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WMS GAMING INC.

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CE

Upright Slot Machine

Model 40X Service Manual

With Details on 1995 Machines

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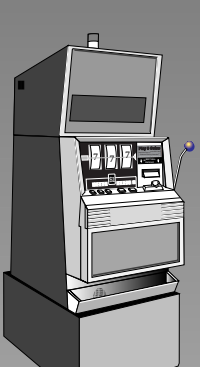

Upright Slot Machine

Model 40X Service Manual

With Details on 1995 Machines

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

Power Requirements	
Voltage	120 or 240 VAC
Line Freq	60 or 50 Hz
Current	4 amps max. at 120 VAC 2 amps max. at 240 VAC

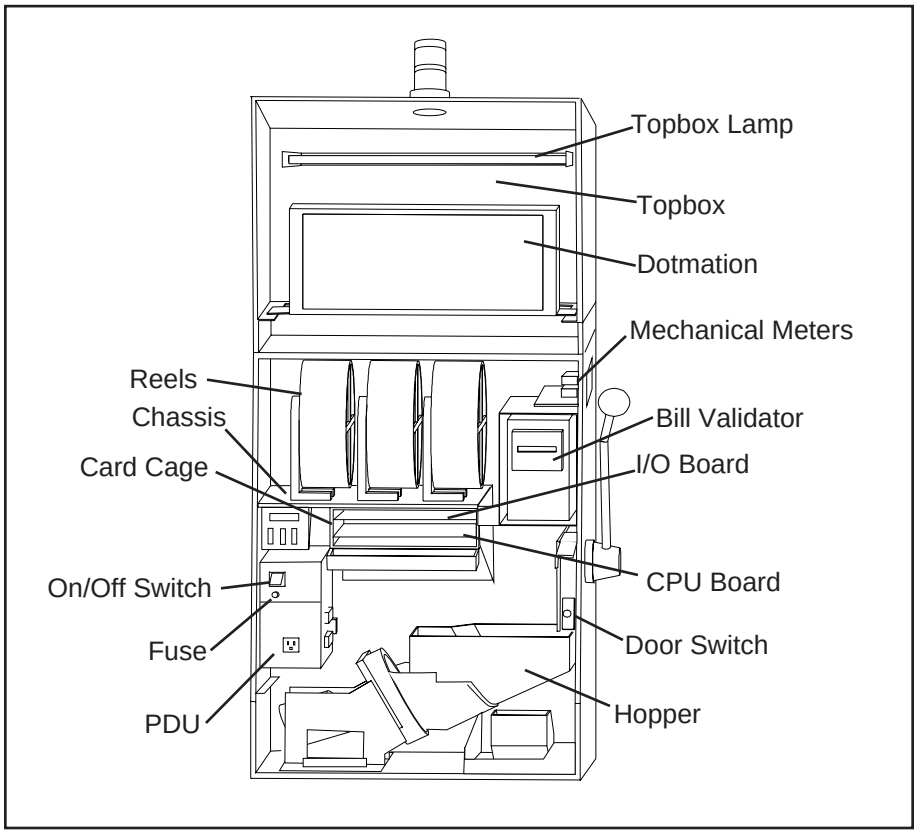
Procedure

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.

❑ 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.

WARNING

BASE-MOUNTED INSTALLATION: Mount machines back to back on a common base. Or secure the base in place. Otherwise the base can tip over, causing injury or damage.

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.

CAUTION

If you install a player tracking unit *(PTU)* in the slot machine: The PTU should be certified by the CSA or by UL.

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).

CAUTION

If you install a player tracking unit *(PTU)* in the slot machine: The PTU ground wire must be connected during use, and reconnected after servicing.

NOTICE

I/O JUMPERS. If you change a jumper setting, you must perform a hard RAM clearance. See the *Maintenance and Troubleshooting* section.

I/O Board Jumper and DIP Switch Settings

DIP Bank	Jurisdiction	8	7	6	5	4	3	2	1
1 *(Jumper Pad)*	Standard	Off	Off	Off	Off	Off	Off	Off	Off
	New Jersey	On	Off	Off	Off	Off	Off	Off	Off
	Missouri	Off	On	Off	Off	Off	Off	Off	Off
	France	On	On	Off	Off	Off	Off	Off	Off
	Delaware	Off	Off	On	Off	Off	Off	Off	Off
	Nevada	On	Off	On	Off	Off	Off	Off	Off
2 (Switch)	**Progressive**								
	Enabled	On	Off	Off	Off	Off	Off	Off	Off
	Disabled	Off	Off	Off	Off	Off	Off	Off	Off

❑ 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.

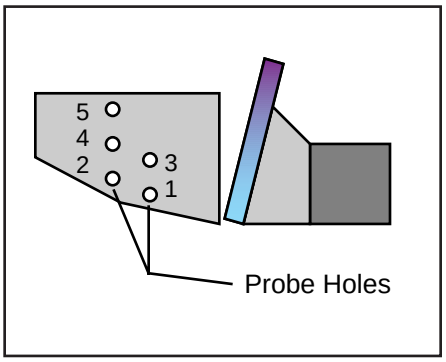
❑ 24. Return the hopper to the machine. Fill the hopper with coins of the proper denomination. See the table *Hopper Probe Level.* The table approximates the optimum number of coins for each coin-level probe hole.

CAUTION

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

Hopper Probe Level

Probe Hole	U.S. $1	25¢	5¢
5	1,080	4,080	4,820
4	710	3,030	3,600
3	680	2,410	2,850
2	530	2,150	2,560
1	330	1,730	1,900



Back view of hopper, showing probe holes.

CAUTION

Plugging a 120V slot machine into a 240V line will damage the slot machine.

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
- BACKPLANE
- DOOR SWITCHBOX
- PDU
- REELS
- METERS
- 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.

NOTICE

OTHER SETUP PROCEDURES...

- **Denomination Adjustments:** See the *Maintenance and Troubleshooting* section of this manual. Also see Chapter 2, *Diagnostic and Adjustment Software.*
- **Reel Strip Installation:** Follow the procedure in the *Maintenance and Troubleshooting* section of this manual. Run the Reel Strip Test described in Chapter 2, *Diagnostic and Adjustment Software.*
- **Software Installation:** Procedures appear in the *Maintenance and Troubleshooting* section of this manual.

SPECIFICATIONS FOR STANDARD LOCKS (INCHES)

Dimensions, Cam Mounting Hole: Diameter 0.28" x 0.22"

Door	Barrel Length	Double D Hole Size	Rotation to Unlock
Stacker	5/8"	0.76" x 0.64"	CCW
Logic	5/8"	0.76" x 0.64"	CW or CCW
Main	5/8"	0.76" x 0.64"	CCW
Stacker Extract. Tool	5/8"	0.76" x 0.64"	CCW

Lock/Switch	Barrel Length	Double D Hole Size	Rotation to Unlock
NJ Extra Extract. Lk.	5/8"	0.76" x 0.64"	CCW

Cam must rotate in the same direction as the lock.

NJ Extra Stacker Dr. Lk.	5/8"	0.76" x 0.64"	**Opposite of Bill Stacker Door Lock**

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

Door	Barrel Length	Double D Hole Size	Rotation to Unlock
Stacker	1.59cm	.19cm x .16cm	CCW
Logic	1.59cm	.19cm x .16cm	CW or CCW
Main	1.59cm	.19cm x .16cm	CCW
Stacker Extract. Tool	1.59cm	.19cm x .16cm	CCW

Lock/Switch	Barrel Length	Double D Hole Size	Rotation to Unlock
NJ Extra Extract. Lk.	1.59cm	.19cm x .16cm	CCW

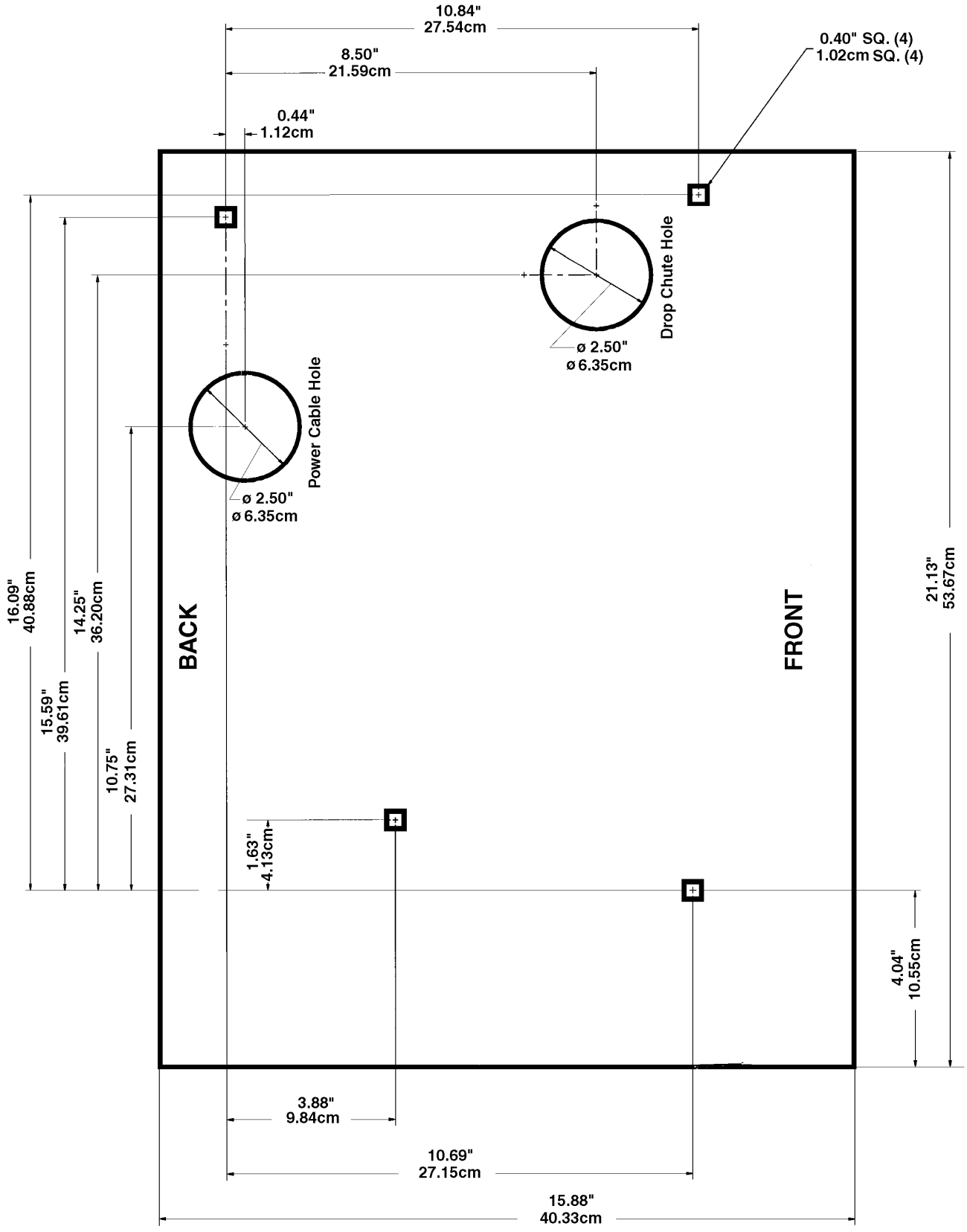
Cam must rotate in the same direction as the lock.

NJ Extra Stakr. Dr. Lk.	1.59cm	.19cm x .16cm	**Opposite of Bill Stacker Door Lock**

Barrel Lock Spacers

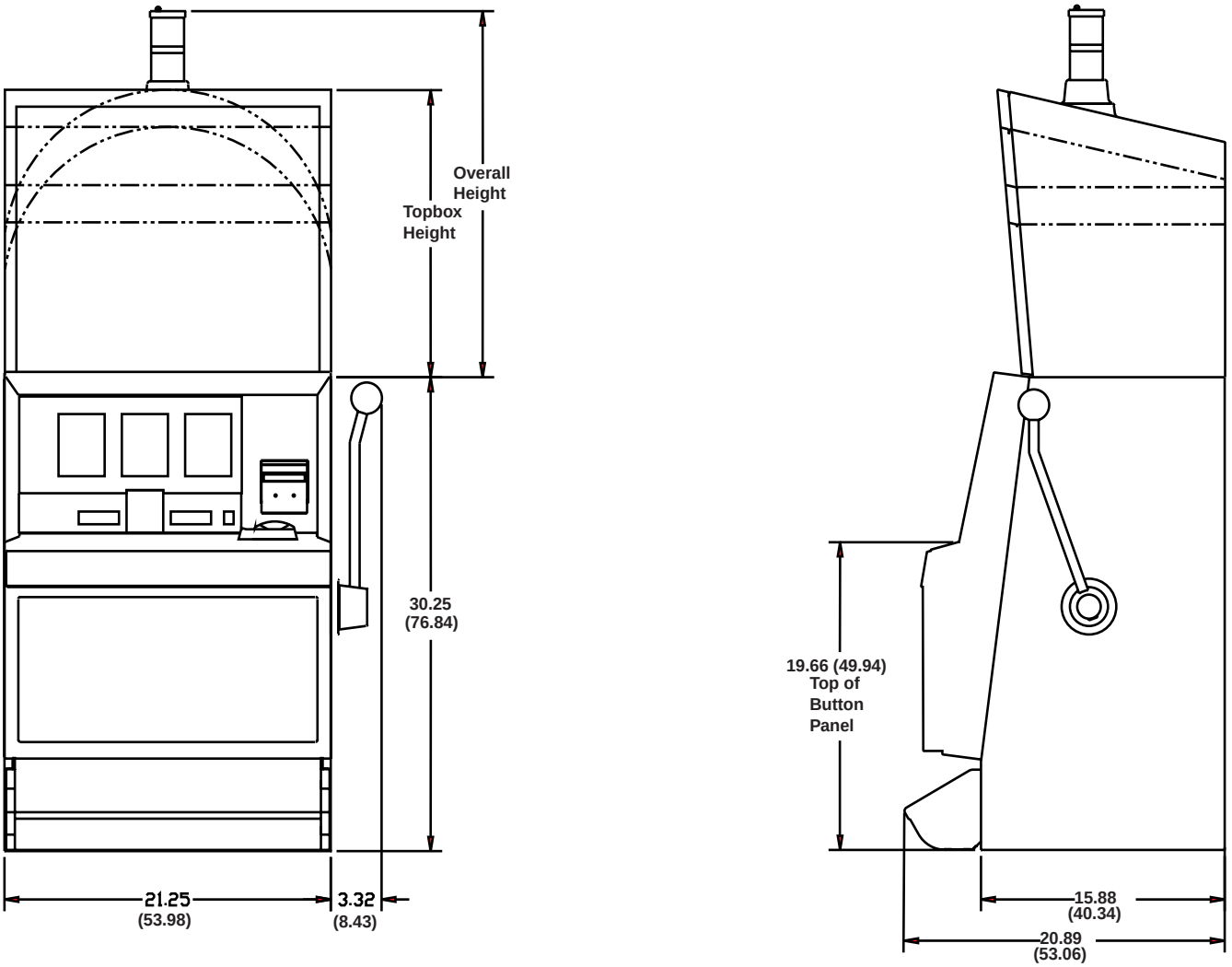
P/N 02-4916-01: .16cm P/N 02-4916-02: .32cm
P/N 02-4916-03: .48cm P/N 02-4916-04: .64cm

Slot Machine Base Dimensions



Wide Body Slot – Model 40S Series

PART DESCRIPTION	TOP BOX HEIGHT	OVERALL HEIGHT
9" Topbox	9.88 (25.35)	15.88 (40.34)
9" Topbox w/Cardreader	12.25 (31.12)	18.25 (46.36)
16" Topbox	15.97 (40.56)	21.40 (54.36)
16" Topbox w/Cardreader	18.34 (46.58)	23.77 (60.38)
Bonnet Topbox	15.97 (40.56)	21.20 (53.85)
Bonnet Topbox w/Cardreader	18.34 (46.58)	23.57 (59.87)



Flammability Classification Weights*

Category	Lbs.	Kg.
Combustible	8.58	3.89
Total	241.14	109.38

*Including metal topbox, but without card reader

NOTICE

Measurements are in inches and in centimeters (parentheses).

NOTICE

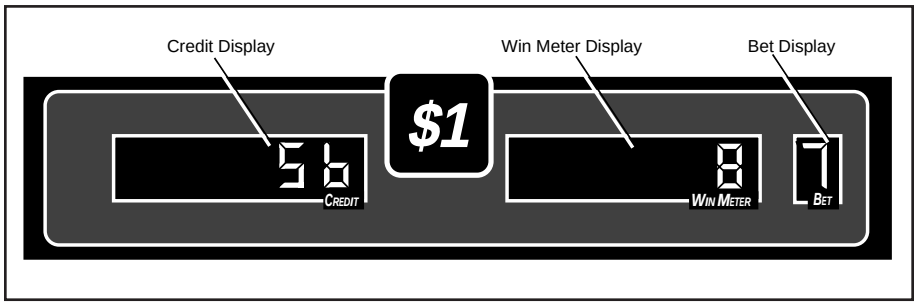
To allow opening of the Bill Door, space games at least 6” (15.24 cm) apart.

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

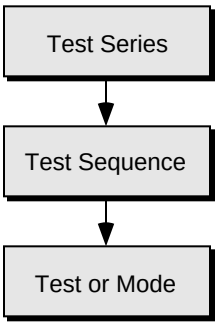
❑ 1. You can enter Administration Mode while the machine operates in *Game-Over Mode or Tilt Mode.* (The slot machine enters Game-Over Mode between games. In this mode, no bet or jackpot is pending and the hopper is inactive. Tilt Mode means that a tilt prevents game play.) Unlock and open the machine's 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

This chapter covers slot software up to v. 5.09.



NOTICE

Administration Mode contains test and setup series. Most series contain sequences of tests or adjustments. Some series have no sequences.

Administration Mode

Series	Subject
0	Host Communications, Sound Volume; Demo, Cash and Credit Modes, Reel Speed, Etc.
1	Input Tests
2	Output Tests
3	Hopper Test
4	Pay Table Test
5	Reel Strip Test
6	Denomination Setting
7	Maximum Hopper Payout
8	Hopper Partial Pay Limit
9	Progressive ID and Level
10	Lamp Test and Custom Features Tests

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.

NOTICE

You can use *either* the SPIN REELS button or the SLOT HANDLE to initiate tests. For simplicity, this chapter only mentions the SPIN REELS button.

NOTICE

You can use *either* the JACKPOT RESET KEY or MAX BET to select tests. For simplicity, this chapter only mentions the JACKPOT RESET KEY.

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 *Administration Mode Controls* for other common switch names.

Administration Mode Controls

Switch	Administration Mode Function
• DIAGNOSTIC	Enters and advances through Administration Mode test series, sequences
• JACKPOT RESET KEY	Selects tests within a series or sequence
• MAX BET	Usually has same effect as JACKPOT RESET KEY
• SLOT HANDLE	Same effect as SPIN REELS
• SPIN REELS	Initiates tests *(except for input tests);* selects setup options

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...*

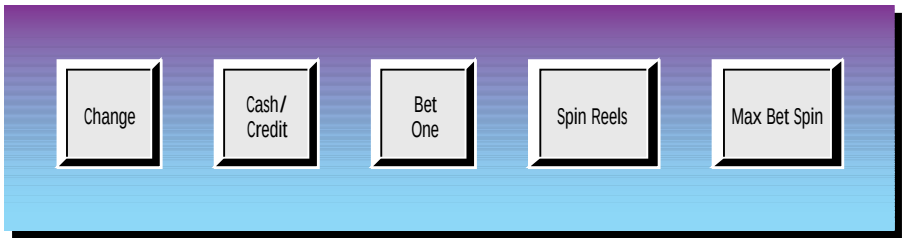
Series 0. Host Communications, Sound Volume; Demo, Cash and Credit Modes, Reel Speed, Etc.

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.

Supported Host Protocols

Credit Display	Protocol
NONE	No Host Communication
SAS	IGT System
SdS	Bally System
ACP	WMS Protocol



Player Panel Buttons

NOTICE

Older machines use a CALL ATTENDANT button, instead of the CHANGE button shown.

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.

NOTICE

You can exit Administration Mode and save changes anytime by closing the Main Door.

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

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.

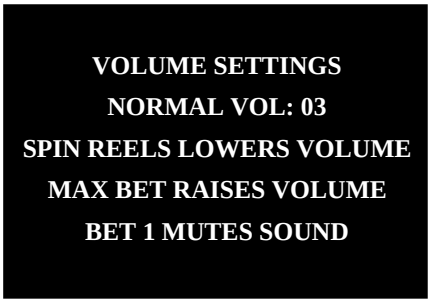
- *To change the flashing digit value,* press SPIN REELS one or more times.
- *To advance to the next digit,* turn the JACKPOT RESET KEY. With each turn of the key, the flashing digit sequentially advances from right to left. Suppose that the flashing digit is the leftmost one: Return to the rightmost digit by turning the JACKPOT RESET KEY one more time.
- *To save settings and enter Sequence 6,* press the DIAGNOSTIC button.

Automated Sound System

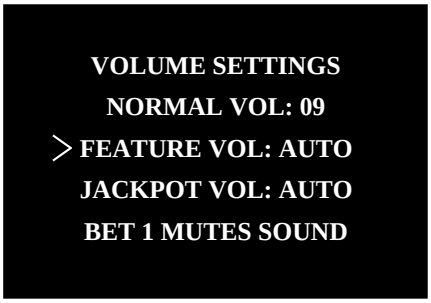
Some game software includes an automated user interface for sound volume settings. This automated interface operates differently than the manual interface already described. Automated versions of Sequences 3, 4 and 5 replace manual versions that we've described above. Here's how the automated sound user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

Automatic Sound Screen 1



Automatic Sound Screen 2



NOTICE

The Automated Sound Value Range is 0 to 63, instead of 0 to 255. Sound level 63 in the automated sound system equals level 255 in the manual system. The automated system's volume 25 (Snd 1) equals the manual system's starting volume 30.

Sequence 3. Normal Sound Volume *(Automated)*

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, 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:	Credit	Win Meter	Bet
	Snd 2	3-Digit No.	0

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

Initial Display Values:	Credit	Win Meter	Bet
	LooP	inFin	0

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

Credit Display	Reel Speed
Slo	Slow
nnEd	Medium

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.

NOTICE

The machine can only enter Demo Mode when certain conditions prevail: (1) The Credit Meter displays zero credits. (2) No bet is pending. (3) The machine isn't tilted. (4) Game rules permit the machine to enter Demo Mode. (5) The slot machine isn't storing bonus credits.

Mode 2. Demo Mode

Initial Display Values:	Credit	Win Meter	Bet
	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.

NOTICE

In some game software versions, Attract Mode sound is on by default. You may turn off Attract Mode sound by following instructions at *"Mode 3. Attract Mode."*

Mode 3. Attract Mode

Initial Display Values:	Credit	Win Meter	Bet
	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 Comparitor® 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

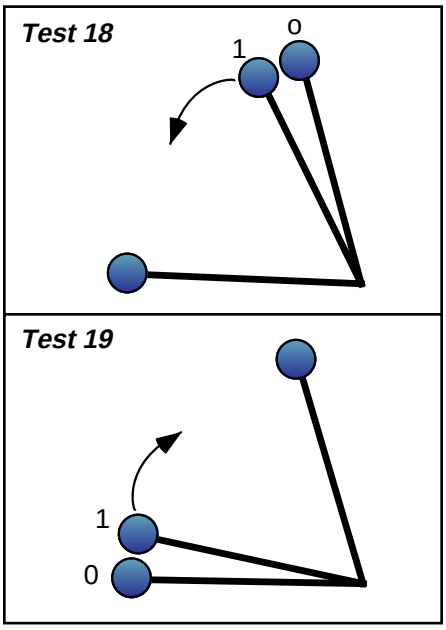
Press the spring-loaded lever atop the hopper escalator. Initially zero, the logic level digit changes to one. During play, dispensed coins actuate the lever, closing contacts.

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.

Input Tests

Test	Subject
10	Coin Comparator
11	Top Coin Opto
12	Bottom Coin Opto
13	Door Switch
14	Hopper Coin Sensor
15	Hopper Probe
16	SPIN REELS button
17	ATTENDANT KEY
18	SLOT HANDLE, top sw
19	SLOT HANDLE, btm sw
20	BET ONE button
21	MAX BET button
22	CASH/CREDIT button
23	CALL ATTENDANT btn
25	DIAGNOSTIC button
26	Stacker Door
27	Logic Door
28	Bill Door
29	Drop Door
30	b Serv
31	Hood
40	Reel #1 Opto
41	Reel #2 Opto
42	Reel #3 Opto
70	Game-Specific Input
71	Game-Specific Input
72	Game-Specific Input
73	Game-Specific Input
74	Game-Specific Input
75	Game-Specific Input



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.

Solenoid and Lamp Tests

Test	Correct Response
09	Coins Played Meter Increments
10	Bill Dollars Meter Increments
11	Coins Out Meter Increments
12	Credits Hand Paid Mtr Increments
13	Coins Drop Meter Increments
14	(Future Use)
18	All lamps Light
19	Payline Lamp 1 Lights
20	Payline Lamp 2 Lights
21	Payline Lamp 3 Lights
22	Payline Lamp 4 Lights
23	Payline Lamp 5 Lights
26	Bill Validator Accepts/Rejects Bill
31	Candle, Top Lights
32	Candle, Btm Lights
33	Coin Diverter Solenoid Energizes
34	Coin Lockout Solenoid Energizes
41	Insert Coin Lamp Lights
42	Coin Accepted Lamp Lights
44	MAX BET Button Lamp Lights
45	BET ONE Button Lamp Lights
46	CASH/CREDIT Btn Lamp Lights
47	SPIN REELS Button Lamp Lights
48	Press SPIN REELS, light Payline 1
49	Press SPIN REELS, light Payline 2
50	Press SPIN REELS, light Payline 3
70	Game-Specific Solenoid or Lamp
71	Game-Specific Solenoid or Lamp
72	Game-Specific Solenoid or Lamp
73	Game-Specific Solenoid or Lamp
74	Game-Specific Solenoid or Lamp
75	Game-Specific Solenoid or Lamp

- *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

Test	Subject
1	Jackpot Tune
2	Large Hit
3	Medium Hit
4	Small Hit
5	Very Small Hit
10	Signature Tune
11	Jackpot Loop Tune
101	Coin Deposited
103	Bill Accepted
104	Reel Spin
108	Hopper Coin
109	Bonus Coin
110	BET 1 Pressed
117	Coin Reject
118	Tilt
119	CASH/CREDIT Pressed
120	Button Turned Off
121	Credit Bang-Up Loop
122	Credit Bang-Up Loop End

Sequence 2. Sound Tests

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

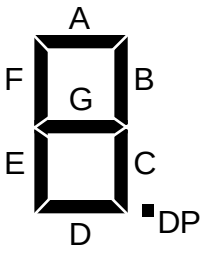
Initial Display Values:	Credit	Win Meter	Bet
	8.8.8.8.8.	8.8.8.8.8.	8.

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. Numeral by numeral, 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.



Display Segments

Series 3. Hopper Test

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

Hopper Error Messages

Credit Display	Subject
HPrE	Hopper Empty
HPrJ	Hopper Jam
HPrC	Hpr Dispensed Extra Coin
Hprr	Hopper Runaway

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 (Game ID/Pctage) Win Meter (Top Awd/Protocol) Bet (Max Bet)

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

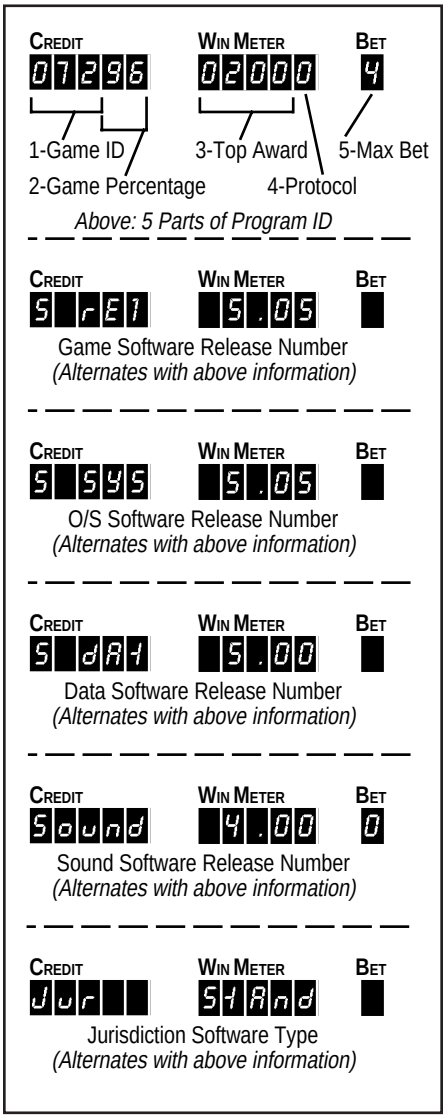
Initially, the software program identification number appears on the slot machine's three displays. This number has five parts. (The illustration in the margin shows the parts, and which display digits each part occupies. The table below the illustration provides several examples.) Then, every two seconds, 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...

	Credit Display	Win Meter Display	Bet Display
A.	07296	02000	4
B.	S rE1	5.05	
C.	S SYS	5.05	
D.	S dAt	5.00	
E.	Sound	4.00	0
F.	Jur	StAnd	

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.



Game ID (3 digits)		Game % (2 digits)
Wild & Loose Copy Cat Power 7's etc.	010 011 012	92 94 96 etc.

Top Award (4 digits)	Protocol (1 digit)	
1,000 2,500 500 etc.	None ACP SAS SDS (Future Use) VLC etc.	0 1 2 3 4 5

Max Bet (1 digit)
0-9: Highest wager that the machine accepts (in credits)

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 paytable 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 paytable 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.

  Suppose that a failure occurs during the test: The test terminates without completing the spin. The Credit Display indicates the failure type with an error code.

- *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.

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...”

Number	Notation
0-99,999	Conventional
100,000-990,099	xxtxx

- 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

Std ROM + No Jumpers	Std ROM + Jumpers	Spcl ROM + Jumpers
(Most Jurisdictions)	Missouri	Delaware
	New Jersey	France

Note: "Std" = Standard; "Spcl" = Special. Install standard or special ROM at XU3 on CPU Board.

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

In electronic coin comparators, a sample coin determines the current denomination. You must also set the slot machine computer for the correct denomination. For this task, use a RAM Clear Chip of the correct denomination. Follow instructions in Section 2, *Maintenance and Troubleshooting,* Chapter 2.

NOTICE

In Series 6, Sequence 1, game denomination *(nickel, quarter, etc.)* appears in the Credit Display. The last RAM Clear procedure installed this value in static RAM.

NOTICE

DIP switches on the bill validator allow you to manually accept or reject denominations. Administration Mode Series 6 *can't* override a DIP switch set to OFF.

Coin Mech Description Tables

•Credit Display

1st 2 Digits

Display	Model
40	40X*
35	35X*

Last 2 Digits

Display	Country
99	Token
05	Peru
04	S. Africa
03	France
02	Italy
01	Canada
00	U.S.

*Note: 35X = slant top; 40X = upright slot.

•Win Meter Display

1st Digit

Display	Coin Mech
2	Smart Mech
1	NRI
0	CC-16

Last 4 Digits

Display	Coin
100	$1
50	50¢
25	25¢
5	5¢

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:	Credit	Win Meter	Bet
	SEcur	4-Digit No.	*(Blank)*

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:	Credit	Win Meter	Bet
	35 00 *(varies)*	0 25 *(varies)*	6

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.

	Credit Display	Win Meter Display	Bet Display
A.	40 1	1 25	6
B.	Stnd		6
C.	Jpr	Set 1	6
D.	0000	0000	6

E.	Jpr	Set 2	6
F.	0000	0000	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:	Credit	Win Meter	Bet
	1	“on” or "OFF"	*(Blank)*

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.

Bill Settings

Coin/Bill	Display
$100	100
$50	50
$20	20
$10	10
$5	5
$2	2
$1	1

- *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.

Series 7. Maximum Hopper Payout

Initial Display Values:	Credit	Win Meter	Bet
	HoPr	4-Digit No.	7

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.

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.

Series 9. Progressive ID and Level

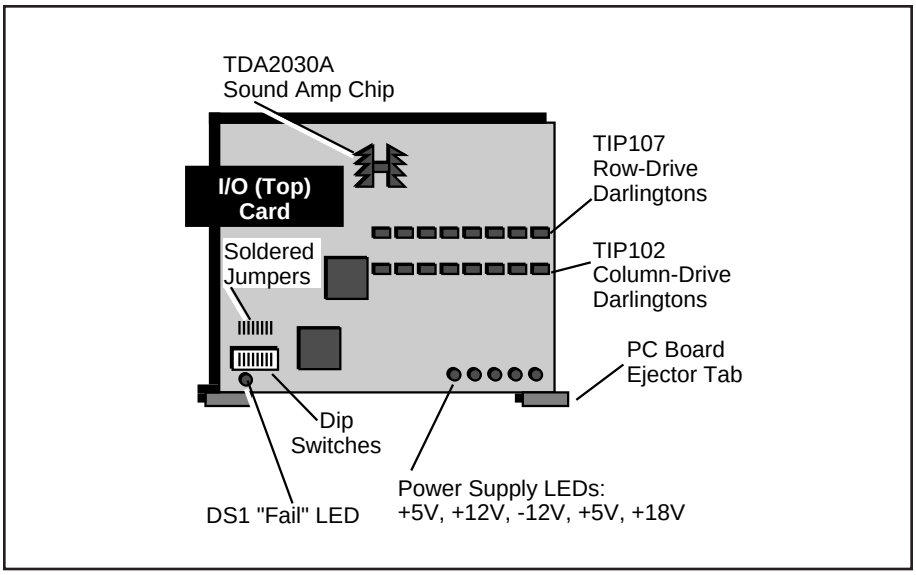
The slot machine supports an interface to progressive systems. To use this system, turn on I/O Board DIP Switch 8 of Bank 2. Then make two settings...

- **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.



- ❑ 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.

CAUTION

To enable the Series 9 progressive option, turn on DIP Switch 8 of Bank 2. Otherwise, the progressive option won't work. After setting the DIP switch, clear the RAM. Otherwise, Bookkeeping Totals will report inaccurate values.

The progressive option only initializes after you clear the RAM. Turning on the switch doesn't disrupt bookkeeping totals, because the GD won't recognize the new switch state.

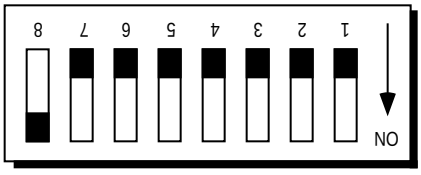
Sequence 1. Set Progressive ID

Initial Display Values:	Credit	Win Meter	Bet
	ID	2-Digit No.	9

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 suport 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.



To use Series 9, turn on DIP Switch 8 in Bank 2. (When viewed from the front of the I/O Board, the DIP Switch is upside down.)

I/O Board Jumper and DIP Switch Settings

DIP Bank	Jurisdiction	8	7	6	5	4	3	2	1
1 *(Jumper Pad)*	Standard	Off	Off	Off	Off	Off	Off	Off	Off
	New Jersey	On	Off	Off	Off	Off	Off	Off	Off
	Missouri	Off	On	Off	Off	Off	Off	Off	Off
	France	On	On	Off	Off	Off	Off	Off	Off
	Delaware	Off	Off	On	Off	Off	Off	Off	Off
2 (Switch)	**Progressive**								
	Enabled	On	Off	Off	Off	Off	Off	Off	Off
	Disabled	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.

CAUTION

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.

Series 10. Lamp Test

Initial Display Values:	Credit	Win Meter	Bet
	LAnnP	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

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.

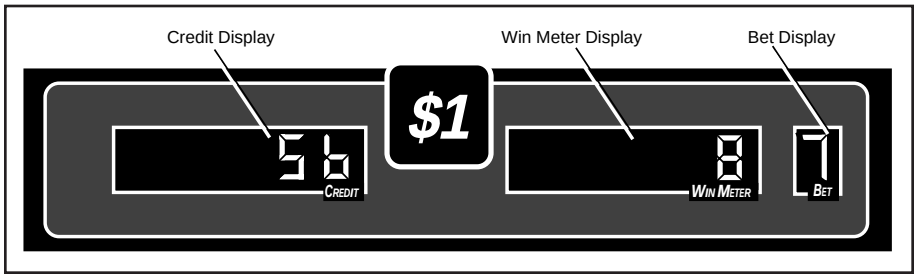
NOTICE

This chapter covers slot software up to v. 5.09.

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.

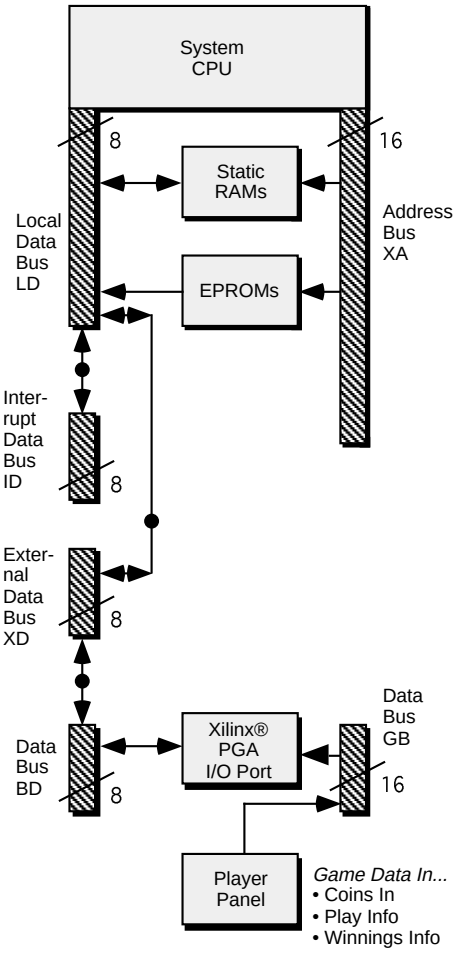
The slot machine presents game data as numeric codes on three displays: The Win Meter, Credit and Bet displays. A data series number appears on the Bet Display. The Credit and Win Meter displays convey meter data. *See the display illustration below.*



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.

The System Stores Game Data



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.

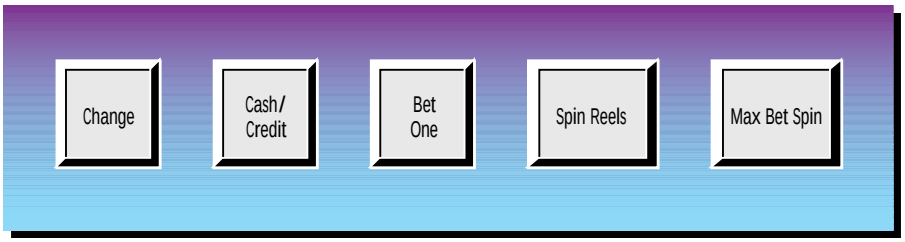
❑ 2. Repeatedly turn the JACKPOT RESET KEY to advance between Bookkeeping Mode series. (Pressing MAX BET serves the same function as turning the JACKPOT RESET KEY.) *Continue until you find the desired series.* The series name appears in the Credit and Win Meter displays. For instance, in the first series,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

Bookkeeping Meter Series

Meter Series	Credit Display	Win Display
1. Coin Info Meters	coin	inFo
2. Play Info Meters	PLAY	inFo
3. Play Log	PLAY	Lo9
4. Door Info Mtrs	door	inFo
5. Tilt Info Meters	tilt	inFo
6. Bill Info Meters	bill	inFo
7. Bill Log	bill	Lo9
8. Bet Info Meters	bet	inFo
9. Cash Info Meters	CASH	inFo
10. Line Info Meters	LinE	inFo
11. Progr Info Mtrs	Prog	inFo

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.



Player Panel Buttons

NOTICE

You can use *either* the JACKPOT RESET KEY or MAX BET to select tests. For simplicity, this chapter only mentions the JACKPOT RESET KEY.

Bookkeeping Mode Controls

Switch	Bookkeeping Mode Function
• JACKPOT RESET KEY	Enters Bookkeeping Mode; advances to the next meter series
• MAX BET	Advances to the next meter series. *(Easier to use than JACKPOT RESET KEY)*
• SPIN REELS	Advances between meters, within each series

NOTICE

You can use *either* the SPIN REELS button or the SLOT HANDLE to initiate tests. For simplicity, this chapter only mentions the SPIN REELS button.

❑ 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)

NOTICE

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

NOTICE

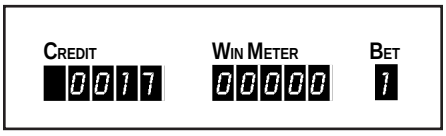
You *can't* enter Bookkeeping Mode from within Administration Mode.

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.)*



NOTICE

These meter readings represent a Meter 01 value. Here, Meter 01 indicates 1.7 million coins in. (The Bet Display actually alternates between "0," "1" and blank.)

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

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.

Series 1. Coin Info Meters

Meter	Subject
01	Coins In
02	Coins Out
03	Coins Drop
04	Bill Dollars
05	Credits HandPay
06	Total Physical Coins In
07	Normal Coin In
08	Escrowed Coin In
09	Error Coin In
10	Total Physical Coins Out
11	Hopper Coin Out
12	Escrow Coin Out
13	Test Coin Out
14	Extra Coin Out
15	Total Electronic Xfer In
16	Card Credits In
17	Bonus Credits In
18	Total Electronic Xfer Out
19	Card Credits Out
20	Bonus Credits Out

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.

Series 2. Play Info Meters

Meter	Subject
01	Games Played
02	Games Played Since Reset
03	Games Played Since Door Close
04	Games Won
05	Total Hand Pays
06	Progressive Wins
07	Player Count
08	Average Time Played
09	Uptime (Playable for X hours)

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.

Series 3. Play Log Meters

Meter	Subject
01	Last Game Data
02	Data from Game 1 Before Last
03	Data from Game 2 Before Last
04	Data from Game 3 Before Last
05	Data from Game 4 Before Last
06	Data from Game 5 Before Last
07	Data from Game 6 Before Last
08	Data from Game 7 Before Last
09	Data from Game 8 Before Last
10	Data from Game 9 Before Last
11	Data from Game 10 Before Last
12	Data from Game 11 Before Last
13	Data from Game 12 Before Last
14	Data from Game 13 Before Last
15	Data from Game 14 Before Last
16	Data from Game 15 Before Last
17	Data from Game 16 Before Last
18	Data from Game 17 Before Last
19	Data from Game 18 Before Last
20	Data from Game 19 Before Last

- *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:	Credit	Win Meter	Bet
	5 MSD	5 LSD	flashes 0, then 1

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.

Series 4. Door Info Meters

Meter	Subject
01	Main Door Access
02	Bill Validator Stacker Access
03	Bill Validator Door Access
04	Logic Door Access
05	Drop Door Access
06	Jam Service Door Access
07	Reel Hatch (Hood) Door Access

- *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.

Meter 05. Drop Door *(Cashbox Door)* Access

Drop Door Access signals entry into the Cashbox Door.

Meter 06. Bill Jam Service Door Access

Bill Jam Service Door Access signals entry into the top DBV door of the machine. This door allows access to the DBV reader mechanism.

Meter 07. Hood Access *(Not applicable to upright slots)*

Hood (Reel Hatch) Access signals entry into the Reel Hatch on the face of the slot machine.

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.

Series 5. Tilt Info Meters

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

*NOTE: GS = Game-Specific
PS = Protocol Specific
Clr = Clear the RAM

Series 6. Bill Info Meters

Mtr	Subject
01	Bill Count *(resets with stacker removal)*
02	Number of $1 bills inserted
03	Number of $2 bills inserted
04	Number of $5 bills inserted
05	Number of $10 bills inserted
06	Number of $20 bills inserted
07	Number of $50 bills inserted
08	Number of $100 bills inserted

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.

- *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.

Series 7. Bill Log Meters

Mtr	Subject
01	Dollar Value of Last Bill Inserted
02	Dollar Value of Bill Inserted Before Last
03	$ Value of Bill Inserted 2 Before Last
04	$ Value of Bill Inserted 3 Before Last
05	$ Value of Bill Inserted 4 Before Last
06	$ Value of Bill Inserted 5 Before Last
07	$ Value of Bill Inserted 6 Before Last
08	$ Value of Bill Inserted 7 Before Last
09	$ Value of Bill Inserted 8 Before Last
10	$ Value of Bill Inserted 9 Before Last

- *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.

Series 8. Bet Info Meters

Mtr	Subject
01	Games Played with 1-Credit Bet
02	Games Played with 2-Credit Bet
03	Games Played with 3-Credit Bet
04	Games Played with 4-Credit Bet
05	Games Played with 5-Credit Bet

- *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 9. Cash Info Meters

Mtr	Subject
01	Total Credits into Machine from Coins
02	Total Credits into Machine from Bills
03	Electronic (Host) Credits In
04	Total Credits In from Bonus
05	Total Credits Out from Hopper
06	Total Credits Out from Attendant
07	Electronic (Host) Credits Out
08	Total Credits Out from Bonus
09	Total Credits Drop from Coins
10	Total Credits Drop (may include bills, depending on jurisdiction)
11	Credits Removed from Credits Won
12	Credits Bet from Credits Won
13	Credits Played
14	Credits Won
15	Hopper Fill Amount

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	Win Meter	Bet
	5 MSD	5 LSD	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.

NOTICE

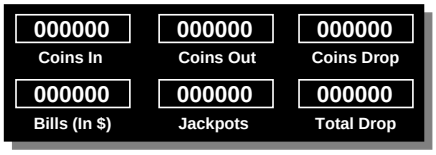
Follow your jurisdiction's procedures for logging currency collection.

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.



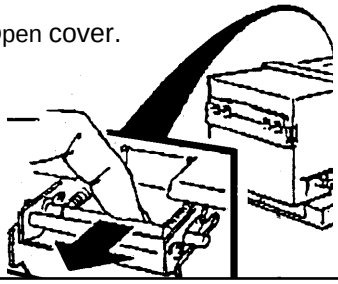
Typical Electromechanical Meters

Bill Validator

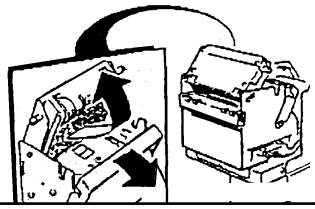
With proper handling and routine preventive maintenance, you can eliminate most bill validator malfunctions. The following procedures assure top performance from JCM® dollar bill validators.

Clearing BV Jams

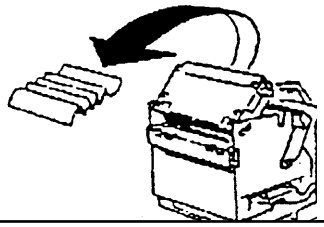
•Open cover.



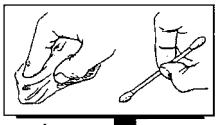
•Lift upper scanner.



•Remove bill.



•Also remove cartridge and check for crumpled bills.



•Clean reader.

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.

- **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.

- **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.

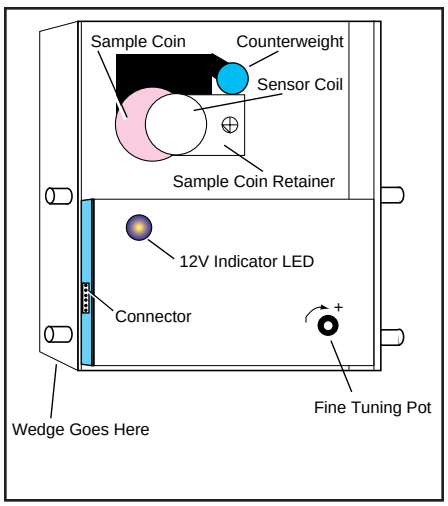
Coin Comparator and Chute

WMS slot machines employ CC-16 Coin Comparitor® 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.

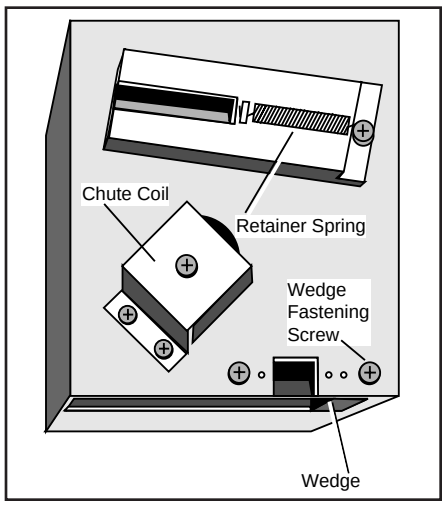
The comparator electronically contrasts the incoming coin signal with the sample coin signal. If the two signals differ, the internal lockout solenoid remains inactive. The incoming coin diverts to the "reject" track. Like signals energize the lockout solenoid. The solenoid allows the incoming coin to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



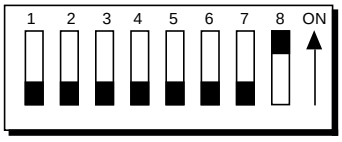
Coin Comparator (Front)



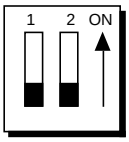
Coin Comparator (Back)

CAUTION

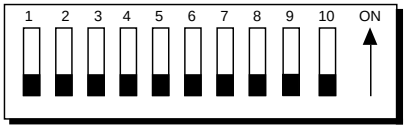
JCM Bill Validator DIP Switch Settings. Your JCM dollar bill validator has two DIP switch banks. One bank has eight switches, and the other has two. The factory setting for these JCM DIP switches is *switch 8 on.* All other switches are off. *Don't change these settings!* Changes can cause the bill validator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



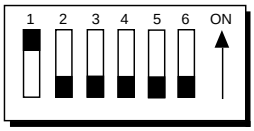
145 SERIES HEAD



JCM Bill Validator DIP Switch Settings



200 SERIES HEAD



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 demominations 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.*

Mounting Hole Plate Table

Game Denomination	Use Plate Part Number
5¢	01-13676-03
25¢	01-13676-02
50¢	01-13676-04
US $1	01-13676-01

Coin Comparator Specs for CC-16 Model

Pin	Function
1	Lockout Enable
2	"Coin In" Output Signal
3	Not Connected
4	Not Connected
5	+12 VDC
6	Ground
Coin Diameter Range	0.705-1.575” (17.9-40mm)
Max. Coin Thickness	0.100” (2.54 mm)

- **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...*

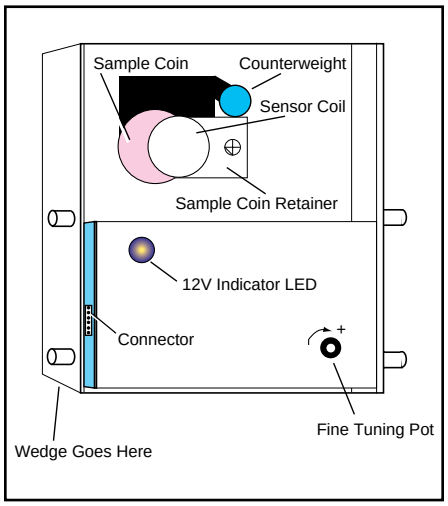
❑ 1. Follow disassembly instructions at *Removing the Coin Comparator,* in this chapter.
❑ 2. Remove the two Phillips screws that fasten the coin entry to the player panel.
❑ 3. Remove the coin entry from the player panel.
❑ 4. Remove two nuts that secure the mounting hole plate to its mounting studs. 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.

Coin Comparator Table

Coin Denomination	Dia (Inch)	Dia (mm) 17.907-	Weight Range (g.)	Weight Range (oz.)	Thickness Range (In.)	Thickness Range (mm)	Comparator Part Number
•US 5¢ •US 25¢	0.705-1.250	31.750 17.907-	4.4-6.8	0.154-0.238	0.05-0.086	1.27-2.184	09-42000-1
•US 50¢ •SA 1R	0.705-1.250	31.750 31.750-	6.9-19.6	0.242-0.686	0.05-0.086	1.27-2.184	09-42000-3
•US $1	1.250-1.575	40.005 17.907-	19.7 +	0.690+	0.075-0.115	1.905-2.921	09-42000-2
•SA 1 Rand	0.705-1.250	31.750 17.907-	2.2-4.3	0.077-0.151	0.05-0.086	1.27-2.184	09-42000-4
—	0.700-1.250	17.78-1.250	5.5-10.4	0.193-0.364	0.05-0.115	1.27-2.921	09-42000-6
—	0.700-1.250	17.78-1.250	2.0-3.0	0.07-0.105	0.05-0.085	1.27-2.159	09-42000-7

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.



Coin Comparator (Front)

- **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.

NOTICE

The glass frame in recently manufactured machines doesn't require foam tape.

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 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.

❑ 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.

WARNING

Take care when working on old topbox glass. This warning especially applies to broken or cracked glass, which can cause severe wounds.

- **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.

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.

- **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.

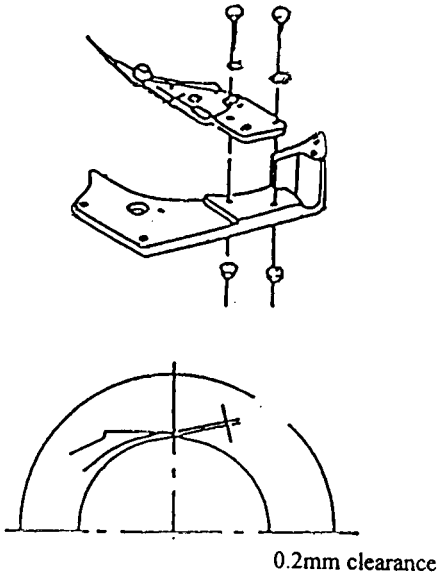
❑ 10. Remove the cover plate. Now you'll be able to see the knife, which was under the cover plate.

❑ 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

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.



Installation of Knife

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.

NOTICE

When installing a $.05 knife, be sure to use an M4 x 10 x 10 flat washer with each mounting bolt. This will prevent the lock washer from jamming into the bolt hole.

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.

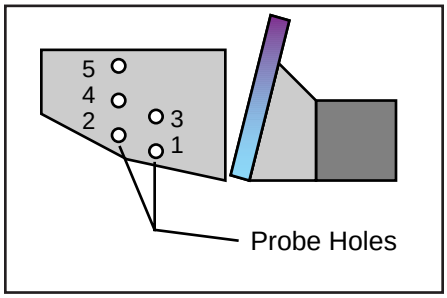
Reassembly

❑ 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

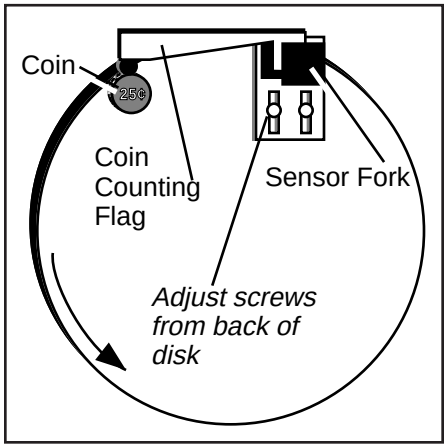
❑ 1. Check the hopper-full probe cable. Make sure that it attaches firmly through quick disconnects on the probe and bowl ground.
❑ 2. Fill the hopper with coins of the proper denomination. See the table *Hopper Probe Level.* The table provides the optimum number of coins for each coin-level probe hole.
❑ 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.

Hopper Probe Level

Probe Hole	U.S. $1	25¢	5¢
5	1,080	4,080	4,820
4	710	3,030	3,600
3	680	2,410	2,850
2	530	2,150	2,560
1	330	1,730	1,900

- **Vertically Aligning the Hopper Coin-Out Sensor**

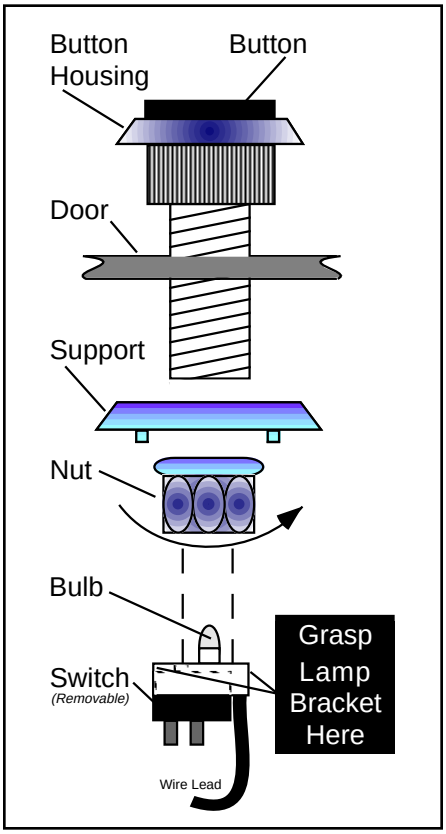
❑ 1. Unlock and open the Main Door.
❑ 2. Switch off slot machine power.
❑ 3. Lift up, disengage and remove the coin tray.
❑ 4. Slide the hopper out. Sensors and power unplug from the blind mating connector as you slide the unit out.
❑ 5. Set the hopper on a table.
❑ 6. Find the motor lock lever on the 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.



Coin-Out Sensor (Looking Through Hopper Disk)

Reassembly

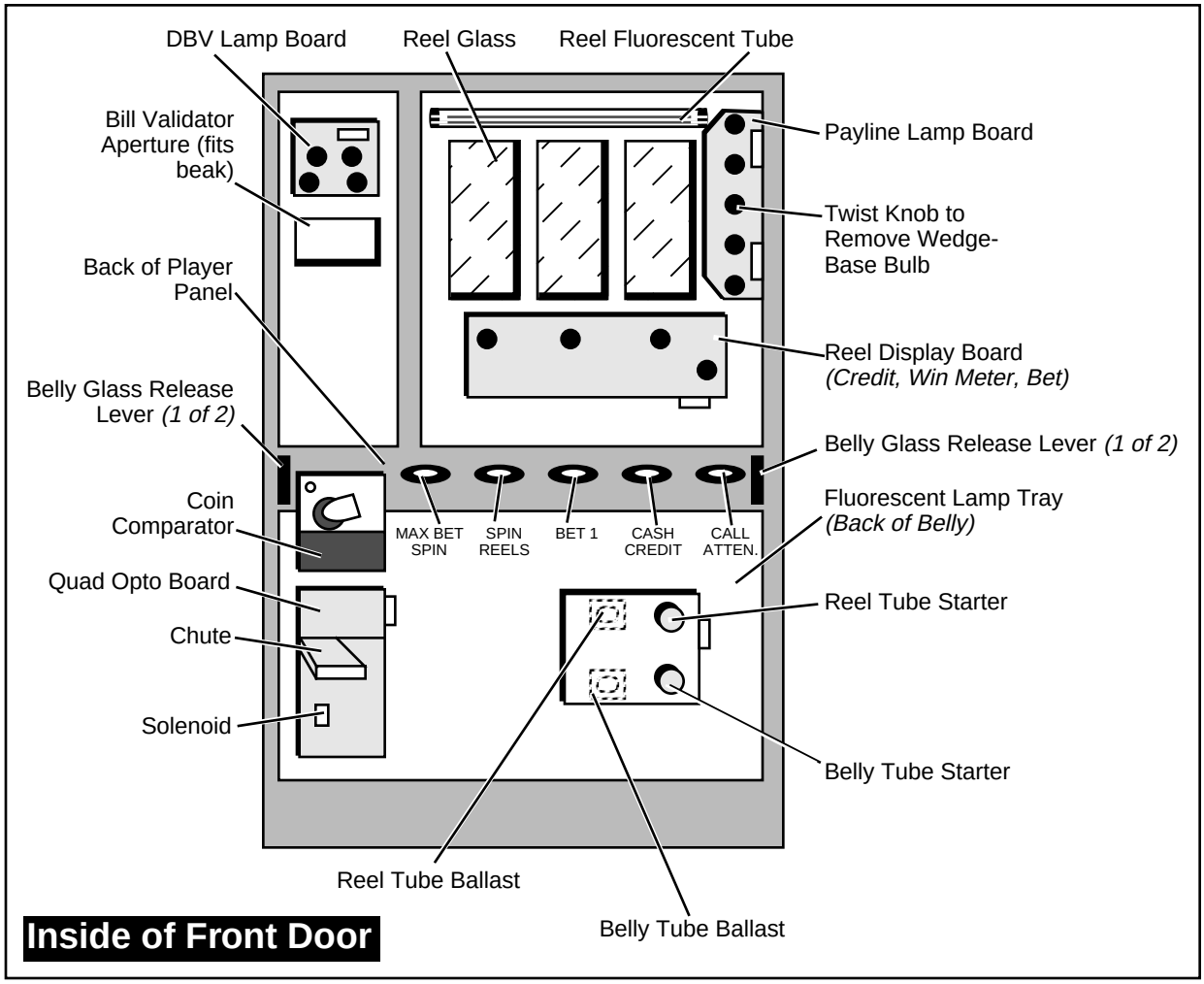
❑ 1. Slide the hopper back into position. Sensors and power reengage at the blind mating connector as you slide the unit in.



❑ 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.

Reassembly

❑ 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.

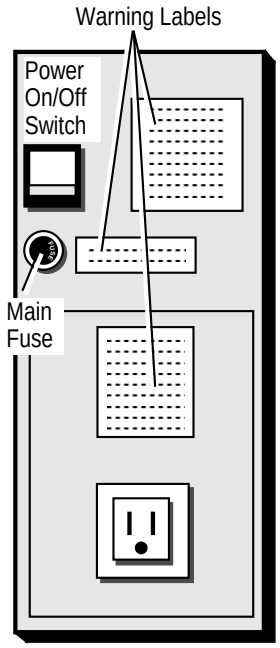
Reels

- **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.



Power Distribution Unit, Front View

CAUTION

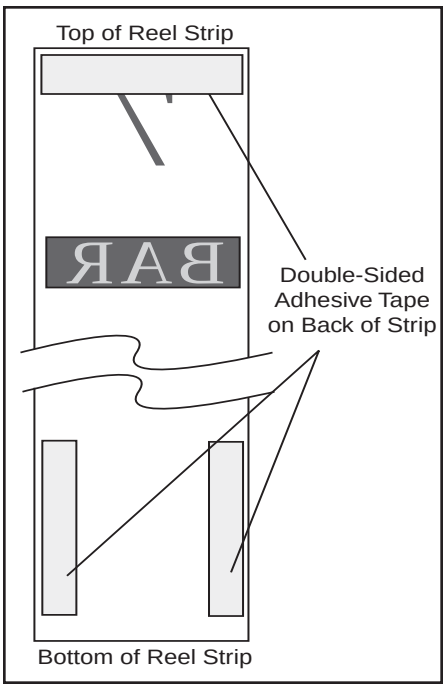
Don't move reel cables from their factory positions on the chassis. If you replace a cable: Route the new cable to the same reel that the old cable served. Routing cables to the wrong reels causes serious and difficult-to-trace malfunctions.

CAUTION

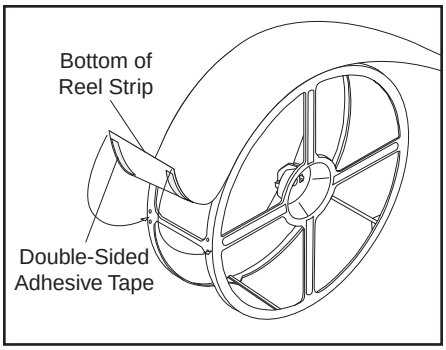
Don't over-torque reel mechanism clips!

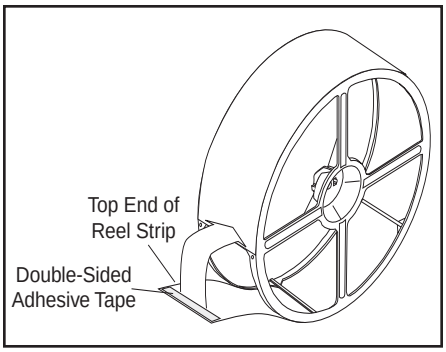
NOTICE

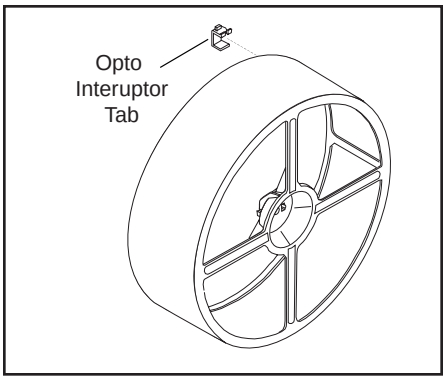
Some slot reel games employ two of the same reel strip. For example, your game may require two copies of Reel Strip 'A' and one Reel Strip 'B'. If so, mount a copy of Reel Strip 'A' at Position 'A' and Position 'C'. Mount the remaining reel strip, marked 'B', at Position 'B'.



Apply Tape







❑ 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.

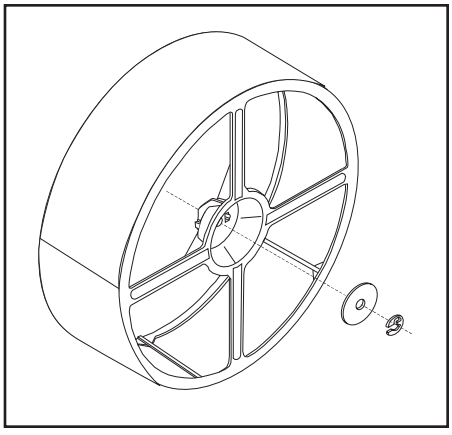
- **Replacing a Reel**
  ❑ 1. Unlock and open the Main Door.
  ❑ 2. Switch off slot machine power.
  ❑ 3. Unplug the cable to the Reel Motor Control Board. *Take care* not to damage delicate mass termination connector pins!
  ❑ 4. Lift up the thumb lever in front of the reel that you want to remove.
  ❑ 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

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.



Install the Reel's Flat Washer

CAUTION

Don't use long screws to remount reel mechanism clips. A long screw can penetrate Driver Board components beneath the chassis. You could damage both logic boards just by driving a screw.

the washer over the motor shaft. The washer must contact the hub.

- ❑ 4. Secure the reel with the E-ring that you removed from the old reel.
- ❑ 5. Follow *Reassembly* instructions at *Replacing and Aligning a Reel Strip,* in this chapter.
- ❑ 6. Slide the reel mechanism into position in the slot machine. The back leg should rest against the rear mounting flange.
- ❑ 7. 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.
- ❑ 8. Plug in the reel motor cable.
- ❑ 9. Switch on slot machine power.
- ❑ 10. Close and lock the Main Door.

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

Reassembly

- ❑ 1. Push the new wedge-base, 555 bulb straight into the socket.
- ❑ 2. 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.

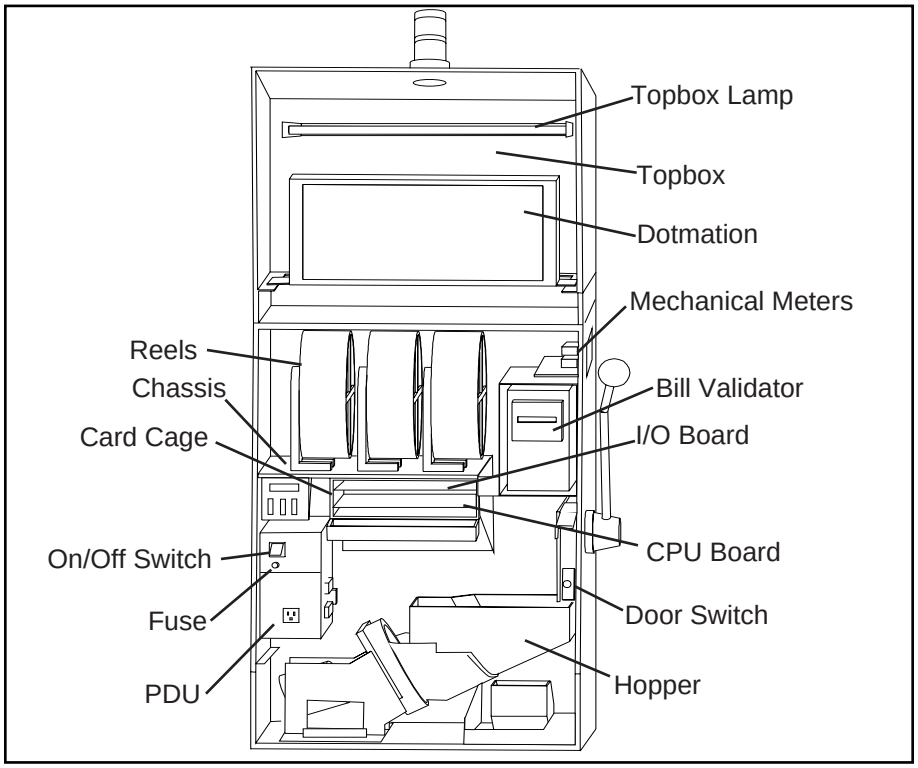
EPROM and RAM Interaction

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.



Interior of slot machine cabinet

- GAME TYPE *(POWER 7S, WILD & LOOSE,* ETC.)
- GAME DESCRIPTOR (GAME PERCENTAGE, MAX BET, EFFECT PACKAGES, ETC.)
- SOFTWARE VERSION
- GAME EPROM CHECKSUM

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...

- **"6AnnE CHn6E 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 6AnnE CHn6E 1 tilt with a mismatched set of EPROMs. Instead, you *must* install two chips of the same type.

- **"6AnnE CHn6E 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.

- **"6AnnE CHn6E 3"** indicates a game version change at CPU Board EPROMs XU2 and XU3. See the "CLEARING" bullet below.

- **"6AnnE CHn6E 4"** indicates a checksum change at CPU Board Game EPROM XU2. See the "CLEARING" bullet below.

- **"6AnnE CHn6E 5"** indicates a checksum change at CPU Board Data EPROM XU3. See the "CLEARING" bullet below.

- **CLEARING "6AnnE CHn6E 2" through "6AnnE CHn6E 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

- ❑ 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. Unlock and open the card cage.
- ❑ 5. 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.
- ❑ 6. Obtain the RAM Clear Chip for the proper denomination. Use this

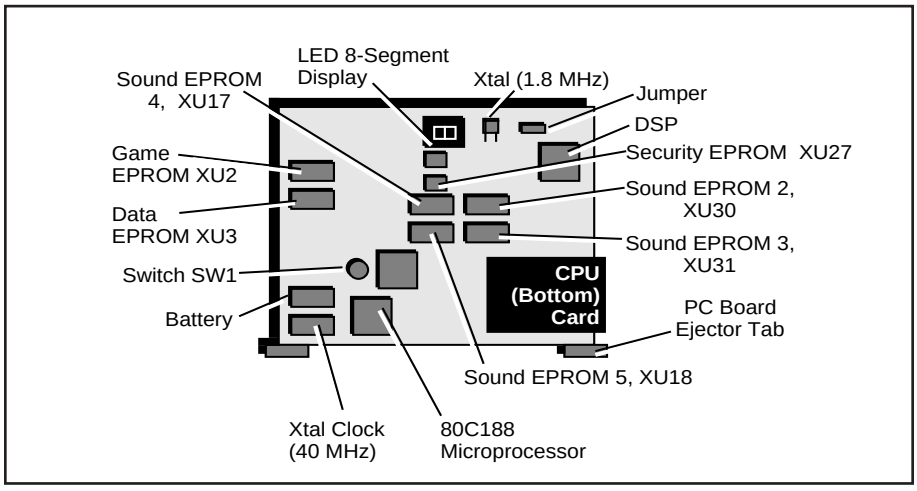
⚠ CAUTION

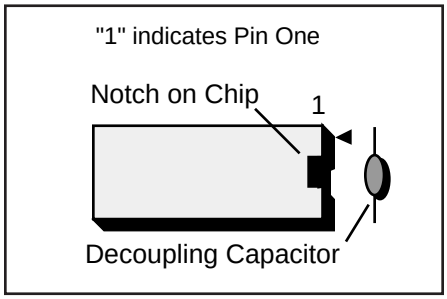
Avoid equipment damage when using the RAM Clear Chip! *Take these precautions...*

- Turn the power OFF before removing or inserting logic boards.
- Turn the power OFF before removing or inserting EPROMs.
- Observe proper static prevention safeguards.
- Before you power up the unit, verify that circuit boards seat securely.
- Properly align EPROMs with socket pins. Otherwise you can severely damage the chips.

NOTICE

Some slot machines don't use all EPROM locations.





EPROM Orientation

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.

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.

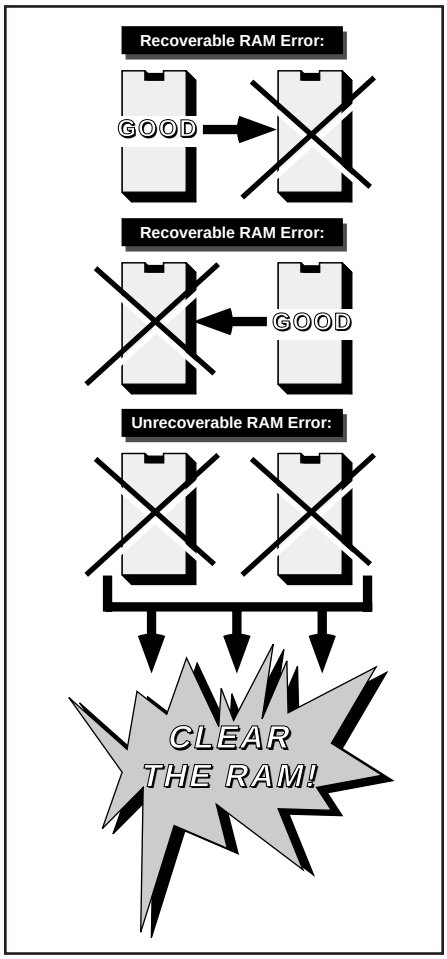
Clearing the CPU Board RAM

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



RAM MTCH		RAM GAME DATA NOT EQUAL TO SECURE DATA
SIG 1	1	RAM SIGNATURE OR DENOMINATION DATA

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
- CLEARS 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.

CAUTION

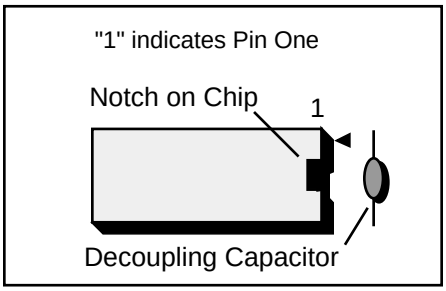
Clearing the RAM erases stored information. Don't clear the RAM unless host system personnel authorize you to proceed.

CAUTION

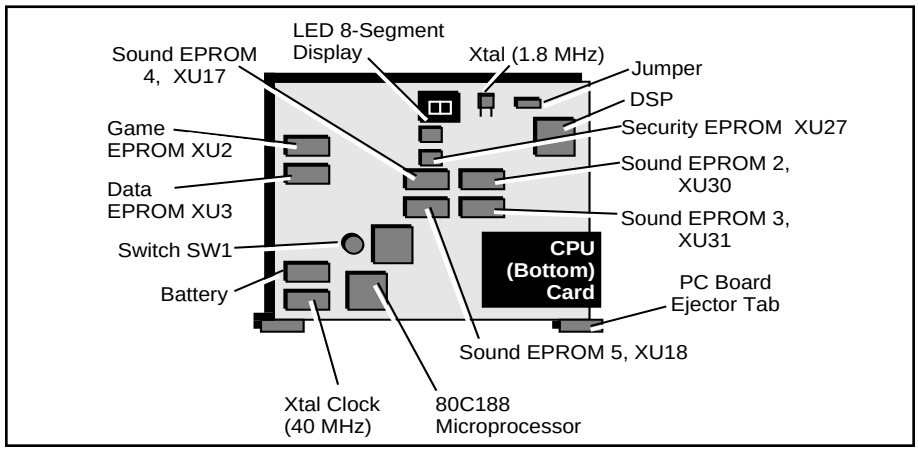
Failure to observe static protection procedures can damage computer components and void your warranty.

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.



RAM Clear Chip Orientation



- ❑ 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.
  - ❑ 9. Close the Card Cage Door.
  - ❑ 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, "6AnnE CHAn6E" appears first. Press DIAGNOSTIC to load the new game information. Then "clr" appears, indicating the cleared RAM.

❑ 20. Lock the card cage.

- ***Reinitialize the System***
  - ❑ 21. 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.
  - ❑ 22. 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.

Tilt Codes

DISPLAY	MEANING
• CPU EEPROM	
GAnnE DiSAb X	HOST PUT GAME X OUT OF SVC
SEcur 1	INSTALLED, CHANGED EEPROM
SEcur 2	BAD OR REMOVED EEPROM
SEcur 3	BAD PASSWORD
SEcur 4	CORRUPT EEPROM CRC
• CPU EPROM	
GAMNE CHNGE 1	GAME EPROM MISMATCH
GAMNE CHNGE 2	GAME TYPE CHANGE
GAMNE CHNGE 3	VERSION CHANGE
GAMNE CHNGE 4	EPROM XU2 CKSUM CHANGE
GAMNE CHNGE 5	EPROM XU3 CKSUM CHANGE
romn1	GAME EPROM CKSUM ERROR
romn2	DATA EPROM CKSUM ERROR
tAbLE	BAD DATA IN EPROM XU3
• DBV/COIN	
coinJ	COIN JAM
coinl	LONG COIN
coinr	REVERSED COIN
(DBV LAMPS oFF)	DBV FULL OR FAILURE
StAc oPEn	NO DBV STACKER
StAc POFF	NO STACKER/POWER OFF
• DOOR	
bill oPEn	OPEN BILL STACKER DOOR
bill POFF	OPEN STACKER DOOR/PWR OFF
bSErv oPEn	OPEN BILL JAM SERVICE DOOR
bSErv POFF	OPEN B. JAM SVC DR/PWR OFF
door POFF	OPEN ELEC DR HPR DR/PWR OFF
droP oPEn	OPEN CASHBOX DOOR
droP POFF	OPEN CASHBOX DOOR/PWR OFF
Hood oPEn	OPEN REEL HATCH
Hood POFF	OPEN REEL HATCH/POWER OFF
logic oPEn	OPEN CARD CAGE DOOR
logic POFF	OPEN CARD CAGE DR/PWR OFF
•DOTMATION	
dot ind	DISPLAY IS INITIALIZING
dot PACEt 0	BAD DATA PACKET
dot PtYPE 0	BAD DATA PACKET TYPE
dot LAMP 0	BAD LAMP PACKET
dot rEEl 1	FAILURE OF DICE/REEL MECH 1
dot rEEl 2	FAILURE OF DICE/REEL MECH 2
dot OPto 0	FAILURE OF DICE OR REEL OPTO
romn dot 1	BAD DOT OS EPROM ON DOT BD
•JURIS JPR	
Jur CHNGE 1	JURISDICTION JUMPER CHANGE
Jur bAd 1	WRONG JURISDICTION JUMPER
• HARD METER	
nEtEr X	MECHANICAL METER X FAILURE
• HOPPER	
HAnd XXXXX	ATTENDANT PAYS XXXXX CRS
HPrC	HPR DISPENSED EXTRA COIN
HPrE	EMPTY HOPPER
HPrJ	HOPPER JAM
HPrr	RUNAWAY HOPPER
• PGA CHIP	
PGA FAIL	XILINX CHIP FAILURE
• PROGRESSIVE	
Prog nonE	NO PROGRESSIVE CONTROLLER
Prog rESP	NO PROGRESSIVE RESPONSE
• REEL DISPLAY	
LEd FAULt	BAD DISPLAY OR LOOSE CABLE
• REEL OPTO	
rEEIX 0	REEL X: NO OPTO FEEDBACK
rEEIX 1	REEL X: INVALID OPTO FEEDBK
• SOUND	
romn Sound	BAD SOUND EPROM ON CPU BD
• STATIC RAM	
bAtt	LOW BATTERY VOLTAGE
clr	MEMORY CLEARED
crc X	RAM ERROR
HEAPC	CORRUPT HEAP
HEAPF	FULL HEAP
Log	CORRUPT GAME LOG DATA
nEEd CLEAr	CLEAR THE RAM
Prog crc	CORRUPT PROGRESSIVE DATA
rAnd	CORRUPT RANDOM NUM SEED
rAm mAtcH	UNEQUAL GAME & SECURE DATA
SIG X	CORRUPT RAM SIGNATURE
• WATCHDOG	
bIG trubl	WATCHDOG CHIP TIMED OUT

NOTICE

This chapter covers slot software up to v. 5.09.

NOTICE

WHERE IS THE MAIN DOOR?

Diagnostic messages refer to the "Main Door." In upright slot machines, the Front Door is also the Main Door.

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

Symptom	Probable Cause	Solutions
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 6. Bad switch inputs on I/O PC Board	1. Plug cable in securely. 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 6. Bad lamp output on I/O Board	1. Replace bulb. 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 4. Bad switch input on I/O Board	1. Replace switch. 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

Candle Section	Candle Activity	Meaning
Top	1. Off 2. On 3. Slow flash	1. Machine is idle. 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. 3. Jackpot.

Communication Troubleshooting Guide

Symptom	Probable Cause	Solutions
No Communication **NOTICE** Report error codes to central communication site for evaluation and processing. Codes enable use of advanced diagnostic facilties.	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

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

CPU Board EEPROM Troubleshooting Guide

Symptom	Probable Cause	Solutions
"GAnnE DiSAb X" appears in displays	Host computer took GD out of service.	Check reason for situation with host system administrator.
"SEcur 1" appears in displays	Someone changed CPU EEPROM 1 (security EEPROM)	Press DIAGNOSTIC.
"SEcur 2" appears in displays	CPU EEPROM 1 (security EEPROM) may be bad or missing	Replace XU27 on CPU Board and press DIAGNOSTIC.
"SEcur 3" or "SEcur 4" appears in displays	CPU EEPROM 1 (security EEPROM) contains corrupt data	Replace XU27 on CPU Board and press DIAGNOSTIC.

CPU EPROM Troubleshooting Guide

Symptom	Probable Cause	Solutions
"6AnnE CHn6E 1" appears in displays.	Mismatch between Game EPROM XU2 and Data EPROM XU3 on CPU Board.	Install matching set of EPROMs.
"6AnnE CHn6E 2" appears in displays.	Game type change.	Acknowledge change by pressing DIAGNOSTIC.
"6AnnE CHn6E 3" appears in displays.	Game version change.	Acknowledge change by pressing DIAGNOSTIC.
"6AnnE CHn6E 4" appears in displays.	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	1. Acknowledge change by pressing DIAGNOSTIC. 2. Replace bad Program EPROM or Backplane EEPROM. 3. Replace bootleg EPROM at XU2 with legitimate, WMS part.
"6AnnE CHn6E 5" appears in displays.	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.	1. Acknowledge change by pressing DIAGNOSTIC. 2. Replace bad Program EPROM or Backplane EEPROM. 3. Replace bootleg EPROM at XU3 with legitimate, WMS part.
"ronn1" appears in Credit Display.	1. ROM checksum error (Bad CPU Board Game EPROM XU2) 2. Bad data bus bits on CPU Board 3. Bad buffer, etc. on CPU Board data bus	1. Replace EPROM XU2. Look for repeat of "ROM" diagnostic message. 2. No message: Problem solved! 3. Message repeats: Replace CPU Board or bench test bus and bus devices.
"ronn2" appears in Credit Display.	1. ROM checksum error (Bad CPU Board Data EPROM XU3) 2. Bad data bus bits on CPU Board 3. Bad buffer, etc. on CPU Board data bus	1. Replace EPROM XU3. Look for repeat of "ROM" diagnostic message. 2. No message: Problem solved! 3. Message repeats: Replace CPU Board or bench test bus and bus devices.
"tablE" appears in displays.	Bad game data	Replace EPROM XU3.

CPU Sound Jumpers

Jumper J2 Position	Meaning
From "P7" to "P7 OUT"	CPU Board contains 8 meg sound EPROMs.
From "P7 OUT" to "+5"	CPU Board contains 4 meg sound EPROMs.

CPU Startup Sounds Troubleshooting Guide

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

Dollar Bill Validator and Coin Mechanism Troubleshooting Guide

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	1. Clear bill validator. 2. Check or replace DBV data cable. 3. Replace faulty I/O Board, or service DBV communication link. 4. Replace bill validator. Check new DBV by running Solenoid and Lamp Test 26.
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	1. Try another bill. 2. Correct entries at Admin Mode. 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. 3b. Slot machine doesn't accept coins: Slot machine is locked out, door is open or machine is tilted. Clear tilts and shut door. 4. Check for 120 VAC at power cable, or for loose connections. 5. Clean DBV with DBV cleaning pad. 6. Check DIP switch settings. 7. If cable is bad, replace it. 8. Replace I/O Board.
• Coins jam the comparator • "coinJ" message doesn't appear • Slot machine doesn't give credits	No sample coin in coin comparator's sample coin retainer	Insert nominal coin in sample coin retainer. Coin should neither be worn nor brand new.
"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	1. Clear coin jam. 2. Realign and remount board halves. 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. If board fails test, clean or replace board. 4. Repeated jams? Realign coin entry.
"coinl" appears on Credit Display	1. Long Coin (Coin took too long between detector optos.) 2. Possible Diverter Door misalignment.	1. Player tried strung coin. 2. Check Diverter Door alignment.
"coinr" appears on Credit Display	1. Reversed coin. 2. Possible Diverter Door misalignment.	1. Player tried to remove coin with string or similar device. 2. Check Diverter Door alignment.
Coins don't drop	1. Coin jam in coin chute 2. Someone inserted coin that was too large	1. Find jam location by looking through coin chute slits. 2. Insert small, flatblade screwdriver to guide coin down and out. 3. Slide sample coin retainer open (as shown on its label). Coin drops out.
Slot machine doesn't give credits	1. Bad harness between comparator and opto 2. Bad Opto Board 3. Bad I/O Board	1. Replace comparator. 2. Repair or replace Opto Board. 3. Repair or replace I/O Board.
"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	1. Replace stacker. 2. Bend bracket back into position. 3. Replace cable. 4. Replace STACKER switch. 5. Service input or replace I/O Board.
"StAc POFF" appears on Credit Display	Security breach: Someone opened Stacker Door while power was off.	To clear tilt, open and close Main Door, or press DIAGNOSTIC button.

Door Troubleshooting Guide

Symptom	Probable Cause	Solutions
"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 6. Bad stacker switch input on I/O Board	1. Close and lock door. 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 5. Bad switch cable	1. Close door. 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

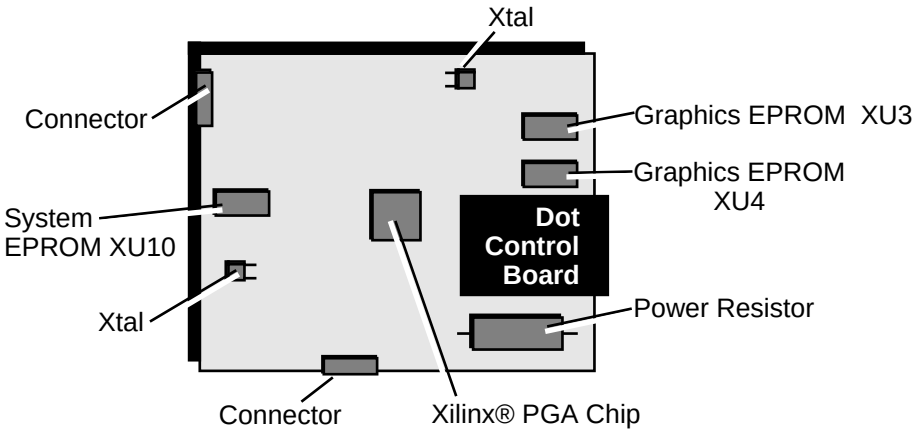
The following door messages *don't apply* to upright models: "bSEru," "bSEru POFF," "Hood oPEn" and "Hood POFF".

Dotmation™ Troubleshooting Guide

Symptom	Probable Cause	Solutions
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) 3. Bad display tube.	1. Replace cable. 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) 3. Bad display tube.	1. Replace cable. 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.
"ronn 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

Symptom	Probable Cause	Solutions
"dot lANP 0" appears in displays. GD has extra lamps driven from Dotmation+® Control Board.	Bad lamp packet	Check or replace serial cable between Dotmation Control Board and I/O Board.
"dot rEEl 1" appears in displays. GD has extra reels or dice driven by Dotmation+ Control Board.	Failure of dice or Reel Mech 1	Replace dice or Reel Mech 1.
"dot rEEl 2" appears in displays. GD has extra reels or dice driven by Dotmation+ Control Board.	Failure of dice or Reel Mech 2	Replace dice or Reel Mech 2.
"dot OPto 0" appears in displays. GD has extra reels or dice driven by Dotmation+ Control Board.	Failure of dice or reel mech opto	Replace opto on reel mechanism.



Hard Meter Troubleshooting Guide

Symptom	Probable Cause	Solutions
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

Symptom	Probable Cause	Solutions
"HAnd xxxxx" appears in displays	Attendant pays xxxxx credits	Attendant must hand pay this amount of credits. This is amount that exceeds Partial Hopper Pay Limit.
"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 necesary. 2. Coin jam 3. Hopper probes 4. Coin-out sensor harness continuity 5. Coin-out sensor	1. Refill the hopper. 2. Clear jam. Clear tilt by opening and closing Main Door. Run Hopper Test. Watch hopper for bent or malfunctioning parts. Replace bad parts. 3. Hopper's full, but not jammed: Swap coin-out sensor cables. Clear tilt by opening and closing Main Door. Run Hopper Test. 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 3. Coin-out sensor	1. Clear jam. Clear tilt by opening and closing Main Door. Run Hopper Test. Watch hopper for bent or malfunctioning parts. Replace bad parts. 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 6. Faulty I/O Board	1. Adjust coin-out (proximity) sensor. Clear tilt by opening and closing Electronics Door. Run Hopper Test. If problem persists, replace sensor. 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

Symptom	Probable Cause	Solutions
"Jur CHNGE 1" appears in displays	Someone changed jurisdiction jumper	Clear RAM.
"Jur bAd 1" appears in displays	Wrong jurisdiction jumper for firmware	1. Set jumper correctly. 2. Clear RAM.

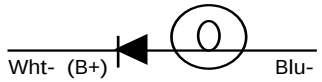
Lamp Matrix Troubleshooting Guide

Symptom	Probable Cause	Solutions
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.

NOTICE

The lamp matrix of some gaming devices may include fewer or additional lamps.

Lamp Matrix



ROW \ COL	0 Wht-Blk Q3	1 Wht-Brn Q4	2 Wht-Red Q7	3 Wht-Orn Q8	4 Wht-Yel Q11	5 Wht-Grn Q12	6 Wht-Blu Q15	7 Wht-Vio Q16
Blu-Blk Q1 0	1 Reel 1 Left, Center	9 Reel 1 Left, Bottom	17 Reel 1 Left, Top	25 Reel 2 Left, Center	33 Reel 2 Left, Bottom	41 Reel 2 Left, Top	49	57
Blu-Brn Q2 1	2 Reel 1 Right, Center	10 Reel 1 Right, Bottom	18 Reel 1 Right, Top	26 Reel 2 Right, Center	34 Reel 2 Right, Bottom	42 Reel 2 Right, Top	50	58
Blu-Red Q5 2	3 Reel 3 Left, Center	11 Reel 3 Left, Bottom	19 Reel 3 Left, Top	27	35	43	51	59
Blu-Orn Q6 3	4 Reel 3 Right, Center	12 Reel 3 Right, Bottom	20 Reel 3 Right, Top	28	36	44	52	60
Blu-Yel Q9 4	5	13	21	29	37	45	53	61
Blu-Grn Q10 5	6	14	22	30 Bill Valid Lamp 0	38 Bill Valid Lamp 1	46 Bill Valid Lamp 2	54 Bill Valid Lamp 3	62
Blu (No Trace) Q13 6	7 Payline Lamp, Top	15 Payline Lamp, 2nd Dn	23 Payline Lamp, Mid	31 Payline Lamp, 3rd Dn	39 Payline Lamp, Btm	47 Tower Lamp, Btm	55 Tower Lamp, Mid	63 Tower Lamp, Top
Blu-Vio Q14 7	8 Max Bet	16 Spin Switch	24 Bet 1 Switch	32 Cash/ Credit Switch	40 Tilt	48 Insert Coin	56 Denom-ination	64 Coin Accept

PGA Chip *(Programmable Gate Array)* Troubleshooting Guide

Symptom	Probable Cause	Solutions
"PGA FAIL" appears on displays	Xilinx chip failure	Replace I/O Board chip XU42, or replace I/O Board.

Power Troubleshooting Guide

Symptom	Probable Cause	Solutions
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.
No I/O Board LEDs light	1. Blown PDU fuses 2. Disconnected DC power cable	1. With VOM, check fuses for continuity. Replace bad fuses. 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... • Monitor is black, but seems to have high voltage (Screen attracts hair; may flicker occasionally) • Bill validator initializes normally	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.	1. Wrong or Missing Voltages at I/O Board: Check backplane, cables, PDU. Repair or replace bad parts. 2a. Wrong or Missing Voltages at PDU: Replace bad switching power supply (inside PDU). 2b. Proper voltages at power supply, but not at card cage: Replace power cables. 3. EPROMs inserted backwards may be damaged. Replace them. 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... • No hopper action • No sound • Dead monitor • Logic doesn't start up	1. Fuse on PDU 2. AC power line in 3. Bad PDU output 4. Faulty line cord	1. Replace fuse. 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

Symptom	Probable Cause	Solutions
"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

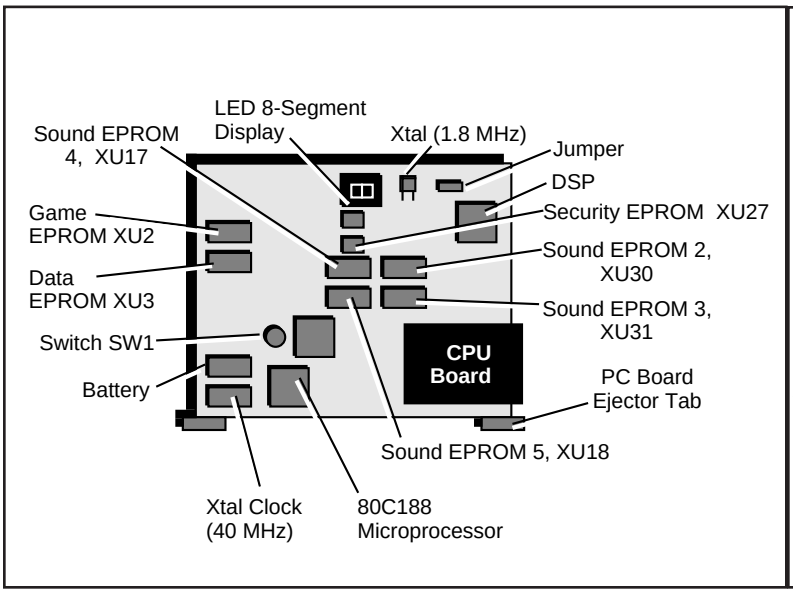
Symptom	Probable Cause	Solutions
• No displays work, or "LEd FAULt" appears on displays • "5" appears on CPU Board LED display	Disconnected or bad cable	Check or replace cable. See CPU Board 7-Segment Display Troubleshooting Guide, in this chapter.
Two entirely missing characters.	Bad anode drive transistor 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!

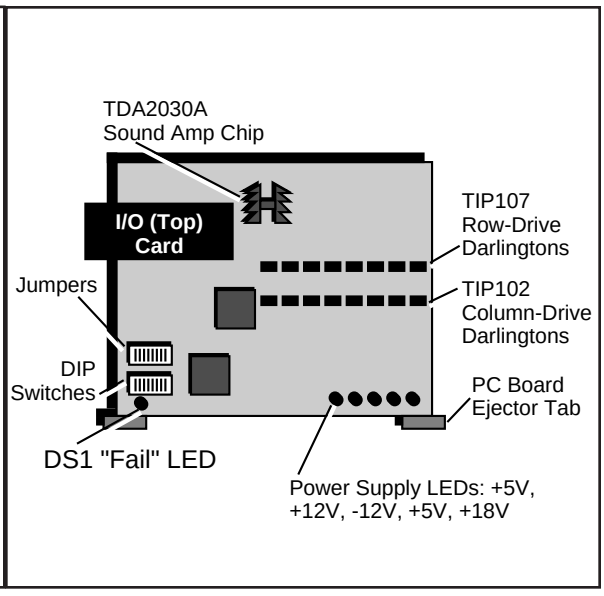
Reel Opto Troubleshooting Guide

Symptom	Probable Cause	Solutions
"rEEl1 0" or "rEEl1 1" appears in Credit Display.	Opto feedback failure at Reel 1	1. Check for dirty opto (Input Tests 40-42. Clean it. 2. Check reel interruptor tab: Is it broken? Is it improperly installed? Does it leak light? 3. Check reel hub for wear, cracks. 3. Check cables to reel. 4. Check reel's opto. 5. Replace bad parts.
"rEEl2 0" or "rEEl2 1"appears in Credit Display.	Opto feedback failure at Reel 2.	Perform above tests for Reel 2 parts.
"rEEl3 0" or "rEEl3 1"appears in Credit Display.	Opto feedback failure at Reel 3	Perform above tests for Reel 3 parts.

Sound Troubleshooting Guide

Symptom	Probable Cause	Solutions
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.





Static RAM Troubleshooting Guide

Symptom	Probable Cause	Solutions
"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. You need to clear static RAM	Perform hard RAM clearance. See Chapter 2.
One of these indications appears in displays... CREDIT DISPLAY / BET DISPLAY crc1 X crc2 X 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	X = 1: Perform soft or hard RAM clearance to restore normal operation. X = 2 or 3: Push DIAGNOSTIC button to restore normal operation.
One of these indications appears in displays... HEAPC HEAPF	• "HEAPC": Corrupt Heap • "HEAPF": Full Heap • Bad backup battery or static RAM failure	1. Perform soft or hard RAM clearance. 2. Save gameplay, pricing and other location-programmed information to central system (or write it down). 3. Shut off power, remove CPU Board and replace battery today. 4. Same symptoms repeat: Check backup battery voltage: Less than 3.6V? Replace battery and reclear static RAM. More than 3.6V? Check or replace MAX791 chip U11 on CPU Board. 5. Rerun startup tests.
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	Perform hard RAM clearance. **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

Symptom	Probable Cause	Solutions
"bi6 trubl" appears in displays, or gaming device may frequently reset.	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.

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 Intfce (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

These parts are for 1995 machines. 1995 machines bear the number 71272 on their nameplates. You'll find your machine's nameplate beneath the slot handle.

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.

NOTICE

These parts are for 1995 machines. 1995 machines bear the number 71272 on their nameplates. You'll find your machine's nameplate beneath the slot handle.

• 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, Deleware, Meters.....H-001917-00
Cable, EDT, PT95A, RS232, Deleware.....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.....5797-14243-00
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

• 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 btns)*.....24-8829
Bulb, #555, 6.3V/250 mA 24-8768
Fuse, 4ASB, 250V 5731-06314-00
Bulb, #161 Reel.....24-8840

NOTICE

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• Supply, Dotmation™ Power

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

NOTICE

****Used Only For Monopoly Top Box.**

• 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

NOTICE

These parts are for 1995 machines. 1995 machines bear the number 71272 on their nameplates. You'll find your machine's nameplate beneath the slot handle.

• 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

Printed Circuit Board	Bar Top Video	Upright 17" Video	Upright 19" Video	Slant Top 19" Video	Slant Top Slot	Upright Slot
Backplane PCB, A-003622-00	✔					
Backplane PCB, A-000632-01		✔				
Backplane PCB, A-18905-03			✔	✔	✔	
Backplane PCB, A-17937-03						✔
CPU 1.5 PCB with 2MB Video Card, A-000051-31; includes...	✔	✔	✔	✔		
•CPU PCB, Sys 1.5, A-17677-03	✔	✔	✔	✔	✔	✔
•Daughter Card, 2MB Video, A-18402-33	✔	✔	✔	✔		
Hopper Control PCB, A-17118-02	✔	✔		✔	✔	✔
I/O PCB, A-18886-01	✔	✔	✔	✔		
I/O PCB, A-17686-03					✔	✔
Lamp PCB, BV, A-19861-01				✔	✔	
Lamp PCB, BV, A-18088-01						✔
Lamp PCB, Payline, A-18087-00					✔	✔
Lamp PCB, Reel Display, A-17382-01					✔	✔
Meter Driver PCB, A-002464-00	✔	✔				
Meter Driver PCB, A-17951-01			✔	✔	✔	✔
Opto PCB, Hex, A-18097-01	✔	✔	✔	✔	✔	✔
Opto PCB, Quad, A-18097-00						✔
Power Distribution Unit PCB, A-18938-03 w/16 Pin Xfmr	✔	✔	✔	✔	✔	
Power Distribution Unit, PCB, A-18938-01 w/12 Pin Xfmr						✔
Reel Motor Control PCB, 20-002002					✔	✔

Chapter 2. Parts, Mechanical

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
Manual, 1998, Model 40X Upright, Svc *(Full Version)* A-004336

• 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

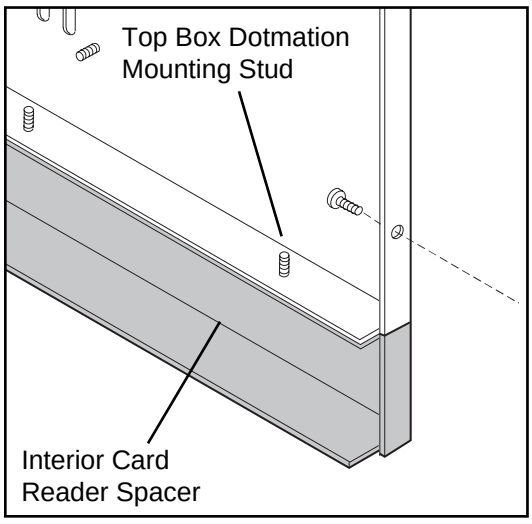
BUTTON, MISCELLANEOUS PARTS OF
Bezel, Rectangular Button Plunger, Spring &.....20-001986-02
Bezel, Square Button Plunger Spring & 20-001986-01
Diode, 1N4004, 1A 5070-09054-00
Lens, Clear, Square Button 20-001986-03
Lens, Clear, Rectangular Button 20-001986-04

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

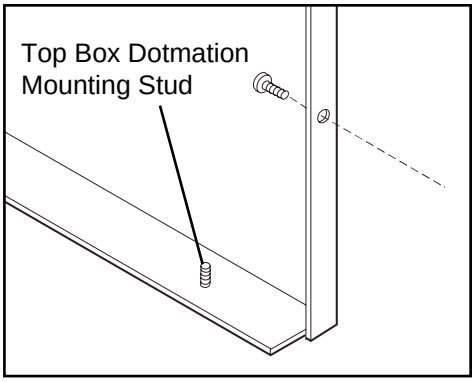
• Kits

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)

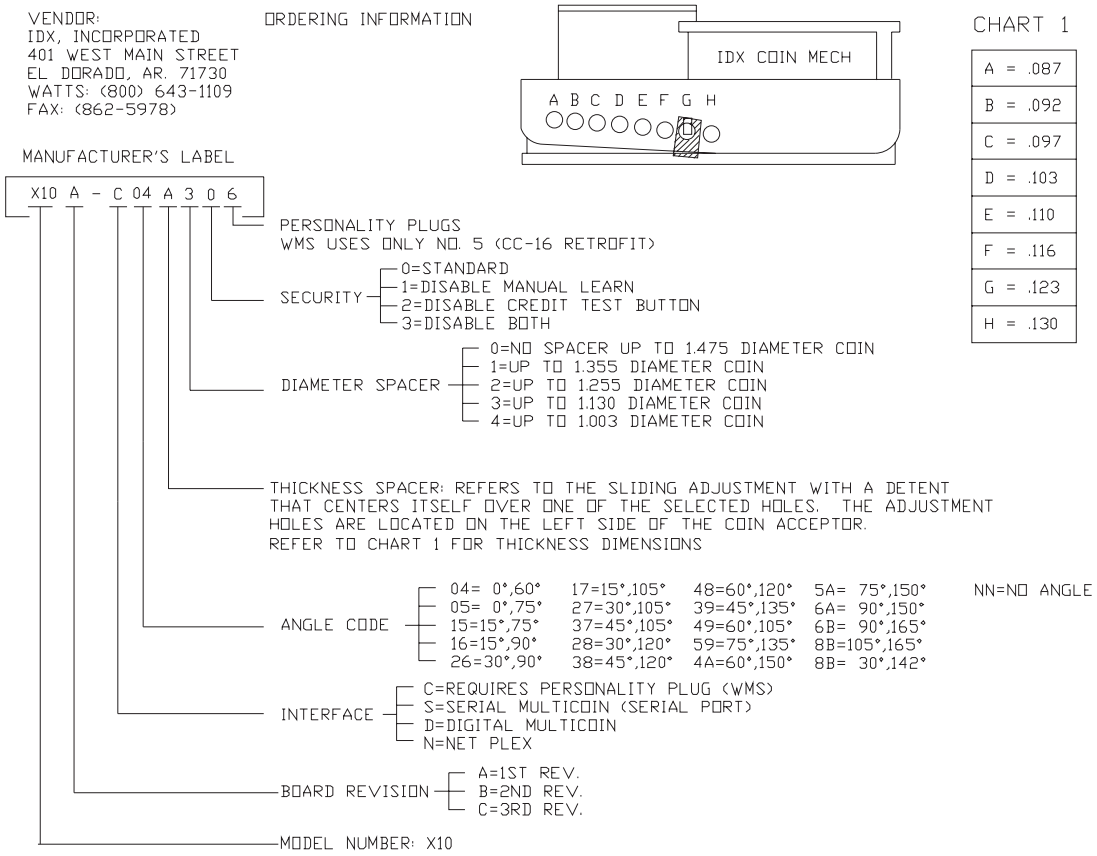
Asahi Seiko $.05 hopper denom. conversion Kit A-000700
Asahi Seiko $.25 hopper denom. conversion Kit A-000701
Asahi Seiko $.50 hopper denom. conversion Kit A-000702
Asahi Seiko $1 hopper denom. conversion Kit A-000703
Asahi Seiko $.50 token hopper denom. conv. Kit A-001797
Asahi Seiko Can. Loonie $1 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

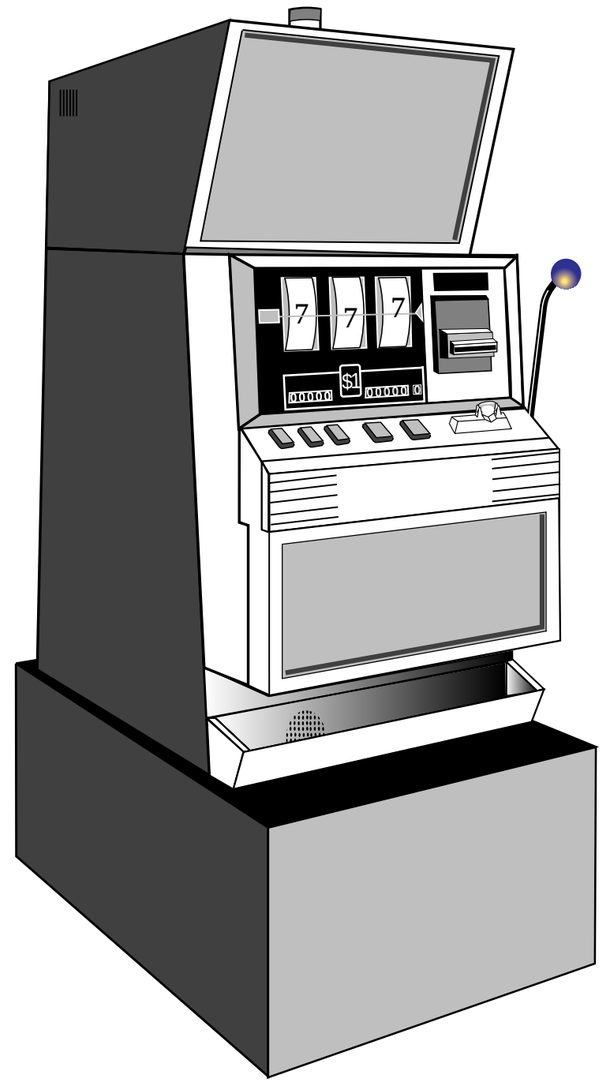
Speaker tray, blind mate bracket & harness Kit.....A-002262

Coin Mechanisms

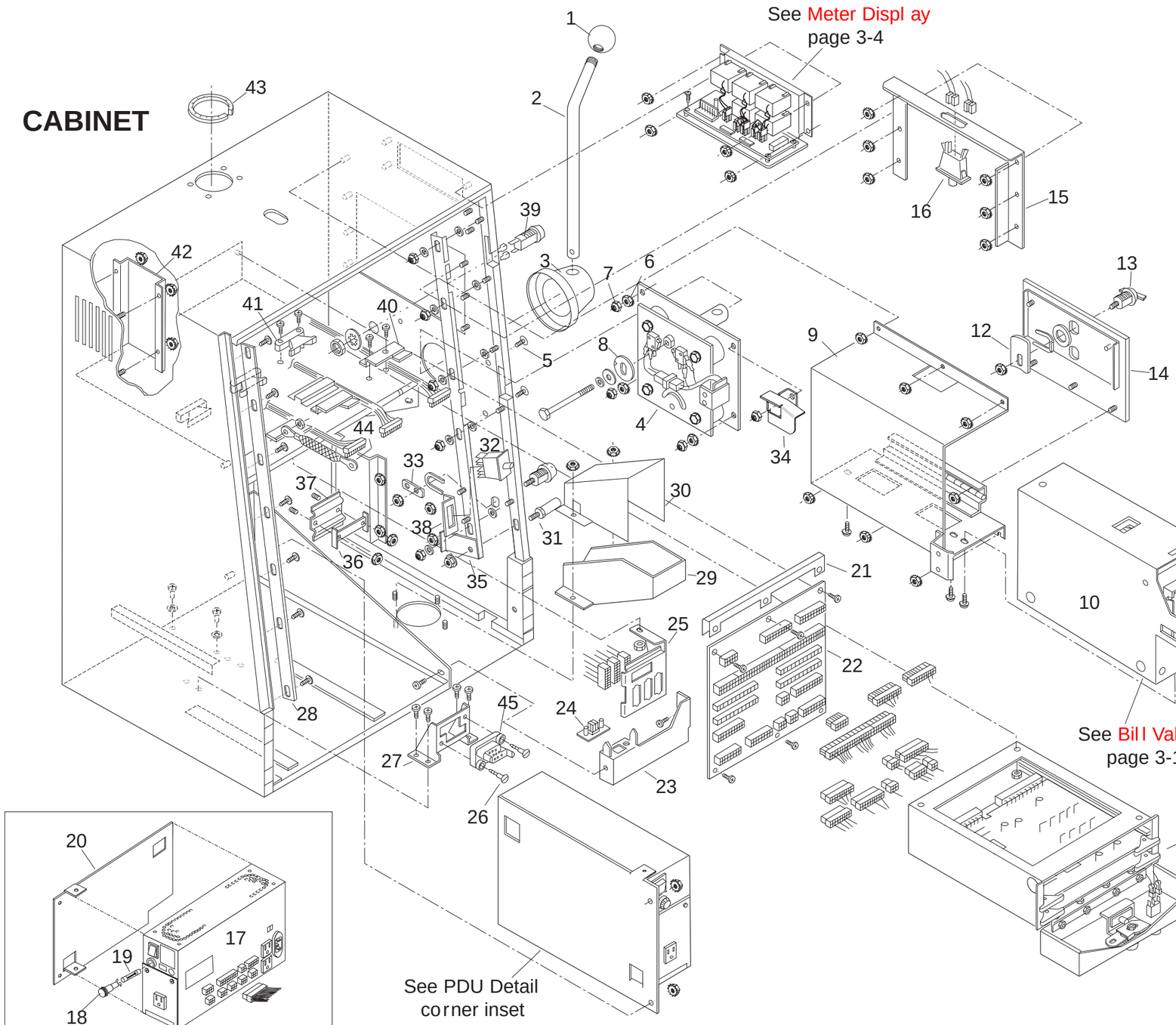
See Section 3 page 5 for Coin Mechanism list.
Legend below describes how to order a replacement IDX Coin Mech via the manufacturers label.

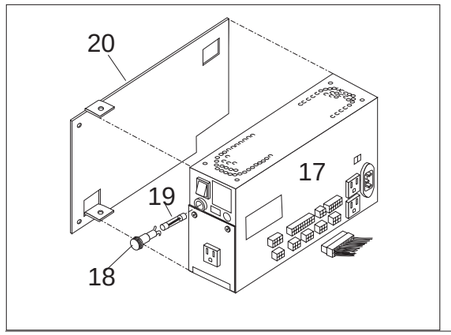


Chapter 3. Large Exploded Views



CABINET





•CABINET

Dwg Ref	Description	WMS Gaming #
1	Knob, Slot Handle, 1-111-105	20-002998
2	Handle, Dual-Bend Slot (Arm)	20-001296-ZZZ
2	Handle, Single Bend Slot (Arm)	20-10009-ZZZ
3	Hub, Chrome, Plastic *(Handle Mechanism)*	03-9159-ZZZ
-	Cap, laminated *(for no-handle machines)*	A-000547-ZZZ
-	Bracket, Door Glide Stop	01-001159
4	Mechanism, Handle (Arm) *(incl. solenoid)*	20-9967-02
5	#10 Carriage Bolt 5/8”, Black	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, 22-3585- 1	20-001066-03
9	BV Mounting Bracket	01-001944
10	Bill Validator, US Dollar, s/l, 145, w/2 cass. & 1 extr.	09-003057
10	Bill Validator, US Dollar, d/l, 145, w/2 cass. & 1 extr.	09-003058
10	Bill Validator, SRA, s/l, w/2 cass. & 1 extr.	09-003115
10	Bill Validator, SRA, d/l, w/2 cass. & 1 extr.	09-003116
10	Bill Validator, Ital. Lira, s/l, w/2 cass. & 1 extr.	09-003118
10	Bill Validator, Ital. Lira, d/l, w/2 cass. & 1 extr.	09-003119
10	Bill Validator, Canadian Dollar, s/l, 135, w/2c & 1 ex	09-003121
10	Bill Validator, Canadian Dollar, d/l, 135, w/2c & 1 ex	09-003122
10	Bill Val., US Dollar, s/l, 200, EPROM, w/2c & 1 ex	09-004568-00
10	Bill Val., US Dollar, s/l, 200, FLASH w/2c & 1 ex.	09-004568-01
11	Bracket, BV Faceplate	01-12877
11A	BV Bezel, US	A-001720-01
11A	BV Bezel, Non-US	A-001721-01

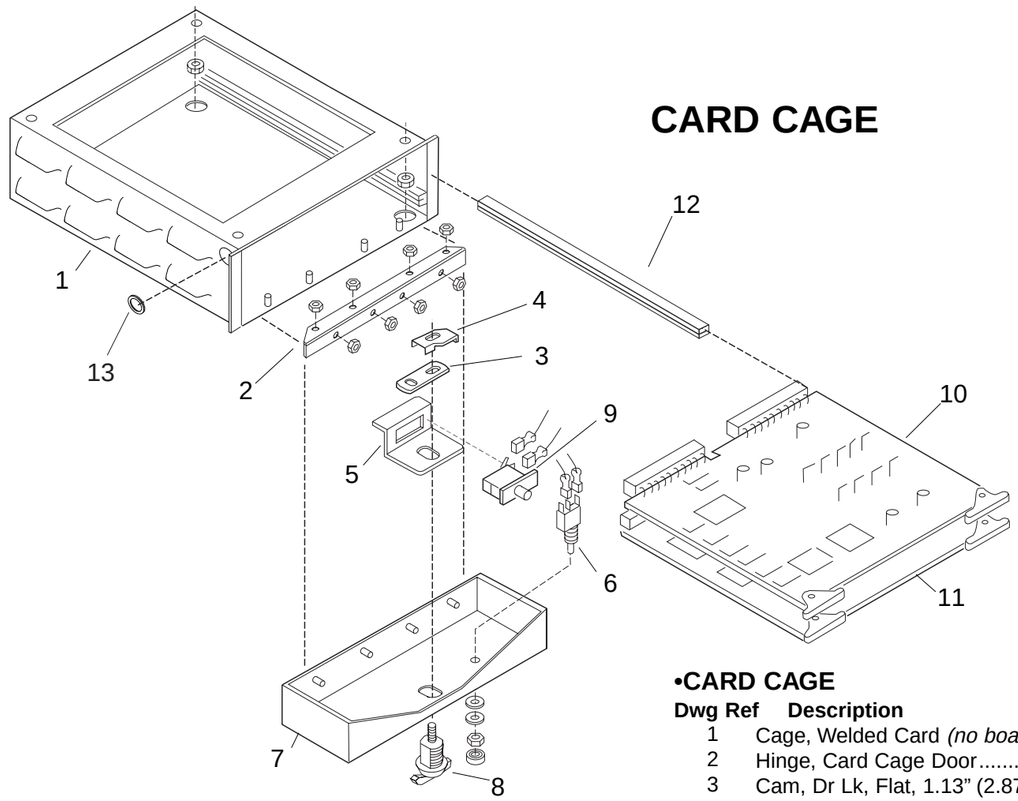
NOTICE

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

•CABINET *(continued)*

Dwg Ref	Description	WMS Gaming #
11A	BV Bezel, Non-US	A-001721-01
11B	Bezel Shroud, Non-USA	03-001253-01
11B	Bezel Shroud, USA	03-001895-01
12	Upper Cam Lock	01-13669
13	Lock, No-Key, Shipping	20-004576
14	Door, DBV Laminated, Blk	A-19402-02-ZZZ
14	Door, DBV Lam, Blk, Dual Lock	A-002699-02-ZZZ
-	Cover Panel, Laminated, Non-BV	A-000214-ZZZ
-	Plate, Non-BV	01-000170
-	Bracket, Non-BV	01-000190
15	Frame, DBV Door	01-13445
16	Switch, Momentary DPDT Interlock	5643-14246-00
17	PDU, N. American, 110V/60 Hz, 16-pin	A-002912-01
17	PDU, Euro, 220V/50 Hz, 16-pin	A-002912-02
17	PDU, Euro/N. Am, 220V/50-60 Hz, 16-pin	A-002912-03
17	PDU, N. American, 110V/60 Hz, 12-pin	A-002938-01
17	PDU, Euro, 220V/50 Hz, 12-pin	A-002938-02
17	PDU, Euro/N. Am, 220V/50-60 Hz, 12-pin	A-002938-03
18	Knob, 5mm x 20mm, Fuse Holder	5733-12869-01
18	Knob, Wht Lt Fuse Holder	5733-12869-00
19	Fuse, 4ASB, 250V	5731-06314-00
19	Fuse, 2ASB, 5 x 20	5735-13853-00
19	Fuse, 2ASB, 250V	5731-08665-00
20	Mounting Plate, PDU	01-13500
21	Cover, Backplane	03-9183
22	PC Board, Slot Backplane	A-17937-03
23	Bracket, Chas Guide Mounting	01-002247
24	Connector, Female Minifit Jr.®, 4-Pin	5792-13721-04
25	Bracket, Switch and Conn Mounting	01-12827
26	Screw, 6-32 x 1", Hex, Socketed Steel Zinc	4006-01162-16
27	Bracket, Hopper Connector Mounting	01-12628
28	Plate, Hinge Gap Blocker	01-12692
29	Chute, Coin Drop (Reversed Coin Transfer)	01-12529
30	Cover, Received Coin Transfer	03-001480
31	Pin, Lock Bar Drive	02-4911
32	Switch, Three-Position Interlock	5643-13204-00
33	Cam, Dr Lk, Flat, .88” (2.24cm) Straight-Dual	01-12793-10
34	Bracket, Door Glide	01-001127
35	Bracket, Door Latch	01-000319
36	Bracket, Line-In Cover	01-13533
37	Plate, Line Cord Cover	01-13532
38	Bracket, Switch Mounting	01-000318
39	Switch, Reset Key (w/Key)	20-10059
40	Clip, Front Mounting	20-9979
41	Clip, Rear Mounting	20-9980
42	Bracket, Vent Cover	01-13528
-	Vent Screen	03-9176
43	Flexible Edge Guard	03-9171-01
44	Strap, Ground	20-10012
45	Connector, Plug Housing, 25-Position	5792-13539-00

CARD CAGE



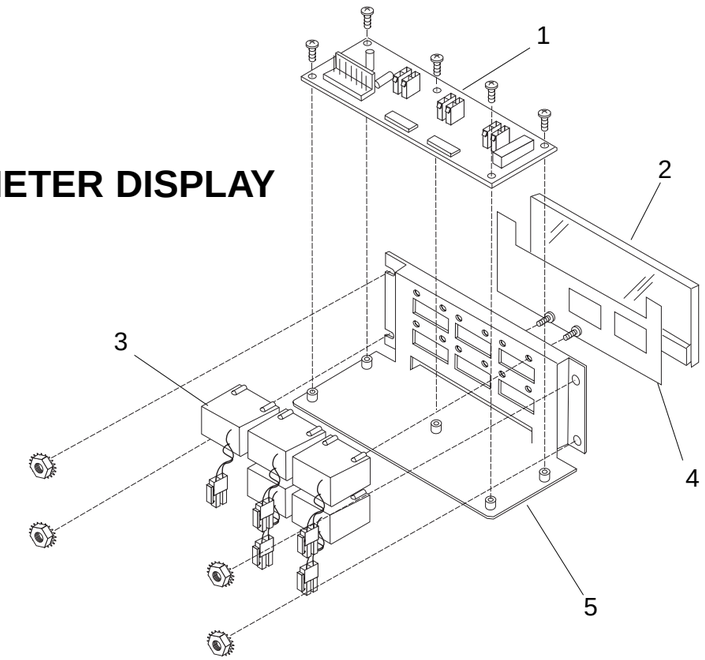
•CARD CAGE

Dwg Ref	Description	WMS Gaming #
1	Cage, Welded Card *(no boards)*	01-12762
2	Hinge, Card Cage Door	01-12764
3	Cam, Dr Lk, Flat, 1.13” (2.87cm) Straight-Dual	01-12793-01
4	Actuator, Door Switch	01-12837
5	Bracket, Door Switch Mounting	01-12765
6	Switch, Pushbutton SPDT, 125V, 5A	5641-09114-00
7	Door, Card Cage	01-12763
8	Lock, No-Key, Shipping	20-004576
9	Switch, SPDT Interlock	5643-14291-00
10	Board, Slot I/O	A-17686-03
11	Board, Slot CPU	A-17677-03
12	Rail, Card Guide	20-9987-01
13	Bushing, Slit, 0.5” (1.27cm) Diameter	03-001168-01

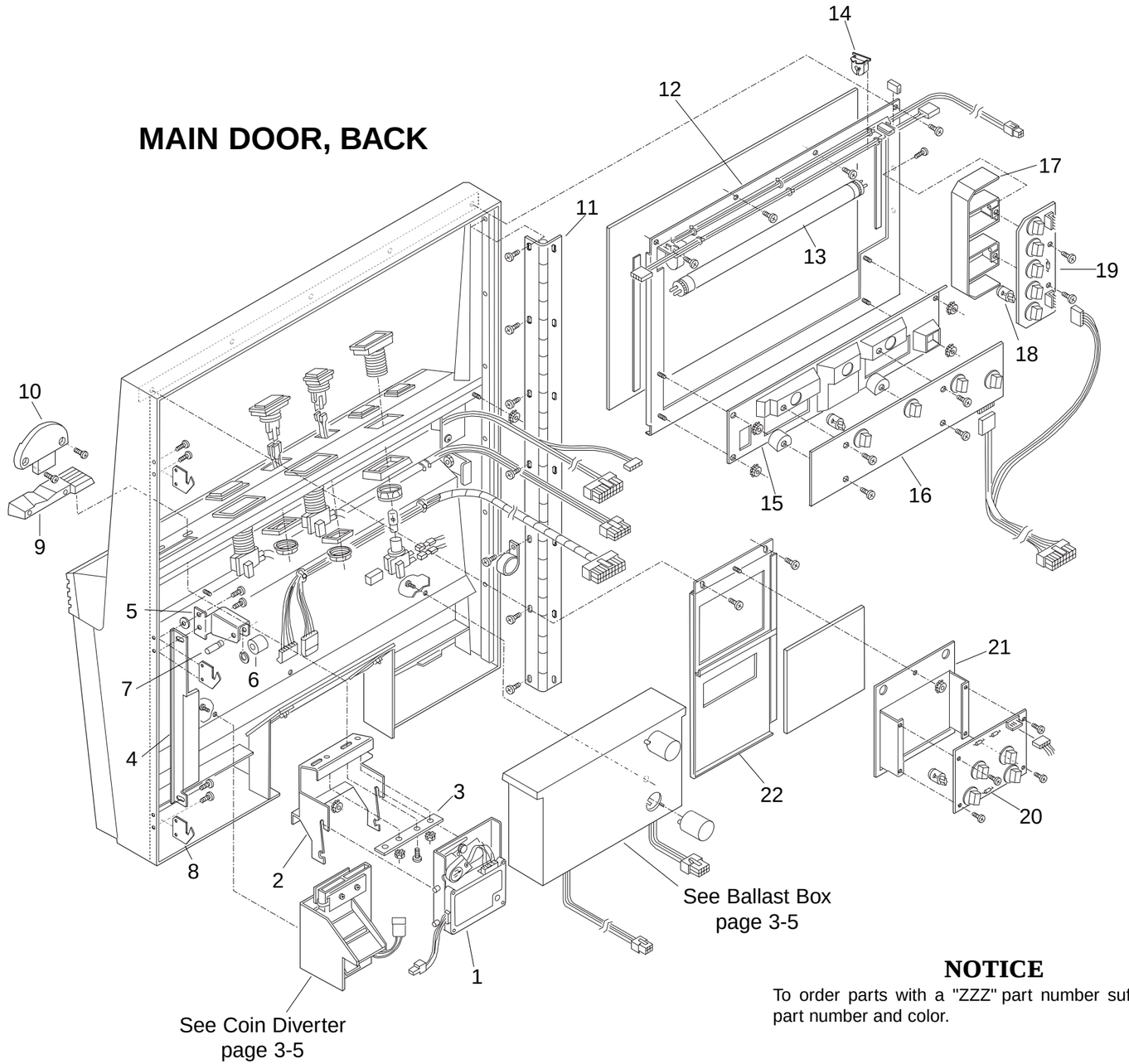
•METER DISPLAY

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

METER DISPLAY



MAIN DOOR, BACK



NOTICE

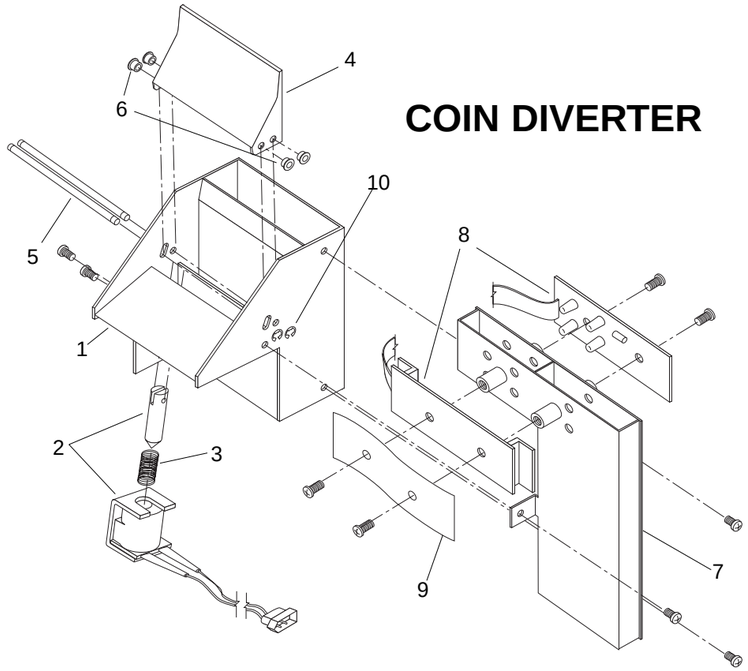
To order parts with a "ZZZ" part number suffix, specify part number and color.

•MAIN DOOR, BACK

Dwg Ref	Description	WMS Gaming #
1	Comparator, CC-16D-Inhibit, US 5¢/25¢ Coin, Italian 500 L Coin, Sigma Tkn, 66160120	09-42000-1
1	Comparator, CC-16D-Inhibit, US $1 Coin, 66160116	09-42000-2
1	Comparator, CC-16D-Inhibit, US 50¢ Coin/Token, Can. $1, 66160118	09-42000-3
1	Comparator, CC-16D-Inhibit, SA 1-Rand Cn	09-42000-4
1	Comparator, CC-16D-Inhibit, 50¢ Coin Wide	09-42000-6
1	Comparator, CC-16D-Inhibit, 10¢ Token	09-42000-7
1	Comparator, NRI, Canadian 5¢	09-002019-03
1	Comparator, NRI, Canadian 25¢	09-002019-04
1	Comparator, NRI, Canadian $1	09-002019-06
1	Comparator, NRI, Canadian $2	09-002019-07
1	Comparator, Condor, Prog, CN101-1	09-004098
1	*Comparator, Smart Mark,	09-004584-XX
	*The XX suffix indicates casino and denomination specifications.	
1	**Coin Mech, IDX, Dia. 0-1.003	09-004659-XXX
1	**Coin Mech, IDX, Dia. 1.004-1.130	09-004660-XXX
1	**Coin Mech, IDX, Dia. 1.131-1.255	09-004661-XXX
1	**Coin Mech, IDX, Dia. 1.256-1.355	09-004662-XXX
1	**Coin Mech, IDX, Dia. 1.356-1.475	09-004663-XXX
	**Replace the XXX with the appropriate numbers for your coin mechanism. Refer to chapter 3 page 6 for reference legend. Bracket,	
2	Coin Comparator Mounting	01-002133-02
3	Tool, Canadian $1 Coin Comp Alignment	01-13676-05
3	Tool, Canadian $2 Coin Comp Alignment	01-13676-11
3	Tool, Emperyal® Token Comp Alignment	01-13676-13
3	Tool, Italian 500 Lire Coin Comp Alignment	01-13676-12
3	Tool, Italian 2,000 Lire Coin Comp Alignment	01-13676-10
3	Tool, SA 1-Rand Coin Comp Alignment	01-13676-07
3	Tool, SA 1-Rand Token Comp Alignment	01-13676-08
3	Tool, Sigma® Token Comp Alignment	01-13676-14
3	Tool, US/Canadian 5¢ Cn Comp Alignment	01-13676-03
3	Tool, US/Canadian 25¢ Cn Comp Alignment	01-13676-02
3	Tool, US 50¢ Coin Comp Alignment	01-13676-04
3	Tool, US 50¢ Token Comp Alignment	01-13676-06
3	Tool, US $1 Token Comp Alignment	01-13676-01
4	Bracket, Door Switch Actuator	01-000481
5	Bracket, Door Cam	01-001128
6	Roller, Door Cam	02-001129
7	Pin, Door Cam Roller	02-001130
-	E-Ring, 1/4" (6mm) Shaft	20-8712-25
8	Door Latch plate	01-12782
9	Entry, Front of Coin (Universal)	21-000669-ZZZ
10	Entry, Back of US/Canadian 5¢ Coin	21-000670-01ZZZ
10	Entry, Back of US/Canadian 25¢ Coin	21-000670-02ZZZ
10	Entry, Back of US 50¢ Coin	21-000670-03ZZZ
10	Entry, Back of US $1 Token	21-000670-04ZZZ
10	Entry, Back of SA 1R Coin	21-000670-06ZZZ
10	Entry, Back of Canadian $1 Coin	21-000670-07ZZZ
10	Entry, Back of US 50¢ Token	21-000670-08ZZZ
10	Entry, Back of 2,000 Lire Token	21-000670-11ZZZ
10	Entry, Back of $2 Canadian Coin	21-000670-12ZZZ
10	Entry, Back of Italian 500 Lire Coin	21-000670-13ZZZ

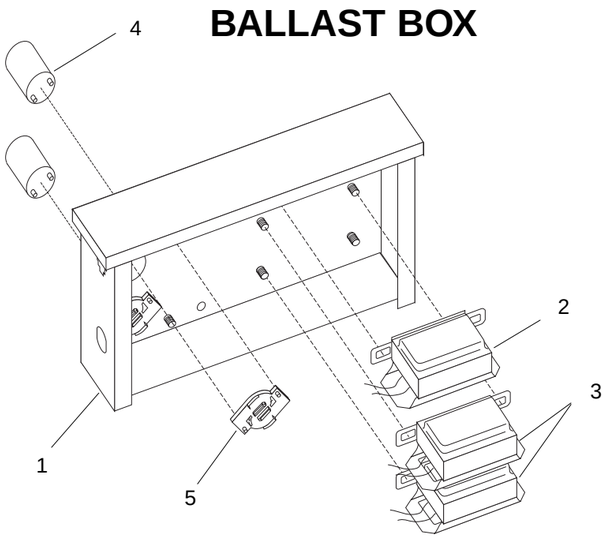
•MAIN DOOR, BACK *(continued)*

Dwg Ref	Description	WMS Gaming #
10	Entry, Back of Emperyl Token	21-000670-14ZZZ
10	Entry, Back of Sigma Coin	21-000670-15ZZZ
10	Entry, Back of Windsor 50¢ Coin	21-000670-16ZZZ
10	Entry, Back of Windsor $1 Token	21-000670-17ZZZ
10	Entry, Back of Windsor $2 Token	21-000670-18ZZZ
11	Hinge, Door Mounting	01-12531
-	Hinge Plate	01-12692
12	Panel, Reel Display Mounting	01-002844
13	Tube, 12" (31cm)/8W Reel Fluorescent	24-8833
13	Tube, 12" (31cm)/8W Reel Fluor *Black Light*	24-8843
14	Socket, Mini Bi-Pin Fluorescent	24-8841
15	Box, LED Display Shadow	03-8973
16	PC Board, LED Display	A-17382-01
17	Box, Payline Shadow	01-12661
18	Bulb, #555, 6.3V/250mA *(Wedge Base)*	24-8768
19	PC Board, Payline Lamp	A-18087-00
20	PC Board, Bill Validator Lamp (4 Lamp)	A-18088-01
-	Shadow Box (4 Lamp)	03-002373
21	Bracket, BV Display Board Mounting	01-00680
22	Panel, BV Display Mounting, Beak	01-12779-ZZZ
-	Panel, No BV Display Mounting, Beak	01-12779-01-ZZZ
-	Panel, BV Display Mounting, Bezel	01-001183-01ZZZ
-	Panel, No BV Display Mounting, Bezel	01-001183-02ZZZ



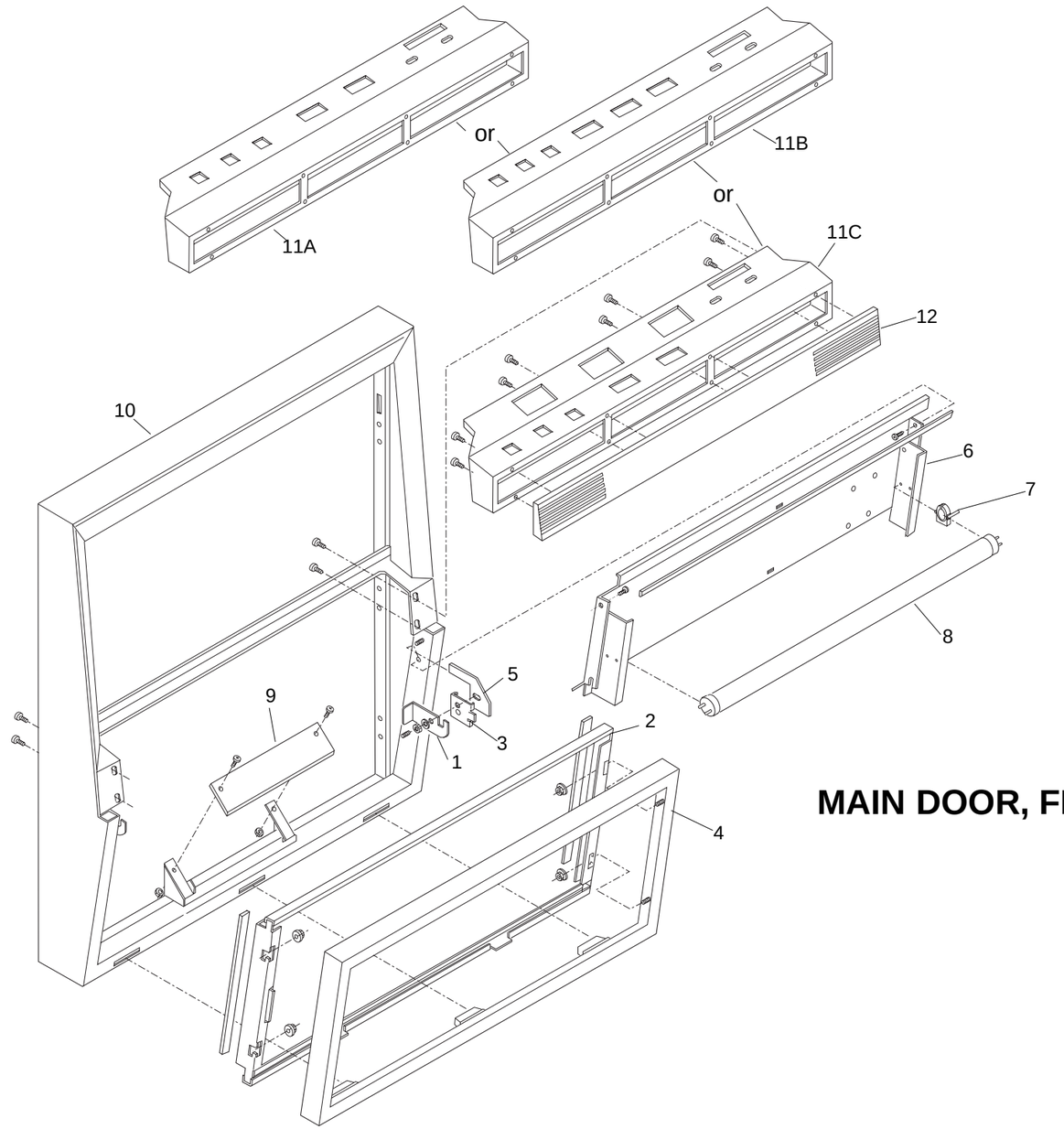
•BALLAST BOX

Dwg Ref	Description	WMS Gaming #
1	Box, Lamp Ballast/Starter	01-12787
2	Ballast, 50/60 Hz, 120V, 0.145A, 4-8W	5610-13545-00
3	Ballast, 15w, 120v, 50/60hz	5610-14210-00
4	Starter, 4-22W (w/capacitor) Fluor	20-002780
5	Starter Socket	20-9849



•COIN DIVERTER

Dwg Ref	Description	WMS Gaming #
1	Chute, Receiver/Diverter	01-13527
2	Solenoid, Diverter	A-16683
3	Spring, .398" x 1.00" (10.1 x 25.4mm)–10T Comp	10-473
4	Chute, Diverter	01-13530
5	Pin	02-5093
6	Bearing, 1/8" (3mm) Nyliner	20-8790-9
7	Chute, Coin Return and Opto Mounting	01-001613
8	Board, Quad Opto (Coin-In Optics)	A-18097-00
-	Board, Hex Opto (Coin-In Optics)	A-18097-01
9	Cover, Opto Board Protector	03-001612
10	E-Ring, 1/8" (3mm) Shaft	20-8712-12



MAIN DOOR, FRONT

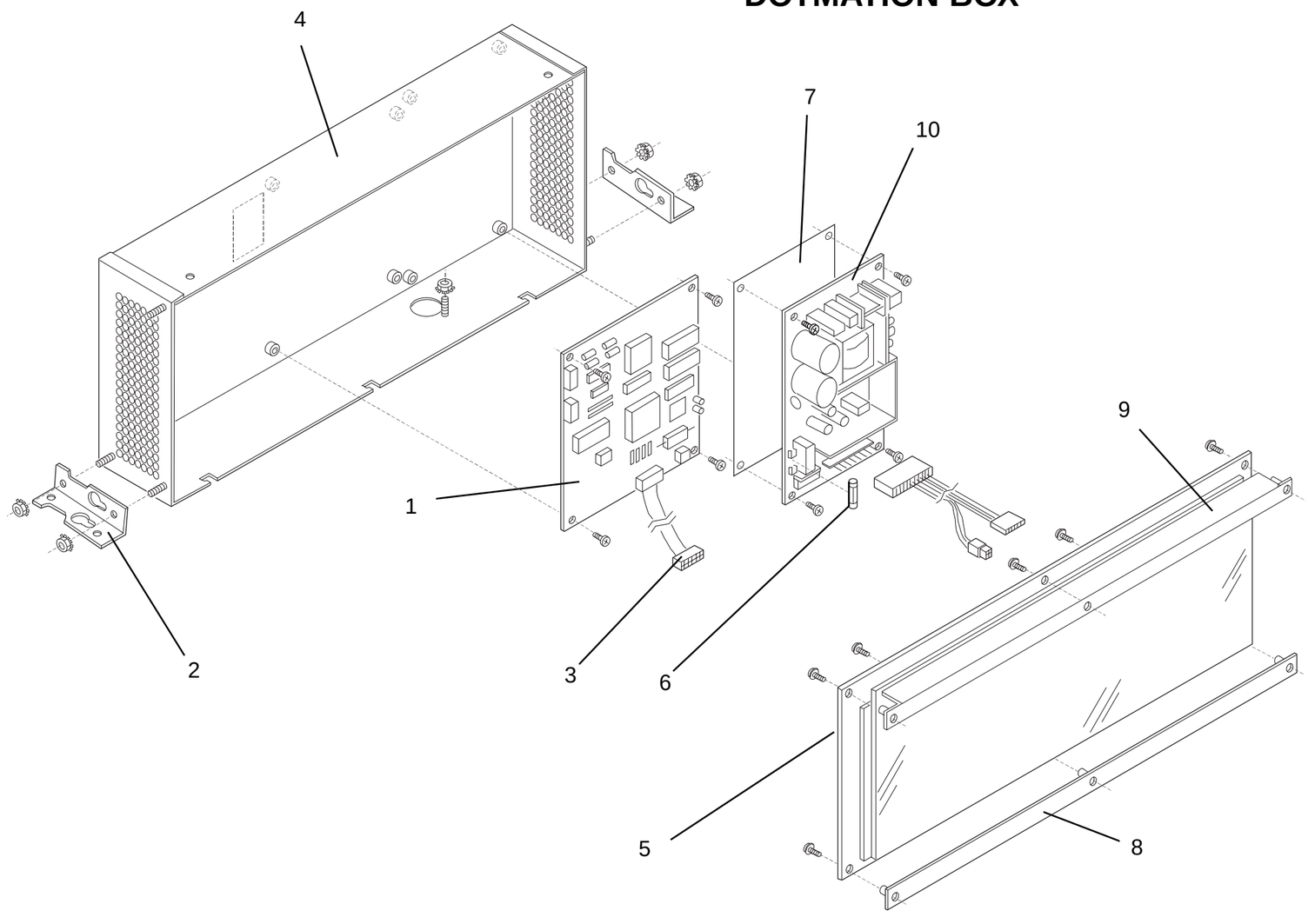
NOTICE

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

•MAIN DOOR, FRONT

Dwg Ref	Description	WMS Gaming #
1	Bracket, Belly Door Latch, Right	01-001971-01
2	Bracket, Belly Glass Support	01-000679
3	Clip, Belly Door Latch Retainer	01-001973
4	Door, Belly Glass	01-12780-ZZZ
5	Retainer, Belly Door Latch, Right	01-001972-01
-	Bracket, Belly Door Latch, Left	01-001971-02
-	Retainer, Belly Door Latch, Left	01-001972-02
6	Socket, Fluorescent Lamp	20-9848
7	Tray, Lamp and Diverter	01-002034
8	Tube, 18" (45.7cm), 15W Fluorescent	24-8809
9	Insert, Green Plexiglass	03-8974-02
10	Door, Wide-Body Slot	01-12784-ZZZ
11A	Panel, 5-Button Player	01-13525-ZZZ
11B	Panel, 6-Button Player	01-13525-02-ZZZ
11C	Panel, 8-Button Player	01-13525-01-ZZZ
12	Plate, Front Deco	21-001283-ZZZ

DOTMATION BOX



•DOTMATION BOX

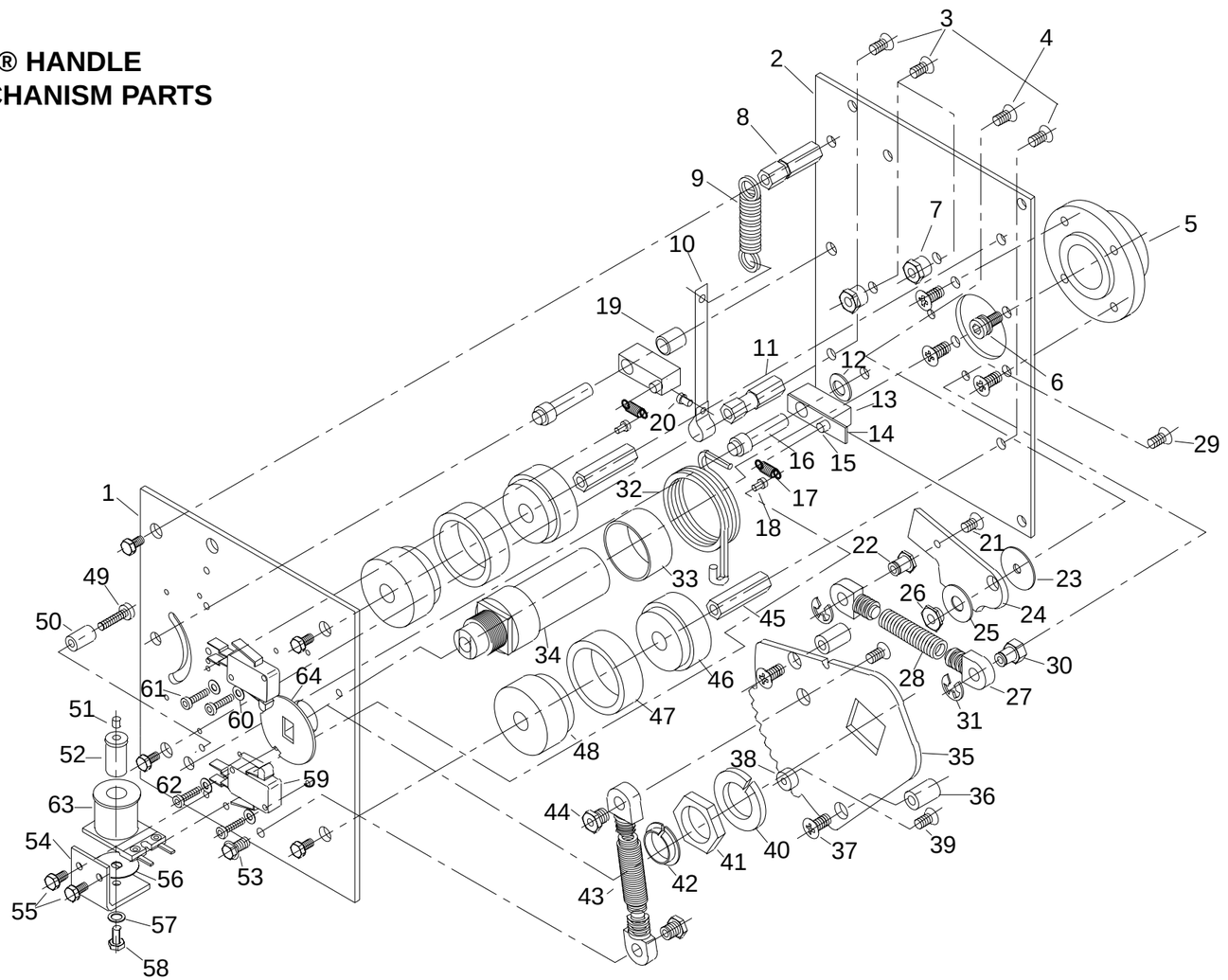
Dwg Ref	Description	WMS Gaming #
1	Board, Dotmation Controller PC	A-000541-01
2	Bracket, Wide Body Dotmation	01-001309
3	Cable, Dotmation Panel to Controller	5797-001293-00
4	Chassis, Dotmation	01-000988
5	Display, 192 x 64 Dot Matrix	5901-001023-00
6	Fuse, 5 x 20mm, 4A, 250V	5731-14094-00
7	Insulator, Dotmation Power Supply	03-001134
8	Rail, Bottom Dotmation	01-000989
9	Rail, Top Dotmation	01-001481
10	Supply, 12V/110W Power	20-001292

• STC® HANDLE MECHANISM PARTS

Dwg Ref	Description	STC #	WMS Gaming #
1	Plate, Bearing Side	12-0020	20-001066-47
2	Plate, Side	12-0012	20-001066-46
3	Screw	260-012-420	20-001066-48
4	Screw	150-008-420	20-001066-49
5	Bearing, Handle	12-0010	20-001066-32
6	Screw, Spring	12-0185	20-001066-33
7	Bushing, Pawl	12-0160	20-001066-02
8	Stud, Spring Mounting	12-0050	20-001066-50

Dwg Ref	Description	STC #	WMS Gaming #
9	Spring	12-0195	20-001066-51
10	Blade Spring	12-0200	20-001066-52
11	Blade Spring Mounting	12-0055	20-001066-53
12	Washer	5080-251	20-001066-54
13	Pawl, Lock	12-0090	20-001066-05
14	Plate, Lock Arm	12-0095	20-001066-27
15	Pin, Lock Arm	12-0175	20-001066-55
16	Shaft, Pawl	12-0075	20-001066-07

STC® HANDLE MECHANISM PARTS



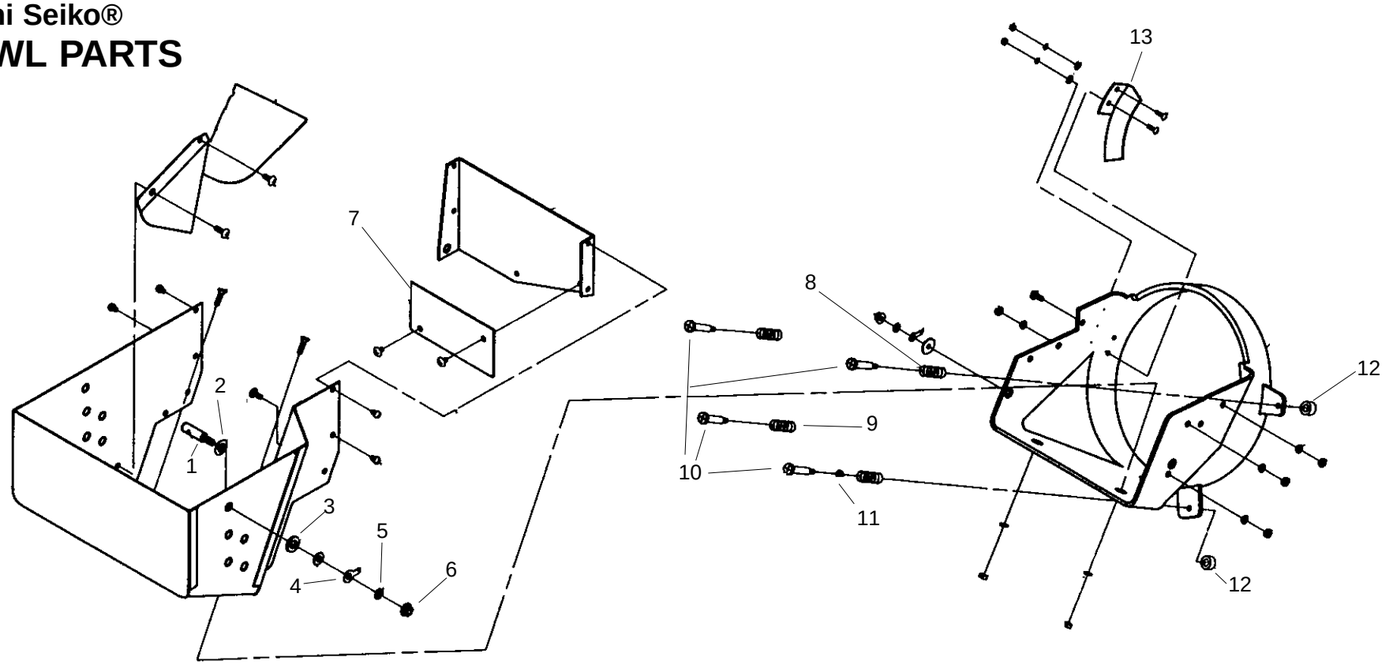
Dwg Ref	Description	STC #	WMS Gaming #
17	Spring, Lock Pawl	12-0085	20-001066-12
18	Rivet	029-008-303	20-001066-56
19	Bushing, Nylon	12-0170	20-001066-57
20	Rivet	020-004-300	20-001066-58
21	Screw	150-010-420	20-001066-59
22	Stud	12-0165	20-001066-60
23	Washer, Steel Stud	12-0145	20-001066-39
24	Simulator, Pawl	12-0060	20-001066-08
25	Washer, Steel Stud	0080-230	20-001066-38
26	Stud	12-0065	20-001066-37
27	Spring, Eye Plug	12-0140	20-001066-10
28	Spring, Simulator	12-0110	20-001066-14
29	Screw	150-012-420	20-001066-61
30	Stud, Mounting	12-0105	20-001066-62
31	E-Washer	5064-0181	20-001066-63
32	Spring, Torsion	12-0180	20-001066-15
33	Bushing, Nylon	12-0190	20-001066-01
34	Shaft, Main	12-0005	20-001066-11
35	Plate, Gear	12-0025	20-001066-36
36	Pin, Actuator	12-0070	20-001066-09
37	Screw	150-016-420	20-001066-64
38	Pin, Actuator	12-0100	20-001066-65
39	Screw	140-010-420	20-001066-66
40	Washer, Spring	5200-020	20-001066-35
41	Nut	9200-052-1	20-001066-34
42	Nyliner	10L2FF	20-001066-06
43	Spring, Main	12-0080	20-001066-13
44	Spring, Mtg Bushing	12-0155	20-001066-67
45	Stud, Mounting	12-0045	20-001066-28
46	Rubber, Mounting	12-0035	20-001066-29
47	Buffering, Metal	12-0030	20-001066-30
48	Buffering, Small, Metal	12-0040	20-001066-31
49	Screw	240-020-222	20-001066-68
50	Bushing	12-0205	20-001066-69
51	Rivet	BM180-63	20-001066-70
52	Mount, Core	12-0120	20-001066-25
53	Screw	150-012-702-1	20-001066-71
54	Bracket, Coil	12-0115	20-001066-45
55	Screw	240-008-700-7	20-001066-43
56	Washer, Brass Coil	12-0150	20-001066-40
57	Washer	1045-032	20-001066-72
58	Screw	140-010-707	20-001066-44
59	Switch, Micro	22-0719-2	20-001066-16
60	Washer	1037-000	20-001066-73
61	Screw	230-016-220	20-001066-41
62	Screw	260-010-700-7	20-001066-42
63	Coil, 12V dc	12-0135	20-001066-04
64	Switch Cam	22-3585-1	20-001066-03

•BOWL PARTS

Dwg Ref	Description	Asahi Seiko #	WMS Gaming #
1	Pin, Outer Bowl Probe	DH7011M025153	20-001064-44
2	Washer, Nylon Inner	DH7011M025152	20-001064-54
3	Washer, Nylon Outer	DH7011M025150	20-001064-55
4	Terminal, Bowl Probe	DH7011M025093	20-001064-45
5	Washer, Bowl M5 Star	W5000SR99	20-001064-46
6	Nut, M5, Bowl Shoulder	N5000SN99	20-001064-47
7	Plate, Hopper Bowl Baffle	DH7011M025006	20-001064-53
8	Spring, Upper Bowl Screw	DH7011M025048	20-001064-50
9	Spring, Lower Bowl Mounting	DH7001M025049	20-001064-51
10	Screw, Bowl	DH7011M025047	20-001064-49
11	Nut, M4 small	N4006HX99	20-004477-08
12	Collar, Mdl $1 Spcr, Bowl	DH7001M10T081	20-001064-52
13	Insulator, Bowl Screw	DH7011M025052	20-001064-48

Asahi Seiko®

BOWL PARTS

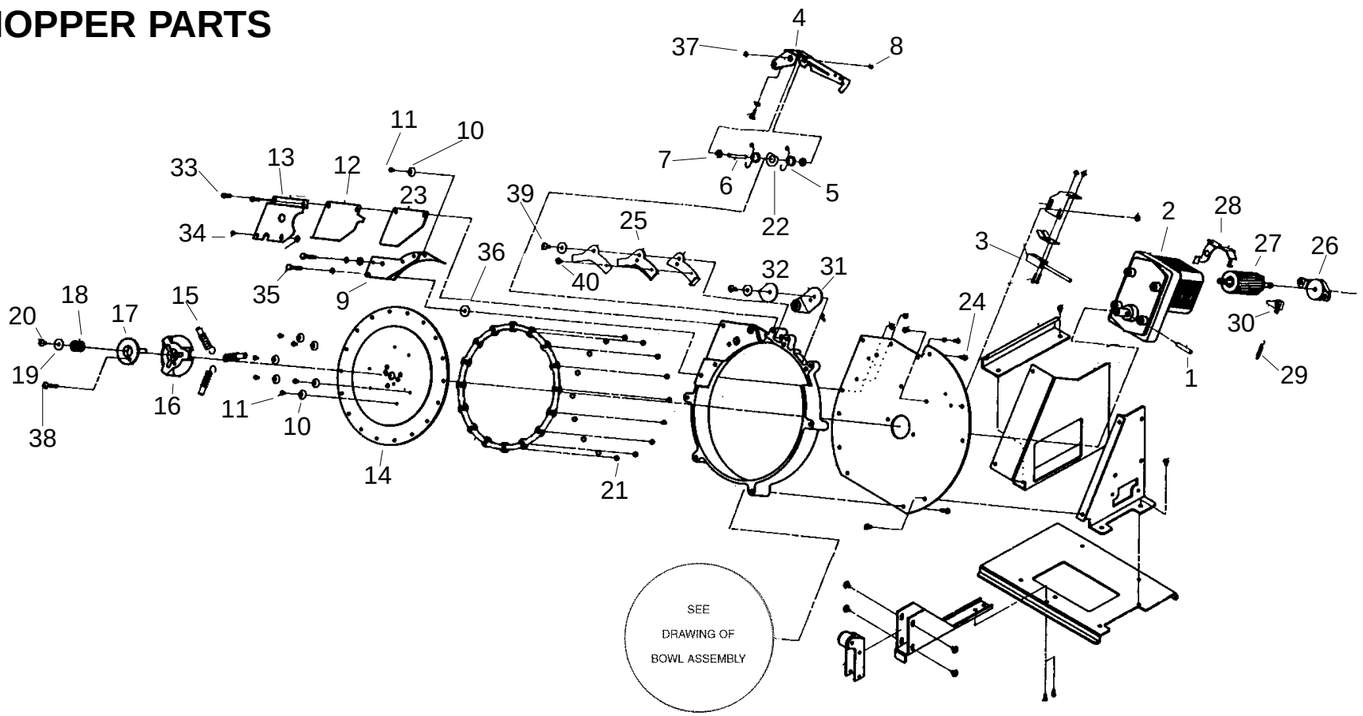


• HOPPER PARTS

Dwg Ref	Description	AS-USA #	WMS Gaming #
1	Pin, Motor Drive	DH7001M025007	20-001064-01
2	Motor, 115V, Gearbox	DH7001M025008	20-001064-02
3	Sensor, Proximity	DH7001P025013	20-001064-03
4	Lever, Steel Roller	DH7001P025015	20-001064-04
5	Spring, Roller Lever	DH7001M025016	20-001064-05
6	Lever, Pin Roller	DH7001M025017	20-001064-06
7	Lever, Bridge Roller	DH7001M025018	20-001064-07
8	E-Ring	W3000ER99	20-001064-08
9	Knife, 5¢	DH7001M005025	20-001064-09
9	Knife, 25¢	DH7001M025025	20-001064-10
9	Knife, $1 Token	DH7001M10T025	20-001064-11
9	Knife, 50¢ Coin	DH7001M050025	20-001064-56
9	Knife, Canadian Loonie $1	DH7001M10T025	20-001064-61
9	Knife, 1 Rand Token	DH7001M027025	20-001064-65
10	Boss, Plastic	DH7001M025026	20-001064-12
11	Screw, Bevel	DH7001M025027	20-001064-13
12	Coin Guide, 5¢/25¢	DH7001M025028	20-001064-14
12	Coin Guide, $1Token	DH7001M010T028	20-001064-15
12	Coin Guide, 50¢	DH7001M050028	20-001064-57
13	Coin Cover (5¢/25¢)	DH7001M025029	20-001064-16
13	Coin Cover ($1 Token)	DH7001M010T029	20-001064-17
13	Cover, 5¢ Jump Rbr	DH7001M005072	20-001064-34
13	Cover, 25¢ & $1 Jump Rbr	DH7001M025072	20-001064-35
14	Disk, 5¢ Token	DH7001M005033	20-001064-18
14	Disk, 25¢ Token	DH7001M025033	20-001064-19
14	Disk, $1 Token	DH7001M10T033	20-001064-20
14	Disk, 50¢ Token	DH7001M050033	20-001064-59
15	Spring, Stirring	DH7001M025034	20-001064-21
16	Spring, Cover Mounting	DH7001M025035	20-001064-22
17	Spring, Cover Holder	DH7001M025036	20-001064-23
18	Spring, Disk	DH7001M025037	20-001064-24
19	Washer, 4 x 15 x 1.0	W4015FW10	20-001064-25
20	Screw, M4 x 8, IRG, Lg Hd	S4008LH99	20-001064-26
21	Bearing with Retainer	DH7001M025402	20-001064-27
22	Washer, Roller Lever	DH7001M025064	20-001064-28
23	Spacer, Coin Guide	DH7001M025065	20-001064-29
24	Plate, Jump Rubber Adj	DH7001M025070	20-001064-30
25	Rubber, 5¢ Jump	DH7001M005071	20-001064-31
25	Rubber, 25¢ Jump	DH7001M025071	20-001064-32
25	Rubber, $1 Jump	DH7001M10T071	20-001064-33
26	Bracket, Motor	DH7001M025079	20-001064-36
27	Armature with Stop	DH7001M025082	20-001064-37
28	Lever, Motor Brake	DH7001M025083	20-001064-38
29	Spring, Brake	DH7001M025084	20-001064-39
30	Stop, Brake	DH7001M025085	20-001064-40
31	Separator, Rubber Coin	DH7001M025073	20-001064-41
32	Support, 5¢ & 25¢ Retainer	DH7001M020074	20-001064-42
32	Support, $1 Token Retainer	DH7001M10T074	20-001064-43
32	Support, 50¢ Retainer	DH7001M050074	20-001064-58
33	Screw, M4 x 14, w/SW	S4014RHSW	20-001064-66
34	Screw M3 x 4 w/SW	S3004RHSW	20-001064-67
35	Bolt M4 x 25 SS	B4025HXSS	20-001064-68
36	Hpr Knife Shim, 4x8x0.2mm	W4008FW02	20-001064-69
36	Hpr Knife Shim, 4x8x0.3mm	W4008FW03	20-001064-70
36	Hpr Knife Shim, 4x8x0.5mm	W4008FW05	20-001064-71
36	Hpr Knife Shim, 4x8x0.8mm	W4008FW08	20-001064-72
37	Bolt M4 x 12	B4012HX99	20-001064-73
38	Screw, M4 x 25, SS Lrg Hd	S4025LHSS	20-001064-74
39	Screw, M4 x 12, Lrg Hd	S4012LH99	20-001064-75
40	Screw M3 x 8 w/SW FW	S3008RHSF	20-001064-76

Asahi Seiko®

HOPPER PARTS



HOPPER MOTOR ASSEMBLY — **AS-USA #** — **WMS Gaming #**

115VAC, w/Harness	DH7561P025008	20-004477-11

HOPPERS, COMPLETE

Hopper, Complete 5¢ Coin	A-18267
Hopper, Complete 25¢ Coin	A-18291
Hopper, Complete 50¢ Coin	A-001305
Hopper, Complete $1 Canadian Coin	A-001987
Hopper, Complete $1 US Token	A-18102

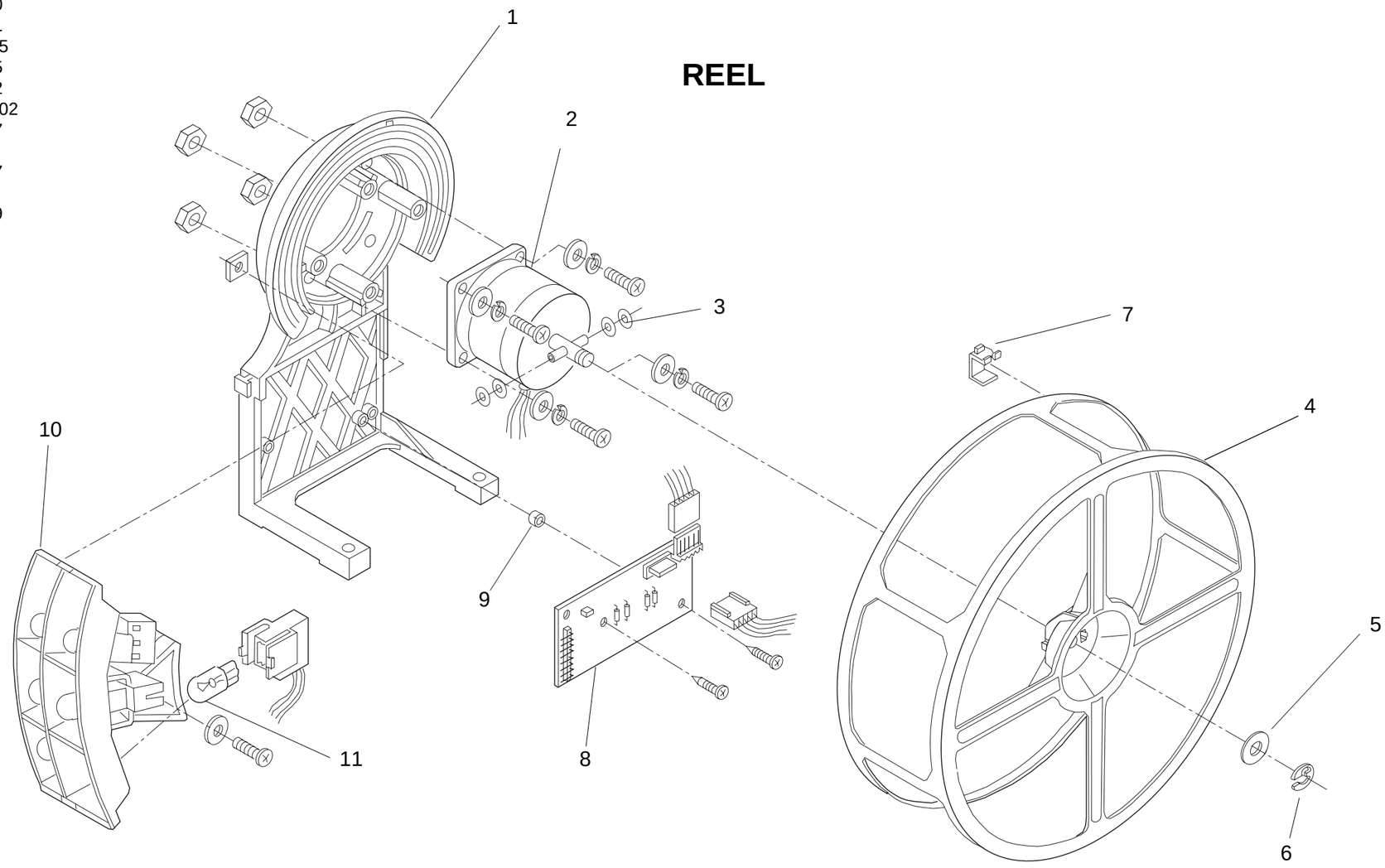
NOTICE

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

• REEL

Dwg Ref	Description	WMS Gaming #
1	Frame, Reel	20-002001
2	Reel, Motor Assembly (Applied Motion)	A-002382
2	Reel, Motor Assembly (Vexta)	A-18120
3	O-Ring, Reel Mounting	20-000536
4	Reel, Starpoint®	20-004400
5	Washer	20-004401
6	E-Ring, 0.25” (6.35mm) Shaft Motor	20-8712-25
7	Tab, Opto Interrupter	20-000535
8	Board, Reel Motor Control	20-002002
9	Spacer, #4 Screw	20-10051-02
10	Housing, Six-Lamp	20-000657
11	Bulb, #555, 6.3V, 25mA, Wedge-Based	24-8768
-	Tape, Reel Mounting	20-000477

Complete Reel Mechanism Assy 20-004399

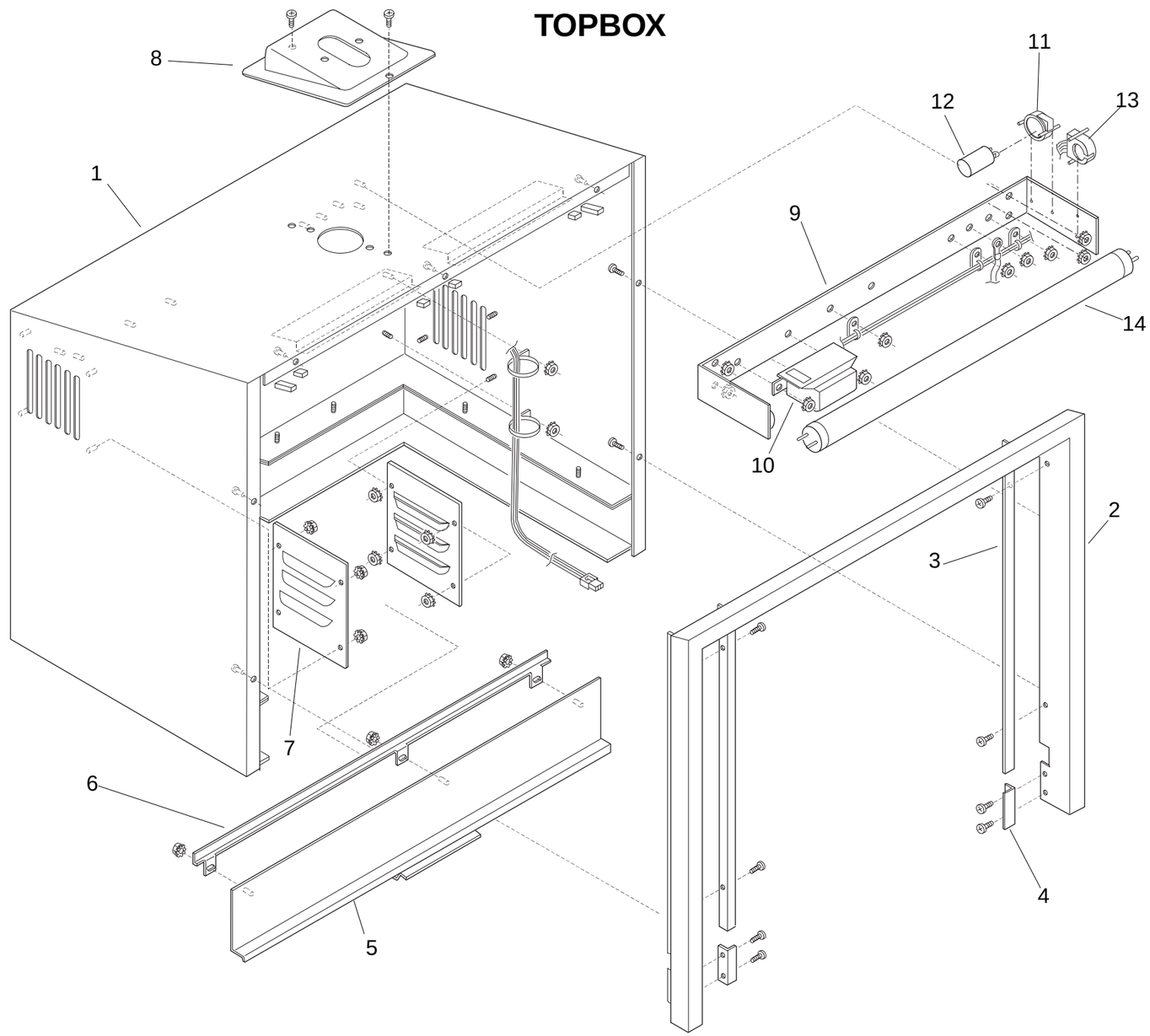


•TOPBOX

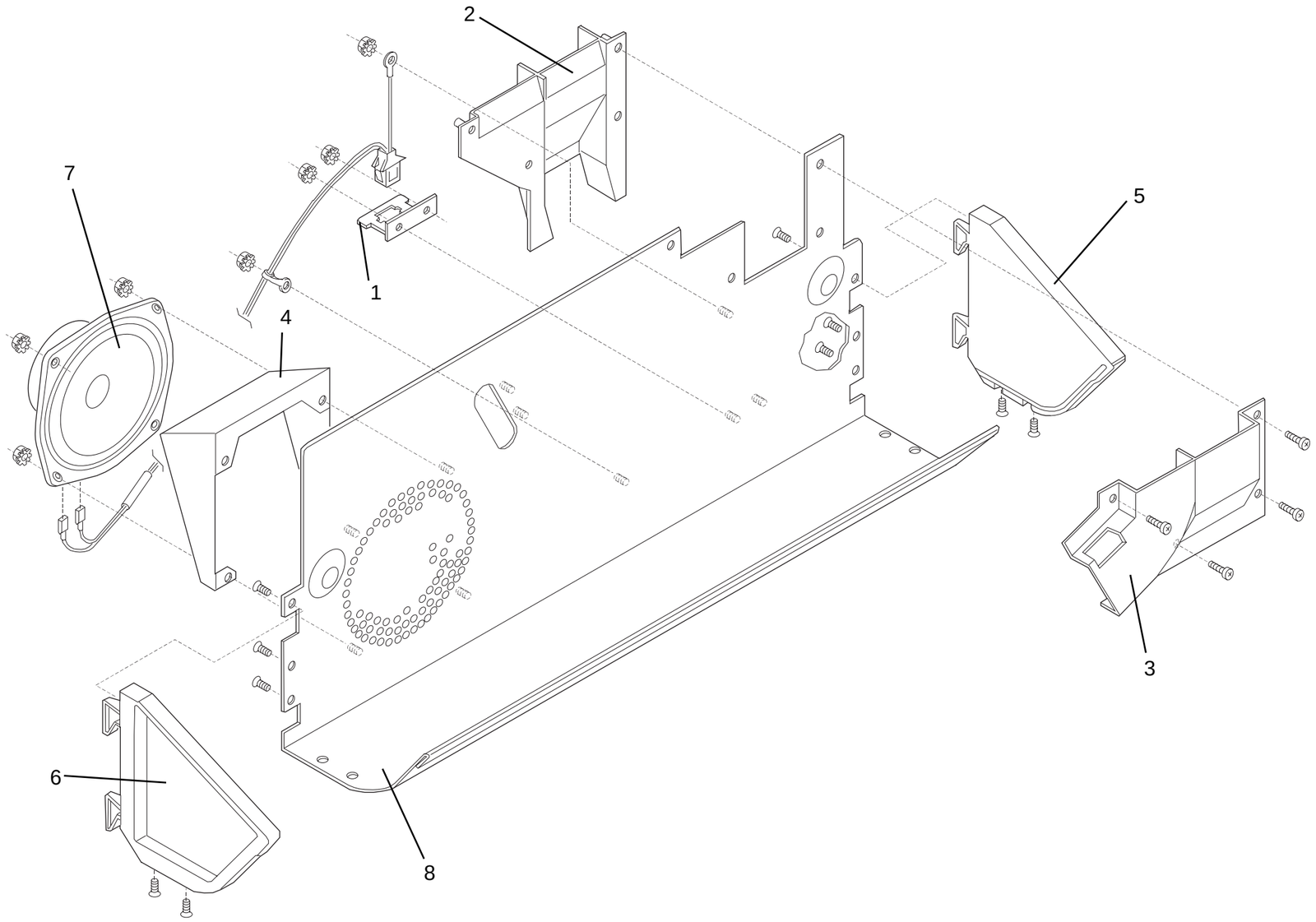
There are 3 styles of Topbox: Chop Top, Big Top, and Bonnet Top. All are available with or without the Interior Card Reader Spacer (the Big Top w/Card Reader Spacer is Illustrated).

Dwg Ref	Description	WMS Gaming #
1*	Cabinet, Topbox	A-000725-XX-ZZZ
	The -XX indicates type & size. The -ZZZ suffix indicates lamin. color	
2*	Facade (Crown)	01-000056-XXZZZ
	The -XX indicates type & size. The ZZZ suffix indicates finish.	
3*	Glass Angle	01-001058-XX
	The -XX suffix indicates type & size.	
4	Angle, Face Plate	01-001058-05
5*	Face Plate	01-001833-XXP06
	The -XX indicates system type.	
5	Face Plate, Blank (shown)	01-001833-00P06
6	Glass Channel w/Card Reader	01-000705
6	Glass Channel w/Card Reader, for IGS system	01-004304
7	Louver Plate	01-001298
8*	Tower Light Block, Big Top	03-9180-XX
	The -XX suffix indicates: -type	
8*	Tower Light Block, Bonnet Top	03-9178-XX
	The -XX suffix indicates: -type	
9	Bracket, 18" (45.7cm) Lamp	01-13496
-	Mounting Plate, 18" (45.7cm) Lamp, (for Dotmation & Chop topbox)	01-004424
10	Ballast, 15w, 120v, 50/60hz	5610-14210-00
11	Starter Socket	20-9849
12	Starter 4-22 w/Condenser	20-002780
13	Fluorescent Lamp Socket	20-9848
14	Fluorescent Lamp 15v, 18" (45.7cm)	24-8809

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



COIN TRAY



•COIN TRAY

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

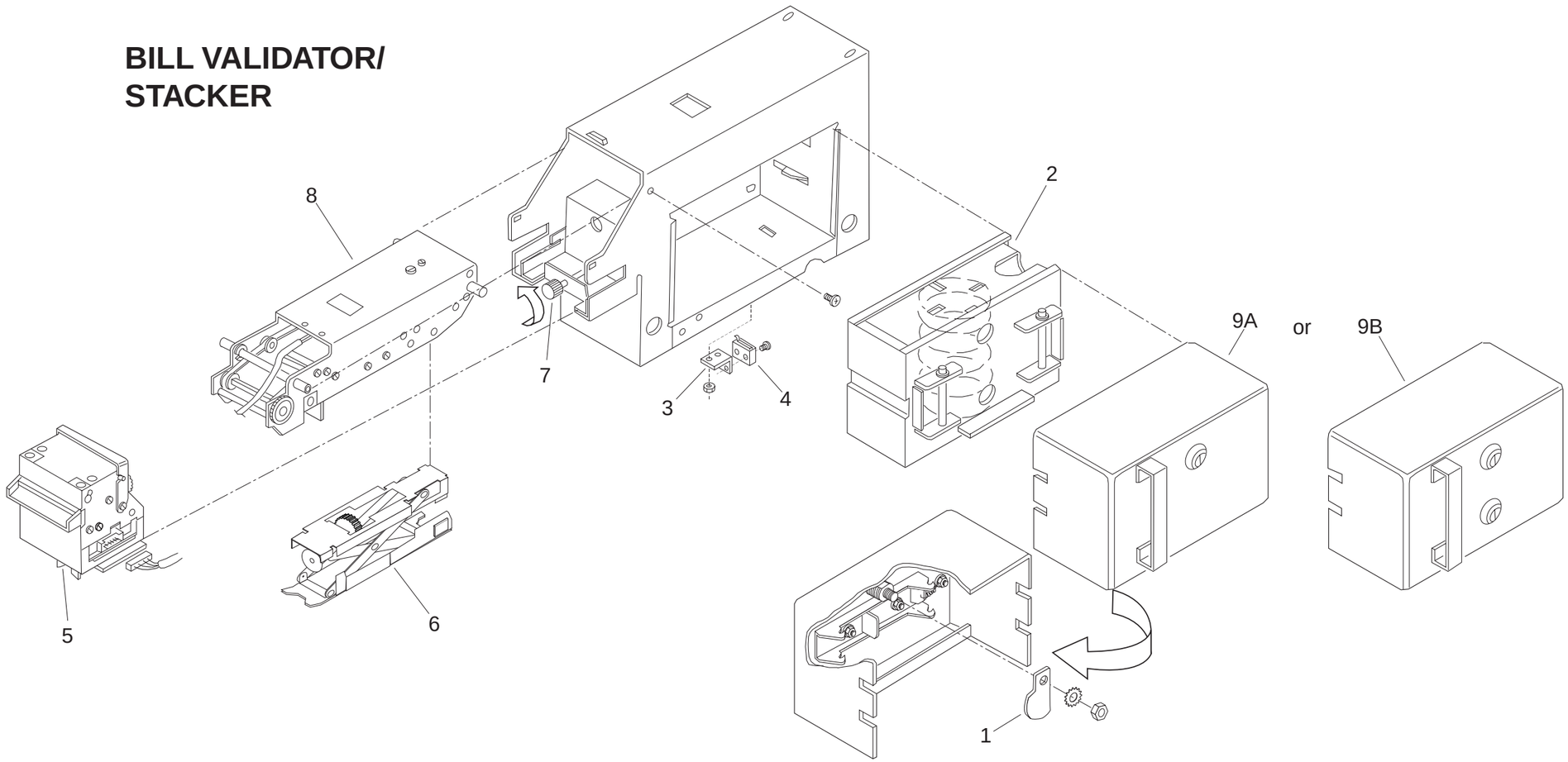
NOTICE

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

•BILL VALIDATOR/STACKER

Dwg Ref	Description	JCM#	WMS Gaming #
1	Cam, JCM Extractor, Single Lock	047605	01-12855
-	Cam, JCM Extractor, Double Lock	049177	01-000156
2	Cassette, JCM Black Stacker, US	049179	01-000157
2	Cassette, JCM Gold Stacker, US	049180	01-000158
2	Cassette, JCM Silvr Stacker, Non-US	050763	01-001718-01
2	Cassette, JCM Gold Stacker, Non-US	050764	01-001718-02
2	Box, Type-G Bill	047575	20-001065-06
2	Box, Type-B Bill	047576	20-001065-07
3	Bracket, Sw Mounting		01-002651
4	Switch, Bare, Sub-mini SPDT		5647-14200-00
5	JCM 145 Bill Validator Head	040676	20-001065-11
5	JCM 200 Bill Valid. Head w/EPROM	040676	20-004565-00
5	JCM 200 Bill Valid. Head w/Flash	040676	20-004565-01
-	V-Belt, Timing (BV Body)	040988	20-001065-03
-	Plate, BV Quick Release		20-001065-08
6	Mech, Push (Conveying)	037565	20-001065-04
7	Screw, Thumb	046054	20-001065-09
-	Nut, M-3 Cap	017202	20-001065-10
8	Stacker, SG	048229	20-001065-01
-	V-Belt, Timing (Conveyor)	040987	20-001065-05
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

BILL VALIDATOR/ STACKER



Tilt Codes

DISPLAY	MEANING
• CPU EEPROM	
GAnnE DiSAb X	HOST PUT GAME X OUT OF SVC
SEcur 1	INSTALLED, CHANGED EEPROM
SEcur 2	BAD OR REMOVED EEPROM
SEcur 3	BAD PASSWORD
SEcur 4	CORRUPT EEPROM CRC
• CPU EPROM	
GAMNE CHNGE 1	GAME EPROM MISMATCH
GAMNE CHNGE 2	GAME TYPE CHANGE
GAMNE CHNGE 3	VERSION CHANGE
GAMNE CHNGE 4	EPROM XU2 CKSUM CHANGE
GAMNE CHNGE 5	EPROM XU3 CKSUM CHANGE
ronn1	GAME EPROM CKSUM ERROR
ronn2	DATA EPROM CKSUM ERROR
tAbLE	BAD DATA IN EPROM XU3
• DBV/COIN	
coinJ	COIN JAM
coinl	LONG COIN
coinr	REVERSED COIN
(DBV lAMPS oFF)	DBV FULL OR FAILURE
StAc oPEn	NO DBV STACKER
StAc POFF	NO STACKER/POWER OFF
• DOOR	
bill oPEn	OPEN BILL STACKER DOOR
bill POFF	OPEN STACKER DOOR/PWR OFF
bSEru oPEn	OPEN BILL JAM SERVICE DOOR
bSEru POFF	OPEN B. JAM SVC DR/PWR OFF
door POFF	OPEN ELEC OR HPR DR/PWR OFF
droP oPEn	OPEN CASHBOX DOOR
droP POFF	OPEN CASHBOX DOOR/PWR OFF
Hood oPEn	OPEN REEL HATCH
Hood POFF	OPEN REEL HATCH/POWER OFF
logic oPEn	OPEN CARD CAGE DOOR
logic POFF	OPEN CARD CAGE DR/PWR OFF
•DOTMATION	
dot init	DISPLAY IS INITIALIZING
dot PACEt 0	BAD DATA PACKET
dot PtYPE 0	BAD DATA PACKET TYPE
dot lAMP 0	BAD LAMP PACKET
dot rEEl 1	FAILURE OF DICE/REEL MECH 1
dot rEEl 2	FAILURE OF DICE/REEL MECH 2
dot OPto 0	FAILURE OF DICE OR REEL OPTO
ronn dot 1	BAD DOT OS EPROM ON DOT BD
•JURIS JPR	
Jur CHNGE 1	JURISDICTION JUMPER CHANGE
Jur bAd 1	WRONG JURISDICTION JUMPER
• HARD METER	
nEtEr X	MECHANICAL METER X FAILURE
• HOPPER	
HAnd XXXXX	ATTENDANT PAYS XXXXX CRS
HPrC	HPR DISPENSED EXTRA COIN
HPrE	EMPTY HOPPER
HPrJ	HOPPER JAM
HPrr	RUNAWAY HOPPER
• PGA CHIP	
PGA FAIL	XILINX CHIP FAILURE
• PROGRESSIVE	
Prog nonE	NO PROGRESSIVE CONTROLLER
Prog rESP	NO PROGRESSIVE RESPONSE
• REEL DISPLAY	
LEd FAULt	BAD DISPLAY OR LOOSE CABLE
• REEL OPTO	
rEEIX 0	REEL X: NO OPTO FEEDBACK
rEEIX 1	REEL X: INVALID OPTO FEEDBK
• SOUND	
ronn Sound	BAD SOUND EPROM ON CPU BD
• STATIC RAM	
bAtt	LOW BATTERY VOLTAGE
clr	MEMORY CLEARED
crc X	RAM ERROR
HEAPC	CORRUPT HEAP
HEAPF	FULL HEAP
Log	CORRUPT GAME LOG DATA
nEEd CIEAr	CLEAR THE RAM
Prog crc	CORRUPT PROGRESSIVE DATA
rAnd	CORRUPT RANDOM NUM SEED
rAnn nntcH	UNEQUAL GAME & SECURE DATA
SIG X	CORRUPT RAM SIGNATURE
• WATCHDOG	
bIG trubl	WATCHDOG CHIP TIMED OUT

Candle Codes

Candle Section	Candle Activity	Meaning
Top	Off	Machine is idle
	On	Change request
	Slow Flash	Tilt or Jackpot Mode
Bottom	Off	Main door closed
	Fast Flash	Main door open
	Slow Flash	Jackpot

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.

Administration Mode

Series	Subject
0	Host Communications, Sound Volume; Demo, Cash and Credit Modes, Reel Speed, Etc.
1	Input Tests
2	Output Tests
3	Hopper Test
4	Pay Table Test
5	Reel Strip Test
6	Denomination Setting
7	Maximum Hopper Payout
8	Hopper Partial Pay Limit
9	Progressive ID and Level

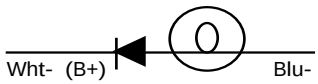
CPU Board 7-Segment Display

Displayed Number	Situation
None	•Constantly ("8" never appears): One power voltage is absent.
	•After "8" clears: System OK.
8	•Briefly: System OK.
	•Constantly: Bad EPROMS XU2 and XU3, or bad CPU Board.

Startup Sound Codes

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

Lamp Matrix



ROW \ COL	0 Wht-Blk Q3	1 Wht-Brn Q4	2 Wht-Red Q7	3 Wht-Orn Q8	4 Wht-Yel Q11	5 Wht-Grn Q12	6 Wht-Blu Q15	7 Wht-Vio Q16
Blu-Blk Q1 0	1 Reel 1 Left, Center	9 Reel 1 Left, Bottom	17 Reel 1 Left, Top	25 Reel 2 Left, Center	33 Reel 2 Left, Bottom	41 Reel 2 Left, Top	49	57
Blu-Brn Q2 1	2 Reel 1 Right, Center	10 Reel 1 Right, Bottom	18 Reel 1 Right, Top	26 Reel 2 Right, Center	34 Reel 2 Right, Bottom	42 Reel 2 Right, Top	50	58
Blu-Red Q5 2	3 Reel 3 Left, Center	11 Reel 3 Left, Bottom	19 Reel 3 Left, Top	27	35	43	51	59
Blu-Orn Q6 3	4 Reel 3 Right, Center	12 Reel 3 Right, Bottom	20 Reel 3 Right, Top	28	36	44	52	60
Blu-Yel Q9 4	5	13	21	29	37	45	53	61
Blu-Grn Q10 5	6	14	22	30 Bill Valid Lamp 0	38 Bill Valid Lamp 1	46 Bill Valid Lamp 2	54 Bill Valid Lamp 3	62
Blu (No Trace) Q13 6	7 Payline Lamp, Top	15 Payline Lamp, 2nd Dn	23 Payline Lamp, Mid	31 Payline Lamp, 3rd Dn	39 Payline Lamp, Btm	47 Tower Lamp, Btm	55 Tower Lamp, Mid	63 Tower Lamp, Top
Blu-Vio Q14 7	8 Max Bet	16 Spin Switch	24 Bet 1 Switch	32 Cash/ Credit Switch	40 Tilt	48 Insert Coin	56 Denom-ination	64 Coin Accept

Programmed and Field Programmable Chip Summary

Chip Type	Board	Location	Description	Part Number
Game EPROM	CPU	XU2	27C010, 128K x 8, 100nS	(Order by Game Name)
Data EPROM	CPU	XU3	27C010, 128K x 8, 100nS	(Order by Game Name)
PLD	CPU	XU12	MACH110	A-18125
Sound EPROM	CPU	XU17	27C040, 512K x 8, 100 nS	(Order by Game Name)*
Sound EPROM	CPU	XU18	27C040, 512K x 8, 100 nS	(Order by Game Name)*
PLD	CPU	XU24	GAL, 16V8, 10 nS	A-18264*
PLD	CPU	XU25	GAL, 16V8, 10 nS	A-18265
Sound EPROM	CPU	XU30	27C040, 512K x 8, 100 nS	(Order by Game Name)*
Sound EPROM	CPU	XU31	27C040, 512K x 8, 100 nS	(Order by Game Name)*
PLD	CPU	XU33	GAL, 16V8, 10 nS	A-18266
EEPROM	CPU	U26*	4 kilobit DIP EEPROM	5345-13617-00
Static RAM	CPU	U4, U5	32K x 8 Low-Power	5340-14212-00
Sound Static RAM	CPU	U38-U40	2K x 8, 35nS, 6116 (Sound RAM)	5340-13304-00
ADSP-MPU	CPU	XU37	2105 KP 40 ADSP-MPU (Sound)	5400-13298-00
PAL	I/O	XU12	MACH110	A-18122
PAL	I/O	XU25	GAL, 16V8, 10 nS	A-18123
PAL	I/O	XU28	GAL, 16V8, 10 nS	A-18124
FPGA	I/O	XU42	3030A-70PC84C Xilinx Field Programmable Gate Array	5352-14012-00
EEPROM	Backplane	U1	x24C04, 512 x 8 bit	5345-13920-00

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