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Optipay™ BV

DBV-30X Bill Validator

*Operation and Maintenance Manual
(Revision 2)*

*Includes configuration setup using a Palm Pilot®
Setting Module*

JCM Part No. 960-000103 - Rev. 2



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Optipay™ BV DBV-30X

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Optipay™ BV

DBV-30X Bill Validator

Section 1

1 GENERAL INFORMATION

This section provides a general overview of the advantages and options of the Optipay™ BV DBV-30X Bill Validator SU upstack with standard mask pictured in Figure 1-1a, and the Optipay™ BV DBV-30X Bill Validator SD downstack with snack mask and SD Kit attached pictured in Figure 1-1b.

This first section is designed to help you navigate through this manual with ease and contains the following information:

- Model and Type Classifications
- Precautions
- Component Names
- General Specifications
- Retrieving Bills

- Cabling
- Dimensions
- Country Codes

In order to make operation of this device and make navigation within this manual easier, the following illustrations were used within the text:

- **Safety instructions**, which need to be observed in order to protect the operators and equipment, have been written in bold text and have been given the pictographs: ⚠️ ⚡
- **Special Notes**, which effect the use of the Bill Validator, have been written in *italic* text and have been given the pictograph: 📖
- **Steps**, requiring the operator to perform specific actions are given sequential numbers (1., 2., 3., etc.).

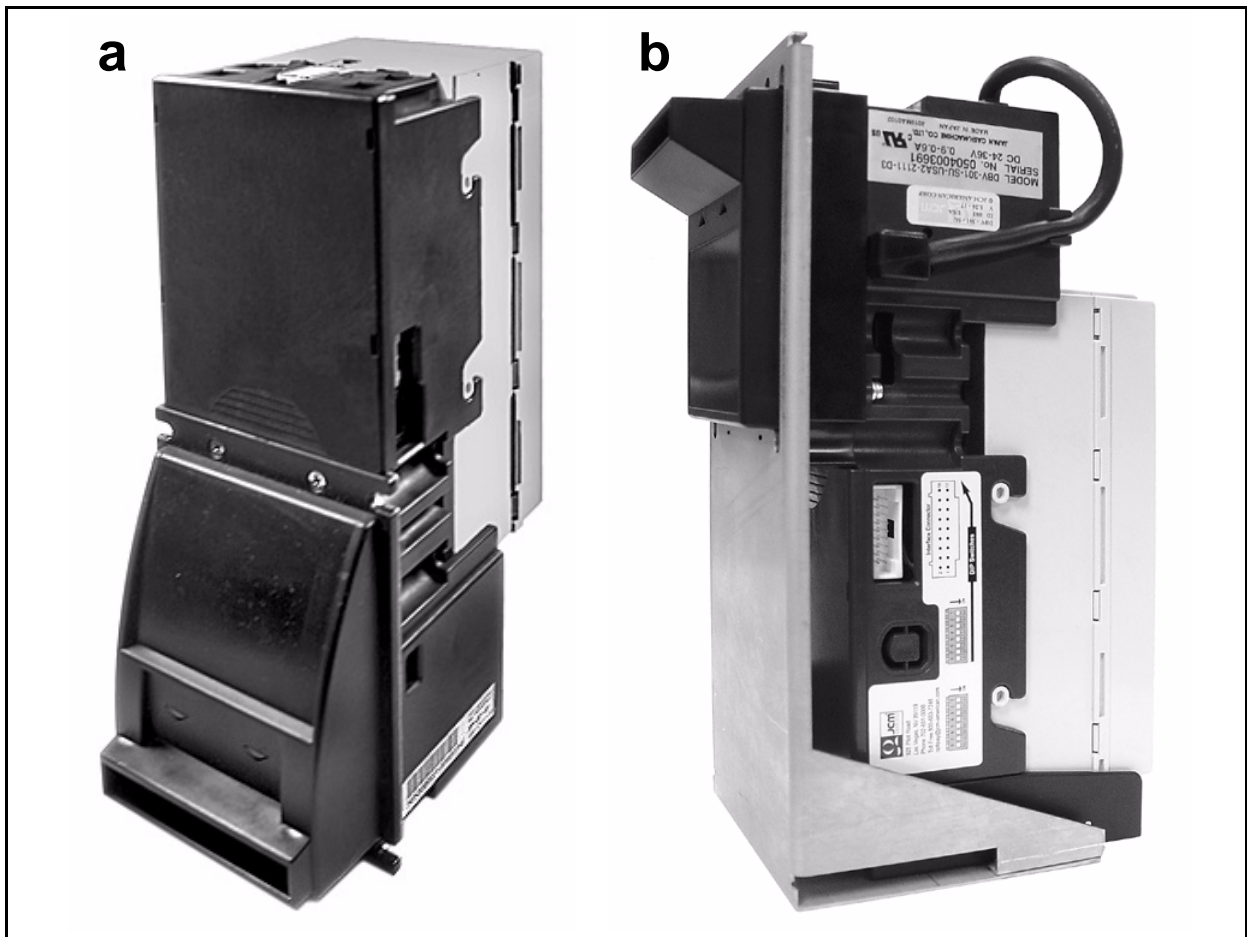


Figure 1-1 Optipay™ BV DBV-30X Bill Validator (SU) & DBV-30X Bill Validator (SD)

Model and Type Classification

Tables 1-1 and 1-2 provide definitions for the model and type number codes found on the unit.

Table 1-1 Model Number Specifications

Nº	Model : DBV - 3 0 1 - SU Nº (1) (2)(3)(4) (5)
(1)	Model Name
(2)	Series Name
(3)	CPU Board Type 0 : JCM Standard
(4)	Power supply 0 : 12 V DC 1 : 18 - 38 V DC 2 : 115 V AC
(5)	Stacker Type SU : Downward vertical stacking

Table 1-2 Type Number Specifications

Nº	Type : * * * - * * * * * - D3 Nº (1) (2)(3)(4)(5)(6) (7)
(1)	Country Code
(2)	Cash Box Capacity 2 : 200 note capacity 3 : 400 note capacity 5 : 1000 note capacity
(3)	Faceplate Type 1 : JCM Standard 2 : JCM Snackmask
(4)	Guide Width 1 : 66 mm width 2 : 67 mm width 3 : 70 mm width 4 : 72 mm width
(5)	Cash Box Type 1 : Upward bill ejection box 2 : Down stacker
(6)	Recycle Type (Optional) 0 : without recycle unit 1 : with recycle unit
(7)	Interface Type 03 : ID-003 (Bi-Directional Serial) 44 : ID-044 (One-way Serial) C3 : ID-0C3 (Bi-Directional Serial Alternate)

Precautions

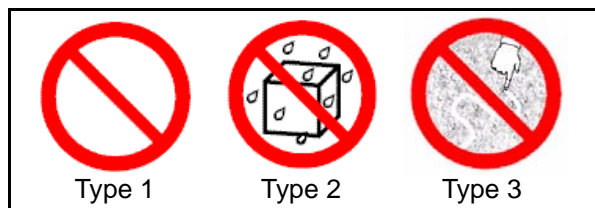


Figure 1-2 Precautionary Symbols

The Figure 1-2 symbols are defined as follows:

1. **(Type 1)** Do not insert a torn, folded, or wet bill, as this action may cause a bill jam inside the unit.
2. **(Type 2)** Do not expose the unit to water. The unit contains several precision electronic devices which can be damaged if water or any liquid is sprayed or spilled into the unit.
3. **(Type 3)** Do not install the unit into a dusty environment. Dust may affect the sensor's performance.

User cautions

1. Be sure to turn the power off before plugging or unplugging connectors.
2. Firmly close the unit's transport path when applying power.
3. When closing the units, ensure they click into place. Make sure to open and close the units gently, and take care that no dust or other foreign objects enter when opening the guides.
4. Do not allow inventory stock to endure high temperature, high humidity or a dusty environment.
5. Do not throw the unit or allow it to fall to the ground.
6. If the bill validator is dirty due to dust, foreign objects, or other such debris adhering to it, bill acceptance rate will degrade. Be sure to clean the validator at least once a month. Use a soft cloth to wipe dust from the magnetic head and the optical sensor. Never use organic solvents, such as paint thinner or benzene to clean the device. Use a soft cloth to wipe dust from the rollers and belts.
7. Inserting worn or damaged bills may cause a jam. Shuffle new bills well before inserting them, otherwise they may stick to one other and could cause a jam.

Component Names

Figure 1-3 and Figure 1-4 illustrate the primary DBV-30X component part names and locations.

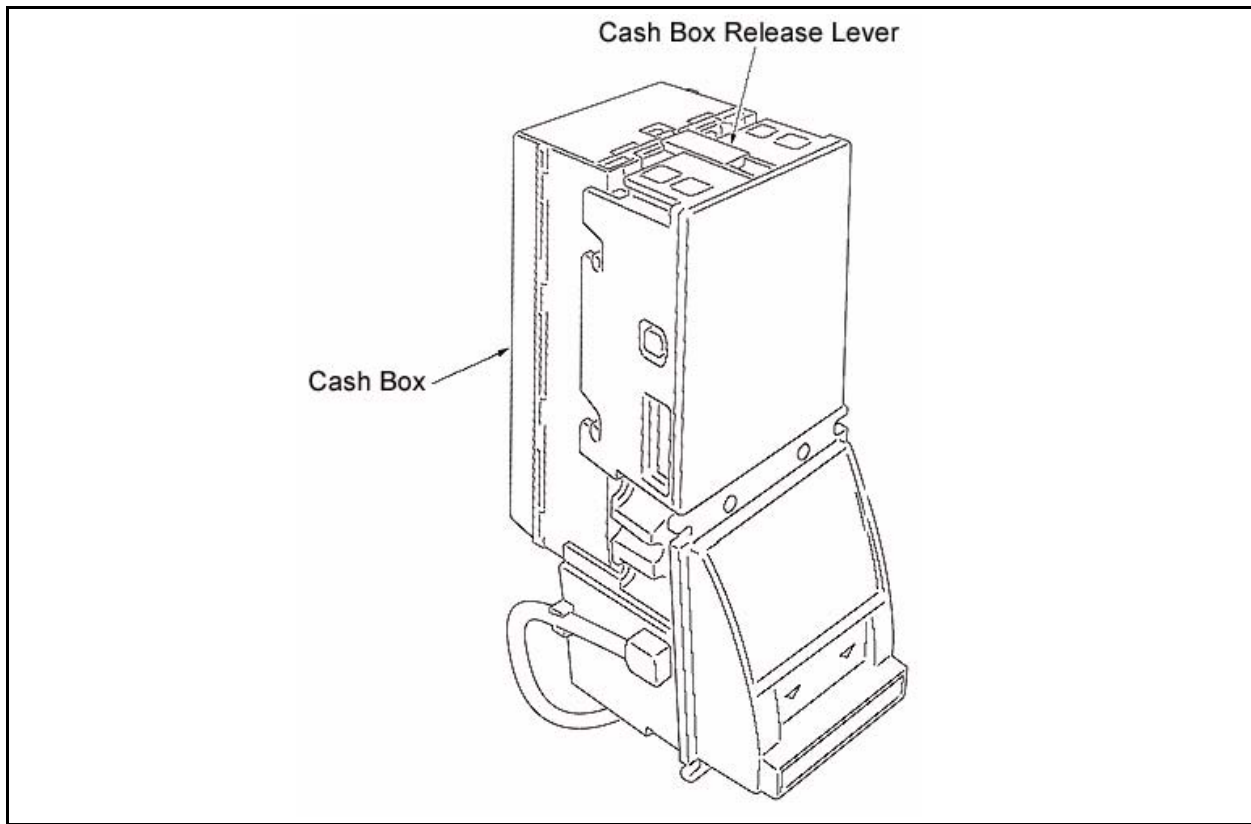


Figure 1-3 Bill Validator Top and Rear View

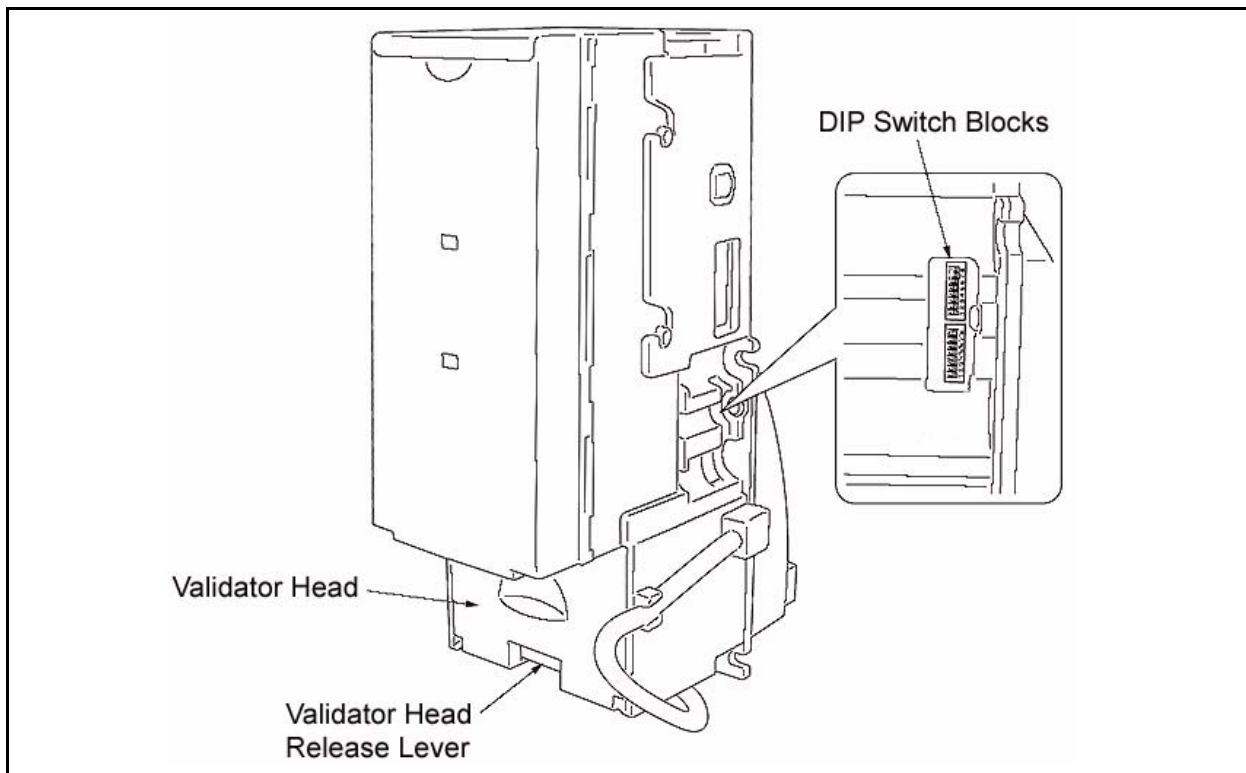


Figure 1-4 Bill Validator Bottom and Right Side View

General Specifications

Table 1-3 lists the general specifications for the DBV-30X Bill Validator.

Table 1-3 DBV-30X Bill Validator Specifications

Nº	MODEL	SPECIFICATION
1	Acceptable Denominations:	Refer to the separate "Software Specifications"
2	Insertion Directions:	Refer to the separate "Software Specifications"
3	Acceptance Rate:	<p>Refer to the separate "Software Specifications"</p> <p>The acceptance rate will be calculated as follows:</p> $\frac{\text{First acceptance number of sheets} + \text{Re-insertion acceptance number of sheets}^{*1}}{\text{Test bill total}} \times 100 (\%)$ <p><small>*1 = Acceptance following subsequent re-insertions</small></p> <p>Note: The following bill types are excluded:</p> <ul style="list-style-type: none"> a) Bills with excessive or poor magnetism or unclear graphics b) Double (dual) notes c) Worn, dirty, wet, torn or excessively wrinkled bills d) Bills having folded corners or edges e) Bills having the wrong cut dimensions or printing displacement
4	Processing speed:	<p>Approximately 2 seconds (time from bill insertion to credit signal output)</p> <p>Approximately 3 seconds (time from bill insertion to bill stack completion)</p>
5	Cash box:	<ul style="list-style-type: none"> a) Capacity: Dependent on specific model b) Ejection directions: Rear ejection
6	Interface:	Refer to specific model
7	Escrow:	1 Bill
8	Indication:	<ul style="list-style-type: none"> a) Indication LED (green LED at front side) b) Condition LEDs (green, yellow and red LEDs at rear side)
9	Power supply:	<p>DBV-300: 12 V DC (±5%)</p> <p>DBV-301: 24 V DC (±5%)</p> <p>DBV-302: 115 V AC (±5%)</p> <p>Correspondence to an MDB interface standard power supply is possible</p>
10	Power consumption	<ul style="list-style-type: none"> a) Standby status: 0.2 A b) Operation status: 0.4 A (0.9 A maximum)
11	Environmental conditions:	<ul style="list-style-type: none"> a) Operational temperature: -15 °C to 60 °C b) Operational humidity: 15 to 95% RH (no condensing) c) Storage temperature: -20 °C to 60 °C d) Storage humidity: 15 to 95% RH (no condensing) e) Light disturbance: Direct sunlight should be avoided
12	Outline dimensions:	4.11 in. (104.5 mm) Width, 9.58 in. (243.5 mm) Height, 6.10 in. (155 mm) Depth (with faceplate)
13	Weight:	Approximately 2.64 lbs. (1.2 kg)
14	Mounting:	<p>Horizontal Mounting</p> <p>(verify with your sales representative prior to selecting a final attachment angle)</p>

Retrieving Bills

1. Push the Cash Box release lever in the arrow ① direction illustrated in Figure 1-5.
2. Lift the Cash Box in the ② arrow direction and remove it.

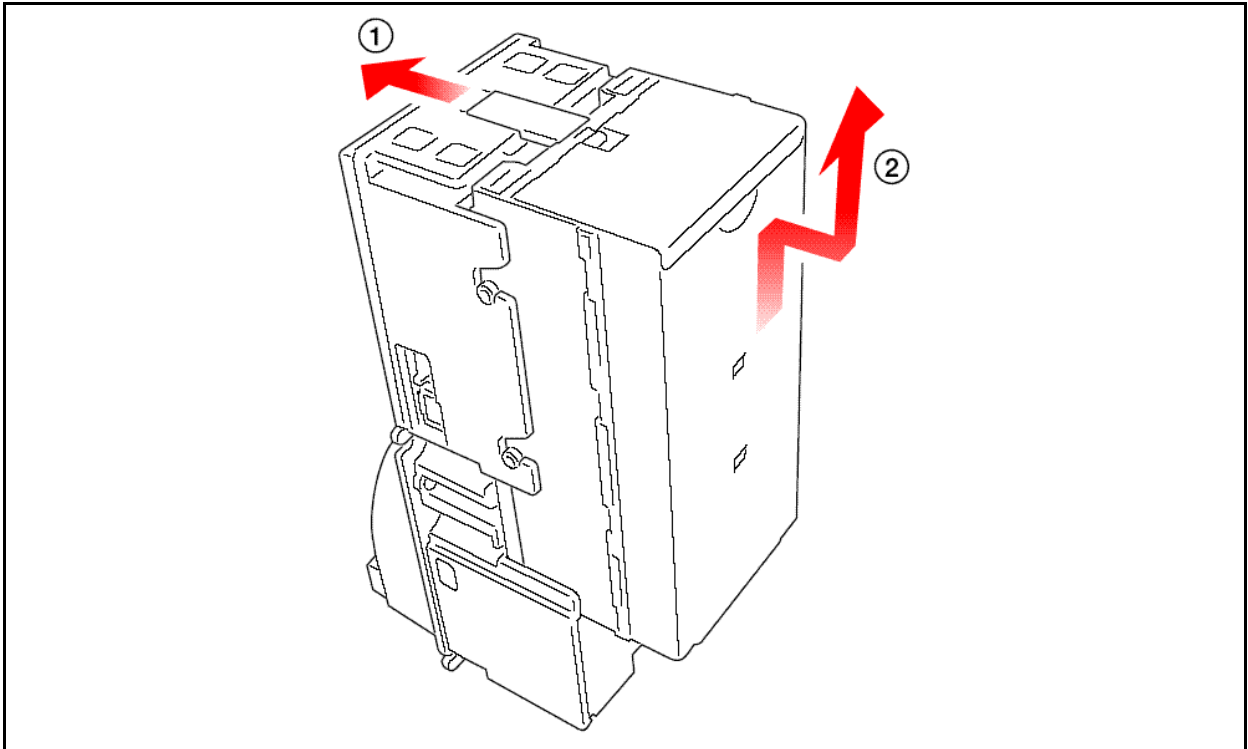


Figure 1-5 Initial Bill Retrieval Steps

3. Open the Cash Box cover in the ③ arrow direction illustrated in Figure 1-6.
4. Remove the bills in the ④ arrow direction.

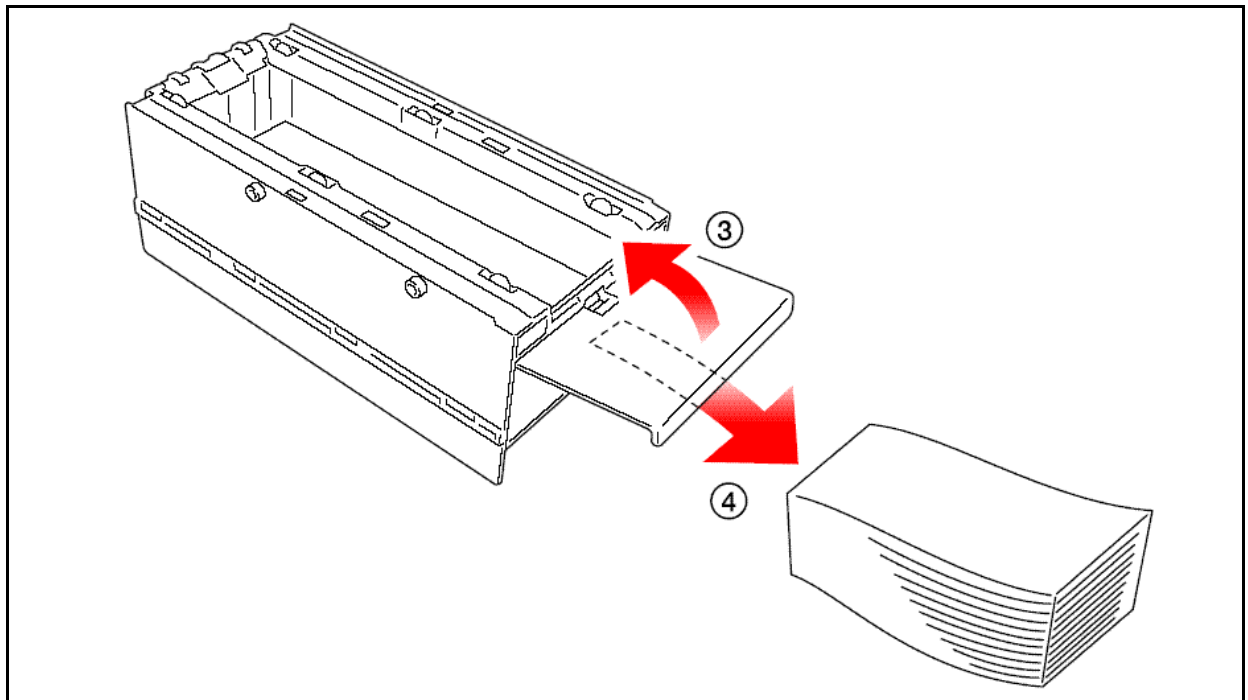


Figure 1-6 Final Bill Retrieval Steps

Cabling

Figure 1-7 illustrates the cabling connection locations for installing the DBV-30X Bill Validator.

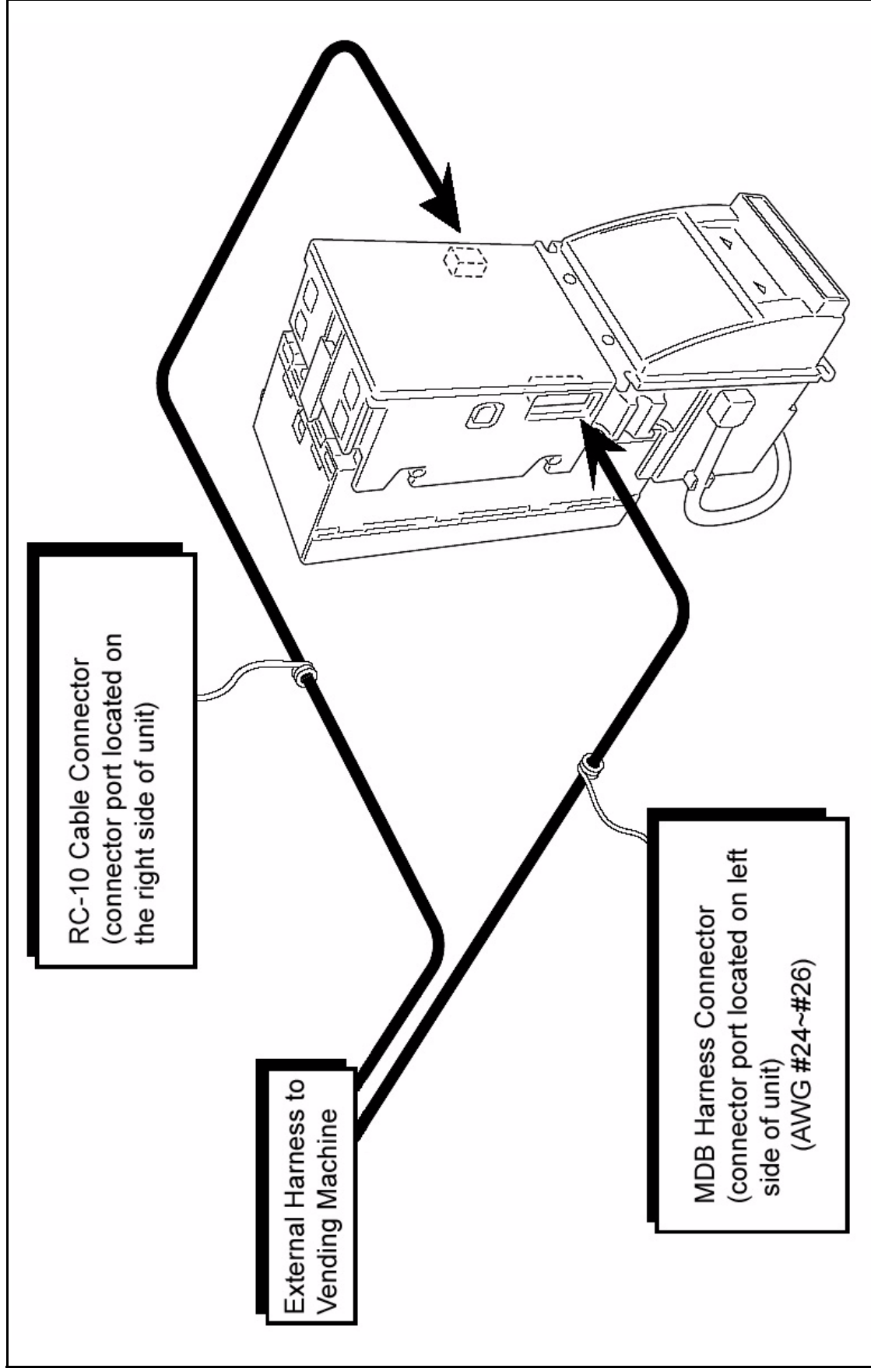


Figure 1-7 Cable Connector Locations

Dimensions

Figure 1-8 illustrates the relative dimensions of the DBV-30X Bill Validator.

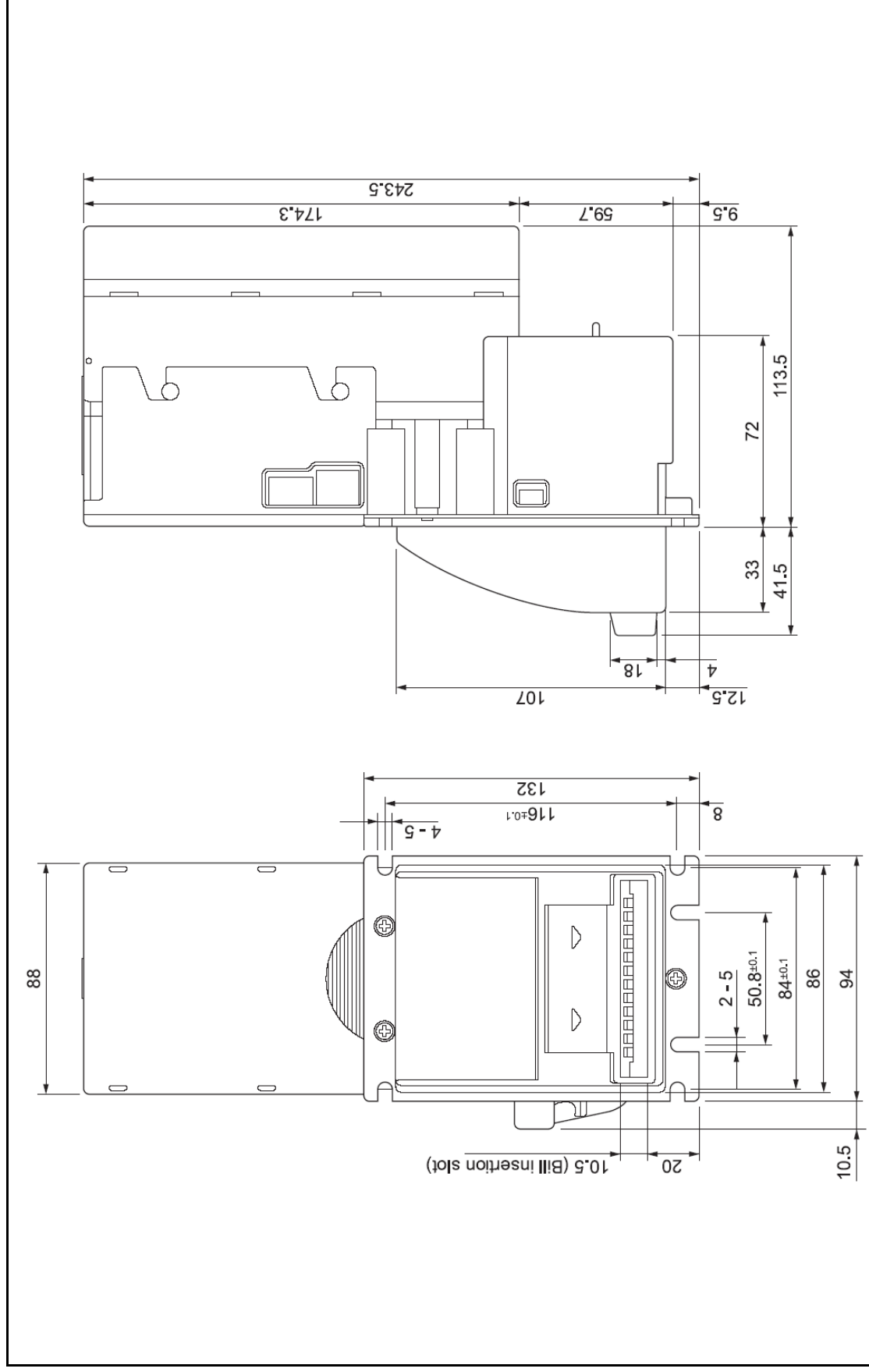


Figure 1-8 Bill Validator Dimensions

Cash Box Label

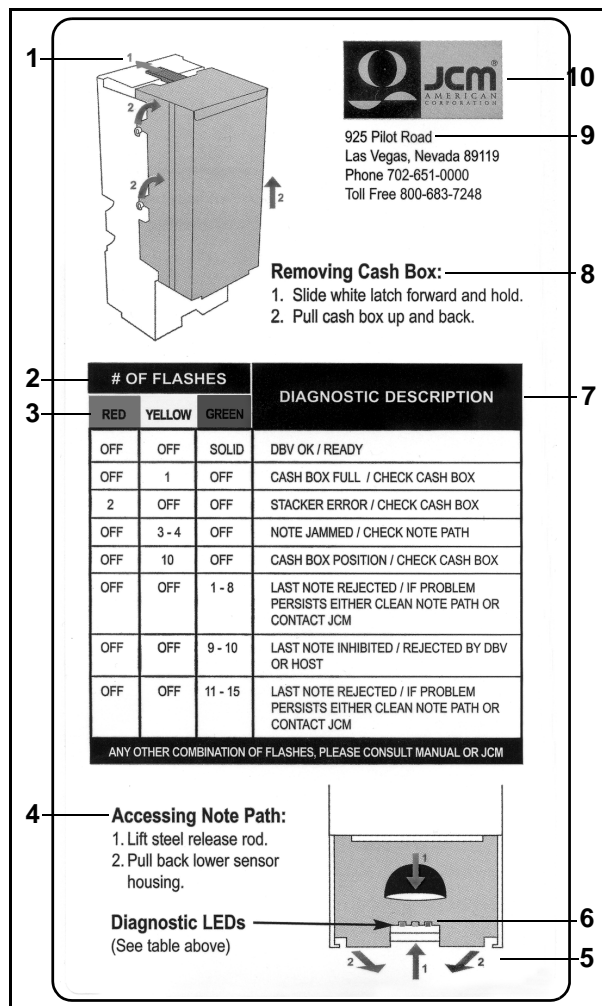


Figure 1-9 Cash Box Front Label

Table 1-4 Cash Box Label Features

1. Cash Box removal step instruction arrows	6. Diagnostic LED location listings
2. Diagnostic LED Flash indication columns label	7. Diagnostic Description column
3. Diagnostic LED column color labels	8. Cash Box removal step instructions
4. Note path access step instructions	9. JCM contact information
5. Note path access step instruction arrows (related to #4 above)	10. JCM Logo.

Table 1-5 DIP Switch Label Features

1. JCM Logo	4. Arrow addressing actual position of DIP Switches and I/O header connector locations (Label is restricted to vertical placement positioning)
2. JCM contact information	5. External Validator-to-vending machine header connector
3. Diagnostic/Inhibit DIP Switch position label (Large block in Early version & small block in later version)	6. Interface small DIP Switch Block switch position label.

DIP Switch Label

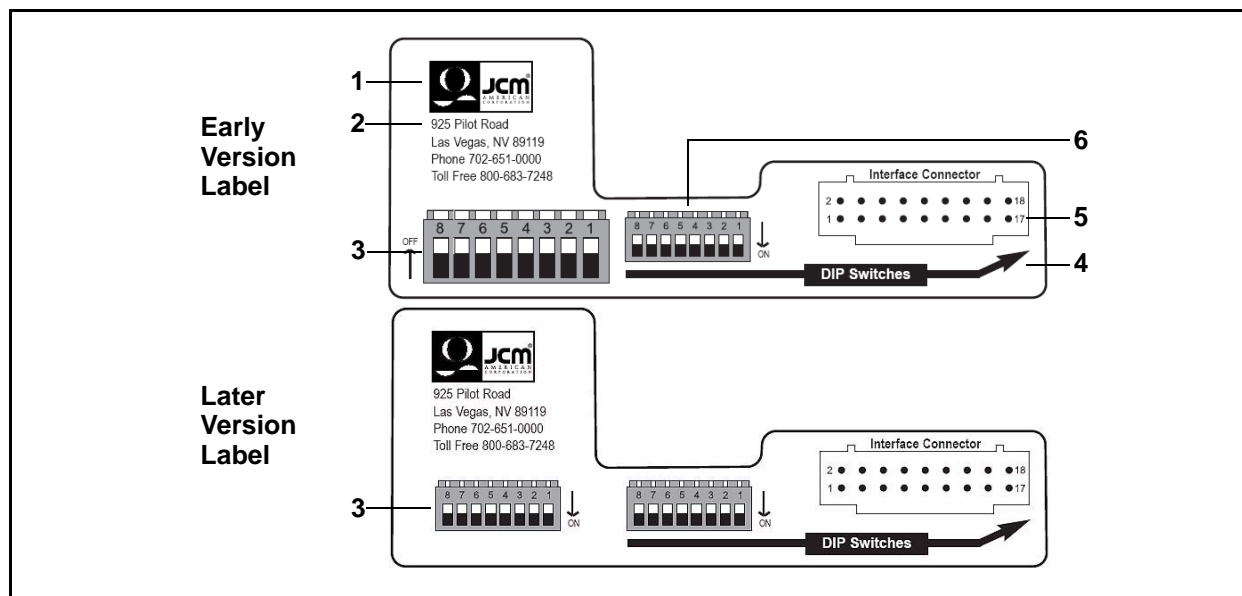


Figure 1-10 Early & Later Version DIP Switch Side Label

Country Codes

Table 1-6 Country Codes

Country	Country Code
Antilles	ANT
Argentina	ARG
Australia	AUS
Austria	AUT
Austria	AUT4
Barbados	BRB
Belgium	BEL
Botswana	BWA
Brazil	BRA
Bulgaria	BGR
Canada	CAN
Canada	CAN
Chile	CHL
China	CHN
Colombia	COL
Costa Rica	CRI
Croatia	HRV
Cyprus	CYP
Czech Republic	CZE
Denmark	DNK
Estonia	ESTE
Estonia	EST2
European Union	EUR
Finland	FIN
France	FRA
Germany	DEU
Germany	DEU1
Germany	DEU2
Germany/Sweden	DEU/SWE
Great Britain (England)	GBR
Great Britain (England)	GBR-B
Great Britain/Gibraltar	GBR/GBI
Great Britain/Isle Of Man	GBR/MAN
Greece	GRC
Greece	GRC-B
Guatemala	MGT
Honduras	HND
Hong Kong	HKG

Table 1-6 Country Codes (Continued)

Country	Country Code
Hungary	HUN
Iceland	ISL
India	IND
Israel	ISR
Italy	ITA
Italy	ITA8
Italy	ITA9
Japan	JPN
Kazakhstan	KAZ
Kazakhstan	KAZ1
Latvia	LVA
Lithuania	LTU
Malaysia	MYS
Malaysia	MYS1
Malta	MLT
Mauritius	MUS
Mexico	MEX
Moldova	MDA
Morocco	MAR
Namibia	NAM
Netherlands	NLD
Netherlands	NLD-B
New Zealand	NZL
New Zealand	NZL1
New Zealand	NZL-B
North Ireland	NIRL
Norway	NOR
Norway	NOR1
Peru	PER
Peru	PER1
Philippines	PHL
Philippines	PHL1
Poland	POL
Poland	POL1
Poland	POL1-B
Portugal	PRT
Qatar	QAT
Republic Of Ireland	IRL

Table 1-6 Country Codes (Continued)

Country	Country Code
Republic Of Korea	KOR
Republic Of Korea	KOR-B
Romania	ROM
Russia	RUS
Russia	RUS-B
Saudi Arabia	SAU
Singapore	SGP
Singapore	SGP-B
Slovakia	SVK
Slovenia	SVN
South Africa	ZAF
Spain	ESP
Sri Lanka	LKA
Sweden	SWE
Switzerland	CHE
Switzerland	CHE3
Switzerland	CHE-B
Taiwan (Republic Of China)	TWN
Tanzania	TZA
Thailand	THA
Trinidad & Tobago	TTO
Ukraine	UKR
Ukraine	UKR1
United Arab Emirates	ARE
United States	USA
Uruguay	URY
Uruguay	URY1
Venezuela	VEN
Venezuela	VEN1
Venezuela	VEN2
Venezuela	VEN-B

These Country Codes conform to the ISO 3166 Country Code list definitions.

Optipay™ BV DBV-30X Bill Validator

Section 2

2 INSTALLATION / OPERATION

This section provides installation and operation instructions for the Optipay™ BV DBV-30X Bill Validator. The information within contains the following features:

- Installation
- Input/Output Circuitry
- Pin Assignment
- Connector
- DIP Switch Settings
- Operation Flowchart
- Clearing a Bill Jam
- Preventive Maintenance

Installation

Mounting the unit

Prepare to mount the DBV-30X Bill Validator as follows:

1. Remove the Cash Box and Lower Guide assembly (See Figure 2-1).

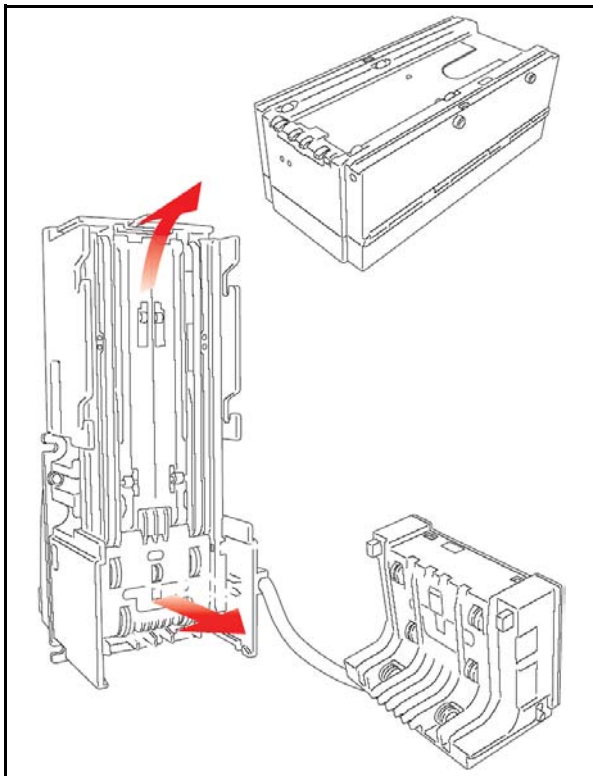


Figure 2-1 Bill Validator Mounting Preparation

2. Insert the DBV-30X unit into the panel cut out provided within the Vending Machine (See Figure 2-2).

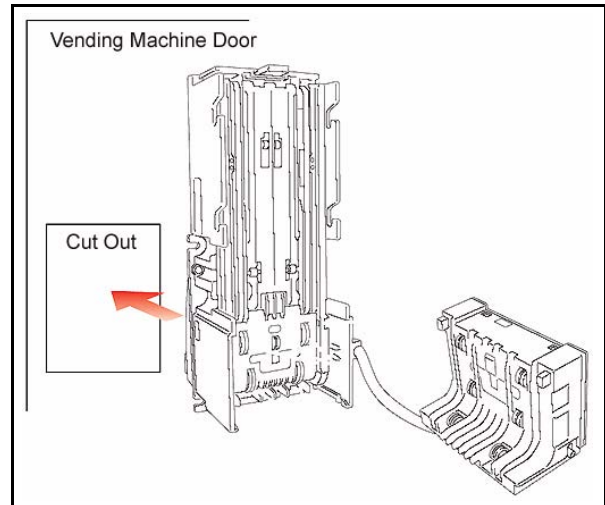


Figure 2-2 Bill Validator Mounting Location

3. Use four #8-32 nuts to mount the DBV in place at the four locations circled in Figure 2-3.

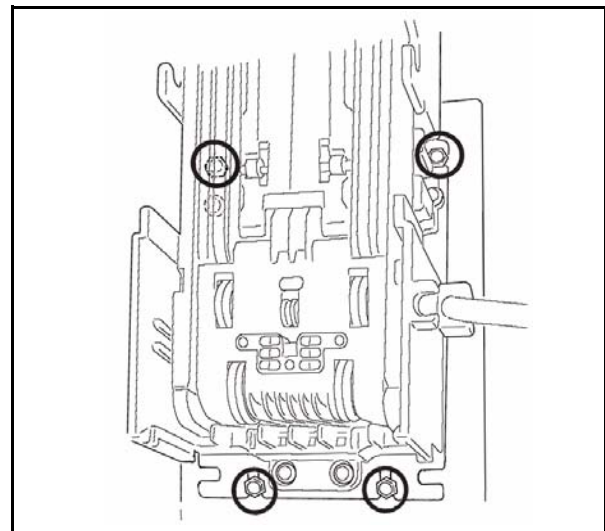


Figure 2-3 Bill Validator Mounting Nut Locations

4. Reinstall the Lower Guide and Cash Box.

Changing the Bill Guides

To change the DBV-30X Bill Guides proceed as follows:

1. Remove the Cash Box and Lower Guide.

2. Remove the Faceplate by removing its four (4) mounting screws (See Figure 2-4).

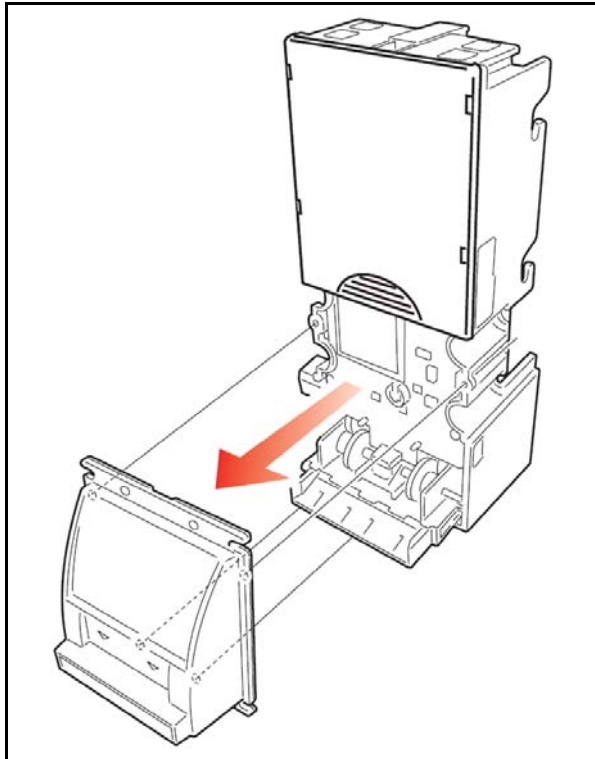


Figure 2-4 Faceplate Removal

3. Remove the Left and Right SB Bill Guides by following the ① and ② directional arrow paths indicated in Figure 2-5.

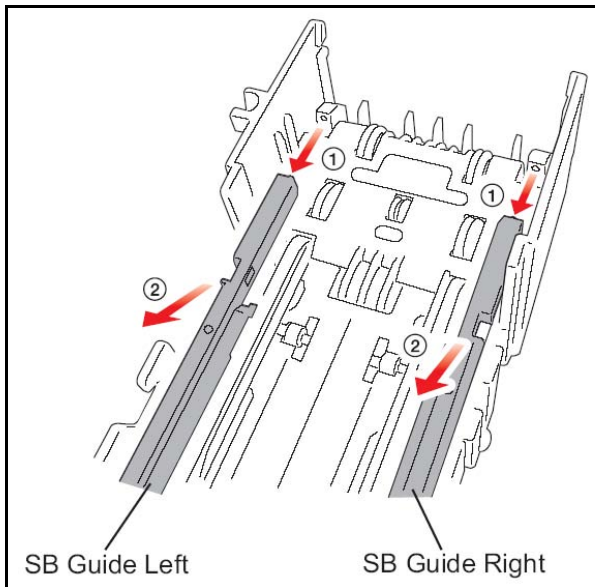


Figure 2-5 Bill Validator Removal

4. Remove the Front Bill Guide by following the arrow ③ direction indicated in Figure 2-6. Reverse the procedure to reinstall it.

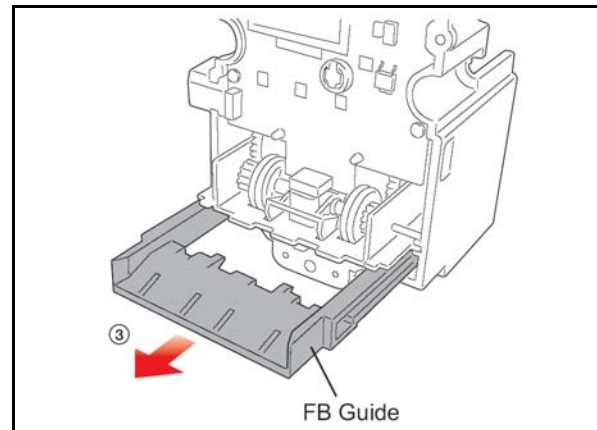


Figure 2-6 Front Bill Guide Removal

Collecting bills

To remove bills from the Cash Box proceed as follows:

1. Push the Cash Box Release Lever in the direction indicated by the Figure 2-7 ① arrow.

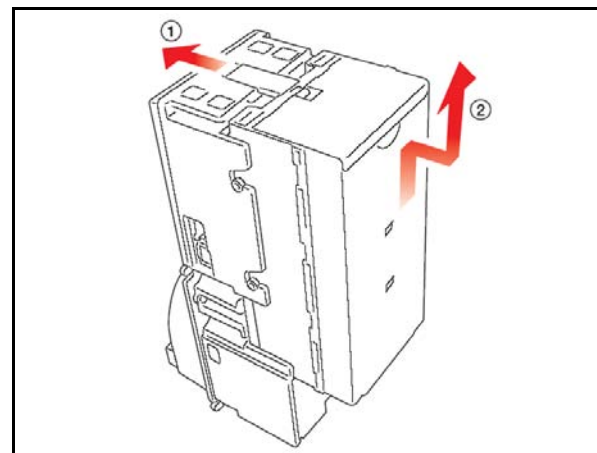


Figure 2-7 Cash Box Removal

2. Lift the Cash Box out in the direction indicated by the Figure 2-7 ② arrow and remove it.
3. Open the Cash Box cover and remove the bills (See Figure 2-8 ③ & ④).

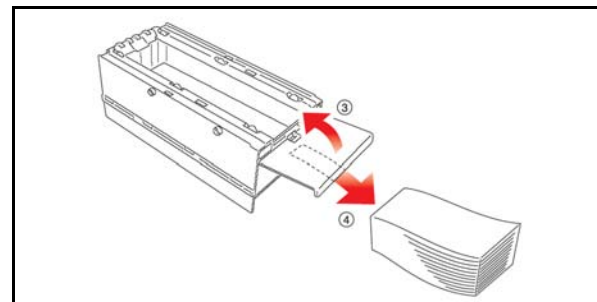


Figure 2-8 Cash Removal

Input/Output Circuitry

Figure 2-9 illustrates the MDB Bill Validator-to-Controller component schematic and interconnecting pin designation diagram.

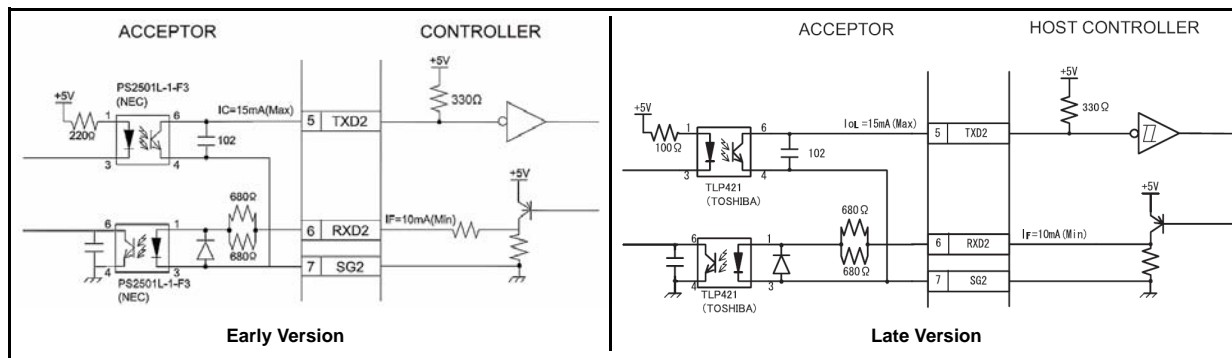


Figure 2-9 Bill Validator-to-Controller I/O Circuit and Pin-out Identification Schematic

Interface Connector Pin Assignment

Figure 2-10 illustrates the MDB Bill Validator's plug interconnect pin assignment diagram and Table 2-1 lists each pin's function.

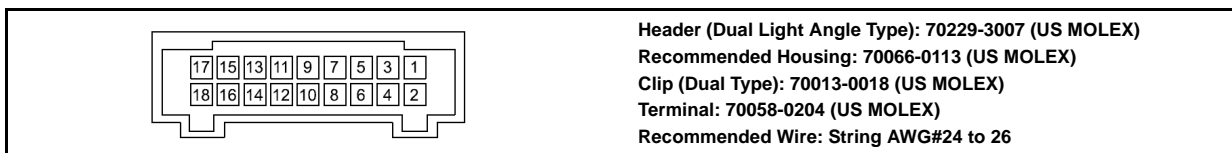


Figure 2-10 Bill Validator's Plug Interconnect Pin Assignment Diagram

Table 2-1 DBV-30X Connector Pin Designations

Pin No.	Signal Name I/O	I/O*	Signal Description
1	34V DC (DC-In)		DC +24 V Power (301 Model)
2	34V DC (DC-Gnd)		(24V DC) Ground
3	12V DC (DC-In)		DC +12 V Power (300 Model)
4	12V DC (DC-Gnd)		(12V DC) Ground
5	TXD1	OUT	Photo coupler: Output signal line from bill validator to controller (MDB)
6	RXD2	IN	Photo coupler: Input signal line from bill validator to controller (MDB)
7	SG2		Photo coupler: Signal ground (MDB)
8	RXD (RS232)		RS 232-C-Txd
9	TXD (RS232)		RS 232-C-Rxd
10	GND		Ground (Signal)
11	RXD (TTL)		Rxd (TTL) / Pulsed Out/ $\overline{\text{Data Out}}$
12	TXD (TTL)		Txd (TTL) / $\overline{\text{Send}}$
13	LED Power		+5V DC Light Emitting Diode Power
14	D/E		$\overline{\text{Acceptor Enable}}$
15	SOFT-R		Soft Reset
16	BUSY		Busy
17	ABN		Abnormal
18	RTS/FULL		$\overline{\text{Interrupt}}$

* I/O (In/Out) viewed from the Bill Validator side.

Connector Types

Figure 2-11 illustrates a typical interconnect plug pin configuration.

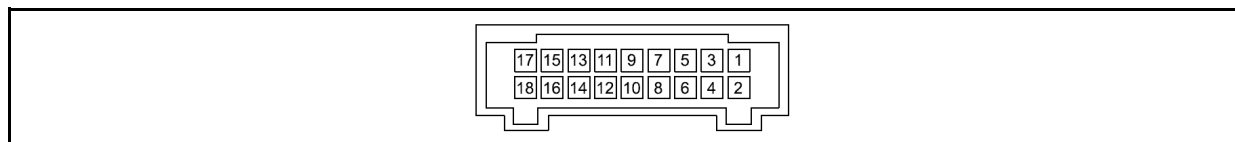


Figure 2-11 Typical Interconnect Plug Pin Assignment Diagram

- Right Angle Dual Header
53107-1820 (MOLEX)
Polyester (w/glass inclusion)
- Header Housing (recommended)
51030-0920 (MOLEX)
Polyester (w/glass inclusion)
- Dual Clip
51041-1800 (MOLEX)
Polyester (w/glass inclusion)
- Terminal
50083-8114 (MOLEX)
Wire Gauge AWG#24 ~ 26
- Separate Wire (recommended)
UL1007 AWG#24 ~ 26

DIP Switch Settings

The DIP switch settings are determined by the software. Verify the current software within the DBV before attempting to reinstall it. See software specifications provided separately for your software's DIP switch settings. See Figure 2-12 for the DIP Switch location.

DIP Switch 1 sets the accepted Denomination and mode. Depending on the software, the denomination settings will differ. Refer to your specific systems software specifications.

No.	Function	ON	OFF
SW1-1	Denomination 1	Inhibit	Accept
SW1-2	Denomination 2		
SW1-3	Denomination 3		
SW1-4	Denomination 4		
SW1-5	Denomination 5		
SW1-6	Denomination 6		
SW1-7	Denomination 7		
SW1-8	Mode Setting	Test Mode *1	Normal Mode

*1 For details concerning using SW1-8 in the Test Mode, refer to "Entering the test mode" on page A-7 of Appendix A.

DIP Switch 2 is used to test the status of DS1. Its switches are all set to OFF in normal operation. Refer to the "DIP Switch Test" on page A-13 of Appendix A for detailed use of these switches.

No.	Function	ON	OFF
SW2-1	-	Always OFF	
SW2-2	-		
SW2-3	-		
SW2-4	-		
SW2-5	-		
SW2-6	-		
SW2-7	-		
SW2-8	-		

Figure 2-12 DIP Switch Locations

Operational Flowchart

Figure 2-13 depicts a typical bill acceptance flow process.

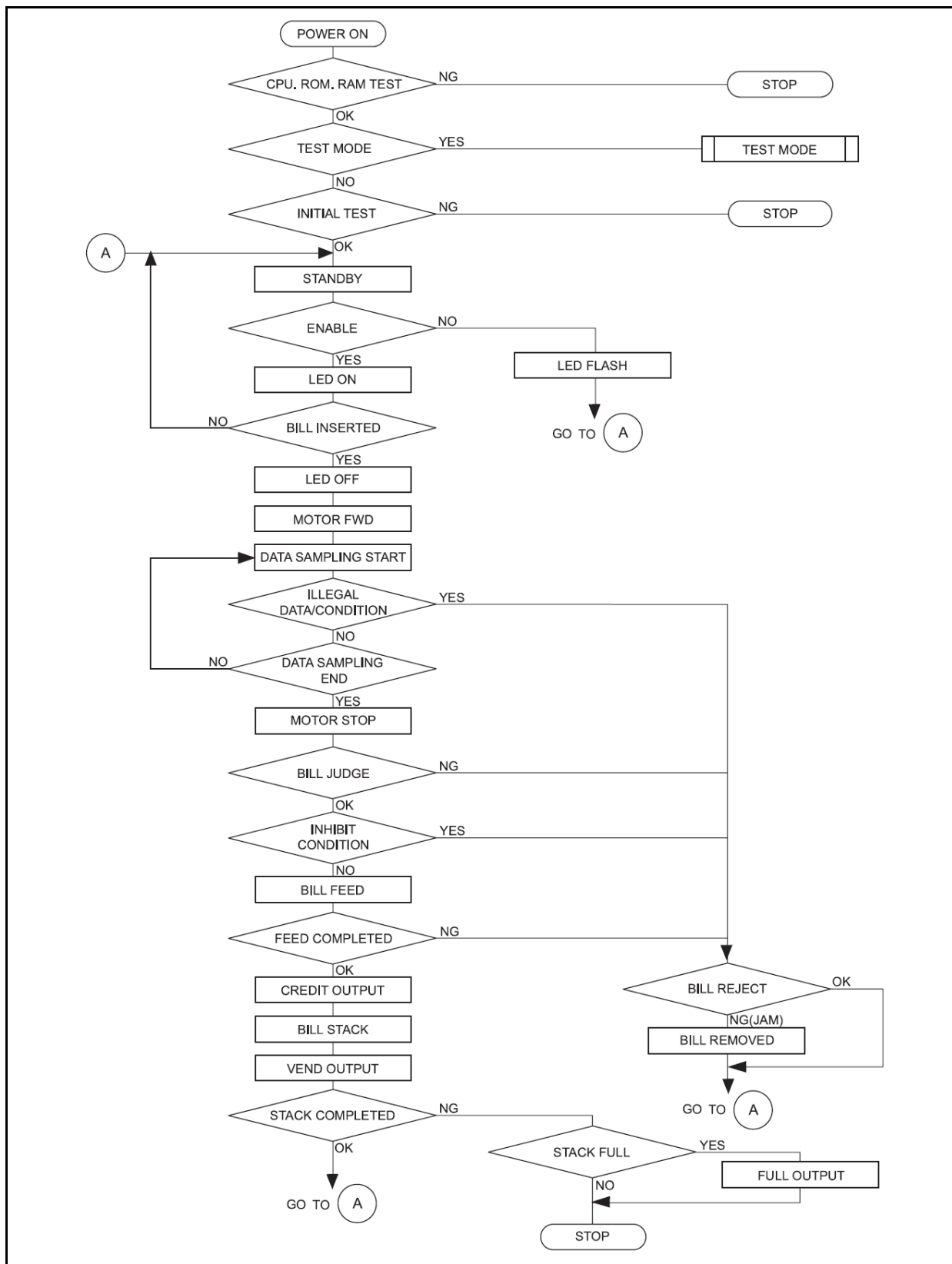


Figure 2-13 Bill Validator Operational Flowchart

Clearing a Bill Jam

When a bill is jammed in the Stacker section:

1. Remove the cash box.
2. Remove the jammed bill following the arrow path shown in Figure 2-14.

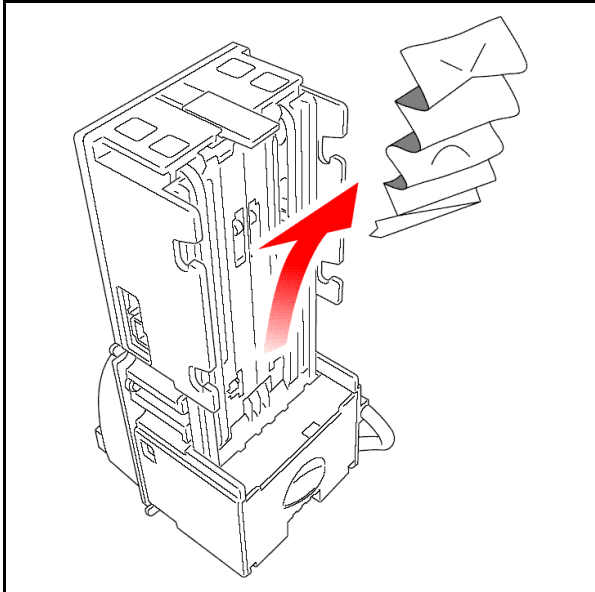


Figure 2-14 Clearing a Jammed Stacker Bill

When a bill is jammed in the Validator section:

1. Lift the Validator head release lever and pull out the Lower Guide (See Figure 2-15).
2. Remove the jammed bill.

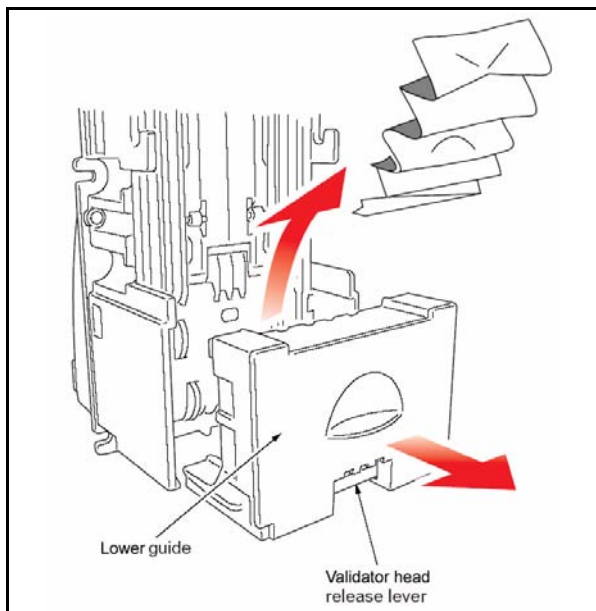


Figure 2-15 Clearing a Jammed Validator

Preventive Maintenance

The DBV-30X sensor lenses ① are made of a transparent polymer material; handle them with care. It is important to keep the bill path, rollers ②, and belts clean (See Figure 2-16, and Figure 2-17 for locations).

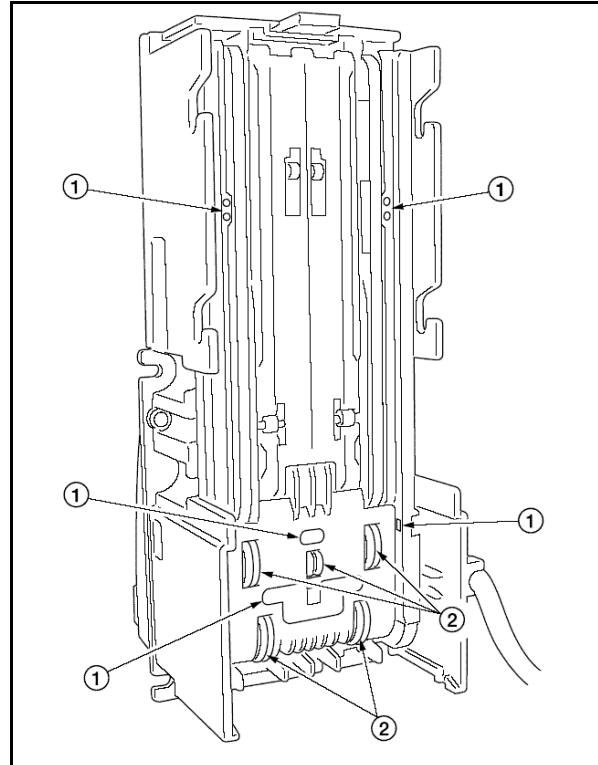


Figure 2-16 Upper Guide and Stacker Sensors and Rollers

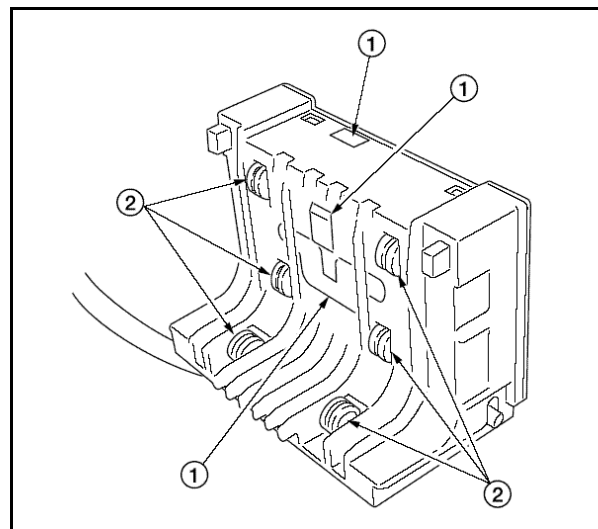


Figure 2-17 Lower Guide Sensors and Rollers

To clean the lenses, use a lint-free cloth and a mild non-abrasive detergent such as liquid dish soap mixed with water.



Do not use alcohol or thinner for any cleaning.



Note: JCM does not recommend using cleaning cards, cleaning pads, or cleaning solutions of any kind.

Cash box Preventive Maintenance (P/M)

Perform periodic P/M on the Cash Boxes to ensure proper operation. The Cash Box sensor lenses ① are made of a transparent polymer material; handle them with care (See Figure 2-18).

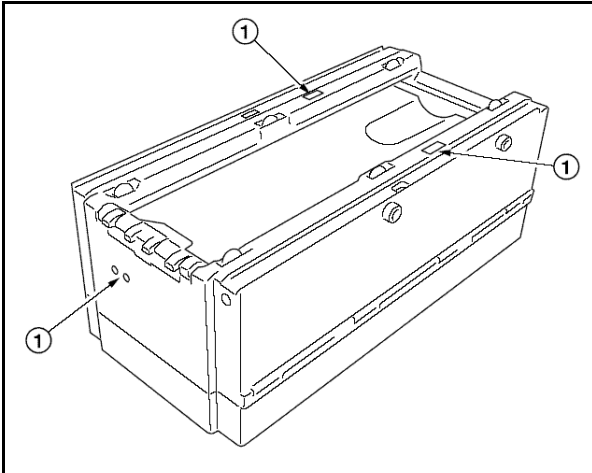


Figure 2-18 Cash Box Sensors

Use compressed air to blow out loose paper fibers and other debris that can build up over time. Check all moving parts for wear and proper positioning. If the unit does not operate properly, it can cause bill jams.

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Optipay™ BV

DBV-30X Bill Validator

Section 3

3 MDB PROTOCOL

NOTE: The latest MDB Protocol Specifications may be found at www.Vending.org

NOTE: For ID-044 or ID-002 Protocol Specifications, contact your local JCM Sales Representative.

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Optipay™ BV DBV-30X Bill Validator

Section 4

4 DISASSEMBLY/REASSEMBLY

This section provides disassembly instructions for the Optipay™ BV DBV-30X Bill Validator. The information within contains the following features:

1. Circuit Board Disassembly
2. Pusher Mechanism Disassembly
3. Upper Guide Disassembly
4. Lower Guide Disassembly

Circuit Board Disassembly

Removing the CPU and Power Supply boards

1. Push the cash box release lever ① and remove the cash box ② (See Figure 4-1).

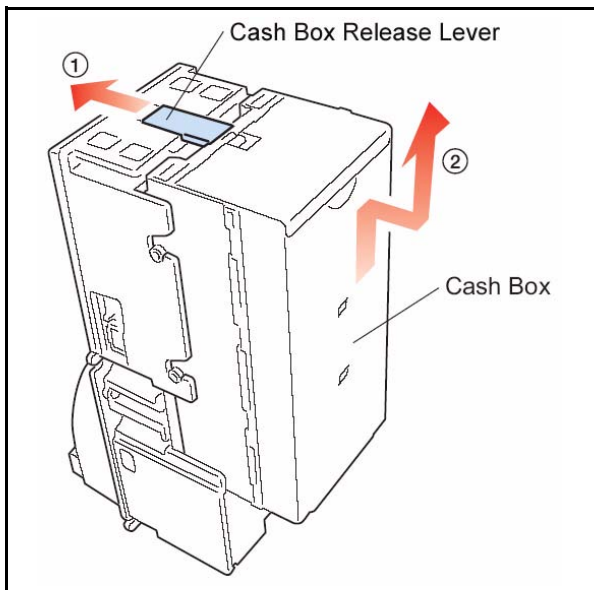


Figure 4-1 Bill Validator Mounting Locations

2. Lift the Validator head release lever and pull out the Lower Guide following the arrows directional path indicated in Figure 4-2.
3. Slide the base cover upward and remove it from the unit (See Figure 4-3).
4. Remove the four (4) Faceplate securing screws and remove the Faceplate (See Figure 4-4 and Figure 4-5).

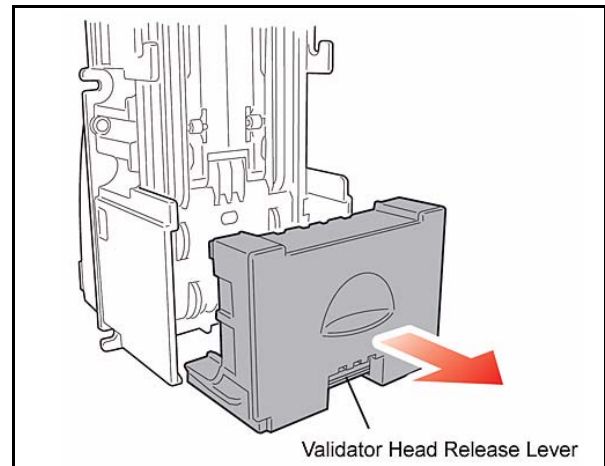


Figure 4-2 Lower Guide Removal

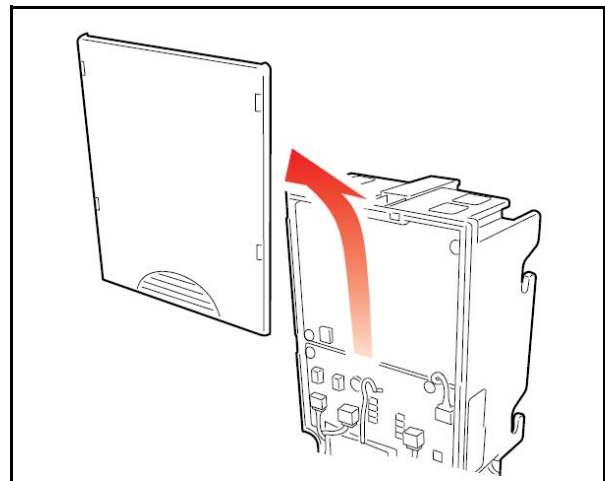


Figure 4-3 Validator Cover Removal

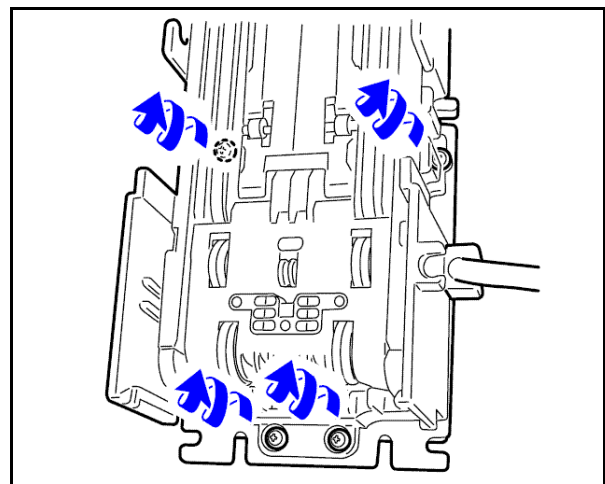


Figure 4-4 Face Plate Rear Mounting View

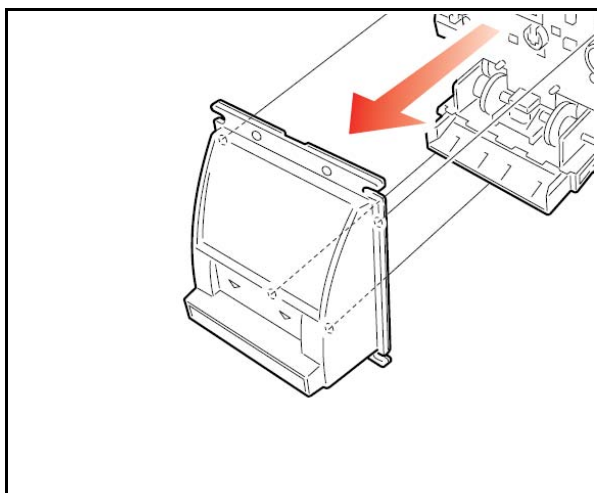


Figure 4-5 Validator Face Plate Removal

5. Lay the assembly on its backside and remove the six (6) screws shown in Figure 4-6. Then disconnect the four plug connectors indicated by the four small arrows in Figure 4-6.

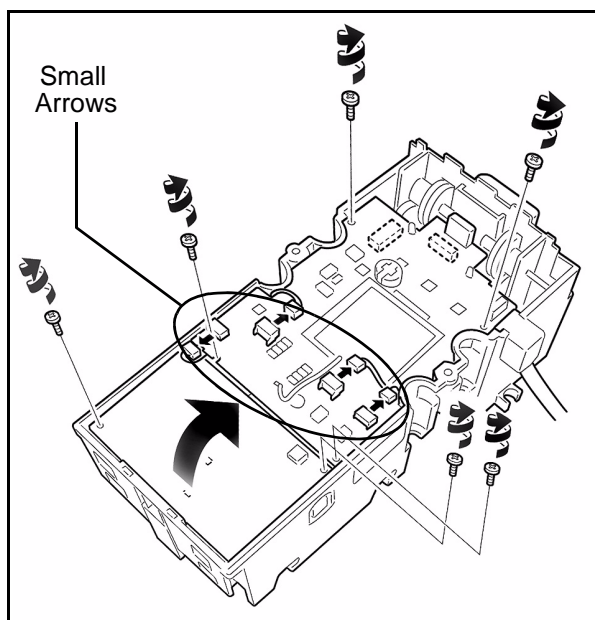


Figure 4-6 Screw and Connector Removal and Circuit Board Access

6. Open the board assembly access box by following the direction of the large arrow indicated in Figure 4-6.
7. Release the ribbon cable connector lock and remove the flexible ribbon cable indicated by the small arrows illustrated in the Figure 4-7 close-up box (See Figure 4-7 a).



NOTE: When disconnecting the flexible connector, be sure to handle it carefully, otherwise, the connector retaining release clip may become damaged.

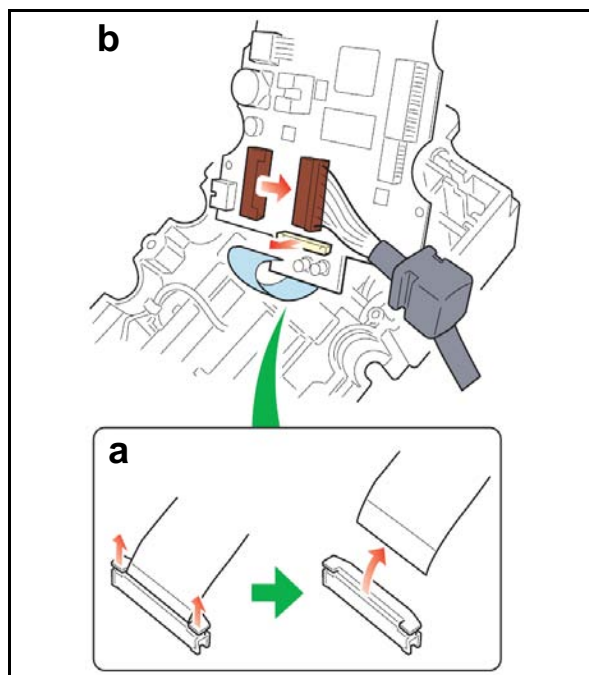


Figure 4-7 CPU Board Connector Removals

8. Disconnect the CPU Board signal cable connector (See large arrow in Figure 4-7 b).
9. Separate the CPU Board and Power Supply Board mating connectors (See Figure 4-8).

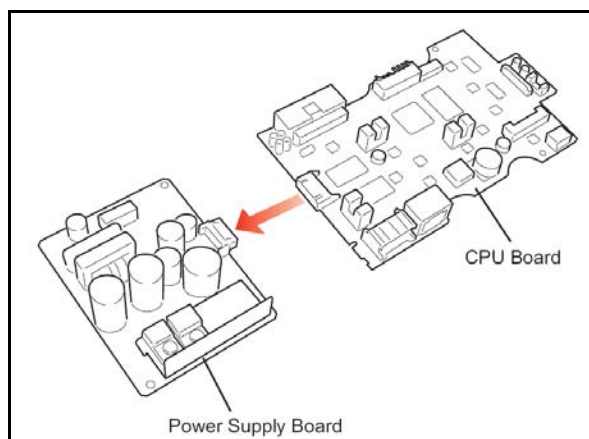


Figure 4-8 CPU and Power Supply Board Connector Separation

Pusher Mechanism Disassembly

Timing Belt removals

1. Remove the CPU and Power Supply boards as previously described (See "Removing the CPU and Power Supply boards" on page 4-1).
2. Remove the Side Bill Guides by following the direction indicated by the ① and ② arrows shown in Figure 4-9.

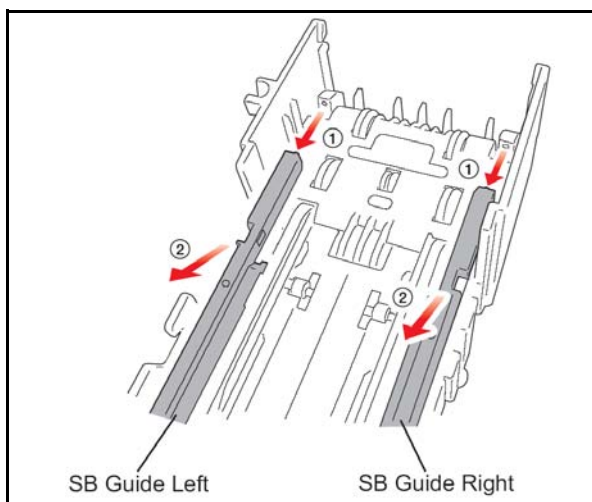


Figure 4-9 Side Guide Removal

3. Remove the Front Bill Guide by extracting it in the direction of the large arrow illustrated in Figure 4-10.

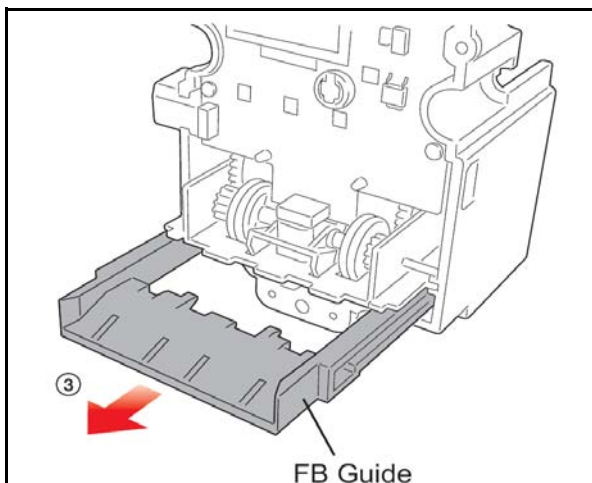


Figure 4-10 Front Guide Removal

4. Remove the Pusher Mechanism retaining screw and remove the assembly by following the large directional arrow shown in Figure 4-11.
5. Remove the two belts from the Pusher Mechanism assembly (See Figure 4-12). Once the belts are removed, remove their related tension rollers on each side as well (See Figure 4-12 a & b).



NOTE: When removing the timing belts from the pusher mechanism, be sure not to loose the rollers once you have removed them.

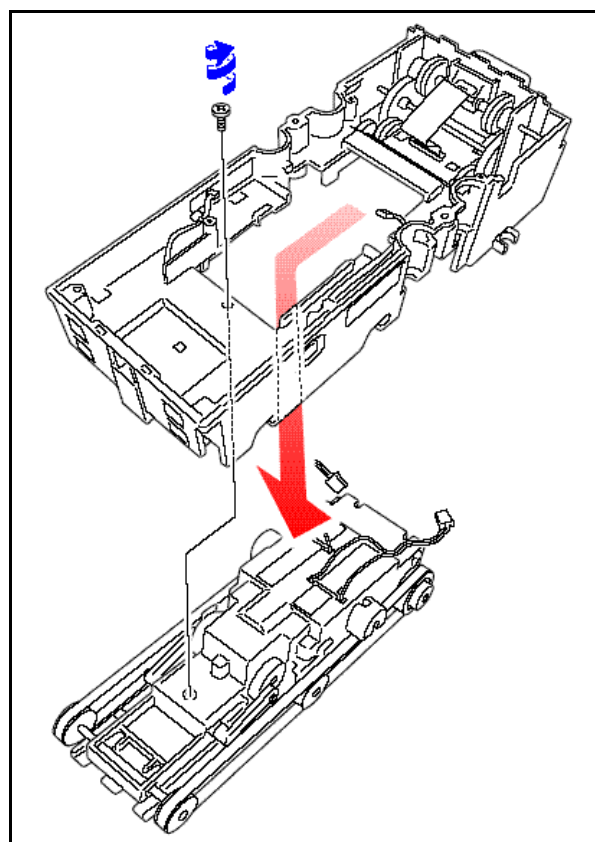


Figure 4-11 Pusher Mechanism Removal

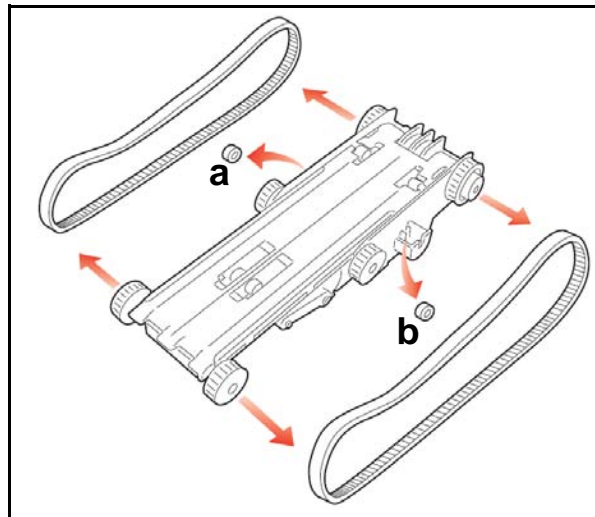


Figure 4-12 Timing Belt Removal

Removing the drive and stacking motors

1. Remove the two shaft retaining C-clip rings and pull the shaft out of the Pusher Plate (See Figure 4-13).

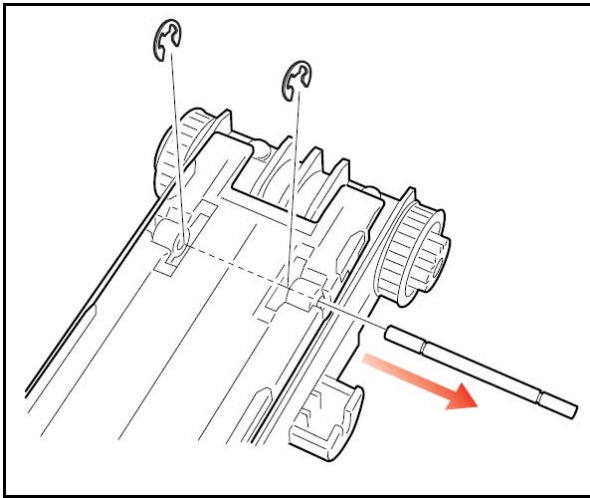


Figure 4-13 Pusher Shaft Removal

2. Slide the Pusher Plate in the direction indicated by the arrow in Figure 4-14 and remove the plate.

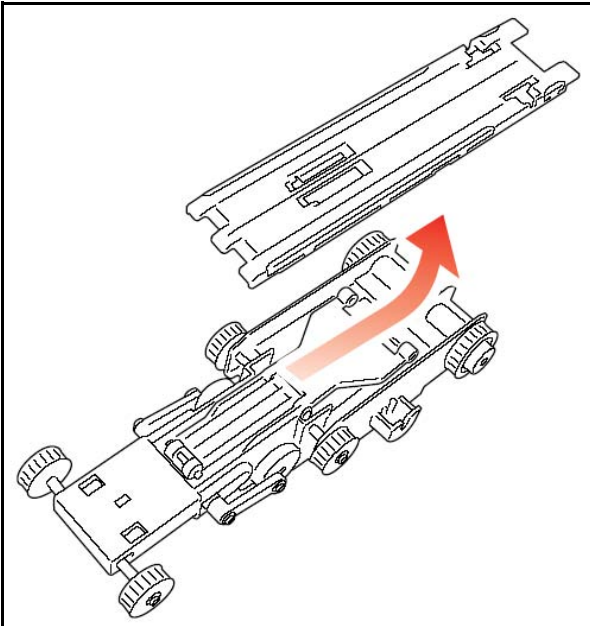


Figure 4-14 Pusher Plate Removal

3. Remove one of the shaft retaining C-clip rings, and pull the shaft out of the pusher arm; then remove the two sleeve spacers (See Figure 4-15).
4. Lift the pusher arm and remove the five retaining screws shown in Figure 4-16, then tip the assembly to the side and remove the loose pin (See Figure 4-16 a).
5. Turn the Pusher Mechanism assembly over and remove the motor guide assembly (See Figure 4-17).

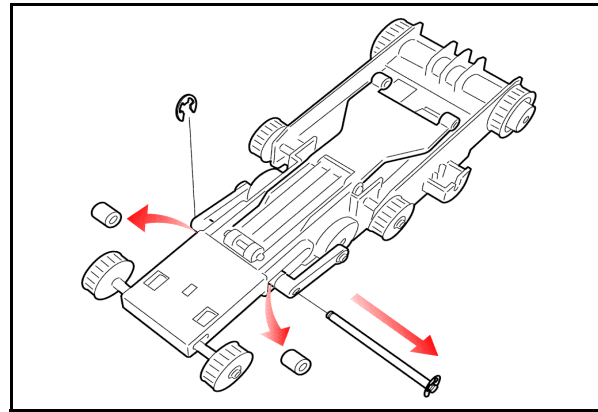


Figure 4-15 Shaft and Sleeve Spacer Removal

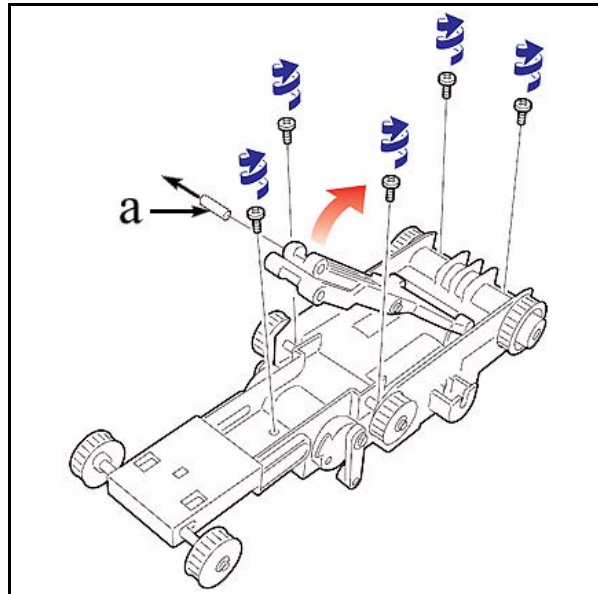


Figure 4-16 Retaining Screw Removals

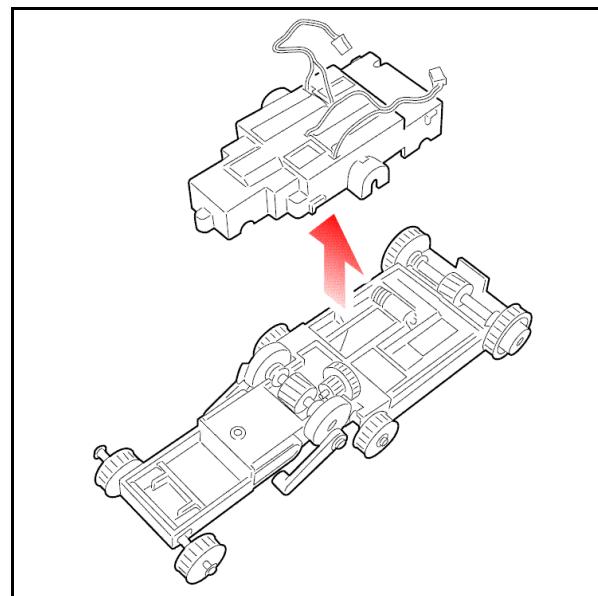


Figure 4-17 Motor Guide Removal

6. Remove the drive and stacking motors from the motor guide assembly (See Figure 4-18).

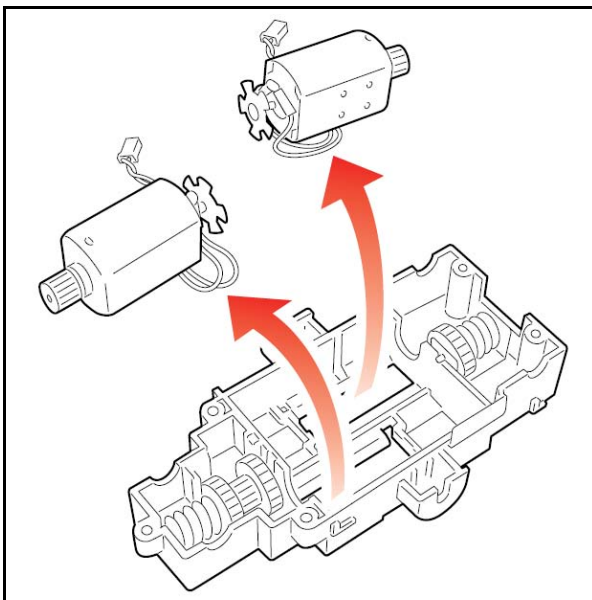


Figure 4-18 Drive and Stack Motor Removal

Upper Guide Disassembly

Sensor board removal

1. Remove the Pusher Mechanism assembly (See “Pusher Mechanism Disassembly” on page 4-2).
2. Remove the two Upper Guide retaining screws and pull the Upper Guide out of the assembly (See Figure 4-19).

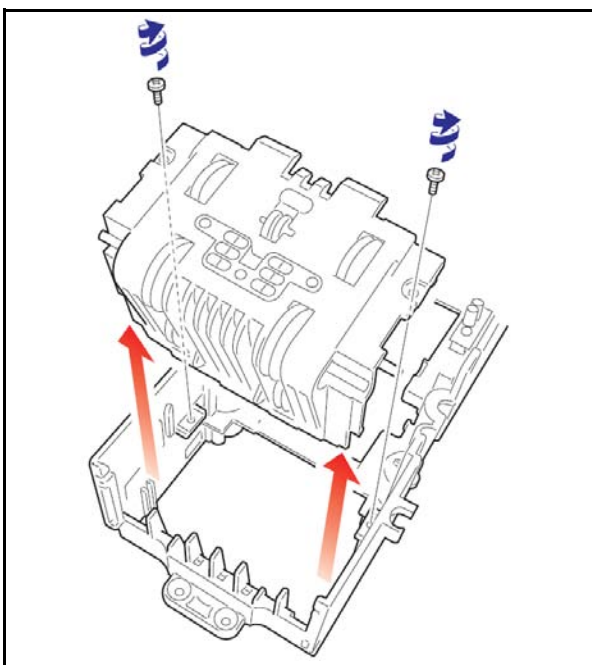


Figure 4-19 Upper Guide Removal

3. Pull the two shafts out and remove the two small and two large gears as illustrated by the arrows in Figure 4-20.

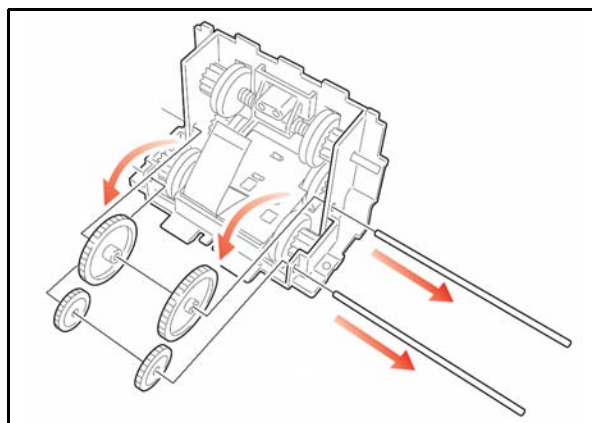


Figure 4-20 Upper Guide Gear Removals

4. Remove the two Sensor board mounting screws and remove the Sensor board from the assembly (See Figure 4-21).

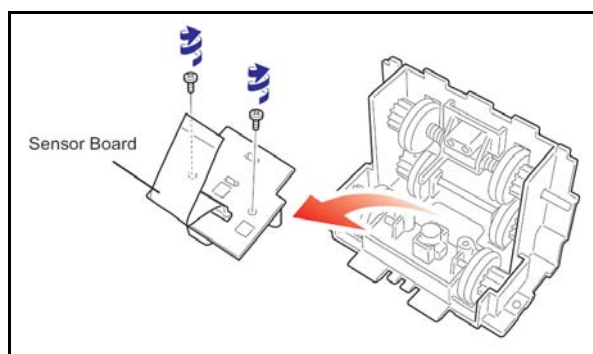


Figure 4-21 Sensor Board Removal

5. Release the ribbon cable connector lock and remove the flexible ribbon cable from the Sensor board (See Figure 4-22 small arrows).

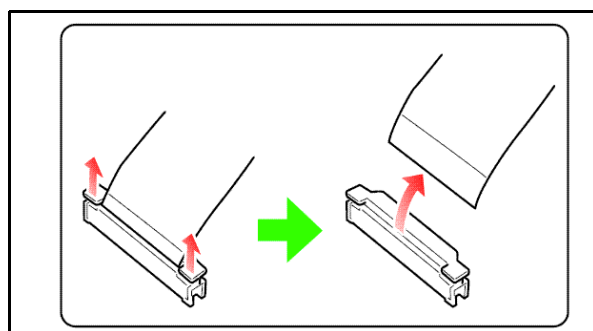


Figure 4-22 Flexible Ribbon Cable Removal



NOTE: When disconnecting the flexible connector, be sure to handle it carefully, otherwise, the connector retaining release clip may become damaged.

O-ring removal

1. Pull the two (2) short gear shafts out and remove the two (2) drive gears they retained (See Figure 4-23).

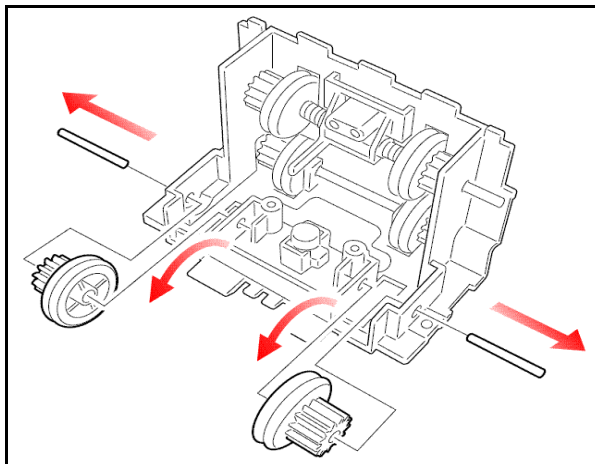


Figure 4-23 Short Shaft and Gear Removal

2. Pull the lower long gear shaft out and remove the two (2) drive gears it retained (See Figure 4-24).

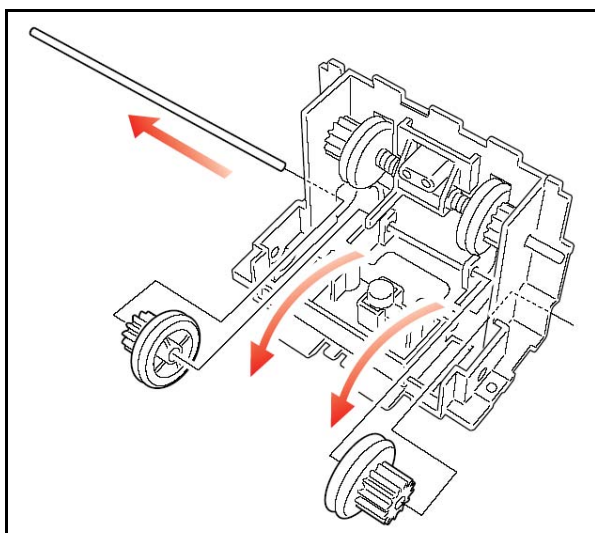


Figure 4-24 Lower Long Shaft and Gear Removal

3. Remove the two concentric O-rings residing on each of the drive gears just removed from the upper shaft assembly (See Figure 4-25).
4. Pull the upper long gear shaft out and remove the two gears, shaft springs, bushings, polly sliders and actuator it supported (See Figure 4-26).

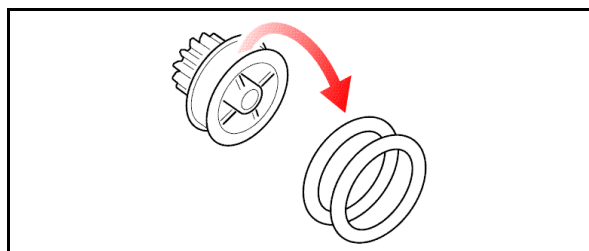


Figure 4-25 O-Ring Removals

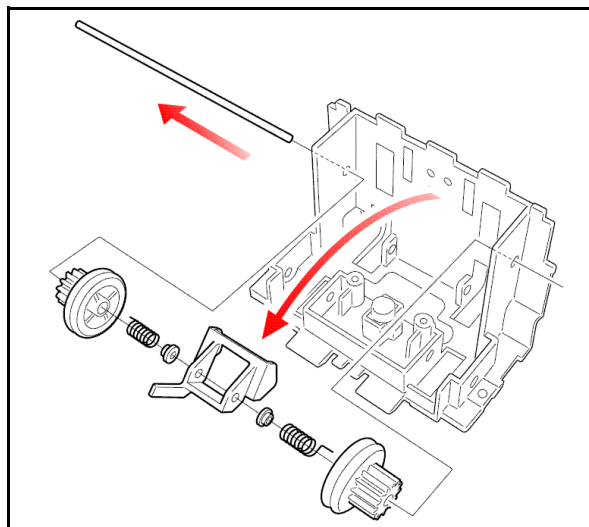


Figure 4-26 Upper Long Shaft and Gear Removal

Removing the Small Feed Sensor Boards

Proceed as follows to remove the Small Feed Sensor Boards:

1. Remove each Small Feed Sensor Board mounting screw (See Figure 4-27).

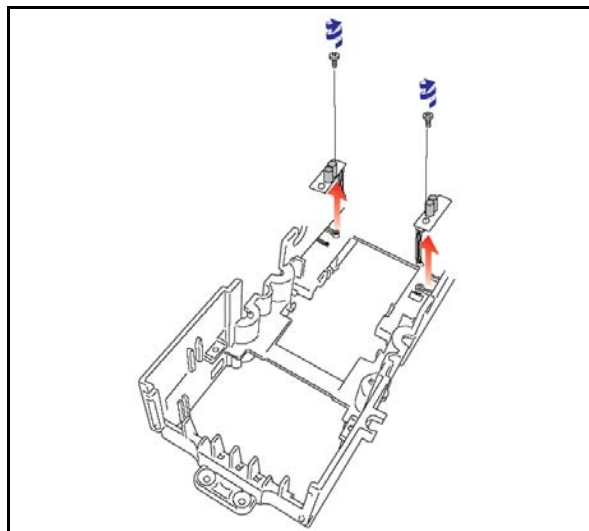


Figure 4-27 Small Feed Sensor Board Removal

2. Remove each Small Feed Sensor Board as indicated by the arrows in Figure 4-27.

Lower Guide Disassembly

MAG board removal

Remove the Lower Bill Guide retaining screw and remove the Lower Bill Guide's cover in the direction of the large arrow illustrated in Figure 4-28.

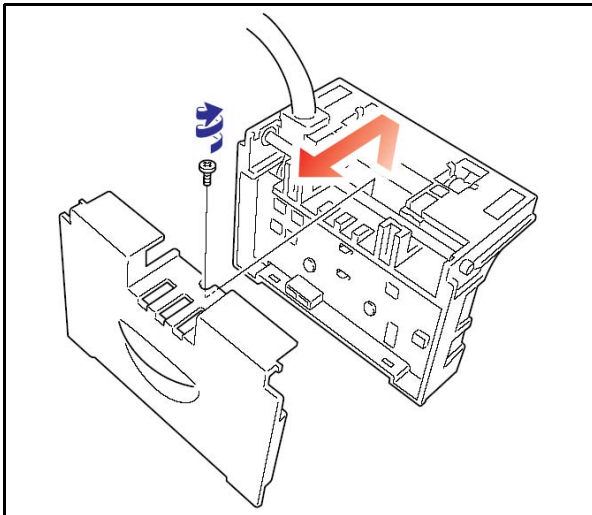


Figure 4-28 Lower Bill Guide Removal

3. Remove the two screws retaining the MAG Board to the assembly and carefully lift the MAG Board up in the direction of the arrow illustrated in Figure 4-29.

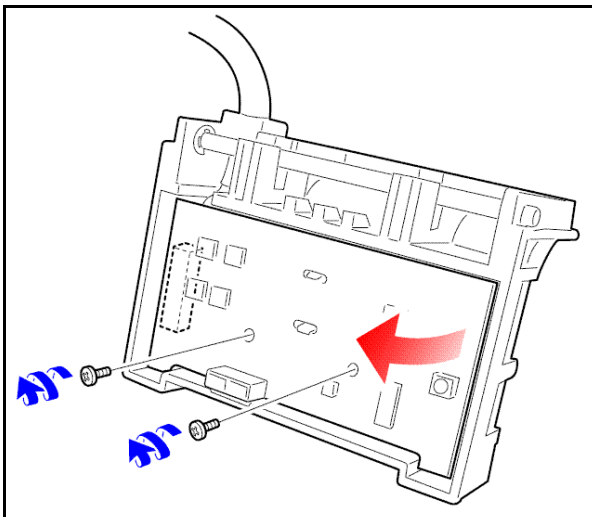


Figure 4-29 MAG Board Removal

4. Disconnect the boards underside connector and remove the MAG Board from the assembly (See Figure 4-30).

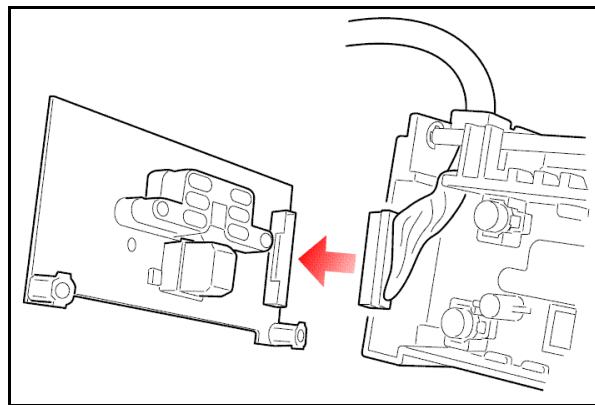


Figure 4-30 Disconnect MAG Board Connector

Reverse all of the proceeding instructions to replace any of the components described during this disassembly process.

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Optipay™ BV

DBV-30X Bill Validator

Section 5

5 WIRING DIAGRAMS

This section provides the Wiring Diagram interconnect for the Optipay™ BV DBV-30X Bill Validator (See Figure 5-1 and Figure 5-2).

This section contains the following information:

1. DBV-30X-SU Interconnect (Part 1)
2. DBV-301-SU Interconnect (Part 2 a)
3. DBV-302-SU Interconnect (Part 2 b)

DBV-30X Interconnect

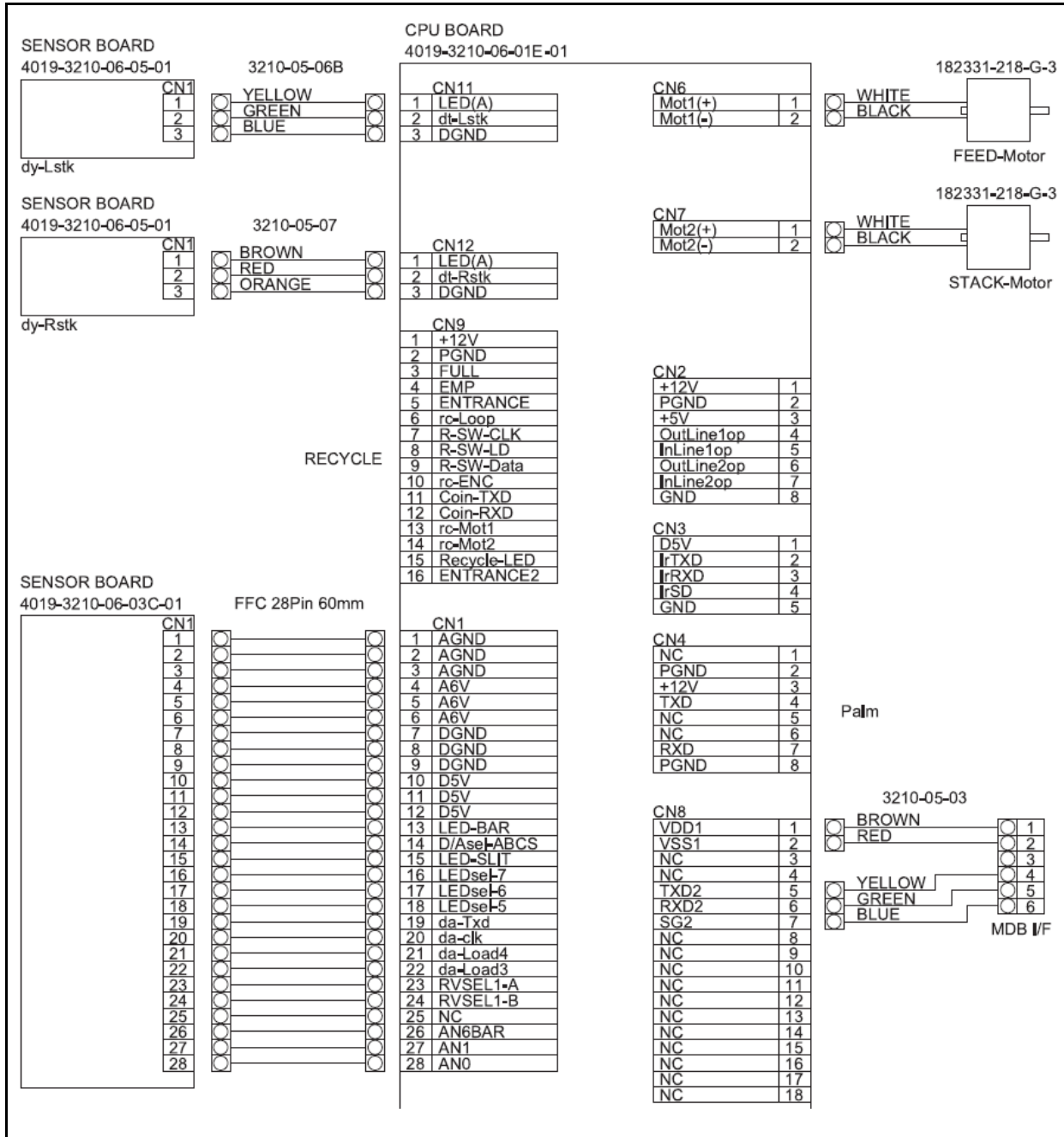


Figure 5-1 DBV-30X Bill Validator Interconnect Wiring Diagram (Part 1)

DBV-30X Interconnect Continued

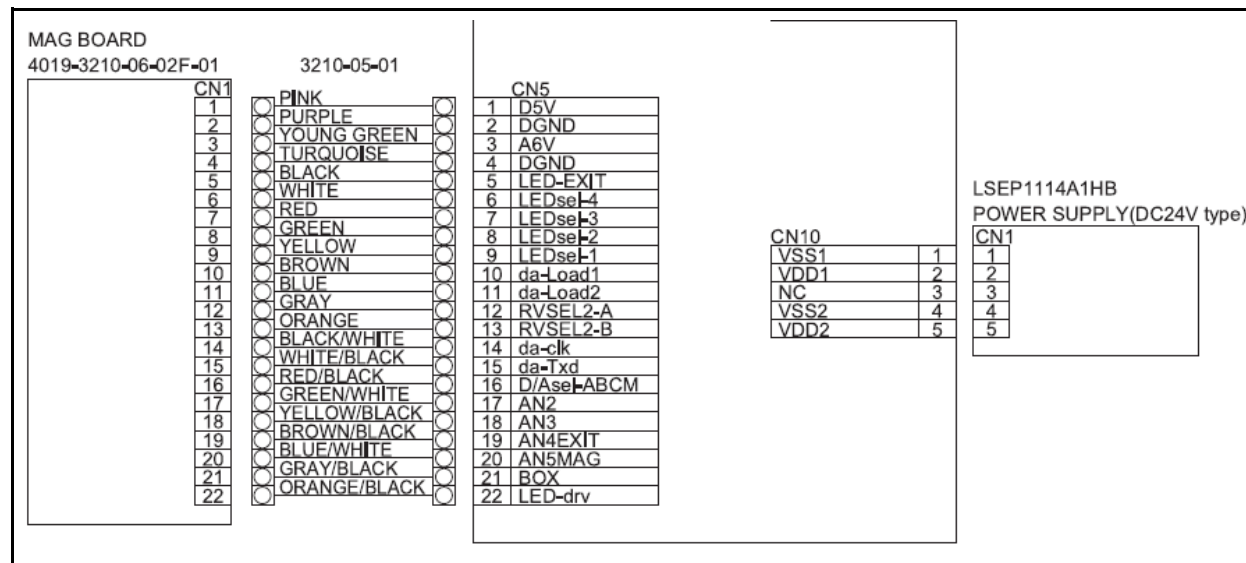


Figure 5-2 DBV-301 Bill Validator Interconnect Wiring Diagram (Part 2a)

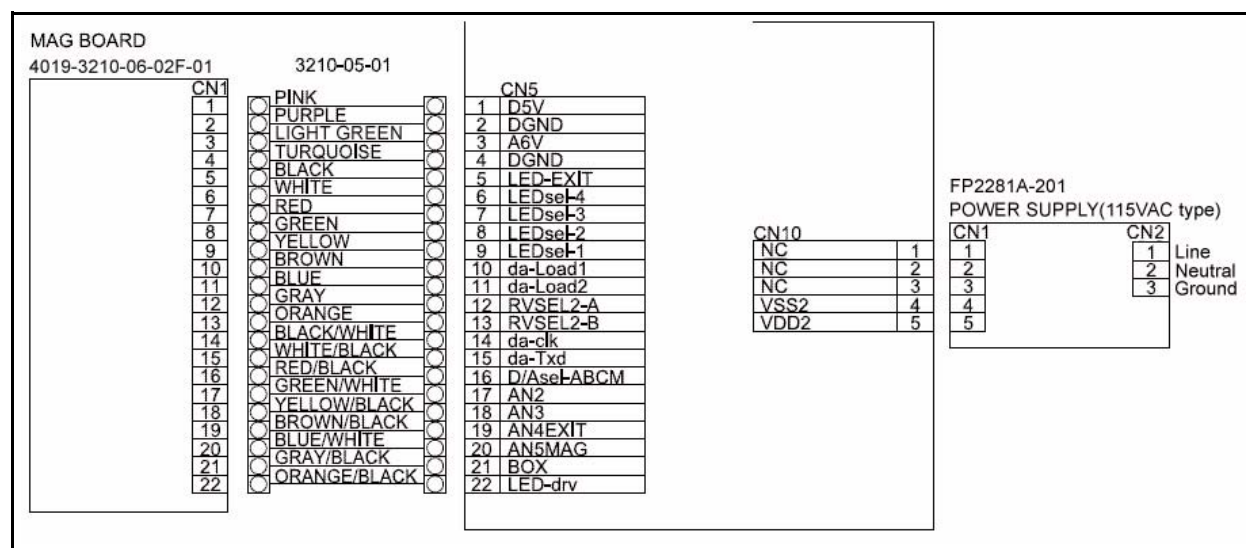


Figure 5-3 DBV-302 Bill Validator Interconnect Wiring Diagram (Part 2b)

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Section 6

6 PC DOWNLOAD & ADJUSTMENT

This section provides download and adjustment procedure instructions for the Optipay™ BV DBV-30X Bill Acceptor. The information within contains the following features:

- Downloading Calibration Software
- Starting the Download Program
- Adjustment Preparation
- Adjustment Procedure

Downloading Calibration Software

This part describes how to download the calibration software program from your PC to DBV-30X unit. When upgrading the software or replacing the CPU Board this software download is required if a Palm Pilot® handheld device containing the JCM PSP-03 Acceptor Program is not available.



NOTE: When downloading the software program from a Palm Pilot® into the DBV-30X unit, refer to the Flash Memory Downloading instructions provided in Section 7 instead of using the procedure described here.

Tool Requirements

When downloading the PC software program, the following items are required:

- DBV-30X-SU unit
- JCM Power Supply unit (Part No. 550-100441)
- JCM Communication cable (IFU-002, Part No.100157)
- PC (Windows® 98 SE/2000/MS-DOS® /XP Version 5.x/6.x with a free RS-232C serial port)
- Download Program
- Software Program
(Example:DBV301SU.USA2)

Initial Set-up

1. Before downloading the software, perform the equipment set-up illustrated in Figure 6-1 to ensure proper cable and harness inter-connection.



Caution: When connecting the harness to the DBV-30X unit, be sure that power to the VM-300/301 Power Supply is OFF. Failure to do so may cause electric shock and/or permanent damage to the device.

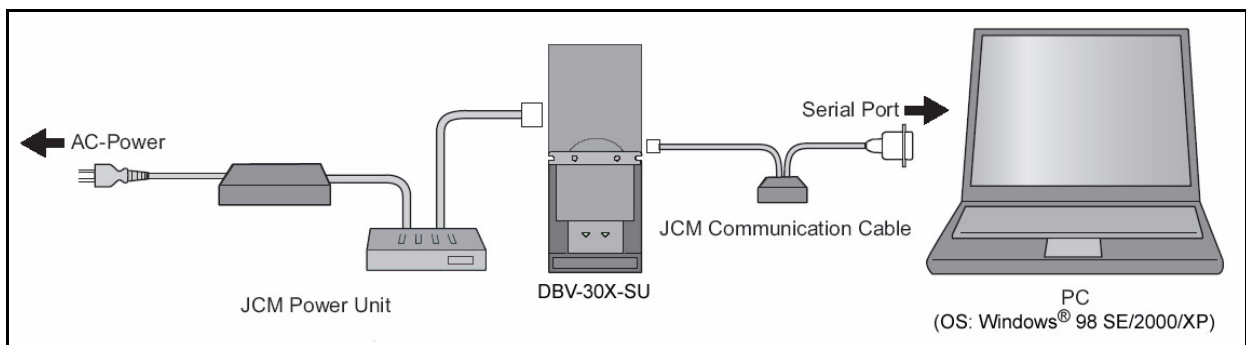


Figure 6-1 PC Software Downloading Configuration

2. Set DIP Switches SW1-1, 1-6, 1-7 and 1-8 to ON and Switches SW1-2 through 1-5 to OFF (See Figure 6-2).
3. Supply the power to the DBV-30X unit.
4. Check that the Indication LEDs are blinking and that the Red, Green and Yellow Condition LEDs alternately light. This indicates the DBV-30X unit is in the Download Mode.
5. Copy the download program (DWN . exe) and the software program (DBV301SU . USA2) onto a floppy disk.

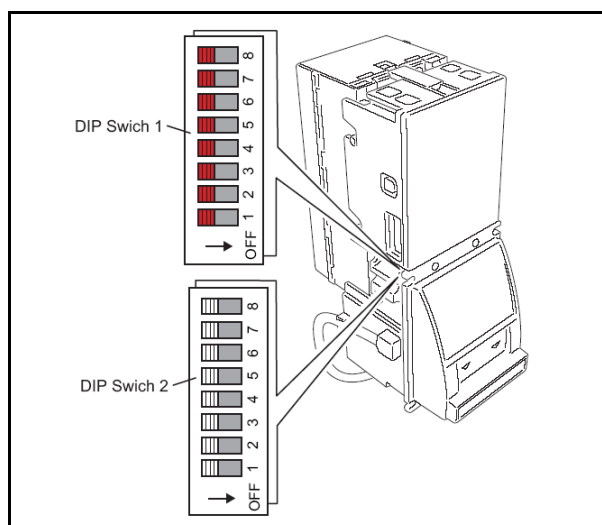


Figure 6-2 DIP Switch Locations

Starting the Download Program

The following steps will begin a download:

1. Turn the PC Power ON.
2. Insert the previously created floppy disk containing the "DWN.exe" download and the "DBV301SU.USA2" software program to your PC's floppy disk drive.
3. Start the MS-DOS Command Prompt. For user instructions, see your PC and MS-DOS/Windows manuals.
4. When the prompt menu appears, type your PC's floppy drive name **[X]**. For example, if your floppy drive is the "A" unit, type **[A]** and press the **[ENTER]** key.
5. To get the list of file names on the floppy disk, type **[DIR]** and press the **[ENTER]** key.
6. Find the software program file name and enter the parameters as shown in the Figure 6-3 diagram. Example, if the file name is DBV301SU.USA2 and your PC's COM Port No. is 1, type: DWN DBV301SU.USA2 2 252 246 1 and press the **[ENTER]** key.

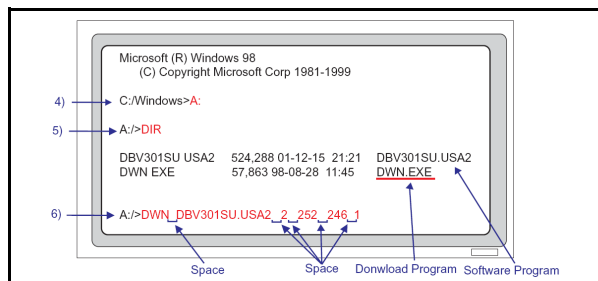


Figure 6-3 Typical Parameter Entry

7. When the program starts, the Figure 6-4 screen will appear.



NOTE: If the download file is correct, "VCF430" appears on the top line.

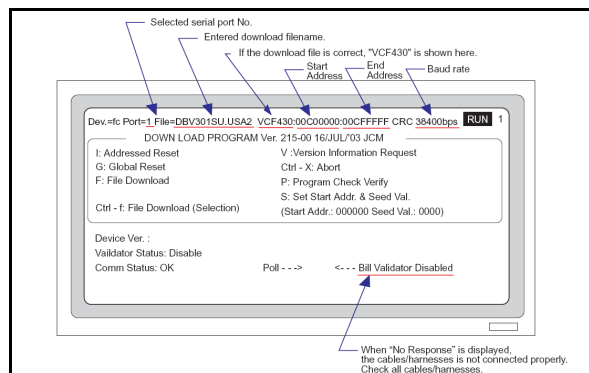


Figure 6-4 Program Start Screen

8. Press the **[SHIFT]** + **[F]** keys (capital letter F) to start the download.
9. When the download is completed, the CRC heck sum is displayed.
10. Press **[CTRL]** + **[X]** keys to exit the download program.
11. To exit the MS-DOS/Command Prompt, type **[EXIT]** and press the **[ENTER]** key.

Adjustment Preparation

This part describes how to adjust the DBV-30X unit. When the DBV-30X unit's Acceptance Rate gets low or the DBV-30X unit's CPU/MAG/Sensor board has been replaced, the DBV-301 unit must be readjusted.

Tool Requirements

When adjusting a DBV-30X unit, the following items are required:

- DBV-30X-SU (with Cash Box installed)
- PC (Windows® 98 SE/2000/MS-DOS®/XP Version 5.x/6.x with a free RS-232C serial port)
- JCM Power Supply unit Part No.550-100441)
- JCM Communication cable (IFU-002, Part No.:100157)
- Adjustment Program Installer (setup.exe/SETUP.LST/Cab300.CAB)
- White Reference Paper (KS-059, Part No.:111542)

- Black Reference Paper Type 1 (KS-060, Part No.:111541)
- Black Reference Paper Type 2 (KS-061, Part No.:111540)

Installing the Adjustment Program (Cab300.exe)

Perform the following steps to install the Cab300.exe adjustment program:

1. Copy the adjustment program installer (setup.exe/SETUP.LST/Cab300.CAB) into a folder on your PC.
2. Double click on setup.exe to start the installation.

3. Follow the instruction shown on the screen to complete the installation.

Initial Set-up

1. Before adjusting the DBV-30X unit, perform the equipment set-up illustrated in Figure 6-5 to ensure proper cable and harness inter-connection.



Caution: When connecting the harness to the DBV-30X unit, make sure the Power Supply is OFF. Failure to do so may cause electric shock and/or permanent damage to the device.

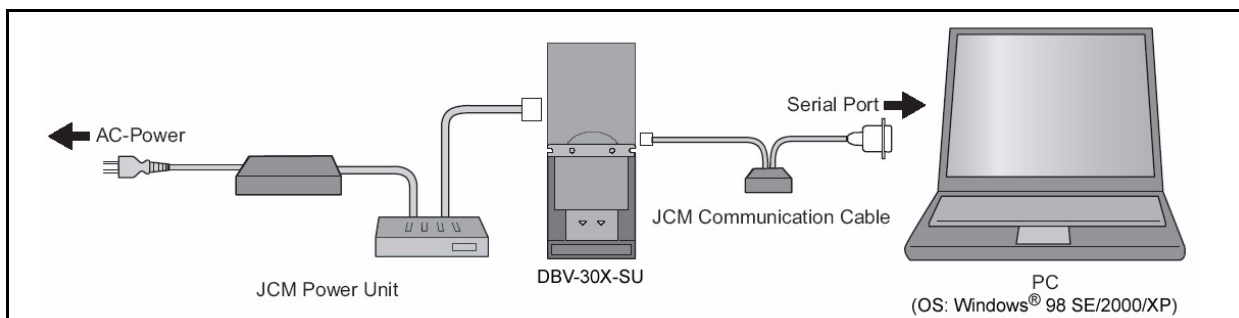


Figure 6-5 Equipment Adjustment Configuration

2. Set DIP Switch SW1-8 to ON and apply power to the unit.
3. Check that the Indication LEDs are blinking and the Green, Yellow and Red Condition LED's light. This indicates that the DBV-30X unit is in the Test Mode.

Adjustment Procedure

To adjust the DBV-30X unit, perform the follow steps:

1. Double click on the Cab300.exe Adjustment Program and the window shown in Figure 6-6 will appear.
2. Select the desired PC's COM Port No. and click the **OK** Button. The DBV-30X Adjustment program shown in Figure 6-7 will then appear.



NOTE: When replacing the CPU board, be sure to write its Serial Number. into the DBV-301 unit memory.

3. Record the DBV-30X unit's Serial No. and write it into memory by selecting the menu bar's [Help(H)/Change SerialNo.] pull down menu (See Figure 6-8).

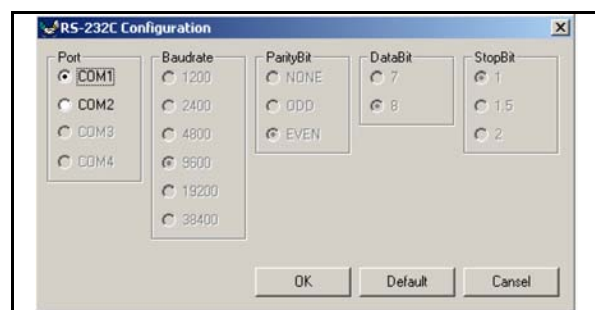


Figure 6-6 RS-232C Configuration Screen

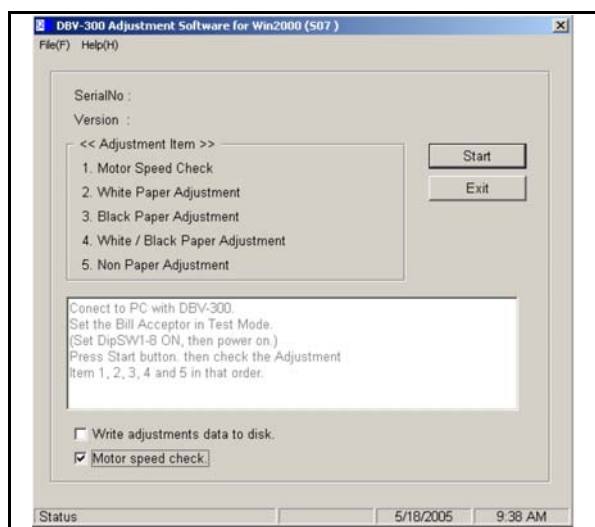


Figure 6-7 S07 Adjustment Program Screen

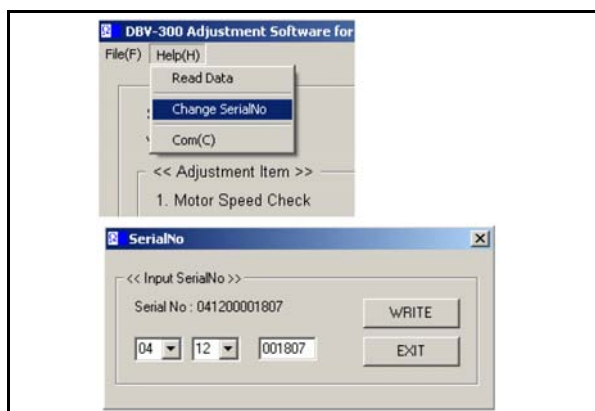




Figure 6-8 Serial Number Input Screen

4. Once the new serial number has been entered click to enter it into memory and to proceed to the next step.

 **NOTE:** If an error occurs while adjusting the DBV-30X unit, repeat the specific Adjustment program instruction, or turn the DBV-30X unit's power OFF and restart the adjustments again from the beginning.

 **NOTE:** Be sure to set the Cash Box into the DBV-30X unit during this test.

5. Click the Button to begin the adjustment procedure. The Motor Speed Check (Adjustment Item #1) will start.
6. When the Motor Speed Check is finished, the message window shown in Figure 6-9 will appear.

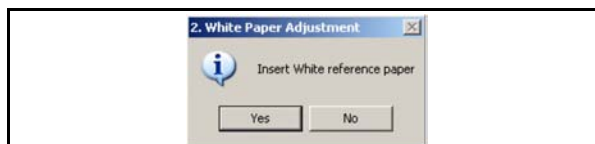


Figure 6-9 Insert White Reference Paper Request Screen

7. Remove the Cash Box and place the White reference paper into the lower guide (See Figure 6-10). Start the White Paper Adjustment Procedure (Adjustment Item #2) by clicking the Button.
8. When the White Paper Adjustment is finished, the message window shown in Figure 6-11 will appear.
9. Open the Lower Guide and remove the White Reference Paper. Place Black Reference Paper #1 into the Lower Guide and insert Black Reference Paper #2 into the bill insertion slot (See Figure 6-12 a & b).

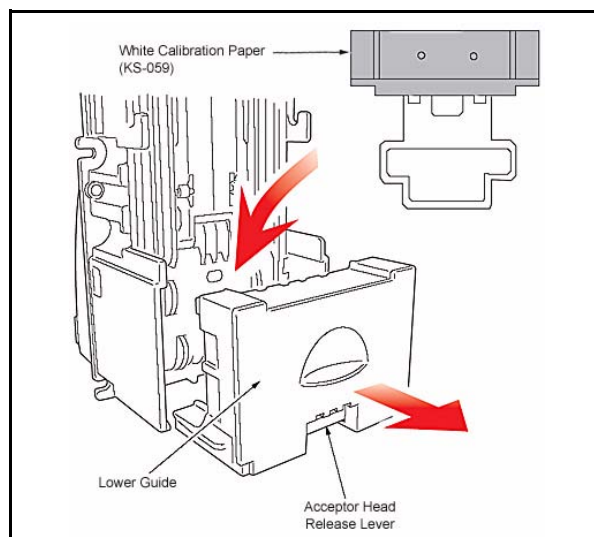


Figure 6-10 Inserting White Calibration Paper

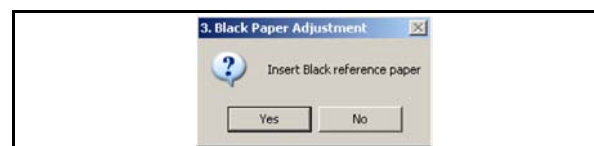


Figure 6-11 Insert Black Reference Paper Request Screen

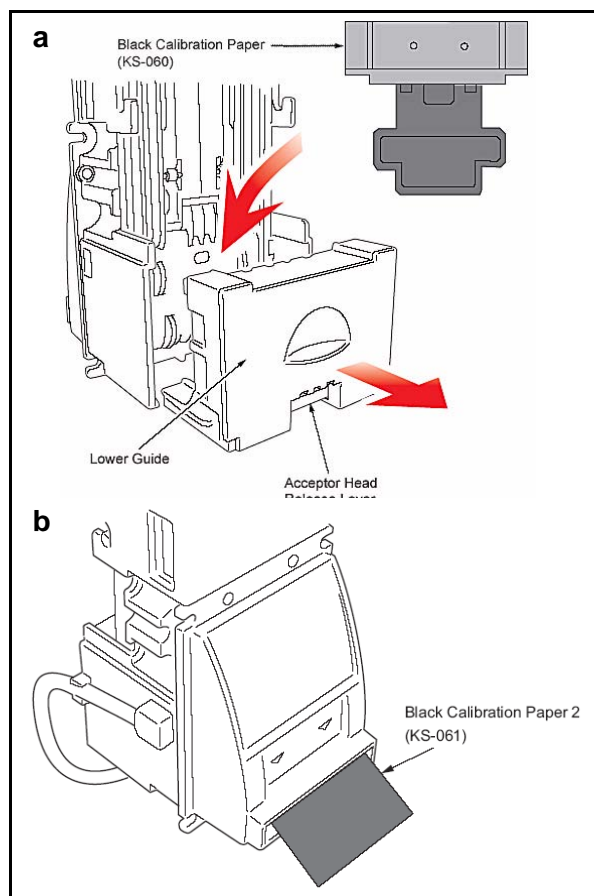


Figure 6-12 Inserting Black Calibration Papers

10. Start the Black Paper Adjustment Procedure (Adjustment Item #3) by clicking the Button.

11. When the Black Paper Adjustment is finished, the message window shown in Figure 6-13 will appear.

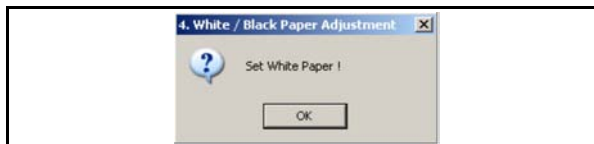


Figure 6-13 Second White Reference Paper Request Screen

12. Remove Black Reference Papers 1 and 2 and replace the White Reference Paper into the Lower Guide.

13. Click the Button to restart the White level adjustment test for the White/Black Paper Adjustments (Adjustment Item #4).

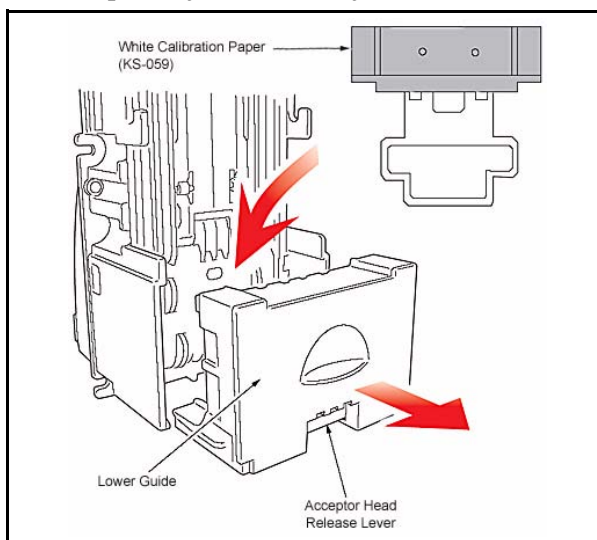


Figure 6-14 Reinserting White Calibration Paper

14. When the White level adjustment of the White/Black Paper Adjustment is finished, the message window shown in Figure 6-15 will appear.

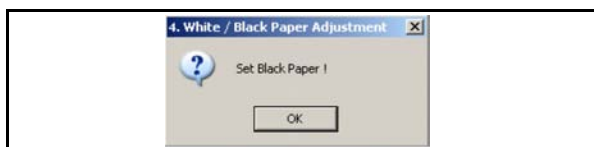


Figure 6-15 Second Black Reference Paper Request Screen

15. Remove the White Reference from the Lower Guide and replace Black Reference Paper #1 into the guide (See Figure 6-16).

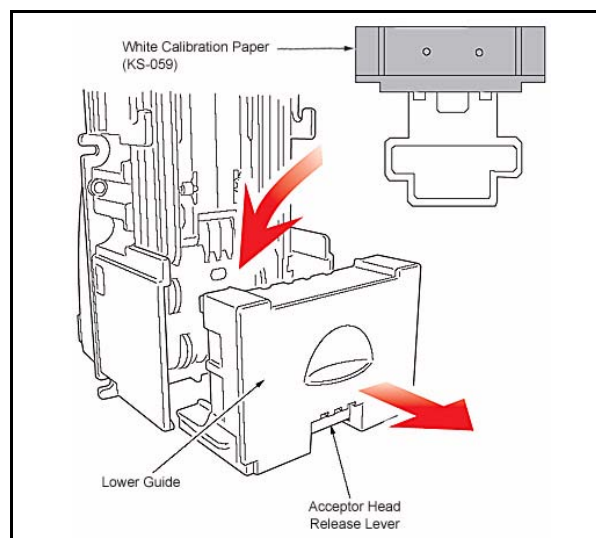


Figure 6-16 Reinserting Black Calibration Paper

16. Click the Button to start the Black level adjustment for the White/Black Paper Adjustment.

17. Once Steps 7 through 16 repeat several times, the message window shown in Figure 6-17 will appear.



Figure 6-17 Non-Paper Request Screen

18. Remove the Black Reference Paper from the Lower Guide and replace the Cash Box into the DBV-301 unit.

19. Click the Button to start Non-Paper Adjustment. The message window shown in Figure 6-18 will then appear.

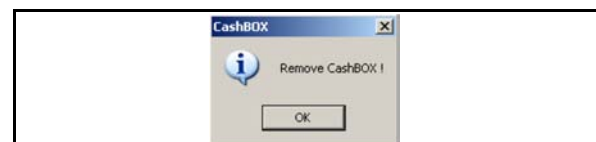


Figure 6-18 Remove Cash Box Request Screen

20. Remove the Cash Box again and click the Button to start the Non-Paper adjustment.

21. When the Non Paper Adjustment is finished, the message window shown in Figure 6-19 will appear.

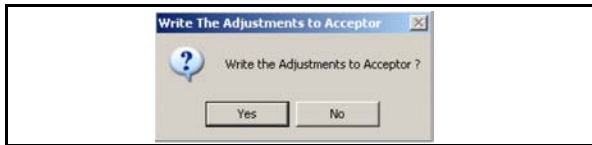


Figure 6-19 Write Adjustments to the Acceptor Request Screen

22. Click the Button to write the adjustment data to the DBV-301 unit's memory.
23. When the data is finished writing to memory, the message window shown in Figure 6-20 will appear.



Figure 6-20 Adjustment Complete Screen

24. Click the Button to Complete the Adjustment Procedure.

This is the end of the DBV-30X Adjustment Procedure.

Optipay™ BV DBV-30X Bill Validator

Section 7

7 PALM PILOT® FLASH MEMORY DOWNLOADING

This section provides download instructions for the Optipay™ BV DBV-30X Bill Acceptor. The information within contains the following features:

- Downloading to Flash Memory Description
- Tool Requirements
- Information Menu Selection
- Diagnostics Menu Selection
- Program Download Menu Selection
- Selecting a Download ROM
- Accepting a Log Menu Selection
- Starting the Download Program
- Downloading Procedure Examples

Tool Requirements

A Palm Pilot® handheld device is required to configure the DBV-30X Bill Acceptor using JCM PSP-03® Acceptor Program software.

Equipment Required

- A Palm Pilot® Handheld – M125, M130, M500, M505, M515, Tungsten T, Tungsten T2, and Tungsten C Handhelds (See Figure 7-1)
- Titan Acceptor Communication Cable
- JCM PSP-03 Acceptor Program for the Palm Pilot® handheld
- PC with Windows 2000 or XP O/S
- Palm Pilot® Application Suite
- Hot Sync Cradle or Cable*



* Refer to the Palm Pilot User's manual for program installation and Hot Sync user instructions.

Information Menu Selection

To use the Palm Pilot® programming application menu perform the following steps:

1. Turn on the Palm Pilot® and select the JCM PSP-03 main menu application (See Figure 7-1a or See Figure 7-2a).



Figure 7-1 Typical Palm Pilot Handheld & Software

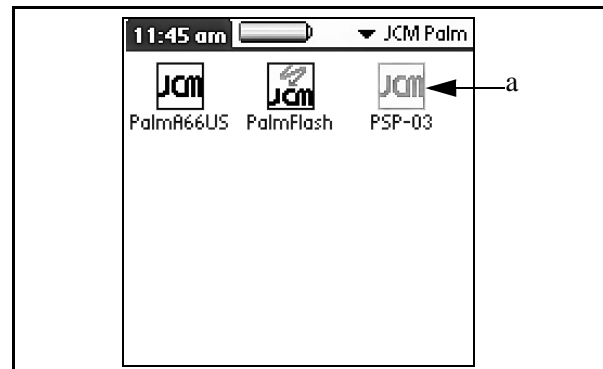


Figure 7-2 PSP-03 Application Selection

2. Select the **Settings** button on the **Palm Setting Program** main menu screen (See Figure 7-3 a).
3. Select the **Information...** button on the **Settings** menu screen. (See Figure 7-4 a) or **Back** to return to the previous screen.

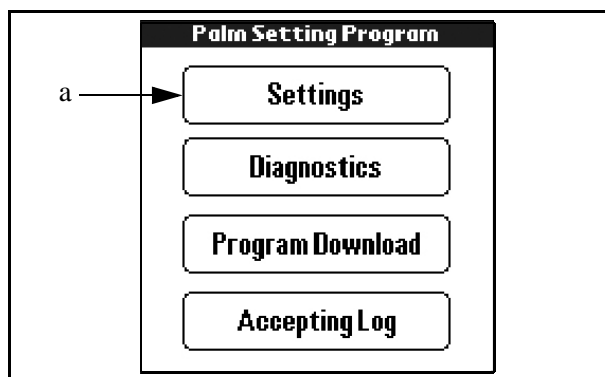


Figure 7-3 Settings Menu Selection

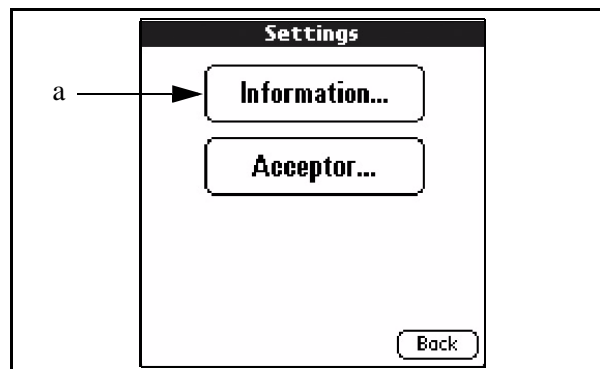


Figure 7-4 Information Menu Selection

4. The following typical configuration settings for a Validator are shown in Figure 7-5 when the **Information...** button is selected:
- The Firmware Version – V1.02C
 - The Enable/Disable DIP Switch Settings
 - The bill values enabled (\$1 and \$5 Bills)
 - The **Rec** Button to enter refreshed data from the Validator and
 - The **Back** Button to return to the **Settings** Screen.

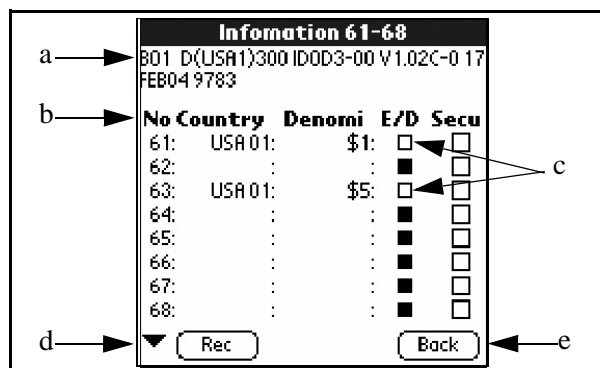


Figure 7-5 Typical Configuration Settings

5. Once back on the **Settings** Screen, select the **Acceptor...** Button (See Figure 7-6 a).

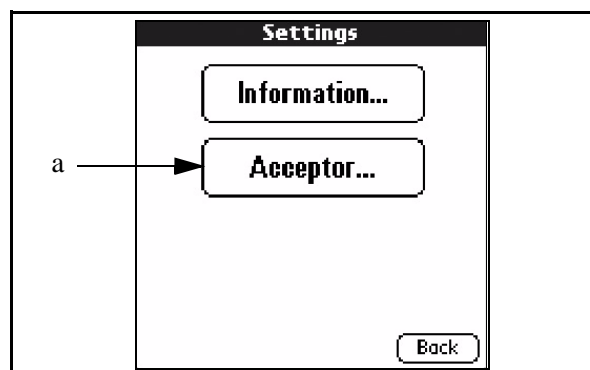


Figure 7-6 Acceptor Mode Selection

6. With future firmware releases, the **Acceptor** screen will be used to configure the Bill Validator settings as well (See Figure 7-7), for the present however, select **Back** to return to the **Settings** main menu screen.

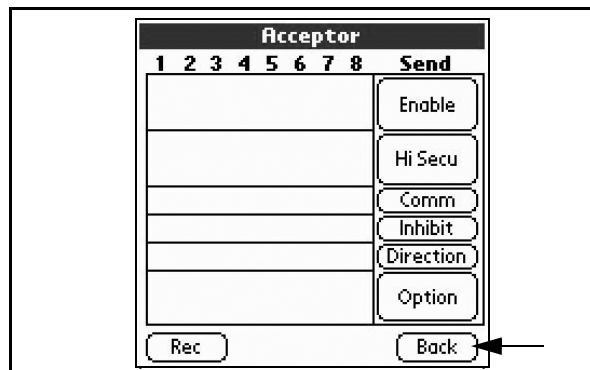


Figure 7-7 Acceptor Screen Functions

7. Once on the **Settings** menu screen, select the **Back** button again to return to the **Palm Setting Program** main menu screen (See Figure 7-8).

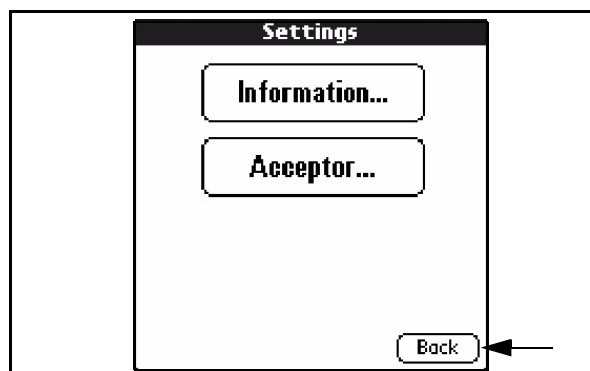


Figure 7-8 Returning to the Settings Screen

Diagnostics Menu Selection

- On the **Palm Setting Program** main menu screen select the **Diagnostics** Button (See Figure 7-9 a).

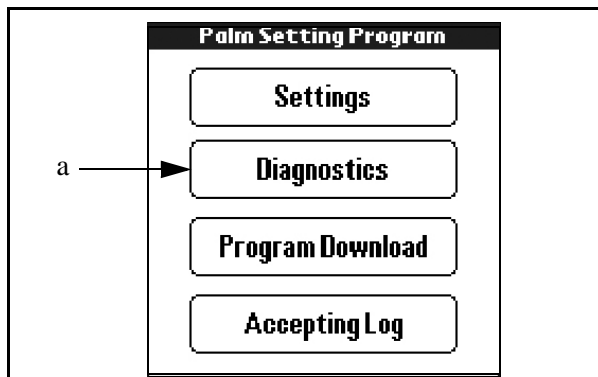


Figure 7-9 Diagnostics Mode Selection

- The **Diagnostics** screen is used to test the following DBV functions:
 - Forward Motor Speed RPM
 - Reverse Motor Speed RPM
 - Stacker Test
 - Run Test
 - Solenoid Test
 - Sensor 1 Transmit/Receive Test
 - Sensor 2 Transmit/Receive Test
 - Dip Switch Settings Test
 (See Figure 7-10 “a” through “h”)

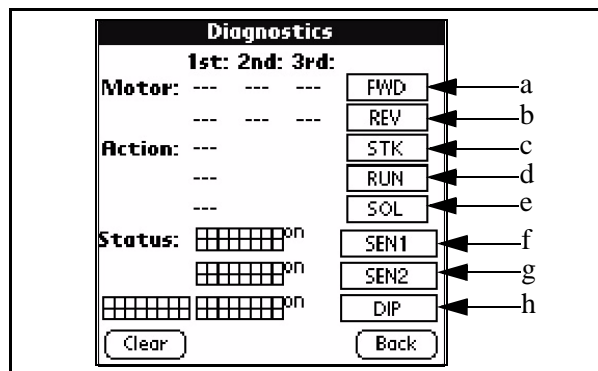


Figure 7-10 Diagnostics Screen Functions

- Select the **Back** Button to return to the **Settings** menu screen.

Program Download Menu Selection

- Select the **Program Download** Button on the **Palm Setting Program** main menu screen (See Figure 7-11 a).

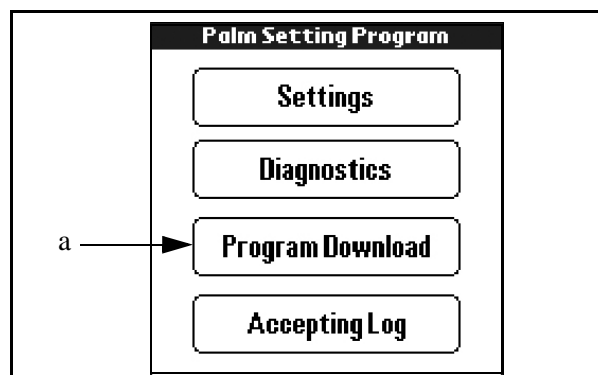


Figure 7-11 Program Download Menu Selection

- Select the software version to be downloaded (See Figure 7-12 a).
- Select **Send** to transmit the software to the Validator (See Figure 7-12 b).

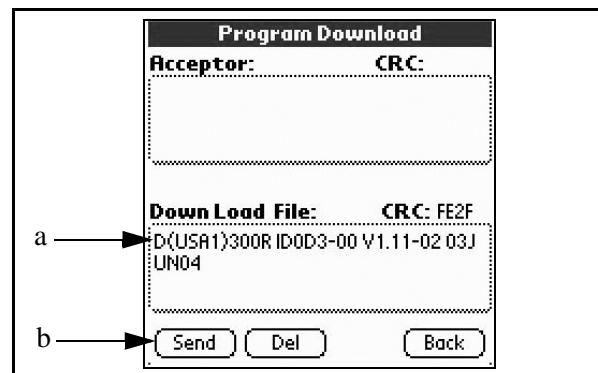


Figure 7-12 Program Download Screen

NOTE: The **Download File:** box shows the loaded firmware version. To select from the available versions loaded, mouse-click any open area inside of the **Download File:** box.

Selecting a Download ROM

Having mouse-clicked any open area inside of the **Download File:** box:

- Select the firmware version from the available list on the **Down Load File Select** screen that appears (See Figure 7-13 a), then
- Click the **Back** Button to return to the **Program Download** main menu screen (See Figure 7-13 b).

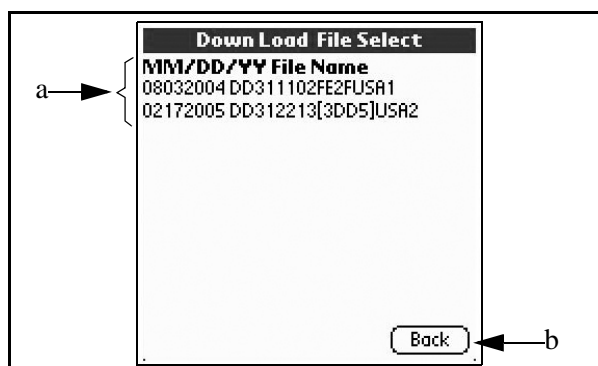


Figure 7-13 ROM Select Screen

3. Select **Send** on the **Program Download** main menu to start the selected firmware download (See Figure 7-15 a).
4. During the download incrementing numbers will appear in an inset **New Data Trans...** window left of the correct final value shown at right (See Figure 7-14 a).

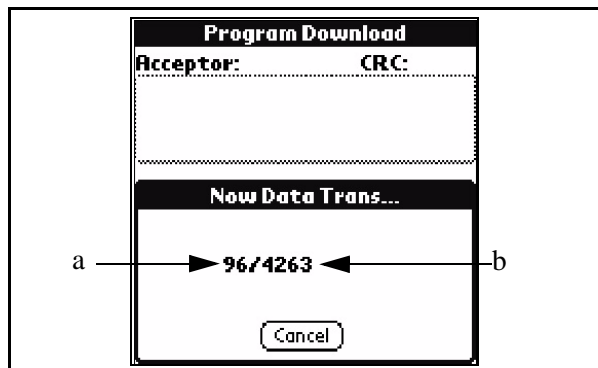


Figure 7-14 Download Transfer Screen



NOTE: Ensure that the number of data bytes loaded versus the total data bytes needed to complete the download process agree when the download is complete (i.e., $a = b$ in Figure 7-14).

5. Once the download is complete, verify that the program version listed in the "Download File:" window agrees with your initial selection (See Figure 7-15 b).
6. Click the **Back** button to return to the on the **Palm Setting Program** main menu screen (See Figure 7-15 c).

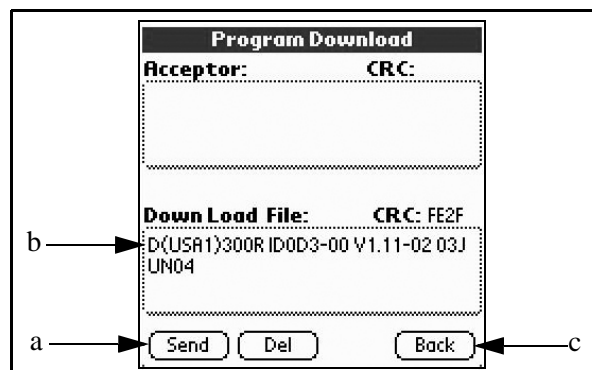


Figure 7-15 Download Send Command

Accepting a Log Menu Selection

1. On the **Program Download** main menu screen, select the **Accepting Log** menu button (See Figure 7-16).

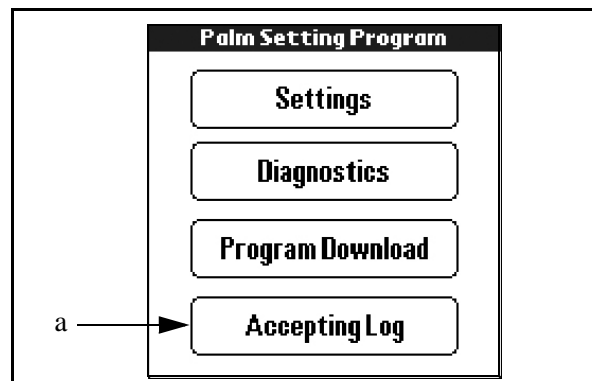


Figure 7-16 Accepting Log Mode Selection

2. In the Figure 7-17 **Accepting Log** menu choose:
 - a. **Rec** to download the Accepting Log
 - b. **Init** to initialize or clear the validator memory
 - c. **Del** to clear all downloaded Accepting Logs, or
 - d. **Back** to return to the **Palm Setting Program** main screen of Figure 7-16.
3. Click on the "download record number" itself to view the related log data (See Figure 7-18 a). The **Accepting Log** Screen illustrated in Figure 7-19 will then appear.
4. Select **Next** to view additional pages of the selected **Accepting Log** (See Figure 7-19).

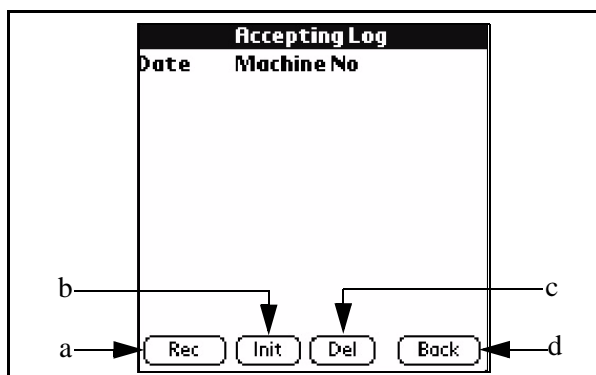


Figure 7-17 Accepting Log Menu



Figure 7-18 Viewing Record Log Data

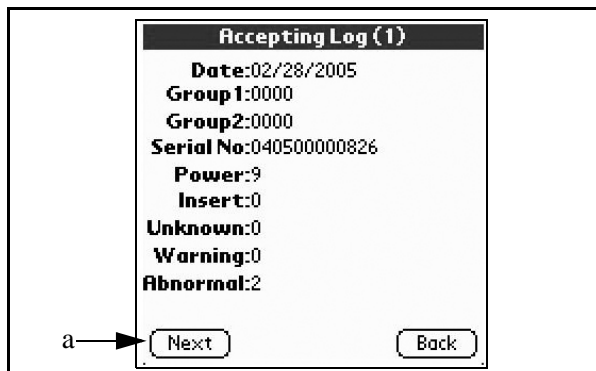


Figure 7-19 Viewing Specific Log Data 1

5. Page two of the **Accepting Log** lists the last 16 bills accepted, their denomination and the direction in which the bill was inserted (See Figure 7-20).
6. Page three lists the total bill denominations counted and their date code, those accepted and those rejected as follows:
 - a. The specific bill type count
 - b. The denomination and its series date code (Example 1 = 1\$ of series 1990, 87 bills accepted, 0 rejected)

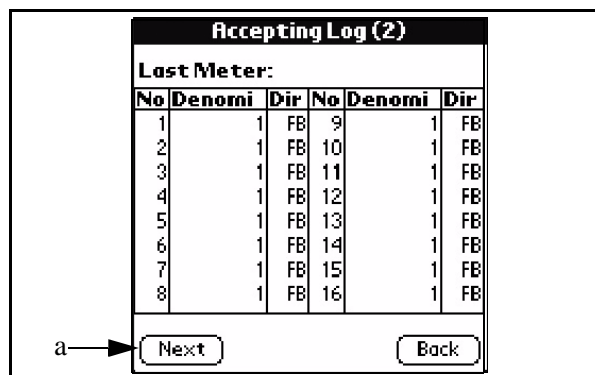


Figure 7-20 Viewing Page Two Log Data

- c. The number of the specific bills accepted
- d. The number of the specific bills rejected (See Figure 7-21 a, b, c, and d respectively).

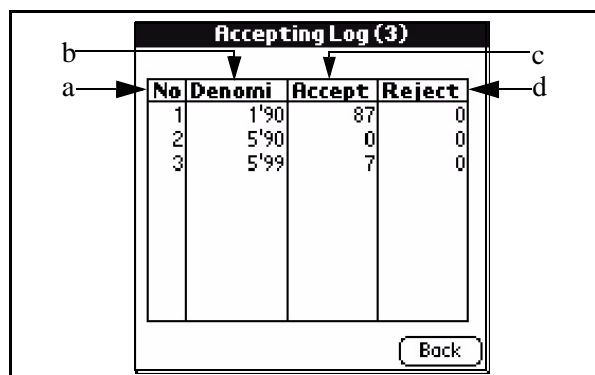


Figure 7-21 Viewing Page Three Log Data

7. Page four, shown in Figure 7-22, lists the **Abnormal Count**: information from left to right/top to bottom in two columns as:

No. - Sequential code number

Abn - Hard fault requiring a unit reset

War - Return code for rejected bills

RC - Error codes for RC-10 Recycler unit errors.

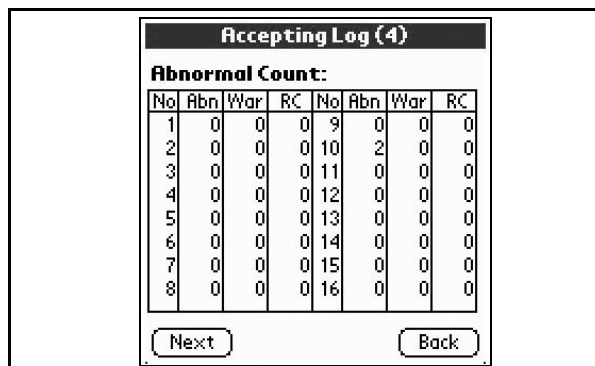


Figure 7-22 Viewing Page Four Log Data

8. Page five, shown in Figure 7-23, lists the following information from top to bottom:

- a. **Bills in Recycler:** Number of bills stored in the Recycler
 - (the amount operator loaded plus customer loaded) minus the (amount operator dispensed plus customer dispensed)
- b. **Recycle Bill Count:** Number of bills accepted by the RC-10 during a normal operating mode.
- c. **Payout Bill Count:** Number of bills dispensed by using the operation mode
 - the amount of bills dispensed from RC-10 during a normal customer transaction
- d. **Dispense Note(SW#1):** Number of bills dispensed manually
 - the amount of bills dispensed from the RC-10 by using the manual dispense function
- e. **Stack Note(SW#2):** Number of bills manually dispensed to the Cash Box
 - the amount of bills dispensed from the RC-10 into the Cash Box during a manual dispense function
- f. **Autoload(SW#3):** Number of bills accepted by the RC-10 during an Auto-Load function
- g. **Empty:** Number of times the Recycler was empty
- h. **FULL:** Number of times the Recycler became FULL (10 Bills)
- i. **CashBox Stack:** Number of bills stacked in the Cash Box
 - (the amount of notes stacked during customer operation) plus (amount of notes stacked during a manual RC-10 stacking operation)
- j. **Abnormal:** Total number of abnormal error codes occurring
 - number of times the Recycler had trouble (including bill jams)
- k. **Recycle Bill to Stacker:** Number of bills rejected by the RC-10
- l. **Payout Bill to Stacker:** Number of bills held in the Stacker during an RC-10 Payout.

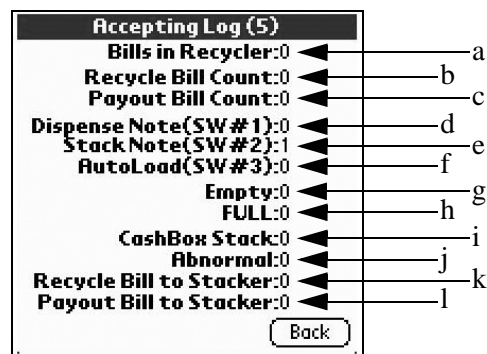


Figure 7-23 Viewing Page Five Log Data

Optipay™ BV

DBV-30X Bill Validator

Section 8

8 EXPLODED VIEWS/PARTS LISTS

This section provides the following wiring diagrams for the Optipay™ BV DBV-30X Bill Validator (See Figure 8-1 through Figure 8-4).

- DBV Primary Component Parts
- Frame and Upper/Lower Guide Exploded View
- Pusher Mechanism Assembly Exploded View
- Pusher Mechanism Assembly Exploded View Parts List
- Cash Box Unit Exploded View
- Cash Box Unit Parts List

DBV Primary Component Parts

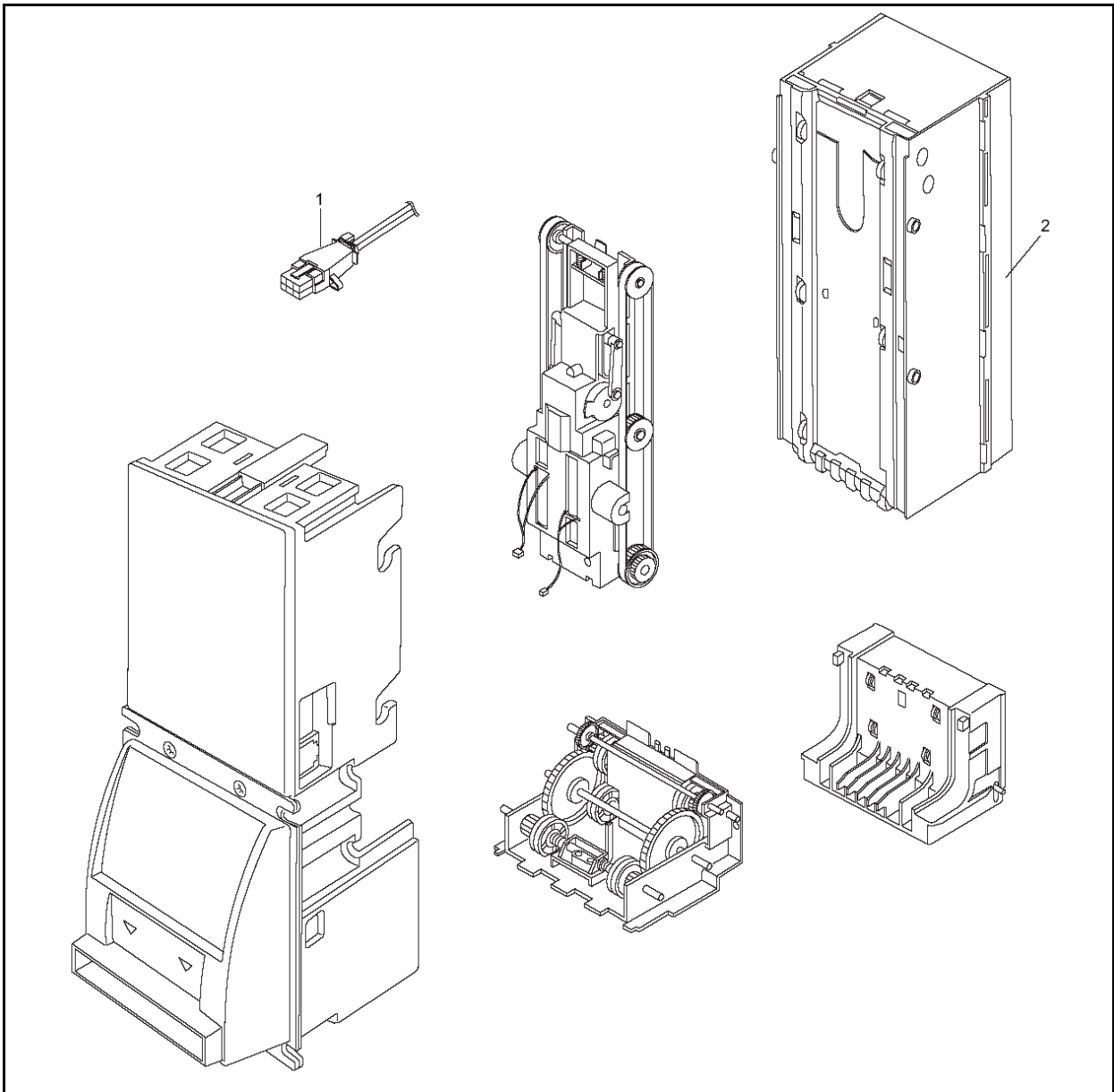


Figure 8-1 DBV-30X Bill Validator Primary Component Parts Exploded View Diagram

DBV Primary Parts List

Table 8-1 DBV Primary Parts List

No.	EDP No.	Part No.	Description	Remarks
1	095379	3210-05-03	MDB Connector	
2	111023		CASH BOX 200	

Frame and Upper/Lower Guide Exploded View

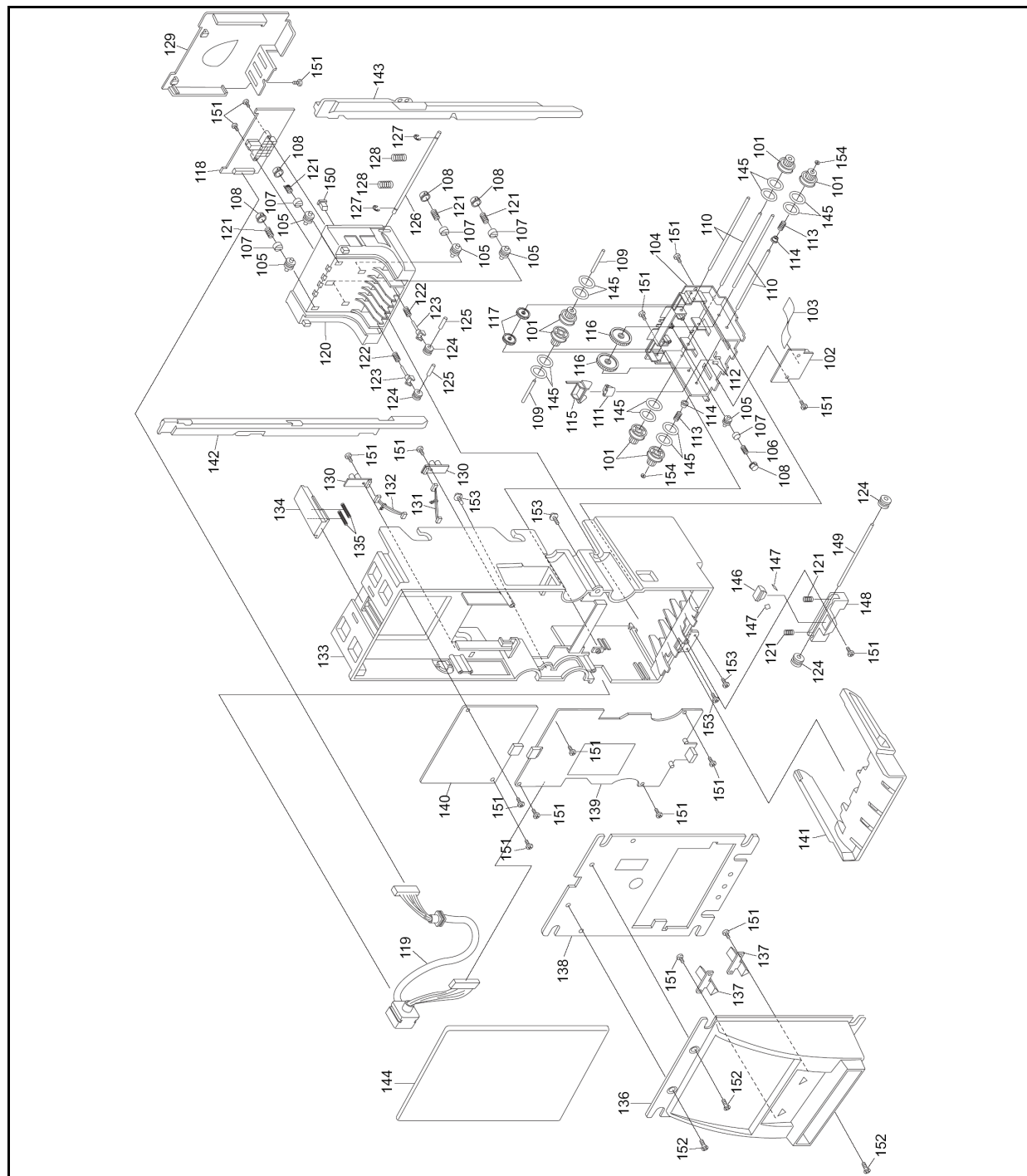


Figure 8-2 Frame and Upper/Lower Guide Exploded View Diagram

Frame and Upper/Lower Guide Parts List

Table 8-2: Frame and Upper/Lower Guide Parts List

No.	EDP No.	Part No.	Description	Remarks
101	095517	4019GE0103	GEAR C	
102	094010	4019-3210-06-03C-01	SENSOR PCB ASSY	
103	095378	FFC28PIN 60MM	FLEXIBLE HARNESS	
104	095472	4019RE0102	UPPER GUIDE	
105	095523	4019RO0101	ROLLER A	
106	066077	0643CS0102A	TRANSPORT ROLLER SPRING	
107	095478	4019RE0107	ROLLER GUIDE B	
108	095477	4019RE0106	ROLLER GUIDE A	
109	095532	4019SH0103	ROLLER SHAFT B	
110	095531	4019SH0102	ROLLER SHAFT A	
111	095485	4019RE0114	SENSOR GUIDE C	
112	095483	4019RE0112	SENSOR GUIDE A	
113	100448	4019CS0101	LEVER SPRING	
114	101151	Z3240-6115	PBT BUSHING	
115	095481	4019RE0110	LEVER	
116	095515	4019GE0101	GEAR A	
117	095516	4019GE0102	GEAR B	
118	094209	4019-3210-06-02D-01	MAG PCB ASSY	
119	095377	3210-05-01A	HARNESS	
120	095474	4019RE0103	LOWER GUIDE	
121	075183	C-125	SPRING (NO.1024)	
122	101904	DC-158	DC-158 SPRING	
123	095479	4019RE0108	ROLLER GUIDE C	
124	095524	4019RO0102	ROLLER B	
125	092230		2X12 PARALELL PIN	
126	095530	4019SH0101	LOCK SHAFT	
127	003707		C-CLIP, 3mm SUSTAINER	
128	064533	C-147	SPRING (NO.1052)	
129	095476	4019RE0105	LOWER GUIDE COVER	
130	094012	4019-3210-06-05-01	SMALL PCB ASSY	
131	095380	3210-05-06B	TRANSPORT HARNESS (Left)	
132	095381	3210-05-07	TRANSPORT HARNESS (Right)	
133	095471	4019RE0101	BASE FRAME	
134	095482	4019RE0111	BOX STOPPER	
135	095880	DC-097	DC-097 SPRING	
136	095505	4019RE0401	FACE PLATE	
137	095506	4019RE0402	LEDGUIDE	
138	095529	4019PT0401	FP BRACKET	

Table 8-2: Frame and Upper/Lower Guide Parts List (Continued)

No.	EDP No.	Part No.	Description	Remarks
139	094138	4019-3210-06-01D-01	CPU PCB ASSY	
140	095376	LSEP1114A1	24VDC POWER SUPPLY ASSY	
	100177	FP2281A-201	115VAC POWER SUPPLY ASSY	
141	095507	4019RE0403	FB GUIDE-67	
142	095508	4019RE0404	SB GUIDE-67 (Left)	
143	095509	4019RE0405	SB GUIDE-67 (Right)	
144	095475	4019RE0104	BASE COVER	
145	095876		O-RING P-16 (EPDM70)	
146	095484	4019RE0113	SENSOR GUIDE B	
147	101906	4019PE0103	SENSOR GUIDE REFLECTOR SEAL	
148	095480	4019RE0109	ROLLER GUIDE D	
149	095533	4019SH0104	ROLLER SHAFT C	
150	072396	0666RE0126A	PRISM GUIDE	
151	055413		2.6x6 BINDING PHILLIPS SELF TIGHTENING	
152	005332		3x5 FLAT HEAD VIS CM	
153	100121		3x6 SCREW w/WASHER FE CM	
154			POLY SLIDER	

Pusher Mechanism Assembly Exploded View

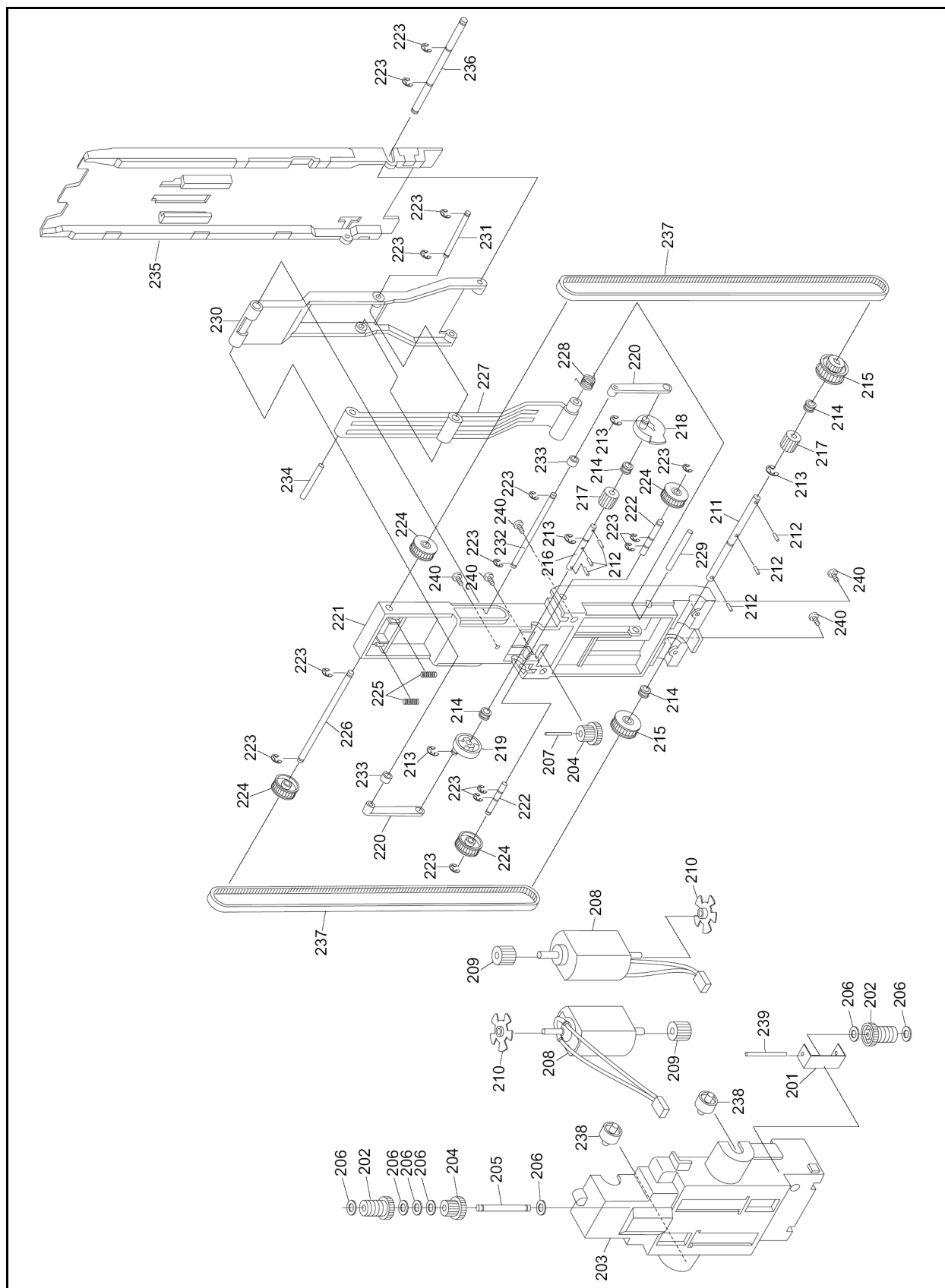


Figure 8-3 Pusher Mechanism Assembly Exploded View Diagram

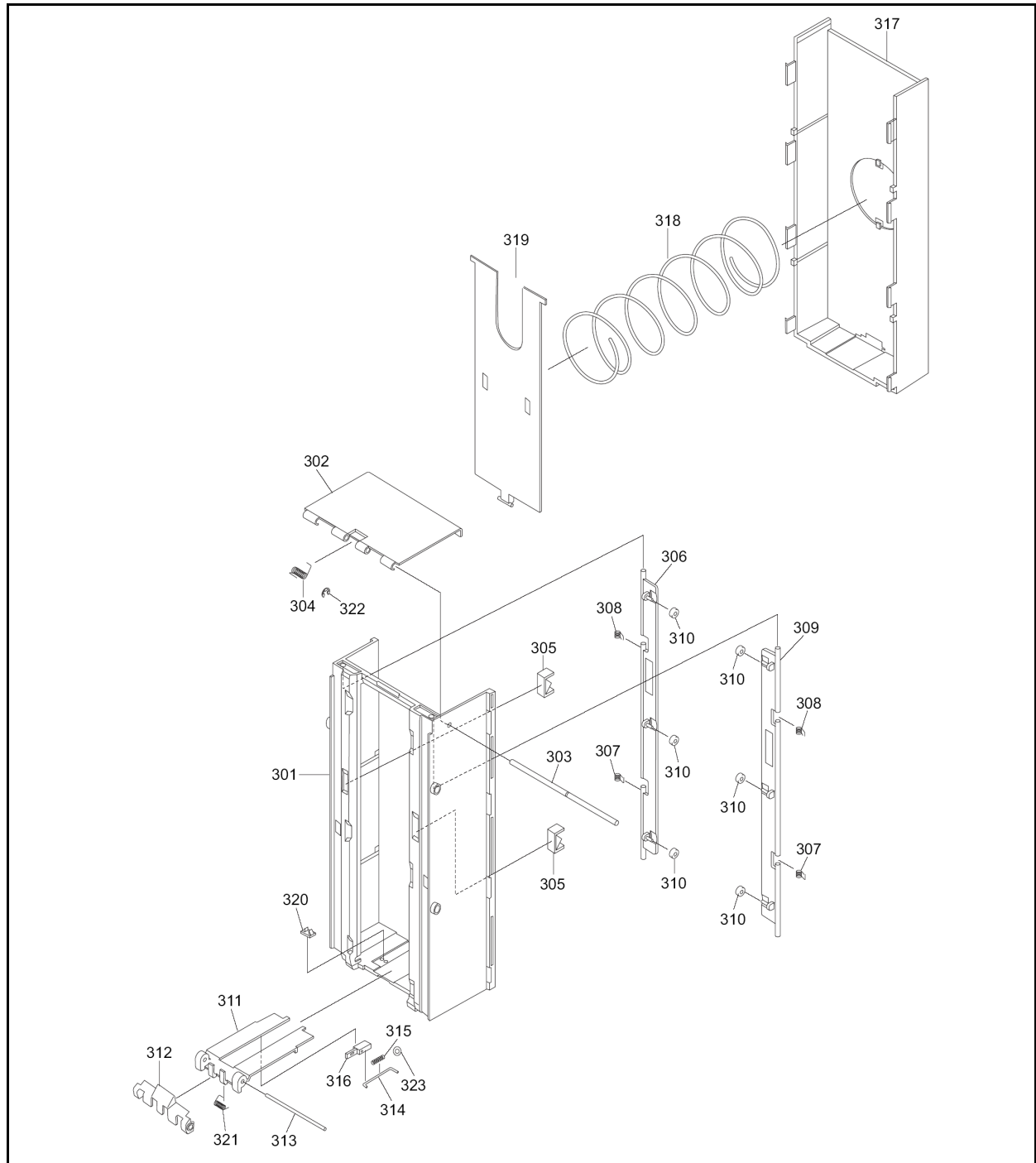
Pusher Mechanism Assembly Exploded View Parts List

Table 8-3: Frame and Upper/Lower Guide Parts List

No.	EDP No.	Part No.	Description	Remarks
201	095528	4019PT0201	MOTOR GUIDE C	
202	103044	4040GE0202	WORM DRIVE GEAR	
203	095486	4019RE0201	MOTOR GUIDE A	
204	095519	4019GE0202	GEAR E	
205	095542	4019SH0209	GEAR SHAFT A	
206	095879		2x6.5x0.2 POLLY WASHER	
207	095544	4019SH0211	GEAR SHAFT C	
208	095382	182331-218-G-3	DC MOTOR	
209	095518	4019GE0201	GEAR D	
210	095493	4019RE0208	ENCODER	
211	095534	4019SH0201	DRIVE SHAFT	
212	095877		1.2x6 WAVE SPRING PIN	
213	003707		C-CLIP, 3mm SUSTAINER	
214	095494	4019RE0209	BUSHING	
215	095522	4019GE0205	GEAR F	
216	095536	4019SH0203	ARM SHAFT A	
217	095521	4019GE0204	WORM WHEEL	
218	095492	4019RE0207	PUSHER ARM D (Right)	
219	100444	4019RE0210	PUSHER ARM D (Left)	
220	095491	4019RE0206	PUSHER ARM C	
221	095487	4019RE0202	MOTOR GUIDE B	
222	095541	4019SH0208	IDLE SHAHFT B	
223	003705		C-CLIP, 2mm SUSTAINER	
224	095525	4019PU0201	PULLY A	
225	061095		C-170 SPRING (No. 1035)	
226	095535	4019SH0202	IDLE SHAFT A	
227	095490	4019RE0205	PUSHER ARM B	
228	095548	4019KS0201	PUSHER SPRING	
229	095540	4019SH0207	ARM SHAFT E	
230	095489	4019RE0204	PUSHER ARM A	
231	095539	4019SH0206	ARM SHAFT D	
232	095537	4019SH0204	ARM SHAFT B	
233	095875		C-303 SPACER	
234	095878		3x15 PARALLEL PIN	
235	095488	4019RE0203	PUSHER PLATE	
236	095538	4019SH0205	ARM SHAFT C	
237	095882		169MXL W4.0 TIMING BELT	

Table 8-3: Frame and Upper/Lower Guide Parts List (Continued)

No.	EDP No.	Part No.	Description	Remarks
238	095526	4019RO0201	ROLLER C	
239	095543	4019SH0210	GEAR SHAFT B	
240	055413		2.6x6 BINDING, PHILLIPS, SELF TIGHTENING	

Cash Box Unit Exploded View**Figure 8-4** Cash Box Unit Exploded View

Cash Box Unit Parts List

Table 8-4: Cash Box Unit Parts List

No.	EDP No.	Part No.	Description	Remarks
301	095495	4019RE0301	BOX FRAME A	
302	095498	4019RE0304	BOX FRAME D	
303	095547	4019SH0302	BOX FRAME SHAFT	
304	095552	4019KS0304	BOX SPRING D	
305	100446	4019RE0311	SENSOR GUIDE D	
306	095500	4019RE0306	BR GUIDE (Left)	
307	095550	4019KS0302	BOX SPRING B	
308	095551	4019KS0303	BOX SPRING C	
309	095501	4019RE0307	BR GUIDE (Right)	
310	095527	4019RO0301	ROLLER D	
311	095497	4019RE0303	BOX FRAME C	
312	095503	4019RE0309	BOX LEVER	
313	095533	4019SH0104	ROLLER SHAFT C	
314	095546	4019SH0301	FG SHAFT	
315	061095		C-170 SPRING (No. 1035)	
316	095502	4019RE0308	BF GUIDE	
317	095496	4019RE0302	BOX FRAME B	
318	095549	4019CS0301	BOX SPRING A	
319	095499	4019RE0305	BOX PLATE	
320	095504	4019RE0310	BF SENSOR GUIDE	
321	102024	4019KS0305	BOX LEVER SPRING	
322			C-CLIP, 1.5mm SUSTAINER	
323			2x4x0.3 FLAT WASHER	

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Section 9

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Appendix A

A TROUBLESHOOTING

This section provides the Troubleshooting procedures for the Optipay™ DBV-30X Bill Validator. The information within contains the following features:

- DBV-30X-SU Troubleshooting
- Error and Reject Code Tables
- Diagnostics
- Sensors, Circuit Boards and Motor Location Diagram

Introduction

Most failures within the Bill Validator occur due to minor causes. It is important to check that the internal connectors are properly mated and that the harness is also firmly connected before replacing parts.

Poor bill acceptance is often due to iron dust content that adheres to the magnetic head or to the magnetic head roller. Therefore, the Bill Validator should always be cleaned first.

To determine the cause of a failure, it is important to observe the operating state of the Bill Validator when power is first applied. This condition also allows the cause of a failure to be determined using the test mode.

When the Bill Validator head has been disassembled for repair, or when the Sensor board has been replaced, the sensor should be readjusted.

All repairs should be performed by referring to the adjustment procedure, the wiring diagrams and the various disassembly procedures.

Failure Classifications

The cause of a failure can be broadly classified into the following four failure conditions. Check for the following operating fault states:

1. Test mode fails (See Figure A-1 and 2).
2. Incorrect initial operation (See Figure A-3).
3. Rejected or poorly accepts bills (See Figure A-4).
4. Improper bill transfer (See Figure A-5).

Test Mode Entry Failure Flowchart

The Figure A-1 and 2 Flowcharts diagram the failure conditions related to entering test correctly.

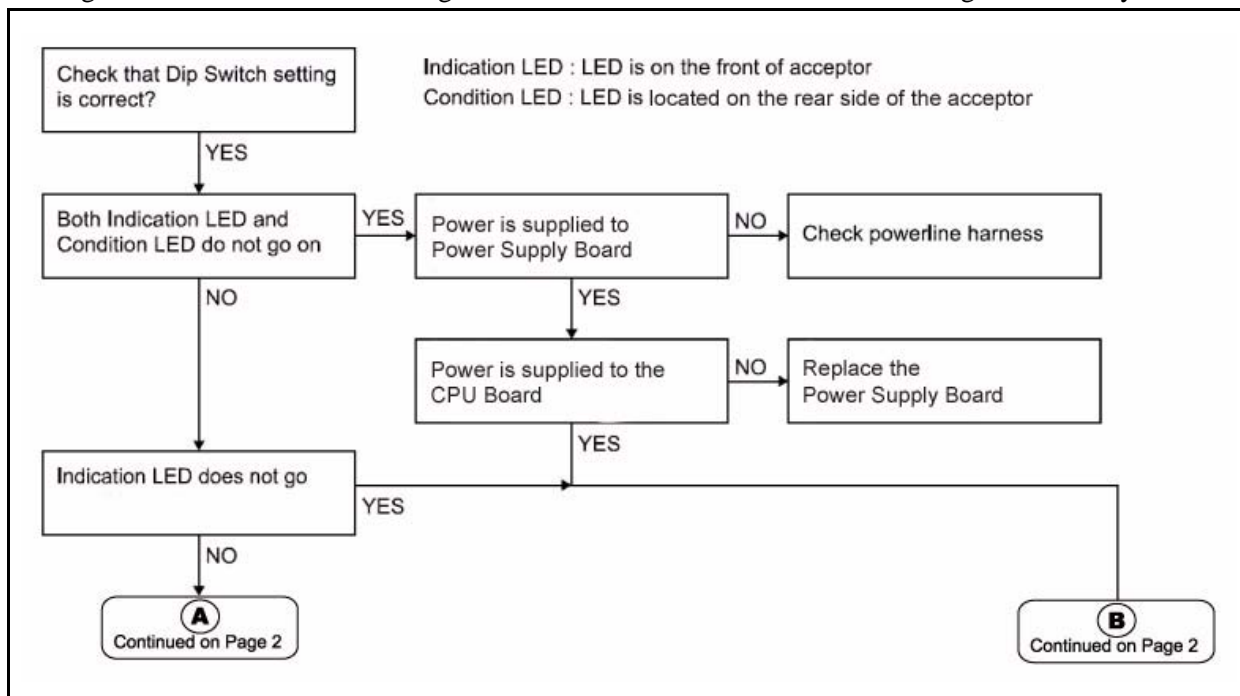
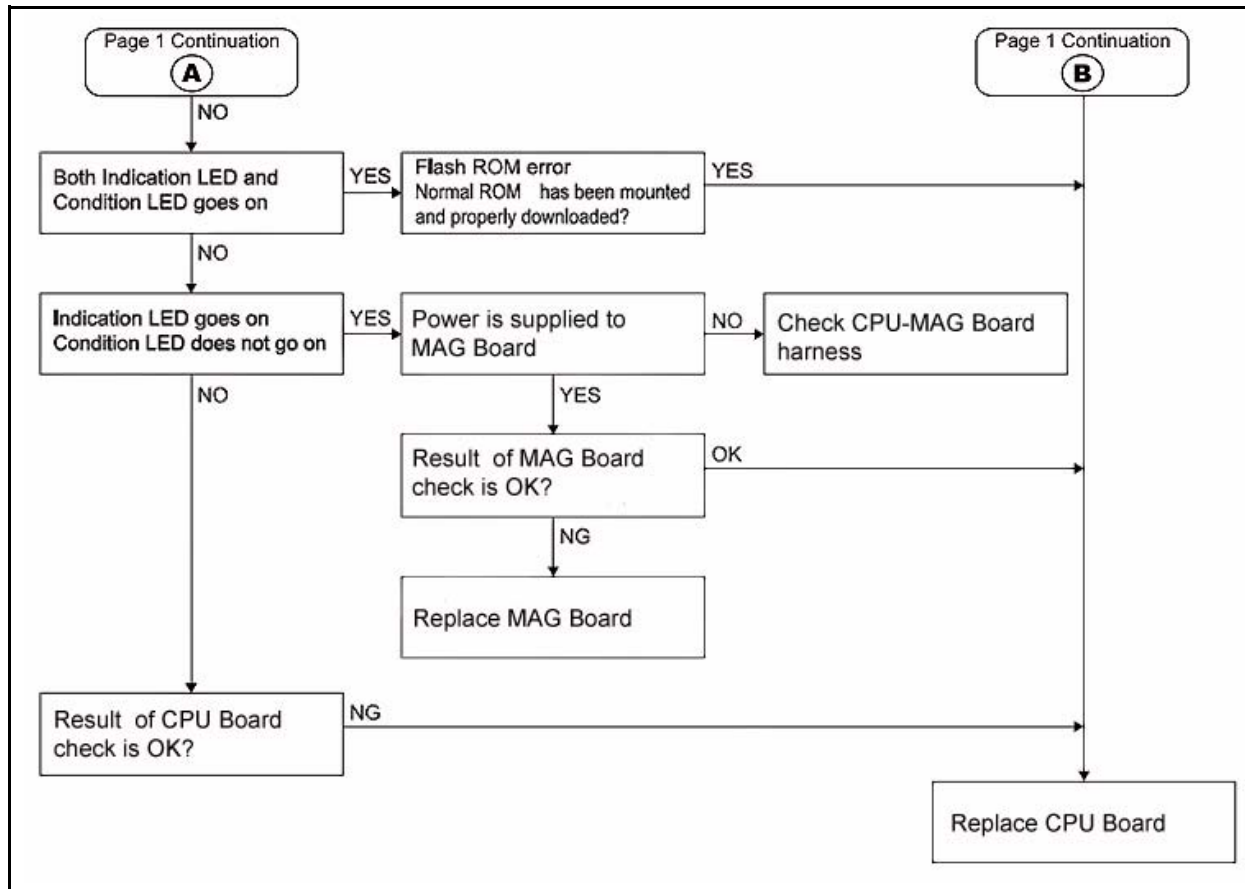


Figure A-1 DBV-30X Bill Validator Test Mode Failure Flow Chart Diagram (Part 1)

Test mode entry failure flowchart (continued)**Figure A-2** DBV-30X Bill Validator Test Mode Failure Flow Chart Diagram (Part 2)

Incorrect initial operation flowchart

The Figure A-3 Flowchart diagrams the LED indications available when an incorrect initial operational fault occurs.

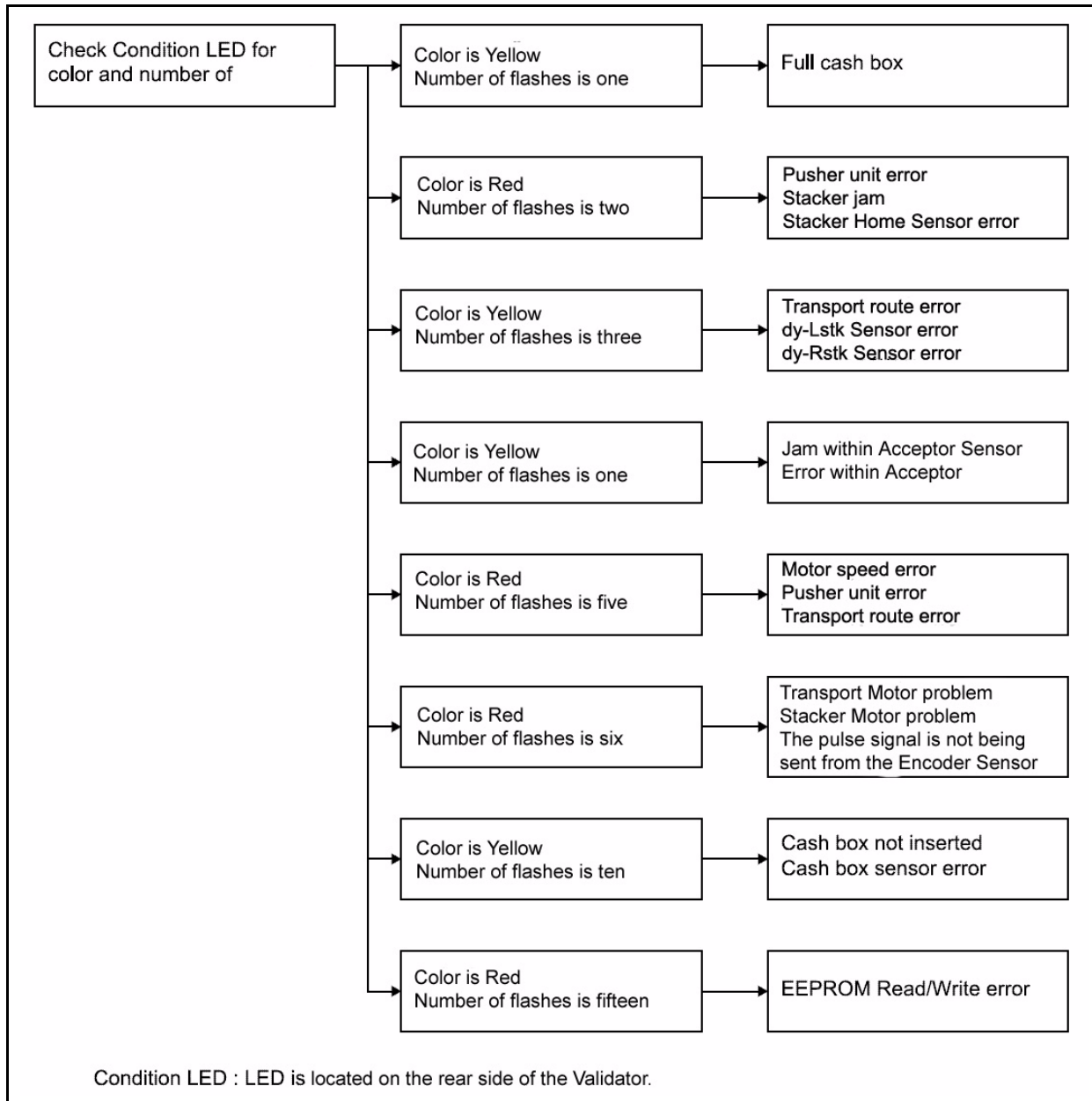


Figure A-3 DBV-30X Bill Validator Incorrect Initial Operation Flow Chart Diagram

Rejected or poorly accepts bills flowchart

The Figure A-4 Flowchart diagrams the fault conditions related to Bill Validator rejects or poorly accepts bills.

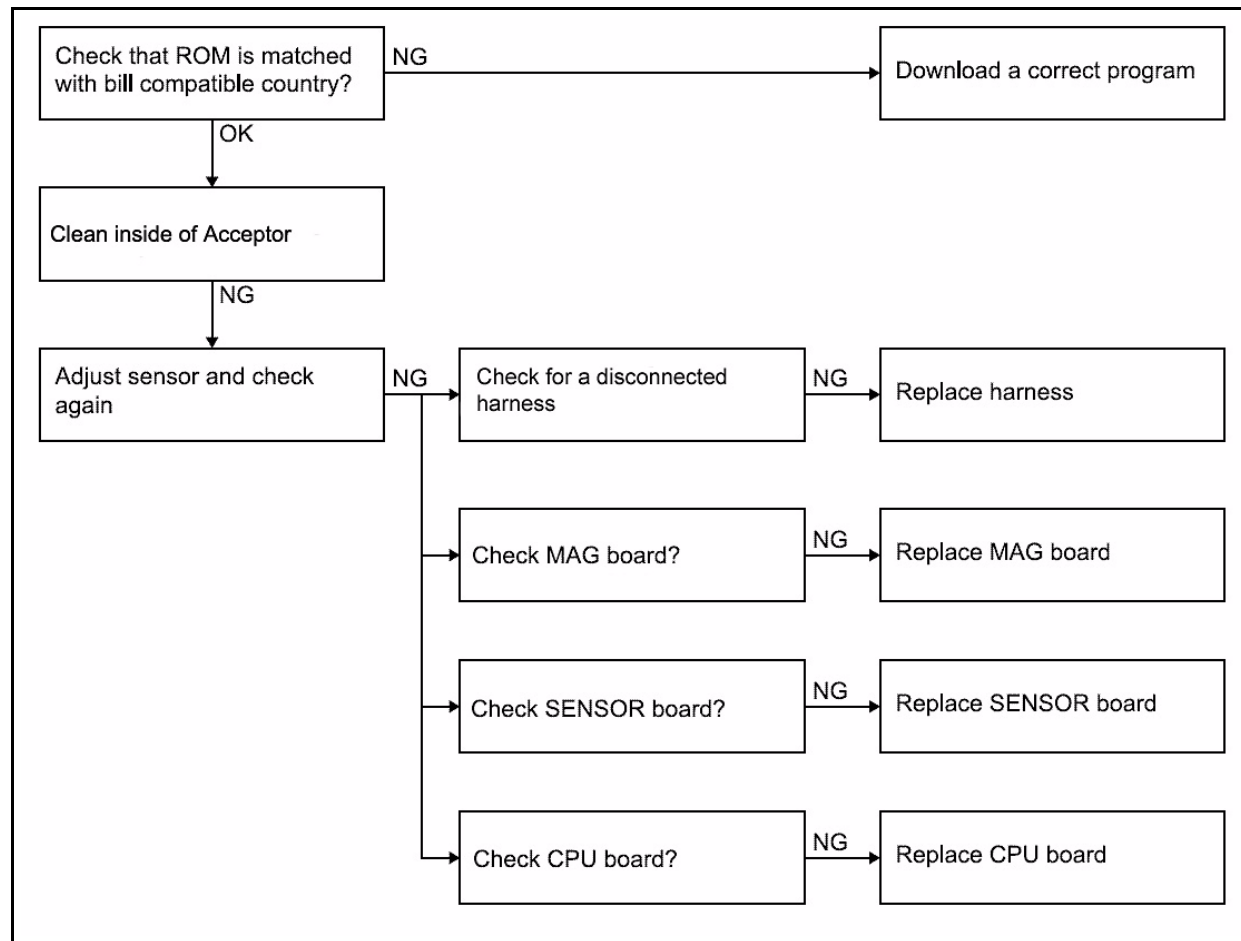


Figure A-4 DBV-30X Bill Validator Rejects or Poorly Accepts Bills Flow Chart Diagram

Improper bill transfer flowchart

The Figure A-5 Flowchart diagrams the fault conditions related to Improper bill transfers.

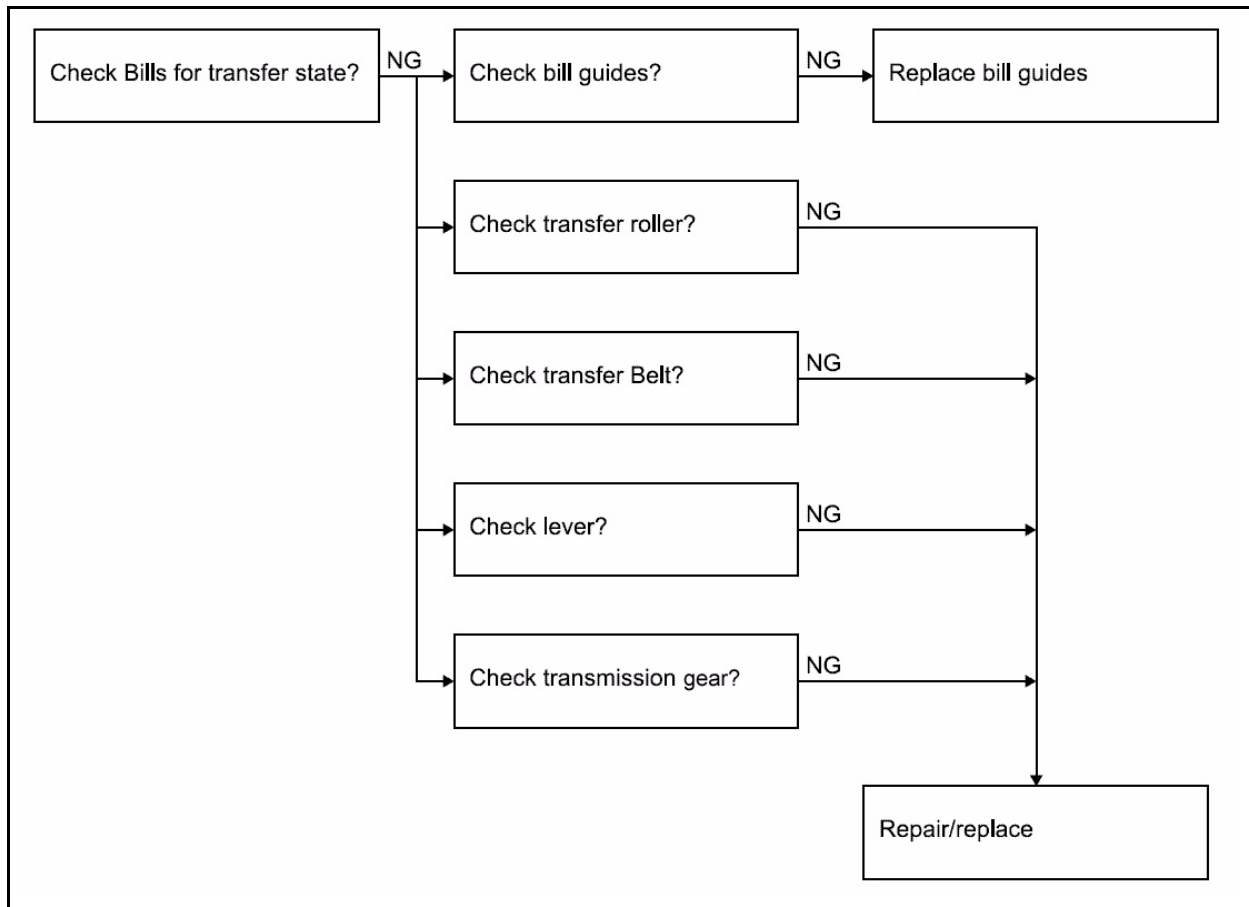


Figure A-5 DBV-30X Bill Validator Improper Bill Transfer Flow Chart Diagram

Error and Reject Code Tables

This section explains the meaning of the lit and flashing LED error and reject codes that can occur. See Table A-1 for the Condition LED's color, the number of blinks and their related meanings. When an error and rejection simultaneously occur, check the Table A-2 Condition LED's color and count the number of blinks to detect the error and determine its cause.

Table A-1 Error Codes

Condition LED Blink No.			Error Description	Solution
R	Y	G		
	1		Stacker Full	Cash Box is full. Remove the Cash Box and empty the collected bills. Refer to "Retrieving Bills" on page 1-5 of Section 1.
2			Stacker JAM	Remove the Jammed bill. Refer to "Clearing a Bill Jam" on page 2-6 of Section 2.
3			Acceptor JAM (When the recycler is operating)	
	4		Acceptor JAM	Perform the related diagnostic test located in the Diagnostics section of this Appendix.
5			Feed Motor Speed Error	
6			Feed Motor Lock	

Table A-1 Error Codes

Condition LED Blink No.			Error Description	Solution
R	Y	G		
	7		Instruction waiting from host when the bill is in escrow	
	8		Reserved	
	9		Continuous Insertion Protect Lever JAM	Remove the Jammed bill. Refer to “Clearing a Bill Jam” on page 2-6 of Section 2.
	10		Box not seated properly	Reset the Cash Box properly into position. If this does not resolve the problem, perform the related diagnostic test in “Diagnostics” section of this Appendix.
	11		Box Sensor Error	
	12		Cheating Detected	Cheating has occurred. When error is reset, remove and reinstall the Cash Box.
	13		Lower Guide is not locked in position	Properly lock the Lower Guide into position.
	14		Reserved	
15			EEPROM Read Error	An EEPROM Read Error has occurred. When error resets, remove and reinstall the Cash Box. If this does not resolve the problem, contact your JCM technical service representative.

Table A-2 Reject Codes

Condition LED Blink No.			Reject Description
R	Y	G	
		1	Insertion Error
		2	Magnetic Read Error
		3	Paper detected inside acceptor at standby
		4	Adjustment/Magnification Error
		5	Reject from a Feed Error
		6	Denomination Select Error
		7	Photo Pattern Error (Type 1)
		8	Photo Level Error
		9	Inhibited Bill
		10	Return directed from the host machine
		11	Foreign substances detected at the exit sensor
		12	Escrow Position Error
		13	Bill Length Error
		14	Photo Pattern Error (Type 2)
		15	Incompatible Bill Error

Diagnostics

The DBV-30X series is equipped with diagnostic features to aid in repair and maintenance. This section describes the test procedure for each function using DIP Switch settings to identify the cause of a failure condition. To identify the cause of a failure condition, the DBV-30X need to be placed into the Test mode.

Entering the test mode

To enter the test mode perform the following steps:

1. Set DIP Switch SW1-8 to ON and DIP Switches SW1-1 through SW1-7 to OFF then
2. Supply power to the DBV-30X.
3. The Indication LED located on the Faceplate will begin blinking and the Condition LEDs (Green, Yellow and Red) located on the rear of the unit will light. This condition indicates that the unit is in the Test mode.
4. Set DIP Switches SW1-1 through SW1-7 according to the test you wish to execute.
5. Set the DIP Switch SW1-8 to OFF to begin a test. When the test starts, the Indication LEDs turn OFF and the Green, Yellow and Red Condition LEDs also turn OFF. After few seconds, the Condition LEDs will turn ON, BLINK or OFF depending on the condition being executed.
6. To finish a test, set the DIP Switch SW1-8 to ON. When the test finishes, the Indication LED blinks and the Green, Yellow and Red Condition LEDs all extinguish (turn OFF).

Feed Motor Forward/Reverse Rotation Test

This test detects the forward/reverse feed motor speed rotation. Confirm that the feed motor operates smoothly without abnormal noise. Set DIP Switches SW1-1 through SW1-7 according to those indicated in Table A-3

Table A-3 Feed Motor Rotation Test Errors

		Forward Rotation		Reverse Rotation	
Condition LED Blink No.			Motor Condition	Cause and Solution	
R	Y	G			
1	1	1	Normal	None	
2	2	2	Fast	Contact your JCM Technical Support Representative.	
3	3	3	Slow	A Power Supply Board failure may have occurred. Refer to "Removing the CPU and Power Supply boards" on page 4-1 of Section 4.	
6	6	6	Abnormal	The Feed Motor Encoder Sensor does not detect motor rotation. Check all harnesses and connectors. A CPU board failure may have occurred. Change the CPU Board. Refer to "Removing the CPU and Power Supply boards" on page 4-1 of Section 4.	

Stacker Test

This test detects the Stacker's operational condition. When the test starts, the pushing mechanism begins working constantly. No LEDs lit indicates the stacker is working properly. If the Red and Yellow LEDs light, refer to the Stacker Test Error Codes listed in Table A-4 to obtain a description of the error.

Table A-4 Stacker Test Errors

<div>SW-1</div> <div><table><tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td></tr><tr><td><div></div></td><td><div></div></td><td><div></div></td><td><div></div></td><td><div></div></td><td><div></div></td><td><div></div></td><td><div></div></td></tr><tr><td><div></div></td><td><div></div></td><td><div></div></td><td><div></div></td><td><div></div></td><td><div></div></td><td><div></div></td><td><div></div></td></tr></table><div>ON ↑</div></div>										1	2	3	4	5	6	7	8	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>							
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Condition LED Blink No.			Stacker Condition	Cause and Solution																																				
R	Y	G																																						
	1		Stacker Full	Check/Empty the Cash Box. Check all harnesses and connectors. A MAG/CPU board failure may have occurred. Change the MAG and/or CPU board if required. Refer to “MAG board removal” on page 4-7 and/or “Removing the CPU and Power Supply boards” on page 4-1 of Section 4.																																				
2			Stacker Jam/ Locked	Check all harnesses and connectors. A CPU and/or Small Feed Board failure may have occurred. Change the CPU/Small Feed Board if required. Refer to “Removing the CPU and Power Supply boards” on page 4-1 and/or “Removing the Small Feed Sensor Boards” on page 4-6 of Section 4. The Stacker Motor may be defective. Change the motor if required. Refer to “Removing the drive and stacking motors” on page 4-3 of Section 4.																																				
	10		Cash Box Not Set	Reseat the Cash Box into proper position. Check all harnesses and connectors. A MAG/CPU board failure may have occurred. Change the MAG and/or CPU board if required. Refer to “MAG board removal” on page 4-7 and/or “Removing the CPU and Power Supply boards” on page 4-1 of Section 4.																																				

Run Test

This test detects the operational condition of the DBV-30X unit. When the test starts, the bill inserted to stacked operations continuously are repeated. No LEDs lit means the DBV-30X unit is operating properly. If the Red or Yellow LED lights, refer to the Run Test Error Codes listed in Table A-5 to obtain a description of the error.

Table A-5 Run Test Errors

<div>SW-1</div> <div><table><tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td></tr><tr><td><div></div></td><td><div></div></td><td><div></div></td><td><div></div></td><td><div></div></td><td><div></div></td><td><div></div></td><td><div></div></td></tr><tr><td><div></div></td><td><div></div></td><td><div></div></td><td><div></div></td><td><div></div></td><td><div></div></td><td><div></div></td><td><div></div></td></tr></table></div> <div>ON ↑</div>							1	2	3	4	5	6	7	8	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>														
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Condition LED Blink No.			Running Condition	Cause and Solution																																								
R	Y	G																																										
	1		Stacker Full	Check all harnesses and connectors. A MAG/CPU board failure may have occurred. Change the MAG and/or CPU board if required. Refer to “MAG board removal” on page 4-7 and/or “Removing the CPU and Power Supply boards” on page 4-1 of Section 4.																																								
2			Stacker Jam/ Locked	Check all harnesses and connectors. A CPU and/or Small Feed Board failure may have occurred. Change the CPU/Small Feed Board if required. Refer to “Removing the CPU and Power Supply boards” on page 4-1 and/or “Removing the Small Feed Sensor Boards” on page 4-6 of Section 4. The Stacker Motor may be defective. Change the motor if required. Refer to “Removing the drive and stacking motors” on page 4-3 of Section 4.																																								
	4		Acceptor Jam	Contact your JCM Technical Support Representative.																																								

Table A-5 Run Test Errors (Continued)

				<div>SW-1</div> <div><div><div>1</div><div>2</div><div>3</div><div>4</div><div>5</div><div>6</div><div>7</div><div>8</div></div><div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div><div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div></div></div><div>ON ↑</div></div>							
Condition LED Blink No.			Running Condition	Cause and Solution							
R	Y	G									
5			Motor Speed	Power Supply Board failure may have occurred. Refer to “Removing the CPU and Power Supply boards” on page 4-1 of Section 4.							
6			Motor Lock-up	Motor Encoder Sensor does not detect motor rotation. Check all harnesses and connectors. A CPU board failure may have occurred. Change the CPU Board. Refer to “Removing the CPU and Power Supply boards” on page 4-1 of Section 4.							
	10		Cash Box Not Set	Reseat the Cash Box into proper position. Check all harnesses and connectors. A MAG and/or CPU board failure may have occurred. Change the MAG and/or CPU board if required. Refer to “MAG board removal” on page 4-7 and/or “Removing the CPU and Power Supply boards” on page 4-1 of Section 4.							
	11		Cash Box Sensor Error	Check whether a foreign object is lodged between the transport path and the Cash Box. Check all harnesses and connectors. A MAG and/or CPU board failure may have occurred. Change the MAG and/or CPU board if required. Refer to “MAG board removal” on page 4-7 and/or “Removing the CPU and Power Supply boards” on page 4-1 of Section 4.							
	13		Lower Guide not locked in position	Reset the Lower Guide into proper position. Check all harnesses and connectors. A MAG and/or CPU board failure may have occurred. Change the MAG and/or CPU board if required. Refer to “MAG board removal” on page 4-7 and/or “Removing the CPU and Power Supply boards” on page 4-1 of Section 4.							

Continuous Insertion Protect Lever Test

This test detects the DBV-30X unit's Continuous Insertion Protect Lever operating condition. When the test starts, the lever will be working constantly. When the Condition Red, Yellow and Green LEDs blink, refer to the following the Continuous Insertion Protect Lever Error Codes listed in Table A-6 to obtain a description of the error

Table A-6 Continuous Insertion Protect Lever Test Errors

<div><div>SW-1</div><div><div><div>1</div><div>2</div><div>3</div><div>4</div><div>5</div><div>6</div><div>7</div><div>8</div></div><div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div><div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div><div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div><div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div><div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div><div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div><div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div><div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div><div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div><div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div><div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div><div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div><div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div><div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div><div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div><div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div><div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div><div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div><div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div><div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div><div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div><div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div><div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div><div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div><div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div><div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div><div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div><div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div><div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div><div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div><div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div><div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div><div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div><div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div><div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div><div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div><div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div><div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div><div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div><div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div><div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div><div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div><div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div><div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div><div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div><div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div><div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></d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Acceptor Sensor Test

This test detects the Acceptor sensors operating condition. In order to check the Acceptor sensors condition, set the related DIP Switch to ON depending on the sensor test selected from Table A-7. For details concerning a particular sensor's location, refer to Sensor Board and Motor Location information on page A-14

of this Appendix.



NOTE: The stacker sensor test can only test one specific sensor. at a time.

Table A-7 Acceptor Sensor Tests

<div style="text-align: center;"> </div>	
Sensor Selection Switch Number	Sensor Name
SW1-1	Left Transport Sensor
SW1-2	Reserved
SW1-3	Right Transport Sensor
SW1-4	Stacker Home Sensor
SW1-5	Cash Box Sensor
SW1-6	Stacker Motor Encoder Sensor
SW1-7	Feed Motor Encoder Sensor

Bill Acceptance Test

This test detects the proper acceptance of bills. Start the test by setting DIP Switch SW1-8 OFF. Insert a bill to verify whether the unit performs bill acceptance. If the Green LED blinks, refer to the Bill Acceptance Error Code listed in Table A-8 to obtain a description of the error.

Table A-8 Bill Acceptance Error Code Tests

<div><div>SW-1</div><div><table><tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td></tr><tr><td>■</td><td>■</td><td>■</td><td>■</td><td>□</td><td>□</td><td>□</td><td>▨</td></tr><tr><td>□</td><td>□</td><td>□</td><td>□</td><td>■</td><td>■</td><td>■</td><td>▨</td></tr></table></div><div>ON ↑</div></div>					1	2	3	4	5	6	7	8	■	■	■	■	□	□	□	▨	□	□	□	□	■	■	■	▨	<table><tr><th colspan="3">Condition LED Blink No.</th><th rowspan="2">Possible Cause</th><th rowspan="2">Cause and Solution</th></tr><tr><th>R</th><th>Y</th><th>G</th></tr></table>			Condition LED Blink No.			Possible Cause	Cause and Solution	R	Y	G
1	2	3	4	5	6	7	8																																
■	■	■	■	□	□	□	▨																																
□	□	□	□	■	■	■	▨																																
Condition LED Blink No.			Possible Cause	Cause and Solution																																			
R	Y	G																																					
		1	Insertion Error	Reinsert the bill correctly (Straight edge flat).																																			
		2	Magnetic Error	Check MAG Sensor for dirt or iron accumulation. Clean the sensor and rollers. To clean the sensors and rollers refer to “Preventive Maintenance” on page 2-6 of Section 2. Check all harnesses and connectors. A MAG Board failure may have occurred. Change the MAG Board if required. Refer to “MAG board removal” on page 4-7 of Section 4.																																			

Table A-8 Bill Acceptance Error Code Tests (Continued)

Condition LED Blink No.			Possible Cause		Cause and Solution	
R	Y	G				
		3	Paper detected inside Acceptor at standby		Open the Acceptor and remove the paper and clean the lenses. refer to "Preventive Maintenance" on page 2-6 of Section 2. Check all harnesses and connectors. A sensor and/or MAG Boards failure may have occurred. To change a sensor refer to the Preventive Maintenance Section to locate the suspect sensor and refer to "MAG board removal" on page 4-7 of Section 4 to replace a MAG Board.	
		4	Adjustment/Magnification Error			
		5	Transportation Error		Reinsert the bill correctly (Straight edge flat). Reset the Lower Guide into proper position. Check all lenses for dirt or scratches. To clean the sensors refer to "Preventive Maintenance" on page 2-6 of Section 2. Check all harnesses and connectors. A sensor and/or CPU Board failure may have occurred. To change a Sensor refer to the Preventive Maintenance Section to locate the suspect sensor and refer to "Removing the CPU and Power Supply boards" on page 4-1 of Section 4 to replace a CPU Board.	
		6	Denomination Distinction Error		Remove the bill from the Acceptor clean the lenses. To clean the lenses refer to "Preventive Maintenance" on page 2-6 of Section 2. Check all harnesses and connectors. A sensor and/or MAG Boards failure may have occurred. To change a sensor refer to the Preventive Maintenance Section to locate the suspect sensor and refer to "MAG board removal" on page 4-7 of Section 4 to replace a MAG Board.	
		7	Photo Pattern Error (1)			
		8	Photo Level Error			
		9	Inhibited Bill		Check and reset the related DIP Switch to proper the desired value selection. Refer to "DIP Switch Settings" on page 2-4 of Section 2.	
		10	Return instruction issued from the host machine		Check if the return instruction actually come from outside the installed Optipay system.	
		11	Exit Sensor Error		Check for any foreign object around or blocking the exit sensor. To clean the sensor refer to "Preventive Maintenance" on page 2-6 of Section 2. A MAG and/or CPU board failure may have occurred. Change the MAG and/or CPU board if required. Refer to "MAG board removal" on page 4-7 and/or "Removing the CPU and Power Supply boards" on page 4-1 of Section 4.	
		12	Escrow Position Error		Check for any dents or nicks on the belts and rollers. Clean the belts and rollers. To clean the belts and rollers refer to "Preventive Maintenance" on page 2-6 of Section 2. Check that the Input power voltage is at the specified voltage rating. Change the CPU and/or Power Supply board if required. Refer to "Removing the CPU and Power Supply boards" on page 4-1 of Section 4.	
		13	Bill length Error		Check all belts and rollers in the transport path. To clean the belts and rollers refer to "Preventive Maintenance" on page 2-6 of Section 2. To change the belts and rollers, refer to "Timing Belt removals" on page 4-2 of Section 4.	

Table A-8 Bill Acceptance Error Code Tests (Continued)

			SW-1		<table><tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr></table>		1	2	3	4	5	6	7	8									ON ↑
1	2	3	4	5	6	7	8																
Condition LED Blink No.			Possible Cause	Cause and Solution																			
R	Y	G																					
		14	Photo Pattern Error (2)	Remove the offending bill from the Acceptor and clean the lenses. To clean the lenses refer to “Preventive Maintenance” on page 2-6 of Section 2. A sensor and/or MAG Boards failure may have occurred. To change a sensor refer to the Preventive Maintenance Section to locate the suspect sensor and refer to “MAG board removal” on page 4-7 of Section 4 to replace a MAG Board.																			
		15	Incompatible Bill Error																				

Stacker Motor Forward/Reverse Rotation Test

This test detects the forward/reverse stacker motor speed rotation. Confirm that the stacker motor operates smoothly without abnormal noise. Set DIP Switches SW1-1 through SW1-7 according to those indicated in Table A-3

Table A-9 Stacker Motor Rotation Test Errors

Condition LED Blink No.			Motor Condition	Cause and Solution
R	Y	G		
1	1	1	Normal	None
2	2	2	Fast	Contact your JCM Technical Support Representative.
3	3	3	Slow	A Power Supply Board failure may have occurred. Refer to "Removing the CPU and Power Supply boards" on page 4-1 of Section 4.
6	6	6	Abnormal	The Stacker Motor Encoder Sensor does not detect motor rotation. Check all harnesses and connectors. A CPU board failure may have occurred. Change the CPU Board. Refer to "Removing the CPU and Power Supply boards" on page 4-1 of Section 4.

DIP Switch Test

This test detects the DIP Switch Blocks operational condition. Perform the test given in the following steps:

1. Set all switches of DIP Switch 1 to ON and supply power to the DBV-30X (See Figure A-6). Check that the Faceplate Indication LEDs are blinking and the Red, Yellow and Green Condition LED's light.
2. Start the test by switching SW1-8 to OFF. The blinking LEDs will extinguish (turn OFF).
3. Set DIP Switches SW1-1 through SW1-7 to ON. Confirm that the Red, Yellow and Green LEDs blink one blink at a time.

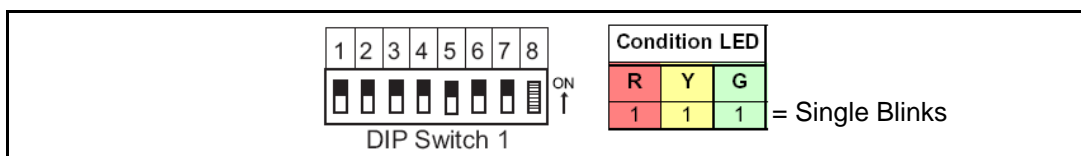


Figure A-6 DIP Switch Test 1

4. Set DIP Switch SW1-1 through SW1-7 and SW2-1 through SW2-8 to ON (See Figure A-7). Confirm that the Red, Yellow and Green LEDs are blinking two blinks at a time (twice).

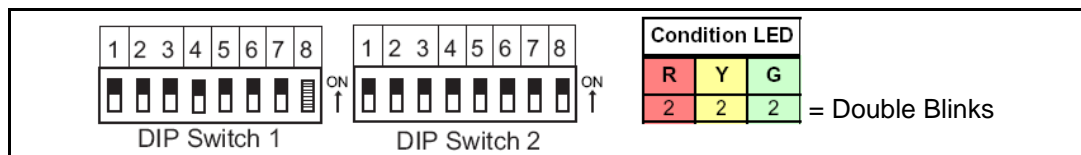
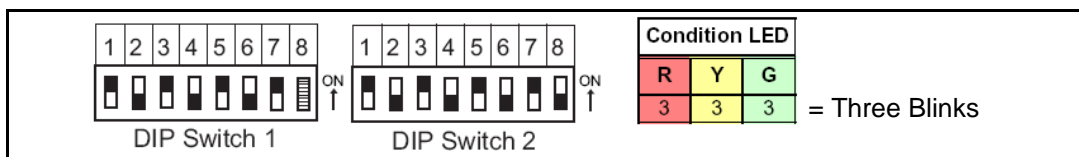
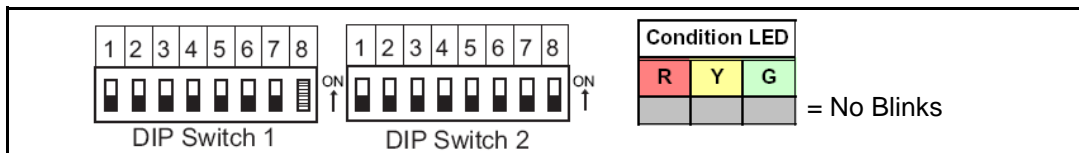


Figure A-7 DIP Switch Test 2

5. Set the even numbered switches (i.e., SW1-2, SW1-4, SW1-6, SW2-2, SW2-4, SW2-6 and SW2-8) to OFF (See Figure A-8). Confirm that the Red, Yellow and Green LEDs are blinking three blinks at a time.

**Figure A-8 DIP Switch Test 3**

6. Set the odd numbered switches (i.e., SW1-1, SW1-3, SW1-5, SW1-7, SW2-1, SW2-3, SW2-5 SW2-7) to OFF (See Figure A-9). Confirm that the Red, Yellow and Green LEDs are all extinguished (OFF).

**Figure A-9 DIP Switch Test 4**

This is the end of the DIP Switch Test. To end the test, set DIP Switch SW1-8 OFF, and turn the DBV-30X unit's power supply OFF.



NOTE: If any LED status is different from those mentioned above, a DIP Switch or CPU board failure may have occurred. A CPU board failure may have occurred. Change the CPU Board. Refer to "Removing the CPU and Power Supply boards" on page 4-1 of Section 4. If the error is still exists once the CPU has been replaced, contact the JCM Technical Service Department.

Sensors, Circuit Boards and Motor Location Diagram

Figure A-10 illustrates the various sensors, circuit boards and motors within the DBV-30X unit.

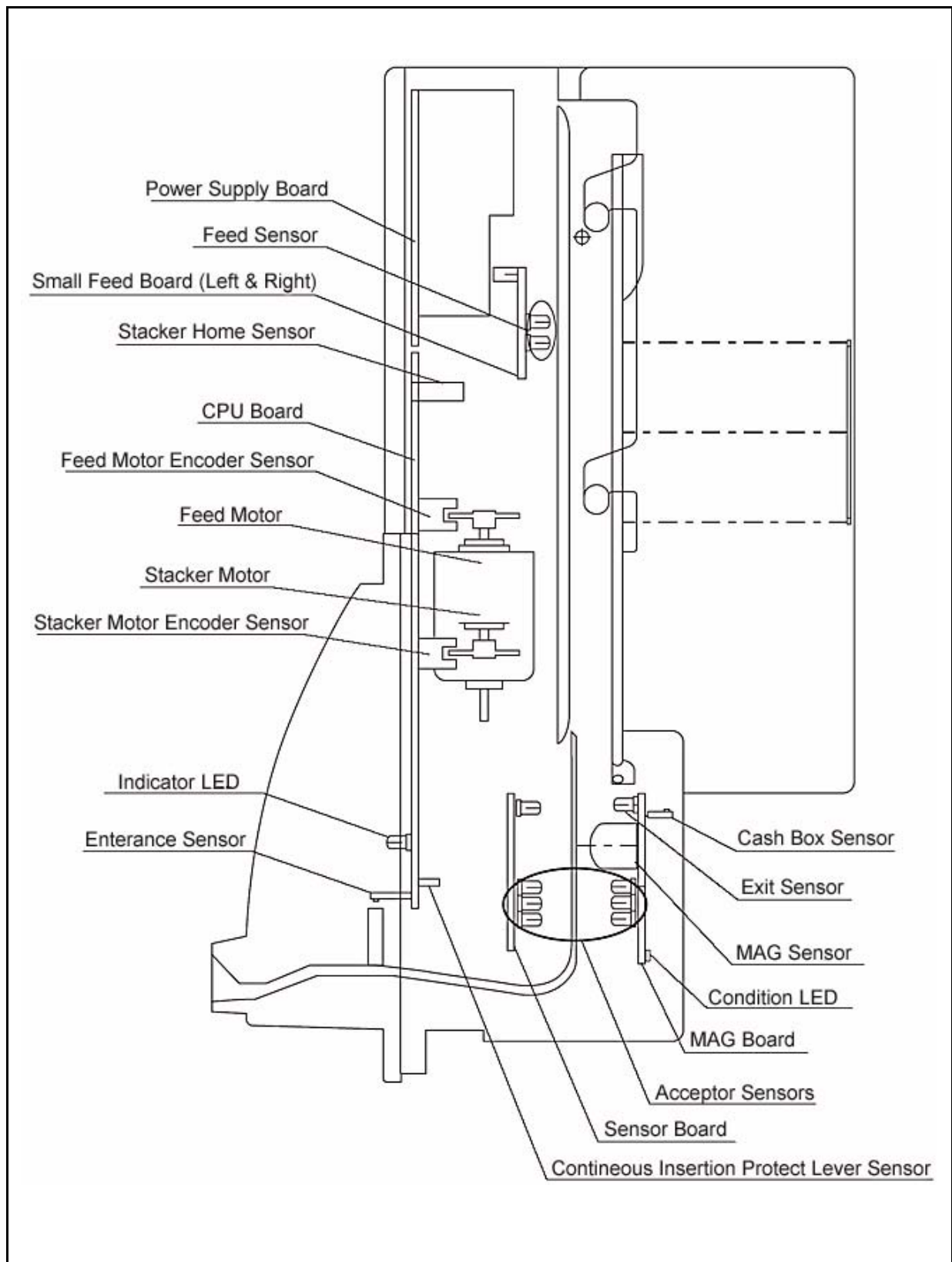


Figure A-10 Sensor, Circuit Board and Motor Location Diagram

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Optipay™ BV

DBV-301 Bill Validator

Appendix B

B GLOSSARY

A

- 1 **Acceptor Head** – the unit containing the sensors capable of reading the note (bill) features.

C

- 2 **Cash Box** – a container designed to collect and stack all accepted bills.
- 3 **C-Clip Ring** – a semicircular retainer clip in the form of the letter “C” designed to fit into a shaft groove to retain a component in place and having hole rings at its ends for insertion of special expansion/removal/replacement tool tips.
- 4 **Country Codes** – specific codes given to a country to identify its currency type.
- 5 **CPU** – acronym for Central Processor Unit - a circuit board usually containing many computer processing integrated circuit chips.

D

- 6 **DIP Switch** – Dual Inline Package Switch - a printed circuit board mountable two-position slide switch package containing up to 16 individual switches.
- 7 **DIP Switch Block** – a single Dual Inline Package two-position circuit board switch set.

E

- 8 **Encoder** – a gear having multiple protrusions (flags) used to interrupt an optical sensor to determine shaft rotational speed.

F

- 9 **Flowchart** – a branched set of trouble shooting steps to test a specific DBV component(s) function.

H

- 10 **Home Position** – the fully retracted position of the Stacker Plate.

L

- 11 **LED** – acronym for Light Emitting Diode.

M

- 12 **MAG** – abbreviation for magnetic.
- 13 **MDB** – acronym for Multi Drop Bus - a communications protocol standard used by the Vending Machine Industry.

P

- 14 **Photo Coupler** – an electronic isolation device that uses an LED and photo-diode combination to translate/transfer a signal condition between large potential differences.
- 15 **Pusher Mechanism** – a mechanical device to move a note (bill) from the Transport into the Cash Box.

S

- 16 **Sensor** – a photo sensitive device positioned to detect specific optical signal levels from an inserted bill or bar coded ticket.



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