opto Board has two parts, the Receiver Board and the Transmitter (LED) Board. Find the Receiver Board inside the door, on the back of the coin chute. Unplug the two Receiver Board connectors.
  4. Unplug the coin chute solenoid connector.
  5. Support the belly glass. Inside the door, raise black metal latches at either side of the belly lamp tray. You'll find these latches just below the back of the player panel (control panel).
  6. Lower and remove the belly glass and frame.
  7. You'll notice two belly fluorescent lamps. Carefully grasp one of
the belly lamps. Twist the fluorescent lamp in either direction until its pins come free of the sockets. Remove the lamp. If your GD has a second fluorescent lamp, remove it in the same way.

- 8. Support the coin chute. Remove four Phillips screws that secure the chute to the lamp tray. These screws are near the latch end of the door.
- 9. Remove the coin chute.
- 10. Remove Phillips screws that fasten the Transmitter Board and Receiver Board. Each board has two screws.
- 11. Remove the Transmitter Board and the Receiver Board.

Reassembly
- 1. Position the new Transmitter Board: Place it on the coin chute side that bolts to the lamp tray. Position the new Receiver Board on the opposite side of the coin chute. Each optotransistor should face an LED through a hole in the coin chute. Be sure that you don't mount the boards backwards! Otherwise, optos and LEDs won't align with their holes.
- 2. Fasten the Transmitter Board with two Phillips screws. Fasten the Receiver Board in the same way.
- 3. Position the coin chute on the lamp tray.
- 4. Support the coin chute. Replace four Phillips screws that secure the chute to the lamp tray. The screw holes are near the latch side of the door.
- 5. Replace the belly fluorescent lamps: Carefully grasp one lamp. Slide the lamp into its socket slots. Twist the lamp in either direction until its pins engage with the sockets. Replace the second fluorescent lamp in the same way.
- 6. Replace and raise the belly glass and frame.
- 7. Support the belly glass. Inside the door, lower black metal latches at either side of the belly lamp tray. You'll find these latches just below the back of the player panel (control panel).
- 8. Plug in the coin chute solenoid connector.
- 9. Plug in the two Receiver Board connectors.
- 10. Switch on slot machine power.
- 11. Close and lock the Main Door.

Glass

- **Replacing Belly Glass**
  - 1. Unlock and open the Main Door.
  - 2. Switch off slot machine power.
  - 3. Support the belly glass. Raise the left and right black metal latches at either side of the belly lamp tray. You'll find them just below the back of the player panel.
  - 4. Tilt the belly glass frame downward, to a 45 degree angle with the slot machine door. Pull the belly glass frame straight back until the hinge tabs disengage from the machine.

**NOTICE**

The glass frame in recently manufactured machines doesn't require foam tape.
5. Using an 11/32" nut driver, loosen four #8 KEPS nuts on the glass retaining bracket.
6. Slide the glass retaining bracket out of the frame.
7. Carefully remove the belly glass from its frame.

**Reassembly**

1. Carefully replace the belly glass in its frame. Position the top of the glass in the frame first. Then press the bottom of the glass against the frame's foam tape. If the tape is worn out, replace it.
2. Slide the glass retaining bracket into the frame.
3. Using an 11/32" nut driver, tighten four #8 KEPS nuts on the glass retaining bracket.
4. Hold the belly glass frame at a 45 degree angle to the slot machine front. Slide the belly glass hinge tabs straight forward into the belly slots.
5. Raise the belly glass frame. Hold it tight against the door. Lock down black metal latches at either side of the belly lamp tray. You'll find them just below the back of the player panel.
6. Switch on slot machine power.
7. Close and lock the Main Door.

**Removing the Topbox Glass**

1. Unlock and open the Main Door.
2. Switch off slot machine power at the Power Distribution Unit (inside the Main Door).
3. Lift the topbox glass by its bottom support bracket. The glass will disengage from the slot machine gutter. Gently pull the glass away from the machine.
4. If a topbox cable connects to the back of the glass, unplug the cable. Remove the glass. Be particularly careful of fragile shadowboxes that may be glued or taped to the glass. Also, take care not to damage the player tracking harness. Set the glass aside in a safe place.
5. **GDs Without Faceplates or PTUs:** Remove the metal, glass-support bracket bonded to the bottom of the glass. You can pry the bracket free from the glass with a flatblade screwdriver. **GDs With Faceplates or PTUs:** Loosen three retaining nuts on the faceplate bracket. Remove the bracket. Save the bracket or faceplate for reassembly.

**Reassembly**

1. Pick up the bracket or faceplate that you removed from the old glass. **GDs Without Faceplates or PTUs:** Use RTV® or equivalent glue for this step. Bond the glass-support bracket to the bottom of the glass. **GDs With Faceplates or PTUs:** Position the faceplate bracket on the bottom of the glass. Tighten three retaining nuts on the faceplate bracket.
2. If a topbox cable connects to the back of the glass, plug in the cable.
3. Replace the glass. Seat the topbox glass-support bracket.
securely in the slot machine gutter.

4. Switch on slot machine power at the Power Distribution Unit (near the Main Door hinge).
5. Close and lock the Main Door.

**Hopper**

- **Removing the Hopper**
  1. Unlock and open the Main Door.
  2. Switch off slot machine power.
  3. Lift up, disengage and remove the coin tray.
  4. Slide the hopper out. Sensors and power unplug from the blind mating connector as you slide the unit out.

**Reassembly**

1. Slide the hopper back into position. Sensors and power reengage at the blind mating connector as you slide the unit in.
2. Replace the coin tray.
3. Switch on slot machine power.
4. Close and lock the Main Door.

- **Replacing the Hopper Knife**
  1. Unlock and open the Main Door.
  2. Switch off slot machine power.
  3. Lift up, disengage and remove the coin tray.
  4. Remove coins from the hopper.
  5. Slide the hopper out. Sensors and power unplug from the blind mating connector as you slide the unit out.
  6. Set the hopper on a table.
  7. Unplug the two quick disconnect terminals of the hopper bowl sensor wires.
  8. Use a #2 metric Phillips screwdriver for this step. Orient the hopper so that the pinwheel faces frontward. Remove the four screws that fasten the hopper bowl to the hopper. Some of these screws may include tension springs or spacers. As you remove this mounting hardware, note its location on the hopper. Save screws and other hardware for reassembly. Remove the bowl.
  9. Use a #2 metric Phillips screwdriver for this step. Remove three Phillips screws that secure the coin exit cover plate. The coin exit cover plate resides at the top, left side of the pinwheel.
  10. Remove the cover plate. Now you’ll be able to see the knife, which was under the cover plate.
  11. Use a 7mm wrench for this step. Turn the hopper around, so that the motor faces frontward. Remove two hex nuts that secure the knife to the aluminum frame. The frame is the cylinder that surrounds the hopper pinwheel.
  12. Use a 7mm wrench for this step. Turn the hopper around, so that the pinwheel faces frontward. The hex head, knife bolts

**NOTICE**

Hopper bowl mounting hardware varies according to the hopper denomination. Not all screws are the same type. Some screws include hardware such as springs or spacers. Replace screws, springs and spacers in exactly the same location that you removed them from.

**NOTICE**

During disassembly, you may find shim washers on screws between the knife and the frame. During reassembly, replace these shims in the same locations where you found them.
reside at the top, right side of the frame. Loosen the knife bolts. Remove the bolts, knife and shims together. Save them for reassembly.

13. Remove the old hopper knife.

Reassembly

1. Orient the hopper so that the pinwheel faces frontward. Properly position the new hopper knife, mounting bolts, lock washers and shims. Loosely install the hopper knife bolts.
2. Prop up the knife with metal shims that came with the hopper.
3. Tighten the knife bolts with a 7mm wrench.
4. For this step, use a feeler gauge. A suitable gauge is available from hardware and auto stores. Place the feeler gauge under the knife tip, between the tip and the pinwheel. Use the gauge to measure the gap between the knife and the pinwheel. Your goal is to achieve the proper measurement, 0.2mm, or 0.008 inch. As necessary, repeat steps 2 through 4. Use fewer or additional shims to regap the knife until you obtain the specified gap.
5. Use a 7mm wrench for this step. Turn the hopper around, so that the motor faces frontward. Replace two hex nuts that secure the knife to the aluminum frame.
6. Turn the hopper around, so that the pinwheel faces frontward. Position the coin exit cover plate over the knife.
7. Use a #2 metric Phillips screwdriver for this step. Replace the three Phillips screws that secure the coin exit cover plate.
8. Use a #2 metric Phillips screwdriver for this step. Replace the hopper bowl. Be sure to replace hardware exactly where it came off the hopper during disassembly.
9. Reconnect the bowl sensor wires, by plugging in two quick disconnect terminals.
10. Slide the hopper back into position. Sensors and power reengage at the blind mating connector as you slide the unit in.
11. Replace the hopper coins.
12. Replace the coin tray.
13. Switch on slot machine power.
14. Perform a software test of the Hopper. GD software includes a hopper test in Administration Mode. This test dispenses 10 coins.
15. If the hopper fails the test, troubleshoot the hopper. Otherwise, close and lock the Main Door.

• Setting the Hopper Probe Level
1. Unlock and open the Main Door.
2. Switch off GD power.
3. Lift up, disengage and remove the coin tray.
4. Remove coins from the hopper.
5. Slide the hopper out. Sensors and power unplug from the blind mating connector as you slide the unit out.
6. Inspect the hopper: Before filling the hopper with coins, remove dust, dirt, loose hardware and other foreign matter. The hopper must be clean, or it can jam!
7. See the table *Hopper Probe Level*. Adjust the hopper coin-level probe. Move the probe to a *higher* hole if the hopper will hold more coins. Move the probe to a *lower* hole if the hopper will hold fewer coins.

**Reassembly**

1. Check the hopper-full probe cable. Make sure that it attaches firmly through quick disconnects on the probe and bowl ground.
2. Fill the hopper with coins of the proper denomination. See the table *Hopper Probe Level*. The table provides the optimum number of coins for each coin-level probe hole.
3. Slide the hopper back into position. Sensors and power reengage at the blind mating connector as you slide the unit in.
4. Check that the hopper's mounting base firmly engages both rails of the track.
5. Replace the coin tray.
6. Switch on GD power and check the hopper. Use Series 1, Input Test 15 of your GD's Administration Mode diagnostic and adjustment software. This test will help you to check probe function. *Hopper works*: Proceed to the next step. *Hopper doesn't work*: Switch off GD power. Double-check cable connections and the hopper. Repeat this step until the hopper passes Input Test 15.
7. Close and lock the Main Door.

* Vertically Aligning the Hopper Coin-Out Sensor

1. Unlock and open the Main Door.
2. Switch off slot machine power.
3. Lift up, disengage and remove the coin tray.
4. Slide the hopper out. Sensors and power unplug from the blind mating connector as you slide the unit out.
5. Set the hopper on a table.
6. Find the motor lock lever on the motor. Release the lever by pushing it down. Spin the hopper shaft.
7. Stop the hopper when a coin reaches top dead center on the counting lever roller.
8. The hopper coin-out sensor is a capacitive proximity sensor. Find the black, proximity sensor fork that resides between the circuit board and the motor. This sensor fork straddles the coin counting flag. Two screws allow you to adjust the fork sideways, for best fork-to-flag fit. This first set of screws is above the fork. Two other screws allow you to adjust the fork up and down on the flag. This second set of screws is below the fork. Loosen the second set of screws. By moving the sensor fork, align bottom edges of the coin counting flag and fork.
9. Tighten the screws.

**Reassembly**

1. Slide the hopper back into position. Sensors and power reengage at the blind mating connector as you slide the unit in.
2. Replace the coin tray.
3. Switch on slot machine power.
4. Run Series 1, Input Test 14 of your GD’s Administration Mode diagnostic and adjustment software. This test will help you to check proximity sensor operation. As necessary, make adjustments and repeat this step until you are satisfied with equipment performance.
5. Run the Hopper Test, Series 3 of your GD’s Administration Mode diagnostic and adjustment software. This test will help you to verify that the hopper counts coins correctly. As necessary, make adjustments and repeat this step until you are satisfied with equipment performance.

6. Close and lock the Main Door.

Lamps

- **Removing Buttons and Replacing Bulbs**
  1. Unlock and open the Main Door.
  2. Switch off slot machine power.
3. Grasp the lamp bracket just behind the plastic nut. Hold the top of the button so that it won’t pop off. Firmly rock the lamp bracket back and forth until it disengages from the button housing. Then pull the lamp bracket away from the button housing. *(Take care not to bend switch leads.)*

4. Grasp and pull the old bulb straight out.

5. If necessary, remove the button housing by unscrewing the notched, plastic nut. Lift the button housing off the Main Door.

**Reassembly**

1. Replace the bulb. Use a type CM86 or equivalent bulb.

2. Replace the button housing through the button hole. Make sure that the letters read right-side up. Secure the button housing by screwing the plastic nut onto the housing. *(The serrated edge of the plastic nut should face the player panel.)*

3. Hold down the button and snap the lamp bracket back on. Test the button to be sure that the bracket seats properly.

4. Switch on slot machine power.

5. Close and lock the Main Door.

**Power Distribution Unit**

- **Replacing Power Distribution Unit Fuses**
  1. Unlock and open the Main Door.
  2. Switch off slot machine power. The main power fuse is part of the slot machine’s Power Distribution Unit. As shown on the illustration, the fuse is on the PDU front panel.
  3. Unscrew the plastic fuse knob.

- **Reassembling**
  1. Replace the fuse. *(In 110-volt GDs, use a 4ASB, 250V fuse. In 220-volt GDs, use a 2ASB, 250V fuse.)*
  2. Return the knob to its position on the PDU front panel.
  3. Twist the plastic fuse knob until it reengages.
  4. Switch on slot machine power.
  5. Close and lock the Main Door.

**Reels**

- **Replacing and Aligning a Reel Strip**
  1. Unlock and open the Main Door.
  2. Switch off GD power at the PDU.
  3. Unplug the cable to the Reel Motor Control Board. The reel motor cable plug is in front of the reel mechanism. *(Take care not to damage delicate mass termination connector pins!)*
  4. Lift up the thumb lever in front of the reel mechanism that you want to remove.
  5. Slide the front leg of the reel mechanism out from under the thumb lever.
  6. Remove the reel mechanism.

*WARNING*

Electric shock hazard! Unplug the slot machine before working on the Power Distribution Unit or power transformer.

*CAUTION*

Don’t over-torque reel mechanism clips!

*NOTICE*

Some slot reel games employ two of the same reel strip. For example, your game may require two copies of Reel Strip ‘A’ and one Reel Strip ‘B’. If so, mount a copy of Reel Strip ‘A’ at Position ‘A’ and Position ‘C’. Mount the remaining reel strip, marked ‘B’, at Position ‘B’.
7. Turn the reel until you find the reel strip seam. Slide your fingernails under the edge of the seam and raise the strip slightly. Lift the strip by the seam.

8. Remove the reel strip from the reel.

9. If you plan to reuse the same reel strip, you must replace the mounting tape. Remove the old tape from the back of the reel strip.

10. Inspect the reel for wobble that may indicate a worn core. If you notice wear at the motor T-drive, replace the reel.

Reassembly

Reel strips differ, but the three reel mechanisms are identical. Still, you must put the proper reel strip on each reel. That is, Reel Strip ‘A’ must be installed on the reel at Position ‘A’. (As you face the machine, the leftmost reel occupies position ‘A’. Position ‘B’ is the next position to the right, and so forth.)

The top of each reel strip bears an ‘A’, ‘B’ or ‘C’. Match each strip to the reel at the appropriate position. (As a reminder, some chassis include a reel position label under each reel mechanism.) If you ever interchange reel mechanism positions, also interchange the reel strips. A strip must remain in the designated reel position. Yet the strip need not remain on the same reel.

Reel movement also affects reel strip placement. The reel revolves down. The leading edge of the strip should be on the outside of the strip overlap. That way, if the trailing edge comes loose, players can still use the GD. With the strip installed this way, reel spin tends to hold the strip to the reel.

1. Apply a piece of double-sided adhesive tape horizontally across the top (print reads normally) of the back of the reel strip. Also put two pieces of tape along the sides near the bottom of the reel, again on the back side.

2. Find the brace that has two sets of holes. Align the bottom of the reel strip with the bottom edge of this horizontal brace, after removing the backing from the bottom two tape strips. Seal the reel strip to the reel by pushing the reel strip against the reel. Support the inside of the reel with your hand to avoid deforming the reel.

3. Turn the reel basket to wrap the new reel strip around the reel. The reel strip symbols should be right-side up. Be careful that you aren’t mounting it upside-down!

4. Remove the backing from the top tape strip. Using hand pressure as above, seal the tape and reel strip to the reel. The top of the reel strip must now adhere tightly to the horizontal tape strip.

5. Align the three opto interrupter tabs: The opto stop is usually the first symbol or the jackpot symbol. Opto stop placement is critical: The three opto stops must line up. Without alignment, reel symbols can’t stop together on the payline. You can adjust
one reel's opto stop position by moving the reel's opto interrupter tab. You can move the opto interrupter position over a broad, two-and-a-half inch range. Begin alignment by sliding each opto tab to the center of the opto stop symbol. Take care not to bend the opto interrupter track.

6. Slide the reel mechanism into position in the GD. The back leg should rest against the rear mounting flange.

7. Lift up the thumb lever in front of the reel. Use the thumb lever to fasten down the reel mechanism's front leg. Be sure that the reel is straight. Otherwise, it might jam and damage drive electronics. A bump on the thumb lever should mate to a recess in the reel mechanism. The lever should snap firmly into place.

8. Plug in the reel motor cable.

9. Switch on GD power.

10. Align the jackpot symbol with the payline on the window: Start by checking symbol positions through the glass. Close the Main Door. Watch reels spin and stop. Your height may cause parallax (visual alignment problems) between a reel and the payline. Look through the Main Door for a payline reflection on the reel. Line up the reflection behind the real payline. Then you know that you’re looking squarely at the reel. Touch up adjustments. Recheck alignment by playing a few games and observing the ending reel position.

11. Close and lock the Main Door.

- **Replacing a Reel**
  1. Unlock and open the Main Door.
  2. Switch off slot machine power.
  3. Unplug the cable to the Reel Motor Control Board. Take care not to damage delicate mass termination connector pins!
  4. Lift up the thumb lever in front of the reel that you want to remove.
  5. Slide the front leg of the reel mechanism out from under the thumb lever. Remove the reel mechanism.
  6. Follow instructions at Replacing and Aligning a Reel Strip, in this chapter.
  7. Use a small, flatblade screwdriver to slip off the reel E-ring. Save the E-ring for reuse.
  8. Remove the flat washer from the old reel. Save the washer for reuse.
  9. Pull the reel off the motor shaft.
  10. Remove the four rubber O-rings from the motor shaft’s T-top. Discard them. Never reuse O-rings.

**Reassembly**

1. Install four new rubber O-rings on the motor shaft’s T-top. Never reuse O-rings.

2. Position a new reel on the motor shaft.

3. Find the flat washer that you removed from the old reel. Place it on the new reel. Install the Reel’s Flat Washer.

**CAUTION**

Change the reel O-rings whenever you replace a reel. Never attempt to reuse O-rings. Otherwise, your machine's reels may behave erratically, and its reels may wear out prematurely.
the washer over the motor shaft. The washer must contact the hub.

- Secure the reel with the E-ring that you removed from the old reel.
- Follow Reassembly instructions at Replacing and Aligning a Reel Strip, in this chapter.
- Slide the reel mechanism into position in the slot machine. The back leg should rest against the rear mounting flange.
- Lift up the thumb lever in front of the reel. Slide the reel mechanism into position. Fasten down the reel mechanism by releasing the lever over the frame’s front leg. A bump on the thumb lever should mate to a recess in the reel mechanism. The lever should grip the frame firmly. Be sure that the reel is straight. Otherwise, it might jam and damage drive electronics.
- Plug in the reel motor cable.
- Switch on slot machine power.
- Close and lock the Main Door.

• Replacing a Reel General Illumination Bulb
- Follow instructions at Replacing and Aligning a Reel Strip, in this chapter.
- Pull the wedge-base, 555 bulb straight away from the socket.

Reassembly
- Push the new wedge-base, 555 bulb straight into the socket.
- Follow Reassembly instructions at Replacing and Aligning a Reel Strip, in this chapter.
Chapter 2. CPU Board, Software and Game Denomination Changes

Board and Software Changes
CPU Board or game software replacement isn’t particularly difficult. Yet replacing these parts involves more than casual board or chip swapping. Before proceeding, you must understand some basics about the CPU Board and its security system. This chapter presents this information in a quick capsule form.

Denomination Changes
The procedure on changing your GD’s denomination appears later in this chapter.

Card Cage Components
The CPU Board and Driver Board reside in the card cage. The card cage is inside the Main Door. *(See the illustration below.)* At the back of the card cage is a blind mating backplane. This backplane attaches peripherals to the card cage circuit boards. For security purposes, the card cage door locks. A door security switch also monitors door openings and closures.

EPROM and RAM Interaction

Game EEPROM Security
When WMS develops new game EPROMs, four pieces of data define this new software...

**NOTICE**
In this manual, switch or button names appear in CAPITAL letters. For example, this manual often instructs you to “press DIAGNOSTIC.” DIAGNOSTIC is the DIAGNOSTIC button behind the Main Door.
Both the Data EPROM and the static RAM store these four pieces of data. Suppose that you install a game EPROM: The CPU compares this EPROM's data with data in the static RAM. If the data doesn't match, the machine displays a tilt code...

- "6A nn E CH n 6E 1" indicates a mismatch between Game EPROM XU2 and Data EPROM XU3. That is, someone installed a non-matching Game or Data EPROM. (For example: Your machine has a Wild and Loose Game EPROM and a Top Cat Data EPROM.) You can't clear a 6A nn E CH n 6E 1 tilt with a mismatched set of EPROMs. Instead, you must install two chips of the same type.

- "6A nn E CH n 6E 2" indicates that someone changed the Game type. For example, you just changed a Top Cat machine to a Wild and Loose machine.) To clear this tilt, remove the CPU Board EPROMs and install the old ones. Or press the Diagnostic Button to load new data to the static RAM. See the "CLEARING" bullet below.

- "6A nn E CH n 6E 3" indicates a game version change at CPU Board EPROMs XU2 and XU3. See the "CLEARING" bullet below.

- "6A nn E CH n 6E 4" indicates a checksum change at CPU Board Game EPROM XU2. See the "CLEARING" bullet below.

- "6A nn E CH n 6E 5" indicates a checksum change at CPU Board Data EPROM XU3. See the "CLEARING" bullet below.

CLEARING "6A nn E CH n 6E 2" through "6A nn E CH n 6E 5". To clear any of these tilts, press DIAGNOSTIC. The machine loads the new game information. If you've cleared the RAM properly before installing new EPROMs, the machine displays "clr". (Clear this tilt by again pressing DIAGNOSTIC.) Otherwise, the “nEEd clr” tilt message appears. This tilt indicates that you must clear the RAM and reinstall the EPROMs. Use a RAM clear chip of the correct denomination.

Software Installation

- Unlock and open the Main Door.
- Turn power off at the PDU switch.
- Disengage the coin chute.
- Unlock and open the card cage.
- Disengage the CPU (bottom) board by pulling the white board ejector tabs toward you. Remove the board. If your GD came with diagnostic software, remove EPROM XU3. Save the Diagnostic chip for later use.
- Obtain the RAM Clear Chip for the proper denomination. Use this...
chip to clear the RAM and set the GD denomination. See How to Perform a Hard (Total) RAM Clearance in this chapter.

7. Track the software change in your official logbook. Install EPROMs at these CPU Board locations...
   - Game and Data EPROMs at XU2 and XU3
   - Sound EPROMs at XU17, XU18, XU30 and XU31 (Some GDs don't use all these EPROMs.)

8. Return the CPU Board to the card cage. Engage the board by pushing its white board ejector tabs toward the cage.

9. Close and lock the Card Cage Door.

10. Slant top machines only: Reengage the coin chute.

11. Turn on the power at the PDU switch. Run a complete diagnostic check to assure that your GD functions nominally.

12. Close and lock the Main Door.

Clearing the CPU Board RAM

Slot machine game software monitors important RAM blocks to verify data integrity. The monitored information includes game meters, coin timing values, configuration parameters, game log data, etc. If the GD detects corrupt data, the GD produces a tilt.

For error detection and recovery purposes, the system maintains duplicate copies of some RAM blocks. If only one copy is corrupt, the other RAM block serves as a master. The GD can copy this block over the erroneous block. This situation is an example of a recoverable RAM error. Yet, if both blocks are corrupt, full recovery is impossible. This situation exemplifies an unrecoverable RAM error.

Six unrecoverable RAM errors exist...

- CRC 1 1 OPERATING SYSTEM DATA
- CRC 2 1 MAIN METER DATA
- LOG 1 GAME LOG DATA
- PROG CRC PROGRESSIVE DATA

---

**NOTICE**

Some slot machines don't use all EPROM locations.

---

**CAUTION**

When inserting EPROMs, match EPROM notches to the notches on chip sockets. White markings on the board also indicate proper chip notch position. Improperly inserting a chip can destroy it.
Recovering data requires that you clear the RAM. You may clear RAM in either of two ways, depending on the problem's severity. A hard RAM clearance restores data to values stored in a special EPROM. A soft RAM clearance restores data to the last values stored by the GD.

When to Clear the RAM
Clear the RAM...
• IF YOU WANT TO CHANGE THE GD DENOMINATION (HARD RAM CLEAR)
• BEFORE YOU CHANGE A GAME OR DATA ROM (HARD RAM CLEAR)
• IF THE GD ALERTS YOU OF A RAM ERROR (HARD OR SOFT RAM CLEAR)

Hard RAM Clearance *(Total RAM Clearance)*
A hard RAM clearance requires you to install a RAM Clear-Denomination EPROM in the GD. The RAM Clear EPROM initializes GD parameters that command GD software to reset. After software installation, GD game software reinitializes or clears GD parameters to their default values.

After hard RAM clearance initialization, the GD system writes several values to the secure EEPROM. These values include...
• UNIQUE GD DATA
• DENOMINATION COIN TIMINGS
• RAM SIGNATURE VALUES

(This data remains unchanged until after another hard RAM clearance initialization.) The machine meters also reset to zero. The GD copies the meters to the secure device.

Soft RAM Clearance *(Partial RAM Clearance)*
To get the GD running again, you can perform a soft (partial) RAM clearance. Unlike a hard RAM clearance, a soft RAM clearance doesn’t require EPROM installation. A soft RAM clearance recovers secure EEPROM data and reinstalls it into the Game RAM. Other parameters reinitialize to their hard RAM clearance values or their values before the error.

What Soft RAM Clearance Achieves
After a Soft RAM clearance, several values reset to hard RAM clearance values. Among these are Bill Log Data, Line Info Meters and GD configuration parameters. GD configuration parameters include...
• SOUND VOLUME LEVELS
• HOPPER PAY LIMIT
• REEL SPEED

*(Configuration parameter examples... Sound Vol Level: 1 - 70; Hopper Pay Limit: 500; Reel Speed: Medium; etc. You can check or alter these parameters in Administration Mode. To read Bill Log Data and Line Info Meters, enter Bookkeeping Mode.)*

The Game Log and Game Credits reinstall, if possible. (If the Game Log isn't
corrupt, it reinitializes to resolve customer disputes. Game Credits follow the same rule. Credits return to the last credit value before the RAM error occurred. If the Game Log or Game Credits value is corrupt, the system can’t reinstall it.)

Due to the unrecoverable RAM error, the system resets all other RAM data. Reinitializing this data assures that the GD returns to a stable, known state. The system also restores EEPROM data (coin timings, RAM signature data, and essential GD meters). The GD system loses very little information.

After every 100 games, GD software updates machine metering information on the secure EEPROM. Metering information also updates when you enter Administration Mode or Bookkeeping Mode. A soft RAM clearance may lose up to 99 games worth of meter information.

How to Perform a Soft (Partial) RAM Clearance
A soft RAM clearance is easy to perform. After an unrecoverable RAM tilt occurs, press DIAGNOSTIC. When the system finishes the soft RAM clearance, press DIAGNOSTIC again. At this point, a “Soft Clear” tilt occurs.

How to Perform a Hard (Total) RAM Clearance
The RAM-clearing procedure requires a special RAM Clear Chip. Before you can clear the RAM, you must install this chip in the GD. The RAM Clear Chip...

• SETS THE GD DENOMINATION
• CLOSES OUT THE GD’S RAM (INCLUDING SOFT METERS)

You have to temporarily install the RAM Clear Chip in your GD. After you power up the chip, it initializes the GD denomination. The new denomination value appears on the Win Meter Display. A ‘6’ appears on the Bet Display. For each denomination, you’ll need a different RAM Clear Chip. *(WMS can provide clear chips for most coin denominations.)*

The RAM Clear Chip also initializes the RAM signature variable. After you reinstall the game EPROM, it checks the RAM signature. This signature signals the game EPROM that...

• YOU CLEARED THE RAM
• YOU CHANGED THE DENOMINATION
• YOU MUST REINITIALIZE THE GAME

Required Equipment

• RAM CLEAR KIT FOR APPROPRIATE DENOMINATION
  • CHIP EXTRACTION TOOL
  • ANTISTATIC WRIST STRAP

Hard RAM Clear Chip Procedure

• *Remove the CPU Board*
  □ 1. Unlock and open the Main Door.
  □ 2. Turn power off at the PDU switch.
3. Unlock and open the card cage.
4. *Slant top machines only*: Disengage the coin chute.
5. The CPU Board is the bottom card in the card cage. Disengage the CPU Board by pulling its white board ejector tabs toward you. Remove the board.
6. Remove Data EPROM XU3 from its socket. *(Leave the other EPROM XU2, in its socket.)*

### Install and Use the RAM Clear Chip

7. Install the RAM Clear Chip in EPROM socket XU3. As you insert the chip, be careful to align chip pins. Inserting the chip backwards can damage it.
8. Return the CPU Board to the card cage. Engage the board by pushing its white board ejector tabs toward the cage.
10. Turn GD power ON. Verify that the proper denomination appears on the LED displays.
11. Turn GD power OFF.
12. Open the card cage.
13. Disengage the CPU Board by pulling its white board ejector tabs toward you. Remove the board.
14. Remove the RAM Clear Chip.

### Install the Game Chip

15. Reinsert the Data EPROM in socket XU3.
16. Return the CPU Board to the card cage. Engage the board by pushing its white board ejector tabs toward the cage.
17. Close the Card Cage Door.
18. *Slant top machines only*: Reengage the coin chute.
19. Turn GD power ON. The message “clr” should appear on the Credit Display. This message indicates proper clearing of the RAM. If you’ve also performed a game change, “6A N E CH AN 6E” appears first. Press DIAGNOSTIC to load the new game information. Then “clr” appears, indicating the cleared RAM.
- Lock the card cage.

**Reinitialize the System**
- Push the DIAGNOSTIC button. The machine shuts down and reboots. If you cleared the machine properly, the message "clr" appears on the Credit Display. Push the DIAGNOSTIC button to acknowledge this message.
- Close and lock the Main Door.

### Changing the Denomination

1. Unlock and open the Main Door.
2. Turn power off at the PDU switch.
3. **Slant top machines only**: Disengage the coin chute.
4. Change the denomination decals on the GD's Reel Hatch.
5. Change the coin denomination of the coin comparator. (Or change the coin comparator.)
6. Change the front of the coin entry.
7. **Hopper Machines**: Change the hopper.
8. Perform a hard RAM clear with the proper RAM Clear Chip. See the procedure above.
Chapter 3. Troubleshooting

Tilt Codes
When the machine enters Tilt Mode, the Tilt Lamp on the reel glass lights. Simultaneously, a mnemonic tilt code appears in the Credit Display. See the Tilt Codes table. (More detailed tables later in this chapter cover all these tilts.) There are several types of tilt codes...

CPU EEPROM Tilts
CPU EEPROM Tilts reveal failures of CPU Board Security EEPROM XU27. To clear security tilts, open and close the Main Door.

CPU EPROM Tilts
A CPU EPROM tilt alerts you that someone has changed a game or data EPROM. To clear CPU EPROM tilts, press the DIAGNOSTIC Button.

DBV/Coin Mech Tilts
DBV and Coin mech tilts involve problems with the bill validator and coin comparator. To clear DBV and Coin mech tilts, open and close the Main Door. Coin mech tilts "coinl" (long coin) self-clears after 25 seconds. While the Main Door is open, slot software suppresses coin tilts. Tilt suppression permits you to repair the coin mech without accumulating irrelevant tilts.

Door Access Tilts
Door access tilts provide information on the Stacker, Logic Door, Drop Door and Bill Door. An open door or missing stacker produces a tilt. To clear door access tilts, close the open door. Uncleared power-off ("POFF") door access tilts self-clear after seven seconds.

Dotmation Tilts
Dotmation tilts convey data on Dotmation and Dotmation+ displays and control electronics. For example, initialization, bad data packets and reel mechanism failures produce Dotmation tilts. The GD also produces a tilt if its Dotmation EPROM version is incorrect. To clear Dotmation tilts, open and close the Main Door.

Hard Meter Tilts
Hard meter tilts describe improper operation of hard meters behind the Main Door. These sturdy, electromechanical meters report important game statistics. Electromechanical meters offer a degree of data security, because you can't reset them. Yet despite their ruggedness, hard meters occasionally fail. Hard meter tilts keep tabs on these unlikely, but possible hard meter failures. To clear hard meter tilts, open and close the Main Door.

Hopper Tilts
Hopper tilts report hopper maladies. These maladies can involve either electronic or mechanical problems, and hopper tilts cover both possibilities. To clear hopper tilts, open and close the Main Door. While the Main Door is open, slot software suppresses hopper tilts. Tilt suppression permits you to repair the hopper without accumulating irrelevant tilts.
Jurisdiction Jumper Tilts
Jurisdiction jumper tilts announce various improper jumper settings. To clear jumper tilts, turn off the machine. Set jumpers properly. Clear the RAM. Turn on the machine and retest it.

PGA Chip Tilts
PGA Chip tilts alert you to failures of the Xilinx® PGA (Programmable Gate Array) chip. The PGA chip is a unique, dynamically programmable input/output chip. It resides on the I/O Board. PGA chip XU41 primarily handles peripheral switch inputs. To clear PGA tilts, open and close the Main Door.

Progressive Tilts
Progressive tilts disclose communication failures between the slot machine and progressive system. To clear progressive tilts, open and close the Main Door.

Reel Display Tilts
Reel Display tilts point out communication failures between the CPU and Reel Display Board. The Reel Display Board is the main LED display board. This board contains the Credit, Win Meter and Bet displays. Some display failure modes may prevent the LEDs from displaying a tilt message. To clear reel display tilts, open and close the Main Door.

Reel Opto Tilts
Reel Opto tilts track failures in the reel feedback system. The feedback system helps the slot computer to control reel position. To clear reel tilts, open and close the Main Door.

Sound Tilts
A sound tilt results if a sound EPROM fails the version test. Sound EPROMs reside on the CPU Board, and may include XU17, XU18, XU30 and XU31. (Some machines use fewer than four chips.) To clear sound tilts, install the proper sound EPROMs. You need not clear the RAM.

Static RAM Tilts
Static RAM tilts signal errors in data stored in the slot computer’s CMOS static RAM chips. To clear static RAM tilts, clear the RAM.

Watchdog Tilts
Watchdog tilts caution you that the Watchdog Timer has timed out. The Watchdog may time out if the processor becomes stuck in a logic loop. A bad memory device or logic board may cause a looping error.

Candle Codes
The two-stage candle on top of the machine indicates slot machine status. The slot machine employs both levels of the candle to convey information about its operation. See the Candle Codes table, later in this chapter.
### Button and Switch Troubleshooting Guide

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Probable Cause</th>
<th>Solutions</th>
</tr>
</thead>
</table>
| Button: A Player Panel button doesn't operate | 1. Loose cable connection at top of Backplane Board  
2. Bad player panel wiring  
3. Bad switch  
4. Bad switch wiring  
5. Bad Faston® connector  
2. Repair or replace player panel cable.  
3. Replace switch.  
4. Rewire switch.  
5. Replace connector at button.  
6. Service input or replace I/O Board. |
| Button and Switch: Opening and closing any door or pressing DIAGNOSTIC Button fails to clear error messages | 1. System halt  
2. Loose connection at switch | 1. Turn power off and wait three seconds. Then turn power on.  
2. Repair connection. |
| Button Lamp: A Player Panel button lamp doesn't light | 1. Bad bulb  
2. Loose cable connection at top of Backplane Board  
3. Bad player panel wiring  
4. Bad Faston® connector  
5. Bad switch wiring  
2. Plug cable in securely.  
3. Repair or replace player panel cable.  
4. Replace connector at button.  
5. Rewire switch.  
6. Service output or replace I/O Board. |
| Switch: ADMINISTRATOR KEY switch doesn't operate | 1. Bad switch  
2. Bad cable harness  
3. Bad Faston® connector  
2. Repair or replace harness.  
3. Replace connector at Backplane Board or I/O Board.  
4. Service input or replace I/O Board. |
| Switch: Door switch doesn't operate | 1. Bad switch  
2. Bad switch cable  
3. Bent, maladjusted or missing actuator bracket  
4. Bad switch wiring  
5. Bad switch input on I/O Board | 1. Replace switch.  
2. Repair or replace switch cable.  
3. Straighten, adjust or replace bracket.  
4. Rewire switch.  
5. Service input or replace I/O Board. |

### Candle Codes Troubleshooting Guide

<table>
<thead>
<tr>
<th>Candle Section</th>
<th>Candle Activity</th>
<th>Meaning</th>
</tr>
</thead>
</table>
| Top            | 1. Off  
2. On  
2. Change request.  
3. Tilt or Jackpot Mode. |
| Bottom         | 1. Off  
2. Fast flash  
3. Slow flash  | 1. Main Door is closed.  
2. Main Door is open.  

### Communication Troubleshooting Guide

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Probable Cause</th>
<th>Solutions</th>
</tr>
</thead>
</table>
| No Communication | 1. Bad power line to slot machine.  
2. Blown 4ASB, main PDU fuse.  
3. Bad communication cables.  
4. Bad external communication power supply.  
5. Bad I/O or Backplane Board. | 1. Make sure that slot machine is on live circuit. Check protocol is optioned properly.  
2. If fuse is bad, replace it.  
3. If cables are bad, repair or replace them.  
4. If your GD has external communication power supply, replace it.  
5. Replace Board and rerun test. |
# CPU Board 7-Segment Display Troubleshooting Guide

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Probable Cause</th>
<th>Solutions</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU Board displays &quot;1&quot;</td>
<td>1. Xilinx® PGA chip-loading failure (I/O Board and FPGA)</td>
<td>1. Replace I/O Board and rerun test.</td>
</tr>
<tr>
<td></td>
<td>2. Bad Xilinx PGA IC XU41 on I/O Board</td>
<td>2. Replace PGA.</td>
</tr>
<tr>
<td>CPU Board displays &quot;2&quot;</td>
<td>Watchdog timeout</td>
<td>1. Replace the CPU Board.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. EPROM or bus buffer may be bad.</td>
</tr>
<tr>
<td>CPU Board displays &quot;3&quot;</td>
<td>On CPU Board, failing voltage at static RAM backup battery</td>
<td>1. Save game play, pricing and other location-programmed information to the central system (or write it down).</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Power down the GD.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3. Remove CPU Board. Replace battery Batt1/1A.</td>
</tr>
<tr>
<td></td>
<td><strong>CAUTION</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Without battery, GD loses vital information at power-down.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4. Replace CPU Board and rerun test.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>5. After test, &quot;3&quot; lights again: Original battery is good. MAX791 chip U11 may be bad.</td>
<td></td>
</tr>
<tr>
<td>CPU Board displays &quot;4&quot;</td>
<td>DSP power-up diagnostics failed</td>
<td>1. Replace CPU Board. Rerun test.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Hear more than one &quot;bong&quot; at startup? Yes: A Sound EPROM or DSP RAM (6116 chips U38-U40) may be bad.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3. DSP chip XU37 may be bad.</td>
</tr>
<tr>
<td>CPU Board displays &quot;5&quot;</td>
<td>LED panel (game display) communication fault</td>
<td>1. Firmly reseat connectors at both ends of cable. Turn game off for five seconds. Then turn it on again.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. After test, &quot;5&quot; lights again: Swap LED Board. Turn game off for five seconds. Then turn it on again.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3. After second test, &quot;5&quot; lights again: Original LED Board is good. Swap I/O Board. Turn game off for five seconds. Then turn it on again.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4. After third test, &quot;5&quot; lights again: Original I/O Board is good. Swap LED cable. Turn game off for five seconds. Then turn it on again.</td>
</tr>
<tr>
<td>CPU Board displays &quot;8&quot;</td>
<td>• Briefly, at power-up: Game OK.</td>
<td>1. Constant &quot;8&quot;: Replace EPROMs XU2, XU3. Save old ones. Rerun test.</td>
</tr>
<tr>
<td></td>
<td>• &quot;8&quot; remains on: Dead CPU Board</td>
<td>2. After test, &quot;8&quot; appears and remains on: Dead CPU. Original EPROMs are good. Swap CPU Board. Rerun test.</td>
</tr>
</tbody>
</table>
### CPU Board EEPROM Troubleshooting Guide

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Probable Cause</th>
<th>Solutions</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;GAnnE DisAb X&quot; appears in displays</td>
<td>Host computer took GD out of service.</td>
<td>Check reason for situation with host system administrator.</td>
</tr>
<tr>
<td>&quot;SEcur 1&quot; appears in displays</td>
<td>Someone changed CPU EEPROM 1 (security EEPROM)</td>
<td>Press DIAGNOSTIC.</td>
</tr>
<tr>
<td>&quot;SEcur 2&quot; appears in displays</td>
<td>CPU EEPROM 1 (security EEPROM) may be bad or missing</td>
<td>Replace XU27 on CPU Board and press DIAGNOSTIC.</td>
</tr>
<tr>
<td>&quot;SEcur 3&quot; or &quot;SEcur 4&quot; appears in displays</td>
<td>CPU EEPROM 1 (security EEPROM) contains corrupt data</td>
<td>Replace XU27 on CPU Board and press DIAGNOSTIC.</td>
</tr>
</tbody>
</table>

### CPU EPROM Troubleshooting Guide

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Probable Cause</th>
<th>Solutions</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;6AnnE CHn6E 1&quot; appears in displays.</td>
<td>Mismatch between Game EPROM XU2 and Data EPROM XU3 on CPU Board.</td>
<td>Install matching set of EPROMs.</td>
</tr>
<tr>
<td>&quot;6AnnE CHn6E 2&quot; appears in displays.</td>
<td>Game type change.</td>
<td>Acknowledge change by pressing DIAGNOSTIC.</td>
</tr>
<tr>
<td>&quot;6AnnE CHn6E 3&quot; appears in displays.</td>
<td>Game version change.</td>
<td>Acknowledge change by pressing DIAGNOSTIC.</td>
</tr>
<tr>
<td>&quot;6AnnE CHn6E 4&quot; appears in displays.</td>
<td>1. Checksum change since last power-up at CPU Board Game EPROM XU2. 2. Bad CPU Board Program EPROM or Backplane EEPROM 3. Bootleg CPU Board EPROM at XU2</td>
<td>1. Acknowledge change by pressing DIAGNOSTIC. 2. Replace bad Program EPROM or Backplane EEPROM. 3. Replace bootleg EPROM at XU2 with legitimate, WMS part.</td>
</tr>
<tr>
<td>&quot;6AnnE CHn6E 5&quot; appears in displays.</td>
<td>1. Checksum change since last power-up at CPU Board Data EPROM XU3. 2. Bad CPU Board Program EPROM or Backplane EEPROM 3. Bootleg CPU Board EPROM at XU3.</td>
<td>1. Acknowledge change by pressing DIAGNOSTIC. 2. Replace bad Program EPROM or Backplane EEPROM. 3. Replace bootleg EPROM at XU3 with legitimate, WMS part.</td>
</tr>
<tr>
<td>&quot;ronn1&quot; appears in Credit Display.</td>
<td>1. ROM checkum error (Bad CPU Board Game EPROM XU2) 2. Bad data bus bits on CPU Board 3. Bad buffer, etc. on CPU Board data bus</td>
<td>1. Replace EPROM XU2. Look for repeat of &quot;ROM&quot; diagnostic message. 2. No message: Problem solved! 3. Message repeats: Replace CPU Board or bench test bus and bus devices.</td>
</tr>
<tr>
<td>&quot;ronn2&quot; appears in Credit Display.</td>
<td>1. ROM checkum error (Bad CPU Board Data EPROM XU3) 2. Bad data bus bits on CPU Board 3. Bad buffer, etc. on CPU Board data bus</td>
<td>1. Replace EPROM XU3. Look for repeat of &quot;ROM&quot; diagnostic message. 2. No message: Problem solved! 3. Message repeats: Replace CPU Board or bench test bus and bus devices.</td>
</tr>
<tr>
<td>&quot;tablE&quot; appears in displays.</td>
<td>Bad game data</td>
<td>Replace EPROM XU3.</td>
</tr>
</tbody>
</table>
Troubleshooting

CPU Sound Jumpers

<table>
<thead>
<tr>
<th>Jumper J2 Position</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>From &quot;P7&quot; to &quot;P7 OUT&quot;</td>
<td>CPU Board contains 8 meg sound EPROMs.</td>
</tr>
<tr>
<td>From &quot;P7 OUT&quot; to &quot;+5&quot;</td>
<td>CPU Board contains 4 meg sound EPROMs.</td>
</tr>
</tbody>
</table>

CPU Startup Sounds Troubleshooting Guide

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Probable Cause</th>
<th>Solutions</th>
</tr>
</thead>
<tbody>
<tr>
<td>No startup bong</td>
<td>1. Disconnected speaker</td>
<td>1. Check speaker wiring continuity. 2. Replace the I/O Board.</td>
</tr>
<tr>
<td></td>
<td>2. Sound circuit problem</td>
<td></td>
</tr>
<tr>
<td>1 startup bong</td>
<td>Normal system</td>
<td>Proceed with next test.</td>
</tr>
<tr>
<td>2 startup bongs</td>
<td>Bad CPU Board EPROM XU30</td>
<td>1. Replace XU30, clear RAM and retest machine. 2. Check sound jumper J2 for correct setting.</td>
</tr>
<tr>
<td>3 startup bongs</td>
<td>Bad CPU Board EPROM XU31</td>
<td>Replace XU31, clear RAM and retest machine.</td>
</tr>
<tr>
<td>4 startup bongs</td>
<td>Bad CPU Board EPROM XU17</td>
<td>Replace XU17, clear RAM and retest machine.</td>
</tr>
<tr>
<td>5 startup bongs</td>
<td>Bad CPU Board EPROM XU18</td>
<td>Replace XU18, clear RAM and retest machine.</td>
</tr>
<tr>
<td>6 to 9 startup bongs</td>
<td>Not used</td>
<td>Recount number of bongs.</td>
</tr>
<tr>
<td>10 startup bongs</td>
<td>Bad CPU Board Sound RAM U38, U39 or U40</td>
<td>1. Replace bad chip, clear RAM and retest machine. 2. Run Sound Tests.</td>
</tr>
</tbody>
</table>
### Troubleshooting

#### Symptom Probable Cause Solutions

**Bill validator “Insert Bill” lamps are out.**

1. Full or jammed bill validator (DBV)
2. Faulty cable from DBV to panel mount cable or Backplane Board
3. I/O Board communication failure
4. Bill validator failure

<table>
<thead>
<tr>
<th>Probable Cause</th>
<th>Solutions</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. Check or replace DBV data cable.</td>
<td></td>
</tr>
<tr>
<td>3. Replace faulty I/O Board, or service DBV communication link.</td>
<td></td>
</tr>
</tbody>
</table>

**Bill Validator (DBV) won’t accept currency**

1. Bad bill
2. Improper entry at Series 6, Sequences 1 and 2 of Administration Mode (Game adjustment software)
3. Bad or disabled DBV
4. Loose DBV power connections
5. Dust and dirt
6. Wrong DBV DIP switch settings
7. Bad data cable
8. Bad I/O Board

<table>
<thead>
<tr>
<th>Probable Cause</th>
<th>Solutions</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Try another bill.</td>
<td></td>
</tr>
<tr>
<td>2. Correct entries at Admin Mode.</td>
<td></td>
</tr>
<tr>
<td>3a. Slot machine accepts coins: Does DBV take bill in and then spit it out? Yes: Bill may put machine over hopper payout limit. No: Replace DBV.</td>
<td></td>
</tr>
<tr>
<td>3b. Slot machine doesn’t accept coins: Slot machine is locked out, door is open or machine is tilted. Clear tilts and shut door.</td>
<td></td>
</tr>
<tr>
<td>4. Check for 120 VAC at power cable, or for loose connections.</td>
<td></td>
</tr>
<tr>
<td>5. Clean DBV with DBV cleaning pad.</td>
<td></td>
</tr>
<tr>
<td>6. Check DIP switch settings.</td>
<td></td>
</tr>
<tr>
<td>7. If cable is bad, replace it.</td>
<td></td>
</tr>
<tr>
<td>8. Replace I/O Board.</td>
<td></td>
</tr>
</tbody>
</table>

- Coins jam the comparator
- “coinJ” message doesn’t appear
- Slot machine doesn’t give credits

<table>
<thead>
<tr>
<th>Probable Cause</th>
<th>Solutions</th>
</tr>
</thead>
<tbody>
<tr>
<td>No sample coin in coin comparator’s sample coin retainer</td>
<td></td>
</tr>
</tbody>
</table>

**“coinJ” appears on Credit Display**

1. Coin Jam
2. Misaligned Opto Board halves (transmitter and receiver)
3. Dirty or faulty Opto Board
4. Repeated jams: Misaligned coin entry

<table>
<thead>
<tr>
<th>Probable Cause</th>
<th>Solutions</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Clear coin jam.</td>
<td></td>
</tr>
<tr>
<td>2. Realign and remount board halves.</td>
<td></td>
</tr>
<tr>
<td>3. Can’t clear tilt by cycling power? Opto Board may be faulty. Use Input Tests 11, 12 to check for proper switching. Display should read “0” with no coins in chute.</td>
<td></td>
</tr>
<tr>
<td>4. If board fails test, clean or replace board.</td>
<td></td>
</tr>
</tbody>
</table>

**“coinl” appears on Credit Display**

1. Long Coin (Coin took too long between detector optos.)
2. Possible Diverter Door misalignment.

<table>
<thead>
<tr>
<th>Probable Cause</th>
<th>Solutions</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Player tried strung coin.</td>
<td></td>
</tr>
<tr>
<td>2. Check Diverter Door alignment.</td>
<td></td>
</tr>
</tbody>
</table>

**“coinr” appears on Credit Display**

1. Reversed coin.
2. Possible Diverter Door misalignment.

<table>
<thead>
<tr>
<th>Probable Cause</th>
<th>Solutions</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Player tried to remove coin with string or similar device.</td>
<td></td>
</tr>
<tr>
<td>2. Check Diverter Door alignment.</td>
<td></td>
</tr>
</tbody>
</table>

**Coins don’t drop**

1. Coin jam in coin chute
2. Someone inserted coin that was too large

<table>
<thead>
<tr>
<th>Probable Cause</th>
<th>Solutions</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Find jam location by looking through coin chute slits.</td>
<td></td>
</tr>
<tr>
<td>2. Insert small, flatblade screwdriver to guide coin down and out.</td>
<td></td>
</tr>
<tr>
<td>3. Slide sample coin retainer open (as shown on its label). Coin drops out.</td>
<td></td>
</tr>
</tbody>
</table>

**Slot machine doesn’t give credits**

1. Bad harness between comparator and opto
2. Bad Opto Board
3. Bad I/O Board

<table>
<thead>
<tr>
<th>Probable Cause</th>
<th>Solutions</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Replace comparator.</td>
<td></td>
</tr>
<tr>
<td>2. Repair or replace Opto Board.</td>
<td></td>
</tr>
<tr>
<td>3. Repair or replace I/O Board.</td>
<td></td>
</tr>
</tbody>
</table>

**“StAc oPEn” appears on Credit Display**

1. No stacker
2. Bent STACKER switch mounting bracket
3. Bad cable
4. Bad STACKER switch
5. Bad switch input on I/O Board

<table>
<thead>
<tr>
<th>Probable Cause</th>
<th>Solutions</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Replace stacker.</td>
<td></td>
</tr>
<tr>
<td>2. Bend bracket back into position.</td>
<td></td>
</tr>
<tr>
<td>3. Replace cable.</td>
<td></td>
</tr>
<tr>
<td>4. Replace STACKER switch.</td>
<td></td>
</tr>
<tr>
<td>5. Service input or replace I/O Board.</td>
<td></td>
</tr>
</tbody>
</table>

**“StAc POFF” appears on Credit Display**

Security breach: Someone opened Stacker Door while power was off.

<table>
<thead>
<tr>
<th>Probable Cause</th>
<th>Solutions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Security breach: Someone opened Stacker Door while power was off.</td>
<td>To clear tilt, open and close Main Door, or press DIAGNOSTIC button.</td>
</tr>
</tbody>
</table>
## Door Troubleshooting Guide

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Probable Cause</th>
<th>Solutions</th>
</tr>
</thead>
</table>
| "bill oPEn" appears on Credit Display        | 1. Open Bill Door  
2. Bent switch mounting bracket  
3. Bad stacker switch  
4. Bad stacker switch wiring  
5. Bad stacker switch cable  
2. Bend back bracket.  
3. Replace switch.  
4. Rewire switch.  
5. Replace interconnect cable.  
6. Service input or replace I/O Board. |
| "bill POFF" appears on Credit Display        | Security breach: Someone opened Bill Door while power was off.                   | To clear tilt, open and close Bill Door, or press DIAGNOSTIC button.       |
| "door oPEn" appears on Credit Display        | 1. Open Main Door  
2. Bad door switch  
3. Bad door switch wiring  
4. Bad door switch cable  
5. Bad door switch input on I/O Board | 1. Close and lock door.  
2. Replace switch.  
3. Rewire switch.  
4. Replace interconnect cable.  
5. Service input or replace I/O Board. |
| "door POFF" appears on Credit Display        | Security breach: Someone opened Main Door while power was off.                  | To clear tilt, open and close Main Door, or press DIAGNOSTIC button.        |
| "drop oPEn" appears on Credit Display        | 1. Open Cashbox Door  
2. Bad switch  
3. Bad switch wiring  
4. Bad switch cable  
5. Bad switch input on I/O Board | 1. Close and lock door.  
2. Replace switch.  
3. Rewire switch.  
4. Replace interconnect cable.  
5. Service input or replace I/O Board. |
| "drop POFF" appears on Credit Display        | Security breach: Someone opened Cashbox Door while power was off.               | To clear tilt, open and close Cashbox Door, or press DIAGNOSTIC button.     |
| "lo9ic oPEn" appears on Credit Display       | 1. Open Card Cage Door  
2. Bad switch  
3. Bad switch input on I/O Board  
4. Bad switch wiring  
2. Replace switch.  
3. Service input or replace I/O Board.  
4. Rewire switch.  
5. Replace bad cable. |
| "lo9ic POFF" appears on Credit Display       | Security breach: Someone opened Card Cage Door while power was off.             | To clear tilt, open and close Card Cage Door, or press DIAGNOSTIC button.  |

**NOTICE**

The following door messages *don't apply* to upright models: "bSEru," "bSEru POFF," "Hood oPEn" and "Hood POFF".
# Dotmation™ Troubleshooting Guide

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Probable Cause</th>
<th>Solutions</th>
</tr>
</thead>
</table>
| Display is black | 1. Disconnected or bad cable from Dotmation Logic Board to display  
2. Disconnected or bad cable from PDU Power Supply  
3. Disconnected or bad cable from Backplane Board to Dotmation Logic Board  
4. No animation EPROMs XU3, XU4  
5. Dotmation System EPROM XU10  
6. System EPROM XU10 isn’t compatible with animation EPROMs XU3 and XU4  
7. Bad +12VDC switching power supply in display chassis  
8. Serial port fault  
9. Dead bus clock on Dotmation Logic Board  
10. Bad Dotmation display. | 1. Check or replace cable.  
2. Check or replace cable between PDU connector J8 and Dotmation Logic Board.  
3. Check or replace cable between Backplane connector J19 and Dotmation Logic Board.  
4. Install proper EPROMs XU3 and XU4. Check labels for version compatibility with EPROM XU10.  
5. Replace EPROM XU10.  
6. Install proper EPROM XU10. Check label for version compatibility with EPROMs XU3 and XU4.  
7. Check and replace this switcher as necessary.  
8. Replace Dotmation Logic Board or check port U13 and associated circuitry.  
9. Replace Dotmation Logic Board or check crystals X1, X2 and associated circuitry.  
10. Replace Dotmation display. |
| Display has missing column | 1. Bad cable between Dotmation Logic Board and display  
2. Bad column driver on Display Scanning Board (after Dotmation Control Board)  
2. Replace bad parts in column-drive circuit.  
3. Replace display. |
| Display has missing row | 1. Bad cable between Dotmation Logic Board and display  
2. Bad row driver on Display Scanning Board (after Dotmation Logic Board)  
2. Replace bad parts in row-drive circuit.  
3. Replace display. |
| Display has missing sections | 1. Disconnected or bad cable from Dotmation Logic Board to display  
2. Dotmation Display  
3. Xilinx® PGA chip XU5 | 1. Check or replace cable.  
2. Replace Display.  
3. Swap Xilinx chip with good chip and retest circuit. Replace bad parts. |
| "dot init" appears in displays | Dotmation system is initializing | Observe display and check for normal initialization. |
| "dot pACEt 0" appears in displays | Bad data packet | Check or replace serial cable between Dotmation Logic Board and I/O Board. |
| "dot pTYPE 0" appears in displays | Bad data packet type | Check or replace serial cable between Dotmation Logic Board and I/O Board. |
| "tron dot 1" appears in displays | Bad or improper System EPROM XU10 on Dotmation Control Board (GD requires proper version) | Swap EEPROM XU10 with good chip and retest circuit. Replace bad or improper parts. |
| Wrong or inappropriate figures appear on Dotmation Display | 1. EEPROM XU10, XU3 or XU4  
2. SRAM chip U2 (not socketed)  
3. Address decoder GAL XU6 | 1. Swap EEPROM with good chip and retest circuit. Replace bad parts.  
2. Replace suspected SRAM with good chip and retest circuit.  
3. Swap decoder GAL with good chip and retest circuit. Replace bad parts. |
### Dotmation+™ Troubleshooting Guide

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Probable Cause</th>
<th>Solutions</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;dot IANP 0&quot; appears in displays. GD has extra lamps driven from Dotmation+® Control Board.</td>
<td>Bad lamp packet</td>
<td>Check or replace serial cable between Dotmation Control Board and I/O Board.</td>
</tr>
<tr>
<td>&quot;dot rEEI 1&quot; appears in displays. GD has extra reels or dice driven by Dotmation+ Control Board.</td>
<td>Failure of dice or Reel Mech 1</td>
<td>Replace dice or Reel Mech 1.</td>
</tr>
<tr>
<td>&quot;dot rEEI 2&quot; appears in displays. GD has extra reels or dice driven by Dotmation+ Control Board.</td>
<td>Failure of dice or Reel Mech 2</td>
<td>Replace dice or Reel Mech 2.</td>
</tr>
<tr>
<td>&quot;dot OPto 0&quot; appears in displays. GD has extra reels or dice driven by Dotmation+ Control Board.</td>
<td>Failure of dice or reel mech opto</td>
<td>Replace opto on reel mechanism.</td>
</tr>
</tbody>
</table>

![Diagram of Dot Control Board](image_url)
# Hard Meter Troubleshooting Guide

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Probable Cause</th>
<th>Solutions</th>
</tr>
</thead>
</table>
| All hard meters fail to increment. | 1. Bad Meter Board cable  
2. Bad Meter Board  
3. Bad I/O Board or CPU Board | 1. Check these DC voltages at Meter Board end of 12-pin Meter Board cable...  
• +12V, pin 11  
• +5V, pin 2  
Missing voltage or voltage reads low: Replace cable.  
2. Voltage checks OK: Replace Meter Board.  
3. Replace faulty PC board. |
| "nEtEr 1," "nEtEr 2," "nEtEr 3,"  
"nEtEr 4" or "nEtEr 5" appears in Credit Display. | Bad connection to meter:  
Meter numbers proceed from left to right as you face the gaming device. | 1. With power off, perform a continuity test between I/O Board, Meter Board and meter.  
2. Tighten loose connections.  
3. Replace bad cable. |
| • One or more hard meters doesn't increment.  
• No tilt message ("nEtEr 2," etc.) appears on Credit Display. | Bad meter | Locate the bad meter and replace it.  
Refer to jurisdiction rules. |
# Hopper Troubleshooting Guide

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Probable Cause</th>
<th>Solutions</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;HAnd xxxxx&quot; appears in displays</td>
<td>Attendant pays xxxxx credits</td>
<td>Attendant must hand pay this amount of credits. This is amount that exceeds Partial Hopper Pay Limit.</td>
</tr>
</tbody>
</table>
| "HPrC" appears in displays | Hopper dispensed extra coin (appears after hopper dispenses 10 extra coins per 5,000 dispensed coins) | 1. Clear tilt by opening and closing Main Door.  
2. Run Hopper Test.  
3. Check hopper's electromechanical brake.  
4. Adjust coin-out (proximity) sensor. |
| "HPrE" appears in Credit Display, indicating empty hopper. | 1. Empty or low hopper: Check it, and refill it if necessary.  
2. Coin jam  
3. Hopper probes  
4. Coin-out sensor harness continuity  
5. Coin-out sensor | 1. Refill the hopper.  
4. Test hopper probes by swapping them with known-good ones.  
5. Adjust coin-out (proximity) sensor. If problem persists, replace sensor. Clear tilt and rerun Hopper Test. |
| "HPrJ" appears in Credit Display, indicating hopper jam. | 1. Hopper brake, motor, etc.  
2. Coin-out sensor harness continuity  
2. Hopper's not jammed: Check or swap hopper power and coin-out sensor cables. Clear tilt and rerun Hopper Test.  
3. Adjust coin-out (proximity) sensor. If problem persists, swap sensor. Clear tilt and rerun Hopper Test. |
| "HPrr" appears in displays, indicating runaway hopper | 1. Coin-out sensor  
2. Faulty hopper data cable  
3. Faulty hopper communication link  
4. Faulty hopper mechanics  
5. Faulty Hopper Driver Board  
2. Check or replace cable.  
3. Service communication link.  
4. Replace faulty hopper mechanics.  
5. Replace or repair Hopper Driver Board: Test hopper SSR for leakage. Bad SSR? Replace it.  
6. Replace faulty I/O Board. |
# Jurisdiction Jumper Troubleshooting Guide

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Probable Cause</th>
<th>Solutions</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;Jur CHNGE 1&quot; appears in displays</td>
<td>Someone changed jurisdiction jumper</td>
<td>Clear RAM.</td>
</tr>
</tbody>
</table>
| "Jur bAd 1" appears in displays | Wrong jurisdiction jumper for firmware | 1. Set jumper correctly.  
                                |                                         | 2. Clear RAM.          |
### Lamp Matrix Troubleshooting Guide

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Probable Cause</th>
<th>Solutions</th>
</tr>
</thead>
</table>
| One entire column of lamps doesn't work         | 1. Bad column driver darlington  
2. Bad cable  
3. Failure in column drive electronics before darlington | 1. Replace bad driver  
2. Repair or replace lamp cable  
3. Troubleshoot and repair column drive circuit. See nearby theory drawing. |
| One entire row of lamps doesn't work            | 1. Bad row driver darlington  
2. Bad cable or connector  
3. Failure in row drive electronics before darlington | 1. Replace bad driver  
2. Repair cable or connector  
3. Troubleshoot and repair row drive circuit. See nearby theory drawing. |
| More than one lamp comes on at once             | Shorted lamp matrix diode                                                      | Check diodes in same row and column as lamp that shouldn't be lighting. Each lamp has diode in series with it. |
| One lamp doesn't come on                        | 1. Burned out bulb  
2. Open lamp diode  
3. Bad PC board trace  
4. Bad cable or connector | 1. Replace bulb.  
2. Replace diode.  
3. Repair trace.  
4. Repair or replace lamp cable. |

### Lamp Matrix

**NOTICE**  
The lamp matrix of some gaming devices may include fewer or additional lamps.
### PGA Chip (Programmable Gate Array) Troubleshooting Guide

<table>
<thead>
<tr>
<th>Symptom</th>
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<th>Solutions</th>
</tr>
</thead>
<tbody>
<tr>
<td>“PGA FAIL” appears on displays</td>
<td>Xilinx chip failure</td>
<td>Replace I/O Board chip XU42, or replace I/O Board.</td>
</tr>
</tbody>
</table>

### Power Troubleshooting Guide

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Probable Cause</th>
<th>Solutions</th>
</tr>
</thead>
</table>
| All I/O Board LEDs light              | Bad or loose CPU Board or I/O Board                 | 1. Turn off VGD power. Reseat boards in the Backplane Board.  
2. Retest VGD.  
3. VGD seems normal now: Proceed with next test. Same symptom: Test each board by substitution. Replace bad boards. |
2. Connect cable. |
| • On I/O Board, “DS1” LED is on.  
• Another I/O Board LED is off.     | Bad power supply                                      | Replace bad supply.                                  |
| Partial Power Failure...             | 1. Missing card cage power: With VGD on, check I/O Board LEDs (Left to right): +5VI*, +12V, -12V, +5V, +18V.  
2. PDU failure: Check voltages at PDU’s DC power connector...  
• Pin 13 = PFD (Power Fail Detect)  
• Pin 16 = +5VI*  
• Pin 14 = +12V  
• Pin 15 = -12V  
• Pin 17 = GND(I)  
• Pins 18, 19 = Approx 22VDC, No load  
• Pins 20-22 = +5V  
• Pins 1-12, 23, 24 = GND  
(NOTE: These voltages have +/- tolerances.)  
3. Improperly inserted EPROMs  
4. Bad CPU or I/O Board  
*NOTES:  
++5VI refers to the isolated +5-volt switcher in the PDU. (Measure between +5VI and GND(I).) Other +5V supply isn’t isolated. Measure between +5V and GND.  
++18V supply is only linear supply. Its LED remains on for few seconds after you shut off power. Other supplies are switchers.  
4. Voltages are good, but DS1 “Fail” LED is on. (DS1 is on I/O Board, near DIP switches and cage door.) Also, “bong” didn’t sound at power-up: Replace CPU Board and retest. If DS1 lights again, try original CPU Board and fresh I/O Board. If DS1 lights again, replace both boards and retest machine. |
| Total Power Failure...               | 1. Fuse on PDU                                         | 1. Replace fuse.  
2. AC power line in  
3. Bad PDU output  
4. Faulty line cord | 2. Turn on circuit breaker or service electrical outlet.  
3. Check all PDU outputs with a digital voltmeter. Repair or replace Power Distribution Unit (PDU).  
4. Replace line cord. |

### Power Troubleshooting Guide

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### Power Troubleshooting Guide

<table>
<thead>
<tr>
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<th>Probable Cause</th>
<th>Solutions</th>
</tr>
</thead>
</table>
| All I/O Board LEDs light              | Bad or loose CPU Board or I/O Board                 | 1. Turn off VGD power. Reseat boards in the Backplane Board.  
2. Retest VGD.  
3. VGD seems normal now: Proceed with next test. Same symptom: Test each board by substitution. Replace bad boards. |
2. Connect cable. |
| • On I/O Board, “DS1” LED is on.  
• Another I/O Board LED is off.     | Bad power supply                                      | Replace bad supply.                                  |
| Partial Power Failure...             | 1. Missing card cage power: With VGD on, check I/O Board LEDs (Left to right): +5VI*, +12V, -12V, +5V, +18V.  
2. PDU failure: Check voltages at PDU’s DC power connector...  
• Pin 13 = PFD (Power Fail Detect)  
• Pin 16 = +5VI*  
• Pin 14 = +12V  
• Pin 15 = -12V  
• Pin 17 = GND(I)  
• Pins 18, 19 = Approx 22VDC, No load  
• Pins 20-22 = +5V  
• Pins 1-12, 23, 24 = GND  
(NOTE: These voltages have +/- tolerances.)  
3. Improperly inserted EPROMs  
4. Bad CPU or I/O Board  
*NOTES:  
++5VI refers to the isolated +5-volt switcher in the PDU. (Measure between +5VI and GND(I).) Other +5V supply isn’t isolated. Measure between +5V and GND.  
++18V supply is only linear supply. Its LED remains on for few seconds after you shut off power. Other supplies are switchers.  
4. Voltages are good, but DS1 “Fail” LED is on. (DS1 is on I/O Board, near DIP switches and cage door.) Also, “bong” didn’t sound at power-up: Replace CPU Board and retest. If DS1 lights again, try original CPU Board and fresh I/O Board. If DS1 lights again, replace both boards and retest machine. |
| Total Power Failure...               | 1. Fuse on PDU                                         | 1. Replace fuse.  
2. AC power line in  
3. Bad PDU output  
4. Faulty line cord | 2. Turn on circuit breaker or service electrical outlet.  
3. Check all PDU outputs with a digital voltmeter. Repair or replace Power Distribution Unit (PDU).  
4. Replace line cord. |
### Progressive Troubleshooting Guide

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Probable Cause</th>
<th>Solutions</th>
</tr>
</thead>
</table>
| "Pro9 nonE" appears on displays | 1. Bad or missing cable to controller  
2. Controller isn't connected to slot machine | 1. Check or replace cable.  
2. Connect controller to slot machine.                                                            |
| "Pro9 rESP" appears on displays | 1. Wrong progressive ID setting in Administration Mode  
2. Improperly set CPU Board DIP switches  
3. Progressive Harness wired incorrectly | 1. Set ID to slot machine’s input line number on progressive controller.  
2. Turn on CPU Board DIP switch 1 at Bank 2.  
3. Verify Progressive Harness is wired to the game correctly.                                      |

### Reel LED Display Board Troubleshooting Guide

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Probable Cause</th>
<th>Solutions</th>
</tr>
</thead>
</table>
| • No displays work, or "LED FAULt" appears on displays  
• "5" appears on CPU Board LED display | Disconnected or bad cable                                                      | Check or replace cable.  
See CPU Board 7-Segment Display Troubleshooting Guide, in this chapter.                                  |
| Two entirely missing characters.                                        | Bad anode drive transistor on LED Display Board                               | 1. Check missing characters in the Display Digits Test.  
2. Replace Display Board, or...  
• Consult LED Display Board schematic. Find which of six transistors drives blank character anodes.  
• Check transistor with DVM.  
• Replace bad parts.                                                        |
| Missing display segments on two characters                              | Bad cathode driver in drive chip                                              | 1. Check missing segments in the Display Digits Test.  
2. Replace Display Board, or...  
• Consult LED Display Board schematic. Find which of three SAA1064 chips drives blank character anodes.  
• Check chip with scope or logic probe.  
• Replace bad parts.                                                         |
| Missing display segments on one character                               | Bad display module                                                            | 1. Check missing segments in the Display Digits Test.  
2. Unplug the display module from its socket.  
3. Replace the display module. Be sure to align it properly!                |
### Reel Opto Troubleshooting Guide

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Probable Cause</th>
<th>Solutions</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;rEEI1 0&quot; or &quot;rEEI1 1&quot; appears in Credit Display.</td>
<td>Opto feedback failure at Reel 1</td>
<td>1. Check for dirty opto (Input Tests 40-42. Clean it.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Check reel interruptor tab: Is it broken? Is it improperly installed? Does it leak light?</td>
</tr>
<tr>
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<td>3. Check reel hub for wear, cracks.</td>
</tr>
<tr>
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<td></td>
<td>4. Check reel's opto.</td>
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<tr>
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<td></td>
<td>5. Replace bad parts.</td>
</tr>
<tr>
<td>&quot;rEEI2 0&quot; or &quot;rEEI2 1&quot; appears in Credit Display.</td>
<td>Opto feedback failure at Reel 2.</td>
<td>Perform above tests for Reel 2 parts.</td>
</tr>
<tr>
<td>&quot;rEEI3 0&quot; or &quot;rEEI3 1&quot; appears in Credit Display.</td>
<td>Opto feedback failure at Reel 3</td>
<td>Perform above tests for Reel 3 parts.</td>
</tr>
</tbody>
</table>
## Sound Troubleshooting Guide

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Probable Cause</th>
<th>Solutions</th>
</tr>
</thead>
</table>
| No sound, but rest of slot machine operates | 1. Bad or disconnected speaker cable  
2. Bad protection diode on I/O Board (Speaker may click when you turn on slot machine.)  
3. Bad capacitor on I/O Board  
4. Bad audio power amp on I/O Board (Unlikely) | 1. Reconnect or replace cable.  
2. Check for shorted D8 or D9. Replace the bad part.  
3. Check C53, C51 or C60. Replace the bad part.  
4. Check U34 (audio IC in large heatsink). Replace the bad part. |
| • "ronn Sound" appears in displays.  
• Some sounds missing or distorted. | Bad or improper sound EPROM on CPU Board (GD requires proper version) | 1. Run Sound Tests.  
2. If one of these EPROMs is bad, replace it: XU17, XU18, XU30, XU31. (Some slot machines may not have all four chips.)  
3. Also replace EPROMs of improper version. Only use correct version parts. |
| All sounds distorted | 1. Bad -12V power supply  
2. Bad protection diode on I/O Board  
3. Bad capacitor on I/O Board  
4. Bad audio power amp on I/O Board (Unlikely) | 1. Check I/O Board -12V LED: If it's out, the power supply may be bad.  
2. Check for shorted D8 or D9. Replace the bad part.  
3. Check C53, C51 or C60. Replace the bad part.  
4. Check U34 (audio IC in large heatsink). Replace the bad part.  
5. Recheck the audio by running the Sound Tests. |

### Diagrams

- **Sound EPROM 4, XU17**
- **Game EPROM XU2**
- **Data EPROM XU3**
- **Switch SW1**
- **Battery**
- **Xtal Clock (40 MHz)**
- **80C188 Microprocessor**
- **Sound EPROM 5, XU18**
- **LED 8-Segment Display**
- **Jumper**
- **DSP**
- **Security EPROM XU27**
- **Sound EPROM 2, XU30**
- **Sound EPROM 3, XU31**
- **PC Board Ejector Tab**
- **CPU Board**
- **TDA2030A Sound Amp Chip**
- **I/O (Top) Card**
- **DS1 "Fail" LED**
- **TIP107 Row-Drive Darlington**
- **TIP102 Column-Drive Darlington**
- **PC Board Ejector Tab**
- **Power Supply LEDs: +5V, +12V, -12V, +5V, +18V**
### Static RAM Troubleshooting Guide

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Probable Cause</th>
<th>Solutions</th>
</tr>
</thead>
</table>
| "bAttd" or "bAttl" appears in displays       | Failure of static RAM backup battery                                          | 1. Replace battery.  
2. Use proper RAM Clear Chip to replace data lost due to battery failure. |
| "clr" appears in Credit Display.             | You just cleared static RAM.                                                  | Press DIAGNOSTIC button.                                                                        |
| "nEEd ClEAr" appears in displays             | Someone changed the Game EPROM or game percentage.                            | Perform hard RAM clearance.  
See Chapter 2.                                                                   |
| One of these indications appears in displays |                                                                               |                                                                                                 |
| CREDIT DISPLAY                               |                                                                               |                                                                                                 |
| BET DISPLAY                                  |                                                                               |                                                                                                 |
| crc1 X                                       |                                                                               | X = 1: Perform soft or hard RAM clearance to restore normal operation.                          |
| crc2 X                                       |                                                                               | X = 2 or 3: Push DIAGNOSTIC button to restore normal operation.                               |
| lo9 X                                        |                                                                               |                                                                                                 |
| SI9 X                                        |                                                                               |                                                                                                 |
| • "crc1 X": Corrupt op system data           |                                                                               |                                                                                                 |
| • "crc2 X": Corrupt meter data               |                                                                               |                                                                                                 |
| • "lo9 X": Corrupt game log                 |                                                                               |                                                                                                 |
| • "SI9 X": Corrupt RAM signature            |                                                                               |                                                                                                 |
| One of these indications appears in displays |                                                                               |                                                                                                 |
| HEAPC                                         |                                                                               |                                                                                                 |
| HEAPF                                         |                                                                               |                                                                                                 |
| • "HEAPC": Corrupt Heap                      |                                                                               |                                                                                                 |
| • "HEAPF": Full Heap                         |                                                                               |                                                                                                 |
| • Bad backup battery or static RAM failure   |                                                                               |                                                                                                 |
| One of these indications appears in displays |                                                                               |                                                                                                 |
| Pro9 crc                                      |                                                                               |                                                                                                 |
| rAnn nntcH                                    |                                                                               |                                                                                                 |
| • "Pro9 crc": Corrupt progressive data       |                                                                               |                                                                                                 |
| • "rAnn nntcH": Game data in RAM differs from data in secure EEPROM              |                                                                               |                                                                                                 |
| CAUTION                                       | You may perform soft RAM clearance, but it might compromise integrity of Bookkeeping data. |
| "rAnd" appears in Credit Display.            | Bad static RAM                                                                 | Replace static RAM.                                                                            |
| "SoFt clr" appears in Credit Display.        | You just performed soft RAM clearance.                                       | Press DIAGNOSTIC button.                                                                      |

### Watchdog Timer Troubleshooting Guide

<table>
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<tr>
<th>Symptom</th>
<th>Probable Cause</th>
<th>Solutions</th>
</tr>
</thead>
</table>
| "bi6 trubl" appears in displays, or         | Watchdog chip U11 on CPU Board timed out during program routine              | 1. Bad memory chip may have caused fault in routine. Test CPU Board EPROMs by replacing one at a time.  
2. If EPROMs aren't bad, test CPU Board RAMs by replacing one at a time.  
3. Permanently replace bad chips.  
4. If chips are good, check for stuck bus bits. |
| gaming device may frequently reset.          |                                                                               |                                                                                                 |
Chapter 1. Parts, Electronic

• Boards, Circuit

Board, Slot Backplane ....................................................... A-17937-03
Board, Bill Validator Lamp ................................................. A-18088-01*
Board, Slot CPU ............................................................... A-17677-03
Board, Dotmation Control (not used on all machines)....... A-000541-01
Board, Dotmation+ Control ................................................ A-003875-02**
Board, Hex Opto (coin-in optics; coin chute dependent) ... A-18097-01
Board, Hopper Control ..................................................... A-17118-02
Board, 4-Tier Twr Lamp Converter (not on all mach) ....... 20-004213-00
Board, Slot I/O ................................................................ A-17686-03
Board, Slot 6-Meter Driver .................................................. A-17951-01
Board, Payline Lamp .......................................................... A-18087-00
Board, Quad Opto (coin-in optics; coin chute dependent) A-18097-00
Board, LED Display .......................................................... A-17382-01
Board, Reel Motor Control (part of reel assembly) ............ 20-002002

• Cable

CABLES, OPTIONAL
Cable, Bally® DMK 220® Serial Interface ......................... 5797-000993-00
Cable, CDS® Ser Intfc (Sentinel II®) to PDU Adapt ........... 5797-001800-00
Cable, DC Power, 12 to 16-Pin Transformer Adapter ....... 5797-003459-00
Cable, Dotmation™ Serial Interface ................................ H-001120-00
Cable, Dotmation AC .......................................................... H-001118-00
Cable, Dotmation+™ Panel Controller ......................... 5797-003968-00
Cable, EDT®/IGT® Com Interface (w/ Sw Inputs) .......... H-19471-00
Cable, IGT PT95A, w/4-Pin Minifit Con, AC Pwr ............. H-002944-00
Cable, MGM System Interface ........................................... H-004672-00
Cable, Monitor/Hopper Service ....................................... 5797-13694-00
Cable, One-Button Special (Part of 6-Button Kits) ............ H-003855-00
Cable, PDU Service Outlet ................................................. H-19452-00
Cable, Ribbon, Dot Logic to Dot Dsply ......................... 5797-001293-00
Cable, Tower/GI Extension .............................................. H-19437-00
Cord, Line Power, IEC320, 220V British ....................... 5850-13273-00
Cord, Line Power, IEC320, 120VAC, North America ...... 5850-13344-00
Cord, IGT, 110V, PT95A Power, Service Outlet .......... 5797-004361-00
Cord, Line, N.A., IEC320, NEMA 6-16P, 10A, 220V, 15' ..5850-004452-00**
Cord, Line Set, Continental Europe .............................. 5850-13272-00
Cord, Line, N.A., NEMA 6-16P, 10A, 220V, N. A., 8' ...... 5850-000992-00

CABLES, UNIVERSAL
Cable, Audio #1 (To Blind Mating Connector Center) ...... H-18115-01
Cable, Audio #2 (to Speaker) ............................................ H-18116-01
Cable, Belly Lamp Bracket .............................................. H-18885-00
Cable, Bill Validator .......................................................... H-17961-00
Cable, Bill Validator Lamps .............................................. H-17974-00*
Cable, Coin Comparator and Chute Door ...................... H-17958-00

NOTICE
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NOTICE
*For use with JCM DBV145 bill validator w/o plastic illuminated bezel.

NOTICE
**Used Only For Monopoly Top Box.

NOTICE
For electronic component part numbers, please refer to Schematic Drawing Set Manual A-004434.
• Cables, Universal, *continued*

Cable, Coin Comparator and Chute ........................................H-17972-00
Cable, Condor® Coin Controller ........................................5797-004090-00
Cable, DC Power ..................................................................H-17965-00
Cable, Door, Key Sw. & Arm Sw. (Casino only) .................H-17959-02
Cable, Door, Key Sw. & Arm Sw. (Lottery only) .................H-004599-00
Cable, EDT, PT95A, Delaware, Meters .............................H-001917-00
Cable, EDT, PT95A, RS232, Delaware ..............................H-004690-00
Cable, Fluorescent #1 (for top belly lamp) .........................H-18882-00
Cable, Fluorescent #2 (for bottom belly lamp) ....................H-18883-00
Cable, Fluorescent #3 (for reel lamp) ..................H-18884-00
Cable, Game Button Door *(shielded)* .............................5797-000150-00
Cable, Handle Solenoid ....................................................H-15596
Cable, Hopper ..................................................................H-17963-00
Cable, Hopper, Blind-Mating Interface *(BMI)* Male ..........H-18096-00
Cable, Hopper Full Sensor ..............................................H-18095-00
Cable, Host, Com, RS485/422 Del .....................................H-19470-01
Cable, JCM Bill Validator AC ............................................H-19860-00
Cable, JCM Stacker Switch ............................................H-18863-00
Cable, Meter ...................................................................H-17962-00
Cable, Payline LED Bd Lamps *(shielded)* .......................5797-000151-00
Cable, PDU AC Distribution *(only used with 12-pin xfmrs)* H-19408-00
Cable, PDU AC Distribution *(only used with 16-pin xfmrs)* H-19408-01
Cable, PDU DC Power *(only used with 12-pin xfmrs)* ......H-19409-00
Cable, PDU DC Power *(only used with 16-pin xfmrs)* ......H-19409-01
Cable, PDU IEC ..................................................................H-19424-00
Cable, PDU PS AC out *(only used with 12-pin xfmrs)* ......H-19407-00
Cable, PDU PS AC out *(only used with 16-pin xfmrs)* ......H-19407-01
Cable, Player (Control) Panel ............................................H-17971-01
Cable, Quad Opto Board to Comparator *(CC-16)* ..........5797-14014-00
Cable, Reel Glass Lamp ..................................................H-18894-00
Cable, Service Outlet Assembly, PDU ...............................H-19452-00
Cable, Six-Lamp Slot Reel Mechanism ..............................H-18105-00
Cable, Special, One-Button (used w/6-btn plyr panel) .......H-003855-00
Cable, Special, Three-Button (used w/8-btn plyr panel) ....H-002609-00
Cable, Three-Conductor Ribbon *(Quad Opto)* ...............5795-13788-00
Cable, Topbox Fluorescent .............................................H-19464-00
Cable with Switch, Voltage Selector ..............................5797-14233-00
Cord, Single Receptacle Line ..............................................5851-13203-00

• Identification, CPU Jurisdictional

EPROM, CPU, XU27, 4K Bit ..............................................5345-13617-00

---

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• Parts, Replacement Electronic (All Boards)

  Bag, Parts .................................................................A-19460
  Bulb, #1888, 7V/500mA (Bayonet) .........................24-8832
  Bulb, #86, 6.3V/0.2A (inside player panel buttons) .....24-8829
  Bulb, #555, 6.3V/250 mA...........................................24-8768
  Fuse, 4ASB, 250V ...................................................5731-06314-00
  Bulb, #161 Reel .......................................................24-8840

• Supply, Dotmation™ Power

  Supply, Dotmation & Dotmation, 12VDC, 110W Power ....20-001292
  Supply, Dotmation & Dotmation+, 24V, 225W Power ......20-004115

• Transformer, Main Power

  Transformer, Int'l, 16-pin, Main Pwr (w/cables) ...........A-002509-00
  Use above part only with 1997 (CE97-approved) power supplies!
  Transformer, Int'l, 12-pin, Main Pwr (w/cables) ..........A-19443-00
  Use above part only with 1995 power supplies!
  Transformer, Int'l, Jpr Tab Type, Main Pwr (w/cbls) ......A-18100
  Use above part only with 1994 power supplies!

• Unit, Power Distribution (PDU)

  BOARD, 16-PIN TO XFMR, LINEAR POWER SUPPLY (PDU BOARD)
  Board, +5/+18VDC, Linear Pwr Supply (PDU Bd) ..........A-18938-03
  Supply, 110W, +5/±12VDC, Triple Output Power ..........20-9965

  BOARD, 12-PIN TO XFMR, LINEAR POWER SUPPLY (PDU BOARD)
  Board, +5/+18VDC, Linear Pwr Supply (PDU Bd) ..........A-18938-01
  Supply, 110W, +5/±12VDC, Triple Output Power ..........20-9965

  PDU, EXCLUSIVE PARTS FOR NORTH AMERICAN, 110 VAC
  Fuse, 4ASB, 250V.....................................................5731-06314-00
  Holder, Panel-Type, 5 x 20mm, Knob Fuse .................5733-12869-00
  Plate, Outlet Mounting ..........................................01-13449-01

  PDU, EXCLUSIVE PARTS FOR EUROPEAN, 220 VAC
  Fuse, 5 x 20-2A .....................................................5735-13853-00
  Holder, Panel-Type, 5 x 20mm, Knob Fuse .................5733-12869-01
  Plate, Blank Cover ..............................................01-13449-02

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NOTICE

**Used Only For Monopoly Top Box.
NOTICE
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• Unit, Power Distribution (*PDU*), continued

**PDU, EXCLUSIVE PARTS FOR N. AMERICAN OR EUROPEAN**
Fuse, 5 x 20-2A, 250V ................................................................. 5731-08665-00
Holder, Panel-Type, 5 x 20mm, Knob Fuse ............................. 5733-12869-00
Plate, Blank Cover ...................................................................... 01-13449-02

**PDU, PLUG & PLAY REPLACEMENT FOR N. AMERICAN, 110 VAC**
PDU, P&P, N. American, 16-Pin to Xfmr, 110V, 60 Hz .......... A-002912-01

**PDU, PLUG & PLAY REPLACEMENT FOR EUROPEAN, 220 VAC**
PDU, P&P, European, 16-Pin to Xfmr, 220V, 50 Hz .......... A-002912-02

**PDU, P & P REPLACEMENT FOR N. AMERICAN OR EUROPEAN**
PDU, P&P ’97 Europe or N. Am., 220V, 50/60 Hz .......... A-002912-03

**PDU, P & P REPLACEMENT FOR N. AMERICAN OR EUROPEAN**
PDU, 12-Pin to Xfmr, 220V .......................................................... A-002938-03

**PDU, P & P REPLACEMENT FOR N. AMERICAN**
PDU, 12-Pin to Xfmr, 110V .......................................................... A-002938-01

**PDU, P & P REPLACEMENT FOR EUROPEAN**
PDU, 12-Pin to Xfmr, 220V .......................................................... A-002938-02
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<th>Upright 17” Video</th>
<th>Upright 19” Video</th>
<th>Slant Top 17” Video</th>
<th>Slant Top Slot</th>
<th>Upright Slot</th>
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<td>Backplane PCB, A-003622-00</td>
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<td>CPU 1.5 PCB with 2MB Video Card, A-000051-31; includes...</td>
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<td>•CPU PCB, Sys 1.5, A-17677-03</td>
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<td>•Daughter Card, 2MB Video, A-18402-33</td>
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<td>Power Distribution Unit PCB, A-18938-03 w/16 Pin Xfmr</td>
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<td>Reel Motor Control PCB, 20-002002</td>
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**NOTICE**

These parts are for 1995 machines. 1995 machines bear the number 71272 on their nameplates. The machine’s nameplate is located beneath the slot handle.

- **Instruction Documents**
  - 40X UPRIGHT SLOT MANUALS
    - Binder, Three 2” (5cm) Rings *(comes with manuals)* ........20-9896-01
    - Handbook, System 1.5 Slot, Abridged, Pocket-Size ........16-000324-01
    - Manual, Gaming Safety ..................................................16-001796-01

- **Tower Candle**
  - Bulb, #1888, 7V/500mA *(Bayonet)* ........................................24-8832

  **CANDLES, CHROME-FINISH, FOUR-TIER, SHORT TOWER**
  - Lamp, Wht, Grn, Yel & Blu, Chrome Twr, Short, 4-Tier ........20-004145-02
  - Lamp, Wht, Grn, Yel & Yel, Chrome Twr, Short, 4-Tier ........20-004145-01

  **CANDLES, CHROME-FINISH, FOUR-TIER, TALL TOWER**
  - Lamp, Wht, Grn, Yel & Blu, Chrome Twr, Tall, 4-Tier ..........20-003945-04
  - Lamp, Wht, Grn, Yel & Yel, Chrome Twr, Tall, 4-Tier ........20-003945-03

  **CANDLES, BRASS-FINISH, TWO-TIER, TOWER**
  - Lamp, Standard Clear and Clear, Brass Tower, 2-Tier ........20-10054-11
  - Lamp, Stand. Short 4”(10cm) Clr & Clr, Brs Twr, 2-Tier ......20-000736-02

  **CANDLES, CHROME-FINISH, TWO-TIER, TOWER**
  - Lamp, Clear and Clear, Chrome Tower, 2-Tier .................20-10053-11
  - Lamp, Short (4”/10cm) Clr & Clr, Chrome Twr, 2-Tier ........20-000736-01

  **FILTER INSERTS**
  - Short Two-Tiered Tower Lamp Filter Insert,
    - Brass or Chrome Finish ..............................................20-000846-XX
  - Tall Two-Tiered Tower Lamp Filter Insert,
    - Brass or Chrome Finish .............................................20-10057-XX
  The -XX part number suffix indicates insert color combinations.

- **Topbox Central System Configuration Hardware**
  - BLANK FACEPLATE PANEL
    - Faceplate, Blank Panel, Matte Black ............................01-001833-00P06

  **MOUNTING HARDWARE, ACRES LEGACY TRACKING SYSTEM W/DISPLAY & MAGNETIC OR OPTICAL READER**
  - Faceplate, Matte Black ..................................................01-001833-01P06
  - Spacer, 7/16” (11mm) ..................................................03-6047-9

  **MOUNTING HARDWARE, ACRES BE 2 TRACKING SYSTEM W/VACUUM FLUORESCENT DISPLAY, KEYPAD, BONUS BUTTON & MAGNETIC READER**
  - Faceplate, Matte Black ..................................................01-001833-21P06
MOUNTING HARDWARE, *ACSC/SMS/LSI TRACKING SYSTEM* W/DISPLAY, KEYPAD, & MAGNETIC CARD READER  
Faceplate, Matte Black ................................................................. 01-001833-18P06  
Faceplate, Matte Black w/Gold Trim ........................................... 01-001833-23D08  
Faceplate, Matte Black w/Black Trim ........................................... 01-001833-23P06  
Spacer, 3/8" (10mm) ........................................................................ 03-6047-2  
Plate SMS pcb btd ........................................................................... 01-000671  
Plate SMS xfamr mounting ............................................................. 01-003916  
Bracket, Ground 95dec ................................................................. 01-003874  
Copper Gasket Contact .................................................................. 20-003380  
Pop Rivet 0.126 x 0.327 ................................................................. 07-6700

MOUNTING HARDWARE, *BALLY TRACKING SYSTEM W/DISPLAY, 2 x 6 KEYPAD, & MAGNETIC CARD READER*  
Faceplate, Matte Black .................................................................... 01-001833-13P06  
Spacer, 5/16" (8mm) ......................................................................... 03-6047-4

MOUNTING HARDWARE, *BALLY SASY TRACKING SYSTEM WITH DISPLAY, 3 x 4 KEYPAD, & MAGNETIC CARD READER*  
Faceplate, Matte Blk ........................................................................ 01-001833-14P06  
Spacer, 5/16" (8mm) ......................................................................... 03-6047-4

MOUNTING HARDWARE, *BALLY EPI TRACKING SYSTEM W/DISPLAY, 2 x 6 KEYPAD, PLAYER SELECT BUTTON, & MAGNETIC READER*  
Faceplate, Matte Blk ........................................................................ 01-001833-17P06

MOUNTING HARDWARE, *CDS TRACKING SYSTEM W/VACUUM FLOURESCENT DISPLAY, KEYPAD, & MAGNETIC OR OPT. READER*  
Faceplate, Matte Black .................................................................... 01-001833-16P06  
Spacer, 5/16" (8mm) ......................................................................... 03-6047-4

MOUNTING HARDWARE, *CDS TRACKING SYSTEM W/LCD, KEYPAD, & MAGNETIC CARD READER*  
Bar, CDS Keypad Mounting ............................................................... 01-003865  
Faceplate, Matte Black .................................................................... 01-001833-02P06  
Spacer, 5/16" (8mm) ......................................................................... 03-6047-4  
Spacer, 3/8" (10mm) ........................................................................ 03-6047-2

MOUNTING HARDWARE, *CDS TRACKING SYSTEM W/LCD, KEYPAD, & OPTICAL CARD READER*  
Bar, CDS Keypad Mounting ............................................................... 01-003865  
Faceplate, Matte Black .................................................................... 01-001833-08P06  
Spacer, 5/16" (8mm) ......................................................................... 03-6047-4  
Spacer, 3/8" (10mm) ........................................................................ 03-6047-2

MOUNTING HARDWARE, *GRIPS SDI TRACKING SYSTEM W/DISPLAY, KEYPAD, & MAGNETIC CARD READER*  
Faceplate, Matte Black .................................................................... 01-001833-06P06  
Terminal 25" Quick Fit ..................................................................... 5826-000643-00

MOUNTING HARDWARE, *GSI TRACKING SYSTEM W/DISPLAY & MAGNETIC CARD READER*  
Faceplate, Matte Black .................................................................... 01-001833-22P06
• Topbox Central System Config. Hardware (continued)

MOUNTING HARDWARE, IGS TRACKING SYSTEM W/VACUUM FLUORESCENT DISPLAY, 2 x 6 KEYPAD, BONUS BUTTON, & MAGNETIC CARD READER
Faceplate, Matte Black ......................................................01-001833-19P06
Plate Keypad Cover .........................................................01-004305-P06

MOUNTING HARDWARE, IGT/EDT TRACKING SYSTEM W/5MM CHAR. DISPLAY & MAGNETIC CARD READER
Faceplate, Matte Black ......................................................01-001833-03P06
Spacer, 3/8” (10mm) ...........................................................03-6047-2

MOUNTING HARDWARE, IGT/EDT TRACKING SYSTEM W/5MM CHAR. DISPLAY & OPTICAL CARD READER
Faceplate, Matte Black ......................................................01-001833-03P06
Spacer, 3/8” (10mm) ...........................................................03-6047-2
Plate, EDT Optical Card Reader Mounting, Matte Black...01-002244-P06

MOUNTING HARDWARE, IGT/EDT TRACKING SYSTEM W/9MM CHAR. DISPLAY & MAGNETIC CARD READER
Faceplate, Matte Black ......................................................01-001833-04P06
 Spacer, 3/8” (10mm) ...........................................................03-6047-2

MOUNTING HARDWARE, IGT/EDT TRACKING SYSTEM W/9MM CHAR. DISPLAY & OPTICAL CARD READER
Faceplate, Matte Black ......................................................01-001833-04P06
 Spacer, 3/8” (10mm) ...........................................................03-6047-2
Plate, EDT Optical Card Reader Mounting, Matte Black...01-002244-P06

MOUNTING HARDWARE, IVERSON GAMING SM1 TRACKING SYSTEM W/1x3 1/8 DISPLAY, & MAGNETIC CARD READER
Faceplate, Matte Blk ..........................................................01-001833-20P06
 Spacer, 5/16” (8mm) ...........................................................03-6047-4

MOUNTING HARDWARE, MIKOHN TRACKING SYSTEM W/DISPLAY, KEYPAD, & MAGNETIC CARD READER
Faceplate, Matte Black ......................................................01-001833-09P06
 Spacer, 7/16” (11mm) ..........................................................03-6047-9

• Buttons

BUTTONS, PLAYER PANEL
Button, Rectangular, 6.3V Lamp, CHEST ......................... 20-001887-05
Button, Rectangular, 6.3V Lamp, MAX BET SPIN .............. 20-002448-16
Button, Rectangular, 6.3V Lamp, PLAY 4 CREDITS .......... 20-002448-35
Button, Rectangular, 6.3V Lamp, PLAY 3 CREDITS ......... 20-002448-34
Button, Rectangular, 6.3V Lamp, SPIN REELS .............. 20-002448-19
Button, Square, 6.3V Lamp, BET ONE ......................... 20-002449-18
Button, Square, 6.3V Lamp, CASH/CREDIT ................. 20-002449-23
Button, Square, 6.3V Lamp, CHANGE ....................... 20-002449-14
BUTTON, MISCELLANEOUS PARTS OF
Bezel, Rectangular Button Plunger, Spring & .......................... 20-001986-02
Bezel, Square Button Plunger Spring & ............................... 20-001986-01
Diode, 1N4004, 1A ...............................................................5070-09054-00
Lens, Clear, Square Button ..................................................20-001986-03
Lens, Clear, Rectangular Button ..........................................20-001986-04

PLAYER PANEL BUTTON LABEL INSERTS .........................20-001986-XX
The -XX part number suffix indicates insert type.

• Kits

DOTMATION
5 to 8 button panel w/dotmation conversion Kit ............... A-002716-01D01
5 to 8 button panel w/out dotmation conversion Kit .......... A-002716-02D01
5 to 6 button panel w/dotmation conversion Kit ............... A-003955-01D01
5 to 6 button panel w/out dotmation conversion Kit .......... A-003955-02D01
8 to 6 button panel w/dotmation conversion Kit ............... A-003955-04D01

Dotmation w/short mounting bracket conversion Kit ......... A-001938
Dotmation w/extended mounting bracket conv. Kit .......... A-001938-01

This topbox has a card reader spacer beneath it and accepts conversion kit A-001938 to install a dotmation unit.

Typically, when a topbox does not have a card reader spacer it uses conversion kit A-001938 to install a dotmation unit.

Only the 18 3/8” (46cm) tall bonnet topbox uses conversion kit A-001938-01 with the extended mounting bracket to install a dotmation unit above a system card reader.
• Kits (continued)

Asahi Seiko $.05 hopper denom. conversion Kit ..............A-000700
Asahi Seiko $.25 hopper denom. conversion Kit ..............A-000701
Asahi Seiko $.50 hopper denom. conversion Kit ..............A-000702
Asahi Seiko $1 hopper denom. conversion Kit ..............A-000703
Asahi Seiko $5 token hopper denom. conv. Kit .............A-001797
Asahi Seiko Can. Loonie $1 hopper Denom. conv. Kit ......A-001835
Asahi Seiko sigma token conv. Kit .............................A-002986
Asahi Seiko $.10 token conversion Kit .........................A-004284
Condor coin mech assy Kit ........................................A-004431
DBV South African Rand conversion Kit .......................A-001937
DBV Canadian conversion Kit ...................................A-002163
NRI coin mech. $1 Canadian, wide body Kit .................A-002775
NRI coin mech. $.25 Canadian, wide body Kit ...............A-002776

Wide body door switch relocation Kit ..........................A-000488
Speaker tray, blind mate bracket & harness Kit .............A-002262

Coin Mechanisms

See Section 3 page 5 for Coin Mechanism list.
Legend below describes how to order a replacement IDX Coin Mech via the manufacturers label.
•CABINET

Dwg Ref  Description  WMS Gaming #
1  Knob, Slot Handle, 1-111-105. 20-002998
2  Handle, Dual-Bend Slot (A rm) 20-001296-ZZZ
2  Handle, Single Bend Slot (A rm) 20-10009-ZZZ
3  Hub, Chrome, Plastic (Handle Mechanism) 03-9159-ZZZ
4  Mechanism, Handle (A rm)/incl. solenoid 20-9997-02
5  #10 Carriage Bolt 5/8", Blac k 4310-01123-10B
6  Nut, 10-24, KEPS® 4410-01128-00
7  Nut, Handle Mech Mtg, 10-24, ESNA® 4410-01119-00
8  Switch, Cam, 223585-1 20-001066-03
9  BV Mounting Bracket 01-001944
10 Bill Validator, US Dollar, s/l, 145, w/2 cas & 1 extr...09-003057
10 Bill Validator, US Dollar, d/l, 145, w/2 cas & 1 extr...09-003058
10 Bill Validator, SRA, s/l, w2 cas s & 1 extr............09-003115
10 Bill Validator, SRA, d/l, w2 cas s & 1 extr............09-003116
10 Bill Validator, Italian Lira, s/l, w2 cas s & 1 extr.....09-003118
10 Bill Validator, Italian Lira, d/l, w2 cas s & 1 extr.....09-003119
10 Bill Validator, Canadian Dollar r, s/l, 135, w2c & 1 ex...09-003121
10 Bill Validator, Canadian Dollar r, d/l, 135, w2c & 1 ex...09-003122
10 Bill Val., US Dollar r, s/l, 200, EPR ROM, w2c & 1 ex ...09-004568-00
10 Bill Val., US Dollar r, s/l, 200, FLASH w2c & 1 ex ....09-004568-01
11 Bracket, BV Faceplate 01-12877
11A BV Bezel, US 001720-01
11A BV Bezel, Non-US 001721-01

NOTICE

To order parts with a “ZZZ” part number suffix, specify part number and color r.
**CARD CAGE (continued)**

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<th>Description</th>
<th>WMS Gaming #</th>
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<td>11A</td>
<td>BV Bezel, Non-US</td>
<td>A-001721-01</td>
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<tr>
<td>11B</td>
<td>Bezel Shroud, Non-USA</td>
<td>03-001253-01</td>
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<td>11C</td>
<td>Bezel Shroud, USA</td>
<td>03-001895-01</td>
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<td>12</td>
<td>Upper Cam Lock</td>
<td>01-13669</td>
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<td>13</td>
<td>Lock, No-Key, Shipping</td>
<td>20-004576</td>
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<td>14</td>
<td>Door, DBV Laminated, BK</td>
<td>A-19402-02-ZZZ</td>
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<td>15</td>
<td>Door, DBV Lam, Blk, Dual Lock</td>
<td>A-002699-02-ZZZ</td>
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<td>16</td>
<td>Cover Panel, Laminated, Non-BV</td>
<td>A-000214-ZZZ</td>
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<td>17</td>
<td>Plate, Non-BV</td>
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<td>18</td>
<td>Bracket, Non-BV</td>
<td>01-000190</td>
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<td>19</td>
<td>Frame, DBV Door</td>
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<td>20</td>
<td>Switch, Momentary DPDT Interlock</td>
<td>5643-14246-00</td>
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<td>21</td>
<td>PDU, N. American, 110V/60 Hz, 16-pin</td>
<td>A-002912-01</td>
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<td>22</td>
<td>PDU, Euro, 220V/50 Hz, 16-pin</td>
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<td>PDU, Euro/N. Am, 220V/50-60 Hz, 16-pin</td>
<td>A-002912-03</td>
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<td>PDU, N. American, 110V/50 Hz, 12-pin</td>
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<td>PDU, Euro, 220V/50 Hz, 12-pin</td>
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<td>PDU, Euro/N. Am, 220V/50-60 Hz, 12-pin</td>
<td>A-002938-03</td>
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<td>27</td>
<td>Knob, 5mm x 20mm, Fuse Holder</td>
<td>5733-12869-01</td>
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<td>28</td>
<td>Knob, Whit Lt Fuse Holder</td>
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<td>Fuse, 4ASB, 250V</td>
<td>5731-06314-00</td>
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<td>30</td>
<td>Fuse, 2ASB, 5 x 20</td>
<td>5735-13853-00</td>
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<td>31</td>
<td>Mounting Plate, PDU</td>
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<td>32</td>
<td>Cover, Backplane</td>
<td>03-9183</td>
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<td>33</td>
<td>PC Board, Slot Backplane</td>
<td>A-17937-03</td>
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<td>34</td>
<td>Bracket, Chas Guide Mounting</td>
<td>01-002247</td>
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<td>35</td>
<td>Connector, Female Minifit Jr/B, 4-Pin</td>
<td>5792-13721-04</td>
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<td>36</td>
<td>Switch, Switch and Conn Mounting</td>
<td>01-12827</td>
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<td>37</td>
<td>Screw, 6-32 x 1&quot;, Hex, Socketed Steel Zinc</td>
<td>4006-01162-16</td>
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<td>38</td>
<td>Bracket, Hopper Connector Mounting</td>
<td>01-12628</td>
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<td>39</td>
<td>Plate, Hinge Gap Blocker</td>
<td>01-12692</td>
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<td>40</td>
<td>Chute, Coin Drop (Reversed Coin Transfer)</td>
<td>01-12529</td>
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<td>41</td>
<td>Cover, Received Coin Transfer</td>
<td>03-001480</td>
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<td>42</td>
<td>Pin, Lock Bar Drive</td>
<td>02-4911</td>
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<td>43</td>
<td>Switch, Three-Position Interlock</td>
<td>5643-13204-00</td>
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<td>44</td>
<td>Cam, Dr Lk, Flat, 88” (2.24cm) Straight-Dual</td>
<td>01-12793-10</td>
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<tr>
<td>45</td>
<td>Bracket, Door Glide</td>
<td>01-001127</td>
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<td>46</td>
<td>Bracket, Door Latch</td>
<td>01-000319</td>
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<td>47</td>
<td>Bracket, Line-In Cover</td>
<td>01-13533</td>
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<td>48</td>
<td>Plate, Line Cord Cover</td>
<td>01-13532</td>
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<td>49</td>
<td>Bracket, Switch Mounting</td>
<td>01-000318</td>
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<td>50</td>
<td>Switch, Reset Key (w/Key)</td>
<td>20-10099</td>
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<td>51</td>
<td>Clip, Front Mounting</td>
<td>20-9979</td>
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<td>52</td>
<td>Clip, Rear Mounting</td>
<td>20-9980</td>
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<td>53</td>
<td>Bracket, Vent Cover</td>
<td>01-13528</td>
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<td>54</td>
<td>- Vent Screen</td>
<td>03-9176</td>
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<td>55</td>
<td>Flexible Edge Guard</td>
<td>03-9171-01</td>
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<td>56</td>
<td>Strap, Ground</td>
<td>20-10012</td>
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<td>57</td>
<td>Connector, Plug Housing, 25-Position</td>
<td>5792-13539-00</td>
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**CARD CAGE**

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<td>1</td>
<td>Cage, Welded Card (no boards)</td>
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<td>2</td>
<td>Hinge, Card Cage Door</td>
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<td>Cam, Dr Lk, Flat, 1.13” (2.87cm) Straight-Dual</td>
<td>01-12793-01</td>
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<td>4</td>
<td>Actuator, Door Switch</td>
<td>01-12837</td>
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<td>Bracket, Door Switch Mounting</td>
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<td>Switch, Pushbutton SPDT, 125V, 5A</td>
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<td>Door, Card Cage</td>
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<td>Lock, No-Key, Shipping</td>
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<td>Switch, SPDT Interlock</td>
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<td>Board, Slot I/O</td>
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<td>Board, Slot CPU</td>
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<td>Rail, Card Guide</td>
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<td>Bushing, Silt, 0.5” (1.27cm) Diameter</td>
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-METER DISPLAY

Dwg Ref  Description .....................................................WMS Gaming #
1 PCB, Meter ..........................................................A-17951-01
2 Window, Clear Meter Viewing ........................................03-8979-15
3 Meter, Non-resettable Electromechanical ..................20-9951
4 Meter Label with text legends ....................................16-9789-ZZ
5 Bracket ......................................................................01-13529

MAIN DOOR, BACK

METER DISPLAY

NOTICE
To order parts with a “ZZZ” part number suffix, specify part number and color.
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### -MAIN DOOR, BACK

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<th>WMS Gaming #</th>
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<td>Comparator, CC-16D-Inhibit, US 5c/25c Coin, Italian 500 L Coin, Sigma Tln, 66160120</td>
<td>09-42000-1</td>
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<td>Comparator, CC-16D-Inhibit, US $1 Coin, 66160116</td>
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<td>Comparator, Condor, Prog. Coin</td>
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<td>*Comparator, Smart Mark, 66160199</td>
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<td>*The XX suffix indicates casino and denomination specifications.</td>
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<td>Coin Comparator Mounting</td>
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<td>Tool, Canadian $1 Coin Comp Alignment</td>
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<td>Tool, Canadian $2 Coin Comp Alignment</td>
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<td>Tool, Empyral Token Comp Alignment</td>
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<td>Tool, Italian 500 Lire Coin Comp Alignment</td>
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<td>Tool, Italian 1 Rand Coin Comp Alignment</td>
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<td>Tool, SA 1 Rand Coin Comp Alignment</td>
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<td>Tool, SA 1 Rand Token Comp Alignment</td>
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<td>Tool, Sigma® Token Comp Alignment</td>
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<td>Tool, US/Canadian 5c Comp Alignment</td>
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<td>Tool, US/Canadian 25c Comp Alignment</td>
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### -MAIN DOOR, BACK (continued)

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<td>Tube, 12” (31cm)/8W Reel Fluor Black Light</td>
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### -BALLOST BOX

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<td>Ballast, 50/60 Hz, 120V, 0.145A, 4.6W</td>
<td>5610-13454-00</td>
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<td>Ballast, 15W, 120V, 50/60Hz</td>
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<td>Starter, 4.22W (w/capacitor) Fluor</td>
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<td>Starter Socket</td>
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### LARGE EXPLODED VIEWS

#### BALLAST BOX

- **COIN DIVERTER**

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<td>Solenoid, Diverter</td>
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<td>Pin</td>
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<td>Board, Quad Opto (Coin-In Optics)</td>
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<td>E-Ring, 1/4” (3mm) Shaft</td>
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### LARGE EXPLODED VIEWS

#### MAIN DOOR, FRONT

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<td>Bracket, Belly Glass Support</td>
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<td>Clip, Belly Door Latch Retainer</td>
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<td>Door, Belly Glass</td>
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**NOTICE**

To order parts with a "ZZZ" part number suffix, specify part number and color.
-DOTMATION BOX

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### STC® HANDLE MECHANISM PARTS

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### STC® HANDLE MECHANISM PARTS Diagram

[Diagram of STC® HANDLE MECHANISM PARTS]

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<td>140-010-707</td>
<td>20-001066-44</td>
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<td>59</td>
<td>Switch, Micro</td>
<td>22-0719-2</td>
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<td>60</td>
<td>Washer</td>
<td>1037-000</td>
<td>20-001066-73</td>
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<td>61</td>
<td>Screw</td>
<td>230-016-220</td>
<td>20-001066-41</td>
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<td>62</td>
<td>Screw</td>
<td>260-010-700-7</td>
<td>20-001066-42</td>
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<tr>
<td>63</td>
<td>Coll, 12V dc</td>
<td>12-0135</td>
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<td>64</td>
<td>Switch Cam</td>
<td>22-3585-1</td>
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### BOWL PARTS

<table>
<thead>
<tr>
<th>Dwg Ref</th>
<th>Description</th>
<th>Asahi Seiko #</th>
<th>WMS Gaming #</th>
</tr>
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<tbody>
<tr>
<td>1</td>
<td>Pin, Outer Bowl Probe</td>
<td>DH7011M025153</td>
<td>20-001064-44</td>
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<tr>
<td>2</td>
<td>Washer, Nylon Inner</td>
<td>DH7011M025152</td>
<td>20-001064-54</td>
</tr>
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<td>3</td>
<td>Washer, Nylon Outer</td>
<td>DH7011M025150</td>
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<td>4</td>
<td>Terminal, Bowl Probe</td>
<td>DH7011M025093</td>
<td>20-001064-45</td>
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<td>5</td>
<td>Washer, Bowl M5 Star</td>
<td>W5000SR99</td>
<td>20-001064-48</td>
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<td>6</td>
<td>Nut, M5, Bowl Shoulder</td>
<td>NS000SN99</td>
<td>20-001064-47</td>
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<tr>
<td>7</td>
<td>Plate, Hopper Bowl Baffle</td>
<td>DH7011M025006</td>
<td>20-001064-53</td>
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<td>8</td>
<td>Spring, Upper Bowl Screw</td>
<td>DH7011M025048</td>
<td>20-001064-50</td>
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<td>9</td>
<td>Spring, Lower Bowl Mounting</td>
<td>DH7001M025049</td>
<td>20-001064-51</td>
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<tr>
<td>10</td>
<td>Screw, Bowl</td>
<td>DH7011M025047</td>
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<td>11</td>
<td>Nut, M4 small</td>
<td>N400SHX99</td>
<td>20-00477-08</td>
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<td>12</td>
<td>Collar, Mtl 81 Spcr, Bowl</td>
<td>DH7001M07T081</td>
<td>20-001064-52</td>
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<tr>
<td>13</td>
<td>Insulator, Bowl Screw</td>
<td>DH7011M025052</td>
<td>20-001064-48</td>
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</table>

Asahi Seiko®

BOWL PARTS
### HOPPER PARTS

<table>
<thead>
<tr>
<th>Dwg Ref</th>
<th>Description</th>
<th>AS-USA #</th>
<th>WMS Gaming #</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Pin, Motor Drive</td>
<td>DH7001M025007 ..</td>
<td>20-001064-01</td>
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<tr>
<td>2</td>
<td>Motor, 115V, Gearbox</td>
<td>DH7001M025008 ..</td>
<td>20-001064-02</td>
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<tr>
<td>3</td>
<td>Sensor, Proximity</td>
<td>DH7001P025013 ..</td>
<td>20-001064-03</td>
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<tr>
<td>4</td>
<td>Lever, Steel Roller</td>
<td>DH7001P025015 ..</td>
<td>20-001064-04</td>
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<td>5</td>
<td>Spring, Roller Lever</td>
<td>DH7001M025016 ..</td>
<td>20-001064-05</td>
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<td>6</td>
<td>Lever, Pin Roller</td>
<td>DH7001M025017 ..</td>
<td>20-001064-06</td>
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<td>7</td>
<td>Lever, Bridge Roller</td>
<td>DH7001M025018 ..</td>
<td>20-001064-07</td>
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<td>8</td>
<td>E-Ring</td>
<td>W3000ER99 ..</td>
<td>20-001064-08</td>
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<td>9</td>
<td>Knife, 5c</td>
<td>DH7001M005025 ..</td>
<td>20-001064-09</td>
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<tr>
<td>9</td>
<td>Knife, 25c</td>
<td>DH7001M025025 ..</td>
<td>20-001064-10</td>
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<tr>
<td>9</td>
<td>Knife, $1 Token</td>
<td>DH7001M10T025 ..</td>
<td>20-001064-11</td>
</tr>
<tr>
<td>9</td>
<td>Knife, 50c Coin</td>
<td>DH7001M050025 ..</td>
<td>20-001064-56</td>
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<tr>
<td>10</td>
<td>Knife, Canadian Loonie $1</td>
<td>DH7001M10T025 ..</td>
<td>20-001064-61</td>
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<tr>
<td>11</td>
<td>Knife, 1 Rand Token</td>
<td>DH7001M027025 ..</td>
<td>20-001064-65</td>
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<td>Boss, Plastic</td>
<td>DH7001M025026 ..</td>
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<tr>
<td>12</td>
<td>Coin Guide, 5c/25c</td>
<td>DH7001M025028 ..</td>
<td>20-001064-14</td>
</tr>
<tr>
<td>12</td>
<td>Coin Guide, $1 Token</td>
<td>DH7001M010T028 ..</td>
<td>20-001064-15</td>
</tr>
<tr>
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<td>Coin Guide, 50c</td>
<td>DH7001M050028 ..</td>
<td>20-001064-57</td>
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<tr>
<td>12</td>
<td>Coin Cover (5c/25c)</td>
<td>DH7001M025029 ..</td>
<td>20-001064-16</td>
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<tr>
<td>12</td>
<td>Coin Cover ($1 Token)</td>
<td>DH7001M010T029 ..</td>
<td>20-001064-17</td>
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<tr>
<td>12</td>
<td>Cover, 5c Jump Rbr</td>
<td>DH7001M005072 ..</td>
<td>20-001064-34</td>
</tr>
<tr>
<td>12</td>
<td>Cover, 25c &amp; $1 Jump Rbr</td>
<td>DH7001M025072 ..</td>
<td>20-001064-35</td>
</tr>
<tr>
<td>12</td>
<td>Disk, 5c Token</td>
<td>DH7001M005033 ..</td>
<td>20-001064-18</td>
</tr>
</tbody>
</table>

### Asahi Seiko® HOPPER PARTS

- **NOTICE**
  - To order parts with a “ZZZ” part number suffix, specify part number and color.

### HOPPER MOTOR ASSEMBLY

- **AS-USA #**
- **WMS Gaming #**

**NOTICE**
- 115VAC, w/Harness

**HOPPERS, COMPLETE**
- Hopper, Complete 5c Coin
- Hopper, Complete 25c Coin
- Hopper, Complete 50c Coin
- Hopper, Complete $1 Canadian Coin
- Hopper, Complete $1 US Token
- **REEL**

<table>
<thead>
<tr>
<th>Dwg Ref</th>
<th>Description</th>
<th>WMS Gaming #</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Frame, Reel</td>
<td>20-002001</td>
</tr>
<tr>
<td>2</td>
<td>Reel, Motor Assembly (Applied Motion)</td>
<td>A-002382</td>
</tr>
<tr>
<td>3</td>
<td>Reel, Motor Assembly (Vexta)</td>
<td>A-18120</td>
</tr>
<tr>
<td>4</td>
<td>O-Ring, Reel Mounting</td>
<td>20-000536</td>
</tr>
<tr>
<td>5</td>
<td>Reel, Starpoint®</td>
<td>20-004400</td>
</tr>
<tr>
<td>6</td>
<td>Washer</td>
<td>20-004401</td>
</tr>
<tr>
<td>7</td>
<td>E-Ring, 0.25” (6.35mm) Shaft Motor</td>
<td>20-8712-25</td>
</tr>
<tr>
<td>8</td>
<td>Tab, Opto Interrupter</td>
<td>20-000535</td>
</tr>
<tr>
<td>9</td>
<td>Board, Reel Motor Control</td>
<td>20-002002</td>
</tr>
<tr>
<td>10</td>
<td>Spacer, #4 Screw</td>
<td>20-10051-02</td>
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<tr>
<td>11</td>
<td>Housing, Six-Lamp</td>
<td>20-000657</td>
</tr>
<tr>
<td></td>
<td>Bulb, #555, 6.3V, 25mA, Wedge-Based</td>
<td>24-8766</td>
</tr>
<tr>
<td></td>
<td>Tape, Reel Mounting</td>
<td>20-000477</td>
</tr>
</tbody>
</table>

Complete Reel Mechanism Assy .................................................. 20-004399
-TOPBOX

There are 3 styles of Topbox: Chop Top, Big Top, and Bonnet Top. All are available with or without the Interior Card Reader Spacer (the Big Top w/Card Reader Spacer is Illustrated).

<table>
<thead>
<tr>
<th>Dwg Ref</th>
<th>Description</th>
<th>WMS Gaming #</th>
</tr>
</thead>
<tbody>
<tr>
<td>1*</td>
<td>Cabinet, Topbox</td>
<td>A-000725-XX-ZZZ</td>
</tr>
<tr>
<td></td>
<td>The -XX indicates type &amp; size. The -ZZZ suffix indicates lamin. color</td>
<td></td>
</tr>
<tr>
<td>2*</td>
<td>Facade (Crown)</td>
<td>01-000056-XXZZZ</td>
</tr>
<tr>
<td></td>
<td>The -XX indicates type &amp; size. The ZZZ suffix indicates finish.</td>
<td></td>
</tr>
<tr>
<td>3*</td>
<td>Glass Angle</td>
<td>01-001058-XX</td>
</tr>
<tr>
<td></td>
<td>The -XX suffix indicates type &amp; size.</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Angle, Face Plate</td>
<td>01-001058-05</td>
</tr>
<tr>
<td>5*</td>
<td>Face Plate</td>
<td>01-001833-XXP06</td>
</tr>
<tr>
<td></td>
<td>The -XX indicates system type.</td>
<td></td>
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<tr>
<td>5</td>
<td>Face Plate, Blank (shown)</td>
<td>01-001833-00P06</td>
</tr>
<tr>
<td>6</td>
<td>Glass Channel w/Card Reader</td>
<td>01-000705</td>
</tr>
<tr>
<td>7</td>
<td>Louver Plate</td>
<td>01-004304</td>
</tr>
<tr>
<td>8*</td>
<td>Tower Light Block, Big Top</td>
<td>03-9180-XX</td>
</tr>
<tr>
<td></td>
<td>The -XX suffix indicates: -type</td>
<td></td>
</tr>
<tr>
<td>8*</td>
<td>Tower Light Block, Bonnet Top</td>
<td>03-9178-XX</td>
</tr>
<tr>
<td></td>
<td>The -XX suffix indicates: -type</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Bracket, 18&quot; (45.7cm) Lamp</td>
<td>01-13496</td>
</tr>
<tr>
<td></td>
<td>- Mounting Plate, 18&quot; (45.7cm) Lamp. (for Dotmation &amp; Chop topbox)</td>
<td>01-004424</td>
</tr>
<tr>
<td>10</td>
<td>Ballast, 15w, 120v, 50/60hz</td>
<td>5610-14210-00</td>
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<tr>
<td>11</td>
<td>Starter Socket</td>
<td>01-700-04-000</td>
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<tr>
<td>12</td>
<td>Starter 4-22 w/Condenser</td>
<td>02-007800</td>
</tr>
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<td>13</td>
<td>Fluorescent Lamp Socket</td>
<td>01-20048</td>
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<tr>
<td>14</td>
<td>Fluorescent Lamp 15v, 18&quot; (45.7cm)</td>
<td>24-8809</td>
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</table>

*See the Mechanical Parts section for the specific type and size combinations
COIN TRAY

- COIN TRAY

<table>
<thead>
<tr>
<th>Dwg Ref</th>
<th>Description</th>
<th>WMS Gaming #</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Bracket, Coin Tray Speaker, Blind Mating</td>
<td>01-001992</td>
</tr>
<tr>
<td>2</td>
<td>Chute, Coin Tray Back</td>
<td>03-002531</td>
</tr>
<tr>
<td>3</td>
<td>Chute, Coin Tray Front</td>
<td>03-001643</td>
</tr>
<tr>
<td>4</td>
<td>Cover, Speaker</td>
<td>03-000987</td>
</tr>
<tr>
<td>5</td>
<td>Endcap, Left Coin Tray</td>
<td>21-001646-01ZZZ</td>
</tr>
<tr>
<td>6</td>
<td>Endcap, Right Coin Tray</td>
<td>21-001646-02ZZZ</td>
</tr>
<tr>
<td>7</td>
<td>Speaker, 4&quot; (10cm) Dia, 8-Ohm, Full-Range</td>
<td>5555-13961-00</td>
</tr>
<tr>
<td>8</td>
<td>Tray, Coin</td>
<td>01-001645</td>
</tr>
<tr>
<td>-</td>
<td>Panel, No-Tray Slot Mach</td>
<td>01-13652</td>
</tr>
</tbody>
</table>

NOTICE

To order parts with a “ZZZ” part number suffix, specify part number and color.
### BILL VALIDATOR/STACKER

<table>
<thead>
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<th>Dwg Ref</th>
<th>Description</th>
<th>JCM#</th>
<th>WMS Gaming #</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Cam, JCM Extractor, Single Lock</td>
<td>047605-01</td>
<td>01-1285</td>
</tr>
<tr>
<td></td>
<td>Cam, JCM Extractor, Double Lock</td>
<td>049177-01</td>
<td>01-000156</td>
</tr>
<tr>
<td>2</td>
<td>Cassette, JCM Black Stacker, US</td>
<td>049179-01</td>
<td>01-00157</td>
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<tr>
<td>2</td>
<td>Cassette, JCM Gold Stacker, US</td>
<td>049180-01</td>
<td>01-00158</td>
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<tr>
<td>2</td>
<td>Cassette, JCM Silver Stacker, Non-US</td>
<td>050763-01</td>
<td>01-01718-01</td>
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<tr>
<td>2</td>
<td>Cassette, JCM Gold Stacker, Non-US</td>
<td>050764-01</td>
<td>01-01718-02</td>
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<tr>
<td>2</td>
<td>Box, Type-G Bill</td>
<td>047575-01</td>
<td>20-001065-06</td>
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<tr>
<td>2</td>
<td>Box, Type-B Bill</td>
<td>047576-01</td>
<td>20-001065-07</td>
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<td>Bracket, Sw Mounting</td>
<td>047651-01</td>
<td>01-02651</td>
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<tr>
<td>4</td>
<td>Switch, Bare, Sub-mini SPDT</td>
<td>5647-14200-00</td>
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</tbody>
</table>

**BILL VALIDATOR/STACKER**

![Diagram of BILL VALIDATOR/STACKER]

- **JCM#**
  - 040676
  - 040676
  - 040987
  - 040988
  - 037565
  - 046054
  - 017202
  - 048229
  - 040987
  - 05647-14200-00

- **WMS Gaming #**
  - 20-001065-11
  - 20-004565-00
  - 20-004565-01
  - 20-001065-03
  - 20-001065-08
  - 20-001065-04
  - 20-001065-09
  - 20-001065-10
  - 20-001065-01
  - 20-001065-05

### BILL VALIDATOR/STACKER

- **9A**: Tool, Single DBV Extraction, US .........047690......20-10034-01
- **9A**: Tool, Single DBV Extract, Non-US ..........050781......20-001717-01
- **9B**: Tool, Dual DBV Extraction, US ............049178......20-10034-02
- **9B**: Tool, Dual DBV Extract, Non-US ..........050779......20-001717-02
### Tilt Codes

<table>
<thead>
<tr>
<th>Button Code</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU EEPROM</td>
<td>HOST PUT GAME X OUT OF Sync</td>
</tr>
<tr>
<td>Gate 1</td>
<td>BAD INSTALL, CHANGED EEPROM</td>
</tr>
<tr>
<td>Gate 2</td>
<td>BAD REMOVED EEPROM</td>
</tr>
<tr>
<td>Gate 3</td>
<td>BAD PASSWORD</td>
</tr>
<tr>
<td>Gate 4</td>
<td>BAD CORRUPT EEPROM CRC</td>
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</table>

### Candle Codes

<table>
<thead>
<tr>
<th>Candle Section</th>
<th>Candle Activity</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top</td>
<td>Off</td>
<td>Machine is idle</td>
</tr>
<tr>
<td>Bottom</td>
<td>On Slow Flash</td>
<td>Top or Jackpot Request</td>
</tr>
<tr>
<td></td>
<td>Slow Flash</td>
<td>Main door open</td>
</tr>
<tr>
<td></td>
<td>Fast Flash</td>
<td>Main door closed</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### I/O Board LEDs

- **No LEDs light**: Check PDU fuse continuity.
- **All LEDs light**: Bad or loose CPU or I/O Board. Check EPROMs.
- **DS1 is on. Another LED is off**: Bad power supply.

### CPU Board 7-Segment Display

<table>
<thead>
<tr>
<th>Displayed Number</th>
<th>Situation</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>• Constantly (&quot;8&quot; never appears): One power</td>
</tr>
<tr>
<td></td>
<td>voltage is absent.</td>
</tr>
<tr>
<td></td>
<td>• After &quot;8&quot; clears: System OK.</td>
</tr>
<tr>
<td>8</td>
<td>• Briefly: System OK.</td>
</tr>
<tr>
<td></td>
<td>• Constantly: Bad EPROMS XU2 and XU3, or bad</td>
</tr>
<tr>
<td></td>
<td>CPU Board.</td>
</tr>
</tbody>
</table>

### Startup Sound Codes

<table>
<thead>
<tr>
<th>No. of Bongs</th>
<th>Situation</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Speaker disconnected or sound</td>
</tr>
<tr>
<td></td>
<td>circuit problem</td>
</tr>
<tr>
<td>1</td>
<td>System is normal</td>
</tr>
<tr>
<td>2</td>
<td>EPROM XU30 is bad</td>
</tr>
<tr>
<td>3</td>
<td>EPROM XU31 is bad</td>
</tr>
<tr>
<td>4</td>
<td>EPROM XU17 is bad</td>
</tr>
<tr>
<td>5</td>
<td>EPROM XU18 is bad</td>
</tr>
<tr>
<td>6-9</td>
<td>Not Used</td>
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<tr>
<td>10</td>
<td>Bad Sound RAM U38, U39 or U40</td>
</tr>
</tbody>
</table>

### Administration Mode

<table>
<thead>
<tr>
<th>Series</th>
<th>Subject</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Host Communications, Sound Volume, Demo,</td>
</tr>
<tr>
<td></td>
<td>Cash and Credit Modes, Reel Speed, etc.</td>
</tr>
<tr>
<td>1</td>
<td>Input Tests</td>
</tr>
<tr>
<td>2</td>
<td>Output Tests</td>
</tr>
<tr>
<td>3</td>
<td>Hopper Test</td>
</tr>
<tr>
<td>4</td>
<td>Pay Table Test</td>
</tr>
<tr>
<td>5</td>
<td>Reel Strip Test</td>
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<td>6</td>
<td>Denomination Setting</td>
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<td>Maximum Hopper Payout</td>
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<td>8</td>
<td>Hopper Partial Pay Limit</td>
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<tr>
<td>9</td>
<td>Progressive ID and Level</td>
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### Lamp Matrix

<table>
<thead>
<tr>
<th>COL</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>ROW</td>
<td>Blu-Blk Q1</td>
<td>Blu-Brn Q2</td>
<td>Blu-Red Q5</td>
<td>Blu-Crn Q6</td>
<td>Blu-Yel Q9</td>
<td>Blu-Crn Q10</td>
<td>Blu-Vio Q13</td>
<td>Blu-Vio Q14</td>
</tr>
<tr>
<td>0</td>
<td>Reel 1 Left, Center</td>
<td>Reel 1 Right, Bottom</td>
<td>Reel 1 Left, Bottom</td>
<td>Reel 1 Right, Center</td>
<td>Reel 2 Left, Center</td>
<td>Reel 2 Right, Bottom</td>
<td>Reel 2 Left, Top</td>
<td>Max Bet</td>
</tr>
<tr>
<td>1</td>
<td>Reel 1 Left, Center</td>
<td>Reel 1 Right, Bottom</td>
<td>Reel 1 Left, Bottom</td>
<td>Reel 1 Right, Center</td>
<td>Reel 2 Left, Center</td>
<td>Reel 2 Right, Bottom</td>
<td>Reel 2 Left, Top</td>
<td>Payline Lamp, Top</td>
</tr>
<tr>
<td>2</td>
<td>Reel 1 Left, Bottom</td>
<td>Reel 1 Right, Bottom</td>
<td>Reel 1 Left, Bottom</td>
<td>Reel 1 Right, Center</td>
<td>Reel 2 Left, Center</td>
<td>Reel 2 Right, Bottom</td>
<td>Reel 2 Left, Top</td>
<td>Reel 1 Left, Center</td>
</tr>
<tr>
<td>3</td>
<td>Reel 1 Left, Center</td>
<td>Reel 1 Right, Bottom</td>
<td>Reel 1 Left, Bottom</td>
<td>Reel 1 Right, Center</td>
<td>Reel 2 Left, Center</td>
<td>Reel 2 Right, Bottom</td>
<td>Reel 2 Left, Top</td>
<td>Reel 1 Center</td>
</tr>
<tr>
<td>4</td>
<td>Reel 1 Left, Center</td>
<td>Reel 1 Right, Bottom</td>
<td>Reel 1 Left, Bottom</td>
<td>Reel 1 Right, Center</td>
<td>Reel 2 Left, Center</td>
<td>Reel 2 Right, Bottom</td>
<td>Reel 2 Left, Top</td>
<td>Reel 1 Right, Center</td>
</tr>
<tr>
<td>5</td>
<td>Reel 1 Left, Center</td>
<td>Reel 1 Right, Bottom</td>
<td>Reel 1 Left, Bottom</td>
<td>Reel 1 Right, Center</td>
<td>Reel 2 Left, Center</td>
<td>Reel 2 Right, Bottom</td>
<td>Reel 2 Left, Top</td>
<td>Reel 1 Right, Bottom</td>
</tr>
<tr>
<td>6</td>
<td>Reel 1 Left, Center</td>
<td>Reel 1 Right, Bottom</td>
<td>Reel 1 Left, Bottom</td>
<td>Reel 1 Right, Center</td>
<td>Reel 2 Left, Center</td>
<td>Reel 2 Right, Bottom</td>
<td>Reel 2 Left, Top</td>
<td>Reel 1 Right, Bottom</td>
</tr>
<tr>
<td>7</td>
<td>Reel 1 Left, Center</td>
<td>Reel 1 Right, Bottom</td>
<td>Reel 1 Left, Bottom</td>
<td>Reel 1 Right, Center</td>
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<td>Reel 2 Right, Bottom</td>
<td>Reel 2 Left, Top</td>
<td>Reel 1 Right, Bottom</td>
</tr>
</tbody>
</table>

### Programmed and Field Programmable Chip Summary

<table>
<thead>
<tr>
<th>Chip Type</th>
<th>Board</th>
<th>Location</th>
<th>Description</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Game EPROM</td>
<td>CPU</td>
<td>XU2</td>
<td>27C010, 128K x 8, 100nS</td>
<td>(Order by Game Name)</td>
</tr>
<tr>
<td>Data EPROM</td>
<td>CPU</td>
<td>XU3</td>
<td>27C010, 128K x 8, 100nS</td>
<td>(Order by Game Name)</td>
</tr>
<tr>
<td>PLD</td>
<td>CPU</td>
<td>XU12</td>
<td>MACH110</td>
<td>A-18125</td>
</tr>
<tr>
<td>Sound EPROM</td>
<td>CPU</td>
<td>XU17</td>
<td>27C040, 512K x 8, 100 nS</td>
<td>(Order by Game Name)*</td>
</tr>
<tr>
<td>Sound EPROM</td>
<td>CPU</td>
<td>XU18</td>
<td>27C040, 512K x 8, 100 nS</td>
<td>(Order by Game Name)*</td>
</tr>
<tr>
<td>PLD</td>
<td>CPU</td>
<td>XU24</td>
<td>GAL, 16V8, 10 nS</td>
<td>A-18264*</td>
</tr>
<tr>
<td>PLD</td>
<td>CPU</td>
<td>XU25</td>
<td>GAL, 16V8, 10 nS</td>
<td>A-18265</td>
</tr>
<tr>
<td>Sound EPROM</td>
<td>CPU</td>
<td>XU30</td>
<td>27C040, 512K x 8, 100 nS</td>
<td>(Order by Game Name)*</td>
</tr>
<tr>
<td>Sound EPROM</td>
<td>CPU</td>
<td>XU31</td>
<td>27C040, 512K x 8, 100 nS</td>
<td>(Order by Game Name)*</td>
</tr>
<tr>
<td>PLD</td>
<td>CPU</td>
<td>XU33</td>
<td>GAL, 16V8, 10 nS</td>
<td>A-18266</td>
</tr>
<tr>
<td>EEPROM</td>
<td>CPU</td>
<td>U26*</td>
<td>4 kilobit DIP EEPROM</td>
<td>5345-13617-00</td>
</tr>
<tr>
<td>Static RAM</td>
<td>CPU</td>
<td>U4, U5</td>
<td>32K x 8 Low-Power</td>
<td>5340-14212-00</td>
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<tr>
<td>Sound Static RAM</td>
<td>CPU</td>
<td>U38-U40</td>
<td>2K x 8, 35nS, 6116 (Sound RAM)</td>
<td>5340-13304-00</td>
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<tr>
<td>ADSP-MPU</td>
<td>CPU</td>
<td>U37</td>
<td>2105 KP 40 ADSP-MPU (Sound)</td>
<td>5400-13298-00</td>
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<tr>
<td>PAL</td>
<td>I/O</td>
<td>XU12</td>
<td>MACH110</td>
<td>A-18122</td>
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<tr>
<td>PAL</td>
<td>I/O</td>
<td>XU25</td>
<td>GAL, 16V8, 10 nS</td>
<td>A-18123</td>
</tr>
<tr>
<td>FPGA</td>
<td>I/O</td>
<td>XU28</td>
<td>GAL, 16V8, 10 nS</td>
<td>A-18124</td>
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<td>FPGA</td>
<td>I/O</td>
<td>XU42</td>
<td>3030A-70PC84C Xilinx Field</td>
<td>5352-14012-00</td>
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<tr>
<td>EEPROM</td>
<td>Backplane</td>
<td>U1</td>
<td>x24C04, 512 x 8 bit</td>
<td>5345-13920-00</td>
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</tbody>
</table>

*EEPROM: Also XU27 on some slots. Sound EPROM: Some machines don’t use all four sound EPROMs.