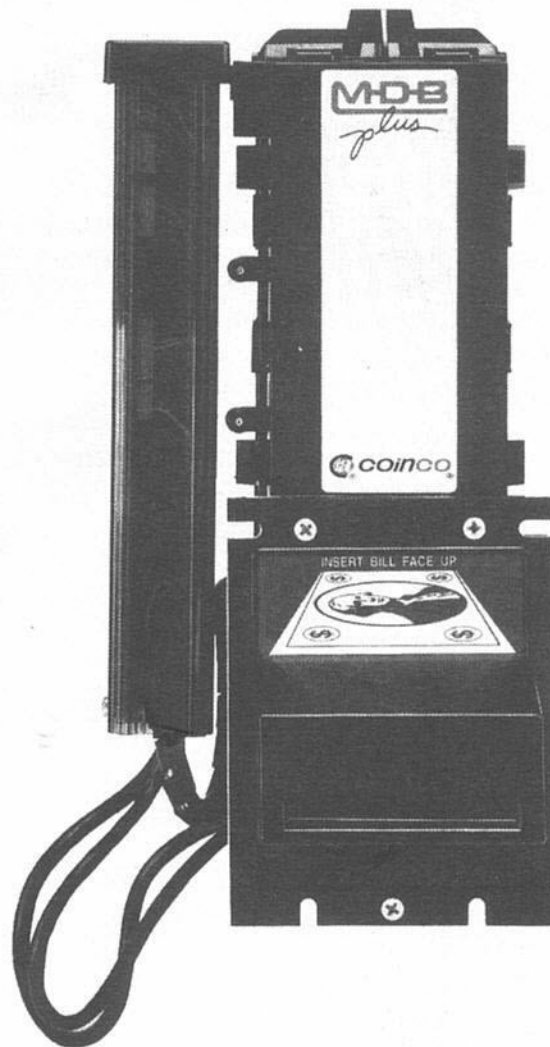


BA30

BILL ACCEPTOR

Operation and Service Manual



 **coinco**

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INTRODUCTION

This manual contains information on installing, operating and maintaining Coinco's **BA30B, BA32B, BA32BX, BA30SA and BA32SA** bill acceptors. This manual is intended for owners, route operators and shop-level technicians as a primary source of information. Taking time to read this manual and becoming familiar with this information will help you obtain the best performance from your **Coinco** bill acceptor.

MODELS

The BA30 bill acceptors are self-contained bill acceptors designed to interface with existing vending machines. The BA30B and BA32B interfaces to existing electro-mechanical, electronic and electronic Multi-Drop Bus vending machines. The BA32BX interfaces to electronic Multi-Drop-Bus vending machines. The BA30SA and BA32SA interface to electronic and electronic Multi-Drop-Bus snack, coffee, and food machines.

FOR YOUR RECORDS

A label indicating the bill acceptor model number and serial number is affixed to the back of the bill acceptor. Refer to the model and serial number whenever you call upon your **Coinco Service Center** for information or service. The first four digits of the serial number contain the manufacturing date code which indicates the beginning of the warranty period.

***EXAMPLE:** Serial No. 269107053. First and second digits indicate week of manufacture. Third and fourth digits indicate year of manufacture.*

FEATURES

- Modular design
- State-of-the-art electronic logic system
- Programmable to accept any combination of the following bills: \$1, \$2, \$5, \$10, \$20
- Fast, accurate acceptance of both new and heavily circulated bills
- High capacity bill box
- Vandal-resistant design protects against:
 - Saltwater
 - Bill Pullback
 - Counterfeit Bills
- Utilizes standard mounting and electrical interfaces
- 110V AC, 24V AC and 24V DC Multi-Drop-Bus interfaces available
- High impact, non-corrosive plastic construction
- Easily accessible bill path
- Optional, non-resettable bill counter
- Self-diagnostics communicated via status light
- Standard/high level security switch
- Accepts bills face up in one or both directions
- Manufactured and supported by Coinco
- Made in the U.S.A.

AFTER UNPACKING

After unpacking the unit, inspect it for any possible shipping damage. If the unit is damaged, notify the shipping company immediately. Only the co-signee (the person or company receiving the unit) can file a claim against the carrier for shipping damage. We recommend that you retain the original carton and packing materials to reuse if you need to transport or ship your acceptor in the future.

If the bill acceptor is being stored or used as a spare, always keep it in its shipping carton when not in use. This will keep it clean and offer the best protection for the unit.

MAIN LOGIC BOARD ASSEMBLY

The main logic board contains the microprocessor which controls all the functions of the bill acceptor based on information from the vending machine, coin mechanism and various bill acceptor sensors.

Also contained on the main logic board is the power supply which receives its primary voltage from the vending machine. On 117V AC interfaces, the primary AC voltage is routed to the transformer where it is reduced to 24V AC. This 24V AC is routed back to the logic board where it is rectified and filtered for logic board operation. On 24V AC and 24V DC interfaces, the primary voltage is reduced to 12 volts, rectified and filtered on the logic board.

SECTION 1: GENERAL INFORMATION

SPECIFICATIONS

Power Requirements
117V AC
 95 to 130V AC 60 Hz
 0.2 Amp max standby
 0.75 Amp max operating

24V AC
 20 to 32V rms 60Hz
 0.2 Amp avg. standby
 2.5 Amp avg. operating

24V DC
 22 to 45V DC
 0.2 Amp avg. standby
 2.5 Amp avg. operating

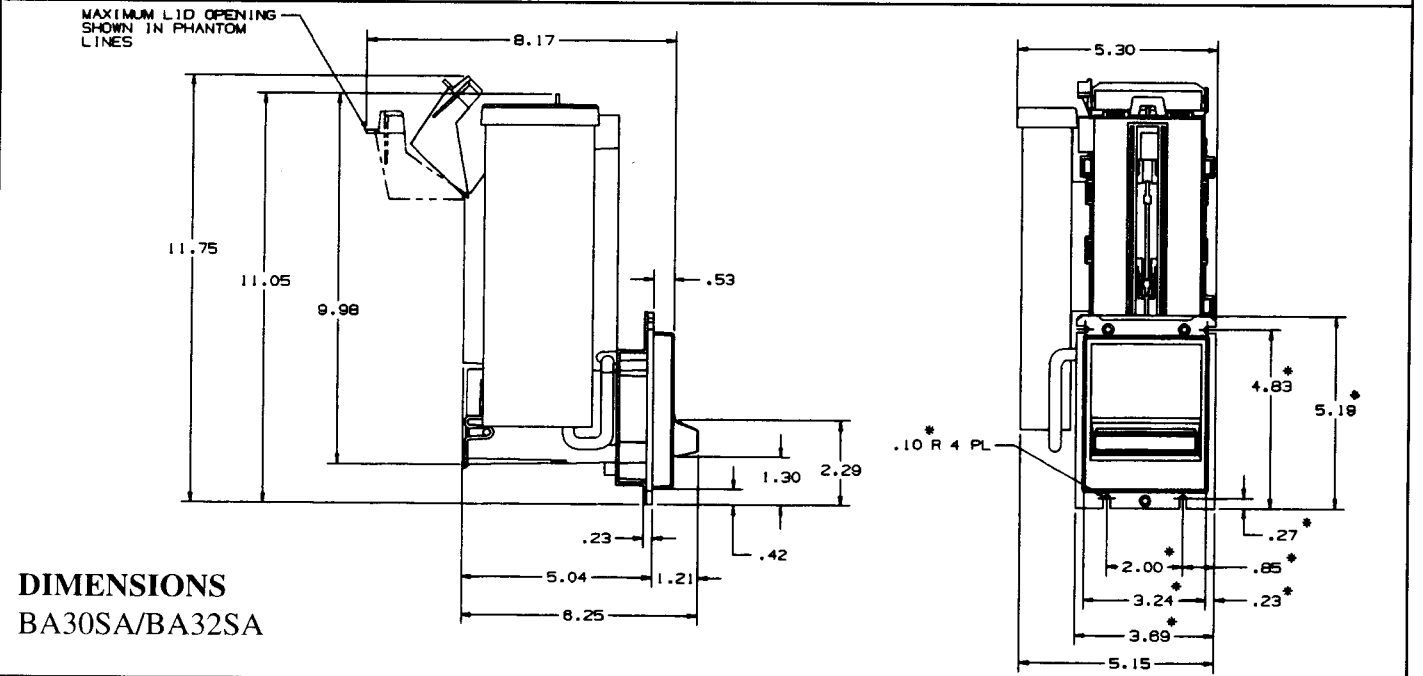
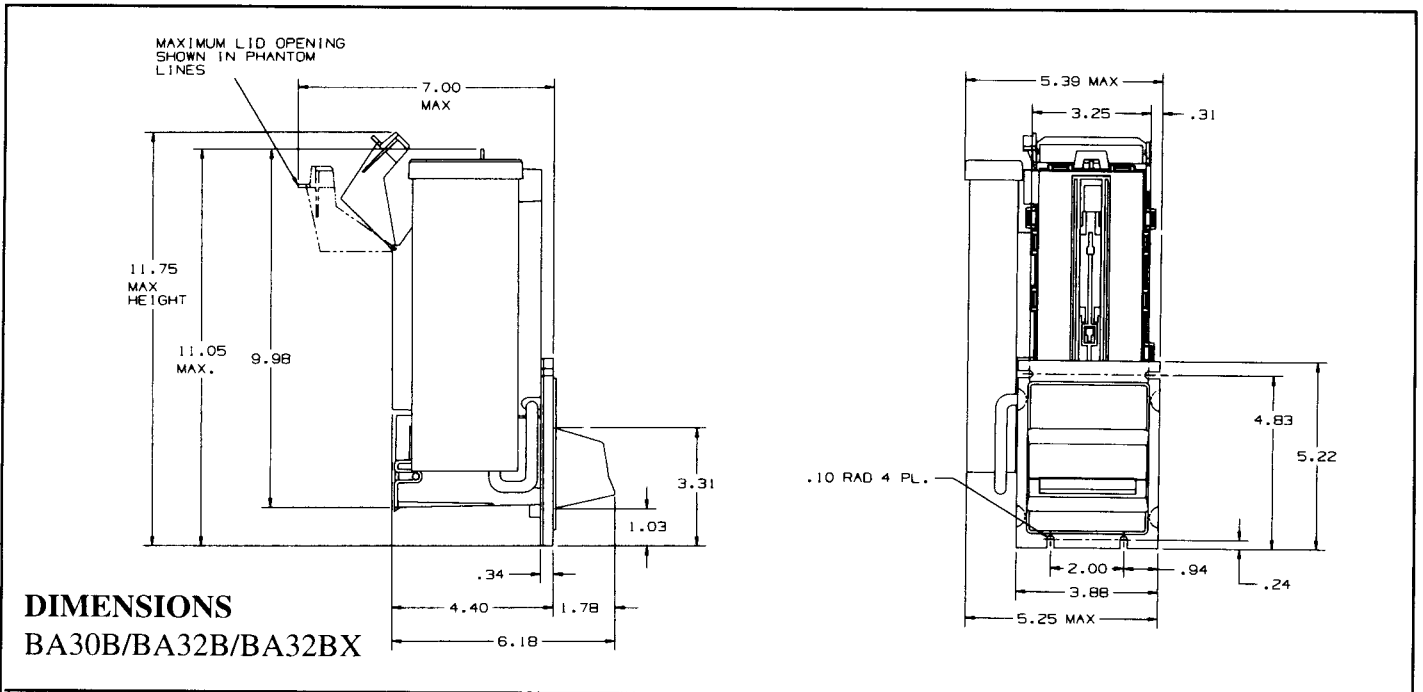
Operating Temperature
 0°F to 150°F
 -18°C to 65°C

Storage Temperature
 -22°F to 165°F
 -30°C to 74°C

Relative Humidity
 5% to 95%
 Non-condensing

Physical Weight in Shipping Carton
 5.7 pounds - 117V AC
 4 pounds - 24V AC

Physical Dimensions
 Height: 11.75 inches (top of bill box to bottom of mounting plate)
 Width: 5.25 inches in width (logic box to mounting plate)
 Depth: 4.40 inches (mounting plate to back of stacker)



OPTION SWITCH SETTINGS

The BA30 bill acceptors contain an option switch module allowing the unit to be customized to the requirements of the individual account. This switch module is factory set with switches 3 and 8 in the ON position and 1, 2, 4, 5, 6, and 7 in the OFF position.

Setting Option Switches (see Figure 1)

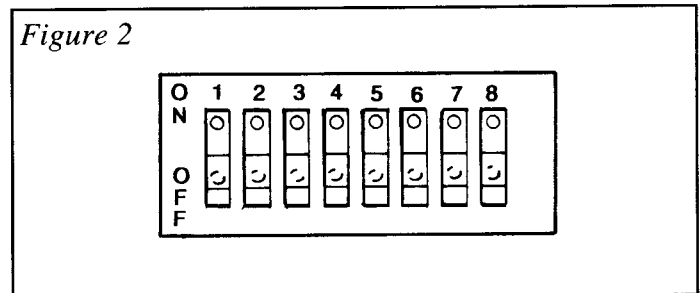
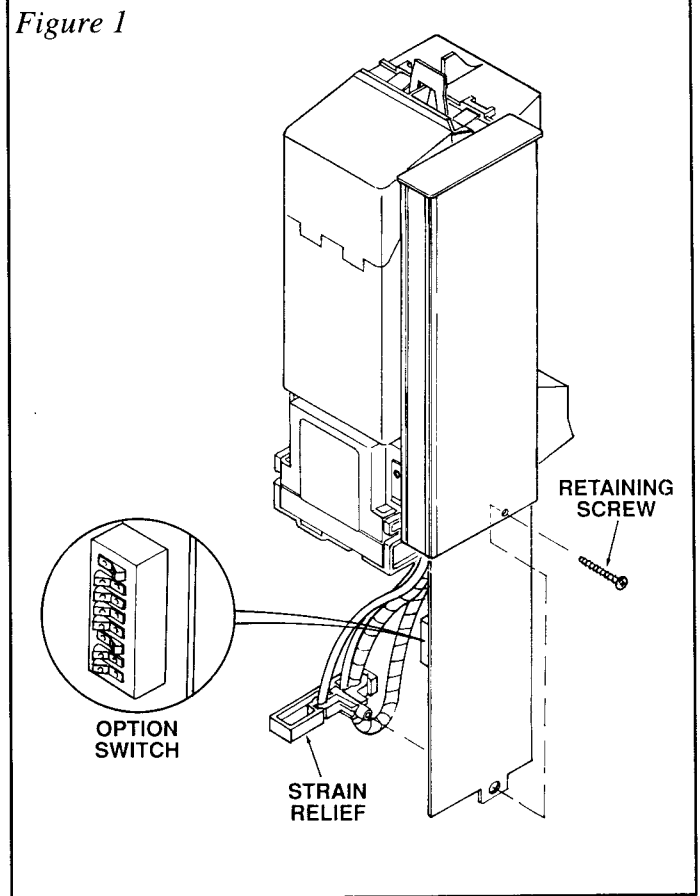
Remove power from the bill acceptor. Remove the retaining screw that secures the logic board and the strain relief. Carefully slide the main logic board and strain relief from the cover. Allow the strain relief to disengage the logic board and continue to slide the logic board down until the option switch module is accessible. Set the option switches to the desired settings (see Figure 2). Reassemble the bill acceptor in reverse order of disassembly. Reapply power and test for proper operation.

INSTALLING THE BILL ACCEPTOR

1. Remove power from the vending machine.
2. Set the bill acceptor to the desired options.
3. Mount the bill acceptor according to mounting instructions found in vending machine manual or appropriate kit literature.
4. Connect the bill acceptor's harness connectors to the vendor's mating connectors.
5. Load the vending machine with product and the coin mechanisms with change.
6. Apply power to the vending machine.
7. Test for proper operation.

BA30B/BA32B/BA32BX Option Switch Settings (see Figure 2)

SWITCH	ON	OFF
1	High Security	Standard Acceptance
2	Accepts bills in one directions only (face up, green seal first)	Accepts bills in both directions (face up)
3	Standard credit pulse 150ms on 150ms off	Short credit pulse 50 ms on 50 ms off
4	\$20 Accept	\$20 Reject
5	\$10 Accept	\$10 Reject
6	\$5 Accept	\$5 Reject
7	\$2 Accept	\$2 Reject
8	\$1 Accept	\$1 Reject



BA30SA/BA32SA Option Switch Settings (see Figure 2)

SWITCH	ON	OFF
1	High Security	Standard Acceptance
2	Accepts bills in one directions only (face up, green seal first)	Accepts bills in both directions (face up)
3	Serial or Parallel Interface	Pulse Interface
4	\$20 Accept	\$20 Reject
5	\$10 Accept	\$10 Reject
6	\$5 Accept	\$5 Reject
7	\$2 Accept	\$2 Reject
8	\$1 Accept	\$1 Reject

SECTION 3: OPERATION

BILL RECOGNITION

When a bill is inserted into the bill acceptor and it blocks the left and right alignment sensors as well as the center optic sensor, the transport motor begins to run.

BILL VALIDATION

From the time the transport motor begins to run until the trailing edge of the bill leaves the alignment sensors, optical and magnetic sensors send information to the microprocessor to determine the validity of the bill.

BILL STACKING AND CREDIT

If the bill is determined to be authentic, it is transported to the stack position. Once the sensors of the lower track's anti-pullback lever signals the microprocessor that the bill is in the stacking position, the stacker motor runs and credit is given.

BILL REJECTION

If the bill is determined to be invalid, the wrong denomination or the anti-pullback levers are active when the bill is determined to be in the stack position, the transport motor will reverse returning the bill to the customer.

COMPONENT EXPLANATION (see Figure 3)

Bill Transport and Stacking

The bill transport system is composed of a motor and gearcase assembly and three sets of pulleys and belts: the lower housing belts, the chassis belts and the intermediate frame belts. When the transport motor is energized, it pulls the bill in by sandwiching it between the lower housing belts and the chassis belts. During the validation process, the bill is transferred from the lower housing and chassis belts to the intermediate frame and chassis belts.

The bill stacker is composed of a motor and gearcase assembly and a pusher plate assembly. When the bill is transported past the anti-pullback levers into the stacking position, the stacker motor energizes driving the pusher plate, which in turn, pushes the bill into the bill box.

Left and Right Alignment Sensors

The left and right alignment sensors send information to the microprocessor to insure that the bill is the right width and that it is being fed in correctly.

Center Optic Sensor

The center optic sensor informs the microprocessor that the bill is ready to be transported if the information from the alignment sensors is correct.

Left and Right Optic Sensors

The left and right optic sensors and associated circuitry perform various optical checks on the bill and send that information to the microprocessor for bill validation.

Magnetic Sensor

The magnetic sensor and its associated circuitry performs checks on the magnetic properties of the bill and sends that information to the microprocessor for bill validation.

Anti-Pullback Lever

The lower anti-pullback lever is optically monitored to tell the microprocessor when the bill has entered the stack position or if an attempt to defraud the unit is taking place.

Stacker Home Sensor

The stacker home sensor is an optical sensor that informs the microprocessor of the position of the stacker pusher plate.

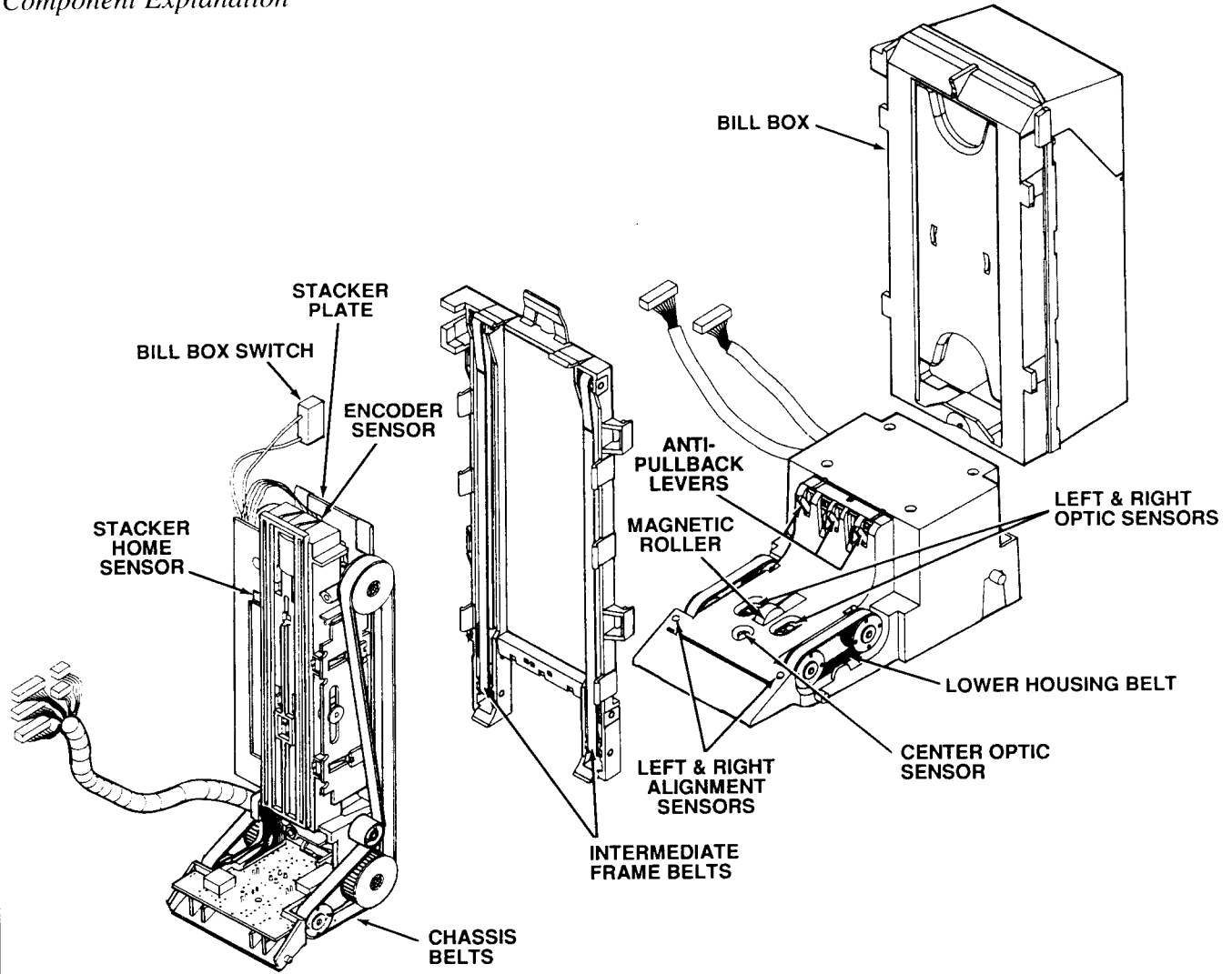
Encoder Sensor

Connected to the transport motor is an encoder wheel which is optically monitored to determine the speed of the transport motor and to determine the position of the bill in the bill path.

Bill Box Switch

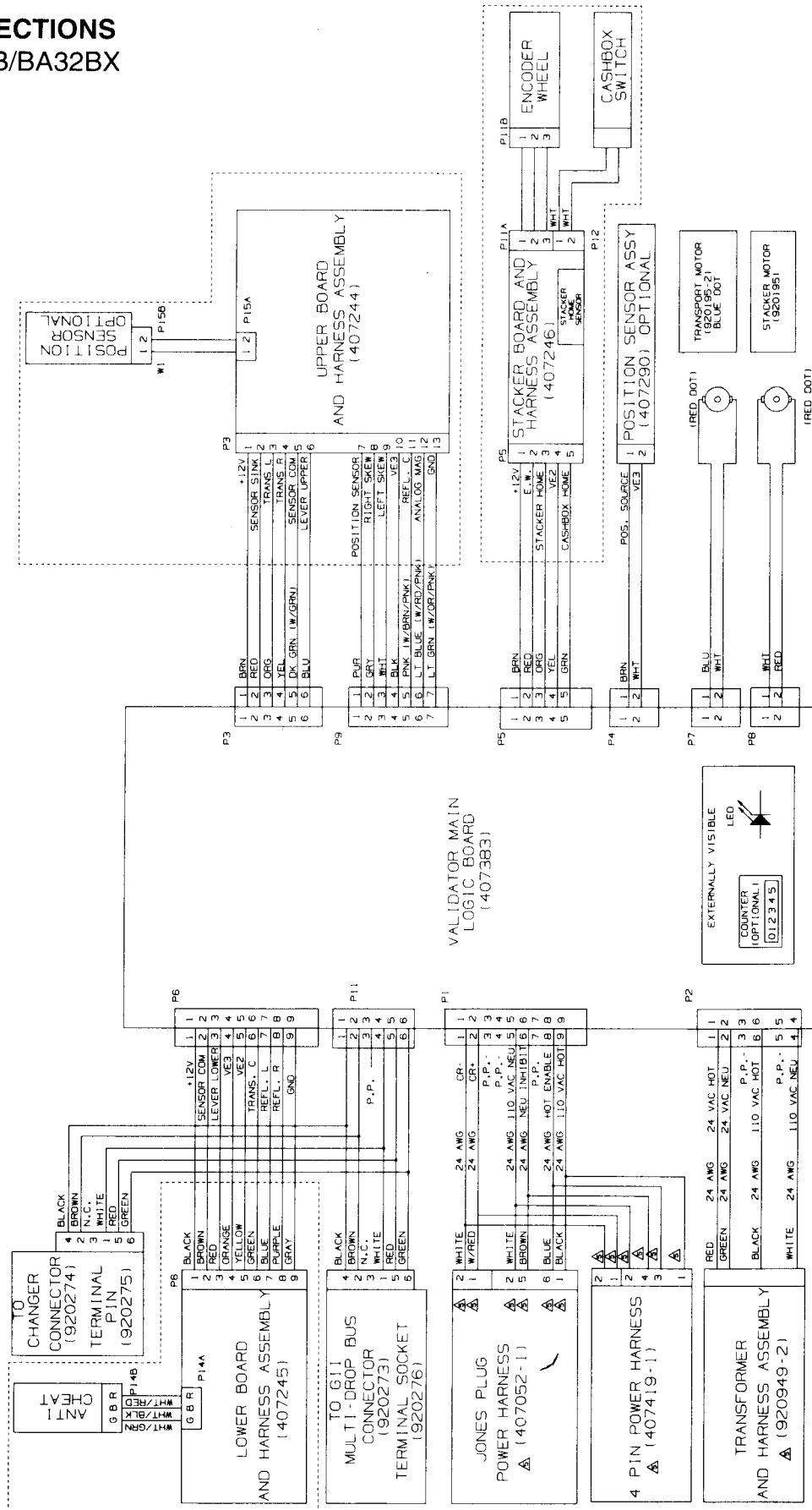
The bill box switch resets the bill acceptor each time the lid is closed.

Figure 3
Component Explanation

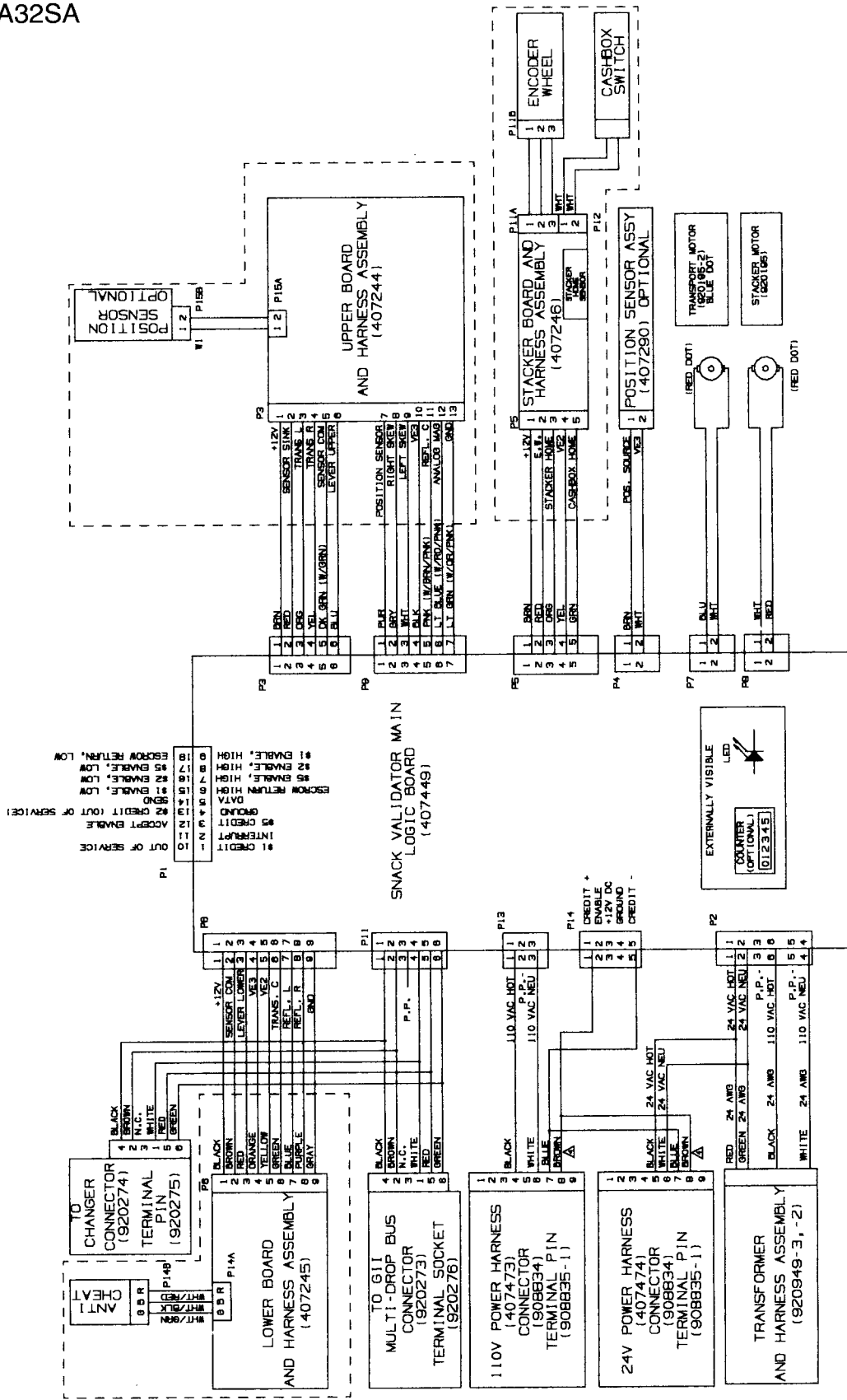


SECTION 3: OPERATION

INTERCONNECTIONS BA30B/BA32B/BA32BX



INTERCONNECTIONS
BA30SA/BA32SA

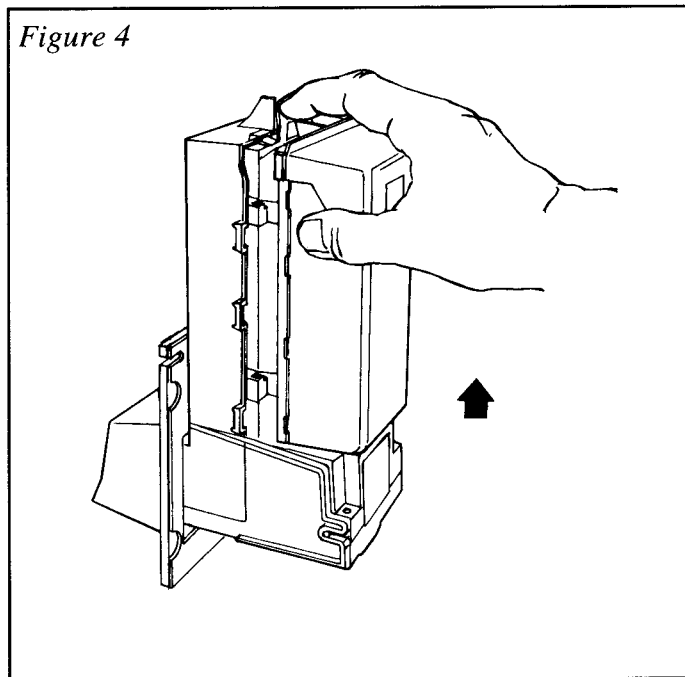


SECTION 4: MAINTENANCE

DISASSEMBLING THE BA30

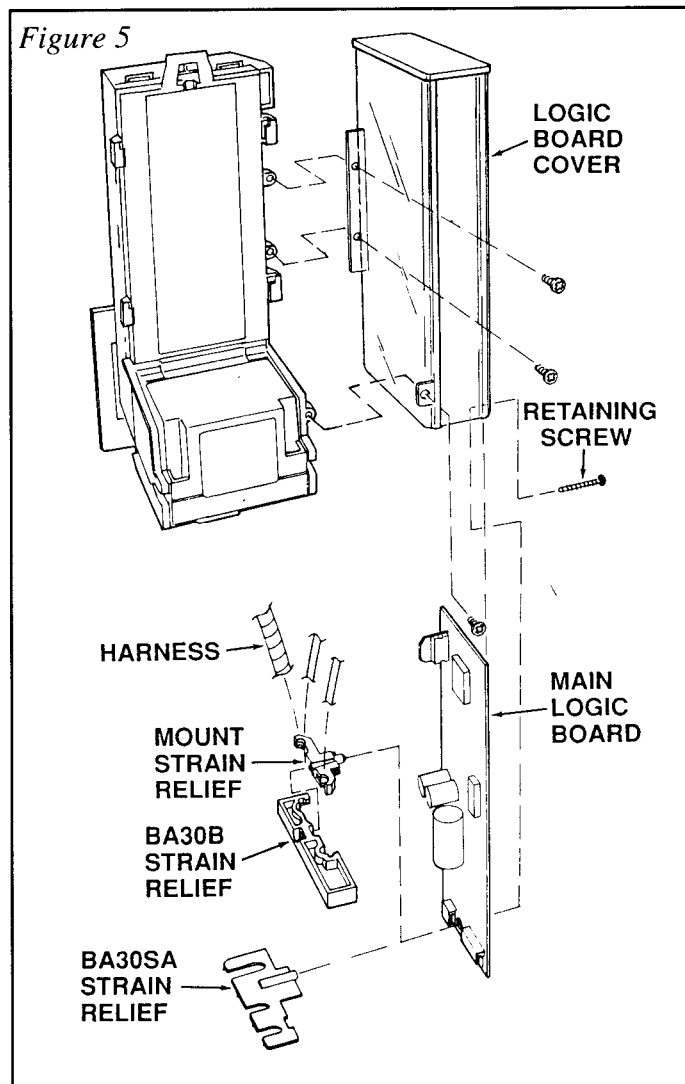
Removing the Bill Box (see Figure 4)

Push the bill box tab forward while sliding the bill box up.



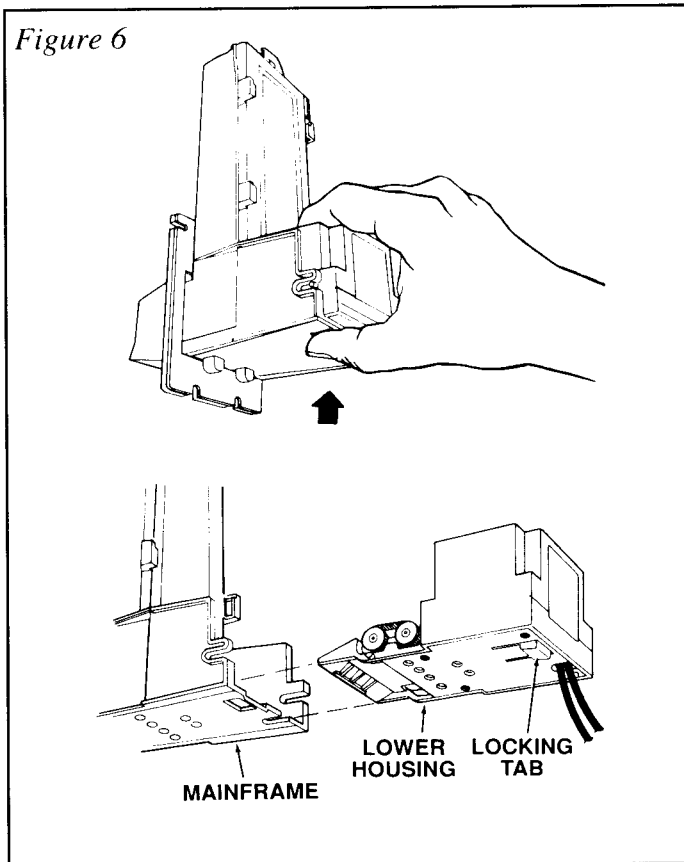
Removing the Main Logic Board (see Figure 5)

Remove the three Phillips screws that secure the logic board cover to the main frame. Remove the Phillips screw from the bottom of the logic board cover that retains the harness strain relief and slide the logic board out of the logic board cover. (The harness strain relief is located at the bottom of the logic board cover.) Unplug the harnessing from the logic board and place the logic board in a static-free area. Remove the strain relief from the harnessing.



**Removing the Lower Housing
(see Figure 6)**

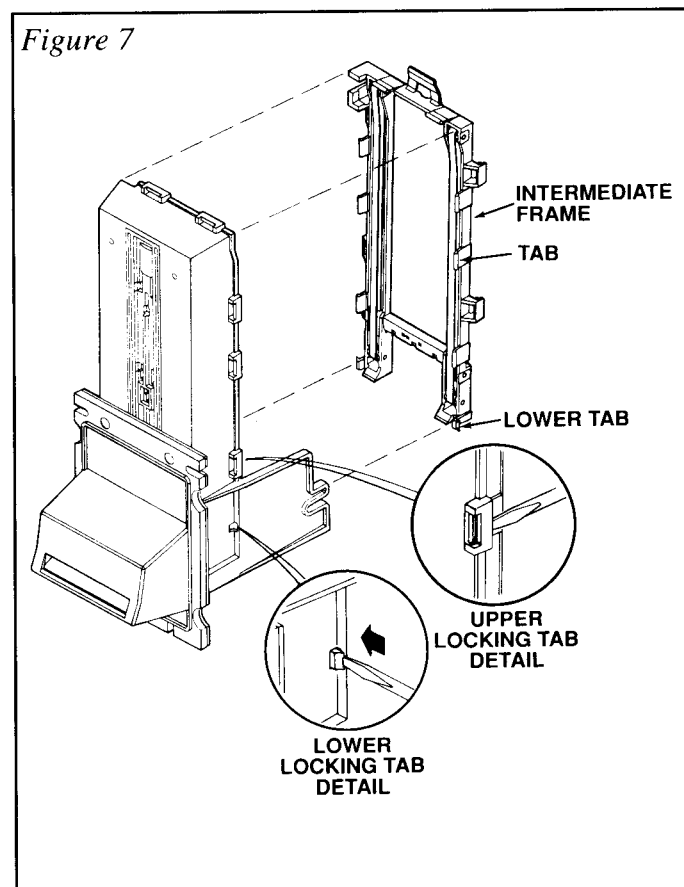
To remove the lower housing, push the locking tab on the bottom of the bill acceptor and pull the lower housing to the rear.



**Removing the Intermediate Frame
(see Figure 7)**

Using a small straight tip screwdriver, free the ten locking tabs which secure the intermediate frame to the main frame and remove the intermediate frame. On early units with a position sensor, it is necessary to remove the position sensor from the intermediate frame. Use a small straight tip screwdriver to remove the position sensor cover from the intermediate frame and remove the position sensor.

NOTE: Units beginning with serial #109300187 or later do not have a bill position sensor.



SECTION 4: MAINTENANCE

Removing the Inlet Mask (see Figure 8 or 9)

Using a Phillips screwdriver, remove the three screws from the inlet mask and remove the mask.

Removing the Mounting Frame and Static Grounding Spring (see Figure 8 or 9)

Using a Phillips screwdriver, remove the five screws that secure the mounting plate and grounding spring and remove both.

Figure 9
BA30S/BA32SA

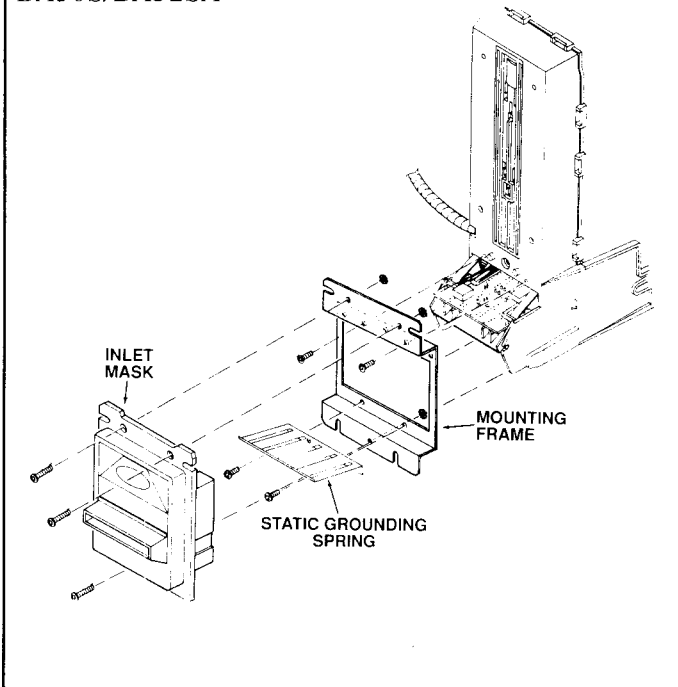


Figure 8
BA30B/BA32B/BA32BX

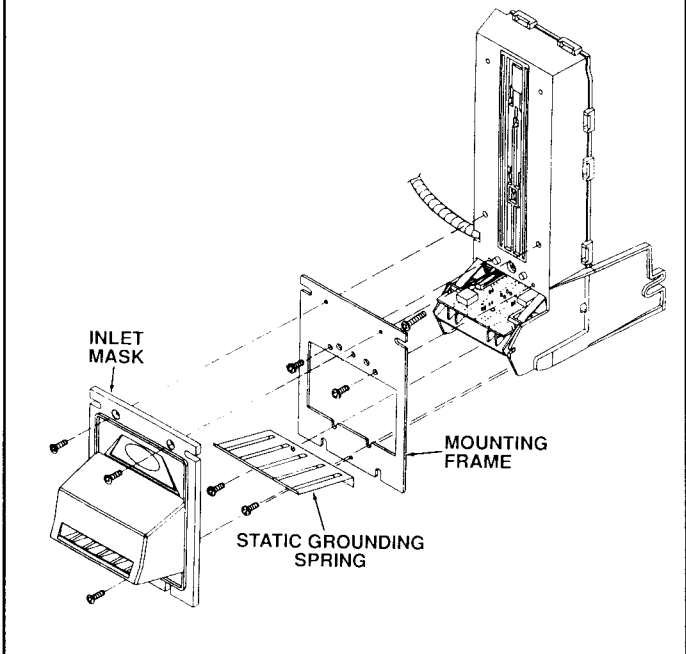
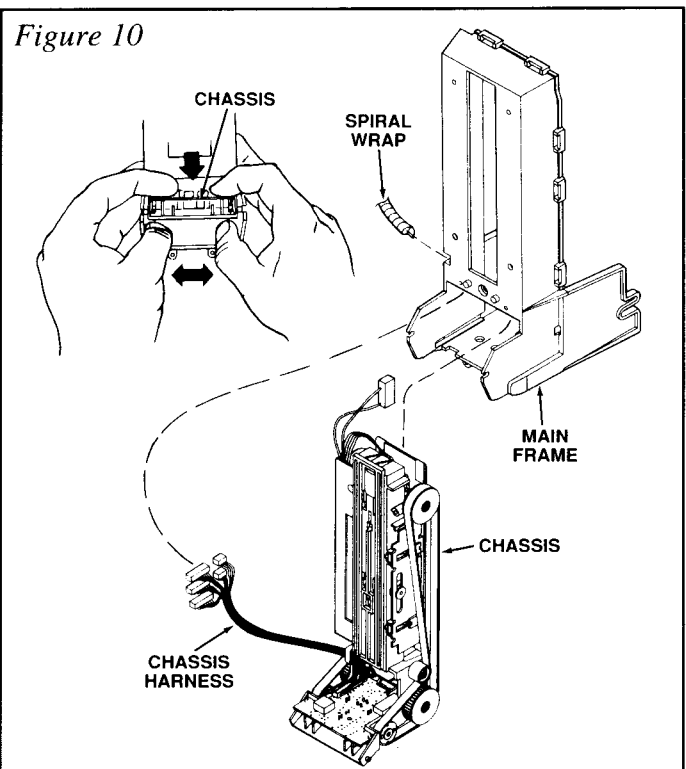


Figure 10



Removing the Chassis from the Mainframe (see Figure 10)

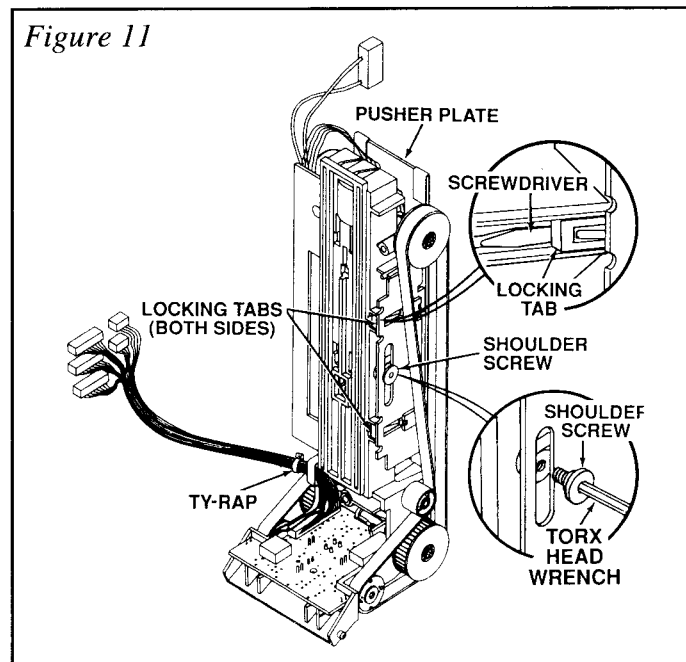
Free the bill box switch from the main frame by sliding it toward the bill box area until it clears the main frame. Let the switch hang. Remove the web wrap from the chassis harness. Spread the main frame to free the two locating pins of the chassis from the main frame and pull down on the chassis. Carefully route the chassis harness through the opening in the main frame. Pull the chassis through the lower main frame opening.

DISASSEMBLING THE CHASSIS

Removing the Pusher Plate from the Chassis (see Figure 11)

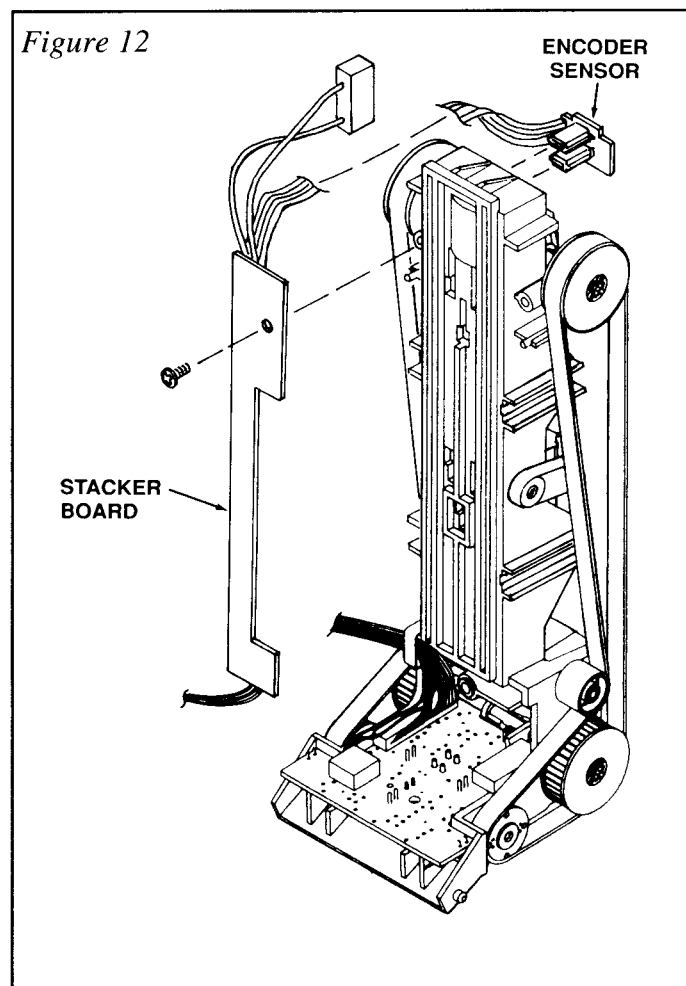
Cut the ty-rap that secures the chassis harnessing. Remove the two T15 Torx head shoulder screws that secure the pusher plate to the stacker gear box assembly. Pull the pusher plate straight out until the locking tabs of the pusher plate slides catch the chassis frame. Using a small screwdriver, release the four tabs and remove the pusher plate.

NOTE: Early models used 1/8" hex shoulder screws.



Removing the Encoder Sensor and Stacker Logic Board (see Figure 12)

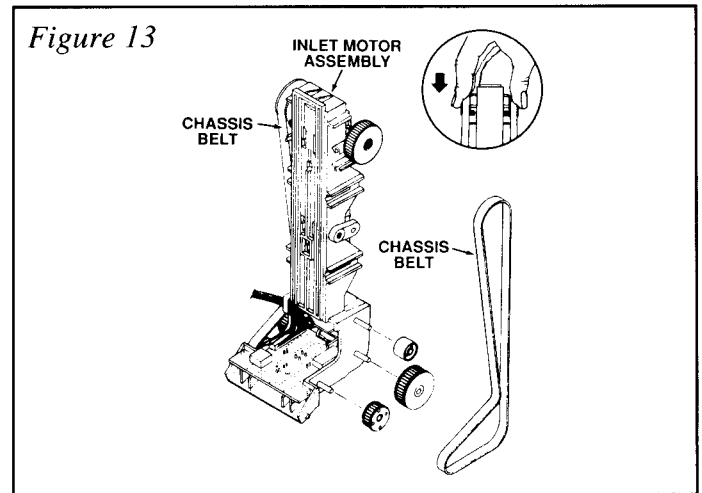
Free the encoder sensor from the top of the inlet motor gear case assembly. Remove the Phillips screw that secures the stacker board to the chassis frame and remove the stacker board.



SECTION 4: MAINTENANCE

Removing the Chassis Belts and Pulleys (see Figure 13)

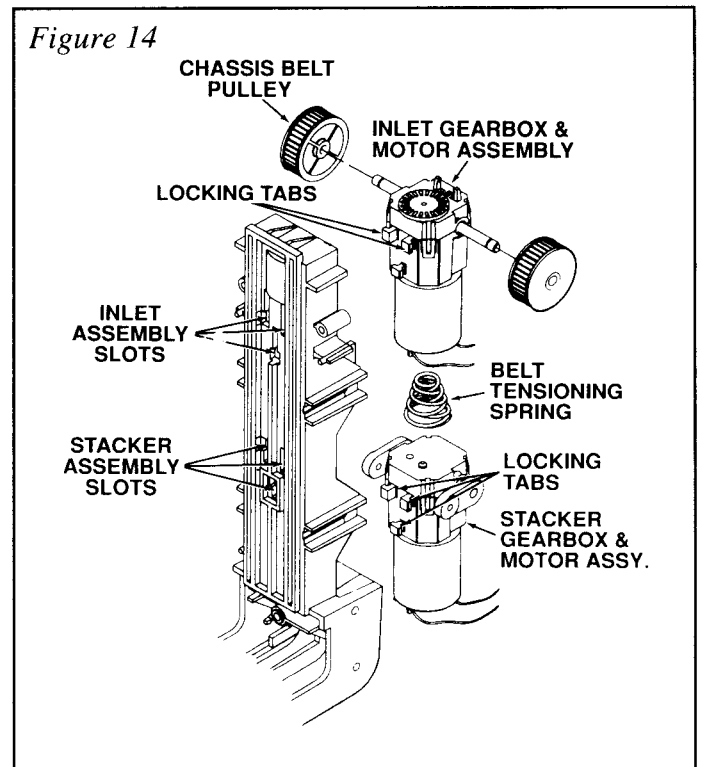
Compress the belt tensioning spring by pressing down on the inlet motor and gear case assembly and remove the chassis belts. Slide the pulleys off the lower shafts to prevent them from falling off.



Removing the Inlet Stacker Gear Box and Motor Assemblies (see Figure 14)

Compress the belt tensioning spring by pushing up on the stacker motor and gear case assembly until the three locking tabs of the gear case can be freed from their mating slots in the chassis frame. Remove the motor and gear case assembly and the tension springs. Slide the inlet motor and gear case assembly down until its three locking tabs are freed from their mating slots in the chassis frame.

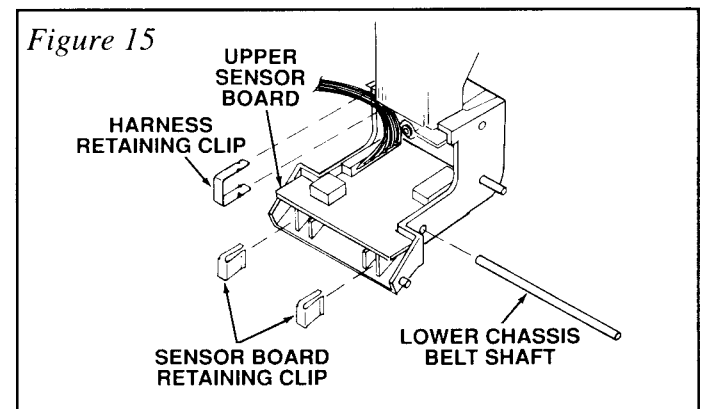
NOTE: It may be necessary to remove the chassis belt pulleys from the motor and gear case assembly.



Removing the Upper Sensor Board from the Chassis (see Figure 15)

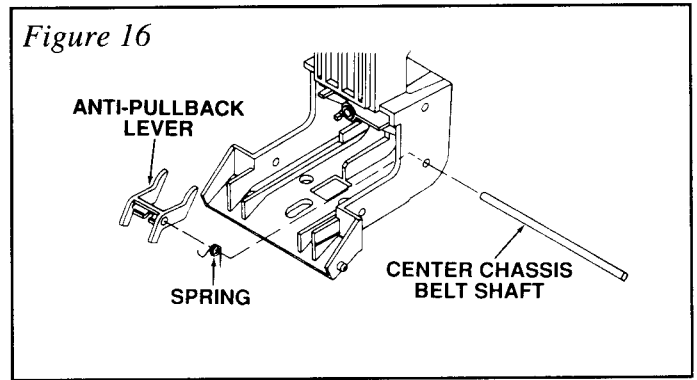
Remove the lower chassis belt shaft. Using a small screwdriver, remove the two metal sensor board retaining clips and the harness retaining clip. Lift the front of the sensor board and pull forward.

NOTE: On earlier units with a position sensor, remove the upper chassis belt shaft and remove the Phillips screw that retains the position sensor board and remove the sensor.



Removing the Chassis Anti-Pullback Lever and Spring (see Figure 16)

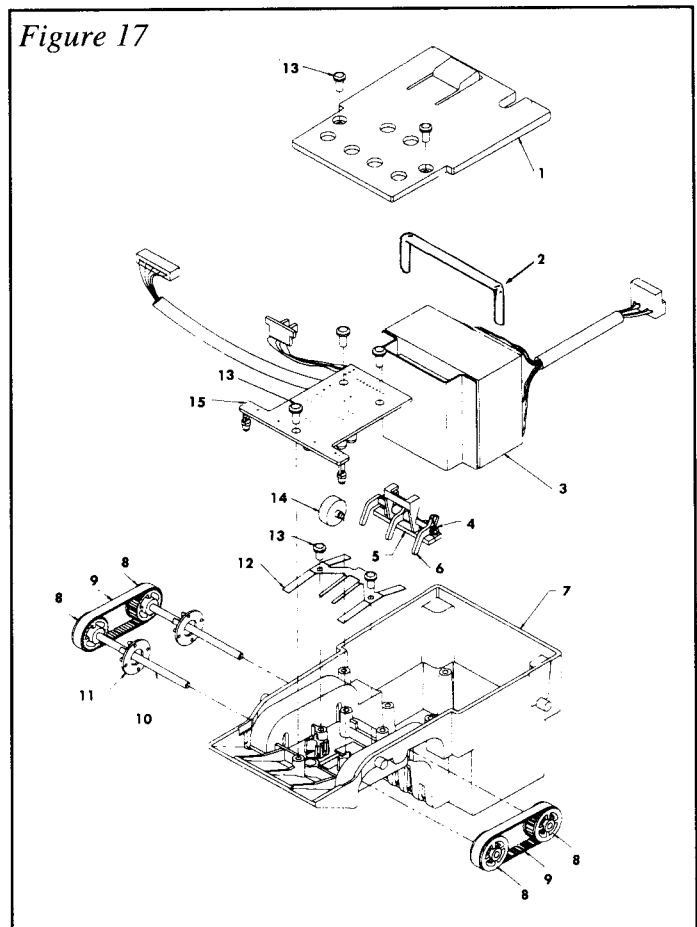
Remove the center chassis belt shaft and remove the anti-pullback lever and spring.



DISASSEMBLING THE LOWER TRACK

Removing the Transformer (see Figure 17)

Remove the two Phillips screws from the bottom of the lower track that secure the bottom cover. Remove the bottom cover. Cut the ty-rap and separate the harness. Remove the hose that holds the transformer in place. Remove the transformer.



SECTION 4: MAINTENANCE

Removing the Lower Sensor Board (see Figure 18)

Remove the Phillips screw that secures the sensor board to the lower track housing, unsnap the lower track anti-pullback sensor board and remove the sensor board.

NOTE: Earlier units may have the anti-pullback sensor board glued into place.

Removing the Mag Roller and Spring (see Figure 18)

Remove the two Phillips screws that secure the mag roller spring and remove the spring and roller.

Removing the Lower Track Anti-Pullback Lever and Spring (see Figure 19)

Using a small drift or Phillips screwdriver, depress the locking tab in small hole in top of lower housing frame. At the same time, insert a small standard blade screwdriver into center slot and push anti-pullback assembly back out of retaining tabs. Remove anti-pullback lever from base by releasing one locking tab on base. Pay close attention to positioning of spring to assure its correct position on reassembly.

Figure 18

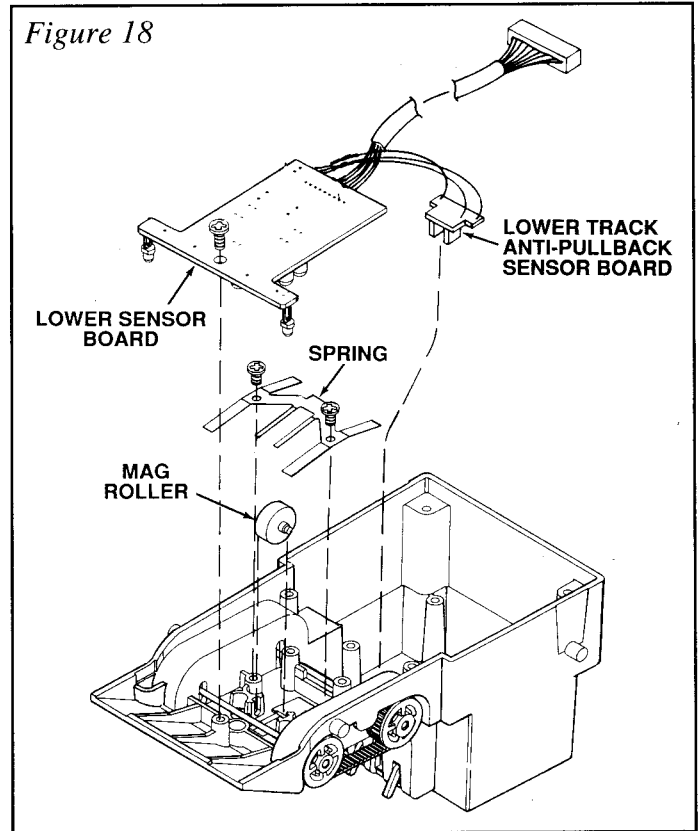
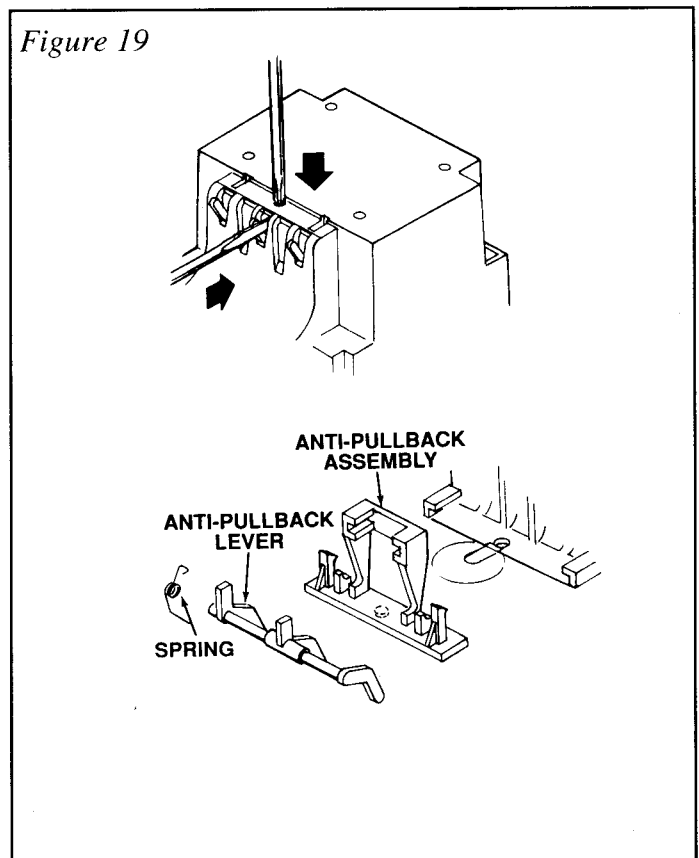
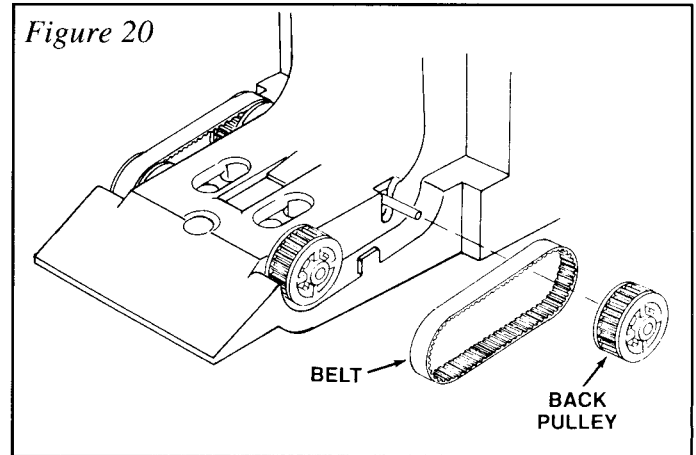


Figure 19



Removing the Lower Track Belts and Pulleys (see Figure 20)

Slide either the front or back pulley off its shaft to free the belt and remove the belt.



BA30 CLEANING MAINTENANCE PROCEDURE

NOTE: Petroleum-based cleaners and freon-based propellants can damage plastic and some electronic components. Scouring pads and stiff brushes may harm the protective conformal coating on the circuit boards and can mar the plastic. These items should never be used when cleaning the BA30 bill acceptor.

The BA30 should be cleaned every 20,000 bills or every two years (or as needed, depending on the environmental conditions of the location). Dust can be removed with a soft brush or cloth or it can be blown out using compressed air.

Procedure

1. Disconnect power from the bill acceptor.
2. Remove the bill box and use a soft cloth to wipe the dust from around the intermediate frame and stacker plate.
3. Remove the lower track.
4. Using compressed air or a soft brush, blow or brush the dust off of the optic sensors and out of the recessed sensor openings.
5. Remove dust from around the belts and wheels on the lower housing and the sensors on the upper sensor board. The upper sensors are located directly above the lower housings sensor when the lower housing is installed.
6. The bill path can be cleaned to remove further dirt and oil using a soft cloth moistened with a mild soap and water solution
7. Clean the magnetic head using a swab and isopropyl alcohol.
8. Once the lower housing is dry, place it back into the mainframe so that the tab on the bottom locks into place.
9. Blow the dust out of the encoder wheel and its sensors. (It may be necessary to extend the stacker plate to access the encoder wheel. This can be done by supplying power to the unit momentarily, so that the stacker plate extends.)
10. Remove dust from the transport belt areas and from any other places of build up.
11. Remount the bill box.
12. Apply power and insert bills to verify that the unit is functioning properly.

SECTION 4: MAINTENANCE

BA30 CLEANING PROCEDURE FOR SALT WATER POLLUTED UNITS

NOTE: Petroleum-based cleaners and freon-based propellants can damage plastic and some electronic components. Scouring pads and stiff brushes may harm the protective conformal coating on the circuit boards and can mar the plastic. These items should never be used when cleaning the BA30 bill acceptor.

Procedure

1. Remove power from the bill acceptor.
2. Remove the bill acceptor from the vending machine.
3. Open the bill box lid and verify that the stacker plate is in the stand-by/home position. If it is not in the home position, apply power and observe that the stacker plate returns home.

WARNING: If moisture is present, allow the unit to dry thoroughly before applying power to avoid possible shock hazard. If the stacker plate does not return to the home position, remove power and carefully remove the bill box to avoid damaging the bill box and/or stacker plate.

4. Remove the lower housing.
5. Remove the bottom cover from the lower housing.
6. Run hot water (110°-140°F) over the lower housing from the top and bottom. Using a soft brush, gently clean any residual salt. Use a soft absorbent cloth to clean any residue off the lower housing. If the transformer gets wet, allow the unit to dry for 24 hours before applying power.
7. Remove the front mask. Using hot water and a soft brush, clean the front mask, upper sensor board, main frame anti-pullback levers and position sensor mount.

CAUTION: The motors are not protected from water, therefore the unit must be held in a manner that prevents water from running over the intermediate frame crossbar.

8. Remove the position sensor cover on the crossbar and carefully lift the LED from its mount. (Early models only.)

CAUTION: Protective coating on the LED leads should not be damaged. Clean all salt residue from the mount, sensor hole and detector area.

The detector can be seen through the sensor hole, and is located in the chassis. Replace the position sensor cover. (Early models only.)

9. Verify that the anti-pullback levers move freely and that the spring returns them to their open position.
10. Allow the unit to dry thoroughly.
11. Clean the magnetic head using a swab and isopropyl alcohol.
12. Replace the front mask.
13. Replace the lower housing cover.
14. Replace the lower housing into the main frame.
15. Remount the bill box.
16. Apply power and insert bills to verify that the unit is functioning properly.

INTRODUCTION

The Troubleshooting Guide on the following pages is intended to help locate problems within the bill acceptor. If an acceptor cannot be repaired by following the guide, return the acceptor to the nearest Coinco Service Center for repair. If it is necessary to return the acceptor to Coinco, please accompany the acceptor with a complete description of the malfunction to help expedite the repair and return of the bill acceptor.

Logic troubleshooting minimizes time spent in removing and replacing modules that are not defective. Some failures are caused by minor problems such as loose or faulty connections. Please check the following before replacing any parts:

- Connectors are inserted correctly.
- Connector pins are not bent or broken.
- All wires are properly secured.
- Coin changer inventory tubes are filled to their correct levels.

COINCO BA30 DIAGNOSTIC CODES

Troubleshooting can be achieved by reading flashes or blinks of light from the LED located on the side of the logic board cover. These flashes can be seen through the grey smoked cover.

Diagnostic codes 1-6 may appear during normal servicing of the BA30. To access diagnostic codes 7-18, open bill box lid and remove power from the BA30 for 10 seconds. Reapply power to BA30 with bill box lid open. Diagnostic codes 7-18 will now appear for the respective error conditions detected in the BA30. If more than one error or condition exists, the lower number diagnostic code will appear until its respective error or condition is corrected. The left and right sensors referenced in the next column are given viewing the BA30 from the front.

# Of Flashes	Description of Diagnostic Codes
1	Bill Box Full
2	** Bill Box Lid Is Open or Bill Box Is Off
3	Check Bill Path
4	All Bill Accept Switches Are Off
5	Bill Jam or Sensor Error
6	Stacker Motor/Home Sensor
7	Transport Motor/Encoder Sensor
8	(Reserved for Future Use)
9	EEPROM Check Sum Error
10	RAM or ROM Check Sum Error
11	Center Optic Sensor
12	Right Optic Sensor
13	Left Optic Sensor
14	* Bill Position Sensor Error
15	Right position Sensor
16	Left Position Sensor
17	Lower Board Anti-Pullback Lever Sensor
18	* Upper Board Anti-Pullback Lever Sensor

* Units beginning with Serial #109300187 do not have a bill position sensor. Units beginning with Serial #359300001 do not have upper board anti-pullback lever sensors.

** Bill box diagnostic code used on BA30B models only.

Figure 20

