

FUJITSU F53 Bill Dispenser Service Guide for U-Scan

Version: North American Version

Document Update: V6

Date: May 23, 2006

U-SCAN®

Document Updates

Version 6:

- Updated cassette magnet information for new cassette. Clarified existing procedure on setting the cassette denominations (page 17).

Version 5:

- Removed information on updating the **USDenomSizes** setting. Added information on verifying the setting and deleting it if it is incorrect.

Version 4:

- Added information on updating the **USDenomSizes** setting when changing a cassette denomination.
- Added the U-Scan DLL to the “Technical Specifications” section.

Version 3:

- Removed **Device Tester** diagnostic information from the “Troubleshooting” section.

Version 2:

- Added information on installing a spacer (page 40).
- Changed screw size for installing a third cassette module (page 42).

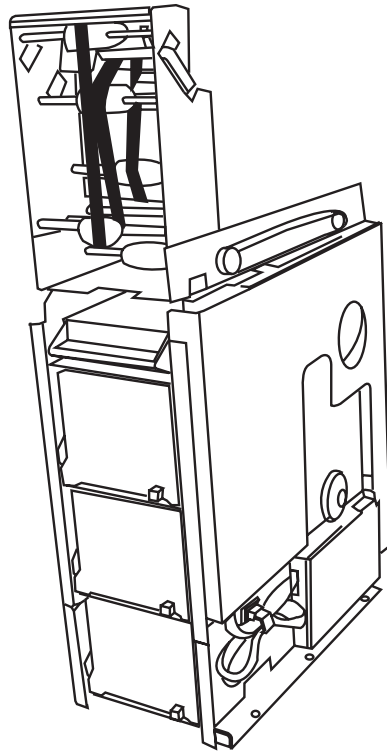
Version 1:

- Document creation.

Contents

FUJITSU F53 Bill Dispenser	1
Technical Specifications	2
Testing the Bill Dispenser in the Device Tester	5
Bill Dispenser Error Messages.....	7
Troubleshooting the F53	8
Additional Information for the F53.....	15
Cleaning and Maintenance.....	16
Setting the Cassette Denominations.....	17
Adjusting and Loading the Cassettes.....	20
Circuit Board Connections and Main Components	22
Seven-Segment LED Status.....	23
On-Board RAS Functions.....	24
Replacing the F53 Components	27
Replacing the Circuit Board.....	27
Replacing the Circuit Board Battery.....	29
Replacing the Sensors	31
Replacing the Cassette Pick and Sub Rollers	33
Adjusting the F53 Components	34
Adjusting the Cassettes for Note Width and Length	34
Adjusting the Reject Gate Solenoid Position.....	36
Adjusting the Carrying Belt Tension	37
Adjusting the Thickness Sensor.....	39
Installing the F53 Spacer (Two- or Three-Denomination F53).....	40
Adding a Third Cassette Module	42
Upgrading the Firmware.....	46
Tracking Bill Quantities in the F53 Bill Dispenser	49
Changing the Bill Dispenser Registry Settings.....	51
Electrical Block Diagrams	53
IOC Error Codes	55
Status Registers.....	74

FUJITSU F53 Bill Dispenser



Features:

- Two to four cassette Bill Dispenser models available for U-Scan
- Cassette capacity of approximately 500 bills (depending on thickness and quality)
- Reject vault capacity of approximately 20 bills
- Bill low sensor
- Denomination sensor
- Firmware download available
- Optional lockable cassettes
- Top delivery of bills to allow bills to be dispensed beside the Scanner Scale

Technical Specifications

Environment

- Operating temperature: 32°F to 104°F (0° to 40°C)
- Storage temperature: 23°F to 122°F (-5° to 50°C)
- Relative Humidity: 10% to 85%

Electrical Interface

- RS-232C connection

Power Supply Requirements

- DC +24 ±10%
- Maximum 6A
- Average 4A

Communication

- 8-pin to DB-9 female RS-232 communication cable
- Connects to COM 9 (Port 7) via DB-9 to DB-25 adapter

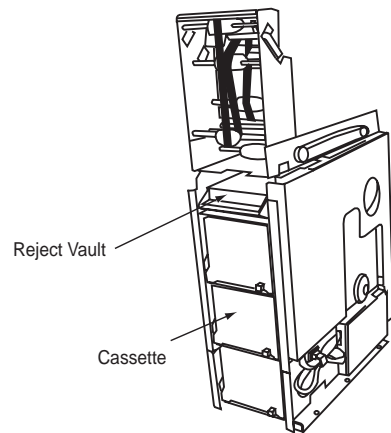
U-Scan Information

- DLL: **F56BD.DLL**

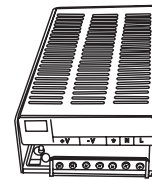
Components of the FUJITSU F53

The FUJITSU F53 Bill Dispenser includes the following components:

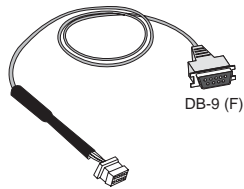
- FUJITSU F53 Bill Dispenser
- Cassettes (two, three, or four)
- Reject vault
- Power supply
- Power cables
- RS-232 communication cable
- DB-9 male to DB-25 female adapter (ADP-1003)



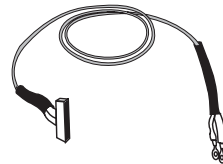
F53 Bill Dispenser



Power Supply



Communication Cable



Power Cable - F53 to Power Supply



Power Cable - Power Supply to Power Bar

Testing the Bill Dispenser in the Device Tester

1. Stop the Customer Software

See “Stop the Customer Software.”

2. Verify the Settings

Refer to “Check the Settings” in the “Using the Device Tester” section of the Introduction.

3. Test the Device

NOTE: For an explanation of error messages, see “Bill Dispenser Error Messages” later in this section. Error messages are also stored in the **Eventlog Viewer** and can be viewed after you exit the Device Tester.

- 1 Click **Start**.
The message **ONLINE{Bill Dispenser}** appears in the **Messages** box.
- 2 Click **Dispense**.
- 3 Enter the amount to be dispensed.
- 4 Click **OK**.
If the test was successful, the F53 dispenses the indicated amount and the **Messages** box displays **BILL_DISPENSER::DISPENSED{amount}**.
- 5 Click **Stop**.
- 6 Click **OK**.

NOTE: When you test the F53 F53, click **Other** if further investigation is required. **Other** allows you to view the diagnostic output, view configurations, dispense bills, and reset the device.

- 7 As required, click the following buttons to perform additional tests or to check settings:

Button	Function
Tray Configuration	Displays the current tray denominations (i.e. 5, 10, 20).

Current Status	<p>Displays the current functional status of the F53.</p> <p>Displays error messages if the F53 is not working properly. Refer to “IOC Error Codes” on page 55 for troubleshooting information.</p>
Dispense	Dispenses a bill from each cassette.
Reset / Purge	<p>Resets the F53 and performs a purge sequence.</p> <p>Use this function to clear bill jams.</p>
Module Status	<p>Displays the current functional status of the F53.</p> <p>Sends the status information to the F53 log file (F56BDUTEST.tra).</p>
Error Log	<p>Displays errors that have occurred.</p> <p>Sends the error data to the F53 log file and resets the error counts.</p>
View Serial Trace	Displays logs for the F53.

Bill Dispenser Error Messages

Refer to table below for a description of the most common Bill Dispenser error messages. Refer to the Additional Information section for your Bill Dispenser model for model-specific error messages.

Error Message	Explanation
BILL_TRAY_EMPTY	Indicates that there are no bills in one of the trays or in the device altogether. Refill the Bill Dispenser and try again.
DISPENSE_LIMIT_EXCEEDED	Indicates that the amount of money to be dispensed exceeds the allowable limit. This limit is configurable. Try dispensing a smaller amount.
MECHANICAL_ERROR	The problem could be with the Serial Communications or the Power Cable, the DLL file may be incorrect, or the device may need to be replaced.
BILL_TRAY_LOW	Indicates that the Bill Dispenser is low on bills.
BILL_TRAY_MISSING	Indicates that a cassette is not present or is not properly inserted.

Troubleshooting the F53



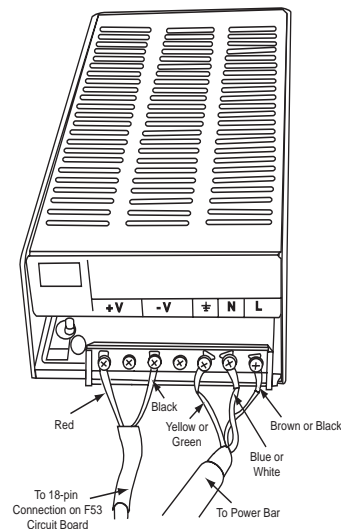
You will be able to identify most issues with the F53 if you follow all of the tasks outlined in this section.

1. Follow the Testing Procedure

See “Testing the Bill Dispenser.”

2. Inspect the Power

- 1 Locate the F53 power supply under the Bag Scale.
- 2 Ensure that the LED on the power supply circuit board is on.
- 3 If the LED is not on, ensure that power supply cable is connected to the power bar.
- 4 Ensure that the power cable is connected to the F53 circuit board.
- 5 Ensure that the power cables are connected to the power supply as shown below:



3. Inspect the Data Cable

- 1 Locate the data cable.
- 2 Ensure that the data cable is connected to the main circuit board in the 5-pin connection (at the front of the circuit board).
- 3 Ensure that the data cable is connected to COM 9 (Port 7) on the Edgeport.
- 4 Inspect the data cable for any visible signs of damage.

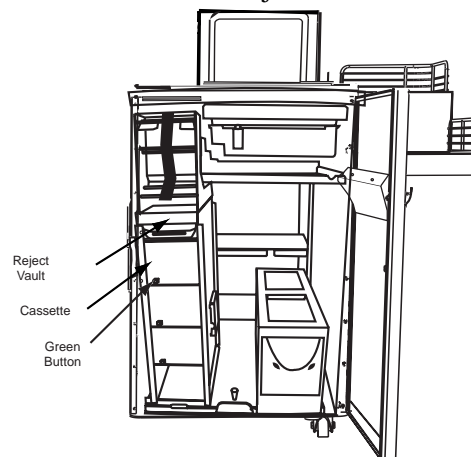
Troubleshooting the F53 (Cont'd)

4. Inspect the Seven-Segment LED

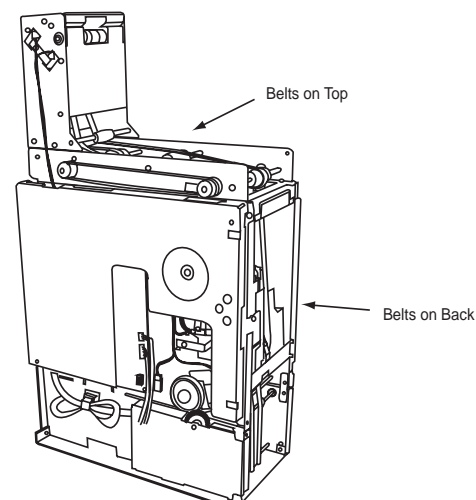
- 1 Ensure that the seven-segment LED on the circuit board is on and that **0** is displayed to indicate normal operation.
- 2 Disconnect the F53 power supply cable from the power bar, then reconnect it.
- 3 If a code other than **0** displays after you cycle the power, refer to “[Seven-Segment LED Status](#)” on page 23 for LED indications and possible troubleshooting solutions.

5. Check for Bill Jams or Debris

- 1 Remove the cassettes and the reject vault from the F53.



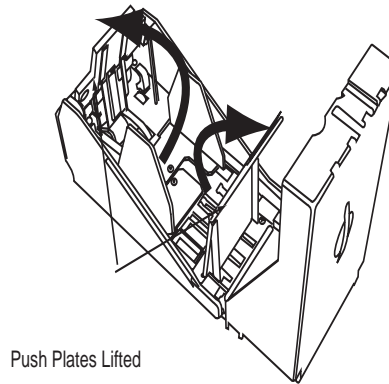
- 2 Check inside the cassette housing for any bill jams or debris.
- 3 Pull the release pin and slide the F53 out of the casing.
- 4 Check for any bill jams or debris in the belts on the back and the top of the F53.



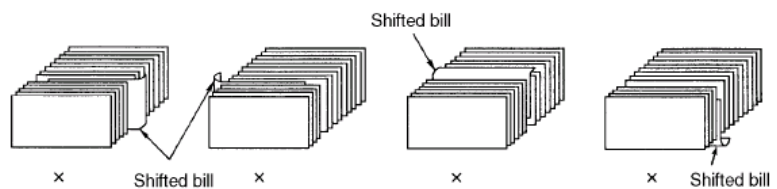
Troubleshooting the F53 (Cont'd)

6. Inspect the Cassettes and Bills Loaded

- 1 Remove the cassettes from the F53.
- 2 Unlock and open the cassettes.
- 3 Lift the push plates to ensure that the internal components function.



- 4 Inspect the quality of the bills. Remove any of the following:
 - a Torn bills (including bills with ripped corners)
 - b Taped bills
 - c Bills with staples attached
 - d Badly stained bills
 - e Severely wrinkled bills
 - f Bills with holes
- 5 If necessary, remove the bills from the cassette and align them in a neat stack. Ensure that no bills protrude from the stack as shown below.

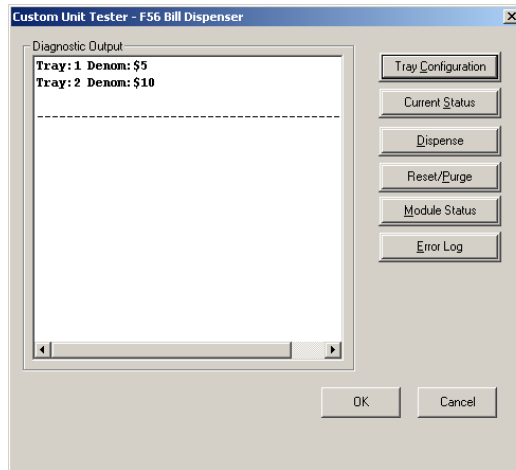


- 6 If necessary, straighten and smooth out any folded or crumpled bills.
- 7 Fan the bills to ensure that they are not stuck together.
- 8 Replace the bills in the cassette. If the bills are curved, make sure that the curve is facing the bottom of the cassette.

Troubleshooting the F53 (Cont'd)

7. Check the Cassette Denomination Settings

- 1 Access the **Device Tester**.
- 2 Click the **Bill Dispenser** tab.
- 3 Click **Other**.
The **Custom Unit Tester** screen displays.
- 4 Click **Tray Configuration**.
The expected denominations for each tray displays.



- 5 Ensure that the proper denomination is loaded into the cassette.
- 6 If you need to check the cassette magnet setup, refer to [“Setting the Cassette Denominations”](#) on page 17.

OR

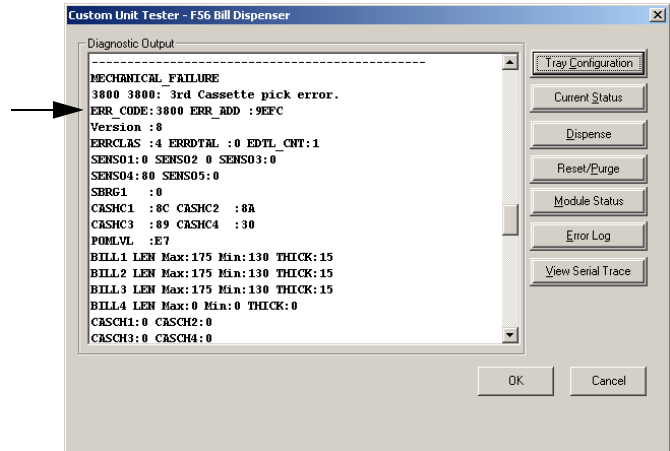
If you need to change the denomination settings in the software, refer to [“Changing the Denominations Settings in the Registry”](#) on page 51.

8. Check the Unit Diagnostics

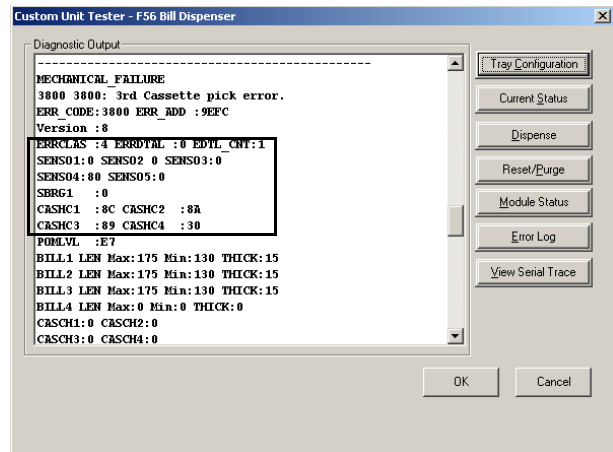
- 1 On the **Bill Dispenser** tab in the **Device Tester**, click **Other**.
The **Custom Unit Tester** screen displays.
- 2 Click **Current Status**.
The device status information is displayed.

Troubleshooting the F53 (Cont'd)

- 3 Check for a four-digit IOC error codes in the **ERR_CODE** field.



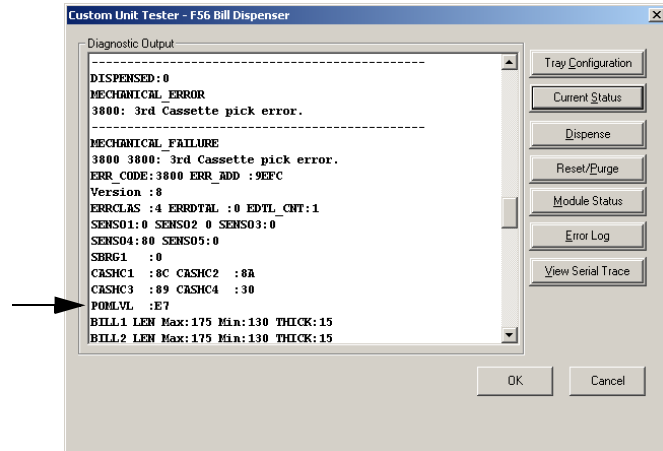
- 4 If an error code appears in this field refer to “[IOC Error Codes](#)” on page 55 for troubleshooting solutions.
- 5 Locate the status register readings.



- 6 If a code appears beside any of the status register readings, refer to “[Status Registers](#)” on page 74.
- 7 Check the thickness sensor value:
 - a On the **Custom Unit Tester** screen, scroll through the device status readings until you find an entry for **POMLVL**.

Troubleshooting the F53 (Cont'd)

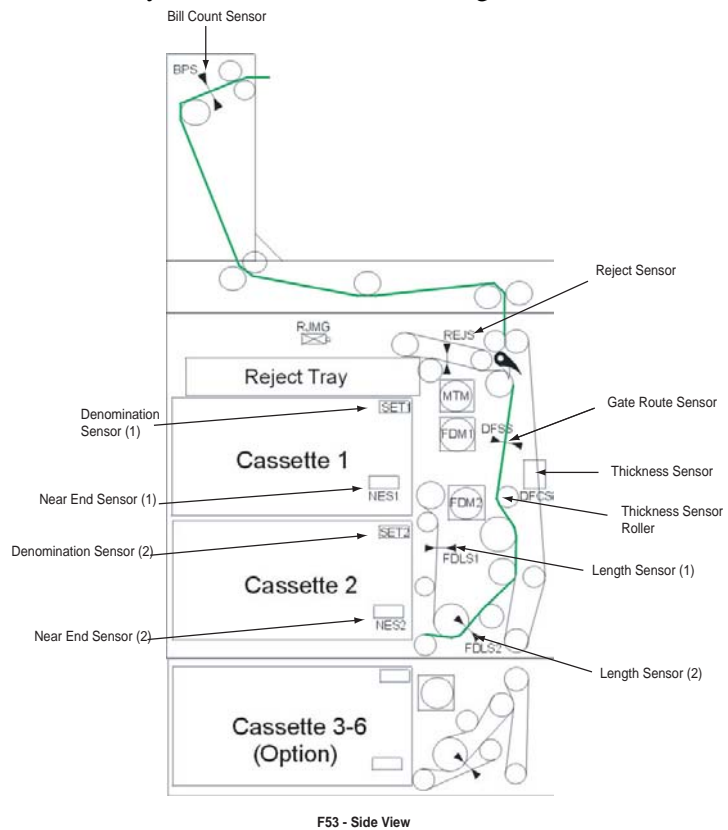
b Ensure that the thickness sensor value is **E7 +/- 4 (E3 - Eb)**.



c If the thickness sensor value is not within the acceptable range, adjust it. Refer to “[Adjusting the Thickness Sensor](#)” on page 39.

9. Clean the Sensors

Use a soft, dry cloth to clean the following sensors:



a Bill Count Sensor

- b** Reject Sensor
- c** Gate Route Sensor
- d** Thickness Sensor (and rollers)
- e** Length Sensor
- f** Near End Sensors (one for each cassette)
- g** Denomination Sensors (one for each cassette)

Additional Information for the F53

- [Cleaning and Maintenance](#) (page 16): Table detailing cleaning and preventive maintenance procedures along with suggested frequency.
- [Setting the Cassette Denominations](#) (page 17): Illustrated procedure for setting the cassettes up to dispense a specific denomination.
- [Loading the Cassettes](#) (page 20): Procedure for loading bills in the cassettes.
- [Circuit Board Connections and Main Components](#) (page 22): Diagram of the circuit board.
- [Seven-Segment LED Status](#) (page 23): Table listing the LED indications and troubleshooting solutions.
- [On-Board RAS Functions](#) (page 24): Instructions on testing the sensor through the on-board diagnostics.
- [Replacing the F53 Components](#) (page 27): Procedures for replacing the following F53 components:
 - [Replacing the Circuit Board](#) (page 27)
 - [Replacing the Circuit Board Battery](#) (page 29)
 - [Replacing the Sensors](#) (page 31)
 - [Replacing the Cassette Pick and Sub Rollers](#) (page 33)
- [Adjusting the F53 Components](#) (page 34): Procedures for adjusting the components of the F53.
 - [Adjusting the Cassettes for Note Width and Length](#) (page 34)
 - [Adjusting the Reject Gate Solenoid Position](#) (page 36)
 - [Adjusting the Carrying Belt Tension](#) (page 37)
 - [Adjusting the Thickness Sensor](#) (page 39)
- [Installing the F53 Spacer \(Two- or Three-Denomination F53\)](#) (page 40): Procedure for installing a spacer on the two- and three-denomination F53 units that they will fit properly into the U-Scan casing.
- [Adding a Third Cassette Module](#) (page 42): Procedure for adding a third cassette module to a two-cassette configuration F53.
- [Upgrading the Firmware](#) (page 46): Steps describing the remote firmware download process. Procedure for manually applying the firmware update.
- [Setting the Bill Quantities](#) (page 49): Procedures for setting bill quantities in **Maintenance Mode**.
- [Changing the Bill Dispenser Registry Settings](#) (page 51): Procedures for changing the number of cassettes and the denominations in the **Registry Editor**.
- [Electrical Block Diagrams](#) (page 53): Electrical block diagrams for the F53.
- [IOC Error Codes](#) (page 55): List of IOC error codes for the F53.
- [Status Registers](#) (page 74): List of status registers for the F53.

Cleaning and Maintenance

Task	Frequency	Description
Thickness Sensor Inspection	Every 12 months	Confirm the value of the thickness sensor in Device Tester (POMLVL setting). Refer to “Check the Unit Diagnostics” on page 11 for instructions.
Thickness sensor roller inspection	Every 4 months	Check for paper dust on the thickness sensor roller (stainless steel roller with a plastic scraper). Refer to “Clean the Sensors” on page 13 for a diagram of the location of the thickness sensor roller.
Reject gate inspection	Every 12 months	Refer to “Adjusting the Reject Gate Solenoid Position” on page 36 for the location of the reject gate. Use your hand to push the reject gate toward the solenoid (magnet). Ensure that the gate moves smoothly. If the gate does not move smoothly, refer to “Adjusting the Reject Gate Solenoid Position” on page 36 to adjust the reject gate solenoid.
Belt tension inspection	Every 12 months	Verify the belt tension. Refer to “Adjusting the Carrying Belt Tension” on page 37.
Sensor output check	Every 4 months	Clean the sensors with a soft, dry cloth. Refer to “Clean the Sensors” on page 13 for the sensor locations. Verify the sensor output values in Device Tester . Refer to “Check the Unit Diagnostics” on page 11 for instructions.
Flat belt inspection	Every 12 months	Verify that the belts are not too loose and that all the belts in a set are the same tension.
Change the pick and sub rollers	Every 4 months	Change the pick and sub rollers in each cassette. Refer to “Replacing the Cassette Pick and Sub Rollers” on page 33.
Clean belts, pick and sub rollers	Every 4 months	Use isopropyl alcohol (rubbing alcohol) to clean the surfaces of the belts and rollers.
Clean the thickness sensor rollers	Every 4 months	Use compressed air to clean the scraper on the stainless steel roller. Use isopropyl alcohol (rubbing alcohol) to clean the surfaces of the rollers.

Setting the Cassette Denominations

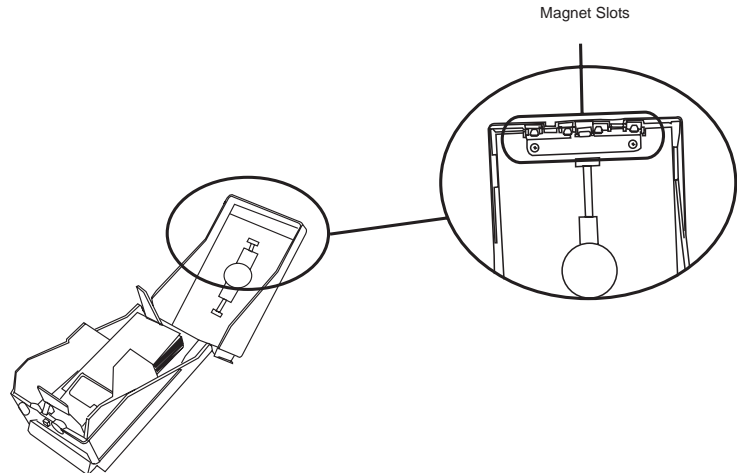
Each cassette uses a set of two magnets to identify which denomination it is being used for. There are four magnet slots available, and two of them are always used to specify one denomination for a cassette.

- 1 Make sure that the **BillDispenser** and **DenomSizesUS** registry settings are updated appropriately. Refer to “[Changing the Denominations Settings in the Registry](#)” on page 51.
- 2 Make sure that the **NumTrays** setting is set for the correct number of cassettes. Refer to “[Changing the Number of Cassettes in the Registry](#)” on page 51.
- 3 Press the green button to remove the cassette you wish to set up from the F53.
- 4 Unlock and open the cassette.
- 5 Refer to the table below to determine the appropriate denomination magnet position.

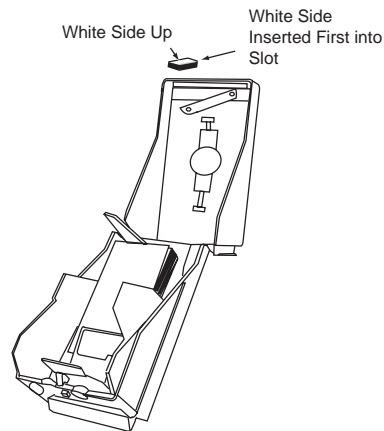
Denomination Magnet Settings

a	b	c	d	USD (\$)	CDN (\$)
X	X			1	N/A
X		X		5	5
X			X	10	10
	X	X		20	20
	X		X	50	50
		X	X	100	100

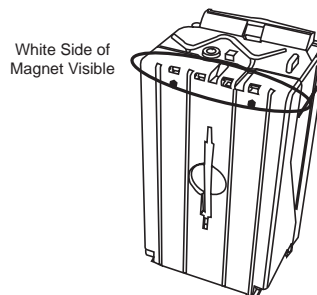
- 6 Locate the magnet slots and tabs on the cassette.



- 7 Remove one of the screws securing the magnet cover plate.
8 Pivot one end of the cover plate down to access the magnet slots.
9 Locate the slot labels (a, b, c, d) on the top of the cassette.
10 With the white top facing up and the white side toward the cassette, insert the magnet into the slot.



- 11 Repeat for the other slot indicated in the table.
12 Close and lock the cassette.
13 Ensure that the white sides of the two magnets are visible through the slots on the top of the cassette.

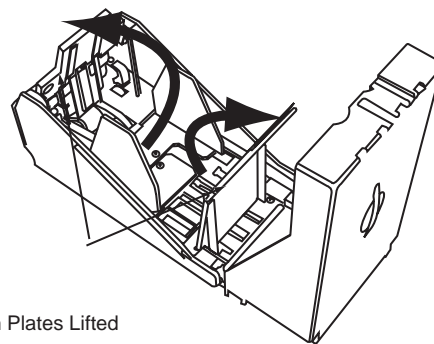


- 14** Replace the cassette in the F53.
- 15** Repeat the steps above for the remaining cassettes.

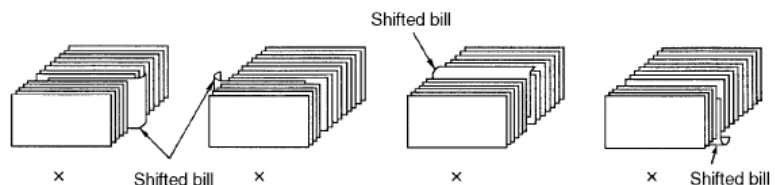
Adjusting and Loading the Cassettes

Loading the Cassettes

- 1 Push the green button and remove the cassette from the F53.
- 2 Unlock the cassette.
- 3 Press the green release button of the back of the cassette and lift the top to open it.
- 4 Lift and tilt the green push plate furthest away from the lock.
- 5 Lift and swivel the green push plate closest to the lock up. The tabs on the bottom of the plate sit in the slots on the front of the cassette to keep the plate raised.

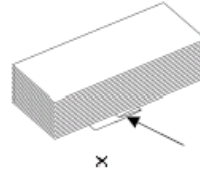


- 6 Inspect the quality of the bills. Do **NOT** load any of the following:
 - a Torn bills (including bills with ripped corners)
 - b Taped bills
 - c Bills with staples attached
 - d Badly stained bills
 - e Severely wrinkled bills
 - f Bills with holes
- 7 Attempt to straighten and smooth out any folded or crumpled bills.
- 8 Align the bills in a neat stack. Ensure that no bills protrude from the stack as shown below.



- 9 Fan the bills to ensure that they are not stuck together.
NOTE: *If you are loading a large quantity of bills, ensure that they are not all facing the same direction.*

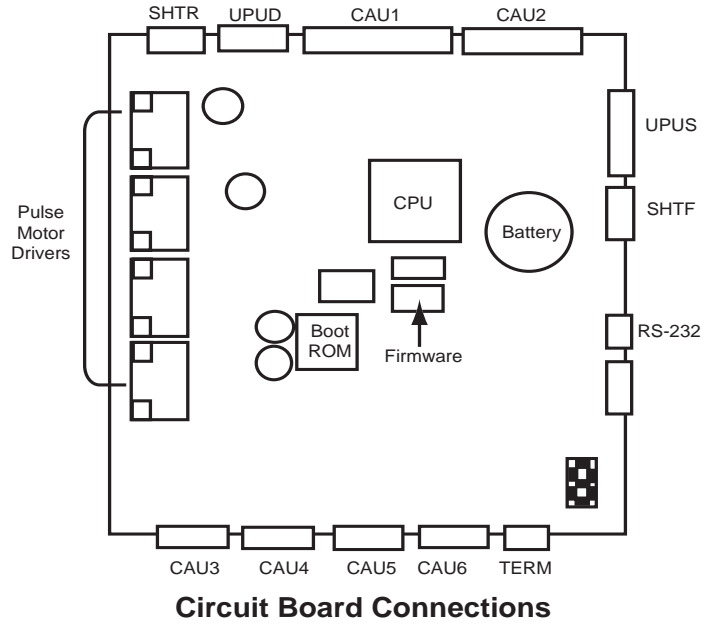
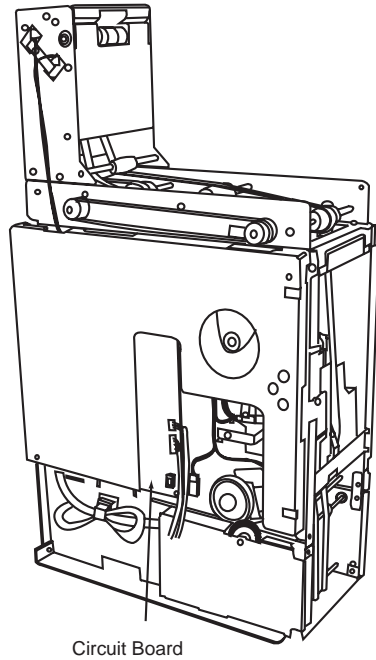
- 10 If the bills are new, ensure to remove any packing paste from the bills. Failure to do so will result in pick failures.
- 11 Insert the bills in the cassette, making sure that the bottom bill does not twist or fold as shown below.



NOTE: *If the bills are curved, ensure that the curve is facing down.*

- 12 Move both push plates against the bills.
- 13 Close the cassette lid.
- 14 Lock the cassette.
- 15 Replace the cassette in the F53.
- 16 Access **Maintenance Mode** and perform a test dispense.
The specified amount is dispensed.
- 17 Touch **EXIT MAINTENANCE** to exit **Maintenance Mode**.

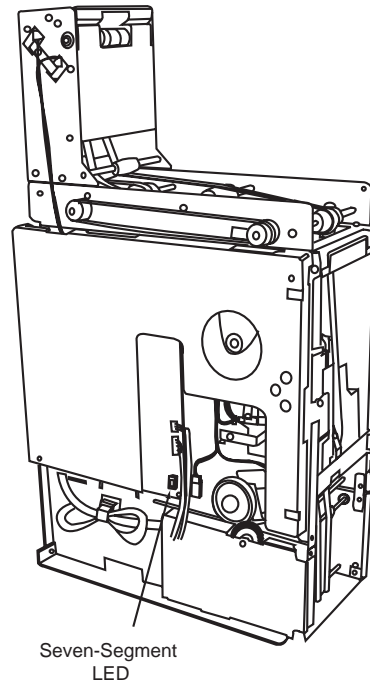
Circuit Board Connections and Main Components



NOTE: *The circuit board cover is secured with five screws.*

Seven-Segment LED Status

The seven-segment LED is located on the F53 circuit board. Refer to the table below for seven-segment LED indications and possible troubleshooting solutions.



NOTE: *Error codes 3 to d in the table below only display after the F53 is powered off and then on again.*

LED Error Code	Indication	Possible Solution
0	Normal operation	N/A
1	Incomplete program download (RAM program loss) OR Download in progress	Download program OR Wait until the download is complete.
r	RAS operation in progress	N/A
3	ROM check sum error	Replace the circuit board.
4	RAM check sum error	Replace the circuit board.
5	Watch dog error	Replace the circuit board.
6	Transmit error (Boot)	Replace the circuit board.
d	System down	Replace the circuit board.

On-Board RAS Functions

The RAS on-board diagnostics allows you to view the status of and test the F53 sensors. All sensors are placed into a group for testing purposes (“[Sensor Groups](#)” on page 25). You can view the status of all sensors in a particular group by selecting the RAS function for that group (“[RAS Functions](#)” on page 24). Each sensor is represented by a specific segment on the seven-segment LED (“[Sensor Groups](#)” on page 25 and “[Seven-Segment LED - Segments Labeled](#)” on page 25).

For instructions on testing a sensor through the on-board diagnostics, refer to “[Performing an On-Board RAS Test](#)” on page 25.

RAS Functions

RAS Function Number	Description
RAS 0	Mechanical Reset continuously
RAS 1	Sensor group 1 on seven-segment LED
RAS 2	Sensor group 2 on seven-segment LED
RAS 3	Sensor group 3 on seven-segment LED
RAS 4	Sensor group 4 on seven-segment LED
RAS 5	Sensor group 5 on seven-segment LED
RAS 6	Sensor group 6 on seven-segment LED
RAS 7	Sensor group 7 on seven-segment LED
RAS 8	Sensor group 8 on seven-segment LED
RAS 9	Display DFCS thickness on seven-segment LED
RAS a	Thickness Sensor Adjustment
RAS b	END on-board RAS

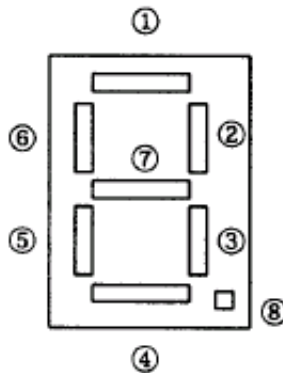
Sensor Groups

NOTES: The codes in the table below are used to label the internal device cables. For example, **REJS** is printed on a small tag on the reject sensor cable. Find the labeled tag to identify the location of the faulty sensor.

Not all sensors are present in the U-Scan F53.

Seg #	8	7	6	5	4	3	2	1
Group 1	-	-	FDLS6	FDLS5	FDLS4	FDLS3	FDLS2	FDLS1
Group 2	BRS1	BRS2	BRS3	EJSF	EJSR	REJS	BPS	DFSS
Group 3	TUS	THS	RJBR	RJBF	SOSR	SCSR	SOSF	SCSF
Group 4	-	-	-	-	RRBO X	RSHT	FRBOX	FSHT
Group 5	BS2A	BS2B	BS2C	BS2D	BS1A	BS1B	BS1C	BS1D
Group 6	BS4A	BS4B	BS4C	BS4D	BS3A	BS3B	BS3C	BS3D
Group 7	BS6A	BS6B	BS6C	BS6D	BS5A	BS5B	BS5C	BS5D
Group 8	-	-	NES6	NES5	NES4	NES3	NES2	NES1

Seven-Segment LED - Segments Labeled



Performing an On-Board RAS Test

- 1 Identify the sensor you wish to test.
- 2 In the table “[Sensor Groups](#)” on page 25, locate the sensor group for the sensor you wish to test. For example, the reject sensor (REJS) is part of sensor group 2.
- 3 In the table “[RAS Functions](#)” on page 24, identify the RAS test number for the sensor you wish to test. For example, RAS function number 2 corresponds to sensor group 2.
- 4 Disconnect the F53 power supply cable from the power bar.

- 5 Place a jumper on position **TRM2** on the circuit board.



- 6 Connect the power supply cable to the power bar.
The seven-segment LED on the circuit board resets. **8. 8.** displays followed by a count from **0** to **b**.
- 7 When the number corresponding to the test you wish to perform is displayed, remove the jumper from **TRM2** to activate the test.
NOTES: *The count cycle will repeat until you select a test or exit RAS.*
*To end the on-board RAS session without activating a test, remove the jumper when **b** displays on the seven-segment LED.*
- 8 In the table “[Sensor Groups](#)” on page 25, identify the segment of the seven-segment LED that corresponds to the sensor you are testing. For example, segment 3 corresponds to the reject sensor (REJS).
NOTE: *Refer to “[Seven-Segment LED - Segments Labeled](#)” on page 25 for a diagram of the LED segments.*
- 9 Block the sensor you are testing and ensure that the corresponding segment on the seven-segment LED lights.
NOTE: *If an error occurs during the test, an error message displays on the seven segment LED in the format **Erxxxx**, where “xxxx” represents the IOC error code. Refer to “[IOC Error Codes](#)” on page 55 for a description of IOC error codes.*
- 10 If the segment does not light when the sensor is blocked:
 - a Use a soft, dry cloth to clean the sensor.
 - b If the issue is not resolved, replace the sensor. Refer to “[Replacing the Sensors](#)” on page 31.
- 11 To end the RAS session after the test is complete, disconnect the power supply cable from the power bar.
- 12 Replace the jumper on only one pin of **TRM2**.
- 13 Reconnect the power supply cable to the power bar.

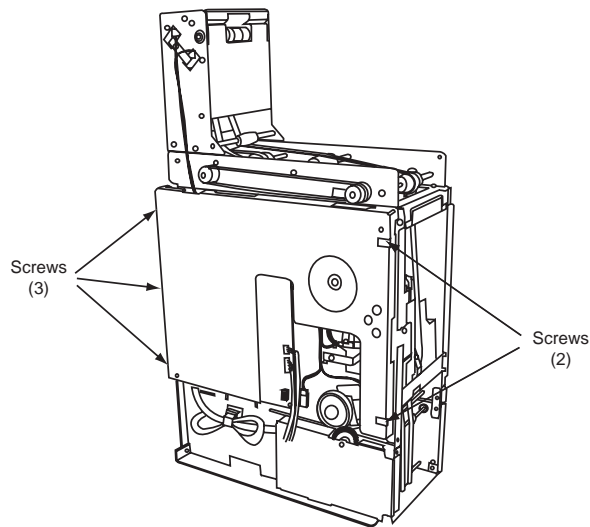
Replacing the F53 Components

Replacing the Circuit Board

Requirements:

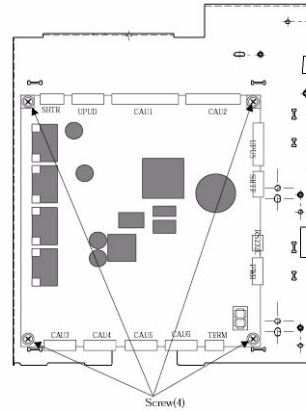
- Phillips screwdriver (magnetic tip recommended)
- Replacement circuit board

- 1 Unlock and open the door below the Scanner Scale.
- 2 Pull the release pin on the side of the slide rail and slide the F53 towards you.
- 3 Locate the five screws securing the circuit board cover.



- 4 Use a Phillips screwdriver to remove the screws. Set the screws and cover aside.
- 5 Disconnect the power supply cable from the power bar.
- 6 Disconnect the on-board cables from the circuit board.

- 7 Locate the four screws securing the circuit board to the F53.



- 8 Use a Phillips screwdriver to remove the four screws securing the circuit board to the F53.
- 9 Remove the old circuit board.
- 10 Align the new circuit board on the side of the F53.
- 11 Fasten the four screws to secure the circuit board to the side of the F53.
- 12 Connect the cables to the circuit board.
- 13 Replace the circuit board cover.
- 14 Reconnect the power supply cable to the power bar.
- 15 When the F53 starts, ensure that **0** displays on the seven-segment LED on the circuit board to indicate normal operation.
- 16 If a code other than **0** displays, refer to [“Seven-Segment LED Status”](#) on page 23 for LED indications and possible troubleshooting solutions.
- 17 Slide the F53 back into place.
- 18 Test the F53 in the **Device Tester**. Refer to [“Testing the Bill Dispenser in the Device Tester”](#) on page 5.

Replacing the Circuit Board Battery

Requirements:

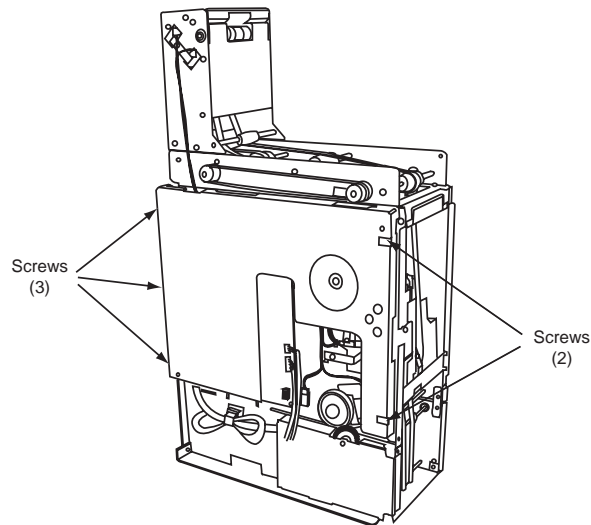
- Replacement battery (SONY 3 V Lithium cell, CR2450)
- Phillips screwdriver (magnetic tip recommended)



Risk of explosion if the wrong type of battery is installed on the circuit board.

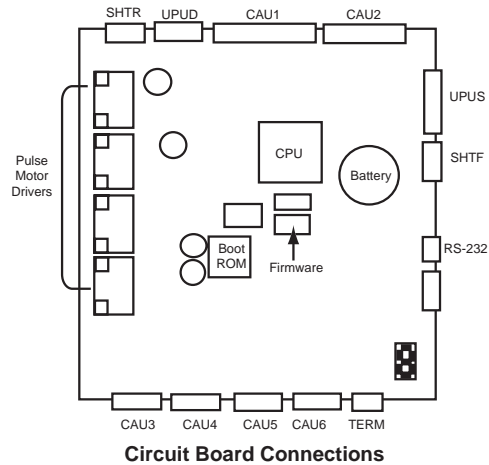
Dispose of the used battery according to the instructions provided by the battery manufacturer.

- 1 Unlock and open the door below the Scanner Scale.
- 2 Pull the release pin on the side of the slide rail and slide the F53 towards you.
- 3 **Disconnect the F53 power supply cable from the power bar.**
- 4 Locate the five screws securing the circuit board cover.



- 5 Use a Phillips screwdriver to remove the screws. Set the screws and cover aside.

- 6 Locate the battery on the circuit board.



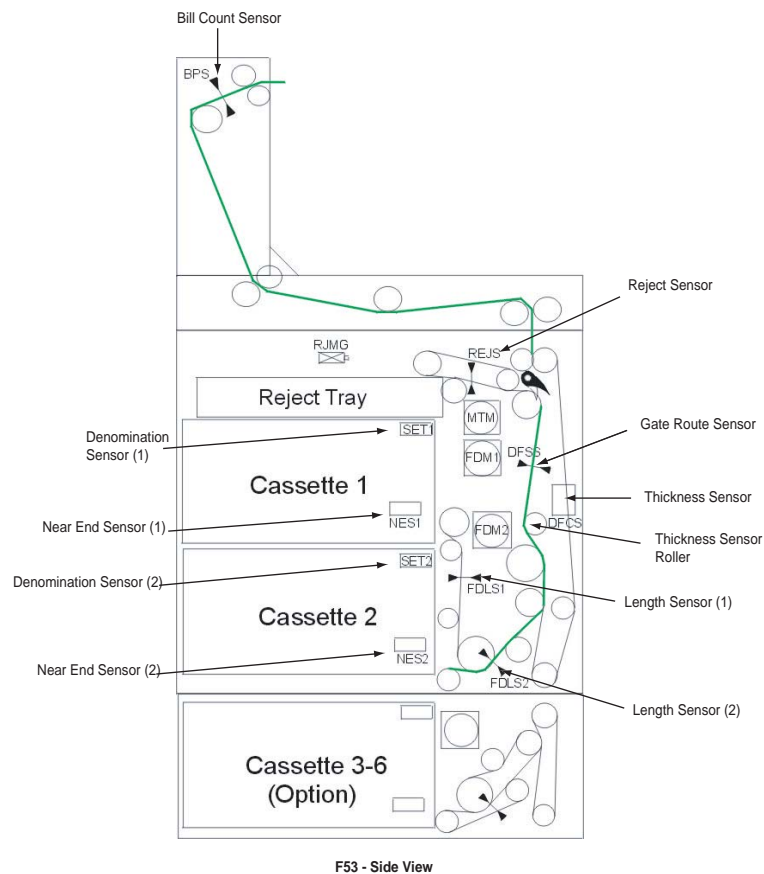
- 7 Remove the battery.
- 8 Press the new battery (SONY 3 V Lithium cell, CR2450) into place on the circuit board.
- 9 Replace the circuit board cover.
- 10 Reconnect the F53 power supply cable to the power bar.
- 11 When the F53 starts, ensure that **0** displays on the seven-segment LED on the circuit board to indicate normal operation.
- 12 If a code other than **0** displays, refer to [“Seven-Segment LED Status”](#) on page 23 for LED indications and possible troubleshooting solutions.
- 13 Slide the F53 back into place.
- 14 Test the F53 in the **Device Tester**. Refer to [“Testing the Bill Dispenser in the Device Tester”](#) on page 5.

Replacing the Sensors

Requirements:

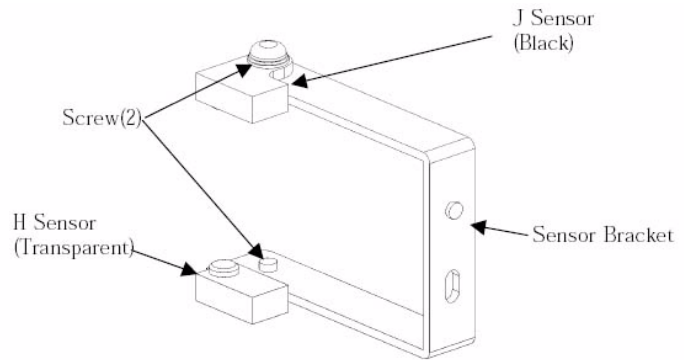
- Phillips screwdriver (magnetic tip recommended)
- Replacement sensors

Sensor Locations



- 1 Disconnect the F53 power supply cable from the power bar.
- 2 Locate the sensors you wish to replace.
- 3 **If** you are replacing the sensors that are covered by the circuit board cover,
 - a Remove the five screws securing the circuit board cover.
 - b Remove the circuit board cover.
- 4 Use a Phillips screwdriver to remove the screw securing the sensor bracket to the F53.
- 5 Disconnect the cable from the sensor on each arm of the sensor bracket.
- 6 Remove the sensor bracket from the F53.

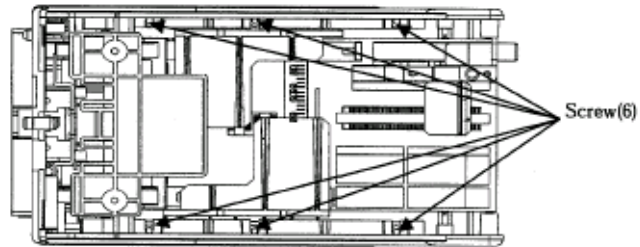
- 7 Remove the screws securing the sensors.



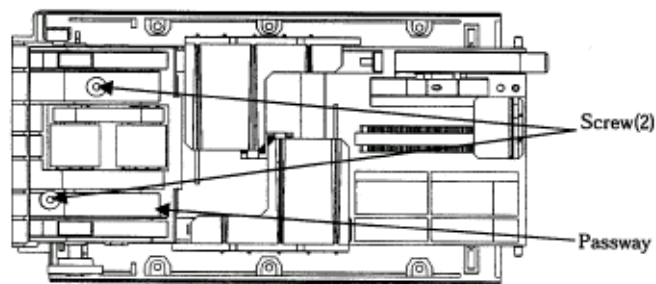
- 8 Align the new sensors on the sensor bracket.
- 9 Fasten a screw to secure each sensor to the sensor bracket.
- 10 Replace the sensor bracket in the F53 and fasten the screw to secure the bracket to the F53.
- 11 Connect the cable to each sensor.
- 12 Reconnect the F53 power supply cable to the power bar.
- 13 Use the on-board RAS diagnostics to test the sensor you replaced. Refer to “[On-Board RAS Functions](#)” on page 24.

Replacing the Cassette Pick and Sub Rollers

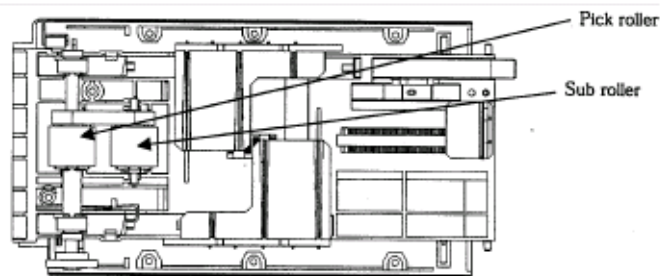
- 1 Open the cassette.
- 2 Remove the six screws indicated below.



- 3 Raise the frame and latch it to the open lid.
- 4 Remove the two screws and the passway bracket that rests on the pick and sub roller assembly.



- 5 Remove the pick or sub roller assembly.



- 6 Install a new pick or sub roller assembly.
- 7 Fasten the two screws to secure the passway bracket.
- 8 Lower the frame.
- 9 Fasten the six screws to secure the frame.
- 10 Close the cassette.

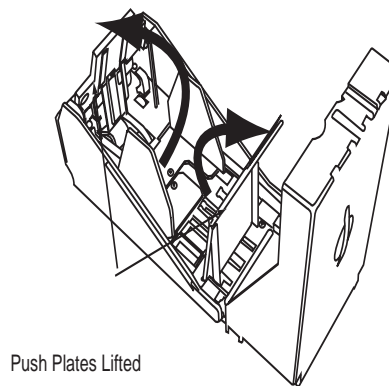
Adjusting the F53 Components

Adjusting the Cassettes for Note Width and Length

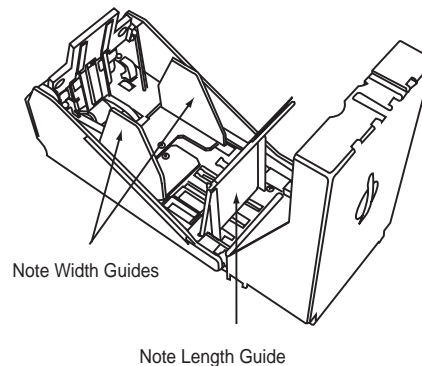
Requirements:

- Phillips screwdriver
- Notes to be loaded, test money, or a measuring tape (Metric)

- 1 Remove the cassette you wish to adjust from the F53.
- 2 Unlock and open the cassette.
- 3 Lift the lock the push plates into place.



- 4 Locate the two note width guides and the note length guide in the cassette.



- 5 Locate the note width and length in the table below:

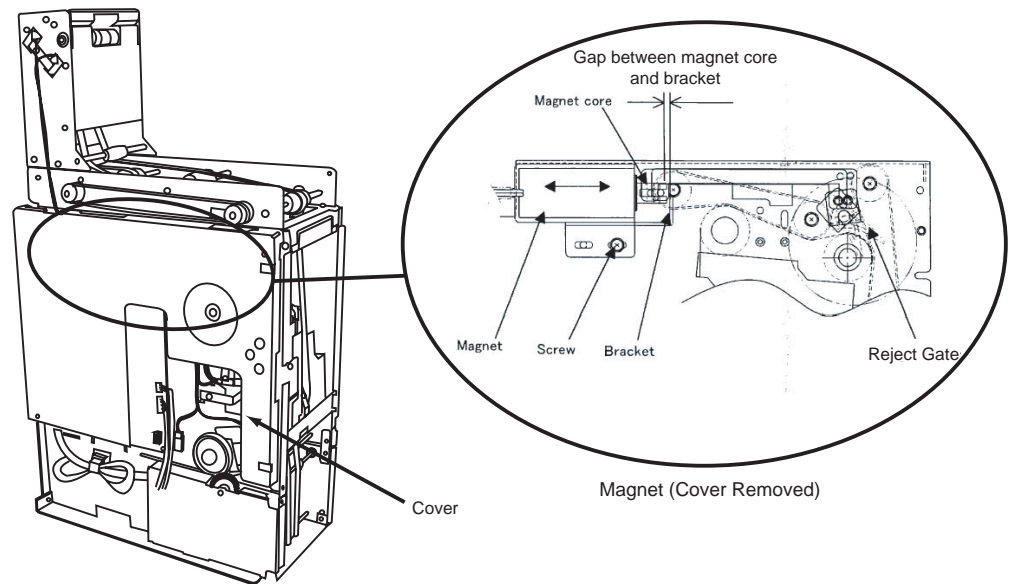
Currency	Note Width	Note Length
\$ USD (all denominations)	66 mm	156 mm
\$ CDN (all denominations)	69 mm	152 mm

- 6** To adjust the cassette for the note width:
 - a** Locate the note guides and the note width indicator on the floor of the cassette.
 - b** On the bottom of the cassette, loosen the screw in each of the note width guides.
 - c** Spread the note width guides apart until you can see the number **80** on the note width indicator beside each note guide.
 - d** Align one of the note width guides with the appropriate note width indicator on floor of the cassette, then add 1 mm total to make it easier to load the cassettes.
For example, if the note is 67 mm wide, adjust the note width guide to **68**.
 - e** Hold the note guide in position, then tighten the screw to secure the note guide in place.
 - f** Repeat the steps above to adjust the second note width guide.
- 7** To adjust the cassette for note length:
 - a** Loosen the screw securing the note length guide at the back of the cassette.
 - b** Slide the note length guide to the back of the cassette.
NOTE: *For US and Canadian currency, we recommend adjusting the note length guide to 12.*
 - c** Place a note (or preferably a stack of notes) of the appropriate denomination in the cassette.
 - d** Slide the note length guide into position, leaving approximately 2 mm between the notes and the note guide.
NOTE: *If you do not have the appropriate note available, measure the distance (length) indicated in the table above inside the cassette.*
 - e** Adjust the note length guide to the proper position, then add 1-2 mm to make it easier to load the cassettes.
 - f** Hold the note guide in position and fasten the screw to secure the note guide in place.

Adjusting the Reject Gate Solenoid Position

Requirements:

- Phillips screwdriver (magnetic tip recommended)
- 1 Disconnect the F53 power supply cable from the power bar.
 - 2 Remove the five screws securing the circuit board cover.
 - 3 Remove the cover. Set the cover and the screws aside.
 - 4 Locate the reject gate solenoid (magnet) on the side of the F53.



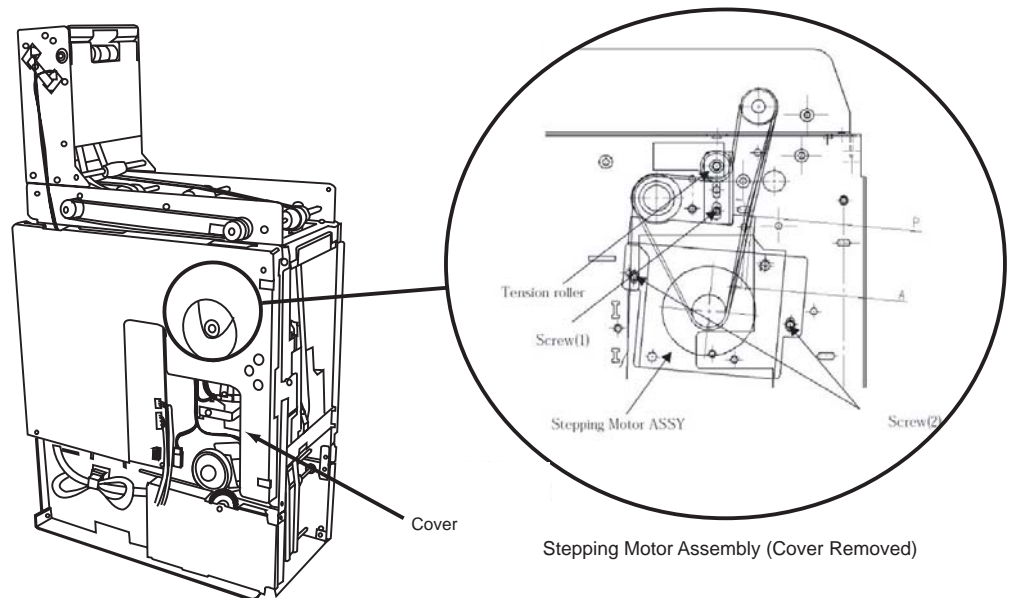
- 5 Use a Phillips screwdriver to loosen the screw indicated in the diagram above.
- 6 Slide the reject gate solenoid so that the reject gate touches the shaft and the gap between the magnet core and the bracket is as shown in the diagram above.
- 7 Fully tighten the screw to lock the reject gate solenoid into position.
- 8 Use your hand to push the reject gate towards the solenoid. Ensure that the reject gate moves smoothly.
- 9 Fasten the five screws to replace the circuit board cover.
- 10 Reconnect the F53 power supply cable to the power bar.

Adjusting the Carrying Belt Tension

Requirements:

- Phillips screwdriver (magnetic tip recommended)
- 300 g spring gauge (part number USA0204169)

- 1 Disconnect the F53 power supply cable from the power bar.
- 2 Remove the five screws securing the circuit board cover.
- 3 Remove the cover. Set the cover and the screws aside.
- 4 Locate the stepping motor assembly on the side of the F53.



- 5 Loosen the screw securing the tension roller bracket.
- 6 Move the tension roller bracket up or down as required to adjust the belt tension.
- 7 Fully tighten the screw.
- 8 Loosen the two screws securing the stepping motor assembly.
- 9 Adjust the position of the stepping motor assembly as required to loosen or tighten the belt.
- 10 Fully tighten the screws.
- 11 Measure the tension of the belt with a spring gauge (part number USA0204169):
 - a Locate position "P" in the diagram above.
 - b In position "P," use the spring gauge to push (deflect) the belt 4 mm toward the tension roller.
 - c Ensure that the reading on the spring gauge is between 150 - 300 g.

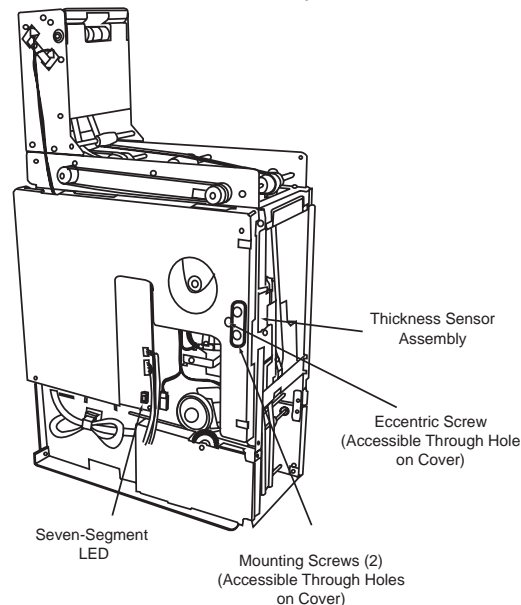
- 12** If necessary, adjust the tension roller bracket or stepping motor assembly again until the belt tension is correct.
- 13** Replace the circuit board cover.
- 14** Reconnect the F53 power supply cable to the power bar.

Adjusting the Thickness Sensor

Requirements:

- Phillips screwdriver (magnetic tip recommended)
- Flat-head screwdriver
- 0.3mm thickness gauge (part number USA0204711 / D15L-0014-0157)

- 1 Locate the thickness sensor assembly on the F53.



- 2 Access on-board RAS function **9**. Refer to “[Performing an On-Board RAS Test](#)” on page 25.
- 3 Use a Phillips screwdriver to **slightly** loosen the two mounting screws indicated above.
- 4 Use a flat-head screwdriver to adjust the eccentric screw until **E5** displays on the seven-segment LED.
- 5 Tighten the mounting screws until **E7** displays on the seven-segment LED. The acceptable range is **E7 +/- 4 (E3 - E6)**.
- 6 Disconnect and then reconnect the F53 power supply to exit RAS **9**.
- 7 Remove the top cassette from the F53.
- 8 Insert the 0.3mm thickness gauge (part number USA0204711 / D15L-0014-0157) through the cassette housing, into the note path and up to the thickness sensor.
- 9 Access RAS function **A**. Refer to “[Performing an On-Board RAS Test](#)” on page 25.
- 10 Ensure that the on-board RAS function **A** measures **0 +/- 4**.
- 11 Disconnect and then reconnect the F53 power supply to exit RAS.

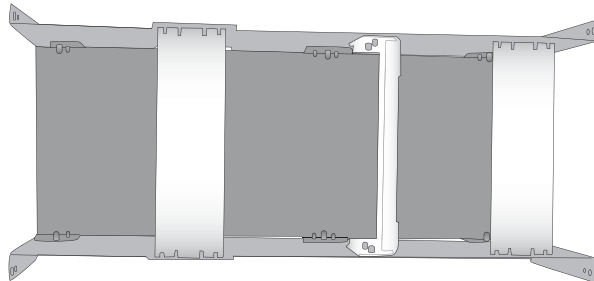
Installing the F53 Spacer (Two- or Three-Denomination F53)

If the F53 dispenses two denominations, follow the steps below to install two spacers on the bottom of the F53. If the F53 dispenses three denominations, install one spacer so that the unit fits into the U-Scan casing properly.

Requirements:

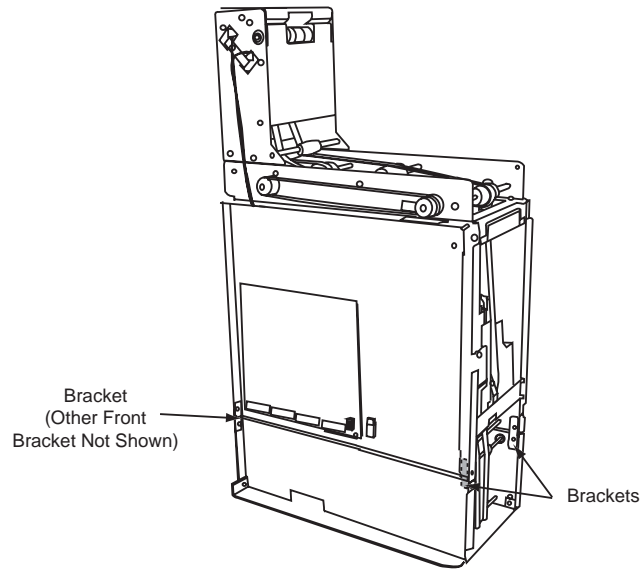
- Spacer kit (11000402) containing the following:
 - Spacer
 - Four brackets
 - Eight Phillips screws (M3 x 6 mm)

- 1 If necessary, remove the F53 from the casing.
- 2 Set the F53 on its side so that you can access the bottom plate.
- 3 Remove the six screws securing the bottom plate. Set aside.
- 4 Place the spacer facing up as shown below.



- 5 Lift the F53 and set it on top of the spacer.
- 6 Locate the rectangular brackets in the third denomination kit.

- 7 Align the round guides (dimples) on a bracket with the round holes on the frame in one of the positions indicated below.



- 8 Use a Phillips screwdriver to fasten two M3 x 6 mm screws and secure the bracket to the F53.
NOTE: *If you are installing the front brackets, thread the screws from the front of the F53 frame and into the bracket. If you are installing the rear brackets, thread the screws through the holes on the bracket and into the F53 frame.*
- 9 Repeat the steps above to secure the other brackets to the F53.

Adding a Third Cassette Module

Follow the steps below to add a third cassette module to an F53.

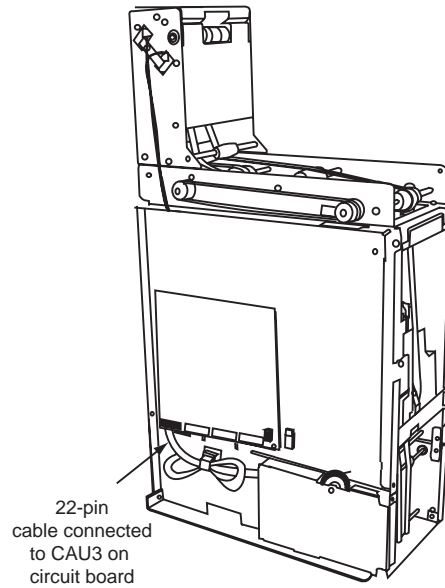
Requirements:

- Phillips screwdriver (magnetic tip recommended)
- Cassette module upgrade kit (KD02881-B009) containing the following:
 - Additional cassette
 - Cassette module
 - Four brackets
 - Eight Phillips screws (M3 x 6 mm)

- 1 Disconnect the F53 power supply cable from the power bar.
- 2 Remove the F53 from the Customer Station casing:
 - a Pull the release pin on the side of the rail and slide the F53 towards you.
 - b Use a Phillips screwdriver to remove the six screws (three on each side) securing the F53 to the plate. Set the screws aside.

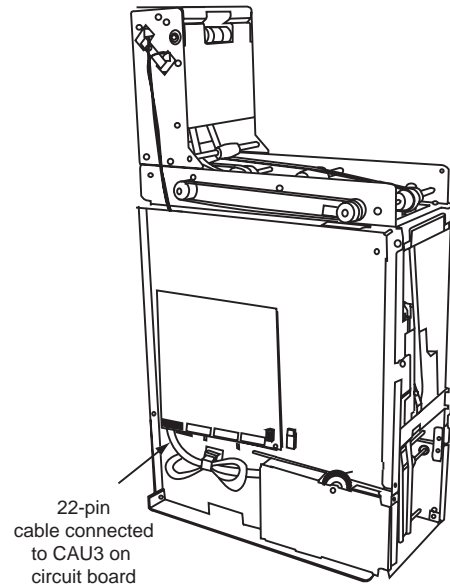
NOTE: *The F53 in the diagram above already has a third cassette installed.*
 - c Lift the F53 off the plate.
- 3 Remove the cassettes from the F53.
- 4 Set the F53 facing down so that you can access the bottom.
- 5 Remove the four brackets securing the spacer to the F53.
- 6 Align the cassette module on the bottom of the F53.

- 7 Align the round guides (dimples) on a bracket with the round holes on the frame in one of the positions indicated below.



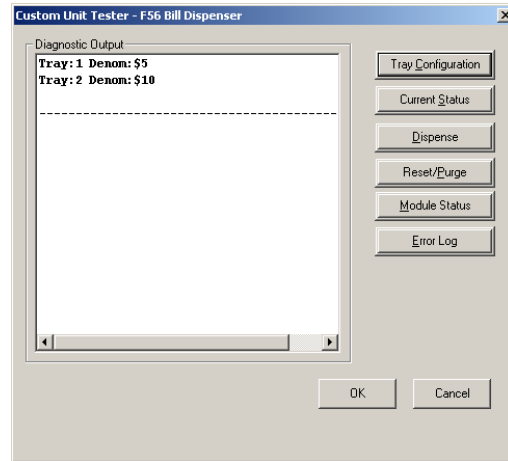
- 8 Use a Phillips screwdriver to fasten two M3 x 6 mm screws and secure the bracket to the F53.
- NOTE:** *If you are installing the front brackets, thread the screws from the front of the F53 frame and into the bracket. If you are installing the rear brackets, thread the screws through the holes on the bracket and into the F53 frame.*
- 9 Use a Phillips screwdriver to fasten two M3 x 6 mm screws and secure the bracket to the F53.
- 10 Repeat the steps above to secure the other brackets to the F53.
- 11 Ensure that the new cassette is set up for the appropriate denomination. Refer to “[Setting the Cassette Denominations](#)” on page 17.

- 12 Connect the 22-pin cable on the third cassette module to the **CAU3** connector on the bottom of the circuit board.



- 13 Tie-wrap the cables neatly so that they remain close the F53 frame, as shown above.
- 14 Put the cassettes in the F53.
- 15 In the Customer Station **Registry Editor**, set the **NumTray** registry setting to **3**. Refer to [“Changing the Number of Cassettes in the Registry”](#) on page 51.
- 16 Add the new denomination to the **BillDenominations** registry setting. Refer to [“Changing the Denominations Settings in the Registry”](#) on page 51.
- 17 Reconnect the F53 power supply cable to the power bar.
- 18 Access the **Device Tester**.
- 19 Click the **Bill Dispenser** tab.
- 20 Click **Test Dispense**.
Ensure that the F53 dispenses a bill from each cassette.
- 21 Click **Other**.
The Custom Unit Tester screen displays.
- 22 Click **Tray Configuration**.

23 Ensure that the correct information for the new cassette appears.



Upgrading the Firmware

F53 Remote Download Process

The F53 firmware version can be upgraded remotely in the following instances:

- Stores with ASM: Firmware can be upgraded through a software update package
- Stores that allow dial-in: Fujitsu can dial in to a store and prepare the store for the download.

The process performed by ASM in stores with ASM to download the firmware is outlined below. **No action is required by field engineers.**

- 1 ASM copies the file containing the upgrade to **C:\Robot\Data**.
- 2 ASM sets the registry setting **HKEY_CURRENT_USER \ Software \ OptimalRobotics \ Devices \ BillDispenser \ DownloadName** to the full path of the upgrade file.
EXAMPLE: **C:\Robot\Data\F56main.prg**.
- 3 Every time the F53 starts, it checks the **DownloadName** registry setting. If this setting is set to anything other than **NONE**, it checks the path specified for the update file.
- 4 When the F53 locates an update, the update is converted into binary format and downloaded to the device.
- 5 Once the download is **successfully completed**,
 - a The F53 driver sets the **DownloadName** setting to **NONE**.
 - b A file named **BDDNLD_XXXXXXXX.ok** (where “XXXXXXXX” represents the Machine Name) is created in **C:\Robot\Data**.
- 6 If the download **fails**,
 - a The **DownloadName** setting does not change to **NONE**. The device will attempt to download the firmware again the next time it starts.
 - b A file named **BDDNLD_XXXXXXXX.nok** (where “XXXXXXXX” represents the Machine Name) is created in the folder on the Customer Station where the download file was stored. This file contains one or two lines explaining why the download failed.

Manually Applying the F53 Firmware Upgrade File

Follow the steps below to upgrade the F53 firmware without changing the memory stick in stores that do not have ASM or if the ASM upgrade process fails.

- 1 Stop the U-Scan software.
 - a Locate the Computer Keyboard.
 - b Press **ALT+TAB** and select **Robot Control**.
The **Robot Control** window appears.
 - c Touch **Stop Robot**.
The **Launchpad** displays.
*NOTE: If the **Eventlog View** screen appears with a warning or error message, ignore it and click **No**.*
- 2 Insert the CD-ROM containing the firmware upgrade file into the CD-ROM drive.
- 3 Go to **C:\Robot\Data**.
- 4 Right-click inside the **Data** folder and select **New**.
- 5 Name the new folder **F53**.
- 6 Copy the file into the **F53** folder.
 - a In Windows Explorer, go to the CD-ROM drive and double-click it to display the contents.
 - b Right-click the file and select **Copy**.
 - c Right-click inside the **F53** folder and select **Paste**.
- 7 Set the **DownloadName** registry setting.
 - a Go to **Start > Run**.
 - b Enter **regedit** and press **ENTER**.
The Registry Editor displays.
 - c Go to **HKEY_CURRENT_USER \ Software \ OptimalRobotics \ Devices \ BillDispenser**.
 - d Double-click **DownloadName**.
 - e Change the value from **NONE** to **C:\Robot\Data\F56main.prg**, or the EXACT file name.
NOTE: Include any hyphens (-) or underscores (_) included in the file name.
 - f Click **OK**.
- 8 Start the F53 in the **Device Tester**.
 - a On the **Launchpad**, click **Device Tester**.
 - b Enter the password (**1379**) and click **OK**.
 - c Select the **Bill Dispenser** tab.

Tracking Bill Quantities in the F53 Bill Dispenser

SET QUANTITY OF BILLS is a feature in **Maintenance Mode** that is enabled in certain software versions. You will use this button to set the number of bills contained in the cassettes. The software then keeps track of how many bills are available to be dispensed.

When the level of bills reaches a predetermined 'low' amount that was configured in the registry setting, the Attendant Station shows a **Bill Tray Low** message for the corresponding Customer Station. If the Bill Dispenser is used when there are no bills left, the Attendant Station shows the message **Bill Tray Empty**.

NOTE: *You can damage the device if you try to dispense bills when the Bill Dispenser is empty.*

Setting the Bill Quantities

For each Bill Dispenser cassette you load at the Customer Station, you need to set the software to show the quantity of bills loaded into the cassettes. Doing this will help you account for the money in the Bill Dispenser cassettes.

The default value before the **SET** button is 0 for each cassette. When you set the bill quantities regularly, the default value before the **SET** button may not be 0. When the value for a cassette is not 0, touch **CLEAR** on the number pad. Then touch **SET** for the corresponding cassette. This resets the value to 0.

Set the bill quantities after loading empty Bill Dispenser cassettes:

- 1** Note the number of bills loaded into each Bill Dispenser cassette. For example, if loading \$1000 into the \$10 cassette, ensure that 100 bills were loaded.
- 2** Touch **SET QUANTITY OF BILLS** from **Maintenance Mode** at the Customer Station. The message at the top of the screen that appears says **Please enter the quantity of bills in each cassette**.
- 3** Touch **CLEAR** on the number pad.
- 4** Touch **SET** for the first cassette denomination to ensure the values are reset to 0.
- 5** Using the number pad on the Touch Screen, enter the quantity of bills loaded into the first cassette on the list.
- 6** After you have entered the number of bills for the first cassette, touch **SET** at the end of that row.
- 7** Touch **CLEAR** on the number pad before entering the next value.
- 8** Repeat steps 3-7 for the next cassette until you have set the bill quantities for all the cassettes in the Bill Dispenser at that Customer Station.
- 9** Touch **GO BACK** to return to **Maintenance Mode**.
- 10** Repeat this procedure for the other Customer Stations.

Reloading the Bill Dispenser Cassettes

Every time the Bill Dispenser cassettes are reloaded, you must set the bill quantities from **Maintenance Mode**. You will follow the same procedure as on the previous page, but now ensure that before you begin you touch **SET** for each cassette whose value is not 0.

If you reload the Bill Dispenser with money already in the cassettes:

- 1 Determine the total amount of bills loaded into the cassette, including the bills already there.
EXAMPLE: If you are loading \$100 into the \$1 Bill Dispenser cassette which already contains \$25, note that the new loading amount will be \$125. Therefore, enter a value of 125 for that cassette.
- 2 Touch **SET QUANTITY OF BILLS** from **Maintenance Mode** at the Customer Station. The message **Please enter the quantity of bills in each cassette** appears at the top of the screen.
- 3 Touch **CLEAR** on the number pad.
- 4 Touch **SET** for the first cassette denomination to ensure the values are reset to 0.
- 5 Using the number pad on the Touch Screen, enter the quantity of bills loaded into the first cassette on the list.
- 6 After you have entered the number of bills for the first cassette, touch **SET** at the end of that row.
- 7 Touch **CLEAR** on the number pad before entering the next value.
- 8 Repeat steps 3-7 for the next cassette until you have set the bill quantities for all the cassettes in the Bill Dispenser at that Customer Station.
- 9 Touch **GO BACK** to return to **Maintenance Mode**.
- 10 Repeat this procedure for the other Customer Stations.

Changing the Bill Dispenser Registry Settings

Changing the Number of Cassettes in the Registry

Perform this procedure if the Bill Dispenser is being upgraded from two cassettes to three cassettes.

- 1 Stop the Customer Station software.
- 2 Exit the **Launchpad**.
- 3 Go to **Start>Run...**
- 4 Enter **regedit**.
- 5 Click **OK**
The **Registry Editor** appears.
- 6 Go to **HKEY_CURRENT_USER**
\Software\OptimalRobotics\Devices\BillDispenser.
- 7 Click **NumTrays**.
- 8 Change the value in the **Value data** text box to **3**. (The default registry setting for NumTrays is **2**.)
- 9 Exit the **Registry Editor**.
- 10 Start the Customer Station software.
- 11 Test the Bill Dispenser in the **Device Tester**.

Changing the Denominations Settings in the Registry

Perform this procedure if you need to change that denominations in the cassettes.

EXAMPLE: The Bill Dispenser now dispenses \$1 and \$10 instead of \$1 and \$5.

- 1 Stop the Customer Station software.
- 2 Exit the **Launchpad**.
- 3 Go to **Start>Run**.
- 4 Enter **regedit**.
- 5 Click **OK**
The **Registry Editor** appears.
- 6 Go to **HKEY_CURRENT_USER**
\Software\OptimalRobotics\Devices\BillDispenser.
- 7 Click **BillDenominations**.
- 8 Add a **10** at the end of the string in the **Value data** text box. (The default registry setting for BillDenominations is **1, 5**.)

NOTE: For Canadian Currency, click **BillDenominations** and add a **20** at the end of the string in the **Value data** text box. (The default registry setting for **BillDenominations** is **5, 10**).

- 9 Verify the **DenomSizesUS** setting:
 - a Go to **HKEY_CURRENT_USER \ Software \ OptimalRobotics \ Devices \ BillDispenser \ Currency**.
 - b Ensure that the **DenomSizesUS** setting includes the following information:

```
{1, 175, 130, 15};{5, 175, 130, 15};{10,175,130,15};{20,175,130,15};{50,175,130,15}
```
 - c If it does **not** include the information shown above, delete the setting. The proper setting will be installed when the Customer Station software starts.
- 10 Close the **Registry Editor**.
- 11 Start the Customer Station software.
- 12 Access the **Device Tester**.
- 13 Configure the cassettes to reflect the new denomination(s). Refer to [“Setting the Cassette Denominations”](#) on page 17.
- 14 Test the Bill Dispenser in the **Device Tester**.

Electrical Block Diagrams

The following diagrams represent the electrical connections for the F53.

Diagram 1

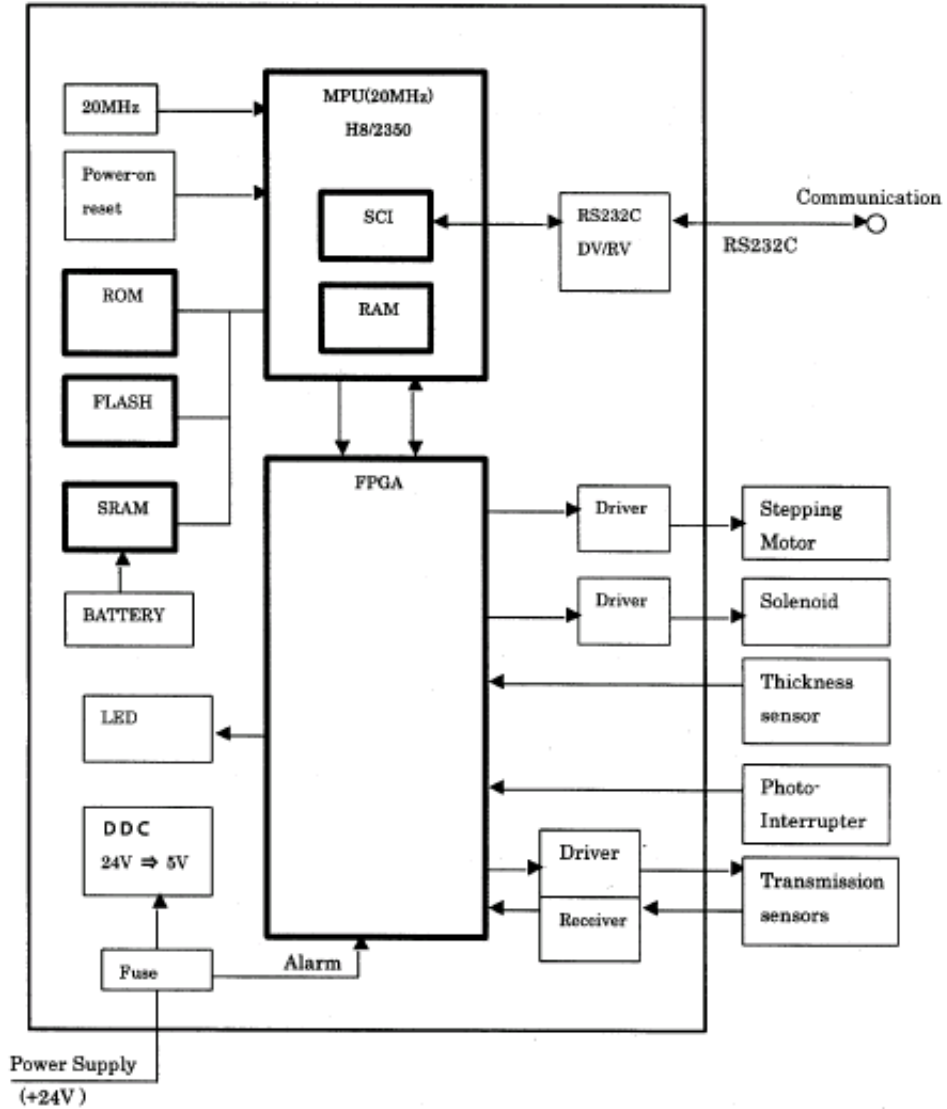
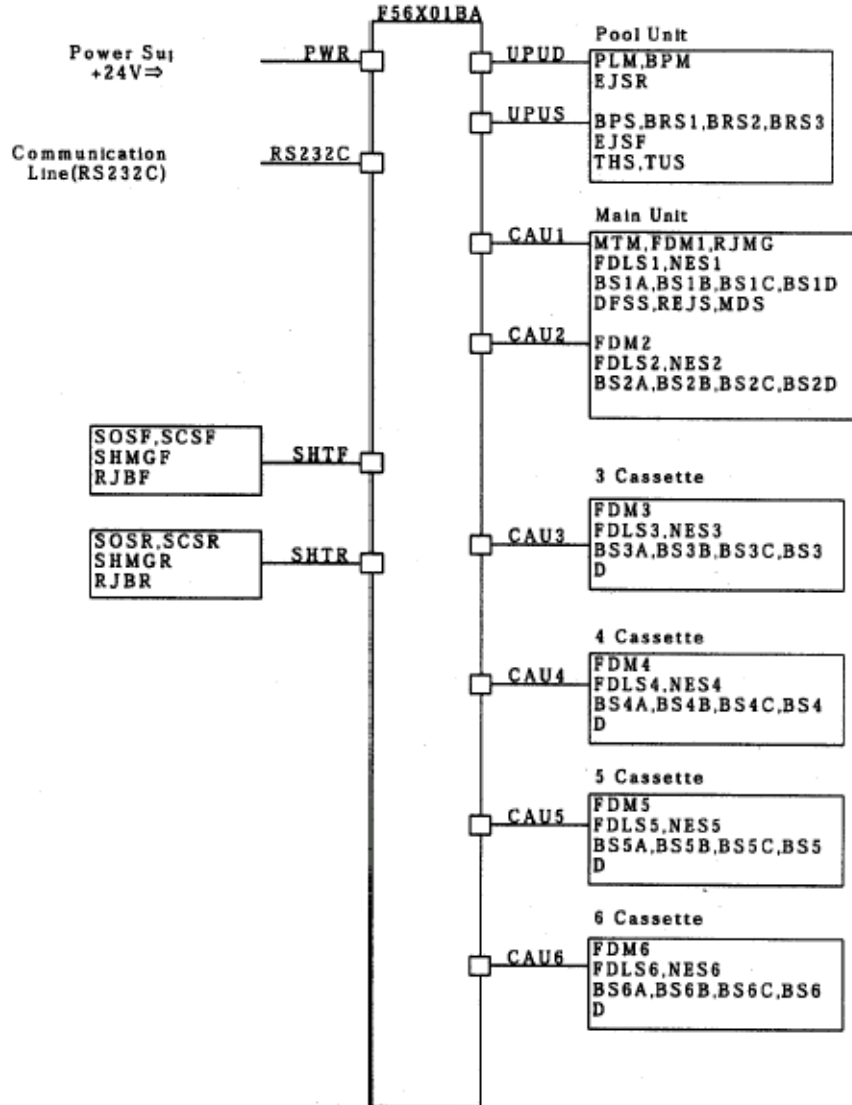


Diagram 2

NOTE: The codes in the diagram below are used to label the internal device cables. For example, **FDM2** is printed on a small tag on the cable for cassette pick motor 2. Find the labeled tag to identify the location of the faulty component.



IOC Error Codes

Legend:

NOTE: *The codes in the table below are used to label the internal device cables. For example, DFSS is printed on a small tag on the cable for the gate route sensor. Find the labeled tag to identify the location of the faulty component.*

BPS: Bill Count Sensor	REJS: Reject Sensor
DFSS: Gate Route Sensor	DFCS: Thickness Sensor
FDLS1 - 6: Length Sensors	NES1 - 6: Near End Sensors
SET1 - 6: Denomination Sensors	FDM1 - 6: Cassette Pick Motor
PLM: Pool Motor	MTM: Transport motor
RJMG: Reject Gate Solenoid	

U-Scan F53 Error Codes

Only the error codes listed in the table below pertain to the U-Scan F53.

1000	No Cassette - CC # 1	C001	Rec LE during RAM Program Mode
1800	Pick Error - CC #1	C002	Rec LE before LD command
2000	No Cassette - CC # 2	C100	Download program lost after receiving RT
2800	Pick Error - CC #2	C101	Flash ROM Write Error
3000	No Cassette - CC # 3	C102	Program Load Check Sum Error
3800	Pick Error - CC #3	C103	Version Error after receiving RT
70 xx	Media remained when command is rec.	C104	Flash ROM erase error
O1	FDLS1	C105	File name error
O2	FDLS2	C106	Data Size error
O3	FDLS3	C201	D-Level Command did not include: RT, LD, DE
O9 OB	DFSS BPS	C301	Download Header Error; D-code is not 00
7801	Jam at FDLS1	C302	Download Header Error; E-code is not 1 or H
7802	Jam at FDLS2	C303	Block number error; D-code is LD
7803	Jam at FDLS3	C304	Data Length Error
7811	Jam between FDLS1 and DFSS	E000	Undefined RAS command received
7812	Jam between FDLS2 and DFSS	E100	Parameter not registered (count)
7813	Jam between FDLS3 and DFSS	E401	No Bill info for 1st CC
7821	Media remains after count at FDLS1	E402	No Bill info for 2nd CC

7822	Media remains after count at FDLS2	E403	No Bill info for 3rd CC
7823	Media remains after count at FDLS3	E5	Count sequence specification error
7831	Media remains after clearing at FDLS1	E6	Invalid ISO code parameter
7832	Media remains after clearing at FDLS2	E8	Invalid thickness/length parameter
7833	Media remains after clearing at FDLS3	EA	Invalid transport parameter
7841	FDLS1 was activated without a bill	EC	FS Error
7842	FDLS2 was activated without a bill	EE	Command format error
7843	FDLS3 was activated without a bill	EF	Pool section not set up
7A01	Jam Occurred at DFSS	F1	Over current; 24v 2a norm, 3.5a bad
7A02	Jam between DFSS and BPS	F2	Option error
7A03	Jam at BPS	F3	Option error; front
7A29	Media remains after count at DFSS	F4	Option error; rear
7A2A	Media remains after count at BPS	F6	Checksum error of log data
7A39	Media remains after clearing at DFSS	F8 0X	Sensor abnormal
7A3A	Media remains after clearing at BPS	O1 FDLS1	81 FDLS1 off check error
7A49	DFSS was activated without a bill	O2 FDLS2	82 FDLS2 off check error
7B01	Jam between DFSS and REJS	O3 FDLS3	83 FDLS3 off check error
7B4B	REJS was activated without a bill	O7 DFSS	87 DFSS off check error
8200	Long bill	O8 REJS	88 REJS off check error
8300	Short bill	O9 BPS	89 BPS off check error
8400	Thickness is abnormal	A1 FDLS1	on check error
8501	Pick from wrong cassette: 1	A2 FDLS2	on check error
8502	Pick from wrong cassette: 2	A3 FDLS3	on check error
8503	Pick from wrong cassette: 3	A7 DFSS	on check error
8600	Spacing between bills is abnormal	A8 REJS	on check error
8800	Count mismatch # requested - BPS	A9 BPS	on check error
		F0	Sensor live write DAC error
		FC00	Illegal operation
		FD00	Power off during count

IOC Error Code Troubleshooting

The pages that follow describe troubleshooting for the **four-digit error codes** that display in the **Device Tester**. After you locate the error code in the **Troubleshooting Tasks** beginning on **page 59**, refer to the table below for clarification on the troubleshooting solutions found in the top row of the tables.

Troubleshooting Solution in Table	Clarification
Medium remain	<ul style="list-style-type: none"> Check for bills remaining inside the F53. Refer to “Check for Bill Jams or Debris” on page 9.
PWR	<ul style="list-style-type: none"> Check the power connections. Refer to “Inspect the Power” on page 8.
RS-232C	<ul style="list-style-type: none"> Check the communication connections. Refer to “Inspect the Data Cable” on page 8.
UPUS - SHTR	<ul style="list-style-type: none"> Check the appropriate connection on the F53 circuit board. Refer to “Circuit Board Connections and Main Components” on page 22. Check the components grouped under the heading in the “Diagram 2” on page 54.
FDLS1 - TUS:	<ul style="list-style-type: none"> Check the sensor specified. Clean the sensors. Refer to “Clean the Sensors” on page 13. If the issue is not resolved, refer to “Replacing the Sensors” on page 31.
DFCS/RAS31	<ul style="list-style-type: none"> Check the thickness sensor. Adjust if necessary. Refer to “Adjusting the Thickness Sensor” on page 39.
Gap of the gate	<ul style="list-style-type: none"> Check the adjustment of the reject gate solenoid. Refer to “Adjusting the Reject Gate Solenoid Position” on page 36.
Transfer motor (MTM)	<ul style="list-style-type: none"> Check the transfer motor. If necessary, replace the transfer motor. Refer to the diagram in “Replacing the Sensors” on page 31 for the location of the transfer motor (MTM).
Table (pool) motor (PLM)	N/A
Pick / sub-roller	<ul style="list-style-type: none"> Check the pick and sub-roller assembly in the cassette. If necessary, replace the pick and sub-roller assembly. Refer to “Replacing the Cassette Pick and Sub Rollers” on page 33.

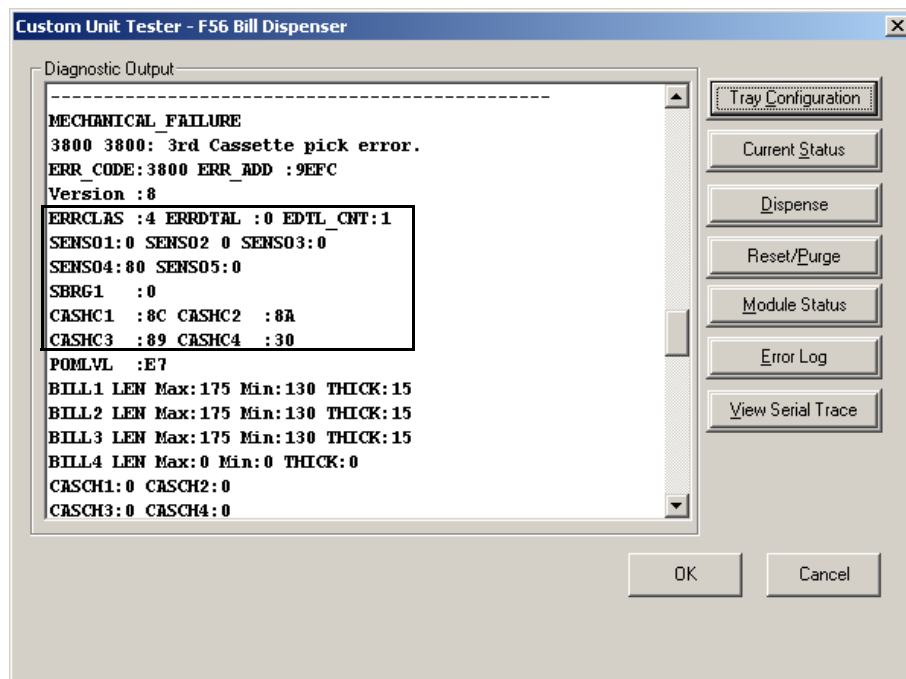
Troubleshooting Solution in Table	Clarification
Top unit	<ul style="list-style-type: none"> • Inspect the top portion of the F53. This is the section that includes the housing for cassettes 1 and 2. • Replace the top portion of the F53 if necessary. Reverse the procedure in “Adding a Third Cassette Module” on page 42 to separate the two portions.
Bottom unit	<ul style="list-style-type: none"> • Inspect the bottom portion of the F53. This is the section that includes the housing for cassettes 3 and 4 (if applicable). • If necessary, replace the bottom portion of the F53. Reverse the procedure in “Adding a Third Cassette Module” on page 42 to separate the two portions.
PCB	<ul style="list-style-type: none"> • Inspect the circuit board. • If necessary, replace the battery on the circuit board. Refer to “Replacing the Circuit Board Battery” on page 29. • If necessary replace the circuit board. Refer to “Replacing the Circuit Board” on page 27.
Command sequence	N/A
Cassette installation	<ul style="list-style-type: none"> • Ensure that the cassettes are properly inserted in the F53.
Bill replenishment	<ul style="list-style-type: none"> • Ensure that there are enough bills in the cassettes. • Load the cassette(s) if necessary. • Inspect the quality of the bills in the cassettes.
Program download	<ul style="list-style-type: none"> • Attempt the program download again.

Error code	Possibly faulty location											E000	E100	E401	E402		
	Check	Cleaning & Check															
	Medium remain																
	PWR																
	RS232C																
	UPUS																
	UPUD																
	CAU1																
	CAU2																
	CAU3 _ CAU6																
	SHTF																
	SHTR																
	FDLS1																
	FDLS2																
	FDLS3																
	FDLS4																
	FDLS5																
	FDLS6																
	DFSS																
	RE/S																
	BPS																
	BRS1/BRS2/BRS3																
	EJSR																
	EJSF																
	SCSF																
	SCSR																
	BS1A, BS1B, BS1C, BS1D																
	BS2A, BS2B, BS2C, BS2D																
	BS3A, BS3B, BS3C, BS3D																
	BS4A, BS4B, BS4C, BS4D																
	BS5A, BS5B, BS5C, BS5D																
	BS6A, BS6B, BS6C, BS6D																
	RJBE FSHT, FRBOX																
	RJBR, ESHT, RRBOX																
	THIS, TUS																
	DPCS RAS31																
	Gap of the gate																
	Cassette guide																
	Transfer motor(MTM)																
	Transfer motor(BPM)																
	Table motor(PLM)																
	Pick/Sub roller																
	Top unit																
	Lower unit																
	PCB																
	Command sequence																
	Cassette installation																
	Bill replenishment																
	Program download																

Error code	Possibly faulty location																				
	Check		Cleaning / Check																		
	CAU1	CAU2	CAU3 _ CAU6	SHTR	SHTF	BS1A, BS1B, BS1C, BS1D	BS2A, BS2B, BS2C, BS2D	BS3A, BS3B, BS3C, BS3D	BS4A, BS3B, BS4C, BS4D	BS5A, BS3B, BS5C, BS5D	BS6A, BS3B, BS6C, BS6D	RJBE, FSHT, FRBOX	RJBR, RSHI, RRBOX	THS, TUS							
	UPUD	UPUS	RS232C	PWR	Medium remain	DFCS RAS31	Gap of the gate	Cassette guide	Transfer motor(MTMD)	Transfer motor(BPMD)	Table motor(PLM)	Pick / Sub roller	Top unit	Lower unit	PCB	Command sequence	Cassette installation	Bill replenishment	Program download		
F100																					
F2XX				1	1																
F3XX					1																
F4XX																					
F6XX																					
F801	2																				
F802		2																			
F803																					
F804																					
F805																					
F806																					
F807																					
F808	2																				

Status Registers

The status registers appear on the **Customer Unit Tester** screen for the F53 Bill Dispenser and provide unit diagnostics information.



For more information on the meaning of the status registers, locate the byte number below, then refer to “[Status Register Description](#)” on page 75.

Field Name in Device Tester	Byte Number
ERRCLAS	3
ERRDTAL	4
EDTL_CNT	5
SENS01 - 05	6 - 10
SBRG1	11
CASHC1 - 4	12 - 15

NOTE: Bytes 1 and 2 contain the IOC error code.

Status Register Description

BYTE 1/2 - IOC Error Code		BYTE 8 - Sensor Output Register 3	
BYTE 3 - Error Classification Register		7 Battery Alarm BALM	
7	Parameter is abnormal	6	- Not Used -
6	Media position is abnormal	5	- Not Used -
5	No media at the position indicated	4	- Not Used -
4	Internal conflict	3	- Not Used -
3	Hardware failure	2	- Not Used -
2	Counting is not complete	1	TUS, Pool is at upper position
1	Jam	0	THS, Pool is at home position
0	Unit is not in ready state	BYTE 9 - Sensor Output Register 4	
BYTE 4 - Error Detail Register		7 MODEL TYPE; 0: F56 1: F53	
7	Pool Section Failure	6	F56; 0: Front Spray Transport 1: Rear Spray Transport
6	Main hardware failure	5	ROtion: 0: N/A 1: Available
5	Sensor is abnormal or media remains	4	ROption Type 0: Shutter 1: Capture Box
4	Shutter Failure (with Shutter Option Only)	3	Rear Capture Box not specified - RJBR
3	Number of counted bills does not balance	2	FOtion: 0: N/A 1: Available
2	Reject box is overflowing	1	FOption Type 0: Shutter 1: Capture Box
1	- NOT USED -	0	Front Capture Box not specified - RJBR
0	Cash cassette is not in ready state	BYTE 10 - Sensor Output Register 5	
BYTE 5 - Counting Error Detail Register		7 Shutter has Open (Front)	
7	Bill is too long	6	Shutter Solenoid Triggered (Front)
6	Bill is too short	5	Shutter Open (Front)
5	- NOT USED -	4	Shutter Closed (Front)
4	Bill thickness is abnormal (multiple feed)	3	Shutter has Open (Rear)
3	Bill spacing too short	2	Shutter Solenoid Triggered (Rear)
2	Bills are fed from wrong cassette:	1	Shutter Open (Rear)
	1st 2nd 3rd 4th	0	Shutter Closed (Rear)
1	1 1 0 0	BYTE 11 - Sensor Output Register 6	
0	1 0 1 0	7 - Not Used -	
BYTE 6 - Sensor Output Register 1		6 - Not Used -	
7	- NOT USED -	5 Sensor Level Down	
6	- NOT USED -	4 Thickness Sensor changed greatly - DFCS	
5	CC # 6 Media Exit - FDLS6	3 UNNOTE; 0: No Data	
4	CC # 5 Media Exit - FDLS5	2 Bill rejected by initialization command	
3	CC # 4 Media Exit - FDLS4	1 Bill rejected by initialization command or count	
2	CC # 3 Media Exit - FDLS3	0 Bill retrieved by initialization command	
1	CC # 2 Media Exit - FDLS2	BYTE 12 - 15 - Cassette Registers	
0	CC # 1 Media Exit - FDLS1	7 Bill near end sensor - C#LL	
BYTE 7 - Sensor Output Register 2		6 - Not Used -	
7	Media at Pool Section - BRS1	5 Cassette not set / denom = 000	
6	Media at Pool Section - BRS2	4 Cassette not in place (same as above)	
5	Media at Pool Section - BRS3	3 Magnet Position 'A'	
4	Media at front pool exit - EJSF	2 Magnet Position 'B'	
3	Media at rear pool exit - EJSR	1 Magnet Position 'C'	
2	Media at Reject Sensor - REJS	0 Magnet Position 'D'	
1	Media exists at Count path sensor - BPS	P POM Level (Thickness Sensor Value)	
0	Media exists at Gate path sensor - DFSS	E7 +/- 4 (E3 - EB)	

