ExpressVote™
Maintenance Guide

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Proprietary Document Section	Description
N/A	N/A

Table of Contents

Part 1: ExpressVote

The chapters in Part 1 of the *ES&S ExpressVote Maintenance Guide* are organized as follows:

Chapter 1: Concept of Operations

This guide describes how to maintain the ExpressVote™ unit before, during, and between elections. In describing the maintenance procedures, the information in this guide tells how to diagnose and correct operational events, such as system alerts, warnings, error messages, and other hardware-related events. This guide does not support the repair of defective components or modules ordinarily done by the manufacturer or firmware developer.

This guide and the *ES&S ExpressVote Operator's Guide* are intended to help you develop election procedures. However, election laws and procedures vary from state to state, and your procedures must be in compliance with the laws and procedures that apply to your jurisdiction.

This section describes the structure and function of the ExpressVote (and related firmware) for election preparation, programming, vote recording, tabulation, and reporting.

1. Main Assembly is the complete Express Vote
2. The Main Chassis/Front Housing is the plastic and metal frame to which all other subsystems are mounted.
3. The Single Board Computer (SBC) is a COTS printed circuit board manufactured by Eurotech, a manufacturer of a range of embedded single board computers. It contains a 1.1 GHz Intel Atom processor. It provides the USB interfaces that are used in the system as well as an Ethernet port, digital audio interface, and a low voltage differential signal (LVDS) that interfaces to the video screen. It is placed in a socketed connector to interface to subsection (2), the IOB board.
4. The Input/Output Board (IOB) is a printed circuit board that interfaces the SBC to the peripheral subsections of the ExpressVote system. It provides the circuitry and connectors to access the USB functionality. It provides the circuitry and connectors to interface the SBC to subsection (6), the LCD screen and backlight inverter. It provides the circuitry for the digital audio and LED Controls to reach subsection (3), the Front Panel Board, which provides user accessible ports and displays. It contains a microprocessor that controls the backlight, monitors the battery, monitors system switches, and provides a serial interface to subsection (9), the detachable keypad board. The microprocessor also is capable of writing to the nonvolatile EEPROM memory on the IOB board.
5. The Front Panel Board (FPB) is a printed circuit board that provides user access to the headphone jack, the dual-switch access (DSA) port, and LEDs indicating line and battery power status. These interfaces are connected by cable to subsection (2), the IOB board.
6. The Scanner Printer Engine board (SPE) is a printed circuit board that contains a microprocessor that controls all the components of subsection (8), the Paper Path Module. It communicates to subsection (1), the SBC via a USB cable.

7. The Power Management Board (PMB) is a printed circuit board that controls power distribution to the ExpressVote. It has as inputs of 120 or 240 Volts AC line voltage and the lithium ion battery. It outputs +24V, +5V, and +3.3V to subsection (4), the SPE. It outputs +12V, +5V, and +3.3V as well as the battery voltage to subsection (2), the IOB.
8. The LCD/Touchscreen Assembly with the backlight inverter powering the backlight allows visual interaction with the graphics of the system. The LCD screen is 15 inch's and manufactured by LG. 12V Power to the inverter is provided by a cable to the IOB. Power and LVDS signals are provided to the LCD screen by a cable to the IOB. The ELO touchscreen allows tactile interaction with the firmware on the system. Interaction is accomplished by the touch sensitive screen connected by a cable to the IOB.
9. The Paper Path Module (PPM) is the subsection where the Activation Card is inserted thus enabling the system to interact with the card. It consists of a contact image sensor that can do an image scan of the card, a Seiko thermal print module that can thermally print on the card, a paper path motor that can move the card along and eject it either to the front (returned to voter) or the rear (deposited into a secure card bin), and paper path sensors that can detect the current position of the card. The components of the PPM are controlled by subsection (4), the SPE printed circuit board.
10. The Detachable Keypad Board (DKB) is the printed circuit board that provides the interface between subsection (10), the keypad, and subsection (2), the IOB. It contains a microprocessor that scans the keypad for key activation. It communicates to the IOB via a cable using a serial interface. The Keypad provides a user interface to those users who find it difficult to use the touchscreen and LCD screen. It can be detached from the ExpressVote to the limit of its interface cable for easier use by the user. The keys are color coded, have unique shapes, and have Braille descriptions to accommodate as many users as possible.
11. The lithium ion battery is the backup battery that can keep the ExpressVote running in the event of main power loss or unplugging of the ExpressVote from main power.

The ExpressVote unit uses a USB media device to store the election definition, audit log, and other election-specific information. Data on the USB media device is referenced and/or updated each time an ExpressVote's Vote Session Activator is inserted or the user interacts with the unit's menus. Use USB media devices with a memory capacity of 1 to 8 GB. Ensure that Express Vote USB media devices are correctly partitioned and properly formatted to the FAT32 file system prior to loading devices with election configuration files.

Power Supply

The ExpressVote unit contains a built-in power supply system that operates on a 24 VDC, max 6.25A. The line voltage enters a power brick which delivers the DC voltage to the unit. Each ExpressVote unit is provided with a line cord suitable for connection to North American three-wire 120 VAC 60 Hz receptacles.

Battery Pack

An internal lithium-ion battery pack provides continuous operation after loss of AC power, for at least two hours. During periods of non-utilization, the battery pack will experience approximately 5% charge loss each month.

ES&S recommends that the battery pack be checked every three months.

Reference: See the *ES&S Standard Operations Manual, Chapter 5: Election Preparation, Charge the Battery* for instruction on charging the battery pack.

The Battery Status screen shows the battery pack's strength.

The standard power supply pack can be used to charge the battery when the unit is outside the case and plugged into a 120 volt electrical outlet.

Note: The battery is charged during normal operation when the standard power supply pack is used as described, even if the power switch is in the **Off** position.

Battery Backup Use Model

- The following parameters describe the usage model for battery backup power: If the AC power is lost or removed, the system automatically switches to battery back-up power.
- The unit may be operated from a power pack with or without a battery installed. However recommended practice is to be sure that a fully charged battery is provided, to provide the intended protection against a loss of AC power.
- The LCD display and backlight will run continuously, with reduced backlight brightness, when on battery backup, to conserve power.
- Power to the scanners and printer will be switched on only when needed.
- The batteries should have sufficient capacity to allow the unit to continue to operate, after loss of AC power, for at least two (2) hours.
- Power usage is tested by marking a typical card. We assume 12 voting sessions per hour, or 5 minutes per voting session.

- If the system continues to run on the battery for greater than the back-up period of two hours, the battery pack will eventually be discharged to no remaining capacity.
- When the battery pack reaches 7.2 VDC, the system will not allow further printing or scanning functions.

The lithium-ion battery pack is replaceable only by authorized service personnel.

Caution: Risk of explosion if battery is replaced by an incorrect type. Dispose of used batteries according to local regulations and conventions.

Power Management Board

The Power Management Board (PMB) (see Chapter 9: Glossary, *ES&S ExpressVote Operator's Guide*) operates from a power supply system that operates on a 24 VDC, max 6.25A. The line voltage enters a power brick which delivers the DC voltage to the unit. and connected to a detachable line cord that is inserted into a North American three-wire, 120 VAC 60 Hz three-wire receptacle.

The PSM controls power distribution to the ExpressVote unit. It generates the DC voltages required by the circuitry within the unit and provides the following functions:

- Automatic Line/Battery Switching
- Battery Charging
- Voltage Conversion

Reference: See "Turning On and Off the ExpressVote Unit" on page 8, for more information on the functions of the Power Supply Board.

Also provided is an interface to a lithium-ion battery pack with sufficient capacity to allow the ExpressVote unit to continue to operate after loss of AC power. When AC power is present, the PMB charges the battery pack. If AC power is lost, the power supply automatically switches from the power provided by the AC line to battery power.

The PMB generates the DC voltages required by the circuitry within the ExpressVote unit.

Automatic Line/Battery Switching

If AC power is interrupted, the PSB automatically switches from standard AC line voltages from to the lower voltage from the battery pack.

Monitoring the Battery Charge Status

A properly maintained rechargeable battery provides reliable power to the ExpressVote unit during an AC power outage. Maintenance involves regular monitoring of the battery status by checking the battery status icons, located on the front access panel; or, checking the Battery Status screen in the Official mode.

Monitor Battery Charging Status

See *ES&S ExpressVote Operator's Guide*, ExpressVote *Overview, Using the Front Panel Access Icons and Ports,* for more information how to read the battery status icons on the front access panel.

Battery Charging

The PSB charges the lithium-ion battery if either the AC line cord is connected to AC power, or an optional battery charger is plugged in.

Turning On and Off the ExpressVote Unit

The power switch is located inside a locked compartment on the left side of the enclosure, which is used by authorized election officials to turn the ExpressVote unit on and off. The power switch is a low-voltage rocker switch connected to power control circuitry on the IOB. When the power switch is in the ON position, power control circuitry on the IOB turns on power to the SBC and SPE. These in turn enable the LCD screen, the backlight, the scanner, the printer, and related system components.

When the power switch is moved to the OFF position, the control processor first communicates with the SBC to make sure that all SBC system processes are complete. Upon acknowledgment from the SBC of readiness to shut down, or after the expiration of a time-out period, the IOB causes power to be interrupted to the SBC, SPE, and connected system components. This scheme provides an orderly shut-down without loss of system data.

Note: The side access panel is locked to prevent tampering. Only election officials with the security keys can unlock and lock the side access panel. By default, all ExpressVote units are shipped keyed alike. Election officials requesting a set of unique keys for their jurisdiction, or different keys for each unit, will require the key lock assembly to be retrofitted at an additional cost.

However, provided that the ExpressVote units is connected to AC power, the PSB will stay on in a low-power mode, even when the power switch is off. The battery charger circuitry on the PSB stays on and will keep the battery fully charged.

Monitor the Power Status

The power cord LED icon on the front panel shows the current status of the power supply. The icon appears green if the unit is plugged into an AC power source. When AC power is present, this lamp will be lit whether or not the unit has been turned on using the power switch. When AC power is present, but the unit is off, the PSB can still charge the internal battery pack.

Changing Voter/Official Modes

The Voter/Official rocker switch, located inside a locked compartment on the left side of the enclosure, is used by authorized election officials to control ExpressVote's operating mode. This switch is connected to the IOB. The control processor on the IOB communicates the status of this switch to the SBC.

When the switch is in the Voter position, ExpressVote is available to voters to make selections and print cards. When the switch is in the OFFICIAL position, only Admin functions are accessible. A menu of maintenance functions is also provided for unit configuration and service. These functions are password-protected.

The switch contacts are connected to low-voltage circuits. They do not directly switch the AC or DC (battery) power input sources. When the switch is in the VOTER or OFFICIAL positions, and the unit is switched on, power is drawn from the AC power line (if available) or the battery pack (only if AC power is unavailable).

Contact ES&S for Ordering Information

To obtain additional ExpressVote units, tools, and spare devices, see Technical Support for Hardware and Firmware for contact information.

Tools Needed for Set Up and Maintenance

The following table lists the tools needed to set up and maintain the ExpressVote unit:

TABLE 1. Common Standard Tools

Type	Manufacturer Description	Size	Advised Quantity
Star screwdriver	Torx™ T10-80mm driver w/security center pin	4-inch minimum length	1
Star right-angle screwdriver	Torx™ T10-51mm short arm L-key w/security center pin	2-inch minimum length	1
Star screwdriver	Torx™ T20	N/A	1
Phillips screwdriver	Generic #2	N/A	1
Allen wrench	Generic 1.5 mm	N/A	1
Nut driver	Generic 5.5 mm	N/A	1
Static mat w/wrist strap	Generic	N/A	1
Small hook	Generic	N/A	1
Compressed Air		10 oz	1
Isopropyl Alcohol (90%)		16 oz	1
Non lint based cloth			1
Mild detergent solution			
Static mat with wrist strap			1

Keeping Spare Devices

Keep the following devices on hand for each ExpressVote. You can order these items from ES&S Technical Support. See Technical Support for Hardware and Firmware for contact information. Please allow four weeks for delivery.

TABLE 2. Standard Spare Devices

Type	Manufacturer Description	Size	Advised Quantity
Headphones	**AVID Airline Products, model number 1A6FV060CB K32ST**	**N/A**	**2-3 sets**

Maintenance Equipment

ES&S is responsible for maintaining any special purpose test and maintenance equipment that its Field Services technicians use for isolating and diagnosing faults. Contact ES&S Technical Support if you have questions or need assistance on hardware and firmware issues.

Parts and Materials

You can obtain parts and materials to maintain the ExpressVote unit directly from ES&S. For a listing of ExpressVote parts and materials see the *ES&S ExpressVote Operator's Guide* for the types, sizes, and quantities needed.

Customer Support

ES&S provides exceptional customer service, training and documentation.

Training Services

ES&S offers comprehensive training programs, created and led by experienced professionals, for everyone who interacts with your voting system. Please contact your Account Manager or Technical Support representative for more information.

Technical Support for Hardware and Firmware

ES&S Technical Support is the single point of contact for all ES&S hardware and firmware customer assistance. Technical Support provides general system information, responds to requests on product procedures, logs problems and has first level responsibility for problem determination. Technical Support will resolve the problem if possible, monitor steps to resolution if escalated, and follow-up with the customer afterwards.

Important: ES&S support services are subject to the prices, terms, and conditions in place at the time the service is used.

Use the following methods to contact Technical Support:

Support representatives normally answer calls Monday through Friday between 8:00 A.M. and 7:00 P.M. central time.

Contact an ES&S Support Representative

Telephone:	**877-377-8683 (USA & Canada)** **402-593-0101 (International)**
Fax:	**402-593-8107**
Write:	**Election Systems & Software** **11208 John Galt Blvd** **Omaha, NE 68137 USA**
Email	• Firmware@essvote.com • Hardware@essvote.com

When you contact ES&S for technical support, be near your equipment. In addition, be prepared to provide the following information to the support representative:

- Model number of the product you are using (e.g., DS850 version 2.2).
- Version number of the firmware installed on the product.
- Exact wording of any messages displayed by the scanner.
- Description of what happened when the problem occurred.

For more information about ES&S Technical Support, click the **Contact ES&S** tab on the ES&S secure website and then click **Technical Support (Hardware & Support)** or scroll to the section.

Ordering Supplies and Peripheral Devices

ES&S recommends maintaining a supply of paper stock, supplies, and peripheral devices for each ExpressVote unit. To order these items, contact ES&S Customer Service at 1-877-8683. Please allow up to four weeks for delivery.

System Acquisition Procedures

See also, "User Acceptance Checklist" in the *ES&S ExpressVote Operator's Guide* for further information on procedures that are required to support system acquisition, installation, and readiness testing.

Web-Based Resources

Licensed customers can view documentation, technical bulletins, and checklist online at **My ES&S Online Customer Portal**:

The ES&S website is secure and requires an authorized user name and password. To learn more or to apply for access, visit the ES&S website at www.essvote.com and click the link to "My ES&S Online Customer Portal" and then "Request Access to My ES&S Portal" and submit the completed e-mail form.

Chapter 2: Preventative Maintenance

Inspecting and Cleaning Contact Image Sensor (CIS)

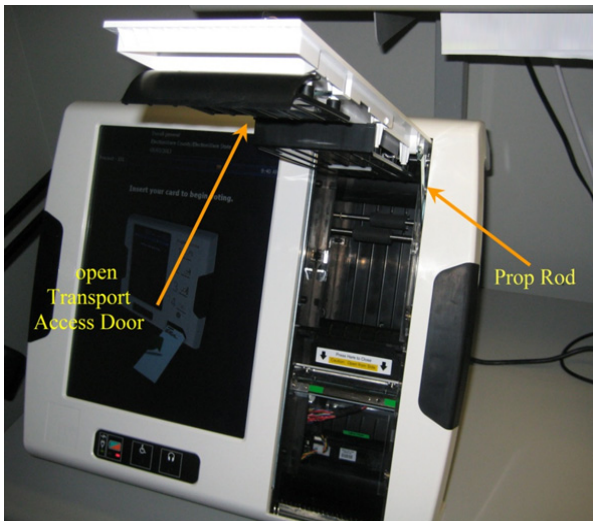
Required Tools: Key, 90% isopropyl alchohol, lint free cloth

Required Staff: ES&S Certified Technician

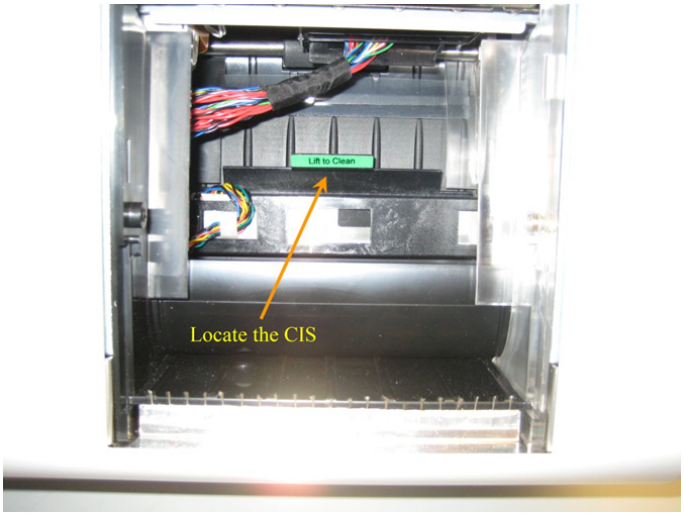
Estimated time to complete: 20 min

1. Unlock the Transport Access Door

2. Open the Transport Access Door; it will be supported by the prop rod



3. Locate the CIS



4. Carefully open the CIS (it will rotate toward you)

5. Be sure to close the CIS after inspection/cleaning

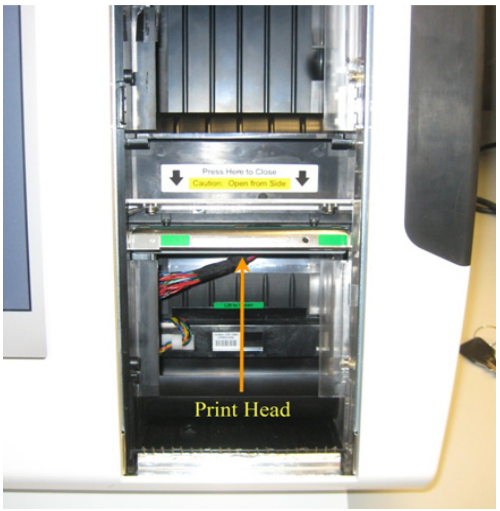
Inspecting and Cleaning Print Head

Required Tools: Key, 90% isopropyl alchohol, lint free cloth, cotton swab

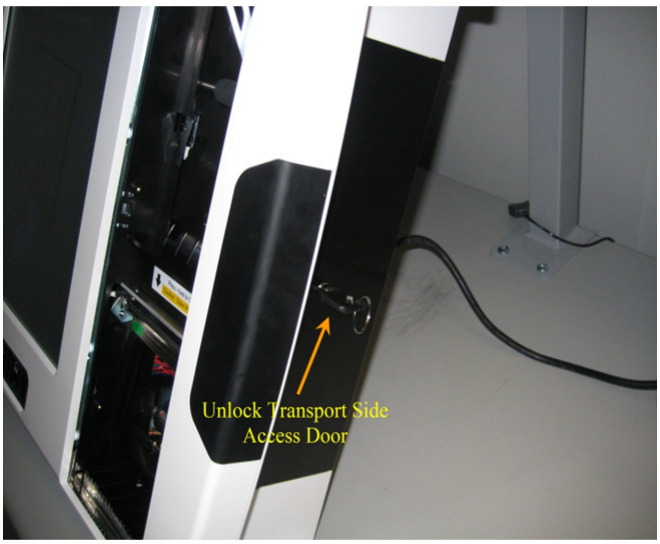
Required Staff: ES&S Certified Technician

Estimated time to complete: 20 min

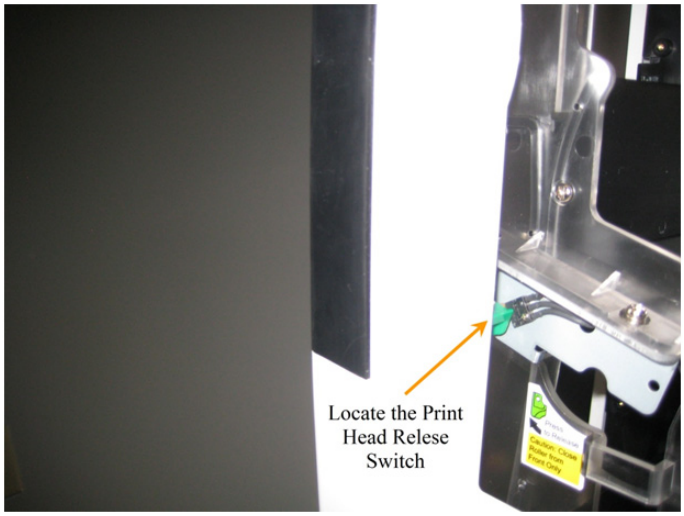
1. Locate the Print Head. Open the Front Door.



2. Open the Transport Side Access Door



3. Locate and activate the Print Head release switch



4. Raise the Print Head and clean the head with 90% alcohol and a lint free cloth or a cotton swab.

Allow at least five minutes for any alcohol to dissipate before closing the Print Head and printing.

5. Close the Print Head, be sure to place pressure on only the two green labels to avoid bending the print head mechanism.

Cleaning the Paper Path and Paper Sensors

Required Tools: Key, Compressed air

Required Staff: ES&S Certified Technician

Estimated time to complete: 20 min

1. Open the Front Access Door to expose the Paper Path.
2. Using compressed air and using short bursts, blow out the Paper Path to remove any paper dust or small fragments of ballots.
3. If there are larger pieces of the Ballot left behind, gently remove them. Do not use any extraction tools as this may damage Paper Path Sensors.

Cleaning Transport Drive Rollers

Required Tools: Key, phillips screwdriver, T10 security driver, Non lint-based cloth, 90% alcohol

Required Staff: ES&S Certified Technician

Estimated time to complete: 30 min

To clean the Transport Drive Rollers, simply use 90% Alcohol and a soft cloth. Slightly dampen, but do not saturate the soft cloth. Use the top roller to turn the other two Drive rollers while wiping them with the soft cloth.

To clean the Pinch rollers, remove the Back Cover and remove the two screws that hold each Pinch Roller to the Paper Path".

How to Test the ExpressVote

Audio

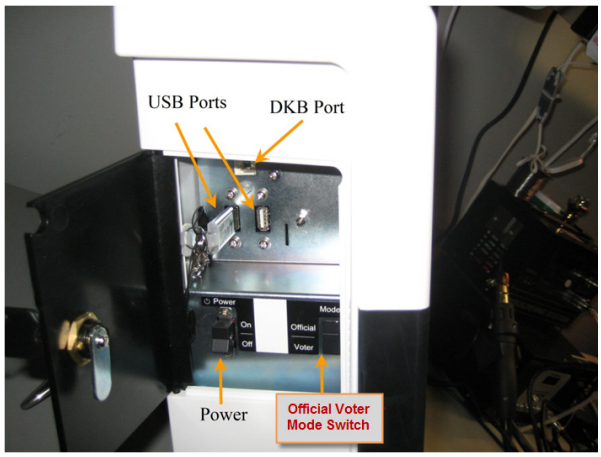
Plug headphones (AVID Airline Products, model number 1A6FV060CBK32ST) or amplified speakers into the audio jack located on the front of the unit. Switch unit to the ON position. You should hear "Please insert your activation card". *If the headphones or amplified speakers have a volume control, make sure the volume is turned up.

Keypad

There are eleven buttons on the keypad. (Volume and Tempo have two switches each) Press each button and confirm that a change happens on the screen or through the audio component of the system. Volume and Tempo may require several individual presses of the button to hear any difference.

USB Ports

Locate the USB ports behind the door on the left side of the Unit. Plug a USB thumb drive loaded with an "Election Definition" into 1 of the 2 ports. You should see a screen asking you for a password. Unplug the USB thumb drive and plug the same USB thumb drive into the 2nd port. You should see the same screen asking you for a password



Chapter 3: System Maintenance Menu

Tap on the ExpressVote System Maintenance navigation buttons to access the functions that you want to either set up or maintain.

You may have come to this menu for the following reasons:

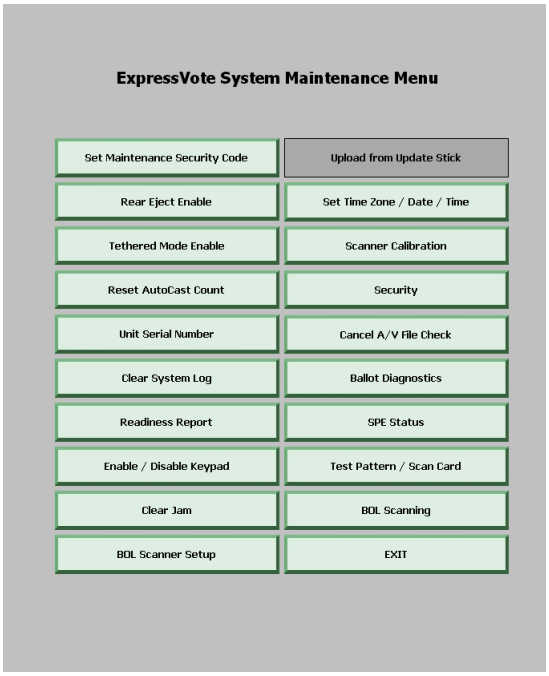
- To set up or maintain System Maintenance functions.
- You have finished calibrating the scanner.
- You have canceled uploading the operating system firmware.

Navigating the System Maintenance Menu

The navigation buttons that are available on the ExpressVote System Maintenance Menu are determined by whether the election definition media device is inserted into the ExpressVote unit and by whether the firmware update media device is inserted.

To view the options on the ExpressVote **System Maintenance screen:**

1. Tap **System Maintenance**.
2. Enter the system security code and tap **Accept**.



Note: The system maintenance security code must be 1-16 characters long with no spaces.

In the Official mode, you can tap from the following options on the ExpressVote System Maintenance Menu if the election definition is installed:

FIGURE 1. System Maintenance Menu
TABLE 3.

Option	Description
Set Maintenance Security Code	Sets new security code that authorizes specified individuals to use ExpressVote's administrative functionality.
Rear Eject Enable	Deposits the cards from the rear slot into a secure ballot box if the Enable for Rear Eject with Post Vote Summary check box is selected. Also allows the voter to re-validate his or her vote selections on the Post Vote Mark Summary/Verify Selections screen and the option to eject the ballot summary card into the secure rear card bin or to eject it from the front slot.
Tethered Mode Enable	Allows the administrator to enable or disable tethering ExpressVote to a DS200® tabulator and scanner for sending cast vote record data to the DS200. This feature is not functional in the current version of the firmware.
Reset AutoCast Count	Resets the AUTOCAST count of the cards that have been ejected through the rear card slot. A warning message requests the user's decision to reset the AUTOCAST count (Y/N) before proceeding.
Unit Serial Number	Sets or changes ExpressVote's serial number. Only ES&S Field Services technicians should set or change the unit's serial number.
Clear System Log	Clears the Systems log.
Readiness Report	Generates a system readiness report to the Operations log. The System Readiness report is a descriptive list of system settings that you can use to verify that the ExpressVote unit is ready to begin processing. The most recently produced System Readiness Report is usually the report that is generated when the unit was turned on. You can print this report on the Get Readiness Report screen. Or, you can generate a more recent report on the Get Readiness Report screen.
Enable / Disable Keypad	Enables the use of the touch keypad if you tap the Keypad Present check box. All keypad errors are recorded if you tap the Keypad Present check box.
Clear Jam	Detects whether a piece of a card remains in the machine after a paper jam and enables the administrator to reset the SPE firmware paper position counter and jam status.
BOL Scanner Setup	Allows the administrator to change required and optional settings for a Ballot Online™ (BOL) barcode scanner.
Upload from Update Stick	Uploads new firmware releases to ExpressVote. Only authorized ES&S personnel and qualified maintenance personnel authorized by the jurisdiction should upload new firmware.
Set Time Zone / Date / Time	Sets the current time zone, date, and time on a numeric touch screen.
Scanner Calibration	Calibrates the ExpressVote unit scanner.
Security	Opens the Security Menu for more options.
Cancel A/V File Check	Bypasses the need for ExpressVote to look at graphics and audio files for corruptions and alterations during startup to save time. Selecting the Enable for Bypass Graphic and Audio Option check box turns on this bypass option.
Ballot Diagnostics	Blank cards are used to calibrate the card marking device and test card marking.
SPE Status	Displays status information about the Scanner Printer Engine (SPE) board.

TABLE 3.

Option	Description
Test Pattern / Scan Card	Allows for an administrator to vote a particular pattern and print a predetermined number of copies of the vote selections on the card.
BOL Scanning	Enables or disables the scanning of Ballot Online (BOL) QR codes.
EXIT	Returns to the ExpressVote Main Menu.

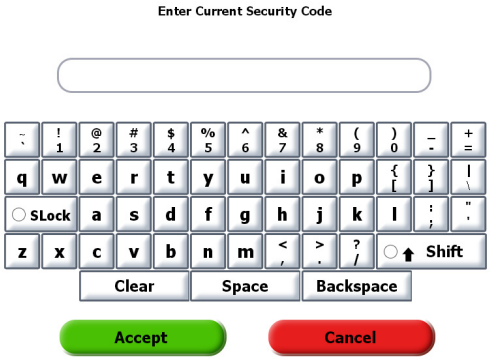
Opening System Maintenance Menu

To open the ExpressVote System Maintenance Menu:

1. On the ExpressVote **Main Menu**, tap the **System Maintenance** button.
2. Enter the security code.
3. Tap either **Cancel** to return to the ExpressVote **Main Menu**, or, tap **Accept** to open the ExpressVote **System Maintenance Menu**.

   One of the following can occur:

   - If an invalid security code is entered, you will be prompted to retry entering the password or contacting your election administrator.
   - If a valid security code is entered, the ExpressVote **System Maintenance Menu** appears.



4. On the ExpressVote **System Maintenance Menu**, do one of the following:
   - If the election definition media device is *not* inserted into ExpressVote, go to Election Definition media device is not inserted.
   - If the election definition media device is inserted into the ExpressVote, go to Election Definition Media Device is Inserted

Election Definition media device is not inserted

In the Official mode, if the election definition media device is *not* inserted into ExpressVote, the following options are dimmed:

- Security
- Unit Serial Number- Only authorized ES&S personnel and qualified maintenance personnel authorized by the jurisdiction should upload new firmware.
- Upload from Update Stick– Only authorized ES&S personnel and qualified maintenance personnel authorized by the jurisdiction should upload new firmware. For more information, see Upload from Upload Stick.

- Ballot Diagnostics

Election Definition Media Device is Inserted

In the Official mode, if the election definition media device is inserted in ExpressVote, the following menu options are active.

- **Set Maintenance Security Code**
- **Rear Eject Enable**
- **Reset AutoCast Count**
- **Unit Serial Number** – Only ES&S Field Services technicians should change the unit's serial number
- **Clear System Log**
- **Readiness Report**
- **Enable / Disable Keypad**
- **Upload from Upload Stick** (not active unless ExpressVote detects new firmware)
- **Set Time Zone / Date / Time**
- **Scanner Calibration**
- **Security**
- **Cancel A/V File Check**
- **Ballot Diagnostics**
- **SPE Status**
- **Test Pattern / Scan Card**
- **BOL Scanning**
- **Exit – Returns to the** ExpressVote **Main Menu**

Set Maintenance Security Code

You can change the maintenance security code to keep ExpressVote secure. Unauthorized users of ExpressVote cannot reprogram the module, set the system date and time, or perform other administrative tasks without knowing the System Maintenance security code.

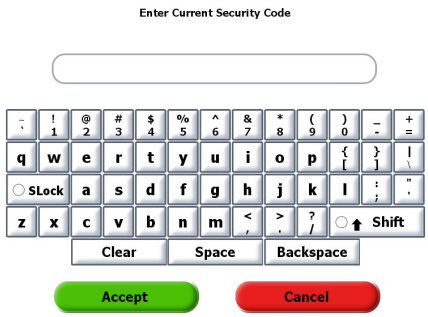
The maintenance security code must be 1-16 characters long with no spaces.

To create the maintenance security code

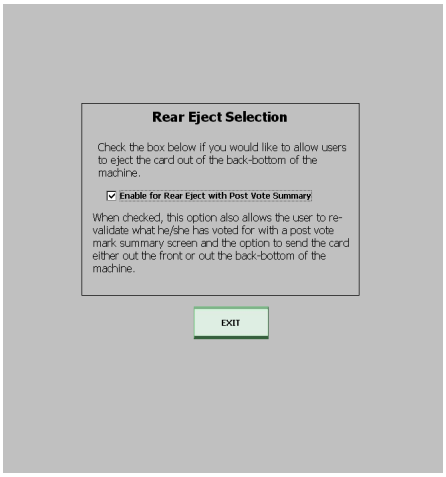
On the **System Maintenance Menu**, do the following to create the maintenance security code:

1. Tap **Set Maintenance Security Code**.

2. Type the current security code and tap **Accept**.
3. When the **Enter New Security Code** screen appears, enter the new maintenance security code **using the on-**screen keyboard and tap **Accept**.
4. Record and store the new security code in at least one location in a safe location away from the ExpressVote unit.



Rear Eject Enable



Tap this option if you want the voter to cast a printed card without physically handling it. When **Enable for Rear Eject with Post Vote Summary** is selected, the voter can validate selections on the Post Vote Summary Selection screen (Verify Selections screen) and choose whether to return the ballot summary card through the front slot or automatically cast it into a rear card bin.

You should also select **Rear Eject Enable with Post Vote Summary** before setting Reset AutoCast Count to **Yes**.

To Enable Rear Eject

On the System Maintenance screen, do the following to enable the rear eject feature:

1. Tap **Rear Eject Enable**.
2. On the **Rear Eject Selection** screen, tap the **Enable for Rear Eject with Post Vote Summary** check box.
3. Tap **EXIT** and then **Yes** to confirm your selection.

Reference: See Validate Ejecting a Card from the Rear Slot for more information on testing the **Enable for Rear Eject with Post Vote Summary** option.

Tethered Mode Enable

This feature is not currently supported.

Reset AutoCast Count

ExpressVote can count the number of cards cast into the ballot box. This total does not contain vote totals, but only the number of cards cast during voting. Before attaching the ballot box to the ExpressVote unit, confirm that the **Enable for Rear Eject with Post Vote Summary** option has been selected on the Rear Eject Enable screen.

On the ExpressVote **System Maintenance Menu**, to reset the AutoCast count, do the following:

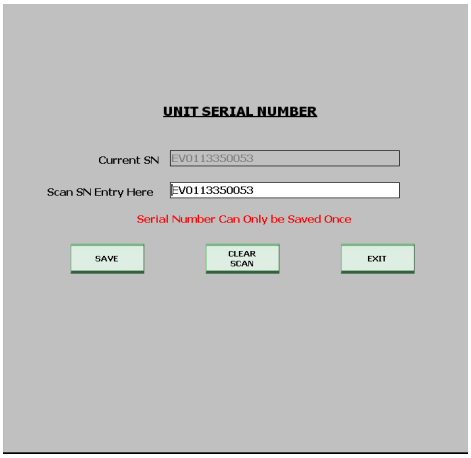
1. Tap **Reset AutoCAST Count**.
2. On the **Reset AutoCASTCount** message box, do one of the following:
   - Tap **Yes** to save the new setting.
   - Tap **No** to retain the previous setting.

Unit Serial Number

Caution: Only ES&S factory or Field Services technicians should set or change the serial number.

To set the serial number

On the **System Maintenance Menu**, ES&S technicians will do the following:



1. Tap **Unit Serial Number.**
2. Use a barcode reader to scan the Serial Number barcode from the label affixed to the machine.
3. Tap **Save**. The Unit Serial Number screen is disabled.

To clear the serial number

If a Unit Serial Number was entered incorrectly, on the System Maintenance Menu, ES&S technicians will do the following:

1. With a special utility media device inserted, tap **Unit Serial Number.**
2. Tap **Clear Scan**.
3. Tap **Save**.

Clear System Log

On the **System Maintenance Menu**, tap **Clear System Log**, and then tap **Yes** to confirm that you want to clear the Systems Log.

Readiness Report

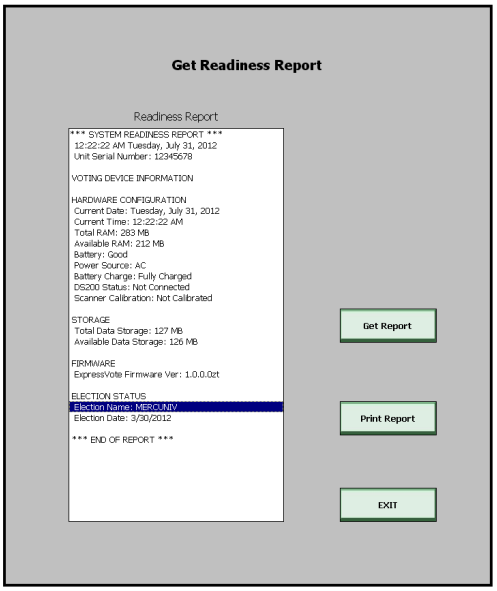
The System Readiness report is a descriptive list of system settings that you can use to verify that the ExpressVote unit is ready to begin processing. The most recently produced System Readiness Report is usually the report that is generated when the unit was turned on. You can print this report on the Get Readiness Report screen. Or, you can generate a more recent report on the Get Readiness Report screen. The System Readiness is stored in the Operations log.

To generate and print a Readiness Report

On the **System Maintenance Menu**, do the following to generate the most recent **System Readiness** report:

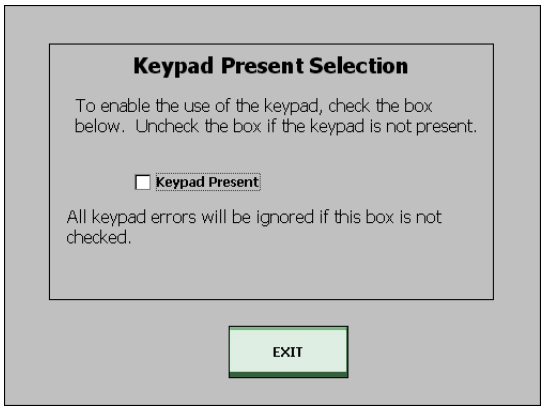
1. Tap **Get Readiness Report**.
2. On the **Get Readiness Report** screen, tap **Get Report**.
3. Tap **Print Report** to print a hard copy of the **System Readiness** report.
4. Tap **EXIT** to return to the System Maintenance Menu.

Note: To generate the System Readiness report that was generated when the ExpressVote unit was turned on, do *not* tap Get Report as instructed in step 2.



Enable / Disable Keypad

Enables the use of the touch keypad if you select the **Keypad Present** check box. All keypad errors are recorded if you tap the Keypad Present check box.

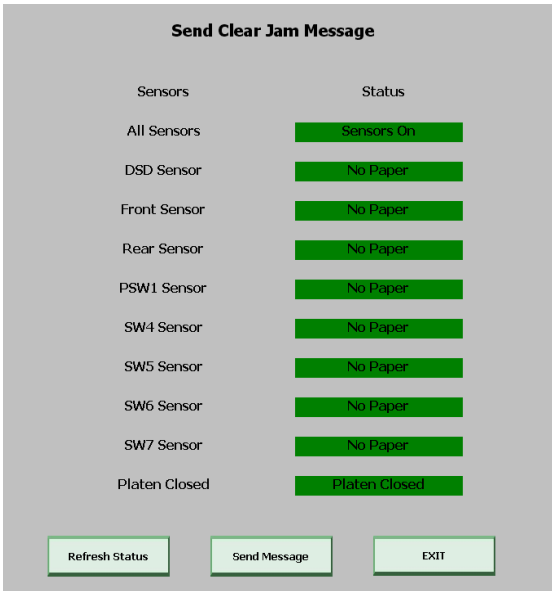


Clear Jam

Enables the administrator to reset the SPE (Scanner Printer Engine) firmware paper position counter and jam status.

To send a Clear Jam message

On the **System Maintenance Menu**, do the following to send a Clear Jam message to the SPE firmware.



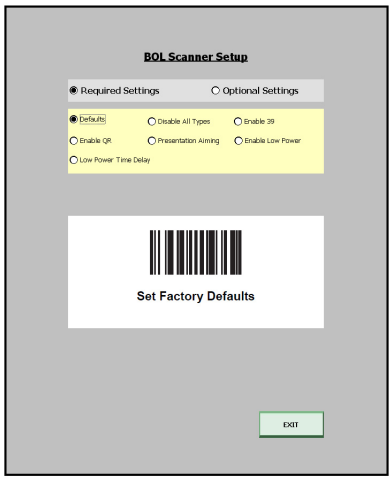
1. Tap **Clear Jam**.
2. Check that all sensors are on, that no sensor detects paper, and that the platen is closed.
3. Tap **Send Message** to inform the SPE firmware that no remaining paper is jammed.
4. The SPE firmware will reset itself to a clear (not jammed) state and set the paper position counter to the correct value for an empty state.

The **Refresh Status** button can be used to refresh all sensor status displays on the Send Clear Jam Message screen.

BOL Scanner Setup

For customers using the Ballot Online™ system, allows the administrator to change required and optional settings for a Ballot Online™ (BOL) barcode scanner.

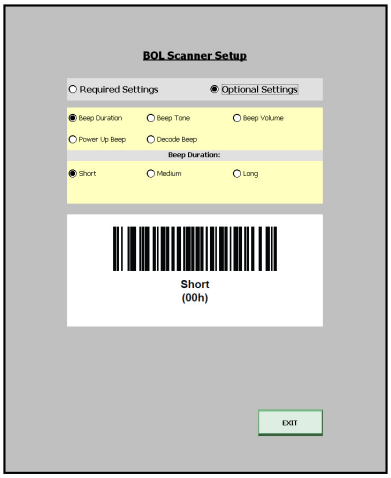
To set up a barcode scanner



With the Motorola DS9208 barcode scanner plugged into one of the ExpressVote USB ports, on the **System Maintenance Menu**, do the following.

1. Tap **Required Settings** if it is not already selected.
2. Tap **Defaults**. With the barcode scanner, scan the barcode that appears on the screen. This ensures the scanner has returned to factory default settings.
3. Tap **Disable All Types**. Scan the barcode that appears on the screen. This ensures that the barcode scanner will not read unwanted types of codes.
4. Tap **Enable 39**. Scan the barcode that appears on the screen. This enables the barcode scanner to read the ExpressVote Serial Number tag.
5. Tap **Enable QR**. Scan the barcode that appears on the screen. This enables the barcode scanner to read QR codes.
6. Tap **Presentation Aiming**. Scan the barcode that appears on the screen. This enables the barcode scanner to project the aiming pattern during barcode capture in presentation mode.
7. Tap **Enable Low Power**. Scan the barcode that appears on the screen. This enables the barcode scanner to enter low power mode after an attempt to read a code.
8. Tap **Low Power Time Delay**. Scan the barcode that appears on the screen. This enables the barcode scanner to wait 10 seconds after an attempt to read a code before entering low power mode.
9. Tap **Optional Settings** if you want to set any optional settings. Otherwise tap Exit.

Optional Settings:



The administrator can set one or more of the following by tapping the option and scanning the barcode that appears on the screen.

- **Beep Duration** - set the duration of the beep (Short, Medium, Long)
- **Beep Tone** - set the tone of the beep (Off, Low, Medium, High, Medium to High)
- **Beep Volume** - set the volume level of the beep (Low, Medium, High)
- **Power Up Beep** - set whether the scanner should beep at power up (Beep - recommended, Do Not Beep - not recommended)

- **Decode Beep** - set whether the scanner should beep after it successfully reads a code (Beep - recommended, Do Not Beep - not recommended)

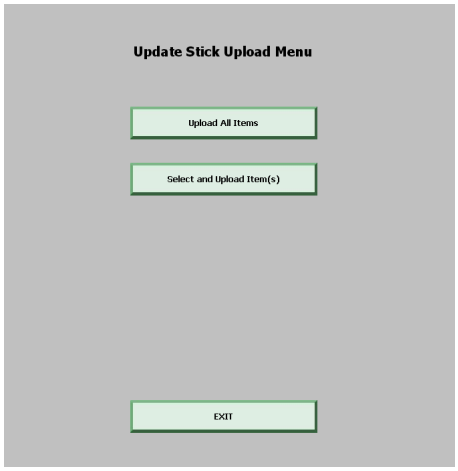
Upload from Upload Stick

When ES&S makes improvements to firmware, ES&S issues updates to the programming that runs the ExpressVote.

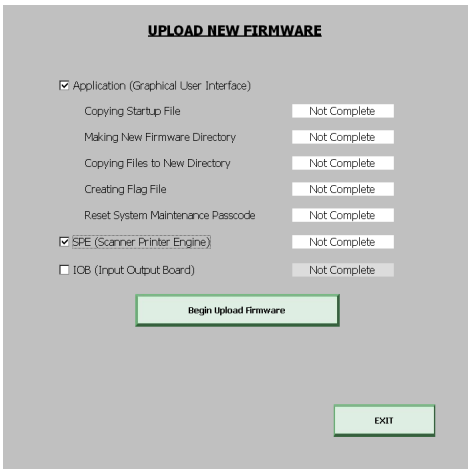
Firmware upgrades consist of full firmware installs and firmware upgrades. The difference between the two types of upgrades lies in the number of files that are upgraded in the processes. Full firmware installs replace all programming files in the system. Firmware upgrades replace only the changed files.

Only authorized ES&S personnel and qualified maintenance personnel authorized by the jurisdiction should install new firmware releases

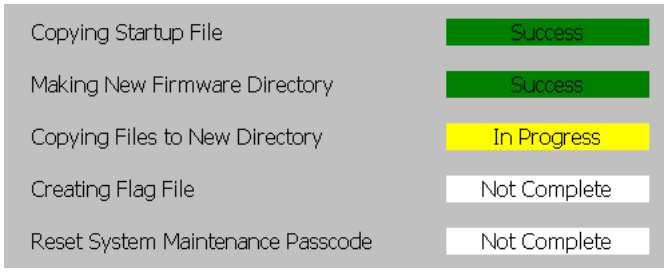
Complete the following steps to upload new firmware, which can be application (Graphical User Interface), SPE (Scanner Printer Engine) and/or IOB (Input Output Board:



1. Insert the media device with the new firmware into any the USB port in the Media Access area.
2. On the **System Maintenance Menu**, tap **Upload from Upload Stick**.
3. On the **Upload Stick Upload Menu** screen, tap either **Upload All Items** or **Select and Upload Item(s)**.
    - If you select Upload All Items, you will be able to upload all firmware updates.
    - If you select Upload New Firmware, you can select one or more firmware types to upload: Application (Graphical User Interface), SPE (Scanner Printer Engine), and/or IOB (Input Output Board).
4. Tap **Begin Upload Firmware**. (You will see an error message if the media device is no longer inserted.)



5. If the media device is inserted, the uploading process continues automatically. Green, yellow and white status bars show the upload progress.



6. If the upload is successful, turn off and reboot the ExpressVote unit to complete the firmware upload process. If an error occurs during the upload process, tap **EXIT**, and then try to upload the firmware again.

Malfunctioning or Wrong Firmware

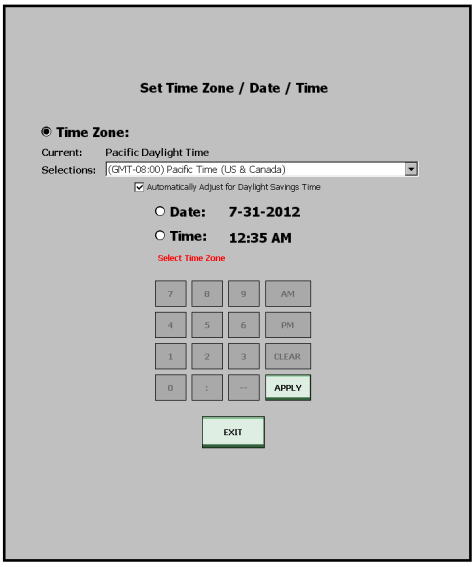
If the firmware is corrupt or incorrect, have an ES&S Field Services technician reload the full firmware. ES&S Customer Support provides technical support for ExpressVote. See **Technical Support for Hardware and Firmware** for contact information.

Set Time Zone / Date / Time

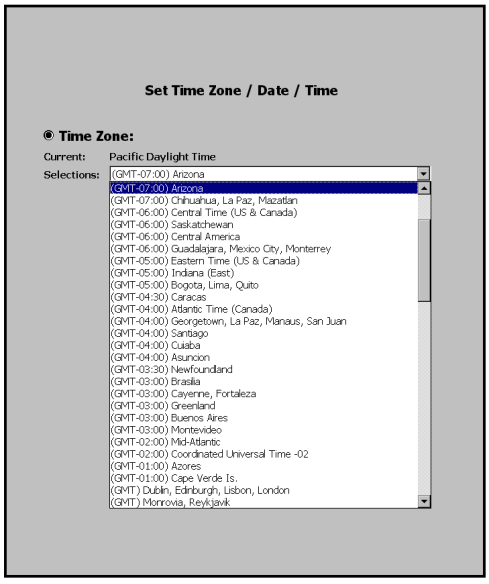
You can set the time zone, date, and time that ExpressVote uses for logging operations in the various operations and diagnostic.

On the **System Maintenance** screen, to reset the date or time, do the following:

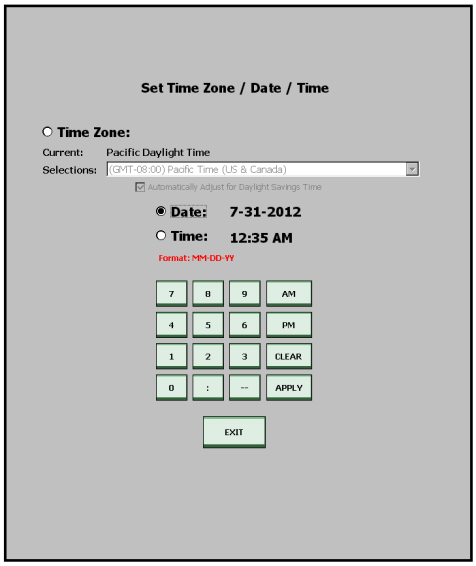
1. Tap **Set Time Zone / Date / Time**.



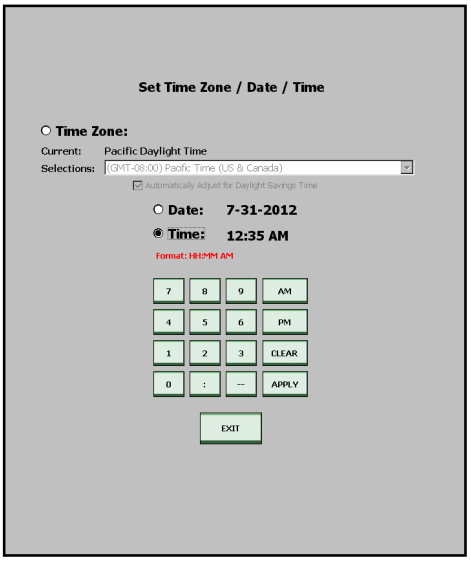
2. To set the time zone, tap the **Time Zone** option button, and then tap the arrow to enable the drop-down menu. Select the appropriate time zone from the listed options, and then tap **Apply**.
3. To automatically adjust the time for Daylight Savings Time, tap the **Automatically Adjust for Daylight Savings Time** check box.



4. To set the date, tap the option button next to the **Date** and tap **CLEAR**.
5. Enter the date in the MM-DD-YY format and tap **APPLY**.



6. To set the time, tap the radio button next to **TIME** and tap **CLEAR**.
7. Enter the new time in the HH:MM AM format and tap **APPLY**.
8. Tap **EXIT** when you are finished editing the date and time.



Note: ExpressVote accepts 24-hour and 12-hour (a.m/p.m.) entries. If p.m. is left off, the entry defaults to a.m.

Scanner Calibration

Scanner calibration ensures that the electronic image scanners convert the optical image of the card into an electronic form that is suitable for temporary storage, transmission, or printing.

The scanner is a contact image photo-sensor (CIS) assembly. Contact ES&S Technical Support [See Technical Support for Hardware and Firmware] if this component needs to be replaced.

Calibration Accuracy

Calibration routines for the integrated printer and scanner within ExpressVote ensure the highest accuracy of print and scan verification. After votes are generated using ExpressVote, the card can be inserted into Express Vote so the voter can review the ballot summary. Or, the card can be inserted into a DS200 to scan and tabulate for verification.

Calibrating the Scanner at the Poll Site

Election officials with administrator-level permissions can calibrate the scanner at the polling place. Cards are scanned to check for bar codes. Cards may be blank, or the activation cards can be pre-printed with an activation bar code. A scanner performs the following functions:

- Identifies the card.
- Verifies the card.
- Images the card.

Because some cards do not provide preprinted alignment marks, the scanner detects the area outside the borders of the card as a black background to sense card alignment within the ExpressVote unit.

To Calibrate a Scanner

The buttons turn yellow as you tap them and turn blank when the processing has stopped.

Important: Do not insert a card into the unit until the message appears on the touch screen.

1. On the ExpressVote **System Maintenance Menu**, tap **Scanner Calibration**.

Note: The Card State field shows Empty if a card is *not* in the unit. It shows Home Print Position if a card is in the unit.

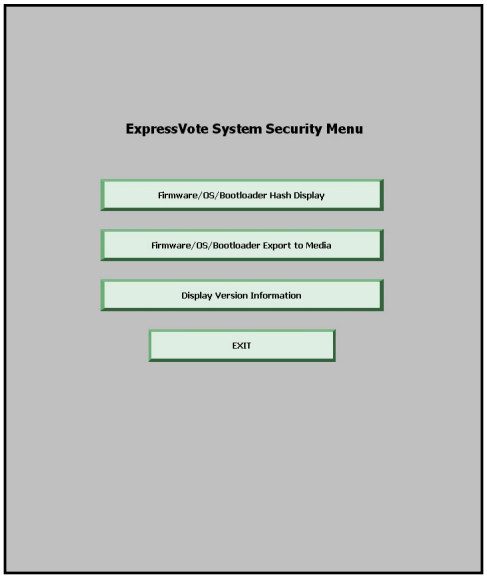
2. On the **Scanner Calibration Utility** screen, tap **Step 1. Double Sheet Calibration - 0 Cards**.
3. Do one of the following:
   - If a card is in the unit, the **Calibration Status** field shows a red **Error** bar and the card is ejected from the front of the unit. Tap **Exit** to return to the ExpressVote **System Maintenance Menu** and start with step 1.
   - If a card is not in the unit, the **Calibration Status** field shows a green **Success bar**. Go to step 4 in this process.

4. When **Step 1. Double Sheet Calibration - 0 Cards** is completed successfully, tap **Step 2. Double Sheet Calibration - 1 Card**.
   - If a card is not inserted in the machine, the unit will prompt you to insert a card until it stops, and then tap **OK** to continue.
5. When prompted, remove the blank card and tap **OK**.
6. When **Step 2. Double Sheet Calibration - 1 Card** is completed successfully, tap **Step 3. Double Sheet Calibration - 2 Cards**.
   - If no cards are inserted the unit will error out, if only 1 card is inserted the unit will calibrate to it but the setting will be incorrect as only 1 card was used
7. When **Step 3** is completed successfully, tap **Step 4. Motion Scanning Calibration**. When prompted, insert a blank card and tap **OK**.
8. Upon completion of the test, when prompted, remove the blank card and tap **OK**.
9. Press **Exit** to return to the ExpressVote **System Maintenance Menu**.

Security

On the **System Maintenance** > **Security** screen, you can do the following:

- Display firmware, OS, and bootloader hash information.
- Export firmware, operating system, and bootloader to a USB media device.
- View software version information.



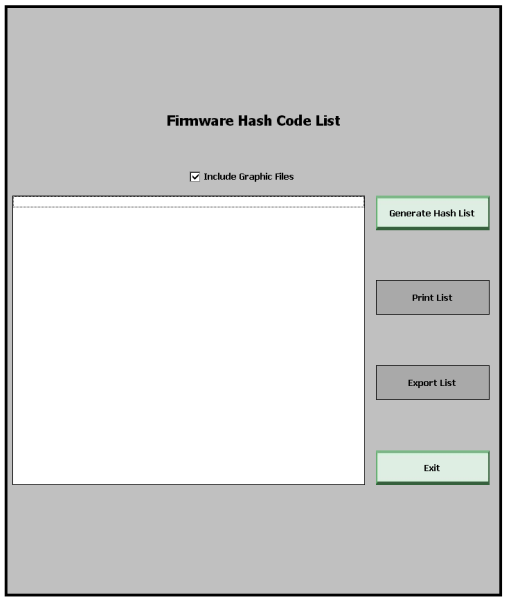
Firmware/OS/Bootloader Hash Display

Allows you to view, print, or export the hash list for the ExpressVote.

1. From the **ExpressVote System Security Menu**, tap **Firmware/OS/Bootloader Hash Display**.
2. After the **Firmware Hash Code List** screen appears, tap **Generate Hash List**. Depending on the size of the election, this step could take some time.

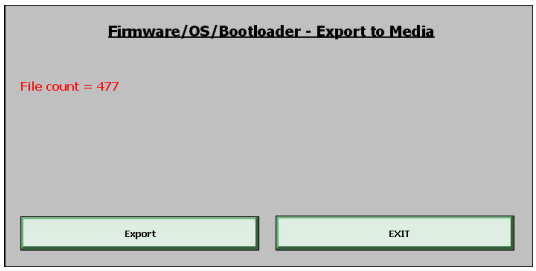
Note: Select **Include Graphic Files** to incorporate the graphic file listing in the hash list.

3. Once the hash list has been generated, tap **Print List** to print the hash list.
4. You can also export the hash list by tapping **Export List**.
5. Tap **Exit** to exit the screen.



Firmware/OS/Bootloader - Export to Media

Aids in the firmware validation process by exporting key firmware files to a USB media device.



Note: When the ExpressVote unit is first powered on, it does not have an operating system running. A program called a boot loader starts the sequence of loading up the operating system.

The following table describes the screen options.

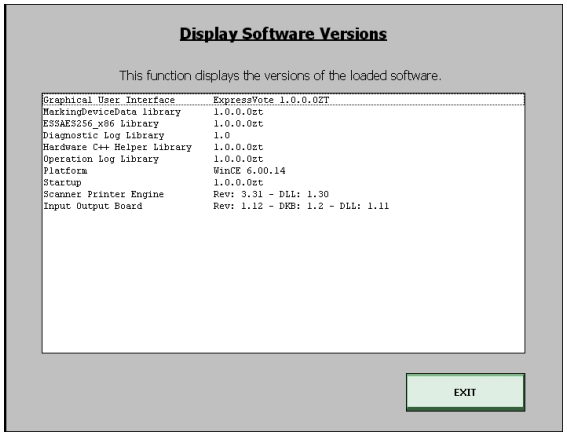
Firmware/OS/Bootloader - Export to Media

Option	Description
Export	Exports the key firmware files to a USB media device so they can be hashed and validated against certified versions.
EXIT	Returns to the ExpressVote System Security Menu screen. Always available by default.

Tap **Exit** to exit the export to media function and return to the ExpressVote System Security Menu screen.

Display Software Versions

ES&S Field Services technicians and election officials can view the information on the Display Software Versions screen to determine that the ExpressVote unit has a special version of a software sub-component.



To view software version information on the **Display Software Versions** screen:

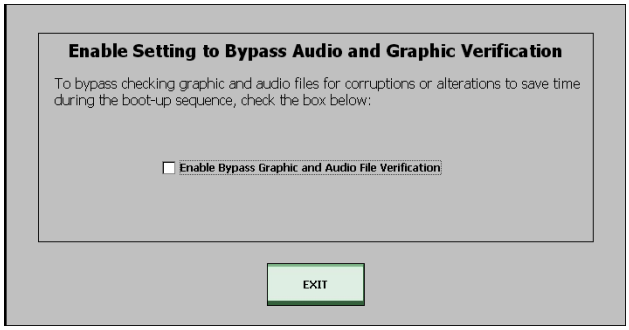
1. On the ExpressVote **System Security Menu**, tap **Display Version Information**.
2. Tap **EXIT** when you are finished viewing the information.

For information about viewing the software version information from the ExpressVote **Main Menu** screen, see Viewing Software Version Information in the *ExpressVote Operator's Guide*.

Cancel A/V File Check

On the Enable Setting for Bypass Option screen, you can tap an option which speeds the ExpressVote startup process. If you tap the check box, ExpressVote does not look at graphics and audio files for corruptions and/or alterations during startup. To turn on this feature:

- Tap the **Enable for Bypass Graphic and Audio Option** check box.



The following table describes the screen options.

TABLE 4. Enable Bypass Graphic and Audio File Verification

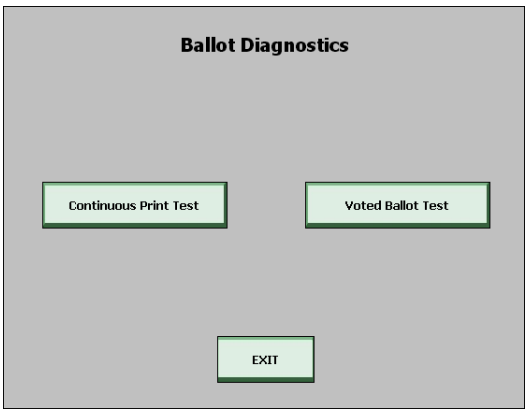
Option	Description
Enable for Graphic Audio Bypass Option	Turns on the feature which bypasses the system check for corruptions and alterations to graphics and audio file during system startup.
EXIT	Returns to the System Maintenance Menu screen. Always available by default.

Ballot Diagnostics

Only ES&S ExpressVote certified technicians should perform diagnostic tests.

Use the Ballot Diagnostics screen to testcard marking and printing. The following functions are accessible on the Ballot Diagnostics Menu screen:

- Continuous Print Test
- Voted Ballot Test



Testing card marking in conjunction with system Logic and Accuracy (L&A) testing procedures verify that system election programming correctly matches card formats. Ballot tabulators and card marking devices notify election officials when scanned test cards do not match installed card programming. Use blank cards to calibrate the card marking device and test card marking.

System accuracy is verified by performing a test print on a blank card from each defined ballot style to verify all positions are correctly selectable and then using those marked cards to perform logic and accuracy testing on an DS200 or DS850.

The following table describes the options available on the Ballot Diagnostics screen.

TABLE 5. Ballot Diagnostics Screen

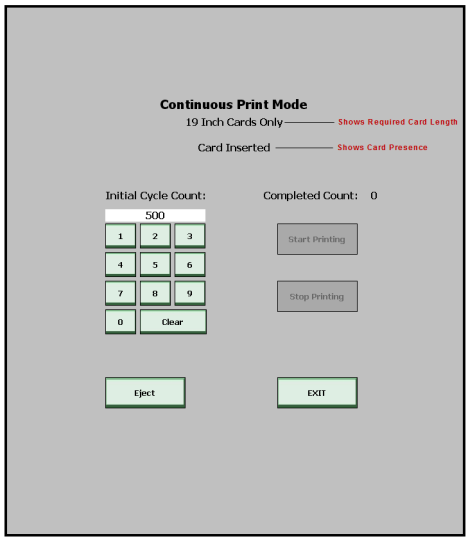
Option	Description
Voted Ballot Test	Sets the Enable Mark Voted Ballot Text check box. For EAC certification purposes, this function is used for the 1.5M test. In the field, it can be used for L&A testing.
Continuous Print Test	Exercises all major ExpressVote functions during hardware testing; and, run for long time periods while confined in a chamber, away from human contact.
EXIT	Returns to the System Maintenance Menu screen. Always available by default.

Continuous Print Test

The Continuous Print runs the ExpressVote unit unattended for long periods of time to verify its ability to operate under various conditions. For example, during radiated electromagnetic field tests, technicians operate the unit in a protected environment (enclosed chamber or room), which is protected from external interference sources to take measurements.

To perform the Continuous Print test

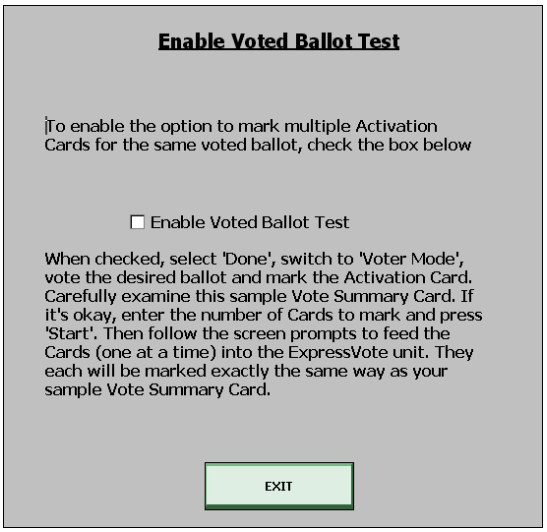
1. On the **System Maintenance Menu** screen, tap **Ballot Diagnostics**, and then tap **Continuous Print Ballot Test**.
2. To set the number of cycles for the test, tap **Clear** to remove the default of 500, and then type the number in the **Initial Cycle Count** field.
3. Insert 19 in card and press **Start Print**.
4. Tap **Stop Print** to end the printing cycle before the specified number of cycles.
5. Do one of the following:
   - Tap **Eject** to remove the card and perform another Continuous Print test.
   - Tap **EXIT** to eject the card and return to the **Ballot Diagnostics** screen.



Voted Ballot Test

Voted Ballot runs on a stand-alone ExpressVote unit. It detects a Cast Vote Record that already contains a printed summary of voter selections.

To run the Voted Ballot test



1. On the **System Maintenance Menu** screen, tap **Ballot Diagnostics**, and then tap **Voted Ballot Test**.
2. On the **Enable Voted Ballot Test** screen, tap the **Enable Voted Ballot Test** check box, tap **EXIT**, and set the mode switch to **Voter**. (The enabled setting is not saved if you do not tap **EXIT** before switching to **Voter** mode.)
3. On the **Voted Ballot Test** screen, do one of the following:
   - Tap **Continue** to proceed with the Voted Ballot test. Go to step 4.
   - Tap **Exit Testing** to go to **Voter mode**.
4. Enter the security code and tap **Accept**. (Entering an invalid security code results in a warning message.)
5. Insert the card into the front slot.
6. Complete the voting process and continue to step 7. For voting procedures, see **Processing in the Voting Process** in the *ExpressVote Operator's Guide*.
7. Once you have completed the voting process, remove and inspect the card to ensure that it is representative of the cards to be used in the test.
8. Depending upon the outcome of the card, do one of the following:
   - Tap **Continue** to finish the printing process if the marked card is a good example of all cards to be marked and go to step 9.
   - Tap **Try Again** to prepare a new sample card.
   - Tap **Exit Testing** to return to the **Voter** mode.
9. Enter the initial card count.
10. Touch **Start Test**.
11. Press **Exit** to return to Voting Mode.

- Tap **Reset**, enter the initial card quantity, and then tap **Start Marking**..

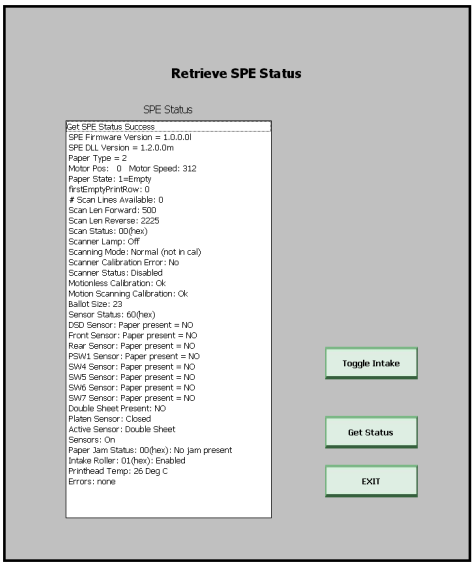
TABLE 6. Printing Process Options

To	Do this action
Suspend the printing process	• Press Pause to suspend the printing Process indefinitely. • Tap Resume Marking to restart the printing process from the last printed card.
Stop the printing process and start over	• Press Stop Marking. • Press Reset to retest the same ballot. • Re-enter the initial card count and tap Start Marking.

12. Remove the card when the printing process ends.
13. When the test is finished, do one of the following:
    - Tap **Reset** to test the same ballot again.
    - Tap **Eject**. Go to step 12.
    - Tap **Vote New Test Ballot**.
14. Tap **Exit Testing** and return to the voting process.Remove the card from the front slot and either insert it into the DS200 or ballot box.

SPE Status

The SPE Status screen displays status information about the Scanner Printer Engine (SPE) board and allows for the transport operations of the card in the paper-path. This screen provides a quick view of the SPE messages apart from the other System Log messages.



The following table describes the options available on the SPE Status screen.

TABLE 7. Retrieve SPE Status Screen

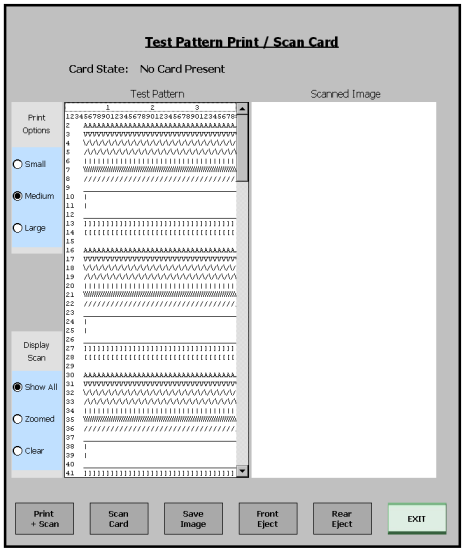
Option	Description
SPE Status	Shows the current status of the Scanner/Printer Engine board. Update the SPE Status pane by selecting the Get Status button. Approximately 32 current status settings of the Scanner Printer Engine are displayed in the SPE Status pane. The settings also appear within the Systems Log.

TABLE 7. Retrieve SPE Status Screen *(continued)*

Option	Description
Toggle Intake	Enables and disables the intake roller for the ExpressVote. Typically, only an ES&S ExpressVote certified technician would use this option, which is used for engineering evaluation of photosensors and other components. It switches the paper-path's intake-tray between being enabled and disabled. If the intake-tray is enabled, a card can be inserted within the paper-path. If it is disabled, a card cannot be inserted in the paper-path. If the intake tray is enabled, the inserted card is pulled into the intake tray.
Get Status	Pulls all available status flag information from the SPE board.
Exit	Returns to the System Maintenance Menu screen. Always available by default.

Test Pattern / Scan Card

On the Test Pattern/Scan Card screen, you can test and diagnose the capabilities of the ExpressVote printer and scanner by using blank and pre-printed cards.



The following table describes the options available on the Test Pattern/Scan card screen.

TABLE 8. Test Pattern / Scan Card Screen

Option	Description
Print Options	Sets the specified size and appearance of the test pattern on the card.
Small	Prints test pattern in small characters.
Medium	Prints test pattern in medium characters.
Large	Prints test pattern in large characters.
Display Scan	Sets the options that determine what is shown in the Scan Image pane.
Show All	Displays all of the scanned image in the Scan Image pane.
Zoomed	Magnifies the image within the Scanned Image pane. Scroll bars appear and allow you to scroll onto the desired portion of the zoomed image.

TABLE 8. Test Pattern / Scan Card Screen *(continued)*

Option	Description
Clear	Removes the image from the Scanned Image pane.
Test Pattern Pane	If you insert an election definition media device which contains a TestPat.txt file, the contents of the file appears in this pane; otherwise, a basic pattern of 219 numbered lines appear within this pane.
Scanned Image Pane	Shows the scanned card image. Appears blank by default.
Print + Scan	Prints the test pattern on the marked card and rescans an image of the card. Appears dimmed by default.
Scan Card	Captures and generates an image of the card in the Scanned Image pane. Appears dimmed by default.
Save Image	Saves a unique, time-stamped bitmap file of the inserted card's scanned image to the inserted election definition media device. The test pattern image does *not* change. Appears dimmed by default.
Front Eject	Forces the printed card from the front of the unit.
Rear Eject	Forces the printed card from the rear of the unit.
Exit	Returns to the System Maintenance Menu screen. Always available by default.

To test a blank card

1. Insert a blank card and the **Print + Scan** button become available.
2. Tap a test pattern attribute in the **Print Options** and **Display Scan** areas, and then press **Print + Scan**.

Note: Two pop-up messages appear in the following sequence: Printing in Progress . . . Please be patient. This may take some time., and Scan in Progress . . . Please be patient. This may take some time. Longer scans require more time.

3. The displayed test pattern is then printed on the card, which is then scanned and displayed within the **Scanned Image** pane. The image in the **Test Pattern** pane should match the image in the **Scanned Image** pane.
4. If the image in the **Scanned Image** pane does not match the image in the **Test Pattern** pane, tap **Eject** and compare the printed card to the **Test Pattern** image.

   To determine the cause of the image failure:

   - If the printed card image and the **Test Pattern** image exactly match (no lines are missing, blurred, distorted), then the unit's scanner is going bad and should be replaced.
   - If the printed card image and the **Test Pattern** image do not exactly match, then the unit's printer is going bad and should be replaced.
5. To save an image, tap **Save Image** to save a unique, time-stamped bitmap file of the inserted card's scanned image to the inserted election definition media device (e.g., SImg_060512021103.bmp).

To test a pre-printed card

1. Insert a pre-printed card and the **Scan Card** button becomes available.
2. Tap **Scan Card** to capture and generate an image of the card in the **Scanned Image** pane. The image in the **Test Pattern** pane should match the image in the **Scanned Image** pane.
3. If the image in the **Scanned Image** pane does not match the image in the **Test Pattern** pane, tap **Eject** and compare the printed card to the **Test Pattern** image.

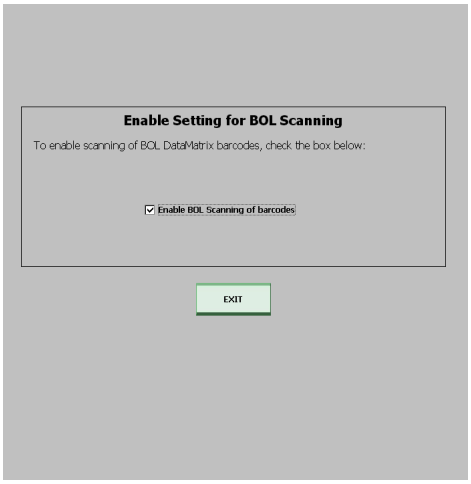
   To determine the cause of the image failure:

   - If the printed card image and the **Test Pattern** image exactly match (no lines are missing, blurred, distorted), then the unit's scanner is going bad and should be replaced.
   - If the printed card image and the **Test Pattern** image do not exactly match, then the unit's printer is going bad and should be replaced.
4. Tap **Save Image** to save a unique, time-stamped bitmap file of the inserted card's scanned image to the inserted election definition media device. The Test Pattern image does *not* change.

BOL Scanning

The BOL Scanning screen allows the administrator to enable or disable the scanning of Ballot Online (BOL) QR codes.

To enable BOL scanning, select the **Enable BOL Scanning of barcodes** check box.



Chapter 4: Hardware Replacement

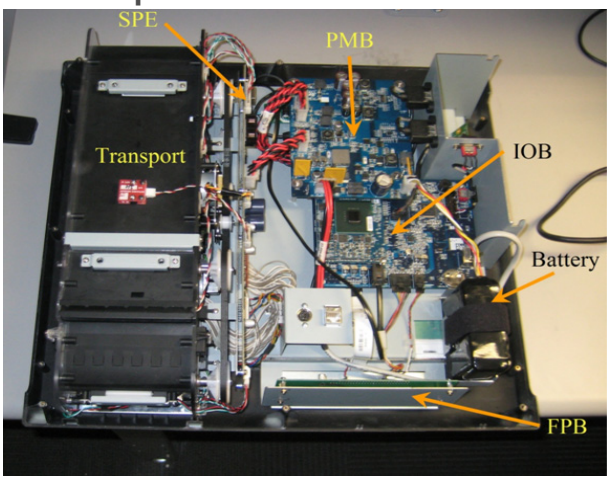
When ES&S makes improvements to the hardware, ES&S makes modifications available.

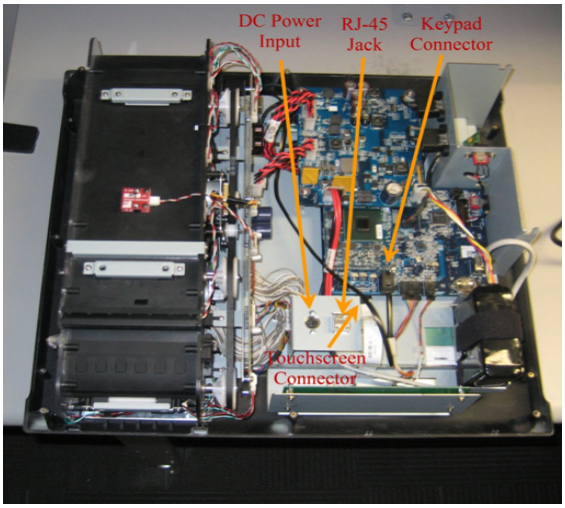
Performing Updates

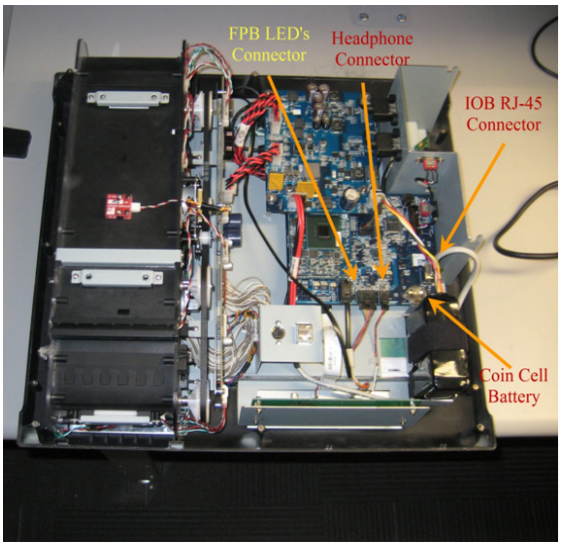
Only authorized ES&S personnel should perform the following hardware-related tasks:

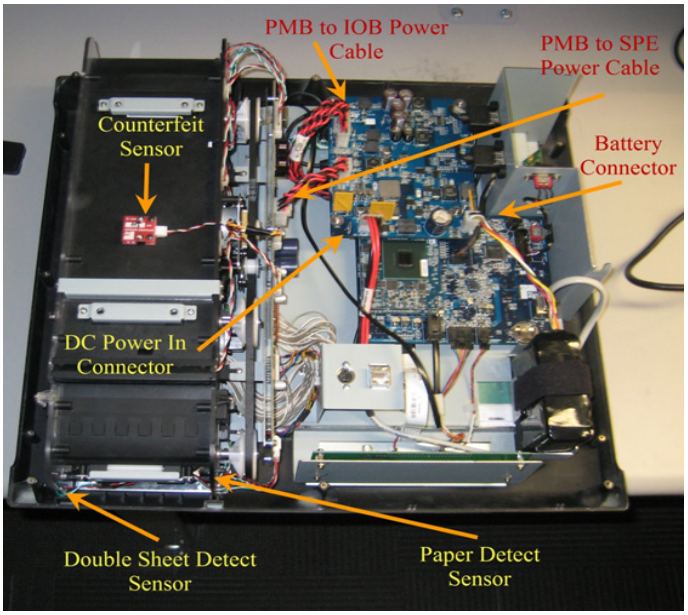
- Install hardware updates - ES&S will determine whether ExpressVote may be upgraded by a field technician on-site, or if the unit must be returned to ES&S.
- Make board-level (e.g., circuit board) repairs.

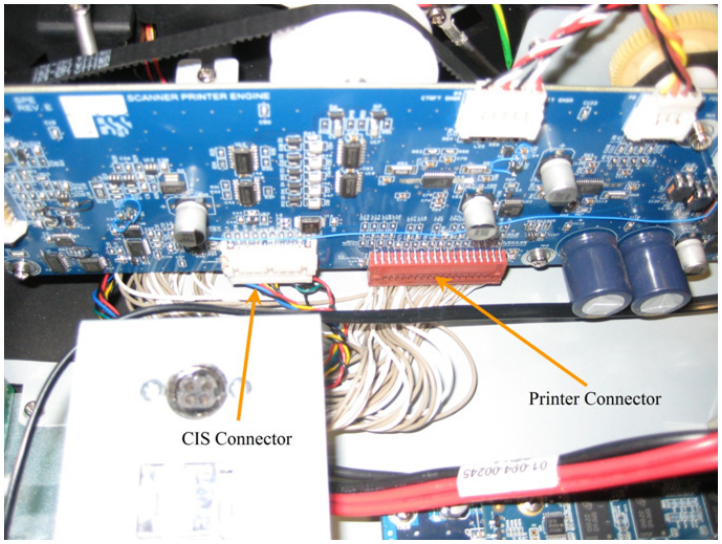
ExpressVote Internal Components

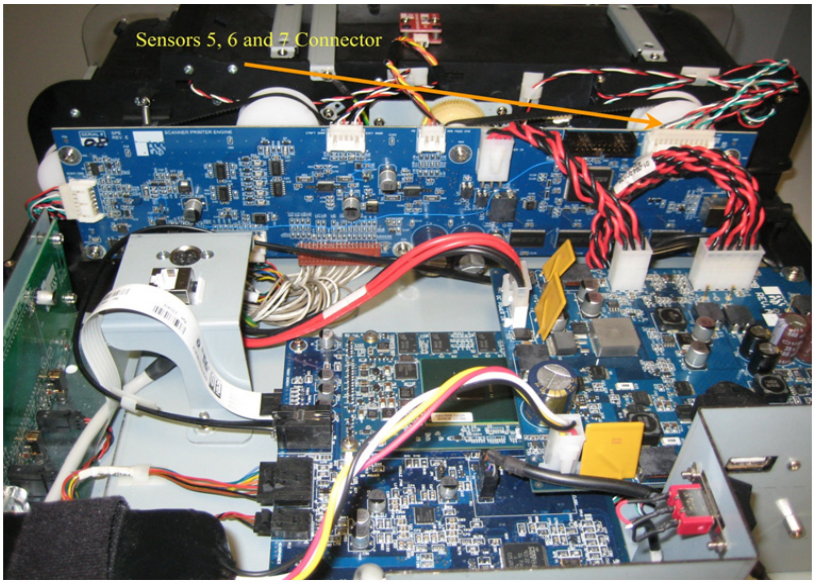


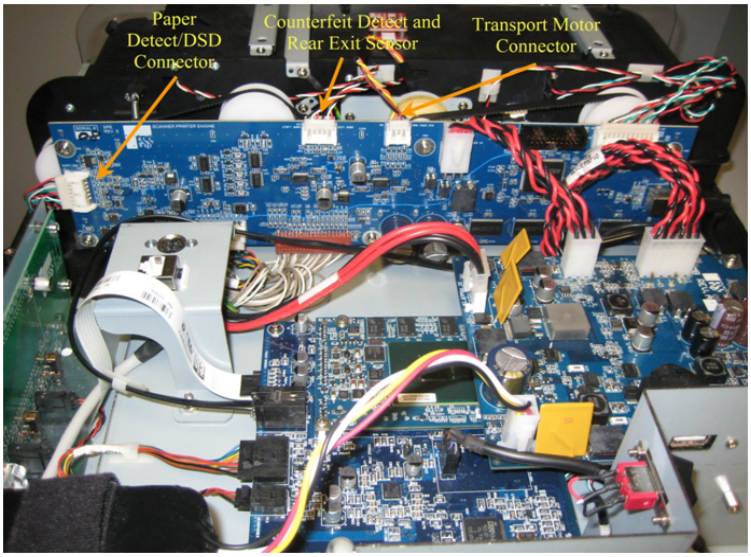



FPB LED's Connector
Headphone Connector
IOB RJ-45 Connector
Coin Cell Battery


PMB to IOB Power Cable
PMB to SPE Power Cable
Counterfeit Sensor
Battery Connector
DC Power In Connector
Double Sheet Detect Sensor
Paper Detect Sensor


CIS Connector
Printer Connector


Sensors 5, 6 and 7 Connector


Paper
Detect/DSD
Connector
Counterfeit Detect and
Rear Exit Sensor
Transport Motor
Connector

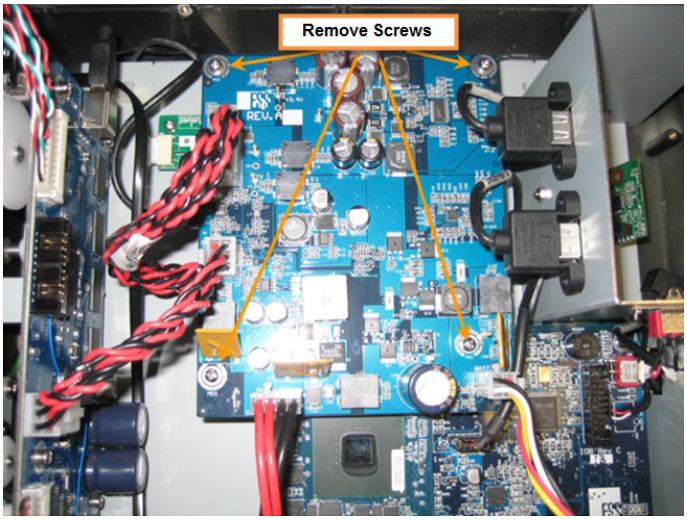
Remove Power Management Board (PMB)

Required Tools: #2 Phillips screwdriver, static mat w/ wrist strap, Torx 10 (w/security center pin) to remove back cover.

Required Staff: ES&S Certified Technician

Estimated time to complete: 20 min

1. Disconnect all cables from the PMB
2. Remove the screws indicated
3. Replace as necessary, being sure to re-connect all cables and secure all screws.



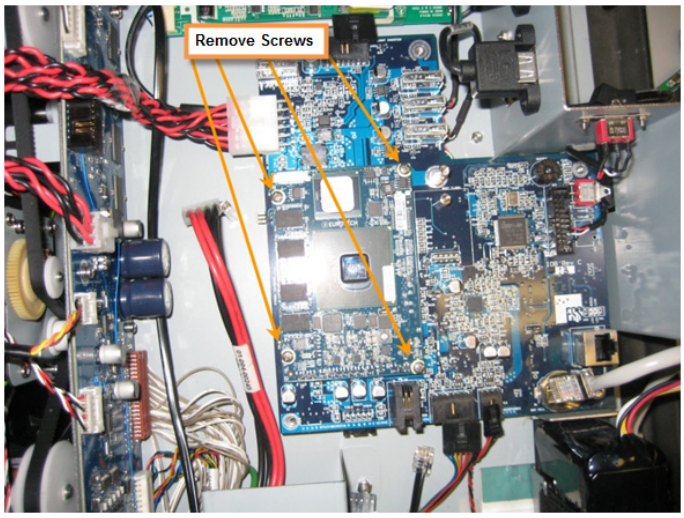
Remove Catalyst Module

Required Tools: #2 Phillips screwdriver, static mat w/ wrist strap

Required Staff: ES&S Certified Technician

Estimated time to complete: 20 min

1. First remove the PMB. See **Remove Power Management Board (PMB)** for instructions.
2. Remove the Catalyst by removing the screws indicated
3. Replace as necessary, being sure to replace and securing all screws.



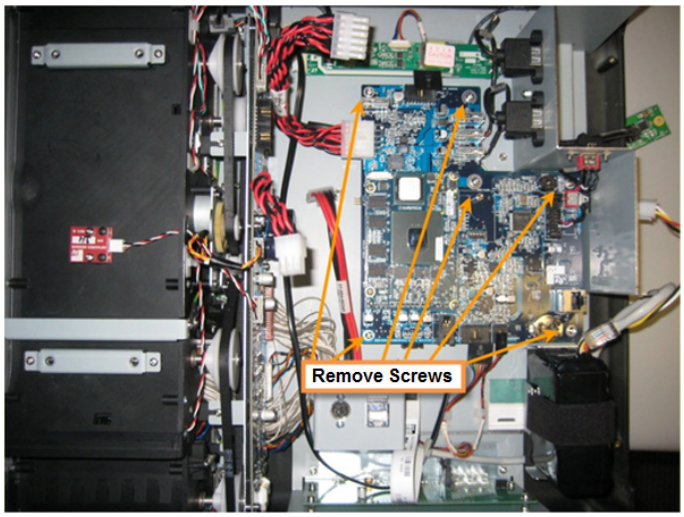
Input Output Board (IOB)

Required Tools: #2 Phillips screwdriver, static mat w/ wrist strap

Required Staff: ES&S Certified Technician

Estimated time to complete: 20 min

1. Disconnect all cables from the IOB
2. Remove the screws indicated
3. Replace as necessary, being sure to re-connect all cables and secure all screws.



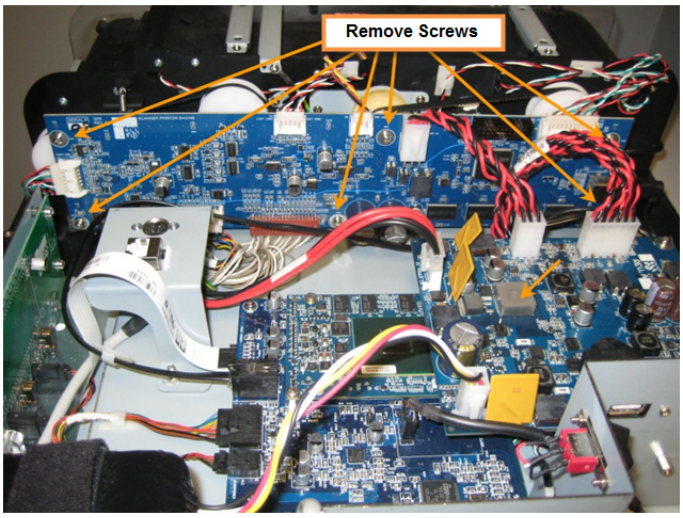
Scanner Printer Engine (SPE)

Required Tools: #2 Phillips screwdriver, static mat w/ wrist strap

Required Staff: ES&S Certified Technician

Estimated time to complete: 20 min

1. Disconnect all cables from the SPE
2. Remove the screws indicated
3. Replace as necessary, being sure to re-connect all cables and secure all screws.



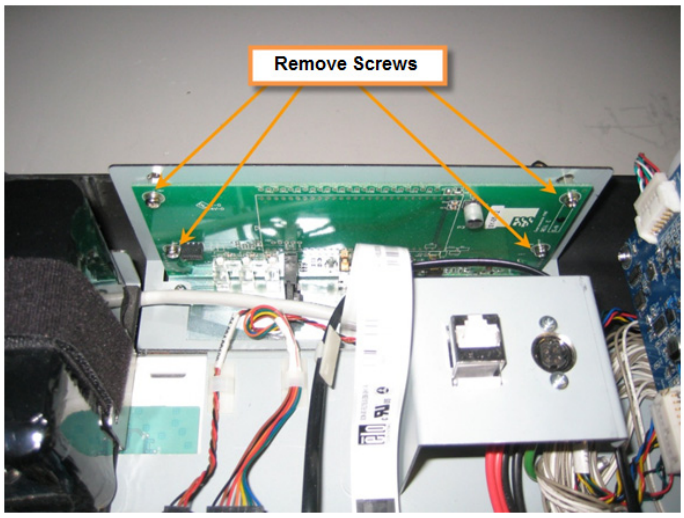
Front Panel Board (FPB)

Required Tools: #2 Phillips screwdriver, #2 Phillips off set screwdriver, static mat w/ wrist strap

Required Staff: ES&S Certified Technician

Estimated time to complete: 20 min

1. Disconnect all cables from the FPB
2. Remove the screws indicated (this may require an offset screwdriver)
3. Replace as necessary, being sure to re-connect all cables and secure all screws.



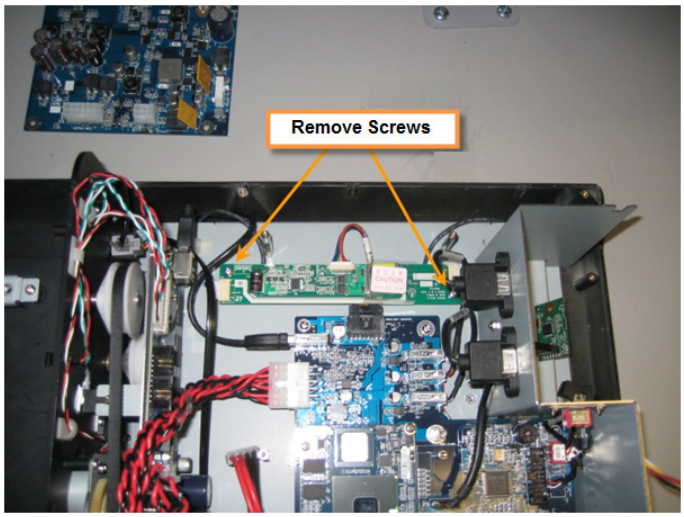
Backlight Inverter

Required Tools: #2 Phillips screwdriver, static mat w/ wrist strap

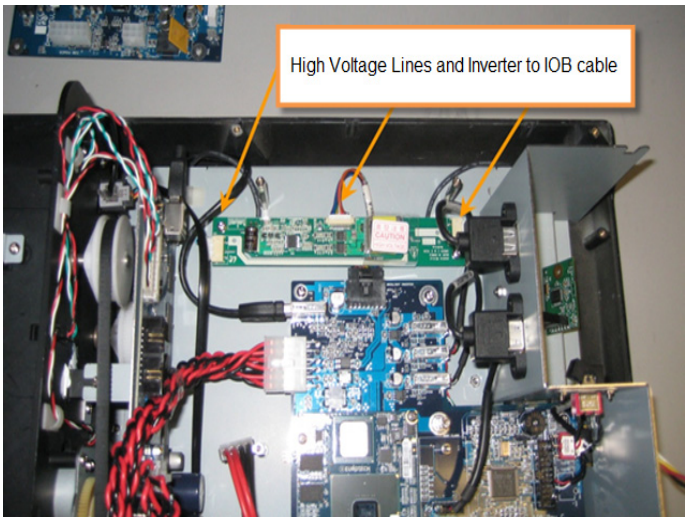
Required Staff: ES&S Certified Technician

Estimated time to complete: 20 min

1. Disconnect all cables from the FPB
2. Remove the screws indicated



3. Remove the High Voltage lines and the Inverter to IOB cable and replace the inverter as necessary, being sure to reconnect all cables and secure all screws.



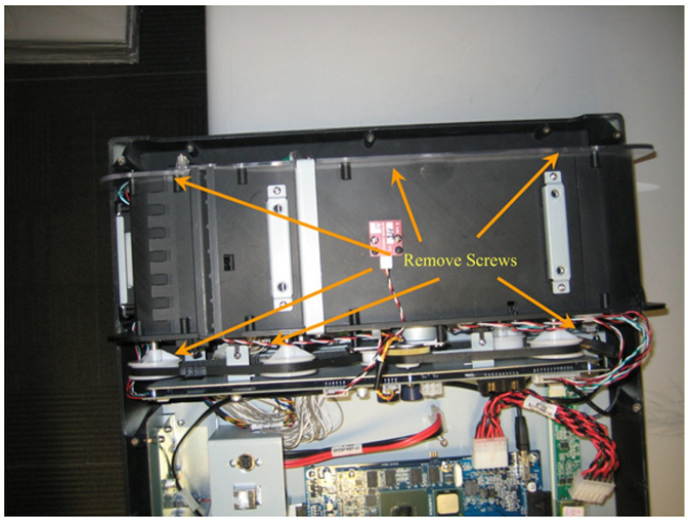
Touch Screen

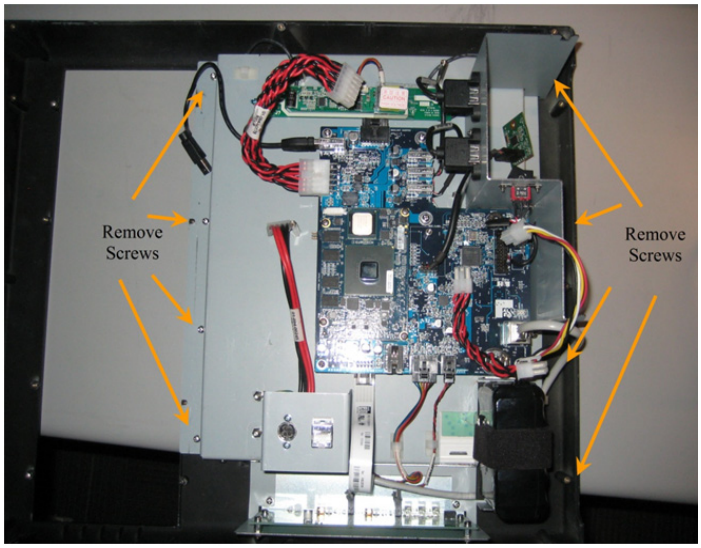
Required Tools: #2 Phillips screwdriver, static mat w/ wrist strap

Required Staff: ES&S Certified Technician

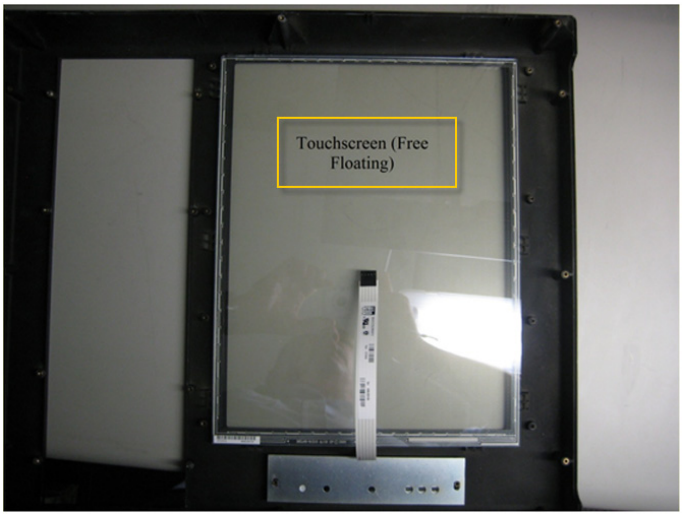
Estimated time to complete: 30 min

1. Remove the Transport
2. Remove the Main Chassis Screws





3. Disconnect the touchscreen cable and lift the main chassis out of the unit. The touchscreen can now be removed. The touchscreen is free floating and can simply be removed and replaced.



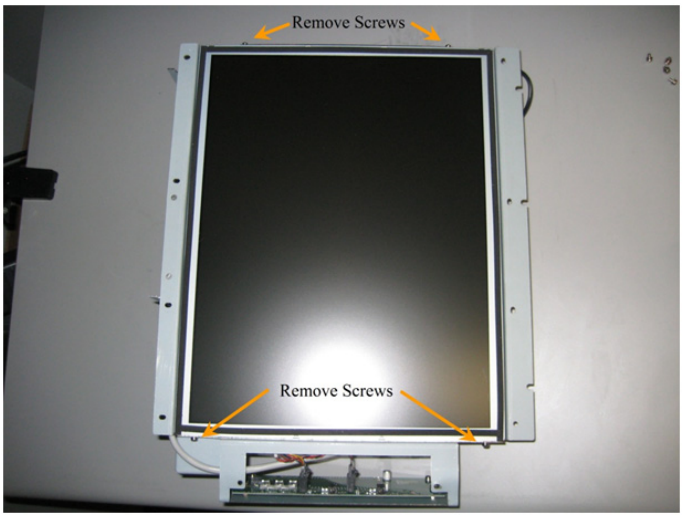
LCD Panel

Required Tools: #2 Phillips screwdriver, static mat w/ wrist strap

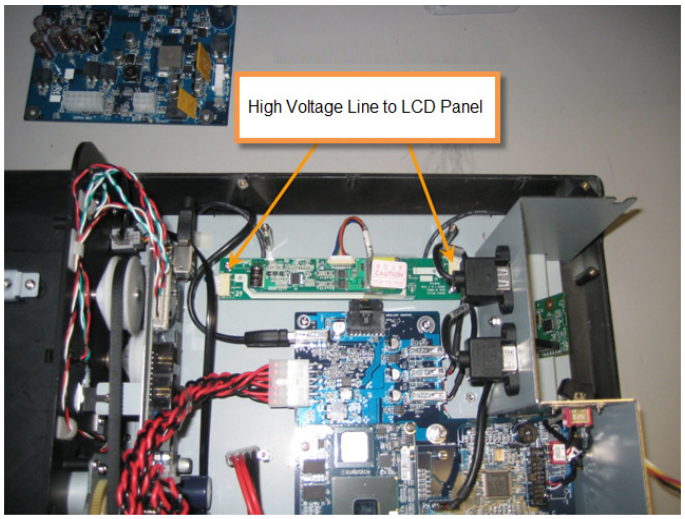
Required Staff: ES&S Certified Technician

Estimated time to complete: 30 min

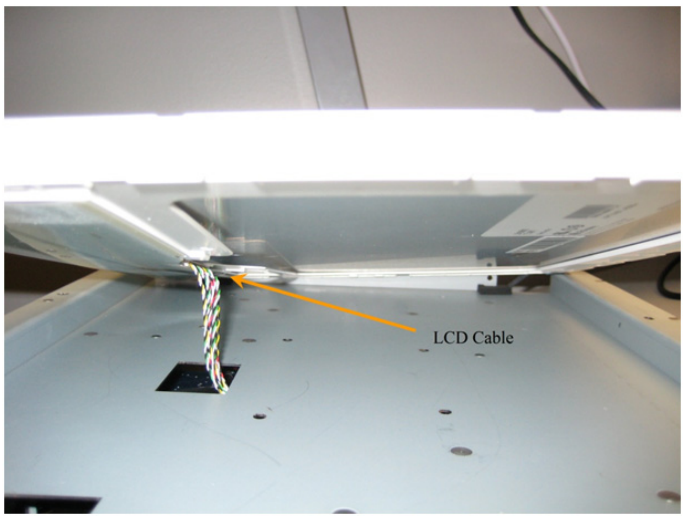
1. Remove main chassis and touchscreen as shown in **Touch Screen**. Turn the Main Chassis assembly over and remove the screws indicated.



2. Be sure to disconnect the High Voltage cables first



3. Then carefully lift the LCD panel and disconnect the LCD cable
4. Reverse these steps to install the new LCD panel being sure to re-connect all cables and secure all screws.



Printer/Cable Assembly

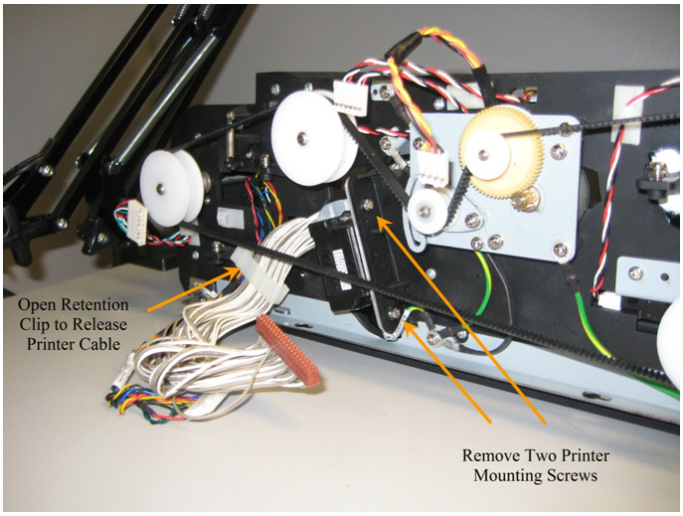
Required Tools: #2 Phillips screwdriver, static mat w/ wrist strap

Required Staff: ES&S Certified Technician

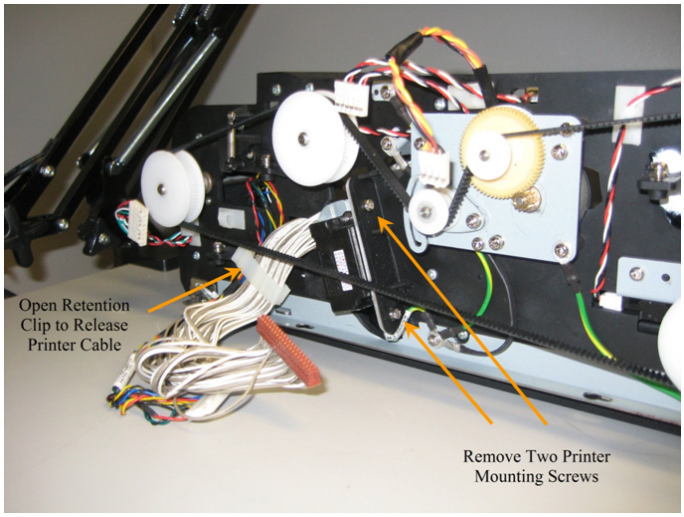
Estimated time to complete: 30 min

1. Remove the Transport from the Express Vote (disconnect all cables first) See **Transport**
2. Remove the SPE (disconnect all cables first) from the Transport See **Scanner Printer Engine (SPE)**.

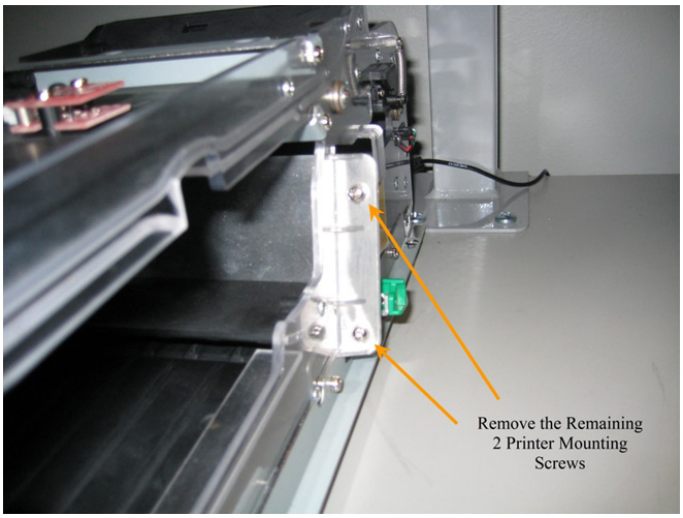
3. Open the Printer cable Retention Clip and Remove two mounting screws



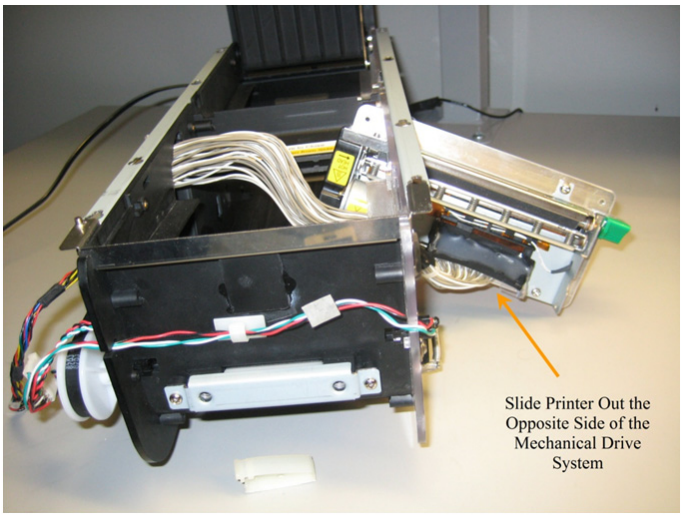
4. Remove the Printer Ground Wire



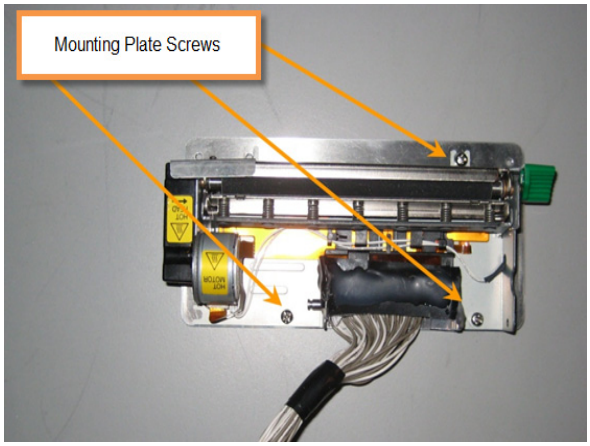
5. Remove the remaining Printer mounting screws



6. Slide the Printer out of the transport

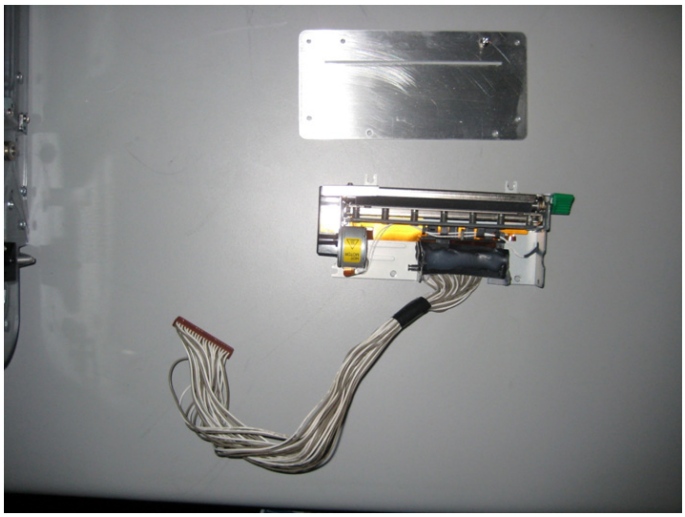


7. Remove the remaining Printer mounting screws



8. Remove the Printer from the Mounting Plate

9. To install the new Printer/ Cable Assembly reverse the above steps being sure to reconnect all cables and secure all screws.



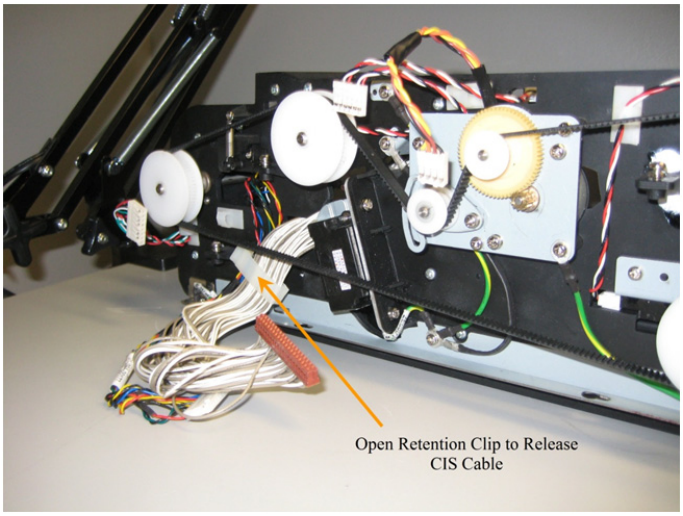
CIS/Cable Assembly

Required Tools: #2 Phillips screwdriver, static mat w/ wrist strap

Required Staff: ES&S Certified Technician

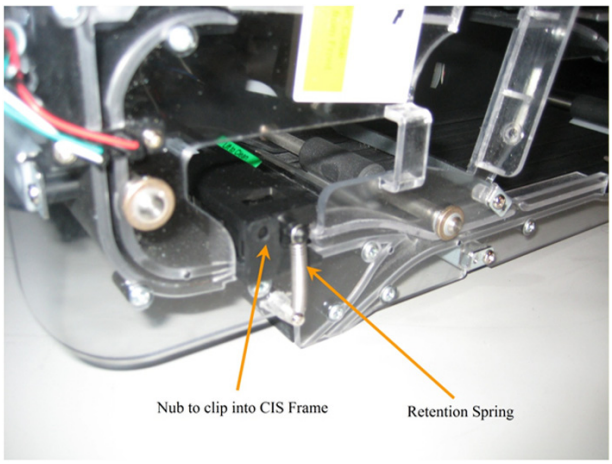
Estimated time to complete: 30 min

1. Release the CIS Cable from its Retention Clip

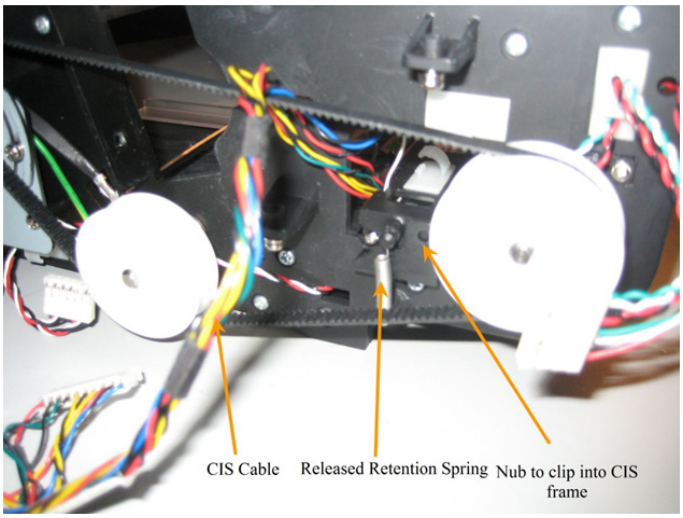


2. Locate the CIS Retention Springs and snap fit nubs.

Note: There is spring and nub on each side of the transport



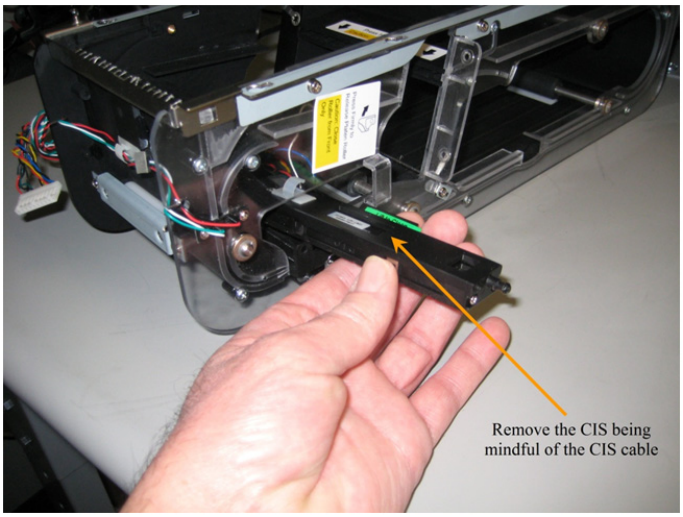
3. Release the CIS Spring and slide the CIS nub out of its holder).



Note: There is spring and nub on each side of the transport

4. Carefully slide the CIS out of the Transport taking care not to damage the CIS cable.

5. To replace the CIS/Cable Assembly reverse these steps, taking care to secure all cables and screws.



Transport

Required Tools: #2 Phillips screwdriver, static mat w/ wrist strap, Torx 10 (w/security center pin)

Required Staff: ES&S Certified Technician

Estimated time to complete: 30 min

1. Remove the Back Cover. ((7) Phillip screws and the (6) T10 TORX Security Screws from the perimeter locations)
2. Remove the two Top and two Bottom screws on the Transport Assembly.
3. Once the three captive screws have been removed on each side, disconnect the Sensor, Printer, and Drive Motor Cables.

Battery Replacement

Required Tools: #2 Phillips screwdriver, static mat w/ wrist strap, Torx 10 (w/security center pin)

Required Staff: ES&S Certified Technician

Estimated time to complete: 30 min

1. Insure that the unit is powered down.
2. Remove the Back Cover. ((7) Phillip screws and the (6) T10 TORX Security Screws from the perimeter locations)
3. Locate the Main Battery on the lower right on the unit.
4. Undo the Velcro strap.
5. Disconnect the old Main Battery from the Main Board.
6. Re-connect the new Main Battery to the Main Board.
7. Strap the new Battery into the Battery Compartment.
8. Reinstall the Back Cover.

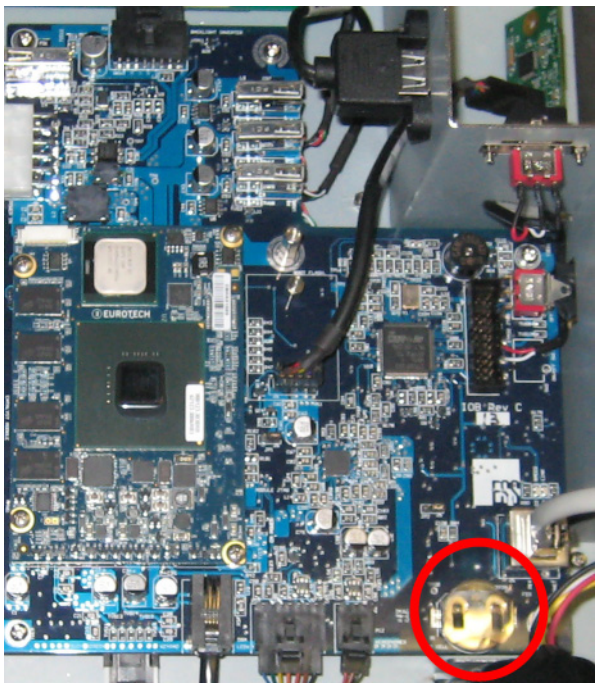
Carrier Board Battery

Required Tools: #2 Phillips screwdriver, static mat w/ wrist strap, Torx 10 (w/security center pin)

Required Staff: ES&S Certified Technician

Estimated time to complete: 30 min

1. Remove the Back Cover. ((7) Phillip screws and the (6) T10 TORX Security Screws from the perimeter locations)
2. Locate the CMOS Battery on the lower right on the Main Board.
3. Disconnect the CMOS Battery from the Main Board by sliding the CMOS Battery out of the Battery socket towards the middle of the Main Board.
4. Reinstall the new CMOS Battery by sliding it into the Main Board Battery Socket. Reinstall the Back Cover.



CBA Firmware Update

Warning: This procedure must be performed ONLY by an ES&S certified technician.

The following section explains how to load firmware to either the Scanner Printer Engine (SPE) board or the Input/Output (IO) board in an ExpressVote unit.

Required Tools: #2 Phillips screwdriver, static mat w/ wrist strap, Torx 10 (w/security center pin) to remove back cover.

Required Staff: ES&S Certified Technician

Estimated time to complete: 1 hour

Items Required

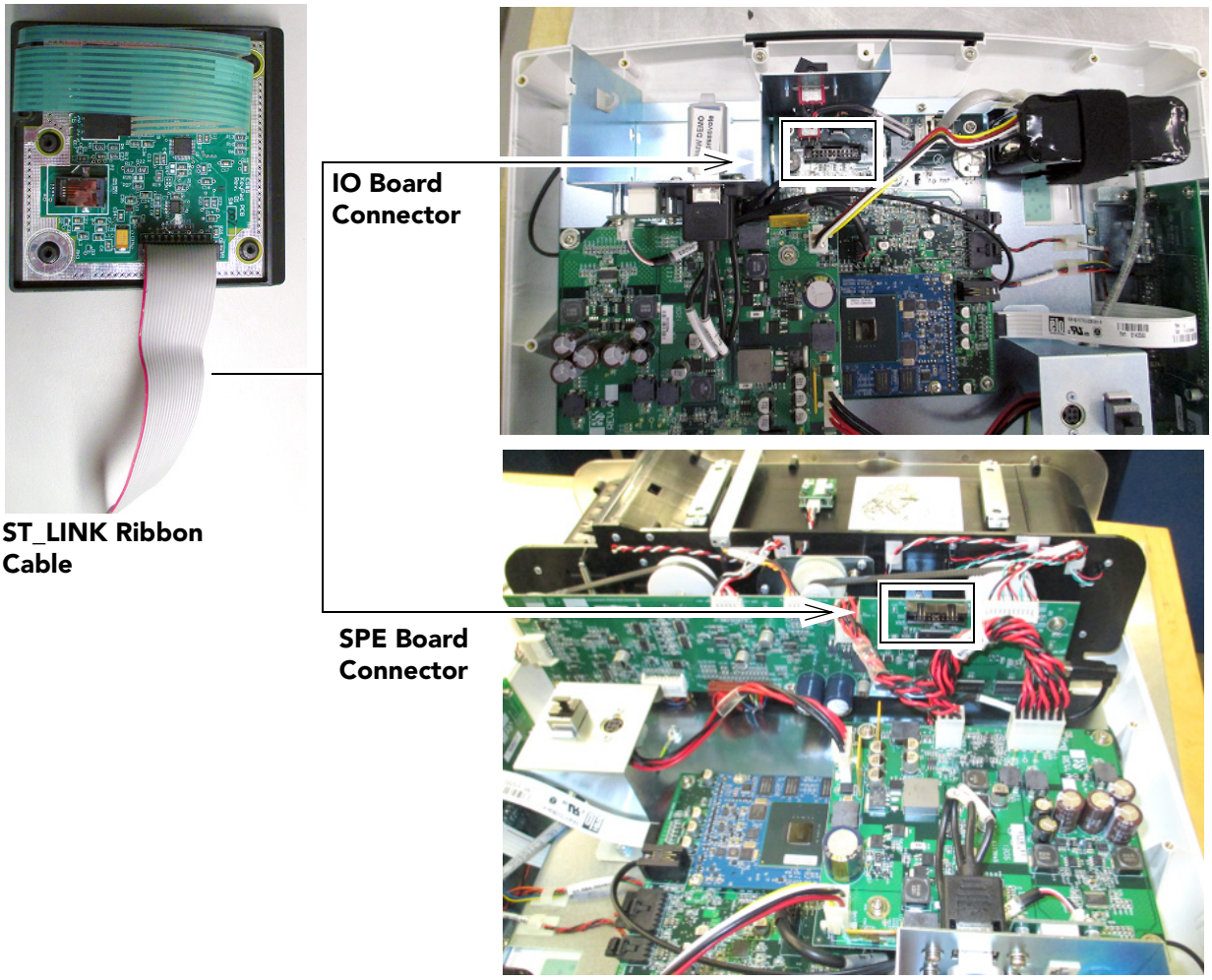
- PC running Windows® XP, Vista, or W7 operating system
- COTS Software product, installed on the PC:
  ST Visual Programmer from Microelectronics
  Product ID 3.2.0 (or later)
- COTS Hardware product:
  ST-LINK – STM8 & STM32
- Tool to remove cover from ExpressVote
- Copy of firmware file for installation

Procedure

1. Disconnect the power cable from the ExpressVote unit.
2. Disconnect the data cable, if connected.
3. Remove the rear panel of the ExpressVote unit. Be careful not to lose the five screws down inside the unit.
4. Disconnect the battery.
5. Connect the ST_LINK ribbon cable to the mating connector on the board to be programmed.

Caution: Although both the cable and board connectors are keyed, it is still possible to reverse their connection. Ensure that they are connected properly.

Caution: The SPE board connector is difficult to install. Before continuing, be careful to ensure that it is properly connected.



6. Connect the USB cable from the ST-LINK to a USB port on the PC.
7. Connect the power cable to the ExpressVote.
8. Turn on the ExpressVote.
9. On the PC, run the ST Visual Programmer application.
10. From the menu, select **Configure**, then enter the settings as shown in the following chart.

Type	Hardware	Port	Programming Mode	Device
SPE	ST-LINK	USB	SWD	STM32F103xE
IOB				STM32F103xB
DKB			JTAG	STM32F100x4XXB

11. Click **OK** to save the settings.
12. From the menu, select **Erase** > **Active Sectors**.
    The bottom window will display the message: `PROGRAM MEMORY successfully erased and blank checked.`
13. From the menu, select **File** > **Open**.
14. Navigate to the device and folder containing the firmware update and open the correct firmware file.
15. From the menu, select **Program** > **All Tabs**.
    The bottom window will display the message: `PROGRAM MEMORY successfully verified`.
    The delay for this message is approximately 1 minute for the SPE board and 15 seconds for the IO board.
16. Close the ST Visual Programmer application.
17. Disconnect the power cord from the ExpressVote unit.
18. Turn off the power switch.

Note: Do not reverse steps 17 and 18. First disconnect power, then turn off the switch.

19. Disconnect the ST-LINK USB cable from the PC.
20. *Carefully* remove the ST-LINK connector from the board.
21. Reconnect the battery.
22. Replace the rear panel and fasten it down with the 5 screws.
23. Reconnect the power cord, and the data cable if used.

Updating the ExpressVote OS

You can install a new OS into the ExpressVote by copying the OS data onto an Innodisk and then connecting the Innodisk to the ExpressVote.

Follow the steps below to copy the new OS onto an Innodisk:

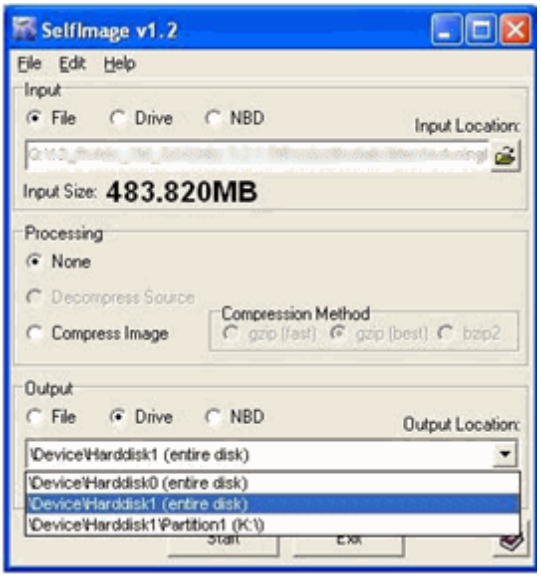
1. Install the SelfImage Utility onto your PC.

Note: SelfImage is a free disk imaging utility that can be downloaded from the Internet. The current version can be obtained from http://majorgeeks.com/SelfImage_d5588.html, or located using an internet search engine. The application works on Windows XP. It does NOT work on Windows 7, but will work within Windows XP Mode on Windows 7.

2. Insert an Innodisk into an Innodisk USB adapter and then plug the adapter into your PC.
   - Sometimes a warning will appear asking "Do you want to scan and fix Local Disk?", Click **Continue without scanning**.
3. Open the **Start** menu.
4. Right click on **Computer**.
5. Click on **Manage**.
6. Navigate in the panel on the left to "Computer Management(Local)->Storage->Disk Management"
7. Right click on the drive letter that corresponds to the Innodisk
8. Click on **Delete Volume…**
9. Click **Yes** on the "Are you sure" dialogue box
10. Close the "Computer Management" window
11. Open the **Start** menu and navigate to **All Programs->SelfImage**. Click on the SelfImage icon to launch the SelfImage application.
12. If on Windows 7, right click and select, **Run as administrator**, and answer **Yes** to allow the program to run
13. Select the **File** radio button in the **Input** grouping and then browse to the location of the OS image you want to copy to the Innodisk.
14. Select the **Drive** radio button in the "Output" grouping and then select **\Device\Harddisk1 (entire disk)** on the "Output Location" drop?down menu.

15. Verify that the input and output sizes are the exact same size. If the output size is different than the input size, select the next disk in the list (i.e. "\Device\Harddisk2(entire disk)").

Warning: Verify that the input and output sizes are the same size. If the output size is much greater than the input size, you are burning the CF card image into your PC's hard drive, which will ruin the drive



16. Press **Start** and then press **Yes** on the warning dialog to start copying the image.
17. When copying is complete, unplug the USB adapter from the computer and then remove the Innodisk from the adapter.
18. Install the Innodisk into the ExpressVote, reassemble, connect power, and turn the unit on. Wait for the ExpressVote to display the WindowsCE desktop.
19. Connect a USB mouse and double-click **My Device**" then the **Windows** folder and then the "RegFlushKey.exe" application. Wait 10 seconds and reboot the machine.
20. If the WindowsCE desktop appears again, repeat step 10. Otherwise, the ExpressVote firmware will have booted up and the unit is ready for use.

Chapter 5: Post-Election Maintenance

See the following topics for instructions on performing maintenance tasks to keep ExpressVote in working order after the election.

Maintenance Cleaning Supplies and Tools

Please refer to Tools Needed for Set Up and Maintenance for the following items that are used in the preventive maintenance of ExpressVote.

Charging the Battery

You must charge the battery between elections to be ready for the next election,

Reference: Refer to Chapter 1: Concept of Operations, Monitoring the Battery Charge Status, for information about monitoring and charging the battery.

Electrical Hazard: Improperly replacing the terminal battery exposes the operator to a risk of explosion. Only qualified ES&S technicians should replace batteries. See Battery Replacement for more information.

Cleaning

ES&S recommends that a trained service technician perform an inspection and maintenance on the following peripheral equipment:

- ExpressVote enclosure
- Touch screen
- ExpressVote table
- ExpressVote voting booth

Preventive maintenance includes regular visual inspections and cleaning and replacement of expendable parts. Inspect cables and connectors to and from the unit and scanner to see if they are worn, pinched, or loose.

The ExpressVote unit and ballot box have locking doors to prevent unauthorized access and modifications. ES&S recommends that you keep the doors locked for security measures.

Clean the Touch Screen

Required Tools: Soft cotton cloth, mild detergent solution

Spray the cloth with the cleaning solution and gently wipe the screen until clean. Then use a dry section of the cloth to dry any remaining cleaning solution from the screen.

Clean the touch screen of the system console with a lint-free cloth and cleaning solution recommended.

Reference: See *Appendix* for more information.

Caution: Do not spray the cleaning solution directly on the screen. Dampen the lint-free cloth and wipe away fingerprints and dust.

Clean the Enclosure

Required Tools: Soft cotton cloth, mild detergent solution

Warning: Before cleaning the enclosure, disconnect the unit from its power source. Do **NOT** use full-strength, harsh detergents, liquid cleaners, aerosols, abrasive pads, scouring powders, or solvents, such as benzene or alcohol. Liquids should never be applied directly to the unit. Use a soft cotton cloth lightly moistened with a mild detergent solution. Ensure that the surface cleaned is fully dry before reconnecting the power.

Clean the ExpressVote table

Required Tools: Soft cotton cloth, mild detergent solution

Warning: Before cleaning the table, if the ExpressVote unit is still attached to the table, disconnect the unit from its power source. Do **NOT** use full-strength, harsh detergents, liquid cleaners, aerosols, abrasive pads, scouring powders, or solvents, such as benzene or alcohol. Liquids should never be applied directly to the unit. Use a soft cotton cloth lightly moistened with a mild detergent solution. Ensure that the surface cleaned is fully dry before reconnecting the power.

Clean the ExpressVote voting booth

Required Tools: Soft cotton cloth, mild detergent solution

Warning: Before cleaning the voting booth, if the ExpressVote unit is still attached to the booth, disconnect the unit from its power source. Do **NOT** use full-strength, harsh detergents, liquid cleaners, aerosols, abrasive pads, scouring powders, or solvents, such as benzene or alcohol. Liquids should never be applied directly to the unit. Use a soft cotton cloth lightly moistened with a mild detergent solution. Ensure that the surface cleaned is fully dry before reconnecting the power.

Storing the ExpressVote Unit

ExpressVote is designed for storage and operation in any enclosed facility ordinarily used as a warehouse or polling place. During operation, facility temperature range should be 60^0 F to 100^0 F and moisture range should be 10% to 50% relative humidity. For storage, facility temperature range should be 0^0 F to 120^0 F and moisture range should be 10% to 85% relative humidity.

To avoid exposure to moisture, dust, and damage, store the unit in the hard case and inside of the plastic bag that was shipped with the unit.

Installing and Removing the Election Definition Media Device

To prepare the ExpressVote unit for storage after an election, remove the election definition media device from the locked compartment on the left side of the enclosure, as the unit should not be stored with one installed. The unit cannot operate without installing an election definition media device. For security reasons, removing the election definition media device during operation requires that the unit be restarted.

Important: Do not remove the election definition media device any time the machine is in Voter mode. In addition, you should only remove the media device when the unit is in Official mode if you are instructed to do so.

See also, "Installing and Removing the Election Definition USB Flash Drive" in *Chapter 7* of the *ES&S ExpressVote Operator's Guide*, for more information on election definition installation and removal.

See also, the *ES&S ExpressVote Operator's Guide*, *Chapter 3:* ExpressVote *Overview*, for more information on using the election definition media device.

Part 2: Appendix

The chapters in Part 2: Appendix of the *ES&S ExpressVote Maintenance Guide* are organized as follows:

- FIGURE 2. Maintenance Checklist
- Chapter 6: Document Version History

See the *ES&S ExpressVote Operator's Guide* for the following topics:

- Glossary of term definitions that might be unfamiliar to persons not trained in either voting systems or computer operations.
- Detailed examples that outline correct system response to faulty operator input.
- Recommended security procedures that are to be executed by the user

FIGURE 2. Maintenance Checklist

Express Vote Maintenance Checklist

Date: _____ **Express Vote Serial Number:** _____
(Confirm in Main Menu {in Official mode) that serial label and internal serial number match)

Clean the entire exterior of the Express Vote (when cleaning the touchscreen use only isopropyl alcohol and a lint free cloth. Do not apply alcohol directly to the touchscreen, apply to the lint free cloth only)

Remove back housing

Clean CIS ☐

Clean print head ☐

Check that all cable connections are secure ☐

Check that all internal screws and fasteners are secure ☐

Check that battery is connected and secure ☐

Check drive belt for correct tension (record amount of belt deflection)_____

Check that all pinch rollers correctly engage the drive rollers ☐

Clean all transport rollers ☐

Check that all screws/fasteners are secure ☐

Replace back cover

Power on terminal and perform touchscreen calibration ☐

Switch the terminal to Official mode

Select the Display Software Versions Button and enter the versions below:
GUI _____
Platform _____
Scanner Printer Engine: Rev _____ DLL _____
Input Output Board Rev _____ DKB_____ DLL_____
Jungo _____

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Proprietary and Confidential Information of Election Systems and Software

Exit the Menu

Check Battery Status_____

Enter System Maintenance

Enter Scanner Calibration and verify that the Calibration Required column has all green bars with NO in them (if not, calibrate the terminal) ☐

Rear Eject state _____

Tethered Mode state _____

Keypad state _____

Time Zone_____ Date _____ Time _____

Switch the terminal to Vote mode

Open an election on the terminal

Vote a card and front eject ☐

Vote a card and rear eject (you may have to enable rear eject functionality in order to perform this, be sure to return rear eject setting to its original state) ☐

Vote a card and verify audio function, front eject ☐

Vote a card and verify ADA port function, rear eject ☐

Vote a card and verify Keypad function (you may have to enable Keypad functionality in order to perform this, be sure to return Keypad setting to its original state), front eject ☐

Remove election stick and insert in opposite USB port to ensure functionality ☐

Ensure all panels/doors are secure and locked ☐

Ensure InnoDisk security panel in place ☐

Check operation of the front panel LED's ☐

Disconnect the power brick and verify battery operation ☐

Maintenance Complete

Chapter 6: Document Version History

ExpressVote v1.4 Maintenance Guide

Documentation Version 2.3
February 7, 2014

Chapter	Description	Project
Chapter 3: System Maintenance Menu, Security	Changed to correct reference to ExpressVote System Security Menu.	EVS 5.2.0.0

Documentation Version 2.2
January 24, 2014

Chapter	Description	Project
Chapter 3: System Maintenance Menu,	Replaced BOL Data Matrix barcode with QR code.	EVS 5.2.0.0
Chapter 5: Post-Election Maintenance, Cleaning	Deleted reference to transportation cart.	EVS 5.2.0.0

Documentation Version 2.1
January 17, 2014

Chapter	Description	Project
Chapter 3: System Maintenance Menu, Figure 1	Updated System Maintenance Menu table to include new options and updated button names.	EVS 5.2.0.0
Chapter 3: System Maintenance Menu, Unit Serial Number	Updated Unit Serial Number description.	EVS 5.2.0.0
Chapter 3: System Maintenance Menu, BOL Scanning	Added BOL Scanning section and listing in System Maintenance Menu options table.	EVS 5.2.0.0
Chapter 3: System Maintenance Menu, Tethered Mode Enable	Added Tethered Mode Enable section and listing in System Maintenance Menu options table.	EVS 5.2.0.0
Chapter 3: System Maintenance Menu, Clear Jam	Added Clear Jam section and listing in System Maintenance Menu options table.	EVS 5.2.0.0
Chapter 3: System Maintenance Menu, BOL Scanner Setting	Added BOL Scanner Setting section and listing in System Maintenance Menu options table.	EVS 5.2.0.0

Documentation Version 2.1
January 17, 2014

Chapter	Description	Project
Chapter 3: System Maintenance Menu, Rear Eject Enable	Updated Rear Eject Enable section.	EVS 5.2.0.0
Chapter 5: Post-Election Maintenance, Charging the Battery	Added correct reference to Chapter 1: Concept of Operations, Monitoring the Battery Charge Status	EVS 5.2.0.0
Chapter 5: Post-Election Maintenance, Cleaning	Re-organized and updated information, added illustration of the ExpressVote Ballot Box (enclosure and transportation cart)	EVS 5.2.0.0

Documentation Version 2.0
January 15, 2014

Chapter	Description	Project
Chapter 6: Document Version History	Updated Project column. Corrected Initial Document creation date to November 1, 2013.	EVS 5.2.0.0
Title Page	Updated firmware listing to 1.4.	EVS 5.2.0.0

Documentation Version 1.0
November1, 2013

Chapter	Description	Project
All	Initial document	EVS 5.2.0.0
4: Hardware Replacement	Updated the SPE/IO firmware update section with requested content “ExpressVoteFirmwareProgrammingV4.1.docx,” including prominent disclaimer stating procedure must be performed by a certified technician. Also changed heading to “CBA Firmware Update.”	EVS 5.2.0.0
Index	Revised index to be more user-friendly.	EVS 5.2.0.0

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