JCM® TRAINING OVERVIEW
iPRO™ Banknote Acceptor

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iPRO™ Banknote Acceptor
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OVERVIEW

This training course addresses the following JCM iPRO™ device versions:

Table 1 iPRO Versions

Device	Version Difference
iPRO-100	Banknote Centering Type - 85mm for Worldwide Banknote Acceptance
iPRO-101	Fixed Banknote Path Type - 66mm for U.S. Currency

IPRO UNIT

Figure 1 illustrates a typical iPRO Banknote Acceptor Unit.

Figure 1 Typical iPRO Unit

Lecture Notes

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COMPONENT LOCATIONS

COMPONENT NAMES

Figure 2 illustrates the iPRO Component Names and Locations.

a) USB Mini-B Type Connector
b) DIP Switch Block
c) Status LEDs (Green & Red)
d) Front Bezel Connector
   (Connects the Optional Bezel Assembly to the Unit)
e) Centering Guide Home Position Indication LED
f) Transport Unit Release Lever
g) Upper Guide Access Lever

h) Interface Connector
   (Connects to the Host Machine)
i) Transport Unit
j) Frame Unit
k) Cash Box
l) Key Lock Holes
m) Last Note Dispute Resolving Windows
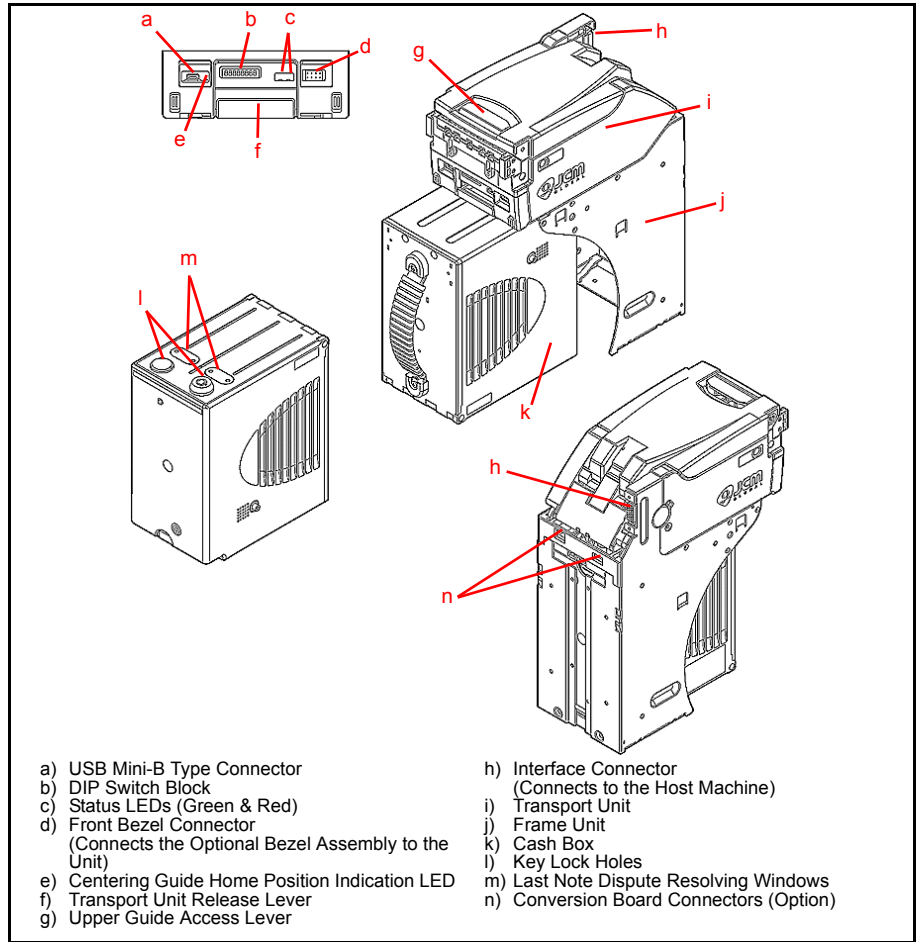n) Conversion Board Connectors (Option)

Figure 2 iPRO Component Names

Lecture Notes

DIP SWITCH SETTINGS

Table 2 lists the default DIP Switch configuration for the iPRO Front Panel DIP Switch Block.

Table 2 iPRO Vend Denomination Setting Switches

Switch No.	Switch ON	Switch OFF
1	VEND 1 INHIBIT	VEND 1 ACCEPT
2	VEND 2 INHIBIT	VEND 2 ACCEPT
3	VEND 3 INHIBIT	VEND 3 ACCEPT
4	VEND 4 INHIBIT	VEND 4 ACCEPT
5	VEND 5 INHIBIT	VEND 5 ACCEPT
6	VEND 6 INHIBIT	VEND 6 ACCEPT
7	VEND 7 INHIBIT	VEND 7 ACCEPT
8	N/A*	OFF (Fixed)

* Not Applicable (N/A). Never Switched to ON.

CPU SWITCH CONFIGURATIONS

The CPU Board features four (4) DIP Switches located on the Circuit Board as shown in Figure 3.

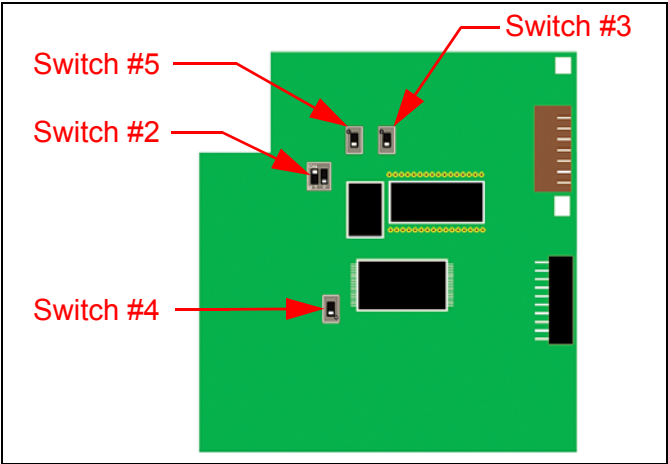*NOTE: DIP Switch settings may vary, based on the Software Version and the location where the iPRO Unit is installed.*

Figure 3 CPU Board Function Select Switches

CPU BOARD SWITCH CONFIGURATIONS

The CPU Board Switch configuration settings are used to specify either an RS232C, Photo-Coupler, or cc-Talk configuration selection. The Switches are also used to enable or disable ICB® and the iPRO-RC™ Recycler Unit. These settings are shown below in Table 3 and Table 4, respectively.

Table 3 CPU Board Switch Configurations

Switch 5	Switch 3	Signal Name
		RS232C
		Photo-Coupler Isolation
		cc-Talk
		Reserved

Table 4 ICB/RC Selection Switch Configuration

Switch 2	Switch 4	Signal Name
		iPRO Unit without an RC Unit (When the ICB Expansion Circuit Board is installed)
		iPRO Unit without an RC Unit (When the ICB Expansion Circuit Board is NOT installed)
		iPRO Unit using an RC Unit

Lecture Notes

CLEANING PROCEDURES

To clean the iPRO Unit, gently wipe the Sensors and Rollers clean using a dry, lint-free Micro-fiber Cloth.

NOTE: DO NOT use Alcohol, solvents, citrus-based products or scouring agents. These items may cause damage to the Validation Section Sensors and Rollers.

SENSOR AND ROLLER CLEANING PROCEDURE

1. Turn the iPRO Unit and Host Machine's Power Supplies OFF.
2. Open the iPRO Unit's Upper Guide.
3. Clean the Lens of each Sensor. Refer to Figure 4 (a-n) for iPRO Sensor Locations, and Table 5 for each Sensor's cleaning method.

NOTE: The iPRO Unit should be calibrated after cleaning.
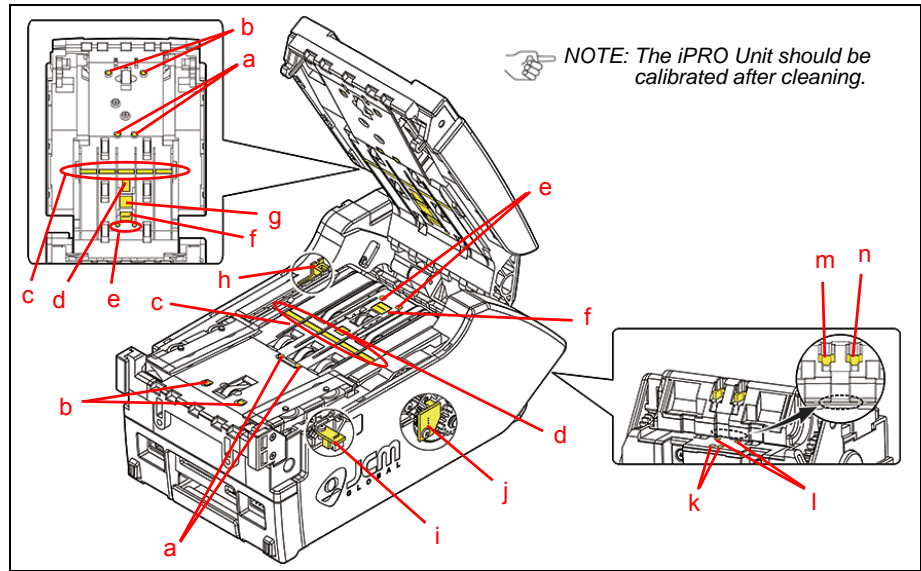
Figure 4 iPRO Sensor Locations

Table 5 iPRO Sensor Cleaning Methods

Label	Sensor Description	Cleaning Method
a	Centering Guide Timing Sensor	
b	Entrance Sensor	
c	Line Sensor	
d	UV Sensor	
e	Anti-Pullback Entrance Sensor	
f	Barcode Sensor	
g	Magnetic Sensor	Wipe clean using a clean, dry, lint-free Micro-fiber cloth, or blow clean using compressed air.
h	Transport Motor Sensor	
i	Centering Guide Home Position Sensor	
j	Stacker Motor Encoder	
k	Exit Sensor 1	
l	Exit Sensor 2	
m	Cash Box Sensor	
n	Stacker Home Position Sensor	

JCM TOOL SUITE

Figure 5 illustrates the JCM Tool Suite Standard Edition's Main Screen.
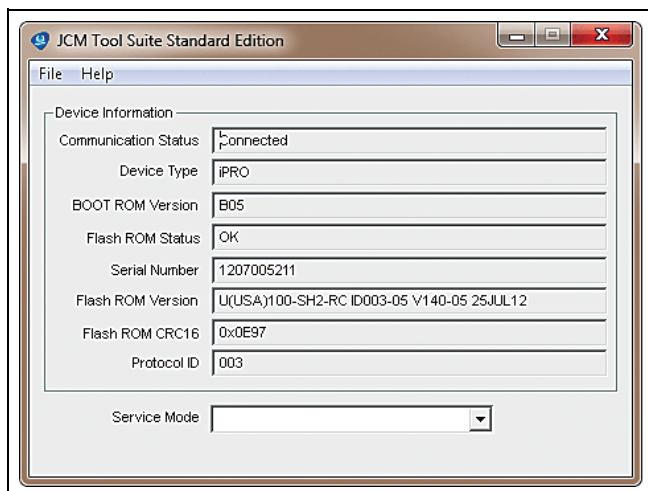
Figure 5 JCM Tool Suite Main Screen

The JCM Tool Suite Standard Edition supports the following operational modes and User-selectable Functions, under the "Service Mode" drop-down Menu:

The Service Mode Functions available on the JCM Tool Suite are:

- Normal Mode or Operational Mode (all DIP Switches = OFF):
  - Download
  - Statistics
  - Utility.
- Test Mode (DIP Switch No 8 = ON):
  - Download
  - Statistics
  - Sensor Adjustment
  - Performance Test
  - Utility.

NOTE: All Diagnostics Tests can be performed by specifying various DIP Switch settings. For more information on setting the DIP Switches for testing, refer to Section 6 of the iPRO™ Operation and Maintenance Manual (P/N 960-000162R {EDP #208082}).

Use a Standard USB Type-A to Mini-B Cable between the PC and the iPRO. Apply power to the iPRO, and open the JCM Tool Suite Application as shown in Figure 5.

SOFTWARE DOWNLOAD PROCEDURES

To download the latest Software Version into the iPRO Unit:

1. Click on the "Service Mode" pull-down Menu, and Click-select "Download" from the Menu. The JCM Downloader Suite display will appear (Figure 6).
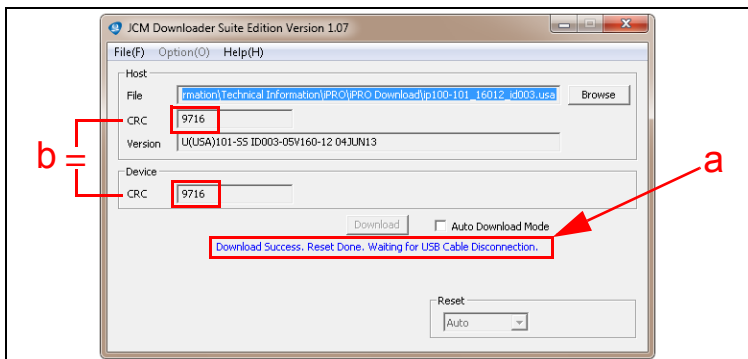
Figure 6 JCM Downloader Suite Display

2. Click on the "Browse" [Browse] Screen Button and select the file to be down-loaded, then click on the "Open" [Open] Screen Button on the Window that appears.

   • The JCM Downloader Suite Edition display will reappear. Click on the "Download" [Download] Screen Button to begin the downloading process.

   > NOTE: A Blue Barograph will display the download progression. Additionally, the iPRO Unit's Front Panel-mounted Red and Green LEDs will flash in an alternating pattern during the download process.
   > When downloading is complete, the Download Success, Reset Done, Waiting for USB Cable Disconnection Message is displayed (Figure 6 a).

3. Verify that the Host CRC (**C**yclic **R**edundancy **C**heck) and the Device CRC Checksum values are identical, as indicated by Figure 6b.

4. Disconnect the USB Type-A to Mini-B Cable used for Downloading, and remove power from the iPRO Unit.

This completes the Software Download Procedure.

> NOTE: If the iPRO Software becomes corrupted, or if it is not installed (e.g., when changing the CPU Circuit Board), set forced Download Mode by turning DIP Switches #6, #7 and #8 to ON (located on the Front Panel of the iPRO Unit). Then follow the Software Downloading Procedure.

> NOTE: Current Software is a combination package for both the iPRO 100 and iPRO 101. DIP Switch No. 5 (located on the Upper Sensor Board) is used to select the proper Unit. For iPRO 101, set Switch No. 5 to ON; for iPRO 100, set Switch No. 5 to OFF.

CALIBRATION

Calibration of the iPRO unit needs to be performed when the following conditions occur:

- When removing and replacing the CPU Circuit Board in the iPRO Unit
- When removing or replacing the iPRO Unit's Upper Sensor Circuit Board
- When removing or replacing ANY sensor in the iPRO Unit
- After cleaning dirt and debris that may adhere to the iPRO Unit's sensors
- Whenever the Banknote Acceptance rate is drastically degraded.

> *NOTE: Reference Papers are specified for use when calibrating the iPRO-100 and iPRO-101. Refer to Table 19 on page 29 for the correct reference paper to use.*

USING THE CALIBRATION PROGRAM

This section describes how to use the Calibration Program to perform the following functions:

- Validation Sensor Calibration
- Positioning Sensor Calibration.

> *NOTE: Calibration Procedures can be performed individually.*

VALIDATION SENSOR CALIBRATION

To perform the iPRO Validation Sensor Calibration procedure:

1. Make sure the iPRO Unit is disconnected from its power source.
2. Set DIP Switch No. 8 on the iPRO Unit's DIP Switch block to ON (Up position).
3. Restore power to the iPRO Unit.

> *NOTE: The iPRO Unit's Front Panel-mounted Red and Green LEDs will both be lit solid simultaneously.*

4. Connect a USB Type-A to Mini-B cable between your PC's USB port and the USB port located on the iPRO Unit's front side.
5. Launch the "JCM Tool Suite Standard Edition" software application.
6. Click on the "Service Mode" drop-down menu, and select the "Sensor Adjustment" menu option.

> *NOTE: The iPRO Calibration Tool Application will display the iPRO Calibration Tool Screen shown in Figure 7.*

Lecture Notes
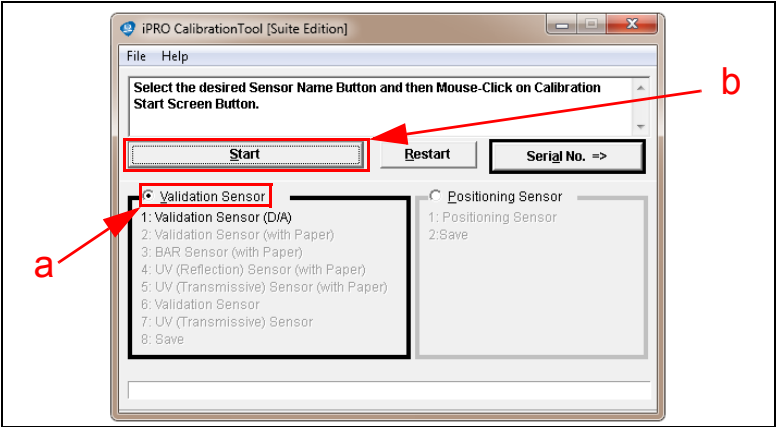
Figure 7 iPRO Calibration Tool

7. Verify that NO Reference Paper is present in the iPRO Unit's Transport Path.
8. Confirm that the Upper Guide is firmly closed.
9. Select the "Validation Sensor" Radio Button ⊙ (Figure 7 a).
10. Select "Start" [____Start____] (Figure 7 b).
11. Select "Calibration Start" to begin the iPRO Validation Sensor Calibration
12. Follow all on-screen prompts to complete the iPRO Validation Sensor Calibration.
13. Click on the "OK" [OK] Screen Button in the *Calibration Completed* pop-up dialogue box once the calibration is completed.

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POSITIONING SENSOR CALIBRATION

To perform the iPRO Positioning Sensor Calibration procedure:

1. Verify that DIP Switch No. 8 (located on the iPRO Unit's Front Panel DIP Switch Block) is set to ON (Up position).
2. Make sure that a USB Type-A to Mini-B Cable is securely connected between your PC and the USB Port located on the iPRO Unit's Front Panel.
3. Launch the "**JCM Tool Suite Standard Edition**" Software application, if it is not already running. The display will appear as shown in Figure 5.
4. Click on the "Service Mode" drop-down Menu, and select "Sensor Adjustment".

   *NOTE: The iPRO Calibration Tool Application will display the **iPRO Calibration Tool [Suite Edition]** Screen shown in Figure 8.*

5. Click the "Positioning Sensor" Radio Button ◉ (Figure 8 a).
6. Click the "Start" [Start] Screen Button (Figure 8 b).

   *NOTE: The message 1) Positioning Sensor Calibration Preparation will appear in the top row of the **iPRO CalibrationTool [Suite Edition]** Screen's Text Field.*
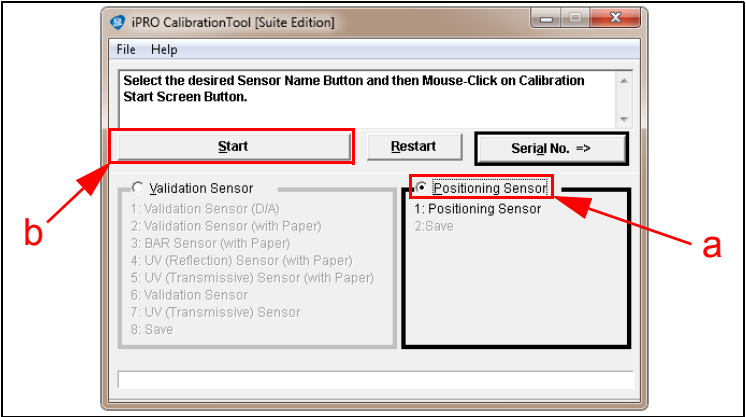
Figure 8 Positioning Sensor Selection

7. Click "Calibration Start" to begin the Positioning Sensor Calibration Procedure.

   NOTE: During the Calibration Procedure, a Green Barograph will display the Test's progress. Calibration values are saved, and the following message will be displayed in a pop-up Dialogue Box:
   Calibration Completed.

8. Click on the "OK" [OK] Screen Button to end the iPRO Positioning Sensor Calibration Procedure.

Lecture Notes

PERFORMANCE TESTING PROCEDURES

PERFORMANCE TESTING

Available Tests

- Operational Tests (Acceptance Tests)
- Device Function Test
- Motor Test
- Motor Speed Test

To perform any of these tests, proceed as follows:

1. Make sure the iPRO Unit is disconnected from its power source.
2. Set DIP switch No. 8 on the iPRO Unit's DIP switch block to the ON (Up) position.
3. Restore power to the iPRO Unit.
4. Connect a USB Type-A to Mini-B cable between your PC's USB port and the USB port located on the iPRO Unit's front side.
5. Launch the "JCM Tool Suite Standard Edition" software application.
6. Click on the "Service Mode" drop-down menu, and select the "Performance Test" menu option (Figure 9 a).

   NOTE: The iPRO Performance Tool Version x.xx screen (Figure 9) appears. (Product version number may vary.)

   NOTE: Refer to Pages 14 through 19 for Acceptance Tests, Device Function Test, Motor Test, Motor Speed Test, Sensor Test and DIP Switch Test procedures.
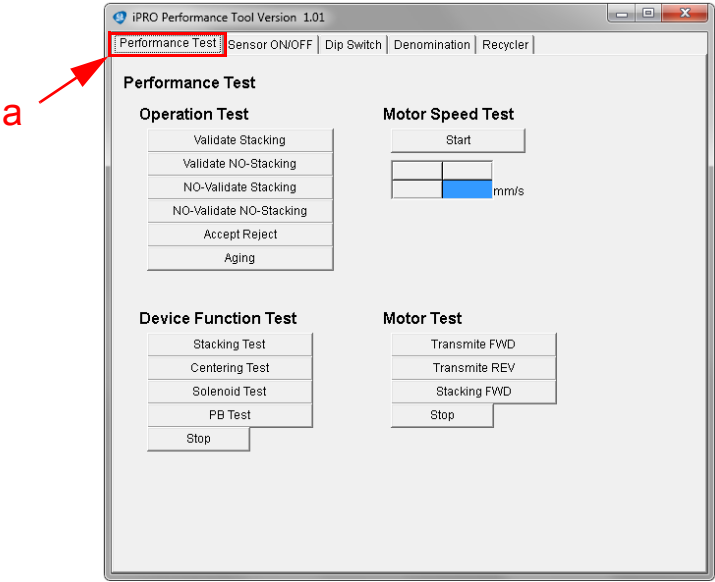
Figure 9 Performance Test Screen

Acceptance Tests

To perform each Acceptance Test:

1. Click on the "Performance Test" Tab.
2. In the "Operation Test" Section, click on the desired Test Screen Button to begin the test.

   ☞ NOTE: For a complete list of Acceptance Test descriptions, refer to Table 6 on page 15. Test information appears in Red at the bottom of the Performance Test Tab Screen as each Test is running.

3. To start the Test, insert a Banknote into the iPRO Unit.
4. Confirm the Banknote's value using either of the following methods:
   • **LED Flash Count** - The LED will flash for each detected denomination value. Count the number of LED Flashes, then refer to Table 6 on page 15 for a list of the Denomination Flash Codes.
   • **Denomination Update** - Click on the "Denomination" Tab (Figure 10 a) to view the Denomination Screen, then click the "Update" [Update] (Figure 10 b) Screen Button to confirm the value of the Banknote that was inserted into the iPRO Unit.

For example, by inserting a $100.00 Banknote into the iPRO Unit and clicking "Update" [Update], the *Denomi:* field (Figure 10 c) displays the value of the Banknote instead of the "XX" Value shown in Figure 10c. By inserting a Ticket and clicking "Update," the *Denomi:* field displays a Zero ("0") Value.
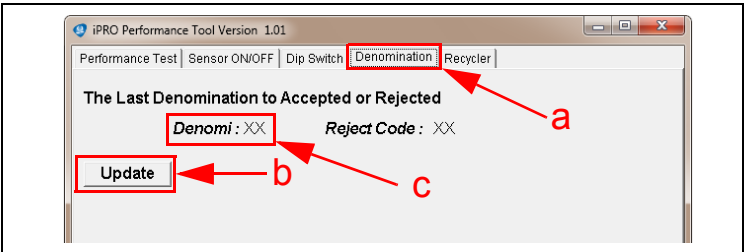
Figure 10 Denomination Tab Selection 2

☞ NOTE: To conduct additional Performance Tests:
   a. Close all screens on the PC desktop
   b. Disconnect the iPRO unit from its power source
   c. Reconnect power to the iPRO Unit
   d. Resume performing additional Operational Tests, as needed.

Lecture Notes

Table 6 Operation Test Items

Test Item	PC Screen	Test Purpose	LED			
			Stand-by	Normal Operation	After Banknote Insertion*	Abnormal Indication†
Banknote Acceptance with Cash Box‡	Validate Stacking	Tests the iPRO with a Cash Box and Acceptance Rate	Red Lit	Extinguished (Out)	Red/Green Flash	Red Flashes
			Green Lit		$1 = 1 time $5 = 2 times	Green Flashes
Banknote Acceptance without Cash Box**	Validate NO-Stacking	Tests the iPRO without a Cash Box and Acceptance Rate	Red Lit	Extinguished (Out)	$10 = 3 times $20 = 4 times $50 = 5 times $100 = 6 times	Red Flashes
			Green Lit			Green Flashes
Banknote Acceptance with Cash Box‡ (No Validation)	NO-Validate Stacking	Tests the iPRO with a Cash Box (No Validation)	Red Lit	Extinguished (Out)	Red Flashes (1 time)	Red Flashes
			Green Lit		Green Flashes (1 time)	Green Flashes
Banknote Acceptance without Cash Box** (No Validation)	No-Validate No-Stacking	Tests the iPRO without a Cash Box (No Validation)	Red Lit	Extinguished (Out)	Red Flashes (1 time)	Red Flashes
			Green Lit		Green Flashes (1 time)	Green Flashes
Banknote Reject‡	Accept Reject	Tests a Banknote's Reject Movement from the Escrow Position when Off-Line	Red Lit	Extinguished (Out)	Green Flashes† (9 times)	Red Flashes
			Green Lit			Green Flashes
Aging††	Aging	Tests each moving part and Sensor through aging movements	Red Lit	Extinguished (Out)	-	Red Flashes
			Green Lit			

*   The LED flashes each time for the denominations and keeps flashing till next insertion.

†   Refer to Table 10 iPRO Startup Error Codes, Table 11 ICB Error Codes, Table 12 iPRO Operational Error Codes, Table 13 iPRO Barcode/Ticketing Error Codes, or Table 14 iPRO Reject Error Codes when an error occurs.

‡   This test is available when the Cash Box is correctly in place.

**   This test is available when the Cash Box is NOT seated in place.

†† When one (1) cycle has completed, the next cycle will begin after approximately 30 seconds.

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Device Function Test

To perform the Device Function Test:

1. Click on the "Performance Test" Tab.
2. In the "Device Function Test" Section, Click on the desired Test Screen Button to begin the Test.
3. Verify that the LEDs are lit as shown in Table 7 during the selected Test.

   NOTE: The Test being performed is shown in RED below the "Stop" Screen Button.

4. Click on the related Device Function Test "Stop" [Stop] Screen Button to end the test.

Table 7 Device Function Test Items

Test Item	PC Screen	Test Purpose	LED	
			Stand-by	Performing Normally
Stacking Movement*	Stacking Test	Tests the Stacker Pusher Plate and the stacking movement.	Red Lit / Green Lit	Extinguish (Out)
Centering Mechanism Movement†	Centering Test	Tests the Centering Mechanism's movement.	Red Lit / Green Lit	When the Centering Mechanism positions at its Home Position, the LED is lit a steady Green Color. If the Centering Mechanism positions at any other location, the LED is extinguished.
Solenoid Movement†	Solenoid Test	Tests the Solenoid's movement.	Red Lit / Green Lit	When the Solenoid positions at its Home Position, the LED is lit a steady Green Color. If the Solenoid positions at any other location, the LED is extinguished.
Pull-Back Unit Movement	PB Test	Tests the Pull-Back Unit's movement.	Red Lit / Green Lit	When the Pull-Back Unit positions at its Home Position, the LED is lit a steady Green Color. If the Pull-Back Unit positions at any other location, the LED is extinguished.

* This test is available when the Cash Box is seated correctly.

† This test is available for only the iPRO-100 Centering Type Unit.

NOTE: Error detection is not available during the Device Function Test.

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Motor Test and Motor Speed Test

Three (3) Motor Test functions are available in this iPRO Unit Test.
To perform each of them, proceed as follows:

1. Click on the "Performance Test" Tab on the iPRO Performance Tool Screen.
2. In the "Motor Test" Section, click on the desired Test's Screen Button to begin the Test (see Figure 11 a).

Figure 11 Motor Test Selection Screen

- Click on the "Transmite FWD" Screen Button or on the "Transmite Rev" Screen Button.
- To run a Stacker Motor Rotation Test, Click on the "Stacking FWD" Screen Button.

  NOTE: A pop-up Dialog Box will display the following messages:
  1) Remove the Cash Box
  2) Mouse-click on the OK Button!

- Remove the Cash Box from the Frame, and Click on the "OK" [OK] Screen Button.
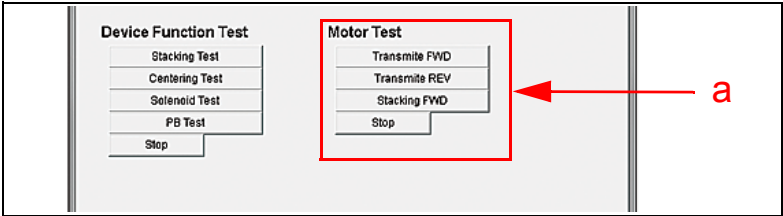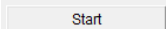
3. Verify that the LEDs are lit as shown in Table 8 during the Test.
4. Click on the Motor Test "Stop" [Stop] Screen Button to end the Test.

   A reading of the Motor's speed can be obtained by clicking on the "Start" [Start] Screen Button under the heading "Motor Speed Test."

   The speed will be listed in mm/sec.

   NOTE: If the Motor Speed Test is not manually stopped, the test will automatically terminate after running 8 seconds.

Table 8 Motor Test Items

Test Item	PC Screen	Test Purpose	LED		
			Stand-by	**Performing (Normal)**	**Abnormal Indication***
Transport Motor Forward Rotation†	Transmite FWD	Test the Transport Motor Forward Rotation movement and confirm the Transport Motor Forward Rotation speed.	Red Lit / Green Lit	Green Lit	Red Flashes
Transport Motor Reverse Rotation†	Transmite REV	Test the Transport Motor Reverse Rotation movement and confirm the Transport Motor Reverse Rotation speed.	Red Lit / Green Lit	Green Lit	Red Flashes
Stacker Motor Rotation‡	Stacking FWD	Test the Stack Motor Rotation movement.	Red Lit / Green Lit	Extinguish (Out)	Red Flashes

* Refer to Table 10 iPRO Startup Error Codes, Table 11 ICB Error Codes, Table 12 iPRO Operational Error Codes, Table 13 iPRO Barcode/Ticketing Error Codes, or Table 14 iPRO Reject Error Codes when an error occurs.

† The LED flashes three times at a Red Color rate If the motor speed is too slow (less than approximately 200mm/s), and the LED flashes two times at a Red Color rate if the motor speed is too fast (more than approximately 550mm/s).

‡ This test is available when the Cash Box is NOT seated. Remove the Cash Box before performing the Stacker Motor Rotation test.

Sensor Test

1. Click on the "Sensor ON/OFF" Tab on the iPRO Performance Tool Screen.
2. Click on the "Start" Start Screen Button to begin running the test.
3. Verify that the "***Sensor Timer running***" Text Message (Figure 12 a) appears next to the "Stop" Stop Screen Button (Figure 12 c).

   ☞ *NOTE: The Sensor Detection condition displays as ON or OFF in the **Positioning Sensor** and **Validation Sensor** columns (blue highlighted fields) (Figure 12 b).*

4. Open the iPRO Unit's Top Cover and ensure that each Validation Sensor changes from OFF to ON when blocked (Figure 12 b).

   ☞ *NOTE: Not all Sensors will change state.*

   The Positioning Sensors may need to be manually activated by blocking and unblocking the Sensor.

5. Click the "Stop" Stop Screen Button to end the "**Sensor ON/OFF Test**".

   ☞ *NOTE: The Solenoid Home Position Sensor and Centering Guide Home Position Sensor are not available on an iPRO 101 Unit.*
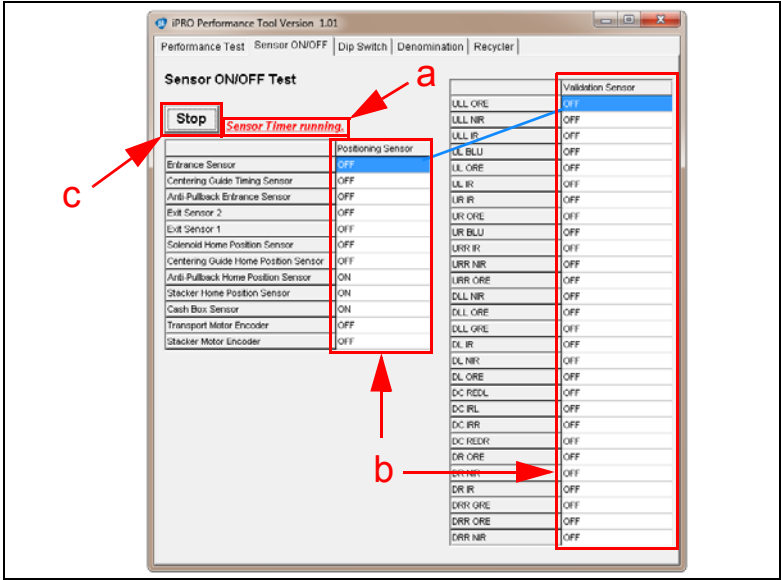
Figure 12 Sensor ON/OFF Test Selection

Lecture Notes

DIP Switch Test

To perform the eight (8) position DIP Switch Block Test:

1. Locate the DIP Switch Block on the front side of the iPRO™ Unit.
2. Click on the "DIP Switch" Tab located in the iPRO™ Performance Tool Screen as shown in Figure 13a.
3. Click the "**Start**" [Start] Screen Button (Figure 13 b) to begin the DIP Switch Test.

   *NOTE: Once the test begins, DIP Switches that are ON will be identified in the fields labeled **SW 1** through **SW 8** shown in Figure 13c below.*

4. To test each Switch, move the Switch from OFF to ON; the Screen will indicate the change in the related **SW x** Switch position.
5. Click the "Stop" [Stop] Screen Button to end the DIP Switch Test.

Figure 13 DIP Switch Tab Selection

Lecture Notes

iPRO TROUBLESHOOTING GUIDE AND ERROR CODES

Table 9 identifies iPRO Troubleshooting issues, probable causes and possible solutions for the iPRO Troubleshooting issues listed below.

Table 9 iPRO Troubleshooting Guide

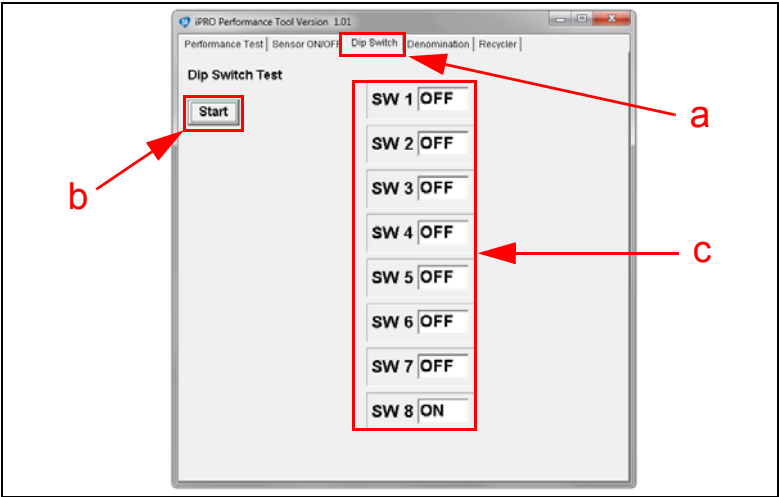| Issue	Probable Cause	Causes/Solutions
iPRO not working	No external power	Verify 12VDC Power Supply is connected and all harnesses are securely connected.
	Corrupted software	Download the current software.
	CPU Board Failure	Test and/or replace the CPU Board.
Banknote Jams occurring	Drive Belts are dirty	Clean the drive belts and rollers.
	Pressure Roller Spring is missing or worn	Check the roller spring tension, replace if needed.
	Foreign material in the Transport Path	Remove foreign material and clean the Transport Path
	iPRO Unit is not properly seated.	Re-seat the Acceptor into the Frame, and make sure latches are secure.
	Banknote width does not meet specification	iPRO 100 Banknote is wider than 85mm or narrower than 62mm.
		iPRO 101 Banknote is wider than 66mm.
Low Banknote Acceptance Rate	Dirt/debris on the sensors/rollers	Clean the Transport Path; see Preventive Maintenance.
	Wrong or old software is installed	Verify that the installed software is the latest version, and that it supports the currency.
	Software incorrect for Banknotes	Verify that the installed software version supports the affected Banknotes.
	Calibration was not completed after repair	Re-calibrate the Sensors.
Upper Guide will not open	Centering Guides are not in Home position	Use a 2.5mm hex nut driver to open the Centering Guides; check for debris, cycle AC power to the Banknote Acceptor.
All Banknotes are being rejected	Incorrect software	Download the current software version.
	Incorrect DIP Switch Setting	Enable all denomination acceptance by switching all DIP switches OFF.
	Banknote Acceptance is inhibited by the Host	Enable Host Banknote Acceptance.
	Upper/Lower Sensor Board Failure	Replace the Upper/Lower Sensor Boards with functioning Sensor Boards.
	Unit was not calibrated after repair	Re-calibrate the Sensors.
Motor continues to run	Foreign material or Banknote	Open the Upper Guide and remove any debris or Banknote. Clean the Transport Unit, if needed.
	Upper Guide is open.	Firmly close the Upper Guide.
	Motor Drive Failure	Run the Transport Motor Test; if failure occurs, replace the Motor or CPU Board.
Cannot enter Test Mode	Incorrect DIP Switch Setting	Set DIP Switches #1 thru #7 OFF; #8 ON.
	DIP Switch Failure	Perform a DIP Switch test to confirm operation.
	CPU Board Failure	Exchange the CPU Board with a functioning CPU board.
Cannot communicate with the Host Machine	DIP Switch Settings are incorrect.	Set DIP Switches #3 and #5 to support the correct communication settings.
	Connectors are off or loose.	
	Damaged Connector Pins	Check for bent or missing pins in the Connectors.
	CPU Board Failure	Exchange the CPU Board with a functioning board.
	Incorrect Interface	Verify the correct interface with the Host Machine.

STARTUP ERROR CODES

Table 10 lists Startup Errors that can occur during initial power up of the iPRO Banknote Acceptor Unit.

Table 10 iPRO Startup Error Codes

RED LED Flashes	GREEN LED State	Error Indication	Causes/Solutions
(1)	ON	External Flash ROM Boot Program ROM Check Error	Boot Program is not correctly written in ROM or cannot be read. Replace the CPU Board.
(2)	ON	External Flash ROM Boot I/F ROM Check Error	Boot Interface is not written correctly, or cannot be read. Replace the CPU board.
(3)	ON	External Flash ROM Main Program ROM Check Error	The Main Operating Program Is not written to ROM or cannot be read. Replace the CPU Board.
(4)	ON	Reserved	Contact JCM if this error occurs.
(5)	ON	CPU Internal RAM Check Error	RAM reading or writing was not properly performed. Replace the CPU Board.
(6)	ON	External SD RAM Error	External SD RAM reading or writing was not properly performed. Reload software. Replace the CPU Board.
(7)	ON	External SRAM Error	SRAM reading or writing was not properly performed. Reload software. Replace the CPU Board.

ICB LED ERROR CODES

Table 11 lists ICB LED Flash Error Codes that can occur during Startup, Causes and Solutions.

Table 11 ICB LED Error Codes

RED LED Flashes	GREEN LED State	Error Indication	Causes/Solutions
(3)	OFF	Incorrect ICB Setting	ICB Function is disabled on the iPRO.
(11)	OFF	ICB Communications Error	ICB Function is enabled on the iPRO. The Cash Box ICB Module is turned OFF or missing.
(12)	OFF	ICB Checksum Error	ICB Data is corrupted. Initialize the Cash Box ICB Module.
(13)	OFF	ICB Number Incorrect	The iPRO Asset Number does not match the Cash Box Asset Number. Install an initialized Cash Box.
(14)	OFF	ICB Initialization Error	The ICB Module on the Cash Box has not been initialized. Place the Cash Box on the Read/Write Tool to initialize it.
(15)	OFF	ICB Module Failure	The ICB Module is not operating properly. Replace the ICB Module.

OPERATIONAL ERROR CODES

Operational Errors can occur when the iPRO Unit is available to accept Banknotes. An Operational Error automatically takes the iPRO Unit Out of Service until the error is corrected. To identify the Error, note the number of Red LED Flashes, then consult Table 12 to determine the Error, Causes and Solutions.

Table 12 iPRO Operational Error Codes

RED LED Flashes	GREEN LED State	Error Indication	Causes/Solutions
(1)	OFF	Cash Box Full	A Full Cash Box was detected; replace with an empty Cash Box.
(2)	OFF	Pusher Mechanism Home Position Error	When stacking Banknotes, the Pusher Mechanism is not returning to the home position. Check for jams and debris in the Cash Box; replace the Pusher Mechanism.
(3)	OFF	Banknote Jam (Cash Box)	When transporting a Banknote to the Cash Box, sensors are not detecting the Banknote. Check for a jammed Banknote or debris blocking the Banknote.
(4)	OFF	Banknote Jam (Transport Unit)	When transporting a Banknote, sensors are not detecting the presence of a Banknote in the Transport Path. Check for a jammed Banknote or debris blocking the Transport Path.
(5)	OFF	Feed Motor Speed Error	While initializing, Motor speed was either too fast or too slow. Perform a Motor Speed Test. Check for jammed belts, replace the Motor.
(6)	OFF	Feed Motor Lockup	The Feed Motor is not moving. Check for jammed material in the Transport. Replace the Feed Motor and/or CPU Board.
(7)	OFF	Stacker Motor Lockup	The Stacker Motor is not moving. Check for jammed material in the Cash Box, replaced the Stacker Motor and/or CPU Board.
(8)	OFF	EEPROM Error	EEPROM reading or writing was not performed correctly. Recalibrate the iPRO. Replace the CPU Board.
(9)	OFF	Anti-Pullback Unit Error	The Anti-Pullback Unit is not performing properly. Perform the Pullback assembly test. Check for jammed material in the PB assembly. Replace if error continues.
(10)	OFF	Cash Box Removal	The Cash Box has been removed or not seated in the Frame. Reseat the Cash Box. Test the Cash Box Present sensor.
(11)	OFF	Reserved	Contact JCM if this error occurs.
(12)	OFF	Fraud Detection	Sensors detected Banknote movement in the wrong direction. Test the iPRO sensors.
(13)*	OFF	Solenoid Roller Error	Movement of the Solenoid Roller is not detected. Perform the Solenoid Test. Replace the Solenoid.
(14)*	OFF	Centering Mechanism	The Centering Mechanism is not moving. Perform a Centering Mechanism test. Clean or repair the Centering Mechanism.

* Errors 13 and 14 are not applicable to the iPRO-101.

iPRO BARCODE/TICKETING ERROR CODES

Table 13 lists various LED Flash Reject Error Codes, Causes and Solutions for Barcode Coupons and Tickets.

Table 13 iPRO Barcode/Ticketing Error Codes

RED LED State	GREEN LED Flashes	Error Indication	Causes/Solutions
OFF	(1)	Barcode Coupon not accepted.	The iPRO Unit is not configured for Coupon/Ticket Acceptance. Check DIP Switch Settings and System Settings.
OFF	(2)	Format Error	The Barcode format does not meet Specifications. Check that properly-formatted Barcode Coupons are used.
OFF	(3)	Incorrect Number of Characters	The Barcode reader detected an incorrect number of characters. Verify that proper Coupons are used. Clean and Calibrate the iPRO Unit.
OFF	(4)	Start Bit Detection Error	The Start Bit of the Barcode Coupon was not detected. Verify that properly-formatted Barcode Coupons are used. Clean and Calibrate the iPRO Unit.
OFF	(5)	Stop Bit Detection Error	The Stop Bit of the Barcode Coupon was not detected. Verify that properly-formatted Barcode Coupons are used.
OFF	(6)	Barcode Coupon Type Error	The format of the Barcode Coupon does not match the settings. Verify that properly formatted Barcode Coupons are used. Clean and Calibrate the iPRO Unit.
OFF	(7)	Abnormal Magnification (Light Print)	Sensors detected an abnormal Barcode Coupon magnification condition. Verify that properly-formatted Barcode Coupons are used. Clean and Calibrate the iPRO Unit.
OFF	(8)	Double Insertion Error	Multiple Coupons were inserted at the same time. Insert a single Barcoded Coupon.
OFF	(9)	Reserved	Contact JCM if this error occurs.
OFF	(10)	Reserved	Contact JCM if this error occurs.
OFF	(11)	Upside-down Insertion	Detected that the Barcode Coupon had been inserted upside-down. Turn the Barcode Coupon over and re-insert it into the iPRO Unit.
OFF	(12)	Reserved	Contact JCM if this error occurs.
OFF	(13)	Barcode Coupon Length Abnormal	Sensors detected a Barcode Coupon either shorter or longer than specified. Clean the Transport Path and Calibrate the Unit.
OFF	(14)	ICB Enable/Disable Ticket Read and/or Setting Error	ICB Enable/Disable/Machine Number Ticket format is improper. Use properly-formatted Enable/Disable/Asset Number Tickets. Ensure that the ICB Module is enabled (DIP Switch DS2 - Switch #1 ON).

REJECT ERROR CODES

Table 14 lists various LED Flash Reject Error Codes, Causes and Solutions for Banknotes.

Table 14 iPRO Reject Error Codes for Banknotes

RED LED State	GREEN Flashing Sequence	Error Indication	Causes/Solutions
OFF	(1)	Skewed Insertion	Banknote was inserted at an angle or was not centered. Check the Centering Mechanism.
OFF	(2)	Abnormal Magnetic Detection	Magnetic Sensor detected an abnormal Banknote. Clean the Magnetic Head and Calibrate the Unit.
OFF	(3)	Remaining Banknotes Returned	Banknotes detected in the Banknote Path during initialization. Clean the iPRO Unit. Test Sensors and Calibrate the Unit.
OFF	(4)	Magnification Error	When reading the Banknote pattern, the magnetic pattern was abnormal. Clean and Calibrate the iPRO Unit.
OFF	(5)	Banknote Transportation Error	Sensors did not detect a Banknote moving through the iPRO Unit. Check for debris, Clean, and Calibrate the Unit.
OFF	(6)	ID Error	A Denomination Error or Banknote Read Error occurred. Clean the Sensors, Clean and Calibrate the iPRO Unit.
OFF	(7)	Pattern Error	The Line Sensor detected an abnormal Banknote. Clean and Calibrate the Unit.
OFF	(8)	Photo Level Error	While processing a Banknote, abnormal conditions were detected (Tape) Clean and Calibrate the iPRO Unit.
OFF	(9)	Inhibited Banknote	The Banknote Accept/Inhibit setting was made by a command from the Host machine.
OFF	(10)	Return Command Received	Banknote returned commanded by the Host. Check the Host settings.
OFF	(11)	Ticket Error	An Upside-down Ticket was detected. Correct the Ticket orientation, then re-insert the Ticket.
OFF	(12)	Fraud Detected	Sensors detected improper Banknote movement. Perform a Sensor test, Clean and Calibrate the iPRO Unit.
OFF	(13)	Banknote Length Error	The Line Sensor calculated the Banknote as too long or too short. Clean the Transport Path.
OFF	(14)	2-Color Margin Error	The Line Sensors calculated that the 2-Color Banknote Margin was too high. Perform a Sensor Test, Clean and Calibrate the iPRO Unit.
OFF	(15)	Suspect Counterfeit Detected	The Banknote was detected as a suspect counterfeit. Clean and Calibrate the iPRO Unit.
OFF	(16)	3-Color Comparison Error	The Line Sensors calculated a 3-Color Comparison that was too high. Clean and Calibrate the iPRO Unit.

CALIBRATION PROGRAM ERROR CODES

Table 15 lists Error Codes, Causes and Solutions for the Calibration Program.

Table 15 Calibration Program Error Codes

Calibration Program	Error Code	Causes/Solutions
Validation Sensor [D/A Value, non-Paper]	01-YYYY-YYYY-YYYY-YYYY	Validation (Line) Sensor Error; refer to Validation Sensor Calibration Error Codes (Table 16).
Validation Sensor with Paper	02-YYYY-YYYY-YYYY-YYYY	Validation (Line) Sensor Error; refer to Validation Sensor Calibration Error Codes (Table 16).
Validation Sensor non-Paper	06-YYYY-YYYY-YYYY-YYYY	Validation (Line) Sensor Error; refer to Validation Sensor Calibration Error Codes (Table 16).
Barcode Sensor	03-00-00-XX	Barcode Sensor Error; refer to Barcode Sensor Calibration Error Codes (Table 18).
UV (Reflection) Sensor with Paper	04-00-00-00	UV (Reflection) Calibration process failed; replace Upper UV Sensor.
UV (Transmissive) Sensor with Paper	05-00-00-00	UV (Transmissive) Calibration process failed; replace UV Sensor.
UV (Transmissive) Sensor non-Paper	07-00-00-00	UV (Transmissive) Calibration process failed; replace UV Sensor.
Positioning Sensor	09-ZZ-ZZ-ZZ	A Positioning Sensor failed to calibrate; refer to Positioning Sensor Calibration Error Codes (Table 17).

NOTES: YYYY-YYYY-YYYY-YYYY - Refer to Validation Sensor Calibration Errors for the specific Sensor that created the Error.

XX - Refer to Barcode Sensor Calibration for specific Sensor information.

ZZ-ZZ-ZZ - Refer to the Positioning Sensor Calibration Errors for the specific Sensor that created the Error.

VALIDATION SENSOR ERROR CODES

Table 16 lists Error Codes, Causes and Solutions for the Validation Sensor.

Table 16 Validation Sensor Error Codes

Sensor	Error Code	Causes/Solutions
dll_ore_ref	0000-0000-0000-0001	
dl_blu_ref	0000-0000-0000-0002	
dc_redl_ref	0000-0000-0000-0004	
dr_blu_ref	0000-0000-0000-0008	
drr_ore_ref	0000-0000-0000-0010	
dl_ir_ref	0000-0000-0000-0020	
dc_irl_ref	0000-0000-0000-0040	
dr_ir_ref	0000-0000-0000-0080	
dc_irr_ref	0000-0000-0000-0100	
dll_gre_ref	0000-0000-0000-0200	
dc_redr_ref	0000-0000-0000-0400	
drr_gre_ref	0000-0000-0000-0800	
ull_ore_ref	0000-0000-0000-1000	
ul_blu_ref	0000-0000-0000-2000	
uc_redl_ref	0000-0000-0000-4000	
ur_blu_ref	0000-0000-0000-8000	
urr_ore_ref	0000-0000-0001-0000	
uc_irl_ref	0000-0000-0002-0000	
uc_iff_ref	0000-0000-0004-0000	
ull_gre_ref	0000-0000-0008-0000	
ul_ir_ref	0000-0000-0010-0000	Validation Sensor error; Verify that the Calibration Reference paper is inserted correctly. Make sure that the Calibration Reference Paper is clean, and is not damaged. Clean the Validation Sensors. Replace the Line Sensor, if necessary.
uc_redr_ref	0000-0000-0020-0000	
ur_ir_ref	0000-0000-0040-0000	
urr_gre_ref	0000-0000-0080-0000	
dc_redl_pen	0000-0000-0100-0000	
dll_nir_pen	0000-0000-0200-0000	
dl_ir_pen	0000-0000-0400-0000	
dc_irl_pen	0000-0000-0800-0000	
dr_ir_pen	0000-0000-1000-0000	
drr_nir_pen	0000-0000-2000-0000	
dll_ore_pen	0000-0000-4000-0000	
dl_nir_pen	0000-0000-8000-0000	
dc_irr_pen	0000-0001-0000-0000	
dr_nir_pen	0000-0002-0000-0000	
drr_ore_pen	0000-0004-0000-0000	
dll_gre_pen	0000-0008-0000-0000	
dl_ore_pen	0000-0010-0000-0000	
dc_redr_pen	0000-0020-0000-0000	
dr_ore_pen	0000-0040-0000-0000	
drr_gre_pen	0000-0080-0000-0000	
ull_ore_pen	0000-0100-0000-0000	
ul_blu_pen	0000-0200-0000-0000	
ur_blu_pen	0000-0400-0000-0000	

Table 16 Validation Sensor Error Codes (Continued)

Sensor	Error Code	Causes/Solutions
urr_ore_pen	0000-0800-0000-0000	Validation Sensor error; Verify that the Calibration Reference paper is inserted correctly. Make sure that the Calibration Reference Paper is clean, and is not damaged. Clean the Validation Sensors. Replace the Line Sensor, if necessary.
ull_nir_pen	0000-1000-0000-0000	
ul_ore_pen	0000-2000-0000-0000	
ur_ore_pen	0000-4000-0000-0000	
urr_nir_pen	0000-8000-0000-0001	

NOTE: Refer to Error Code YYYY-YYYY-YYYY-YYYY from the Calibration Program Error Codes Table (Table 15), last 16 digits to identify a specific Sensor.

POSITIONING SENSOR CALIBRATION ERROR CODES

Table 17 identifies Positioning Sensor Calibration Error Codes, Causes and Solutions.

Table 17 Positioning Sensor Calibration Error Codes

Sensor/Error	Error Code	Cause and Solution
Entrance Sensor [D/A Value, non-Paper]	00-00-01	Calibration of the Entrance Sensor failed; replace the Entrance Sensor.
Positioning Sensors	00-00-02	Calibration of a Positioning Sensor failed. Perform Sensor test to determine which Sensor failed.
Anti-Pullback Entrance Sensor	00-00-04	Calibration of the Anti-Pullback Entrance Sensor failed. replace the Anti-Pullback Entrance Sensor.
Exit Sensor 2	00-00-08	Calibration of the Exit Sensor 2 failed; replace Exit Sensor 2.
Exit Sensor 1	00-00-10	Calibration of the Exit Sensor 1 failed; replace Exit Sensor 1.
EEPROM Read Error	00-01-00	EEPROM Reading and/or saving was not properly performed.
EEPROM Write Error	00-02-00	EEPROM Writing and/or saving was not properly performed.
EEPROM Error	00-04-00	EEPROM reading, writing and/or saving was not properly performed.
EEPROM Error	00-08-00	EEPROM reading, writing and/or saving was not properly performed.

NOTE: Refer to Error Code ZZ-ZZ-ZZ from the Calibration Program Error Codes Table (Table 15), last 6 digits to identify a specific Sensor or Error condition.

BARCODE SENSOR ERROR CODES

Table 18 identifies Barcode Sensor Error Codes, Causes and Solutions.

Table 18 Barcode Sensor Error Codes

Sensor	Error Code	Causes and Solutions
Upper Barcode Sensor	00	Calibration of the Upper Barcode Sensor failed; replace the Upper Barcode Sensor.
Lower Barcode Sensor	01	Calibration of the Lower Barcode Sensor failed; replace the Lower Barcode Sensor.

NOTE: Refers to Error Code XX from the Calibration Program Error Codes Table (Table 15) (last two digits).

iPRO MAINTENANCE EQUIPMENT

Figure 14 lists and pictorially represents all of the Maintenance Equipment required to test an iPRO Acceptor Unit.
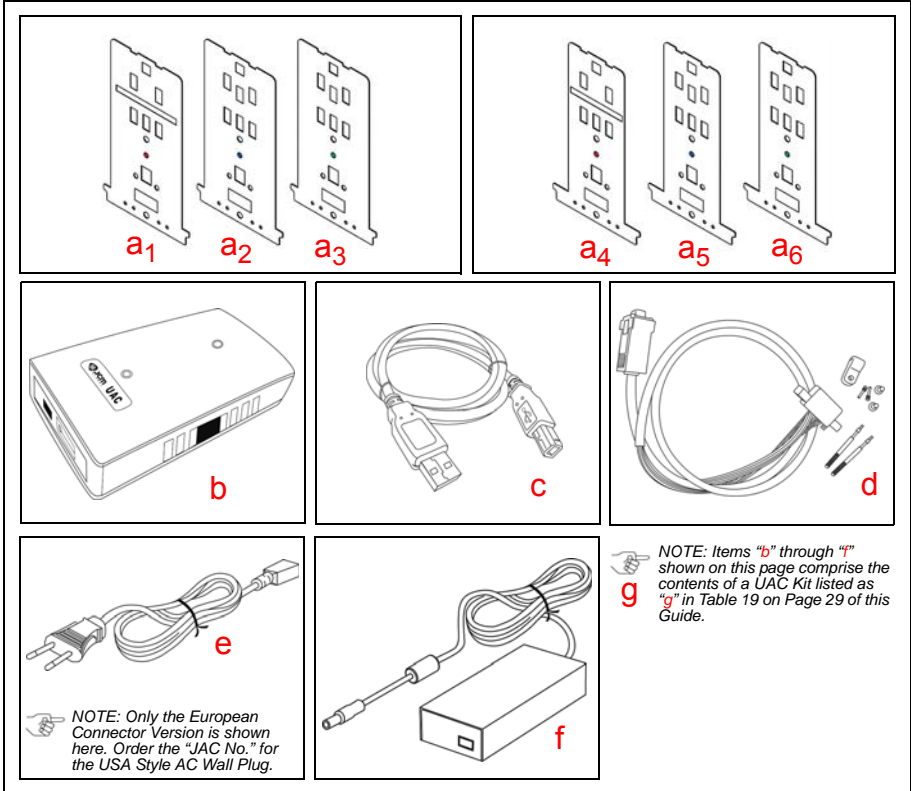

Figure 14 Maintenance Equipment Requirements

Table 19 on the next Page lists each part and a description related to the Figure 14 images.

MAINTENANCE EQUIPMENT PARTS LIST
Table 19 Maintenance Parts List

Letter	EDP No.	JAC No.	Description	Qty.	Remark
a_1	199571	N/A	Reference Paper (KS-081)	1	For iPRO-100
a_2	199573	N/A	Reference Paper (KS-082)	1	For iPRO-100
a_3	199574	N/A	Reference Paper (KS-083	1	For iPRO-100
a_4	199575	N/A	Reference Paper (KS-084)	1	For iPRO-101
a_5	199576	N/A	Reference Paper (KS-085)	1	For iPRO-101
a_6	199577	N/A	Reference Paper (KS-086)	1	For iPRO-101
b	Use JAC # ⟶	501-100218R	UAC Module	1	
c	G00230	400-100249R	UAC USB Cable	1	For UAC to PC
d	Use JAC # ⟶	302-200409R	iPRO to UAC Interface Cable	1	For either iPRO
e	G00213	302-100007RA	Power Cord	1	For UAC
f	G00286	⟵ Use EDP #	AC Power Adapter	1	For UAC
g	Use JAC # ⟶	701-100103R	UAC Kit	1	For UAC

👉 *NOTE: Product EDP Numbers that begin with "G" designate products developed by JCM-E Germany.*

👉 *NOTE: Items "b", "c", "d", "e", and "f" are included in a UAC Kit. listed as "g" in Table 19.*

PERSONAL NOTES AND COMMENTS

Add relevant notes or comments regarding your installation here.

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Add relevant notes or comments regarding your installation here.

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