MAGNER 100 and 110

Coin Counters

Service Manual

MAGNER

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AMENDMENTS

From time to time Magner Corp. will be sending technical updates to assist field service representatives who maintain and repair the Coin Counters. For your reference, you may wish to log the periodic revisions and updates of procedures and parts to this text in the space provided below.

Technical Update No.	Date	Description

INTRODUCTION

This manual is intended as a reference source for the technician who services and maintains the Magner 100 and 110 Coin Counters.

Most of the procedures are the same for both Coin Counters. Any differences are pointed out in the instructions.

When followed as prescribed, the instructions in this manual ensure optimum safety for the technician and proper maintenance and repair of equipment.

Therefore, read this manual carefully before servicing the Coin Counter; and carefully follow each step as specified when performing test, maintenance and adjustment procedures.

SAFETY

WARNING: To avoid electrical shock or injury, observe the following precautions:

1. Make sure power is off and power source is disconnected before performing any maintenance or service procedure.
2. Do not operate with covers removed unless otherwise instructed.
3. Do not wear jewelry or loose clothing (e.g., necktie) that could get caught in the moving parts of the machine.
4. Be sure unit is connected to a properly grounded electrical outlet.

GENERAL DESCRIPTION

The following is a general description of how the Magner 100 and 110 Coin Counters work, their major operating parts and function keys, and the correct procedures for operation.

HOW MAGNER COIN COUNTERS WORK

The Magner 100 and 110 Coin Counters use a combination of mechanical and electronic components to sort and count coins.

After coins are placed into the hopper, the rotation disk picks up the coins one at a time and positions them at the top of a rail. The coins then roll down the rail, past a series of infrared sensors, and fall through openings in the rail that coincide with the sizes of the coins. The coins then drop through a coin guide box and into coin trays.

Coins are counted in the following manner: As the coins roll past the sensors, they are calculated by adding 0.10 at the first sensor, subtracting 0.09 at the second sensor, adding 0.04 at the third sensor, adding 0.20 at the fourth sensor, and adding 0.75 at the last sensor.

MAJOR PARTS OF THE COUNTER

The following are the major operating parts of the Coin Counter and a brief description of their functions. (See Figure 1).

OPERATION PANEL

Located on the front of the Coin Counter, the operation panel is used to program and control the operation of the Coin Counter. It is also used to display the calculated value of the coin and all error codes listed in the "Troubleshooting" section of this manual.

INSPECTION TRAY

Seated on top of the Coin Counter, the inspection tray is used to hold the coins, while they are being inspected for damaged coins or foreign objects, before they are pushed into the hopper and sorted.

HOPPER

Mounted on the left side of the Coin Counter, directly underneath the inspection tray, the hopper holds the coins until they are picked up by the rotation disk.

ROTATION DISK

The rotation disk is located at the base of the hopper and is mounted to the disk drive motor. Its function is to pick up the coins, using a series of pick-up pins, and carry the coins to the top of a sorting rail.

RAIL SYSTEM

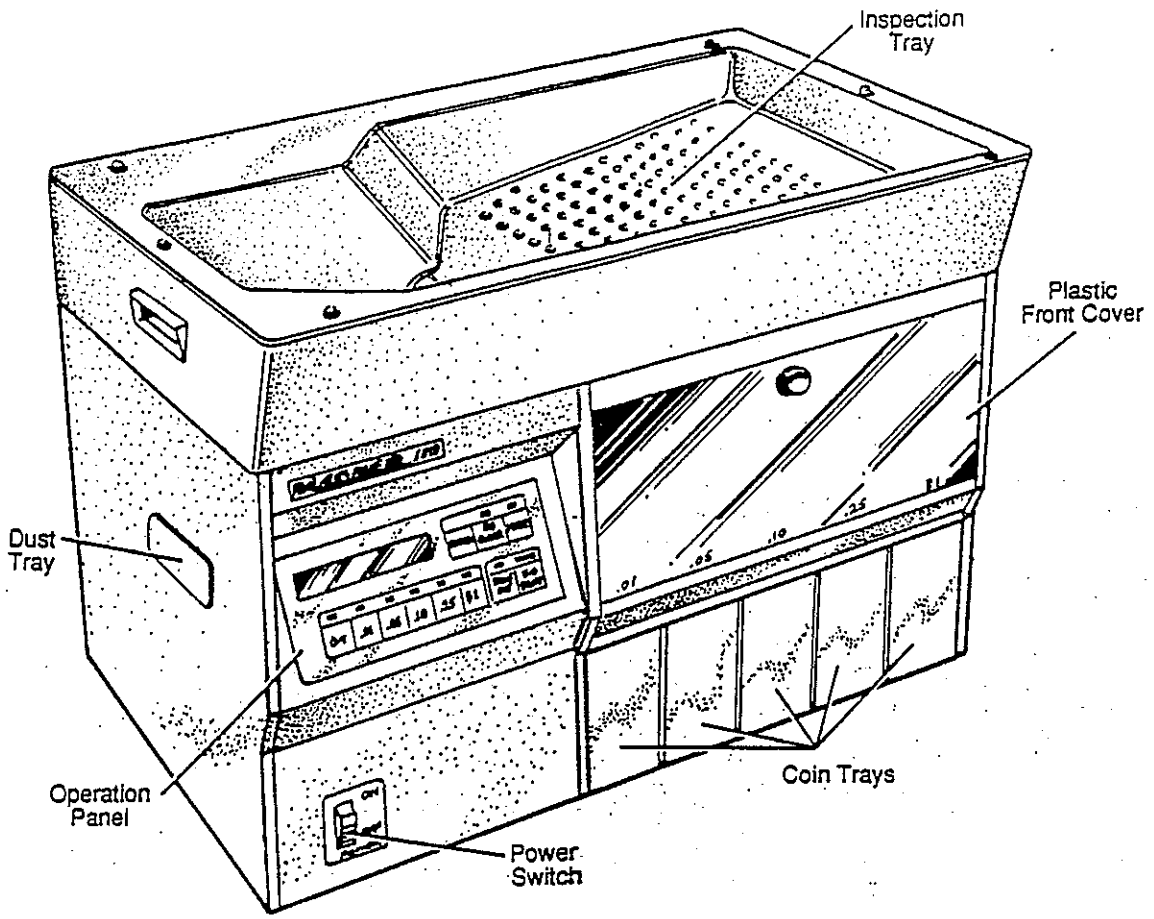
The rail system is made up of the upper shoot plate, shoot plate, shoot cover and shoot B. It is mounted to the front of the frame assembly, behind the inspection window. The rail system provides a path for the coins to travel past the count sensors and into the coin guide box.

SENSORS

Count Sensors

There are a total of five count sensors used by the Coin Counter. The sensors are mounted to the frame assembly at various points along the rail system, and they are visible through the inspection window. Each sensor produces an infrared beam that is broken every time a coin rolls past it. Each time the beam is broken, a signal is sent to the CPU board where a value is given to the signal. From that value, an accurate count of the coins can be tabulated by the CPU board and displayed on the operation panel.

Figure 1. Magner coin counter.



Drawer-Full Sensor (Model 110 Only)

The drawer-full sensor is attached to the coin counter in two locations. The sending unit is connected to the front separation plate, next to the power supply; and the receiving unit is attached to the right side frame assembly, just inside the right side cover. The drawer-full sensor establishes an infrared beam that travels through a hole at the top of each coin tray. When the beam is broken by a full coin tray or by a coin tray that is not seated correctly, the sensor stops the machine and generates an error code.

Jam Sensor Assembly (Model 110 Only)

The jam sensor is a reflective type infrared sensor mounted to the frame assembly on the back side of the Coin Counter, just above the disk drive motor. The jam sensor establishes an infrared beam through a hole in the frame assembly. The infrared beam reflects off the reflective areas of the tape ring on the back of the rotation disk. The jam sensor processes the reflective areas of the ring into electronic pulses. If for

any reason the disk slows down or stops suddenly, the jam sensor detects this and produces an error signal.

COIN TRAYS

There are a total of five coin trays located in the lower right corner on the front side of the Coin Counter. They catch and store the coins as the coins drop from the coin guide box.

FUNCTION KEYS

The following keys are located on the operation panel and are used to control the operation of the Coin Counter. All keys except the CLEAR key have red LEDs that light up when the function is on.

Figure 2a. Operation panel—100 Model.

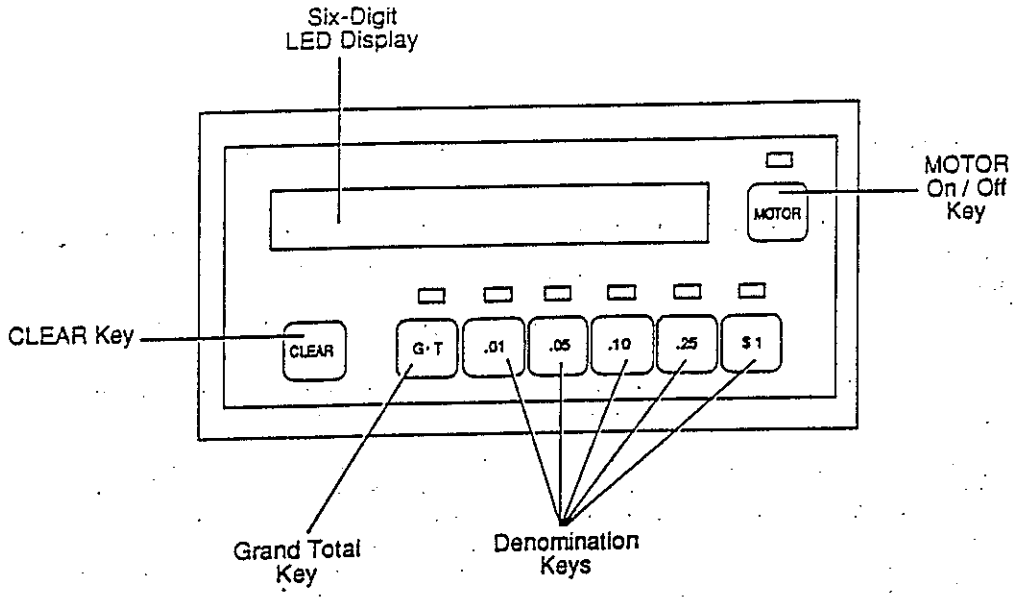
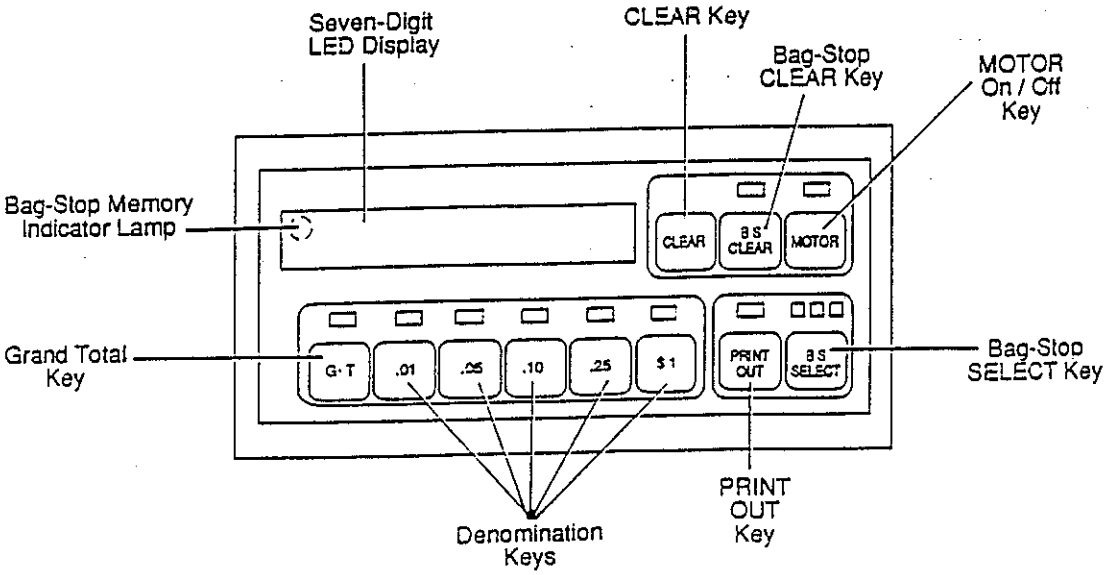


Figure 2b. Operation panel—110 Model.



"CLEAR" KEY

This key is used to clear the display total and/or grand total information and to reset all error codes except those generated by the drawer-full sensor (Model 110 only) and the jam sensor (Model 110 only). These sensors must be cleared by emptying the coin tray(s), seating the coin trays correctly or clearing the jam that is affecting the rotation disk.

"MOTOR" KEY

This key is used to turn the rotating disk motor on and off.

DENOMINATION KEYS

When pressed, the denomination keys (".01", ".05", ".10", ".25", "$1") give the individual total for each denomination. Each key may also be used together with the G·T key to display the total for that denomination, including previous totals stored in memory.

"G·T" KEY

When pressed, the grand total key gives a grand total amount of all coins counted since the last time the grand total was cleared.

To clear the grand total, hold down the G·T key and press CLEAR.

It is also used in conjunction with the denomination keys to display the grand total amounts for each denomination.

To clear a denomination grand total, hold down the desired denomination and G·T keys, then press the CLEAR key. (See also "Denomination Keys.")

"PRINT OUT" KEY (Model 110 Only)

This key is used in conjunction with an external printer to print out the total and grand total data.

BAG STOP SELECT SWITCH (Model 110 Only)

This switch is used to select one of three (3) levels of bag stop quantities: "Test" (for rolled coin amounts) "½B" (half bag), and "1B" (full bag).

Each bag stop quantity is factory preset at specific test quantities and federal reserve quantities as follows:

	$.01	$.05	$.10	$.25	$1
Test	50	40	50	40	25
1/2B	2,500	2,000	5,000	2,000	1,000
Full B	5,000	4,000	10,000	4,000	2,000

A red LED indicator is on when any bag stop has been selected. When the preset level of coin quantity for a denomination has been reached, the LED above that denomination will flash and the number of coins that went over the preset quantity will flash on the display.

BAG STOP CLEAR KEY (Model 110 Only)

When a bag stop value is in memory a red LED is on, in the top left corner of the display. To clear bag stop memory hold down the B·S CLEAR key and press the CLEAR key.

When the bag stop value has been reached, the machine stops and the denomination value and the B·S CLEAR LED alternately flash. To clear this condition, hold down the B·S CLEAR key and press the denomination that is flashing.

CORRECT OPERATING PROCEDURES

1. Clear the memory as follows:

   a. If required press ".25", ".10" and ".05" denomination keys at the same time and turn POWER switch to "On" then "Off". All memory will now be cleared.

      Turn POWER switch to "On".

   b. Clear total by pressing CLEAR key. Clear grand total by holding down G·T key and pressing CLEAR key. Clear denomination grand totals by holding down the G·T key and each denomination key, then press the CLEAR key.

      (Model 110 only): Clear bag stop memory by holding B·S CLEAR key and pressing CLEAR key.

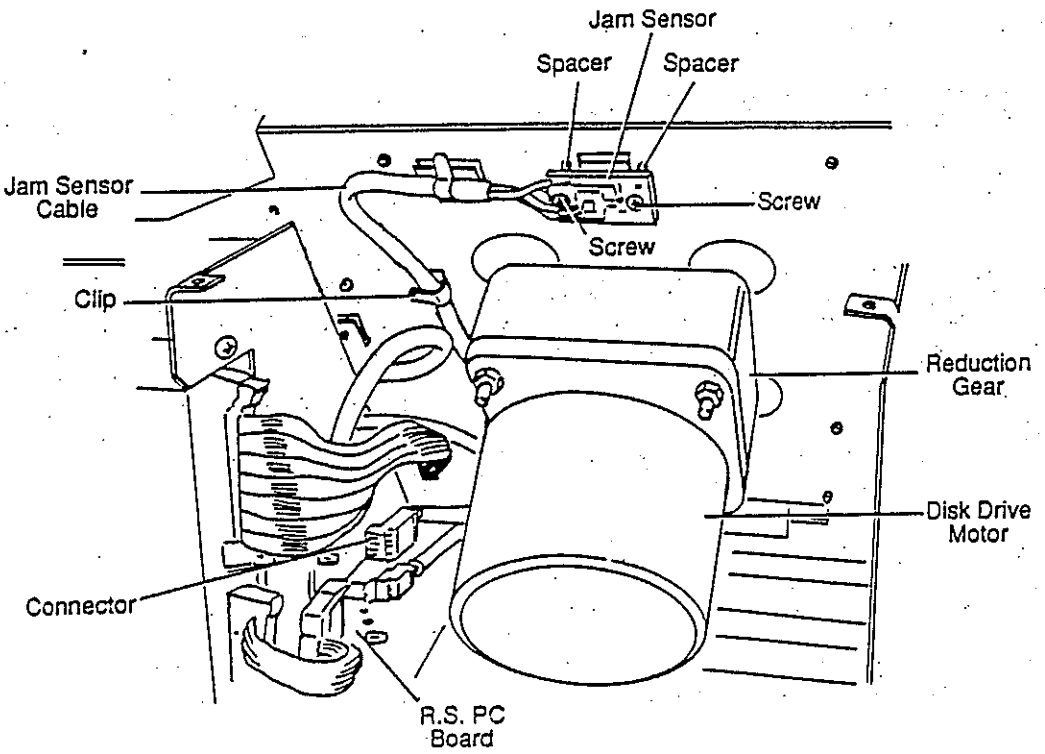
2. (On 110 Only): Set bag stop amount at "Test." "½B." or "1B" (if

CAUTION: When removing the two (2) 1/4-in. spacers, make sure spacers do not fall into power supply.

4. Remove two (2) screws and 1/4-in. spacers that connect jam sensor to frame assembly.

5. Remove jam sensor cable from two (2) cable clips. (See Figure 12.)

Figure 12. Jam sensor assembly.



6. To disconnect jam sensor electrical connector from R.S. PC board (on back side of coin counter next to disk drive motor assembly), pull lock mechanism away from quick disconnect and remove connector.

7. Remove jam sensor from frame assembly. (See Figure 12.)

8. Replace with new jam sensor, if necessary.

9. Reassemble by reversing procedure in steps 1 through 7.

REMOVING AND REPLACING DISK DRIVE MOTOR

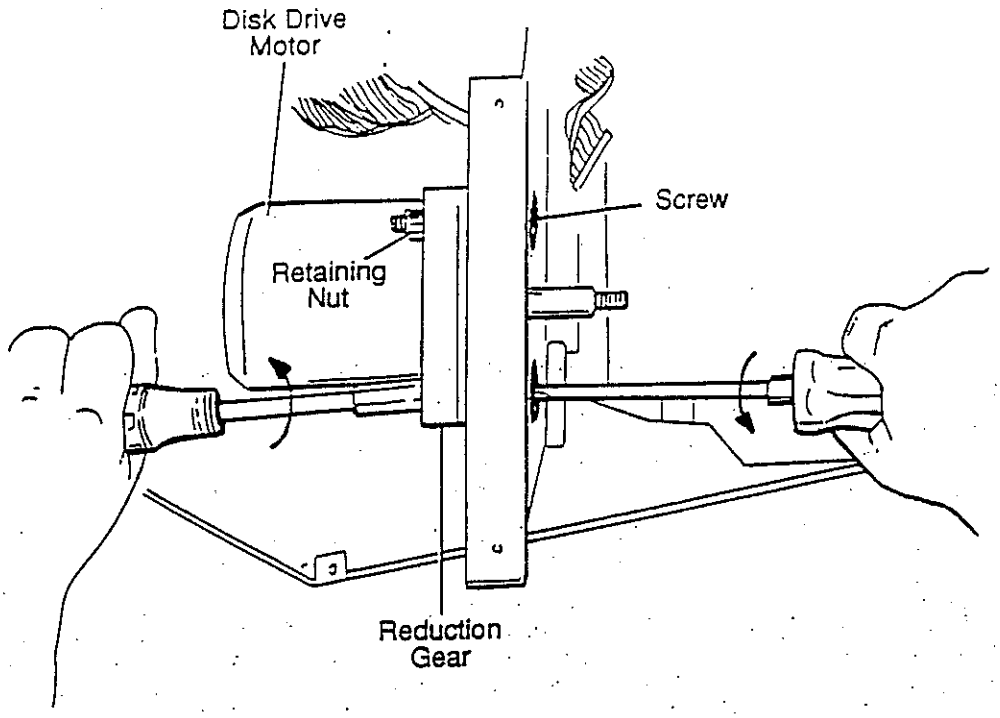
WARNING: **Before performing the following procedure, make sure power is off and power source is disconnected.**

1. Lift inspection tray from top of Coin Counter.
2. Pull coin trays out of Coin Counter.
3. Pull plastic cover from front of Coin Counter.
4. Remove upper shoot plate according to steps 4 through 6 on page 21.
5. Remove shoot cover, shoot B, and L-plate according to steps 4 through 7 on page 23.
6. Remove count sensors according to steps 6 through 9 on pages 24 through 26.
7. Remove shoot plate from frame assembly.
8. Remove hopper according to steps 8 through 10 on pages 30 and 31.
9. Remove rotation disk according to steps 9 through 15 on pages 32 and 33.
10. To disconnect disk drive motor power cable from power supply (on back of coin counter in motor assembly section), squeeze sides of connector together and pull straight up.

CAUTION: **Be careful to replace screws into same holes from which they have been taken.**

11. Remove four (4) screws, lock washers, and 8 mm nuts from disk drive motor and frame assembly by turning screws counterclockwise with a Phillips head screwdriver and applying opposite pressure with a 8 mm nut driver, as shown in Figure 13.

Figure 13. Disk drive motor assembly.



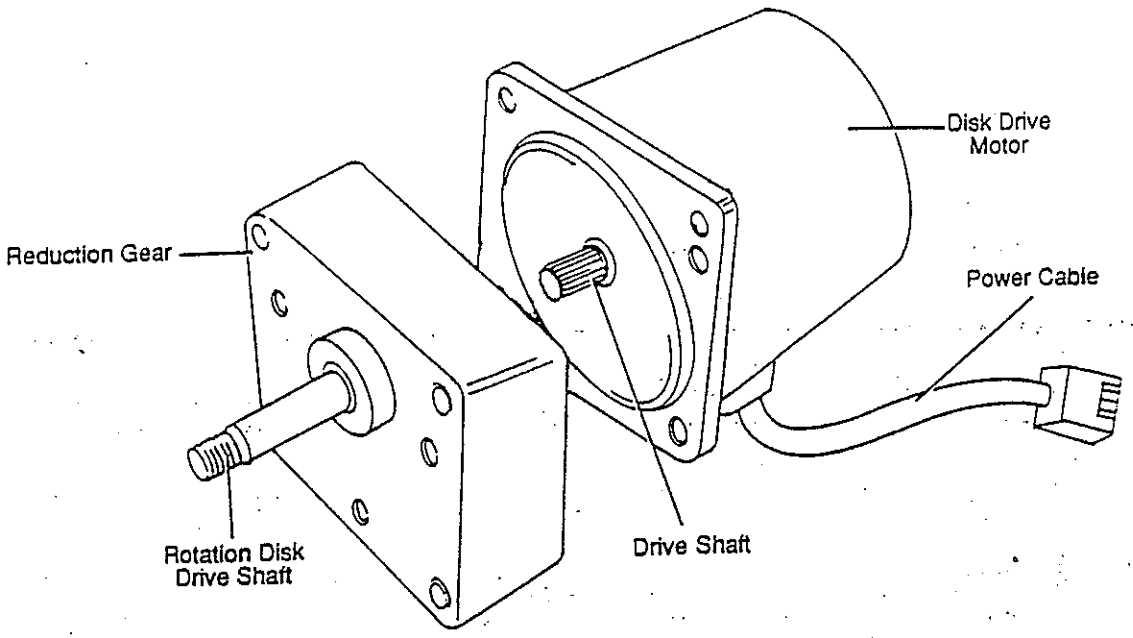
12. Remove disk drive motor and reduction gear from frame assembly.

13. Replace with new disk drive motor and/or reduction gear, if necessary.

NOTE: When reassembling disk drive motor assembly, be sure to assemble the motor and reduction gear as shown in Figure 14.

14. Reassemble by reversing the procedure in steps 1 through 12.

Figure 14. Disk drive motor/reduction gear assembly.



REMOVING AND REPLACING POWER SUPPLY

WARNING: **Before performing the following procedure, make sure power is off and power source is disconnected.**

1. Lift inspection tray from top of Coin Counter.
2. Pull coin trays out of Coin Counter.
3. Pull plastic cover from front of Coin Counter.

CAUTION: **Be careful to replace screws into same holes from which they have been taken.**

4. Remove six (6) screws holding back cover and remove cover.
5. Disconnect disk drive motor power cable from power supply by squeezing sides of connector together and pulling straight up.
6. Disconnect CPU board cable connector from power supply by pulling connector straight up.
7. Gently tip Coin Counter up on one end to gain access to mounting screws.

NOTE: In step 8 hold power supply when removing screws to make sure power supply does not fall free.

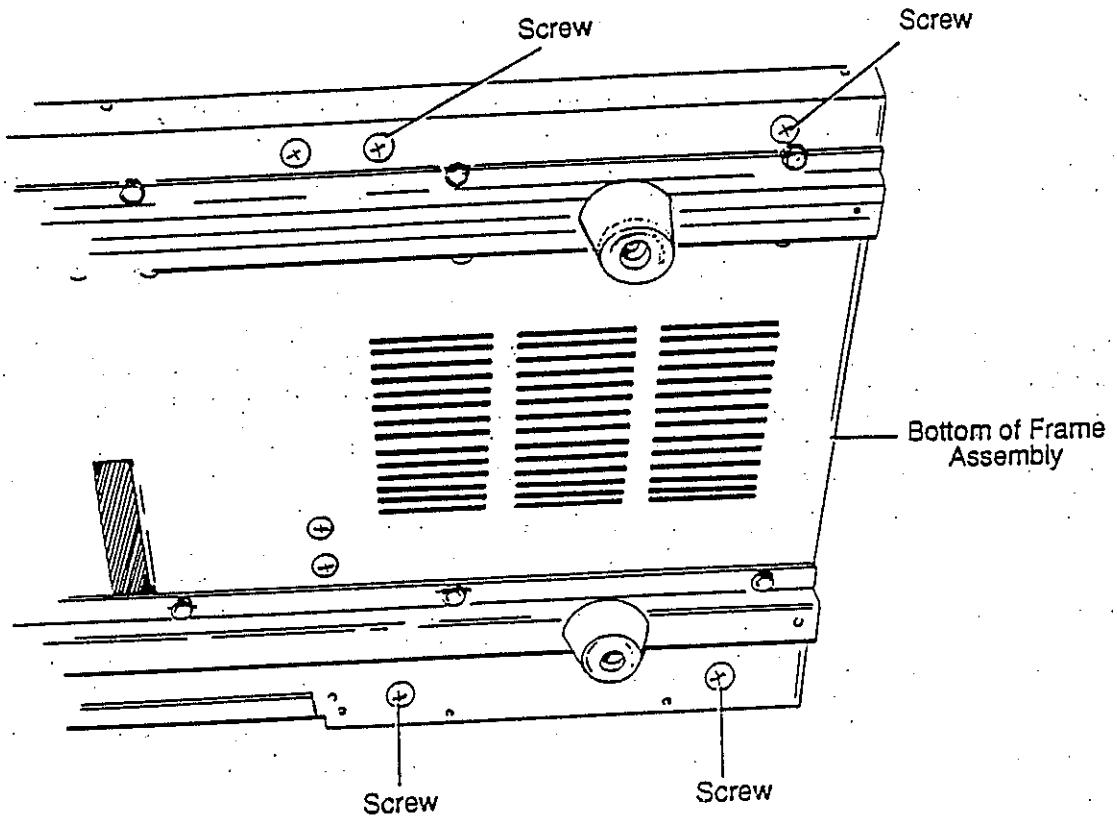
8. Remove four (4) screws that connect power supply to bottom of frame assembly. (See Figure 15.)
9. Remove power supply from frame assembly by pulling it backward through opening left by the back cover.
10. Replace with new power supply, if necessary.
11. Adjust the +5 Vdc signal used to operate all sensors as follows:
    a. Plug in power supply and turn POWER switch to "On".
    b. Attach a multimeter to +5 terminal and gnd terminal on power supply board. See schematic diagram.

c. Using a small screwdriver, slowly turn VR1 on power supply terminal board until multimeter indicates +5.1 Vdc.

d. Turn POWER switch off and remove plug from power source.

12. Reassemble by reversing the procedure in steps 1 through 9.

Figure 15. Power supply screw location.



REMOVING AND REPLACING CPU BOARD AND I/O BOARD (110 ONLY)

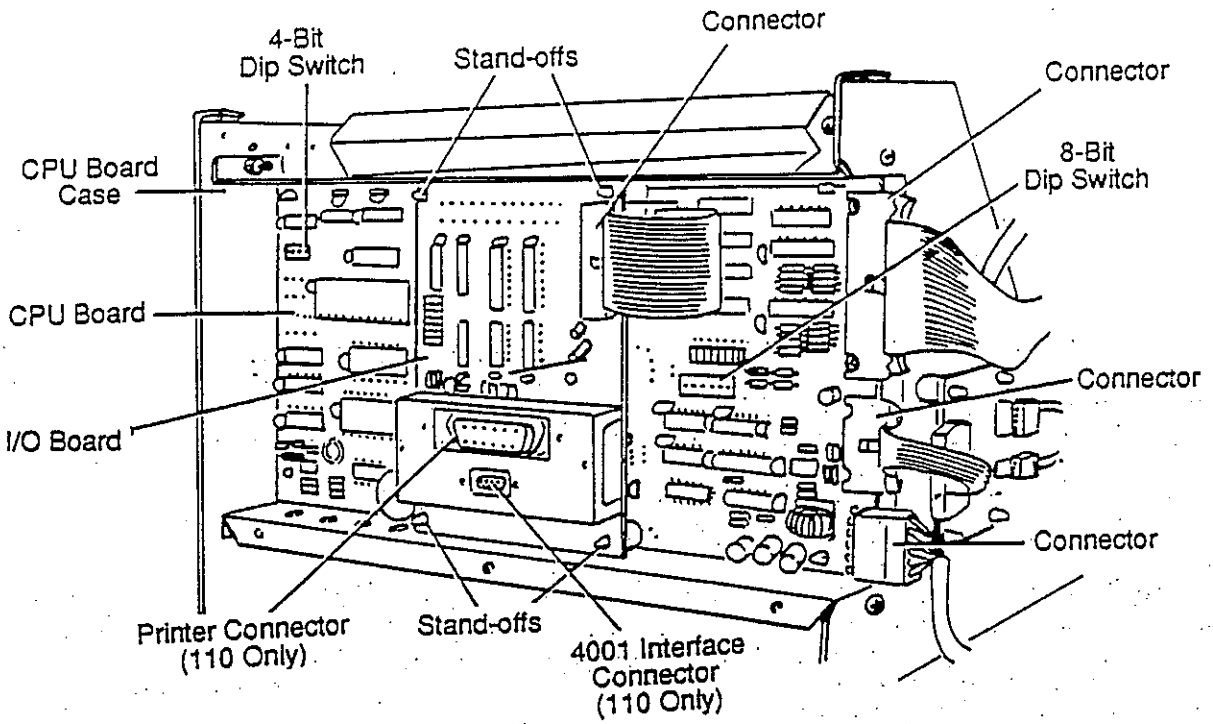
WARNING: **Before performing the following procedure, make sure power is off and power source is disconnected.**

1. Lift inspection tray from top of Coin Counter.
2. Pull coin trays out of Coin Counter.
3. Pull plastic cover from front of Coin Counter.

CAUTION: **Be careful to replace screws into same holes from which they have been taken.**

4. Remove six (6) screws holding on back cover and remove cover.
5. Remove three (3) screws holding CPU board cover, slide cover down and remove.
6. Disconnect operation panel ribbon interface connector as follows:
   a. Unlatch connector locks at each end.
   b. Pull connector free from CPU board assembly.
7. Disconnect R.S. PC board interface connector as follows:
   a. Unlatch connector locks at each end.
   b. Pull connector free from CPU board assembly.
8. Disconnect power supply interface connector as follows:
   a. Pull lock mechanism away from quick disconnect.
   b. Remove connector.
9. Remove four (4) screws and ring washers holding right side cover plate and remove plate.
10. Remove CPU board case, CPU board, and I/O board (110 only) by removing four (4) screws that connect CPU board case to right side frame assembly and back separating plate (two screws each). (See Figure 16.)

Figure 16. CPU board assembly.



11. Model 110 Only: Remove I/O board from CPU board as follows:

    a. Disconnect CPU board interface ribbon connector from I/O board connector by unlatching connector locks at each end and pull connector free.

    b. Using needle-nosed pliers, squeeze top head of each stand-off together and pull board free.

    c. Replace with new I/O board, if necessary.

    d. Reassemble by reversing the procedure in steps a and b.

NOTE: When removing CPU board assembly from board case assembly, use needle-nosed pliers to hold plastic receptacle bases so that they don't spin.

12. Remove CPU board assembly from CPU board case by removing six (6) screws from plastic stand-off receptacles.

13. Replace with new CPU board, if necessary.

14. If installing a new CPU board, make sure dip switches are set as follows:

    a. Set 4-bit DIP switch (DSW 1) for a 4800 baud rate as follows:

Switch	Condition
1	Off
2	On
3	Off
4	Off

    b. 8-bit DIP switches

    1) On 110 only: Set the 8-bit DIP switch (DSW 2) as follows

Switch	Condition
1	Off
2	On
3	On
4	On
5	Off
6	On
7	On
8	Off

For more information, see "DIP Switch Descriptions" on page 62.

    2) On 100 model, all 8-bit DIP switches are off.

15. Reassemble by reversing the procedure in steps 1 through 12.

REMOVING AND REPLACING COIN GUIDE BOX ASSEMBLY

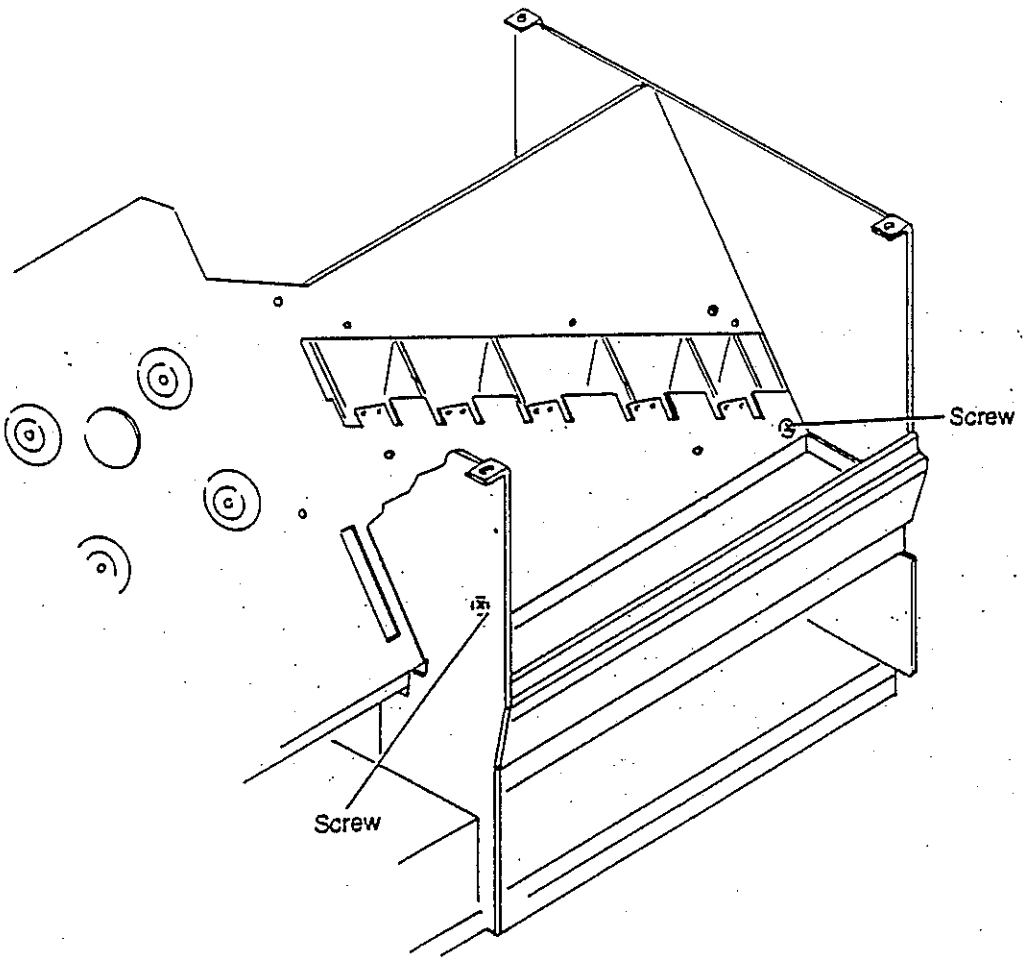
WARNING: **Before performing the following procedure, make sure power is off and power source is disconnected.**

1. Lift inspection tray from top of Coin Counter.
2. Pull coin trays out of Coin Counter.
3. Pull plastic cover from front of Coin Counter.

CAUTION: **Be careful to replace screws into same holes from which they have been taken.**

4. Remove six (6) screws holding on back cover and remove cover.
5. Remove four (4) screws and ring washers holding right side cover plate and remove plate.
6. Remove upper shoot plate according to steps 4 through 6 on page 21.
7. Remove shoot cover, shoot B, and L-plate according to steps 4 through 7 on page 23.
8. Remove count sensors according to steps 6 through 9 on pages 24 through 26.
9. Remove shoot plate from frame assembly.
10. Remove motor cover by removing two (2) screws that connect motor cover to back stay and two (2) screws that connect cover to the frame assembly. (See Figure 11.)
11. Remove rear stay by removing remaining screw in top right rear corner of Coin Counter and lift stay from frame assembly.
12. Remove CPU board assembly according to steps 5 through 10, and 12 on pages 42 and 43.
13. Remove two (2) screws (on front below count sensors) that connect bottom of coin guide box to frame assembly. (See Figure 17.)

Figure 17. Coin guide box front screw location.



14. Remove two (2) screws located on back of coin counter that connect top of coin guide box to frame assembly. (See Figure 18.)

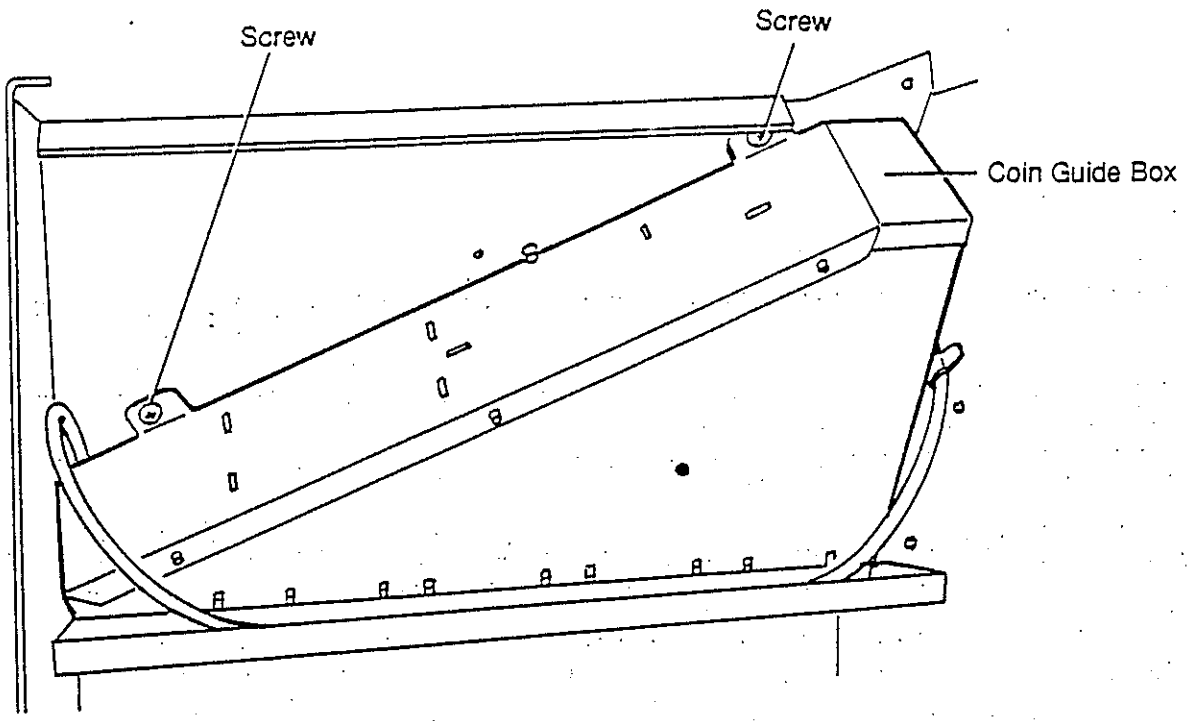
15. Carefully pull coin guide box up and out back of chassis assembly.

16. If installing same coin guide box assembly, clean with a mild cleaner or isopropyl alcohol and a clean cloth.

17. Replace with new coin guide box assembly, if necessary.

18. Reassemble by reversing the procedures in steps 1 through 15.

Figure 18. Coin guide box assembly.



REMOVING AND REPLACING DRAWER-FULL SENSOR (110 ONLY)

WARNING: **Before performing the following procedure, make sure power is off and power source is disconnected.**

1. Lift inspection tray from top of Coin Counter.
2. Pull coin trays out of Coin Counter.
3. Pull plastic cover from front of Coin Counter.

CAUTION: **Be careful to replace screws into same holes from which they have been taken.**

4. Remove six (6) screws holding back cover and remove cover.
5. Remove four (4) screws and ring washers holding right side cover plate and remove plate.
6. Remove upper shoot plate according to steps 4 though 6 on page 21.
7. Remove shoot cover, shoot B, and L-plate according to steps 4 through 7 on page 23.
8. Remove count sensors according to steps 6 through 9 on pages 24 through 26.
9. Remove shoot plate from frame assembly.
10. Remove motor cover by removing two (2) screws that connect motor cover to back stay, and two (2) screws that connect cover to frame assembly. (See Figure 11.)
11. Remove remaining screw in top right rear corner of Coin Counter and remove rear stay from frame assembly.
12. Remove CPU board assembly according to steps 5 through 10, and 12 on pages 42 and 43.
13. Remove coin guide box according to steps 13 through 16 on pages 45 and 46.
14. Remove two (2) screws from drawer-full sensor receiving board and right side frame assembly. Pass drawer-full sensor receiving board through opening, to inside of frame assembly. (See Figure 19.)

15. Remove drawer-full sensor cable from two (2) frame cable clips on rear retaining tray. Pass board through opening in back separating plate.

16. Remove two (2) screws, spacers, and nuts from drawer-full sensor sending board and back separating plate.

17. Disconnect drawer-full sensor connector from R.S. PC board (on back of coin counter next to rotation disk drive motor) as follows:

    a. Pull lock mechanism away from quick disconnect.

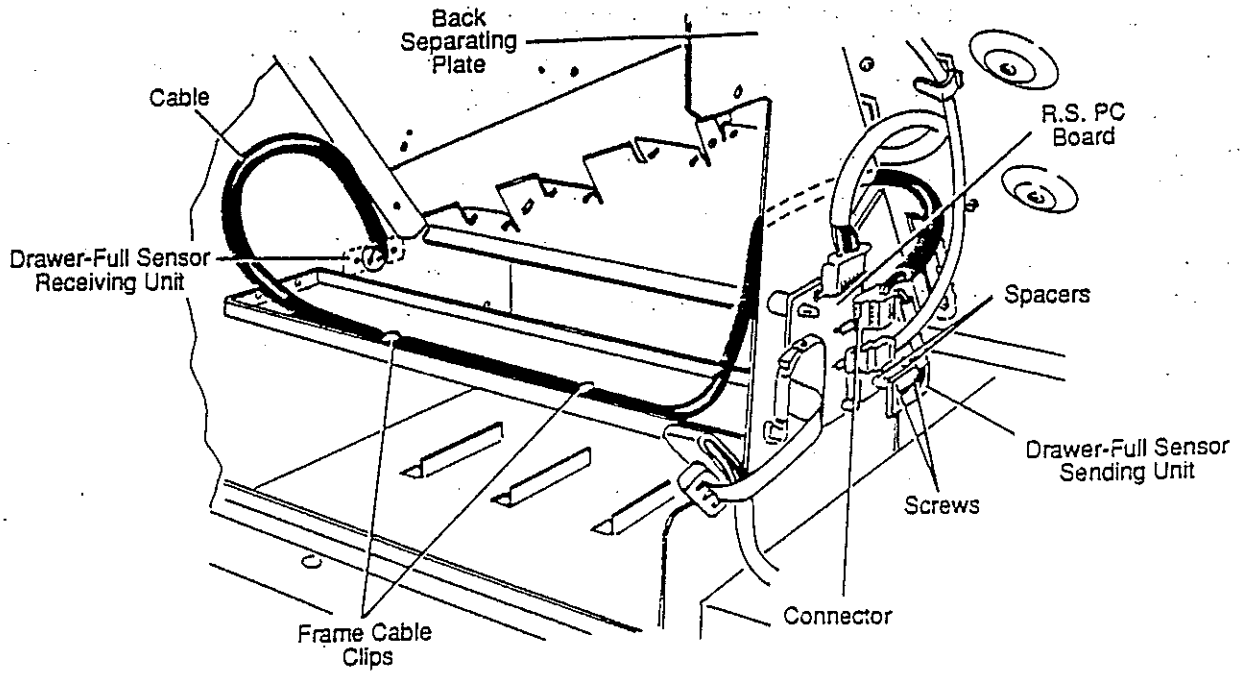
    b. Remove connector.

18. If installing same parts, clean drawer-full sensor sending and receiving boards with canned air and a clean cloth.

19. Replace with new drawer-full sensor, if necessary.

20. Reassemble sensor by reversing procedure in steps 1 through 17.

Figure 19. Drawer-full sensor.



TEST FUNCTIONS

SENSOR TESTS

1. While holding down the "$1," ".25" and ".10" keys, turn POWER switch to "On".

   The display will show "0000" then "JA--".

2. Perform any of the following tests:

   a. Individually block the count sensors 1 through 5. Display will show "CH-1" through "CH-5" respectively, if the sensors are working correctly.

   b. 110 Only: Block drawer-full sensor. Display will show "FULL."

   c. 110 Only: Rotate the disk. Display will alternate between "0000" and "JA---" indicating that the jam sensor is operable.

KEY SWITCH TEST

1. While holding down the "$1" key, turn POWER switch to "On". Display will show "00."

2. Press each key individually. Display will show the following:

Press	Display	Press	Display
$1	01	.05	08
.25	02	.01	10
.10	04	CLEAR	84
G.T.	20	B·S SELECT	88
B·S CLEAR	82	PRINT	90

3. Verify that jam sensor and disk drive motor are operating correctly by pressing MOTOR key.

   Motor will rotate, and display will show alternately "81" and "8888888".

DISPLAY TEST

Test all display segments and LEDs as follows:

While holding down the "$1" and ".25" cent keys, turn POWER switch to "On". Display will show the following in sequence:

Magner 100		Magner 110	
Display	LED	Display	LED
012345	Motor	0123456	Motor
6789AB	G.T.	789ABCD	G.T.
000000	.01	0000000	.01
111111	.05	1111111	.05
222222	.10	2222222	.10
333333	.25	3333333	.25
444444	$1	4444444	$1
555555	None	5555555	B.S. Clear
666666	None	6666666	None
		7777777	Print
		8888888	B.S. Select (Test)
		9999999	B.S. Select (1/2B)
		AAAAAAA	B.S. Select (Full)

CLEAR MEMORY

1. While holding down the ".25," ".10," and ".05" keys, turn POWER switch to "On." All RAM data will have been reset when display flashes 88.
2. Turn power off, then back on again.

COMMUNICATIONS TEST

1. Make sure that dip switch #7 is on (this activates communications capability with a cash settlement system).
2. Turn #8 of dip switch #2 on.
3. Short pin 2 to pin 3 of the 9-pin "D" connector on rear of machine.
4. Hold down the "$1" and ".10" keys and turn POWER switch to "On."

   If communications capability is working correctly, display will alternately flash 8C and 88.

   If communications capability is not working correctly, display will show 8E.

TROUBLESHOOTING

This section covers the error codes that indicate machine is not operating properly, their probable causes, and the corrective actions to take. It also covers process faults and their solutions.

Should an error occur, the machine immediately stops and the display alternately flashes the error code and the current count figure.

ERROR CODES

NOTE: 1) Drawer-full error must be fixed by pushing in the individual drawer or emptying out the coins.
2) All jams have to be cleared.

Error Indicator	*Description/Possible Cause*	*Corrective Action to Take*
E0	Slow coins (wet ?)	Clean the coin rail
E1	1. Dirty dime sensor. 2 Malfunctioning dime sensor.	1. Clean dime sensor. 2. Replace dime sensor.
E2	1. Dirty penny sensor. 2. Malfunctioning penny sensor.	1. Clean penny sensor. 2. Replace penny sensor.
E3	1. Dirty nickel sensor. 2. Malfunctioning nickel sensor.	1. Clean nickel sensor. 2. Replace nickel sensor.
E4	1. Dirty quarter sensor. 2. Malfunctioning quarter sensor.	1. Clean quarter sensor. 2. Replace quarter sensor.
E5	1. Dirty dollar sensor. 2. Malfunctioning dollar sensor.	1. Clean dollar sensor. 2. Replace dollar sensor.
E6	Same as EF	
EF	1. Drawer full. 2. Drawer blocking sensor. 3. Dirty sensor. 4. Sensor malfunctioning.	1. Empty drawer. 2. Push drawer all the way in. 3. Clean sensor. 4. Replace sensor.
EJ	1. Disk jammed. 2. Sensor dirty. 3. Sensor malfunctioning.	1. Clear jam. 2. Clean sensor. 3. Replace sensor.
EP	Power failure during operation.	Push clear key.
Full 9	Memory full.	Clear RAM.
A	RAM malfunction.	a. Clear RAM by holding down "25", ".10", ".05" and turn POWER switch to "On" then"Off ", then "On". b. Press reset button on CPU board to clear RAM. c. Replace CPU board.

OPERATION FAULTS

NOTE: 1) Drawer-full error must be fixed by pushing in the individual drawer or emptying out the coins.
2) All jams have to be cleared.

Fault	*Description/Possible Cause*	*Corrective Action to Take*
Coins not picked up by rotation disk.	1. Worn pins.	1. Remove and replace pins.
	2. Machine not level.	2. Place on level surface.
Coins fall off rotation disk.	1. Worn disk.	1. Remove and replace rotation disk.
	2. Machine not level.	2. Level Coin Counter.
Coins fall off shoot B.	1. Shoot B incorrectly adjusted.	1. Adjust shoot B according to step 9 on page 23.
	2. Shoot B damaged.	2. Remove and replace shoot B.
	3. Push spring incorrectly adjusted.	3. Adjust push spring 1.0-3.0 mm away.
Power switch is on but display does not appear on.	1. Fuse blown.	1. Replace fuse.
	2. Machine is unplugged.	2. Plug in machine.
	3. Power switch is broken.	3. Remove and replace power supply.
	4. Model 110 only — Coin tray is out.	4. Push tray in.
	5. Power supply is not functioning.	5. Remove and replace power supply.
	6. CPU board is not functioning correctly.	6. Do the following: a. Check circuit card connection. b. Check E-PROM connection, remove and clean if necessary. c. Remove and replace CPU board.
	7. Display board is not functioning correctly.	7. Remove and replace display board.
Machine not sorting correctly.	1. Shoot B out of adjustment.	1. Adjust shoot B according to step 9 on page 23.
	2. Rail assembly is dirty.	2. Clean rail assembly.

Machine not counting correctly.	1. Count sensor out of electronic adjustment. 2. Count sensor out of mechanical adjustment. 3. Count sensor malfunctioning.	1. Adjust the +5 Vdc signal according to steps 1 through 12 on pages 40 and 41. 2. Adjust count sensor according to procedure on page 24. 3. Remove and replace count sensor.
Machine not communicating, through the RS-232 port, with a cash settlement system.	1. Baud rate incorrect. 2. DSW 2 switch #7 is off. 3. Interface cable incorrectly wired. 4. Still not working.	1. Reset baud rate. 2. Turn switch #7 to "On." 3. Replace interface cable. (See Appendix.) 4. Verify communications test according to procedure on page 51 when properly hooked up.