UNITED STATES DISTRICT COURT NORTHERN DISTRICT OF FLORIDA TALLAHASSEE DIVISION CASE NO. 4:18cv529-MW/CAS

MIKE FOX, et al., *Plaintiffs*,

versus

KEN DETZNER, in his official capacity as Florida Secretary of State, et al., *Defendants*.

NOTICE OF FILING EXHIBITS FOR MEMORANDUM IN SUPPORT OF MOTION FOR PRELIMINARY INJUNCTION (PLAINTIFFS' EXHIBITS 21-30)

Plaintiffs submit Exhibits 21-30 to the Memorandum of Law

Supporting the Motion for Preliminary Injunction (DE32).

Respectfully submitted on December 26, 2018.

<u>S/ Benedict P. Kuehne</u> **BENEDICT P. KUEHNE KUEHNE DAVIS LAW, P.A.** Miami Tower, Suite 3550 100 S.E. 2nd Street Miami, FL 33131-2154 Florida Bar No. 233293 Tel: (305) 789-5989 Fax: (305) 789-5987 ben.kuehne@kuehnelaw.com efiling@kuehnelaw.com S/ Carl Christian Sautter CARL CHRISTIAN SAUTTER 3623 Everett Street NW Washington, DC 20008 Indiana Bar No. 45-53 Pro Hac Vice to be Sought Tel: 202-285-7560 sauttercom@aol.com Attorneys for Plaintiffs

CERTIFICATE OF SERVICE

I certify that on December 26, 2018, I electronically filed the foregoing document with the Clerk of the Court using CM/ECF. I also certify that the foregoing document is being served this day on all counsel of record identified on the CM/ECF and transmitted in accordance with CM/ECF requirements.

<u>S/ Benedict P. Kuehne</u> **BENEDICT P. KUEHNE**

STATE OF FLORIDA

Affidavit of Michael D. Fox, Plaintiff in mandamus case.

I, Michael D. Fox, swear and affirm as follows::

1. I reside at 719 52nd Street N, St. Petersburg, Florida 33710.

2. I am registered to vote in Pinellas County in the 13th Congressional District.

3. I am initiating this action in order to preserve all digital ballot images and to require that state and local election officials comply with federal and state law to preserve all election materials, including ballot images, related to the 2018 general election in Florida and for all Florida elections thereafter.

4. According to information and belief, it is the practice and intention of Florida State election officials to permit the deletion and destruction of digital ballot images, except in some cases "write-in" images, contrary to federal law.

5. On October 24, 2018, I spoke with Dustin Chase, Communications Director for Pinellas County Supervisor of Elections. Mr. Chase stated that the county does not preserve digital ballot images with the exception of "write-in" votes.

I declare under the penalty of perjury that the foregoing is true and accurate to the best of my knowledge.

State of Florida **County of Pinellas**

I, P.LYNN KENT, a Notary Public of the aforesaid county, hereby certify that Michael D. Fox personally appeared before me this day and having been duly sworn deposes and says that the facts set forth in the above affidavit are true and correct.

Notary Public

My commission expires:

07, 25, 2020



STATE OF FLORIDA

Affidavit of Gregory Nason, Plaintiff in mandamus action.

I, Gregory Nason, swear and affirm as follows:

1. I reside at 2036 S. Colonial Avenue, Homosassa, Florida 34448.

2. I am registered to vote in Citrus County which is in the 11th Congressional District.

3. I am initiating this action in order to preserve all digital ballot images and to require that state and local election officials comply with federal law to preserve all election materials, including ballot images, related to the 2018 general election in Florida and for all Florida elections thereafter.

4. According to information and belief, it is the practice and intention of Florida state election officials to permit the deletion and destruction of digital ballot images, except in some cases "write-in" images, contrary to federal law.

5. On October 19, 2018, I had a telephone conversation to Citrus County Supervisor of Elections, Susan Gill and inquired how long the scanned ballot images are preserved after an election. Susan Gill replied, "We just don't save them. Paper ballots are retained for 22 months, scanned images are not."

I declare under the penalty of perjury that the foregoing is true and accurate to the best of my knowledge.

<u>10-19-18</u> Date

Gregory Nason

State of Florida **County of Citrus**

I. Crustal Ver H, a Notary Public of the aforesaid city, hereby certify that Gregory Nason personally appeared before me this day and having been duly sworn deposes and says that the facts set forth in the above affidavit are true and correct.

Notary Public

08,24

My commission expires:

2020

CRYSTAL PERT Notary Public - State of Florida Commission # GG 252662 My Comm. Expires Aug 26, 2022 Bonded through National Notary Assn.

STATE OF FLORIDA

Affidavit of Jeffrey M Richards, Plaintiff in mandamus action.

I, Jeffrey M Richards, swear and affirm as follows:

- 1. I reside at 11704 Cypress Nook, Tampa, Florida 33626.
- 2. I am registered to vote in Hillsborough County in the 14th Congressional District.
- 3. I am initiating this action in order to preserve all digital ballot images and to require that state and local election officials comply with federal and state law to preserve all election materials, including ballot images, related to the 2018 general election in Florida and for all Florida elections thereafter.
- 4. According to information and belief, it is the practice and intention of Florida state election official to permit the deletion and destruction of digital ballot images, except in some cases "write-in" images, contrary to federal law.
- 5. In September, I filed a records request in Hillsborough County under the Freedom Information Act seeking digital copies of ballots from the August 28, 2018 primary election. I received an e-mail response from Geri Kramer, Director of Communications, Hillsborough County Supervisor of Elections, that read, "there are no records responsive to this request."

I declare under the penalty of perjury that the foregoing is true and accurate to the best of my knowledge.

Richards

State of Florida County of Hillsborough

I, <u>DUTOMR</u>, a Notary Public of the aforesaid county, hereby certify that Jeffrey M Richards personally appeared before me this day and having been duly sworn deposes and says that the facts set forth in the above affidavit are true and correct.

Notary Public

My commission expires:

01,14,2019



DS850[®] Ope<u>rator's Guide</u>

Document Version 4.0 Software Version 2.10 Published: February 26, 2014



FSS

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The document sections referenced below contain Election Systems and Software, Inc. (ES&S) confidential information, which is provided for the sole purpose of permitting the recipient, to evaluate the ES&S Voting System submitted herewith. The following sections are designated as "Proprietary and Confidential" by Election Systems & Software.

Proprietary Document Section	Description
N/A	N/A

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Part 1: Introduction

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Part 1: Introduction

The Introduction contains the following chapters:

- Chapter 1: DS850 Overview
- Chapter 2: Safety Information
- Chapter 3: DS850 User Interface

Chapter 1: DS850 Overview

The ES&S DS850 is a high-speed, computerized, digital image-based scanner and tabulator with ballot sorting capabilities. The ES&S DS850 is designed to process all of the ballot types supported by the ES&S election management system, including folded (absentee) ballots.



The DS850 accurately records all votes as marked by the voter and is capable of meeting or exceeding the 1.5 million mark test as stated in Volume 1, Section 2.1.1 of the 2005 VVSG. Voter accumulation records are saved on the machine's hard drive and can be transferred from the hard drive to a USB flash drive.

The DS850 is capable of supporting multiple election models. In a traditional central count model, voting takes place at various locations within a precinct, and when the polls close, the ballots are physically transported to a central location, then scanned and tabulated using the ES&S DS850. In a traditional precinct count model, ballots are scanned during election day on an ES&S precinct scanner and tabulated once the polls are closed. In this precinct-based model, the central count scanner is used to process early voting and absentee ballots by scanning the ballots in the days up to and including election day and subsequently tabulating them when the election is closed. In an all mail-in model, all ballots are physically collected via mail to one or more central locations and scanned up until the polls close on election day, at which time they are tabulated.

This manual and the ES&S DS850 System Maintenance 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.

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Chapter 1: DS850 Overview

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ES&S Elections

Jurisdictional Nomenclature

Terminology for the lowest-level common geopolitical civil division differs by state and country. In this manual and other ES&S documentation, the entity is referred to as a precinct.

As a company with accounts across the country and around the world, ES&S recognizes that certain jurisdictions use terms other than precinct. Some examples of the terms used by other jurisdictions are Election District (or ED), Borough, Province, Division, and District. These terms and others may be substituted for precinct depending upon the particular jurisdiction. However, for consistency, ES&S uses the term precinct throughout its documentation.

Election Definition

Using ElectionWare, election coders program a custom election definition onto a USB flash drive for each DS850 used in your jurisdiction. An election definition contains all of the candidates, contests, and ballot variations that the scanner will process at the polling place. It also contains the user-defined codes that must be entered on the scanner to perform various functions. The election definition provides default values for configuration settings, some of which can be modified on the scanner after the election definition is loaded.



Note: Screen text that ends with an ellipsis (...) indicates that more characters were entered for the text in ElectionWare than the DS850 can display

Election Security

All ports for connecting USB and Ethernet devices are located behind lockable doors. Each of these locations contains a provision for a wire seal for an additional level of security. See Locks and Seals for information on the placement of the locks and seals.

Access to various system screens require entry of a code to prevent unauthorized access to certain system functions.

The DS850 records errors and major events and tags these incidents with the date and time the incident occurred based on the DS850's real-time clock settings. Audit log information can be exported to a USB flash drive inserted into a USB port on the DS850. The Zero Report, which is printed before polls are open on Election Day, is used to indicate no tampering has been done to the vote totals.

Election officials using the DS850 must provide physical security measures or implement procedures that limit access to the DS850 during the election period to authorized personnel only. The election period encompasses the time the election definition is loaded onto the system to the time final, official election results are produced and validated.

Provisional Voting

In paper ballot-based systems, provisional ballots are handled procedurally. Voters are allowed to vote a paper ballot that is segregated from valid Election Day ballots. After the election, each provisional ballot envelope is authenticated against the appropriate criteria and either allowed or not allowed. Those ballots found to be valid are then opened and included in the Election Day totals according to processes defined by your jurisdiction's requirements. For example, some jurisdictions may hand-count provisional ballots and manually enter them into Election Reporting Manager (ERM), while others may create a separate election group and scan the ballots using a precinct or central scanner such as the DS850.

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Chapter 1: DS850 Overview

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Facilities, Furnishings, and Fixtures Required for DS850 Operation

The following facilities, furnishings, and fixtures are required to operate the DS850:

- ES&S recommends using the metal cart available for the DS850 for easier setup and movement of the machine, which weighs approximately 200 pounds. The metal cart weighs 190 pounds.
- The DS850 is intended for indoor use only. During tabulation, ES&S recommends the DS850 should be operated in a room measuring a minimum of 10 feet by 10 feet.
- The DS850 can be operated in any temperature controlled facility, with temperatures from 50 degrees Fahrenheit to 95 degrees Fahrenheit. Operational humidity during operations should be between 10 and 88 percent RH. The DS850 is not protected against harmful ingress of moisture.
- A standard 110V outlet must exist in the facility for power cord plug in. The DS850's input rating is 120V~50/60 Hz 8.0A single phase or 240V~50/60 Hz 8.0A dual phase. The main supply voltage fluctuations are not to exceed plus or minus 10 percent of the rated supply voltage range. To ensure 2 hours of uninterruptible power you must use an Uninterruptible Power Supply (UPS) with the DS850.
- The storage temperature for the DS850 is from -4 degrees Fahrenheit to 140 degrees Fahrenheit.



Reference: See Chapter 2: Safety Information for a complete list of the DS850 specifications and cautions.

Locks and Seals

ES&S recommends the lock and seal placements described below to physically lock down the DS850 and prevent system tampering.

The rear of the scanner is secured by locking both door locks. A tamper-evident tape seal can be used for additional security.



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Chapter 1: DS850 Overview

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The DS850 data ports on the right side of the DS850 are all behind clear access doors that can be protected by both locks and seals.



The DS850 data ports on the left side of the DS850 are all behind a clear access door that can be protected by both a lock and a seal.





Note: See Election Security in this chapter for more information.

Chapter 1: DS850 Overview

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Using USB Media Devices

USB Media Devices are used to clear and initialize the DS850, load an election definition into the DS850, create an archive, and export data that has been saved to the DS850's internal memory. The ES&S EQC Media Device flash drive is used clear all data from the machine and load the encryption keys that are needed to load and run the election. The ES&S Election Definition Media Device flash drive is used to load the election definition into the scanner. ES&S Election Definition Media Device flash drive and blank ES&S Media Device flash drives and blank ES&S Media Device flash drives and can be used to create an archive and to export data.



Reference: See Clearing and Initializing the Scanner, Loading the Election Definition, and Exporting Data for more information on these processes.



Note: If you choose to use USB Media Devices, it is strongly recommended that you use fully-formatted USB Media Devices rather than the Quick-formatted or cleared (all files deleted) flash drives. The fully-formatted flash drives work faster and are more reliable. If you have any questions about formatting your flash drives contact ES&S.

The picture on the right shows a typical USB flash drive.

Before inserting a USB flash drive, remove the protective plastic cap to expose the USB connector.



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Chapter 1: DS850 Overview

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The ES&S EQC Media Device flash drive, the ES&S Election Definition Media Device flash drive, and a blank ES&S Media Device flash drive can be inserted into any one of the USB ports on the DS850. Never force a USB flash drive into a USB port.



Adjusting the DS850 Workspace

You can make several manual adjustments to the DS850 workspace to improve usability, including adjusting the tilt of the screen, changing the length of the input and output trays, and raising and lowering the side of the DS850's cart.

Adjusting the Tilt of the Screen

You can tilt the screen forward to achieve a potentially better viewing angle by gently pulling the top of the screen outward. The picture on the right shows a screen that has been pulled forward.



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Chapter 1: DS850 Overview

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Adjusting the Input and Output Trays

You can adjust the length of the input and output trays to accommodate different sized ballots.

The input tray can be extended to provide a solid support for longer ballots. Use the round opening to pull the extension to the right for longer ballots. Slide the extension to the left for shorter ballots. The picture on the right shows the input tray extended for longer ballots.

It is also important that the output trays (or bins) be adjusted to the proper length before the ballots are scanned. If the output trays are set for ballots that are longer than the ones being scanned, the ballots might overshoot the trays as they come through the transport. If the output trays are set for ballots that are



shorter than the ones being scanned, the ballots will jam up in the trays.

Adjusting the output trays consists of changing the length of the trays and the position of the output tray paper stops. Each of the output trays, like the input tray, has an extension with a round opening in it. You can use the opening to pull the extension to the left for longer ballots, and you can slide the extension to the right for shorter ballots. There are markings on the output trays to help you adjust them to the correct length for the ballots. The picture on the right shows an output tray set for 17" ballots.

After you adjust the length of the output trays, set a sample ballot in each of them. Then slide the output tray paper stops so that there is approximately 10 mm between the stop and the end of the ballot. The picture at the right shows the output tray paper stops.





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Raising and Lowering the DS850's Cart Extension

To use the DS850 cart extension, lift up on the extension until it is level and push up on the brackets on both sides (as shown in the picture on the right) until they lock into place.

To lower the extension, simultaneously press the release button on the inside of the bracket and press down on the hinge of the bracket. Repeat this process with the other bracket and carefully lower the extension. The extension must not be allowed to drop as to prevent damage to the extension and the cart.



Uninterruptible Power Supply (UPS)

You must use an Uninterruptible Power Supply (UPS) with the DS850. The UPS will provide continuous power to the machine and to prevent the DS850 and the attached printers from being damaged in case of a power surge.



Note: The DS850 was certified using an external UPS to comply with electrical test requirements in the VVSG. The DS850 must be operated with an external UPS to be in a certified configuration.



Reference: See Chapter 5: Pre-Election Day Tasks for information on installing the UPS, attaching the DS850 and printers to the UPS, turning on the UPS, and checking that the UPS is communicating with the DS850.

Installing New Firmware

A certified ES&S Technician will usually install new firmware on the DS850. If you have been instructed to install the new firmware an ES&S Support Representative will assist you in the process.



Warning: Contact an ES&S Technician for instructions to return your DS850 to an earlier firmware version. Do not use an earlier firmware update Compact Flash card to revert a DS850 firmware version back to an earlier version.



Note: The Compact Flash card must be a minimum of 1 GB.

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Contacting ES&S for Technical Support

This manual should aid you in accomplishing most tasks. However, if you need additional assistance, or if you encounter a processing problem or system error, ES&S' technical support staff can provide advice and help you resolve the situation.

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:

- The version number of the product you are using.
- The *exact* wording of any messages that appeared.
- A description of what happened when the problem occurred.

Support representatives are available Monday through Friday, between 8:00 A.M. and 7:00 P.M. CST.

Telephone Number (USA & Canada):	877-377-8683
Telephone Number (International):	402-593-0101
Fax:	402-593-8107
Address:	Election Systems & Software 11208 John Galt Blvd. Omaha, NE 68137 USA

Contact an ES&S Support Representative



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

Contacting ES&S for Supplies

ES&S recommends that you keep the supplies listed below on hand for each DS850. You can order these items from ES&S by calling (877) 377-8683. Allow four weeks for delivery.

- 8.5" x 11", continuous feed, one-part paper for the audit log printer: ES&S recommends that the printer paper be carbon-less to avoid smearing. If you will be using ERM the same type of one-part paper can be used for both the ERM and DS850 continuous-feed printers. Quantity: two boxes.
- 8.5" x 11", standard laser printer paper for the laser printer. Quantity: two boxes.
- **Pressurized air cans:** Used to clean the sensors. **Quantity:** two.

- Cloth and isopropyl alcohol: Used to clean the rollers. Quantity: one bottle.
- Small white adhesive labels, ½ inch wide: Use these labels to cover stray marks on the ballots. Only use labels from ES&S. Quantity: 12 sheets.
- USB flash drives: These must be FAT32 formatted drives. Depending on the number of ballots processed, you may need multiple drives to transfer all of the ballot image data. Election results data will fit on a single drive. The minimum size is 1GB and the maximum is 8 GB. Quantity: 6



Warning: The flash drives you use in the DS850 must be used for the election process only. Using the drives for anything other than the election process violates security practices.

 Marking Devices: Although the DS850 reads a wide variety of marking devices, ES&S recommends that you use the following devices:

VL Ballot Pen (ES&S part # 6100). The pen is a BIC Grip roller ball with black ink and a 0.7 mm tip.	A MARINE AND A MAR
Absentee Pen (ES&S part #00500) Easily fits into an envelope for mailing.	- THE R. C.
Absentee Pencil (ES&S part # 00540) Red, 0.125 point	Absented over Pencil

- Audit log printer ribbon (ES&S part # 4778)
 Quantity: 1 per printer
- Report Printer Toner Cartridge (ES&S part # 6826)
 Quantity: 1 per printer
- Touch screen cleaning kit.

General Timeline for Election Preparation

90 Days	Submit site support request to ES&S	
63 Days	All forms are due to ES&S (excluding Candidate forms)	
56 Days	Candidate forms due to ES&S	
46 Days	Last day to give ballot proofs to counties (strictly for military or overseas voting)	
45 Days	Absentee Voting begins	
42 Days	Certification deadline	
28 Days	All ballot proofs must be signed off	
21 Days	Last day to deliver Election Day ballots	
20 Days	Advance or early voting begins	
18 Days	Last day for ES&S to ship coding materials	
10 Days	Software installation for pre-election procedures	
1 Day	Early voting ends	

General Timeline for Election Preparation



Reference: Refer to the Personnel Deployment and Training Requirements document for more information.

Operations Support Frequently Asked Questions

How is the system purchased?

You can purchase the **DS850** by contacting your ES&S representative.

How is the system installed?

You can install new firmware to the DS850 by following the steps in the ES&S implementation plan. See Installing New Firmware for more information.

• How can I verify the system?

You can verify the system in the following ways:

- Compare the serial numbers on the hardware to the numbers on the purchase order.
- Compare the firmware version to the version listed on the purchase order.
- The Acceptance Checklist will aid in the verification of the system.
- What training is required?

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Training is determined at the time the system is purchased.

What checklist should be followed?

Use the Acceptance Checklist to ensure that the system has been delivered and is performing as expected.

System Acquisition Procedures

Use the Acceptance Checklist to ensure that the system has been delivered and is performing as expected. The following is a descriptive list of the DS850 acceptance testing criteria.

Visual Inspection

- Ensure that there are no scratches or gouges on any part of the unit.
- Verify that all labels are placed in their appropriate place and in their correct orientation.
- Check the wheel locks on the table to ensure the cart rolls freely in the unlocked position and does not when the wheels are locked.
- Inspect the table's folding extensions and drawer for proper operation.
- Verify all locks and doors have a smooth function and are locked.
- Open the rear door on the scanner and check for any loose connections or damaged parts.
- Ensure that all belts, transport rollers, and protective guards are in place.

Physical Inspection

- Install the UPS, connect the printers and the scanner to the UPS, set up the printers, and then turn on the UPS and the scanner. See Chapter 5: Pre-Election Day Tasks for instructions.
- Observe that both printers and the DS850 power on. If an election has been loaded, at the Login screen, enter the Election Code.
- Verify that the AC power icon is present in the upper right-hand corner of the screen and that it indicates that the power connection is plugged in.
- Verify that a red "X" is not displayed on the printer icons.
- Perform Touch Screen calibration by selecting the Hardware menu and then pressing Screen Calibration. Touch the circle in the upper left-hand corner. When the screen with a circle in the lower right-hand corner appears, touch that circle. Touch the next screen in multiple places to verify that the pointer (x) will follow the touch points. Then press the Save & Exit button.

- Verify that the DS850 firmware version matches the certified version for your jurisdiction. To do so, select the System menu and then press Firmware. COTS firmware versions that the system can report will also be displayed.
- Test each of the USB ports on the DS850 by using the following procedure:
 - Press **Election** to access the Election menu.
 - From the Election menu, press Setup to access the Setup screen.
 - On the Setup screen, press **Clear and Initialize**. This displays the *Searching for* EQC Media Device pop-up screen.
 - Insert the ES&S EQC Media Device flash drive into one of the scanner's USB ports. The previous pop-up screen is temporarily replaced by a *Detecting inserted device* pop-up screen. When the scanner recognizes the ES&S EQC Media Device flash drive, the Qualification Code screen appears.
 - Press Cancel and move the USB flash drive into another unused USB port.
 - Repeat the steps above for each unused USB port, except for the last one, to ensure that each USB port on the scanner is functioning correctly. On the last port, clear and initialize the scanner. See Clearing and Initializing the Scanner for instructions.
- Check the date and time displayed at the top of each screen to ensure the date and time are correct. If necessary, change the time and date. See Set Date/Time for instructions on modifying the scanner's system date and time.
- Load the election definition into the scanner. See Loading the Election Definition for instructions.
- Load the ES&S test deck of ballots onto the input tray of the scanner.
- Scan the test deck of ballots. See Scanning for instructions.
- Save the election results to a USB flash drive. See Exporting Data for instructions.
- Print the election results reports and compare them to the reports provided by ES&S to verify that the scanner is reading the ballot marks accurately. See Printing Election Reports for instructions on printing reports. See Chapter 8: Reports for more information and examples of the reports.
- Verify that the scanner can detect when power to the UPS is lost. See Checking the Connection Between the UPS and the Scanner for instructions on checking whether the scanner can detect when power to the UPS is lost.
- Power down both printers and the scanner, then power down the UPS. See Shut Down and Power Off the Scanner for instructions on how to shut down and power off the scanner. See Turn Off the UPS for instructions on turning off the UPS.
- Place the dust cover over the scanner, and ensure it is free of tears and rips.

Acceptance Checklist

Shown below is an example of the Acceptance Checklist for the DS850.

EL	DS850 Acceptance C	heck List
	Serial Number:	Date
	Physical Inspection Table is free of scratches or other damage Table wings latch OK Labels: Serial, EAC, Safety Printers complete- AC cords, USB cables, ribbon'toner Printer Paper Display hinge Camera head hinge Door latch I/O cloors Locks and Hardware Camera clean and free of dust	Owner
H	Output tray adjustment	
	Functional Testing Boot up Firmware version	
	Touch Screen calibration	
	Time and Date	
	Load Test Election	
H	Run Test Deck	
	Verify Test Deck Results	
	Clear and Initialize	
	Log report	
	Imprinter	
	Multisheet	
	Final Inspection	

Chapter 2: Safety Information

When used properly, the DS850 is safe and effective. The following symbols, used throughout this manual, indicate when hazards may occur during normal operation of the scanner. Read the warnings and proceed with caution when you carry out potentially hazardous scanner operations.

Warning Icons

Symbol	Definition
9	Electrical Shock Danger: This symbol indicates a danger of electric shock. There are high voltages present inside the enclosure of DS850 scanner. To reduce the risk of fire or electric shock, do not attempt to open any enclosures or gain access to areas for which you have not been trained. Only ES&S qualified personnel should open enclosed areas of the scanner.
	Warning: This user caution symbol indicates that damage to the scanner or injury to the user could occur if the proper procedures are not followed. Carefully follow all instructions and proceed with caution when this symbol is associated with a set of instructions.
	Caution: Keep fingers, hands, and loose clothing clear of the areas where this symbol is displayed.

Important Safety Instructions

Please read all safety instructions before operating the DS850. Carefully follow all instructions and heed all warnings.

Power Sources

Operate this product only from the type of power source indicated in this manual. Make sure that the installation complies with applicable sections of the National Electric Code. Consult your local building code before installing. See Facilities, Furnishings, and Fixtures Required for DS850 Operation for more information.

Ventilation

Slots and openings in the case of the DS850 are included to provide adequate ventilation for the unit. These openings must remain clear. Do not block or cover any openings in the DS850 case; otherwise, the unit could overheat. Do not operate the DS850 in an enclosed housing not approved by ES&S.

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Water and Moisture



Warning: Do not place containers with liquids such as coffee, water, or soda on or around the DS850. Do not operate the equipment in a damp environment. Store the DS850 in a cool, dry place.

Cleaning

Follow the instructions in the Pre-Election Maintenance section of this manual for cleaning the DS850. Use only the cleaning solutions approved by ES&S. Cleaning instructions are also provided in the **DS850 System Maintenance Manual**.

Heating

Do not install this product near heat sources such as radiators, air ducts, areas subject to direct sunlight, or other products that produce excessive heat.

Power Cord Protection

Route or install the power supply cord for this product in such a manner to protect it from being walked over or pinched. Make sure you power down the unit completely before connecting or disconnecting the power cord. Before moving the unit, shut down and power off the DS850, and then turn off the UPS. The UPS should be unplugged from the wall outlet and safely stowed before moving. You should take care not to pinch the power cord when locking the power switch access door.

Servicing



Electrical Hazard: Electrical Shock Danger: Do not attempt to service the scanner unless specifically instructed to do so by ES&S. Do not attempt to gain access to areas of the unit where dangerous voltages are present. Only qualified ES&S technicians should service the DS850.

Damage Requiring Service

Unplug the DS850 and call ES&S to consult a qualified service technician under the following conditions:

- When the power cord is damaged.
- If liquid has been spilled into the scanner casing.
- If the scanner does not function normally while following instructions in this manual.

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- If the product is damaged in any way.
- When the scanner displays a negative change in performance.



Warning: Adjust only the controls specified in this manual. Improper adjustment of other controls may result in damage to the scanner and could require work by an ES&S technician to restore the scanner to normal operating condition.

Radiation Protection

The DS850 meets or exceeds Federal Communication Commission standards for protection against generated or induced electromagnetic radiation, and no additional safety precautions are required.

Specifications and Cautions

\bigcirc	Indoor Use Only
	Ordinary Protection (not protected against harmful ingress of moisture)
\bigcirc	The rear door of the DS850 must be locked at all times during normal use. Store the keys to the door in a secure location while you are using the DS850.
	Warning: Weight: 200 lbs - 2 person lift.
\bigcirc	Electrical input rating : 120V~ 50/60Hz 8.0A single-phase power or 240V~ 50/60Hz 8.0A dual-phase power. Consult a licensed electrical contractor for proper electrical connections.
	Pollution Degree 2 for the ambient environment
\bigcirc	Operating relative humidity : 10% to 88% RH, non-condensing
	Operating temperature : 50 degrees Fahrenheit to 95 degrees Fahrenheit
	Maintenance: For applicable maintenance items, refer to the DS850 System Maintenance Guide.
	Warning : The interior of the DS850 is not accessible to the user. Service opera- tions inside the electrical enclosure must be done by trained and authorized personnel.
\bigcirc	Transport and storage conditions : -4 degrees Fahrenheit to 140 degrees Fahrenheit

Chapter 3: DS850 User Interface

This chapter describes the DS850 user interface. The screens that make up the DS850 user interface are displayed on the DS850 touch screen. The top-center line of text on each screen identifies the current screen. The menus for the DS850 user interface are listed below and described on the pages which follow.

- Scanning Menu
- Election Menu
- Reports Menu
- System Menu
- Hardware Menu

A menu can be displayed by selecting the corresponding tab along the left side of the screen. See Chapter 11: Menu Structure for diagrams showing the screen hierarchy for each of the menus. The diagrams are intended to help you quickly identify how to access a particular screen.

The date and time are displayed in the upper right-hand portion of each screen. Displayed below the date and time are the icons that indicate the operating status of the DS850. See Operating Status Icons for a description of each icon.

A help menu is available on the DS850. If **Help** is available for the screen that is being displayed, the button will be located in the upper right corner of the screen. Select the **Help** icon to display the help text for that screen and the functions that are performed from that screen.



Unauthorized access to the user interface can be can be prevented by locking the scanner.



Reference: See User Access and Locking the Scanner for more information on preventing unauthorized access to the user interface.



Note: Make sure that the camera lid and rear panel are closed before you attempt to perform any function that engages the DS850's motors, such as scanning ballots, running hardware menu tests, and clearing the transport. The scanner does not allow functions that engage the motors to be performed when the camera lid or rear panel is open.

Operating Status Icons

Described below are the operating status icons that appear in the upper right-hand corner of the screens that are displayed on the scanner's touch screen.

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Battery Power - This icon is used for the Uninterruptible Power Supply (UPS). If the scanner is not using a UPS, this icon is not displayed on the screens. If the scanner is plugged into the UPS, the UPS is plugged into a wall outlet, and the UPS is fully charged, then the solid green Battery Power icon appears on the screen. If the UPS is then unplugged from the wall outlet (or the wall outlet loses power,) then the scanner is running off the UPS Battery Backup System, and the icon will change color to indicate the extent to which the battery is charged: Green for 80-100 percent charged, Yellow for 60-80 percent charged, Orange for 40-60 percent charged, and Red for 20-40 percent charged. A message will also appear if the scanner is on/off battery, you will need to press **OK** to clear this message.



AC Power - This icon indicates whether the DS850 is connected to AC power. If the scanner is plugged into the UPS, the UPS is plugged into a wall outlet, and the UPS is fully charged, then the AC Power icon has its two connectors

connected. If someone disconnects the UPS from the wall outlet, the AC Power icon has its two connectors separated.



Election Definition - This icon indicates whether an election definition is loaded onto the DS850. An orange check mark in the lower left-hand corner of the icon indicates that an election definition is loaded; a red "X" in the lower left-hand corner indicates that an election definition is not loaded.



Dot Matrix Printer - This icon indicates whether the DS850 is connected to a dot matrix log printer. If there is a red "X" in the lower left-hand corner of the icon, the printer is not connected; otherwise, it is connected.



Laser Printer - This icon indicates whether the DS850 is connected to a laser printer. If there is a red "X" in the lower left-hand corner of the icon, the printer is not connected; otherwise, it is connected.

Scanning Menu

Use the Scanning menu to scan ballots and to clear the ballot transport path.

- Press **Scan Ballots** to begin the ballot scanning process or to select your precinct. See Scanning for additional information on these processes.
- Press Clear Transport to clear the ballot transport path.

The following is an example of the Scanning menu.



Election Menu

Use the Election menu to load an election definition, view election setup information, export election results, and to set your scanner configuration options.

The following is an example of the Election menu.

		8/30/10 2:03 PN 🛯 🖋 🗎 🐨 🚔
	Election	(? Neb
Scanning		
Election		
Reports	Configuration	\supset
System	Results	
Hardware		
	Setup	

- Press Configuration to set your scanner's configuration options. See Configuring the Scanner for information on setting your scanner's configuration options.
- Press Results to access the Results screen. From the Results screen, you can export the poll place collection data, the election definition and the audit log. The Results screen is also used to clear election results. You can clear all election results or the election results for only a selected precinct.



Reference: See Exporting Data and Clearing Election Results for more information on the Results screen.

 Press Setup on the Election menu to view election setup and ballot count information, clear and initialize the scanner, and load an election definition.



Reference: See Clearing and Initializing the Scanner and Loading the Election Definition for more information on the Setup screen.

Reports Menu

Use the Reports menu to print or preview reports. See Chapter 8: Reports for additional information on the various reports that are available and for the steps to follow to preview or print the reports.

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The following is an example of the Reports menu.

Reports		
Scanning	Please select the Report Type	report to preview/print.
Election	Zero Report	Not Processed (Top Bin)
Reports	Results Report	Processed (Middle Bin)
System	Batch/Bin Report	Processed (Bottom Bin)
_	Precincts Processed Report	Report Level
Hardware	System Readiness Report	Long
	Ballot Style Counts Report	Short
Exit	Preview	Print

System Menu

The System menu lists the following options:

- Set Date/Time
- Firmware
- Antivirus
- User Access
The following is an example of the System menu.

	8/30/10 0 🚿	2:07 PM
	System	(?) Help
Scanning	Protected Counts	
Election	Total Ballots Scanned: Since Last Cleared/Zeroed:	
Reports	Since Last Maintenance: Not implemented	
System	Set Date/Time	
Hardware	Firmware	
	Antivirus	
	User Access	
Exit		

Set Date/Time

The Set Date/Time option allows you to change the date, time, or both on the DS850.



Note: The scanner's date and time settings cannot be changed when the scanner contains ballot data.



Reference: See Set Date/Time for the steps that must be taken to change the scanner's system date and time.

Firmware

Press **Firmware** on the System menu to access the Firmware screen. On the Firmware screen, you can see the version of the firmware loaded onto the DS850 and other information about the machine.



Reference: For detailed instructions on loading new firmware, refer to the ES&S DS850 System Maintenance Guide.

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The following is an example of the Firmware screen.

BMW 2013-10-29 Poll On	e		1/7/14 2:59 PM 🛯 🖋 📠 😨 🚔
Menu	F	irmware	Per p
Firm	nware	Car	nera
Firmware:	2.10.0.0e	Interface:	412.
		Library:	412.
Controller:	A83-40-22021322	Components Main Motor:	A83-41-08011321
Output Tray:	A83-43-22021322	Solenoids:	A83-44-11081020
Input Tray:	A83-42-22021322	Imprinter:	A83-49-11081020
Detectors Bank 1	A83-45-11081020	Detectors Bank 2:	A83-45-11081020
	Creat	e Validation Media	



Note: The **Load** and **Validate** buttons refer to future functionality that is not currently available on the DS850.

Antivirus



Note: This section refers to future functionality that is not currently available on the DS850.

User Access

When an election definition is loaded into the scanner, the firmware on the DS850 sets the User Access feature to enabled. When User Access is enabled, a user can lock the scanner. When the scanner is locked, no function can be performed from the touch screen, such as modifying configuration settings or scanning ballots, until the Election Code is entered and the scanner is unlocked. Once an election definition has been loaded, you can disable the User Access feature from the User Access screen, if you wish to do so. When User Access is disabled, the scanner cannot be locked.



Reference: See Locking the Scanner for the steps that must be followed to lock the scanner.

If an election definition has been loaded, the User Access setting determines the screen that is displayed when the scanner is started. If an election definition has been loaded and User Access is enabled, the Startup screen is displayed when the scanner is started. If an election definition has been loaded and User Access is disabled, the Scan Ballots screen is displayed when the scanner is started. (If an election definition has not been loaded, the Setup screen is displayed when the scanner is started.)



Reference: See Starting the Scanner for the steps to follow to start the scanner.

Follow the steps listed below to change the User Access setting:

1. Press User Access on the System menu to display the User Access settings screen.



Note: If an election definition has not been loaded onto the scanner and you press User Access on the System menu, a pop-up screen will appear indicating that an election must be loaded in order to access this screen.

- **2.** Press **Edit** on the User Access settings screen to change the user access setting.
- **3.** When prompted, enter the Administration Code and press **Accept**.

1 PRECINCT 1	2010-11-02		9/29/10 9:36 AM 🛯 💉 🗎 🕏 🍋
🔄 Menu	U	ser Access	(?) Help
	User Access:	View of Options	
	Settings	User Access Setting	Edit
	Instructions; Select 'Edit' to change this setting.	 Disabled Enabled 	
	Edit		



4. When the User Access selection screen appears, highlight the desired option (Disabled or Enabled) by pressing on it. Then press Save to save the change, or press **Cancel** to cancel it.



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Hardware Menu

The Hardware menu lists the following options:

- Screen Calibration
- Printers
- Audio
- Camera
- Transport

The following is an example of the Hardware menu.

	Hardware	Р
Scanning	Scroop Calibration	
Election	Scieen Calibration	
Reports	Printers	
System	Audio	
Hardware		
	Camera	
	Transport	
Exit		

Screen Calibration

Press Screen Calibration to calibrate the scanner's touch screen.



Reference: Refer to the ES&S DS850 System Maintenance Manual for further information on calibrating the scanner's touch screen.

Printers

The Printers option on the Hardware menu allows you to print test pages on the report and log printers.

Follow the steps below to print test pages on these printers:

1. From the Hardware menu, press Printers.

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2. When the Printers screen appears, press either Report Printer or Log Printer.



If you select Report Printer, the Report Printer screen appears. On the Report Printer screen, press **Print** to print a test page on the report printer. When you are finished, press **Back**.

005 Electionwide 2012-05-05	6/24/10 9:19 AM 0 💉 둼 🐲 🍋
Repor	t Printer 🛛 😰
Report Printer: Utilities Instructions: Make a selection to test the report printer. When you are finished, press 'Back'.	Test Page Print
Back	

A test page, similar to the one below, prints from the report printer:



If you select Log Printer, the Log Printer screen appears. On the Log Printer screen, use the Form Feed and Line Feed buttons to advance the paper in the log printer to the point at which you want printing to begin. Then press **Print** to print the test report on the log printer. When you are finished, press **Back**.

005 Electionwide 2012-05-05	6/24/10 9:21 AM 1 # 🗟 🖗 🏝 2000 Printer
Log Printer: Utilities Instructions: Make a selection to test the log printer. When you are finished, press 'Back'.	Feeds Form Feed Line Feed
Back	

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A test page, similar to the one below, prints from the log printer:

TEST PROE - TEST PROE

Audio



Note: This section refers to future functionality that is not currently available on the DS850.

Camera

From the Camera screen, you can calibrate the camera and adjust the camera's threshold, adaptive tolerance, and despeckle settings. These tasks should only be performed by trained personnel.



Reference: See the *ES&S DS850 System Maintenance Guide* for more information on the tasks that can be performed from the Camera screen.

Transport

From the Transport screen, you can set the ballot transport settings, as well as exercise individual components of the DS850 transport. The Transport screen lists the following options:

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- Interface
- Command Entry
- Tests ٠
- **Pick Delay**



Note: If a hardware failure occurs, the scanner will be in a Limited Functionality mode and some features may not be available.

Follow the steps below to access the Transport screen:

- 1. Press Transport on the Hardware menu.
- 2. When prompted, enter the Administration Code.

Administ	ration Code.	1 Poll One	2012-0	2-04										2	/8/12 0 💉	2:44	PM A
					A	dr	nin	ist	rat	ior		ode	e				? Help
					Ple	ease	ente	er the	e adn	ninist	tratio	n co	le.				
					_	_	_	_	_	_	_	_	_				
			:	! 1	@ 2	# 3	\$ 4	% 5	^ 6	& 7	* 8	(9) 0	-	1		
			Q	W aps	E	R	T	Y F	UG	1 H	0	P	i	1	 \ "		
			Z	X	c	۷	В	N	M	••••••••••••••••••••••••••••••••••••••	2	?	01	; Shi	, ft		
					C	Clear			Space		Bi	acksp	ace				
						Acc	ept) (Ca	ncel					
After you	ı successfully enter	1 PRECIN	CT 1 Z	2010-1	1-02	ç.									9/29/	/10 9	:37 AM
Transpor	t screen is displayed.	🤄 Men	u					Tr	an	sp	ort						
	Varning: Adjustments to allot transport settings					(Inter	face)				
t	rained technicians.					C		Cor	nmai	nd E	ntry						
						(_		Te	sts			>				
						C		F	Pick I	Dela	y)				

8/8/13 11:15 AM

💰 🔊 🚔

Pick Delay

The Pick Delay option is used to change the number of ballots that are picked for scanning in a given period of time. The value in the Pick Delay field specifies the number of seconds that the pick mechanism waits before grabbing the next ballot from the input tray. For example, if the pick delay is set to 15 seconds, only four ballots will be picked for scanning in one minute.

Increasing the pick delay value reduces the number of ballots that are picked for scanning in a given period of time; decreasing the pick delay value increases the number of ballots that are picked for scanning in a given period of time.

BMW

2013-07-08 | Poll One

Follow the steps below to change the DS850's pick delay setting:

- 1. Press Pick Delay on the Transport screen.
- 2. When the Pick Delay settings screen appears showing the current pick delay setting, press Edit.



screen appears showing the current setting and the up and down arrows, press the up arrow to increase the pick delay, or press the down arrow to decrease the pick delay. The numbers change more quickly if you hold down on the up or down arrow. The maximum pick delay is 30 seconds.

3. When the Pick Delay selection

4. After you select a new pick delay, press **Save** to save the new setting, or press **Cancel** to cancel the change.

Interface

The Interface screen lists the following options:

- Sensor Status
- Pick One Ballot
- Trays
- Motors
- Diverters
- Export Log

The following is an example of the Interface screen.

1 PRECINCT 1 2010-11-02		4/19/10 6:11 PM 🔒 🖋 둼 🐨 🚔
🜗 Menu	Interface	(?) Help
	Sensor Status	
	Pick One Ballot	
	Trays	
	Motors	
	Diverters	
	Export Log	

Sensor Status



Note: This section refers to future functionality that is not currently available on the DS850.

Pick One Ballot



Note: This section refers to future functionality that is not currently available on the DS850.

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Trays

Use the Trays option to raise or lower the input tray or the bottom output tray. Press **Trays** on the Interface screen to display the Trays screen. Press the up arrow in the **Input Tray** field to raise the input tray, or press the down arrow in that field to lower it. Press the up arrow in that field to lower it. When you are finished, press **Back**. The DS850 will reset itself, which clears the paper path and returns the trays to their original positions.

The following is an example of the Trays screen.



Motors

Use the Motors option to start and stop the DS850's transport motors. Press **Motors** on the Interface screen to display the Motors screen. In the **Transport Motors** field on the Motors screen, press **Start** to start the transport motors, or press **Stop** to stop the transport motors. When you are finished, press **Back**.

The following is an example of the Motors screen.

2010-11-02		0 💉	ا 🗢 🗟
	Motors		(?) Heb
Motors: Start/Stop	Tran	sport Motors	
Instructions; To start the motors, press the 'Start' button.	Start	Stop	
To stop the motors, press the 'Stop' button.			
press 'Back'.			
Back			
	Motors: Start/Stop Instructions: To start the motors, press the 'Start' button. To stop the motors, press the 'Stop' button. When you are finished, press 'Back'.	2010-11-02 Motors: Start/Stop Instructions: To start the motors, press the "Start" button. To stop the motors, press the "Stop" button. When you are finished, press 'Back'.	2010-11-02 Transport Motors Start/Stop Instructions: To start the motors, press the "Start" button. To stop the motors, press the "Stop" button. When you are finished, press "Back"

Diverters

Press **Diverters** on the Interface screen to display the Diverters screen. On the Diverters screen, press **Test** on the **Top Bin**, **Middle Bin**, and **Bottom Bin** fields to flip the position of the corresponding diverters. When you are finished, press **Back**. The DS850 will reset itself, which clears the transport path.

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The following is an example of the Diverters screen.

1 PRECINCT 1	2010-11-01		8/31/10 🔋 🚿	1:46 PM
		Diverters		(?) Help
	Diverters: Bin Selection	Top Rin		_
	Instructions:	Test		
	To set the diverter positions, press the			_
	corresponding button. When you are finished, press 'Back'.	Test	l ç	
		Bottom Bin		
		Test		
	Back			

Export Log

Use the Export Log option to export the interface log to a blank ES&S Media Device flash drive, if this report is requested by ES&S Technical Support.



Note: The Export Interface Log is used by highly skilled engineers and technicians to analyze the operation of the BAP Image Systems (BAPis) interface to the camera on the DS850.

Follow the steps listed below to export the contents of the interface log to a USB flash drive:

- 1. Insert a blank ES&S Media Device flash drive into one of the USB ports on the DS850.
- 2. On the Interface screen, press Export Log. The following is an example of the screen that is displayed when the interface log has been exported successfully.
- **3.** Remove the ES&S Media Device flash drive, and then press Done to close the Export Interface Log screen.



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Command Entry

Use the Command Entry screen to manually send commands to the transport.

Follow the steps below to send a command via the Command Entry screen:

- 1. Press Command Entry on the Transport screen.
- **2.** When the Command Entry screen appears, enter a Command code in the text box and press Send to manually send the command.



Warning: Use of this screen should be limited to ES&S Certified Technicians. See the ES&S DS850 System Maintenance Manual for additional information.

The following is an example of the Command Entry screen.

enu		С	om	ima	anc	1 E	ntr	у				1
Transp Comr Return	ort: nand E n Statu	Entry Is:										
	!	0	#	s	%	Â	&	*		?	Send	•
	! 1 W	@ 2 E	# 3 R	s 4 T	% 5 Y	^ 6 U	& 7 	* 8 0	(9 P) 0 1	Send	+ - - -
: Q 0	! 1 W Caps	@ 2 E A	# 3 R S	s 4 T D	% 5 Y F	° G	& 7 	* 8 0 J	(9 P K) 0 { [L	5end	+ = \ \ .

Tests

Use the Tests screen to display the last saved ballot and to print the Mark Code and Digital Readings reports. To access the Tests screen, press **Tests** on the Transport screen. The Tests screen lists the following options:

- Display Ballot
- Gate Flipper
- Reports

The following is an example of the Tests screen.



Display Ballot

Press **Display Ballot** on the Tests screen to display the last ballot scanned and saved on the DS850.

The following is an example of a displayed ballot.



▲ Hide Controls	Use the Hide Controls button to hide the Flip Sides , arrow, and zoom buttons. When you press the Hide Controls button, it becomes the Show Controls button. Press the Show Controls button to re-display the Flip Sides , arrow, and zoom buttons.
+ -	Use the button with a plus sign (+) to zoom in; use the button with a minus sign (-) to zoom out.
Flip Sides	Use the Flip Sides button to view the other side of the displayed ballot.
« »	Use the forward arrow to go to the next ballot and the back arrow to go to the previous ballot.
I<< >>I	Use the forward arrow to go to the last ballot in the batch and the back arrow go to the first ballot in the batch.
	Use the arrow buttons to position the ballot on the screen.
EXPORT CURRENT	Use Export Current to send the .tif image (front and back) for the currently displayed ballot, along with the associated Mark Code and Digital Reading reports, to USB media. (If using ExpressVote cards the Bar Code Report will be exported).
EXPORT BATCH	Use Export Batch to send the .tif images (front and back), for all ballots in the run in which the currently displayed ballot resides, along with the associated Mark Code and Digital Reading reports, to USB media. (If using ExpressVote cards the Bar Code Report will be exported).

Gate Flipper



Note: This section refers to future functionality that is not currently available on the DS850.

Reports

Use the reports option to print the following reports:

- Mark Code contains the mark code data from the scanner's image processor for the last ballot scanned and saved on the scanner.
- Digital Readings contains the reading data from the scanner's image processor for the last ballot scanned and saved on the scanner.
- Barcode Report contains data from the scanner's image processor for the last card scanned and saved on the scanner. It converts the barcodes on the card to a series of digits.



Note: ES&S Technicians use these reports to analyze scanner performance.



Note: If the last ballot scanned was out-stacked, then the Mark Code and Digital Readings reports will not work because a ballot image was not saved for the last ballot scanned.

- Follow the steps below to print the reports:
- 1. Press **Reports** on the Tests screen to display the Reports screen.
- 2. On the Reports screen, highlight the desired report by pressing on the report title and then press **Print**.



Note: The Zero, Results, Batch/Bin, Precincts Processed, and System Readiness reports are not available from this Reports screen. They are printed from the Reports menu. See Chapter 8: Reports for more information on accessing and printing those reports.



3. Press **Done** when you are finished printing reports.

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Page 1 of 4 Ballot Number: Rows: 91 Columns: 24 IMR Filter Val Side 1 _1_	060700 ues: 13 _2	0002 3, 120 34	Exa Mark Co _56_	mple ode F	e: Repo _8_	rt	Contac Technic with qu this rep 10	t ES& cal Si estio oort.	&S upport ns about
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$		- M- Mar - V- Vote I - Igno - 1 (No M 99 - dark be consi	rginal e ore lark) k enough dered a r	to mark.			- I-1 - - - - - - - - - - - - - -		- - - - - - - - - - - - - - - -



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Ballot Number	DS850 assigned scan number
Barcode	Number of selection barcodes on the card
Master Barcode	<internal id="" precint=""><internal ballot="" id=""><write-in count=""><total barcode="" count="" selection=""></total></write-in></internal></internal>
Selections	each row indicates the position of the candidate/response on the corresponding ballot. <column><row><side><sheet number=""></sheet></side></row></column>

Locking the Scanner

If an election definition has been loaded on the scanner and if User Access is enabled, you can lock the scanner to prevent unauthorized users from modifying the scanner configuration or performing other scanner functions from the touch screen.

Follow the steps listed below to lock the scanner:

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- 1. Press Exit in the lower left-hand corner of the screen to display the Exit screen.
- 2. From the Exit screen, press Lock Scanner to access the Lock Scanner screen





Note: If an election definition is not loaded or if User Access is disabled, the Exit screen does not include the **Lock Scanner** button. See the User Access section for information on enabling and disabling User Access.

3. On the Lock Scanner screen, press Lock to lock the scanner, or press Cancel to leave the scanner unlocked. If you press Lock, the Scanner Locked screen appears. See the steps below for an example of the Scanner Locked screen.



Follow the steps below to unlock a locked scanner:

4. From the Scanner Locked screen, press Unlock.



5. When prompted, enter the Election Code and then press Accept.

If you press **Exit** on the Exit screen, the Exit screen closes and the Scanning menu is displayed.

												11	/5/10	2:15 P	M
I PRECINC	11	2010-1	1-02										*		
	Election Code													Hel	2
				Ple	ase e	enter	the e	electi	on co	ode.					
		(_	_	_	_	_	_	_	_	_				
	e L	1	@ 2	#	S	%	Â	&	:	()	-	•		
	Q	W	Ē	R	T	Y	U	Í	0	P	1	}	1		
	0	Caps Lock	Α	s	D	F	G	Η	J	к	Ĺ				
	Ζ	X	С	۷	В	Ν	М	۲.	>	?	0 †	Sh	ift		
				Clear			Space		Ba	cksp	ace				
			_			_									
				Acc	ept) (Ca	ncel)			



Reference: See Shut Down and Power Off the Scanner for an explanation of how the **Shutdown Scanner** button on the Exit screen is used.

Part 2: Election Tasks

This part of the manual contains instructions for the tasks that must be performed before, on, and after Election Day. It includes the following chapters:

- Chapter 4: DS850 Election Workflow
- Chapter 5: Pre-Election Day Tasks
- Chapter 6: Election Day Tasks
- Chapter 7: Post-Election Day Tasks

Chapter 4: DS850 Election Workflow

The following is the DS850 election workflow. Click on the hyperlinks to view additional information on the referenced steps.

- **1.** Perform the Pre-Election Maintenance.
- 2. Install the UPS; see Installing the UPS.
- 3. Connect the scanner to the UPS; see Connecting the Scanner to the UPS.
- **4.** Connect the printers to the scanner and the UPS; see Connecting the External Printers.
- **5.** Set up the printers; see Setting Up the Audit Log Printer and Setting Up the Report Printer.
- 6. Turn on the UPS; see Turning On the UPS.
- 7. Power on the printers and the scanner; see Starting the Scanner.
- 8. Clear and initialize the scanner; see Clearing and Initializing the Scanner.
- 9. Load the election definition; see Loading the Election Definition.
- **10.** Perform Logic and Accuracy Testing to verify that the DS850 properly reads ballot marks.
- **11.** Make any desired modifications to the processing mode, bin sorting, audit log printing, and batch/bin reporting configuration options; see Configuring the Scanner.
- **12.** Place the ballots on the input tray and begin scanning ballots; see Scanning.
- **13.** After you have finished scanning the ballots, you can print reports; see Printing Election Reports. You can also export election results, ballot images, and the audit log; see Exporting Data.
- **14.** When you are finished printing reports and exporting data, you can clear the election results; see Clearing Election Results
- **15.** When the election results have been cleared, perform the post-Election scanner and UPS maintenance tasks; see Perform Scanner Maintenance and Perform UPS Maintenance.
- **16.** When the post-Election maintenance tasks have been completed, shut down and power off the scanner; see Shut Down and Power Off the Scanner.
- **17.** After the scanner has been shut down and powered off, turn off the UPS; see Turn Off the UPS.

Chapter 5: Pre-Election Day Tasks

This chapter describes the tasks that must be performed to prepare the UPS, printers, and scanner for scanning ballots on Election Day. It provides instructions for performing the following preparatory tasks:

- Pre-Election Maintenance
- Installing the UPS
- Connecting the Scanner to the UPS
- Connecting the External Printers
- Setting Up the Audit Log Printer
- Setting Up the Report Printer
- Turning On the UPS
- Starting the Scanner
- Checking the Connection Between the UPS and the Scanner
- Clearing and Initializing the Scanner
- Loading the Election Definition
- Setting the Date/Time
- Logic and Accuracy Testing
- Configuring the Scanner

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Pre-Election Maintenance

In order to keep the scanner in working order, perform routine maintenance before each election. Before performing the following maintenance steps, ES&S recommends that the unit be fully powered off using the proper shutdown procedures. Maintenance to any component inside the scanner requires that the power plug be unplugged from the scanner. Such maintenance should be done only by trained technicians.



Warning: Make sure you power the scanner down completely and power off and unplug the UPS before connecting or disconnecting the power cable. Remove the power cord before moving the scanner. Place the power cord near an easily accessible unobstructed power outlet.

Clean the Rollers

Required Tools: Dry cotton cloth, isopropyl alcohol **Required Staff:** Personnel trained by ES&S **Required Time:** 30 minutes

The rollers move each ballot, picked from the input tray, over the transport path, through the scan area (upper and lower camera housing), and into one of the three output bins (the top, middle, or bottom bin). If the surfaces of the rollers are dirty or discolored, clean them.

To clean the rollers, apply isopropyl alcohol to a cotton cloth and clean the visible surfaces of the rollers, turning them as you clean to expose most of the surface area of the rollers.



Caution: Keep fingers, hands, and loose clothing clear of the rollers.

Clean the Cameras

Required Tools: Dry cotton cloth, pressurized air can **Required Staff:** Personnel trained by ES&S **Required Time:** 5 minutes

To clean the cameras, wipe them with a dry, cotton cloth, or use a pressurized air can to clean out any debris or paper dust collected during scanner operation. It is important to hold the can upright so that you do not expel propellant onto the sensors.

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Clean the Scanner Case

Required Tools: Soft cotton cloth, mild detergent solution **Required Staff:** Personnel trained by ES&S **Required Time:** 5 minutes



Warning: Before cleaning the scanner case, disconnect the unit from its power source. Do **NOT** use full strength or harsh detergents, liquid cleaners, aerosols, abrasive pads, scouring powders, or solvents, such as benzene or alcohol. Liquids should never be applied directly to the scanner. 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 Touch Screen

Required Tools: ES&S touch screen cleaning kit **Required Staff:** Personnel trained by ES&S **Required Time:** 5 minutes

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.

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Installing the UPS

Installation of the UPS involves connecting the bottom battery connector to the top battery connector.

Follow the steps below to install the UPS:

1. Move the UPS so that the front panel of the UPS hangs over the edge of the table as shown in the picture on the right.



2. Press down on the front panel and then slide it off as shown in the picture on the right.



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- Insert the bottom battery connector into the top battery connector. The picture below on the left shows the two connectors before they are connected; the picture below on the right shows the two connectors after they have been connected.
- **4.** Replace the front panel.
- **5.** Move the UPS to the spot where you want it to be when the scanner is operating.
- **6.** Plug the UPS into a power outlet.





Connecting the Scanner to the UPS

Plug one end of the DS850's power cord into the left side of the DS850, just below the power switch. Plug the other end of the power cord into one of the bottom receptacles on the UPS that provides battery backup. Connect the data communication cable to the UPS and one of the USB ports on the DS850. The data communication cable is used by the UPS to let the DS850 know when the UPS is operating on battery power.

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Connecting the External Printers

The DS850 uses a dot matrix printer to print the continuous audit log and a laser printer for printing reports. Both printers can be attached to any USB connection on the side of the scanner. ES&S recommends that the printers be connected to the USB port next to the power switch on the left side of the scanner. This will allow the security door to be closed after connecting the printers. In addition, the audit log printer power cord should be connected to the battery backup power of the UPS, and the report printer power cord should be connected to the UPS power jack that has surge protection only. Connecting the laser printer power cord to the battery backup of the UPS will overload it.



Reference: Refer to the printer manuals for specific instructions on operating the printers.

Follow the steps below to connect the external printers:

- **1.** Plug the printer cables into the external USB printer ports located next to the power switch on the left side of the scanner.
- **2.** Plug the other end of the printer cables into the printer ports on the back of the printers.
- **3.** Connect one end of the printer's power cords to the backs of the printers.



4. Connect the other end of the printers' power cords to the UPS as shown below.



from the audit log printer should be connected to the battery backup power of the UPS, and the power cord from the report printer should be connected to the UPS power jack that has surge protection only.

Note: The power cord



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Setting Up the Audit Log Printer

The dot matrix printer is used to print the continuous audit log. Before using the printer, make certain that there is plenty of paper in the printer and that the printer is connected to the UPS and powered on.

The following is an example of a dot matrix printer.



Follow the steps below to configure the dot matrix printer using the buttons on the front panel of the printer:

- 1. Verify that there is plenty of paper in the printer.
- **2.** Verify that the printer is powered on.
- 3. Press and hold SHIFT and then press SEL to enable the menu.
- 4. Release SHIFT.
- 5. Press LF. The printer control emulation is displayed on the printer.
- 6. Press TEAR repeatedly until the "Epson FX" mode prints.
- 7. Press and hold SHIFT, and then press SEL to save the setting.

Setting Up the Report Printer

The laser printer is used to print reports. Before using the printer, make certain that the printer is connected to the power jack that has surge protection only on the UPS, there is paper in the printer and it is powered on.

The following is an example of a laser printer.



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Turning On the UPS

Before turning on the UPS, make sure that the UPS is plugged into a power outlet. Then press the power switch, as shown in the picture below. The green light visible at the top of this unit indicates that the UPS is powered on and that utility power is powering battery backup outlets.



Note: The first time the UPS is powered up, it will take eight hours for it to reach its full charge.



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Starting the Scanner

To start the scanner, flip the power switch on the left side of the DS850 to the on position. A pop-up screen will display telling you to touch the screen if you want to calibrate it. The next screen that displays depends on whether an election definition has been loaded into the DS850, and if an election definition has been loaded, whether User Access is enabled or disabled.

 If an election definition has not been loaded on the scanner, the screen that appears when the scanner is started is the Setup screen. The Setup screen allows you to either clear and initialize the scanner or load an election definition. The following is an example of the Setup screen.



Reference: See Clearing and Initializing the Scanner and Loading the Election Definition for the steps to follow to perform these procedures.

If an election definition has been loaded on the scanner and User Access is enabled, the screen that appears when the scanner is started is the Startup screen. From the Startup screen, press **Login** if you are ready to scan ballots for the loaded election, press **Setup** to load a different election definition, or press **Shutdown** to shut down the scanner. The following is an example of the Startup screen.

If you press **Login** from the Startup screen, you will be



prompted to enter the Election Code. Enter the Election Code and then press **Accept**. The next screen that is displayed is the Scan Ballots screen.

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If an election definition has been loaded on the scanner and User Access is disabled, the screen that appears when the scanner is started is the Scan Ballots screen. If you are ready to scan ballots, place the ballots in the input tray and press Start. The following is an example of the Scan Ballots screen.

inu	C	SCAII DA	nots	
V	oad Ballots			
Mode:	Mixed		🖲 S	orting: O
	Current		Saved	
	Top Bin	0		
	Middle Bin	0	Middle Bin	6
	Bottom Bin	0	Bottom Bin	2
	Total	0	Total	8
_			Last Export: 2011-06-08 11:00:03	Total: 4



Note: If the election is **By Style** or if the Processing Mode is set to **Single Precinct**, you will have to select a precinct before you can begin scanning the ballots. See <u>Select a Precinct</u> for more information. If the Processing Mode is set to **Mixed Precinct**, you will not need to select a precinct before you can scan ballots. The **Select Precinct** button will be the only available button until you select a precinct.



Reference: See Scanning for the steps to follow to perform the procedure. See Select a Precinct for instructions on selecting a precinct.

Select a Precinct

If an election is **By Style** or if the Processing Mode is set to **Single Precinct**, you must select a precinct before you can scan ballots.

Follow the steps below to select a precinct:

1. Press Select Precinct



Reference: See Scanning for an example of the Scan Ballots screen showing the **Select Precinct** button.

2. Enter the precinct number or name and then press **Search** or just press **Search**.



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You can enter the precinct name or the first few letters of the precinct to narrow your search. Use the keyboard to type in the first few letters, numbers or the precinct name then press Search. Then go to Step 3.

24685											5/2	4/12	1:47	PM
0001 Poll No. 1	2012-0	3-20										*	6 2	2
🧲 Scan			S	ele	ect	Pr	eci	nc	t					2 Heb
	Select P Searcl Currer ed	recinct h nt Sele	ectior	n: NO	NE						s	earc	h	
	:	!	@ 2	#	\$ 4	%	6	& 7	*	(9)	-	1	
	Q	W	E	R	T	Y	U	1	0	Ρ	1	}	1	
	0	Caps Lock	Α	S	D	F	G	Η	J	К	L	;		
	Ζ	X	С	V	В	Ν	М	< .	>.	?	0	Sh	ift	
				Clear			Space	8	Ba	ickspa	ice			



Note: You do not have to enter a precinct number or name in the search field in order to perform a search. You can leave the field blank and press **Search**. Entering a number in the field simply helps to narrow the search.

 You can also search the entire list of precincts on the DS850 by selecting Search. Then go to Step 3.

											5/2	4/12	1:47 PI
0001 Poll No. 1	2012-0)3-20										¥	576
🗐 Scan			S	Sele	ect	Pr	eci	nc	t				Heb
	Select F Searc Curre	Precinct h nt Sele	ection	n: NO	NE						s	earc	h
	:	!	@ 2	#	\$ 4	%	6	& 7	* 8	(9)		+
	Q	w	E	R	Т	Y	U	1	0	Ρ	1	}	1
	0	Caps Lock	Α	S	D	F	G	Η	J	К	L	:	
	Z	X	С	V	в	N	М	۲.	>.	?	01	Sh	ift
			-								-		

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- **3.** The Select Precinct results screen appears. Select the desired precinct by pressing on it and then press **Next**. If the precinct you want to select is not listed, press **Back** to perform another search.
- 24685 5/17/12 2:08 PM 0001 Poll No. 1 2012-03-20 0 💉 🖻 🐨 🍰 Select Precinct Select Precinct: 1 Results Found Results ED1 - AD: 40, ED: 00 Instructions Select the Precinct you want and then press 'Next'. If the Precinct you are looking for is not available, press 'Back' to start a new search. Back Next
- 4. The Select Precinct confirmation screen appears, press Next to confirm your selection. If you are not satisfied with your selection, press Back to review the list of search results, or press Search to start a new search.



Once you have selected the correct precinct and pressed **Next**. You will be returned to the Select Precinct screen. Under Current Selection, it will show the precinct you selected. i

24685											5/1	7/12	2:06 PM
0001 Poll No. 1	2012-0	3-20									(1 💉	🖹 🕈 🍰
Scan			S	ele	ect	Pr	eci	nc	t				() Heb
	Select P Searcl Currer	recinct h nt Sele	ectior	n: ED	1 - AD): 40,	ED: 0	01			S	earc	
		1	@ 2	#	\$ 4	%	6	& 7	*	()	-	+
	Q	W	E	R	T	Y	U	Ì	0	Ρ	1	}	
	0	Caps Lock	Α	s	D	F	G	Η	J	к	L	÷	
	Ζ	X	С	۷	В	Ν	М	۲.	>.	?	0	Sh	ift
				Clear			Space	2	Ba	ckspa	ace		

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Checking the Connection Between the UPS and the Scanner

The DS850 uses a USB connection to the UPS so that the DS850 can detect when external power is lost to the UPS.

Follow the steps below to test the UPS:



Note: These steps assume that the scanner has been connected to the UPS, the UPS has been turned on, the scanner has been powered on, and the AC Power icon indicates that external power is being applied to the UPS.



Reference: See Connecting the Scanner to the UPS, Turning On the UPS, and Starting the Scanner to verify the assumptions listed in the note above.

- 1. Disconnect external power from the UPS.
- **2.** Verify the DS850 screen indicates that external power has been lost. (The two connectors in the AC Power icon should be disconnected.)
- 3. Reconnect external power to the UPS.
- **4.** Verify that the screen indicates external power has been applied. (The two connectors in the AC Power icon should be connected.)



Reference: See Operating Status Icons for more information on the AC Power icon.

Clearing and Initializing the Scanner

You must clear and initialize the DS850 prior to loading the election definition. The clear and initialize process clears all data from the machine and loads the necessary encryption keys to load and run the election.

Follow the steps below to clear and initialize the scanner:

1. Press Election to access the Election menu.
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- 2. From the Election menu, press Setup to access the Setup screen.
- **3.** On the Setup screen, press **Clear and Initialize**. This displays the *Searching for EQC Media Device* pop-up screen.
- 4. Insert a valid (for the election) EQC Media Device flash drive into one of the scanner's USB ports. The previous pop-up screen is temporarily replaced by a Detecting inserted device pop-up screen. Then, the Qualification Code screen appears.

oll One 2012-02-04			2/8/12	2.30 PN
Menu	Set	tup		() Help
ES	5&S DS850™ C	entral Tabula	tor	
	Version:	2.4.0.0		
	Election Status:	Loaded		
	Log Printing:	Enabled		
	Log Printing: Results Printing:	Enabled Disabled		
s	Log Printing: Results Printing: ettings	Enabled Disabled Ballot Co	ounts	
S Processing Mode:	Log Printing: Results Printing: ettings Precinct Selection Off	Enabled Disabled Ballot Co Current Batch:	ounts	0
	Log Printing: Results Printing:	Enabled Disabled		
S Processing Mode: Precinct Selection: Print Bin Reports:	Log Printing: Results Printing: ettings Precinct Selection Off Auto Off	Enabled Disabled Ballot Cc Current Batch: Total Saved: Collected:	ounts	0 12 12



Reference: See Using USB Media Devices for instructions.

5. Enter the Qualification Code and then press **Accept**.



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Chapter 5: Pre-Election Day Tasks 63

- 6. When the Clear and Initialize screen appears notifying you that the system has found valid EQC media for the election, press Yes to continue, or press No if you do not want to proceed. If you press Yes, a pop-up screen appears briefly to inform you that the DS850 is being cleared and initialized.
- 7. The following screen appears when the DS850 has been successfully cleared and initialized. Remove the EQC Media Device flash drive from the scanner's USB port and then press Done.



Loading the Election Definition

You must clear and initialize the DS850 prior to loading the election definition. The clear and initialize process clears all data from the machine and loads the necessary encryption keys to load and run the election.

Election coders create the USB flash drives containing the current election information for every new election. If ES&S is coding your election, they will send the drives to you.

Follow the steps below to load the election definition:

1. Press Election to access the Election menu.

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Chapter 5: Pre-Election Day Tasks 64

- 2. From the Election menu, press Setup to access the Setup screen.
- **3.** On the Setup screen, press **Load Election**. This displays the Searching for Election Definition Media Device pop-up screen.
- 4. Insert a valid (for the election) Election Definition Media Device flash drive into one of the scanner's USB ports. The previous pop-up screen is temporarily replaced by a *Detecting inserted device* pop-up screen. Then, the Election Code screen appears.

0 # D 🖗 🏠
eulator
bulator
tallot Counts
0
12

Reference: See Using USB Media Devices for instructions.

5. Enter the Election Code and then press Accept.

1 PRECINC	Т1	2010-1	1-02									11	./5/10 🖋	2:15 PM
					Ele	ecti	on	Сс	ode	2				(?) Help
	Please enter the election code.													
		C		_	_	_	_	_	_	_	_			
	e L		@ 2	#	\$ 4	% 5	^ 6	& 7	8	(9)	-	1	
	Q	W	Ε	R	Т	Y	U	1	0	Ρ	1	}	1	
	0	Caps Lock	Α	S	D	F	G	Η	J	К	L	:		
	Z	X	С	۷	В	Ν	М	× .	>	?	•	Sh	ift	
				Clear			Space		Ba	cksp	ace			
	Clear Space Backspace Accept Cancel													

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6. When the Load Election screen appears notifying you that the system has found valid Election Definition media for the election, press Yes to start the election definition load process, or press No to stop it. If you press Yes, a pop-up screen appears briefly to let you know that the election definition is being loaded.



7. The following screen appears when the election definition has been loaded successfully. Remove the Election Definition Media Device flash drive containing the election definition and store it in a safe place. Then press **Done**.



Chapter 5: Pre-Election Day Tasks

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Setting the Date/Time

The Set Date/Time option allows you to change the date, time, or both on the DS850.



Note: The scanner's date and time settings cannot be changed when the scanner contains ballot data. Therefore, if the scanner's date and time are incorrect, change them before you begin scanning ballots.

Follow the steps listed below to change the date on the DS850:

- 1. Press Set Date/Time on the System menu to access the Date/Time screen.
- 2. Press Change Date to change the date on the scanner. The Set Date settings screen appears displaying the current system date.



3. Press **Edit** on the Set Date settings screen to change the current system date.



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1 Poll One 2012-02-04

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Administration Code

Please enter the administration code.

2/8/12 2:44 PM

0 🖋 🖻 😨 🌥

4. When prompted, enter the Administration Code and then press **Accept**.

- When the Set Date selection screen appears, use the up and down arrows to modify the settings for month, day, and year.
- After you have modified the system date settings, press Next to display the Set Date confirmation screen, or press Cancel to cancel the change.
- On the Set Date confirmation screen, review your changes. Then press Save to save the new settings, Cancel to cancel them, or Back to return to the previous screen.



Follow the steps listed below to change the time on the DS850:

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1 PRECINCT 1 2010-11-02

🔄 Menu

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Date/Time

Change Date

Change Time

9/29/10 9:35 AM

0 💉 🖻 🐨 🊔

?

- 1. Press Set Date/Time on the System menu to access the Date/Time screen.
- 2. Press Change Time to change the time on the scanner. The Set Time settings screen appears displaying the current system time.

3. Press **Edit** on the Set Time settings screen to change the current system time.



4. When prompted, enter the Administration Code and then press **Accept**.

		ļ	Adr	mir	ist	rat	ion		ode	e			
		P	ease	e ente	er the	adn	ninist	ratio	n coo	le.			H
1	:	@ 2	#	5	%	^ 6	& 7	*	()	-	1	
Q	W	Ē	R	T	Y	U	Ì	0	Ρ	1	1	1	
0	Caps Lock	Α	s	D	F	G	Н	J	к	L			
Z	X	C V B N M ^{<} ^{>} [?] / ○ _↑ Shi						ift					
		Clear			Space Backspace								
	1	_					_	20	-	_			

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- 5. When the Set Time selection screen appears, use the up and down arrows to modify the settings for hours and minutes and to change the indicator to AM or PM.
- 6. After you have modified the system time settings, press Next to display the Set Time confirmation screen, or press Cancel to cancel the change.
- On the Set Time confirmation screen, review your changes. Then press Save to save the new settings, Cancel to cancel them, or Back to return to the previous screen.

1 PRECINCT 1	2010-11-02	10/18/1	0 11:06 AM
		Set Time	(?) Help
	Set Time: Selection Instructions: To adjust the time use the up and down arrows and press 'Next'. If you do not want to make a change, press 'Cancel'.	Hour Hour	•
	Cancel	Ne	ext

1 PRECINCT 1 2010-	11-02		1	0/18/10 1 0 💉 🕻	1:06 AM
	S	Set Time			(?) Help
Set Ti	me:	Review Your Change			
Con	firmation	Time		Ec	lit
Instrue	tions: "Save" to accept	11:06 AM			
the ne	w time setting.				
Select time s	''Back' to edit the etting.				
Select discar return menu.	'Cancel' to d changes and to the Date/Time				
E	Back		Cancel	Save	

Logic and Accuracy Testing

Perform logic and accuracy testing as required by your jurisdiction's procedures and applicable laws. Logic and accuracy testing includes zeroing totals, scanning the ballot test deck, and checking reports.

A hand counted test deck for each election is available from ES&S. A test deck is a stack of sample ballots that are marked and scanned at ES&S. The reports included with the test deck contain accurate results for the election definition sent to your jurisdiction.

Use the test deck to verify your election definition and to test scanner operation. Be sure to follow your local election laws regarding election testing.

The steps listed below are provided as a guide to help you develop a procedure for logic and accuracy testing that meets the requirements of your jurisdiction.

1. Clear and initialize the scanner; see Clearing and Initializing the Scanner.

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- **2.** Load the election definition; see Loading the Election Definition.
- **3.** Print the Zero Report to verify that ballot totals are all zeros.
- **4.** Scan the test deck of ballots; see Scanning.
- **5.** Print the Results Report.
- **6.** Compare your reports to the ones provided by ES&S to verify that the scanner is operating properly.
- 7. Clear the election results; see Clearing Election Results.
- 8. Print the Zero Report to verify that ballot totals are all zeros.



Note: If you turn off bin sorting for logic and accuracy testing, be sure to set the bin sorting options as required for your election after the testing has been completed. See Bin Sorting for information on turning off bin sorting.



Reference: See Chapter 8: Reports for more information on the Zero and Results reports.

Configuring the Scanner

Use the Configuration screen to change the DS850's configuration settings from the default settings established in ElectionWare. This screen can be accessed by selecting **Configuration** from the Election menu screen. The following items are listed on the Configuration screen:

- Processing Mode
- Bin Sorting
- Audit Log
- Batch/Bin Reporting
- Results Access
- Precinct Labels
- Ballot Images
- Network
- Multifeed Stop

The following is an example of the Configuration screen.

BMW 2013-10-29	Poll One		1/7/14 0 🚿	3:00 PM
付 Menu	Co	nfigur	ation	Provide the second seco
	Processing Mode		Precinct Labels	\sim
	Bin Sorting		Ballot Images	\supset
	Audit Log		Network	
	Batch/Bin Reporting		Multifeed Stop	
	Results Access			

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Processing Mode

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4		

Reference: Default settings for the processing mode are part of the Election Definition defined in ElectionWare. See the ES&S ElectionWare User Guides for information on modifying Election Definition settings.



Note: If the election definition from ElectionWare specifies a By Style election, the processing mode can only be changed in ElectionWare and there are no available options on the Processing Mode screen.

The two processing modes that can be used for an election are described below:

- Precinct Selection Off- Every ballot has the precinct information coded into the ballot ID.
- Single Precinct Every ballot has the precinct information coded into the ballot ID. The user is prompted to enter the precinct number prior to scanning ballots. After the user enters the precinct number, the scanner diverts any ballot that is outside of that precinct to the top (out-stacked), Not Processed bin.

Follow the steps below to change the Processing Mode:

- Press Processing Mode on the Configuration screen to access the Processing Mode settings screen.
- 2. Press Edit on the Processing Mode settings screen.



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3. When prompted, enter the Election Code and then press **Accept**.



 When the Processing Mode selection screen appears, highlight the desired Processing Mode by pressing on it. Then press Save to save the new Processing mode setting, or press Cancel to cancel the change.

0018 EARLY VOTING 2012-03-20	4/25/12 3:07 PM 0 💉 🖻 😎 🍰								
Processing Mode									
Processing Mode: Selection Instructions: Select the mode you would like to use to scan your ballots and press 'Save'. Select 'Cancel' if you do not want to make a change.	2 Available Options Precinct Selection Off Single Precinct								
Cancel	Save								

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Bin Sorting

There are two options on the Bin Sorting screen: Sort Settings and Scan Screen Sort Options.

Sort Settings

The Sort Settings option allows you to specify which output bin the ballots will be diverted to. It also allows you to specify whether undervotes, overvotes, crossovers, blank ballots, and ballots with unclear marks are to be processed.

Note: ElectionWare provides the ability to set bin sorting in the Election Definition. If you want to use settings that are different from the ones in the Election Definition, you can use the bin sorting screens to change the settings on the scanner.



If the Sorting on/off feature is enabled, you can override the default settings for bin sorting in the Election Definition, as well as any changes that have been made using the Bin Sorting screens, by turning sorting off from the Scan Ballots screens. When the Sorting on/off feature is enabled, there is a button on the scan ballots screens that allows the user to turn sorting on or off. The middle bin is not able to be changed and will always follow the ElectionWare defaults

Reference: See the *ES&S ElectionWare Volume IV: Deliver User's Guide* for additional information on ElectionWare.



See Scan Screen Sort Options for instructions on how to enable and disable the Sorting on/ off feature.

See Sorting On/Off Feature for information on the impacts of turning sorting off.

Write-In	A write-in space appears on the ballot as a voting target next to a blank line that a voter uses to fill in the name of a write-in candidate. To vote for a write-in candidate, a voter writes the name of the candidate on the write-in line and marks the ballot target that corresponds to the line.
Overvote	Ballots having more than the allowed number of votes cast for one or more contests
Undervote	The election definition can designate one or more contests as an "undervote-contest". This option out-stacks any scanned ballot that has a designated undervote contest that was undervoted. This option does not out-stack blank ballots
Blank Ballots	This option out-stacks ballots that do not contain any votes, have been marked with a non-standard marking device for the DS850, or have been marked improperly (for example, the voter circled the candidate's name instead of filling in the appropriate oval).

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Unclear Marks	Unable to interpret a mark in an oval position on the ballot.
Cross Over	In an Open Primary, this option out-stacks ballots with votes for any multiple party candidate.
Invalid ID	Sorts ballot that are not associated with the current election or a ballot style that is not associated with any of the election precincts.
Unreadable	Not able to read or interpret the ballot. Example: Marks on the code channel, torn ballot

When the DS850 scans a ballot, it gathers two images (front and back) and a cast vote record from the ballot. A ballot is normally scanned within a batch of ballots. The cast vote records of ballots diverted to the bins that have been processed are selected for inclusion in the collection process. The cast vote records of ballots diverted to the Not Processed bin are selected for exclusion from the collection process. These ballot images and cast vote records are then saved to the scanner's internal memory when the batch is saved.



Reference: See Exporting Data for information on exporting the vote results and ballot images to USB flash drives.

Follow the steps below to configure the sort settings:

- **1.** Press **Bin Sorting** on the Configuration screen. The Bin Sorting options screen opens.
- 2. On the Bin Sorting options screen, press Sort Settings.



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 The Sort Settings screen will show the current selections, which were setup in ElectionWare for each bin. Press Edit to change the settings for each bin.

 When prompted, enter the Election Code and then press Accept.



Z X C

V

Clear

Accep

N M [<]

Space

в

5. To change the options for the bin sorting, press the Option Button under each ballot exception to sort the ballots to the bin of your choice. You can only choose one bin per ballot exception. Press Save to save the settings and return to the Sort Setting View screen.

PowrTemp 2013-06-04	Hillwood	od						6/20 0	/13 8:47 💉 🖻 😨	AM
			S	ort S	Setti	ngs				2
Sor Insti Sele Sele	t Settings: ructions: ect the Ball ect "Cancel	Edit ot Types y	you want to o not want	o divert to to make a	each bin a change.	nd press "S	iave".			
	BINS	Write	Over Vote	Under Vote	Blank Ballot	Unclear Marks	Cross	Invalid ID	Unread- able	
Der	Top S n't Process	0	0	0	\odot	0		•	•	
	Middle V Process	0	0	0	0	0				
	Bottom	٠	•	٠	•	•				
	Cancel]							Save	

?

Backspace

Cancel

🛉 Shift

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Note: The Cross Over option is only applicable for an open primary election.



Note: For Logic and Accuracy Testing, you may be required to turn off bin sorting prior to scanning the test deck. Bin sorting is turned off when the **Ballots With Write-ins** option is set to Process and none of the ballot types for the **Ballots Not Processed** option are selected. When logic and accuracy testing has been completed, make certain the bin sorting options are set as required for your election.

Scan Screen Sort Options

The Sort Option allows you to enable or disable the Sorting on/off feature. When the Sorting on/off feature is enabled, the Sorting on/off button is displayed in the top portion of the main scan ballots screen with Sorting On. When the Sorting on/off feature is disabled, the Sorting on/off button is not displayed on the main scan ballots screen, however Sorting remains on. By default, the Sort Option is disabled.



Reference: See Sorting On/Off Feature for information on the impacts of turning sorting off.

Follow the steps below to modify the Sort Option setting:

- **1.** Press **Bin Sorting** on the Configuration screen. The Bin Sorting options screen opens.
- On the Bin Sorting options screen, press Scan Screen Sort Options. The Scan Screen Sort Options settings screen is displayed.

	l 💉 🗟 🕏 🌥
Bin Sorting	Refe
Sort Settings	
Scan Screen Sort Options	
	Bin Sorting Sort Settings Scan Screen Sort Options

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3. On the Sort Option settings screen, press **Edit**.

4. When prompted, enter the

Administration code and then

press Accept. The Sort Option

selection screen is displayed.

- 6/8/11 11:25 AM 0001 01001 1 2014-01-02 0 💉 🖻 🐨 🌥 Menu Sort Option 2 Sort Option View of Options Settings Sort Option Edit Instructions: O Disabled Enabled Select 'Edit' to change this setting. Edit 2/8/12 2:44 PM 1 Poll One 2012-02-04 0 💉 🖻 🐨 🌥 Administration Code Please enter the administration code. # \$ 4 @ 2 % 5 & 7 6 8 (9) QWE R т Y U L 0 Ρ 1 O Caps Lock s D F G н Α J K L С М ZX V в Ν Shift ٠ Backspace Clear Space Cancel
- On the Sort Option selection screen, highlight the desired option (Disabled On Scan Screen or Enabled On Scan Screen) by pressing on it. Then press Save to save the new setting, or press Cancel to cancel the change.



Audit Log

Activity on the DS850 is recorded to the audit log, and the DS850 prints the contents of the audit log to the attached dot matrix printer.

ElectionWare provides the settings for the audit log printing function in the election definition. There are settings that are provided which enable audit log printing and prevent the user from disabling it. The user also has the option to set the ability to enable or disable the Real Time Audit Log on the DS850.

1 PRECINCT 1	2010-11-02		9/29/10 9:41 AM 🛯 🚿 둼 😨 🚔
Menu 🗧	Audi	t Log Printing	(?) Help
	Audit Log Printing:	View of Options	
	Settings	Audit Printer Setting	Edit
	Instructions: Select 'Edit' to change this setting.	Oisabled • Enabled	
	Edit		



Reference: See the ES&S ElectionWare Volume IV: Deliver User's Guide for additional information on ElectionWare.

Batch/Bin Reporting

The Batch/Bin Reporting screen allows you to change the number of copies of each Batch/Bin report to be automatically printed whenever a user saves a scanned batch of ballots. Together, the following three Batch/Bin reports identify the resulting bin disposition of each ballot within the saved batch:

- Not Processed
- Processed with Write-ins
- Processed



Note: ElectionWare provides the default settings for batch/bin reporting in the election definition. By default, no batch/bin reports are printed automatically when the user saves a scanned batch of ballots. If you want reports to print automatically when you save a batch of scanned ballots, you must use the Batch/Bin Reporting screen to specify the number of reports you want printed.

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Reference: See the *ES&S ElectionWare Volume IV: Deliver User's Guide* for additional information on ElectionWare.



Reference: The Batch/Bin reports can also be printed from the Reports menu. See Chapter 8: Reports for instructions on how to preview and print the reports and for an example of a Batch/Bin Report.

Follow the steps below to change the number of copies to be automatically printed for each report:

- 1. Press Batch/Bin Reporting on the Configuration screen to access the Batch/Bin Reporting settings screen.
- When the Batch/Bin Reporting settings screen appears, press
 Edit to modify the current settings.

3. When prompted, enter the Election Code and then press **Accept**.



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- 4. When the Batch/Bin Reporting selections screen appears, use the up and down arrows to change the number of copies to be printed for each report type: Top Bin, Middle Bin and Bottom Bin.
- 5. When you are finished, press Save to save the changes, or press Cancel to cancel the changes.

Batch	/Bin Repo	orting	6/20/13 8:52 AM
Batch/Bin Reporting: Selections Instructions: To set the amount of copies printed for each report, press the up and down arrows under that report heading. When you are finished, press 'Save'.	Top Bin (Not Processed)	Middle Bin (Processed)	Bottom Bin (Processed)
Cancel			Save

Results Access

The Results Access option will allow jurisdictions to restrict access to the Results Report and vote collection process before polls have closed. This option will restrict access to the following DS850 screens:

- Reports selection screen option Results Report
- Results menu screen options
 - Export Results
 - Export Files
 - Backup menu screen option Collection
- 1. From the Election Menu select Configure.
- 2. Select Results Access.

MW 013-10-29	Poll One	1/7/14 3:00 PM 🕺 🖋 🖻 😨 🌥
🗐 Menu	Configu	iration 📀
\subset	Processing Mode	Precinct Labels
\subset	Bin Sorting	Ballot Images
\subset	Audit Log	Network
\subset	Batch/Bin Reporting	Multifeed Stop
C	Results Access	

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- **3.** On the Results Access screen press **Edit** to update your option.
- MARTIN COUNTY, IN 2012-12-31 ALL PRECINCTS 0019 Menu Results Access: Settings Instructions: Setect "Edit" to change this setting. Edit Edit
- **4.** Enter the Administration Code.



- 5. Select one of the following options:
 - Unlocked Results Report and vote process options are available.
 - Locked The following options are restricted from use:
 - The Reports selection screen option Results Report
 - Results menu screen options
 - Export Results
 - Export Files
 - Backup menu screen option Collection



Note: If the user attempts to use any of the locked functions they will receive a message informing them that these options are unavailable.

6. Press Save to save your current option.

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Precinct Labels

The Precinct Labels section will allow you to change the name of how a precinct is labeled on the scanner. You will be able to change the name to your jurisdictions preference (example: borough, ward, etc...). For example, if you change the name to borough, it will replace "precinct" on the screens and reports.

- **1.** Select **Precinct Label** on the Configuration screen to access the Precinct Labels settings screen.
- 2. When the Precinct Labels screen comes up, you will have the following choices:
- Change Singular Label this will change any of the labels that are singular text.
- Change Plural Label this will change any of the labels that are plural.

Singular Label

3. Press Change Singular Label to change the singular text.

All Fill 1781 F 1 Poll One 20	12-02-04		🔲 🥬 🚨 🐨 🛙
🗧 Menu	Pre	ecinct Labels	
	Ch	ange Singular Label	
	C	hange Plural Label	
All Fill 1781 F 1 Poll One 20	ormat 1 12-02-04		2/8/12 2:42 PI
All Fill 1781 F 1 Poll One 20	ormat 1 12-02-04 Singula	ar Precinct Label	2/8/12 2:42 PI 0 💉 🖻 🐨 着
All Fill 1781 F 1 Poll One 20	ormat 1 12-02-04 Singular Singular Precinct	ar Precinct Label	2/8/12 2:42 PI 0 # 10 7 1 0
All Fill 1781 F 1 Poll One 20	ormat 1 12-02-04 Singular Precinct Label: Settings	Current Setting Singular Precinct Label	2/8/12 2:42 PI 0 💉 🗎 🐨 🕯 Hett Edit
All Fill 1781 F 1 Poll One 20	ormat 1 12-02-04 Singular Precinct Label: Settings Instructions:	Current Setting Current Setting Singular Precinct Label Label	2/8/12 2:42 PI 0 # @ 7 C Edit
All Fill 1781 F 1 Poll One 20	ormat 1 12-02-04 Singular Precinct Label: Settings Instructions: Select "Edit" to change the setting.	ar Precinct Label Current Setting Singular Precinct Label Label	2/8/12 2:42 P 0 💉 🖻 😨
All Fill 1781 F 1 Poll One 20	ormat 1 12-02-04 Singular Precinct Label: Settings Instructions: Select "Edit" to change the setting.	Current Setting Singular Precinct Label Label	2/8/12 2:42 P 0 💉 🖻 <table-cell> Edit</table-cell>
All Fill 1781 F 1 Poll One 20	ormat 1 12-02-04 Singular Precinct Label: Settings Instructions: Select 'Edit' to change the setting.	Current Setting Singular Precinct Label Label	2/8/12 2:42 P 0
All Fill 1781 F 1 Poll One 20	ormat 1 12-02-04 Singular Precinct Label: Settings Instructions: Select 'Edit' to change the setting.	Current Setting Singular Precinct Label Label	2/8/12 2:42 P * * * * * * *
All Fill 1781 F 1 Poll One 20	ormat 1 12-02-04 Singular Precinct Label: Settings Instructions: Select 'Edit' to change the setting.	Current Setting Singular Precinct Label Label	2/8/12 2:42 P 0

4. Press **Edit** to change the text of the label.

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5. Enter the preferred name into the field by using the on-screen keyboard. After you have completed entering the name press **Save**.

Poll One 2012	02-04										2/	8/12] 💉	2:43 F
📜 Menu		Sir	ιgι	ıla	r P	rec	inc	t L	.ab	el			H
s E C	ingular E dit Currer	Precinc nt Lab	el: L	abel								Save	
		1	@ 2	#	\$ 4	%	6	& 7	*	(9)	-	1
	Q	w	Ε	R	T	Y	U	1	0	Ρ	1	1	
	0	Caps	Α	S	D	F	G	Η	J	K	L	;	
	Z	X	С	۷	В	Ν	М	× .	>.	?	0	Shi	ift
				Clear			Space	2	Ba	ckspa	ace		

6. Confirm that the name is correct, if it is correct select the Menu button. This will return you to the Precinct Labels screen.

1 Poll One 2012-02	-04		2/8/12 0 🖋	2:43 PM
(Menu	Singular	Precinct Label		Heb
Sing	ular Precinct	Current Setting		
Lab Sei	el: ttings	Singular Precinct Label	3	Edit
Inst	ructions:	Precinct		
Sele	ect 'Edit' to change setting.			
	Edit			

Change Plural Label

1. Press **Change Singular Label** to change the singular text.

All Fill 1781 Format 1 1 Poll One 2012-02-04		2/8/12 2:42 PM
🧲 Menu	Precinct Labels	(2) Help
	Change Singular Label	
	Change Plural Label	

2. Press **Edit** to change the text of the label.



3. Enter the preferred name into the field by using the on-screen keyboard. After you have completed entering the name press **Save**.



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4. Confirm that the name is correct, if it is correct select the Menu button. This will return you to the Precinct Labels screen.



Ballot Images

1. Select Ballot Images on the Configuration screen to access the Ballot Images settings screen.

BMW 2013-10-29 F	Poll One	1/7/14 0 <i>#</i> 4	3:00 PM
Menu Menu	Conf	iguration	(?) Hep
	Processing Mode	Precinct Labels	
	Bin Sorting	Ballot Images	
	Audit Log	Network	
E	Batch/Bin Reporting	Multifeed Stop	
	Results Access)	

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- 2. Press Edit to update the selections.
- **3.** You will be able to select from one of the following options:
 - None
 - All Processed Images
 - Processed Write-In Images Only



4. After you make your selection, press Save to save your selection, or press Cancel to exit.

BMW	1/10/14 8:43 AM
2013-10-29 Poll One	0 # 1∋ ⊽ ≏
Ba	Iot Images
Ballot Images: Selection Instructions: Select the type of ballot images you would like exported during export operation and press 'Save'. Select 'Cancel' if you do not want to make a change.	3 Available Options 3 Available Options None All Processed Images Processed Write-in Images Only

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Network



Note: See Chapter 9: DS850 Network for instructions on using a network.

Multifeed Stop

1. Select Multifeed Stop on the Configuration screen to access the Ballot Images settings screen.

付 Menu	Configu	ration	-
\subset	Processing Mode	Precinct Labels	
\subset	Bin Sorting	Ballot Images	
\subset	Audit Log	Network	
\subset	Batch/Bin Reporting	Multifeed Stop	
C	Results Access		

2. Press **Edit** to select you option to turn on or off the multifeed detection.



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3. Press **On** or **Off** to select the option you would like. To save the selection press **Save**.

0004 EARLY VOTE 0004 2015-01-02		5/1/12 2:45 PM
Multife	ed Stop Option	(2) Help
Multifeed Stop: Selection Instructions: Select an option, and press 'Save'. Select 'Cancel' if you do not want to make a change.	2 Available Options	
Cancel		Save

This is an example of the error screen you will see if you have the Multifeed Stop Option on. You will get this error when multiple ballots are fed through the scanner at the same time.

<jurisdiction name="" re<br="">0004 EARLY VOTE 0004</jurisdiction>		5/1/12 2:44 PM 💉 🖻 😨 🚔
	Scan Ballots	(P)
Mode: Mix	Attention Multifeed(s) occurred during the last run of ballots.	
×	ОК	0 0 44:3
Start	Stop	Select Precinct

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Chapter 6: Election Day Tasks

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Chapter 6: Election Day Tasks

This chapter contains instructions for the following Election Day tasks:

- Scanning
- Printing Election Reports
- Exporting Data
- Clearing Election Results



Reference: Before you begin the Election Day tasks, see Chapter 5: Pre-Election Day Tasks to make certain that all pre-election tasks have been completed.

Special Instructions for Processing Folded Ballots

This section covers instructions on how to process folded ballots.

1. Remove the ballot from the envelope and unfold it.



3. Start running ballots by laying them flat in small stacks of about 25 to 50 ballot. Slowly increase the stack size if the scanner successfully processes smaller ballot batches without issues. Maximum stack size for folded ballots should not exceed 150 ballots.





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Scanning

This section covers the following:

- Scanning ballots
- Handling out-stacked ballots
- Saving a batch of ballots
- Deleting a batch of ballots
- Using the Sorting on/off feature

Scanning the Ballots/Cards



Warning: The ballot scanning process assumes that the scanner has been powered on, all pre-Election Day tasks have been completed, the election definition has been loaded, the user has the authority to scan ballots, and the scanner has been calibrated.



Note: Before you attempt to scan ballots/cards make sure that the camera lid and rear panel are closed. The scanner does not allow functions that engage the motors to be performed when the camera lid or rear panel is open.

1. On the touch screen, press Scanning to display the Scanning menu.



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- 2. Press Scan Ballots from the Scanning menu. The Load Ballots screen appears. As shown below, in Mixed Precinct mode all of the buttons in the bottom portion of the screen are dimmed. However, in By Style and Single Precinct modes, the Select Precinct button would be available.
- **3.** Load the ballots\cards as described below.
 - **a.** Adjust the length of the input and output trays to accommodate the ballots.

V ¹	oad Ballots			
Mode:	Mixed		🖲 So	orting: O
C	Current		Saved	
	Top Bin	0		
	Middle Bin	0	Middle Bin	6
	Bottom Bin	0	Bottom Bin	2
	Total	0	Total	8
_			Last Export: 2011-06-08 11:00:03	Total: 4



Reference: See Adjusting the Input and Output Trays for instructions on how to adjust the trays.

b. Slide the ballot guide out of the curved opening in the input tray, as shown in the picture on the right.



c. Place the ballots in the input tray. The ballots can be in any orientation.



Note: ES&S recommends using a jogger to separate the ballots and to align the ballot stack before you place the ballots in the input hopper. If the ballot stack is slightly curved, place the stack in the input hopper with the convex side up. If the scanner cannot read a ballot because of its condition or because of the way in which it is fed into the scanner, the scanner will not process the ballot and will out stack the ballot to the Not Processed (top) bin.

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d. Slide the ballot guide back toward the opening until it rests gently against the ballot stack as shown in the picture on the right.



5. Once the ballots have been loaded, the *Scan Ballots* screen appears. Press **Start** to begin scanning.

V F	Ready to Scan			
Mode:	Mixed		Se	orting: O
	Current		Saved	
	Top Bin	0		
	Middle Bin	0	Middle Bin	6
	Bottom Bin	0	Bottom Bin	2
	Total	0	Total	8
			Last Export: 2011-06-08 11:00:03	Total: 4



Note: If you are required to select a precinct and have not yet done so, the **Start** button will be dimmed. The only button that you will be able to use is the **Select Precinct** button. Press **Select Precinct** and follow the steps listed in the <u>Select a Precinct</u> section to search for and select a precinct. After you have selected a precinct, you will be able to scan ballots.

While the ballots are being scanned, the *Scanning* screen is displayed. Only the **Stop** button is available on this screen; the other buttons are dimmed.



Note: If you need to stop the machine before the input tray is empty, press **Stop** to stop scanning. The number of ballots that have been scanned will be displayed in the Current column.



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After the ballots have been scanned, the *Scan Ballots* screen is re-displayed. This time, only the **Save** button is available; the other buttons are dimmed. The Current column on the screen indicates the number of ballots in each bin, as well as the total number of ballots scanned.

	3	can ba	.11015	
V Loa	d Ballots			
Mode: Mix	ked		🖲 So	rting: Or
C	Current		Saved	
	Top Bin	0		
	Middle Bin	0	Middle Bin	6
	Bottom Bin	1	Bottom Bin	2
×	Total	1	Total	8
			Last Export: 2011-06-08 11:00:03	Total: 4

At this point, you can do any one of the following:

• Save the current batch; see Save the Current Batch.

1	
4	

Note: If ballots have been out-stacked to the top (not processed) bin, you have the option of generating the Not Processed Ballots report. You can also remove the ballots from the bin and reset the top bin quantity to zero, before you save the batch. The removed ballots can later be reviewed or re-scanned.



Reference: See Out-Stacked Ballots for additional information.

- Delete the current batch; see Delete the Current Batch.
- Load more ballots into the input tray. The Scan Ballots screen will be displayed. Press Start to scan the additional ballots. When the ballots have been scanned, the Scan Ballots screen will be displayed again, and the numbers in the Current column will be updated.



Warning: If any of the output hoppers are full or nearly full and you wish to scan more ballots into the batch, make sure that you keep any ballots you remove from the output bins segregated from other batches. Ballots removed but not yet saved as part of a batch must all be segregated by the bin from which the ballots were removed.

Out-Stacked Ballots

The following is an example of the Current column on the scan ballots screen, showing seven ballots out-stacked to the top (not processed) bin.

	Current	
X	Top Bin	7
	Middle Bin	65
	Bottom Bin	85
X	Total	157

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Note: The red "X" at the bottom of the column is used to delete the entire batch.



Reference: See Delete the Current Batch for instructions on deleting the current batch.

Press the button to the left of the top red "X" to generate and display the Not Processed Ballots report.

If you want to either review or re-scan the ballots out-stacked to the top bin, you can remove them and reset the count for the top bin to zero. To reset the count for the top bin, press the top red "X". You will be prompted to indicate whether you want to re-scan the ballots. If you select **Continue** the Top Bin count is zeroed out. If you select **Cancel** the Top Bin count remains unchanged.





Note: Ballots that are outstacked for "Image Unreadable" or "Ballot Long" conditions and fail to read after a second scan should be reviewed and processed using the adjudication procedures established by your jurisdiction.

Save the Current Batch

Follow the steps listed below to save a batch of scanned ballots:

1. From the Scan Ballots screen, press Save.



2. When you are prompted to confirm that you want to save the batch, press **Save**.

)
Save curre	nt batch of 1 ballots?		
To save curre To return to th	nt batch, press 'Save'. ne previous screen, press 'Ca	ncel'.	
Bin	Ballot Type	Quantity	
Top Middle	Not Processed Processed with Write-ins	0	
Bottom	Processed	1	

After you press **Save**, a popup screen containing the following message will display briefly: "The batch ballot data is being saved." After the data has been saved, the popup screen closes and a screen similar to the one shown below is displayed.

At this point, you can press **Done** or **Scan**. If you press **Done**, the Scanning menu is displayed. If you press **Scan**, the *Scan Ballots* screen is displayed, allowing you to scan another batch of ballots.

0001 01001 1 2014	-01-02		6/8/11 11:23 AM
1	Scan Ballot	s	(?) Heb
	Saved 1 ballots for batch: batch_2011-06-08T11_23_47 To scan ballots, press 'Scan'. To exit ballot scanning, press 'Done'.		_
	Bin Ballot Type Top Not Processed Middle Processed with Write-inst Bottom	Quantity 0 5 0 1	
	Scan	Done	



Note: If you press **Scan**, when the *Scan Ballots* screen opens, the quantities in the Current column will be all zeros, and the quantities in the Saved column will have been updated to include the quantities in the saved batch.
Delete the Current Batch

Follow the steps listed below to delete a batch of scanned ballots:

1. Press the red "X" to the left of the Total line in the Current column.



2. When prompted, enter the Election Code and then press Accept.

				Ele	ecti	on	Сс	ode	2				
			Ple	ase (enter	the e	electi	on co	ode.				
		_	_	_	_	_	_	_	_	_			
e L		@ 2	#	\$ 4	%	Â	& 7	8	()	-	1	
Q	Ŵ	Ē	R	T	Ŷ	U	Ì	0	Ρ	1	}	1	
0	Caps Lock	Α	s	D	F	G	Η	J	К	Ĺ		÷	
Z	X	С	۷	в	Ν	М	× .	>	?	0	Sh	iift	
			Clear			Space		Ba	cksp	ace			
	1	_			_					_			

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3. When you are prompted to confirm that you want to delete the batch, press **Delete**.



After you press **Delete**, a popup screen containing the following message will display briefly: "The batch ballot data is being deleted." After the data has been deleted, the popup window closes and a screen similar to the one shown below is displayed.

At this point, you can press **Done** or **Scan**. If you press **Done**, the Scanning menu is displayed. If you press **Scan**, the *Scan Ballots* screen is displayed.





Note: If you press **Scan**, when the *Scan Ballots* screen opens, the quantities in the Current column will have been reset to zeros.

Sorting On/Off Feature

By default, the Sorting on/off feature is disabled. You can, however, enable the feature by changing the Sort Option setting to enabled.



Reference: See Scan Screen Sort Options for instructions on how to enable and disable the Sorting on/off feature.

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V	Ready to Scan			
Mode:	Mixed		🖲 s	orting: O
	Current		Saved	
	Top Bin	0		
	Middle Bin	0	Middle Bin	6
	Bottom Bin	0	Bottom Bin	2
	Total	0	Total	8
-			Last Export: 2011-06-08 11:00:03	Total: 4

Sorting On

•

The DS850 scanner diverts ballots to the following bins:

Processed (bottom bin)	All ballots that do not meet any of the sort criteria are diverted to this bin
Processed (middle bin)	If the middle bin is configured as 'Processed' then the ballot conditions that have selected for this bin will be diverted to the middle bin and should be Processed. By default, write-ins will be diverted to this bin. Ballots that cannot be processed such as Invalid Ballot ID, Unreadable ballot condition cannot be diverted to this bin.



Note: The saved cast vote records for ballots that are diverted to the Processed bin (bottom/ middle bin) are marked for inclusion in the collection process.

Not Processed (middle bin)	If the middle bin is configured as 'Not Processed' then the ballot conditions that have selected for this bin will be diverted to the middle bin and will not be processed. By default, ballot conditions such as Write-ins, Overvotes, Undervotes, Blank, Unclear Marks and Crossovers will be diverted to this bin.
Not Processed	By default, the ballot conditions such as Invalid Ballot ID and
(top bin)	Unreadable Ballot will be diverted to this bin.



Note: The saved cast vote records for ballots that are diverted to the Not Processed bin are marked for exclusion from the collection process.

Sorting Off

The DS850 scanner diverts ballots to the following bin:

- All the ballot conditions except the following conditions will be diverted to the bottom bin for processing.
 - Invalid ID
 - Unreadable

Invalid ID and Unreadable ballots will not be processed and diverted to the top bin.



When loaded, the Election Definition establishes the sort settings for the election. An Operator may change these settings via the series of Sort Settings screens, previously described in this manual. Accordingly, the current, existing sort settings may not be those established by the Election Definition.)

If the Sorting button is set to OFF the following will occur:

- Write-Ins, Overvote, Undervotes, Blank, Unclear Marks and Crossover ballots are processed and diverted to the bottom bin.
- Invalid ID ballots are NOT processed and divert to the middle bin, if middle bin is set to Not processed and if the Invalid ID condition is configure to go to the middle bin.
- Unreadable ballots that cannot be read will divert to the top bin

If the Sort Option is set to Disabled, the Sorting on/off button is not displayed on the scan ballots screens. However, sorting is performed as if the Sort Option was set to Enabled and the Sorting on/off button was set to On.

Not Processed Ballot Report

The DS850 can generate a "Not Processed Ballots Report" for the ballots that were out-stacked to the Top Bin.

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1. Select the "magnifying glass" next to the Top Bin line in the Current column.

The Not Processed Ballots Report will appear on the screen:

2. Press Print to print a copy of the report or press Close to go back to the Scan Ballots screen.



batch_2011-06-23T10_06_20

Contest(s) U.S. PRESIDENT U.S. PRESIDENT

Close

06/23/2011 10:06 13 06/23/2011 10:06 20 Reason C

Print

Printing Election Reports

The DS850 can generate a variety of results reports. You can manually select the desired reports from the Reports menu. Follow the instructions below to preview or print reports from the Reports menu.

Batch

Total: Ballot # Range: Batch Started: Batch Completed



Reference: See Chapter 8: Reports for information on the different report types and options that are available. The chapter also contains examples of the reports.

- 1. Select the desired report from the Reports menu.
- 2. If there are options associated with the selected report, set the desired options.
- **3.** Press **Preview** to view the report on the touch screen, or press **Print** to print the report on the laser printer.

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The following is an example of the Reports menu.

	Repo	rts
canning	Please select the	report to preview/print.
Election	Zero Report	Election Detail
Reports	Results Report	Election Public
System	Batch/Bin Report	Precinct by Precinct Detail
a constant and a second	Precincts Processed Report	
ardware	System Readiness Report	Select Precinct

Exporting Data

Data saved to the scanner's internal memory can be exported to the Election Definition Media Device flash drive or to a blank USB flash drive. However, if a blank USB flash drive is used, it should be first fully formatted. Described below are the export functions that can be performed from the scanner.



Note: If you choose to use USB media device, it is strongly recommended that you use fully-formatted USB media device flash drives rather than the Quick-formatted or cleared (all files deleted) flash drives. The fully-formatted flash drives work faster and are more reliable.

Export Results copies the poll place collection data, the election definition, and the audit log to the Election Definition Media Device flash drive or a fully-formatted ES&S Media Device flash drive. All of the copied data, except for the audit log, is encrypted. The data can be pulled into the Election Reporting Manager (ERM) to be consolidated with vote data from other devices (e.g., DS200) to generate the election results. The data can also be used in ERM to generate reports.



Reference: See Export Results for the steps to follow to perform this function.

EVS5200_DOC_SOP_DS850 Software Version 2.10 Published: February 26, 2014 Export Files copies the poll place collection data, the election definition, the gathered ballot data (including ballot images) of any scanned ballot that was not out-stacked and the audit log to the Election Definition Media Device flash drive or a fully-formatted ES&S Media Device flash drive. All of the copied data, except for the audit log, is encrypted.



Reference: See Export Files for the steps to follow to perform this function.

 Backup copies the gathered ballot data, marked for inclusion in the Election Definition, all the cast vote records, the election definition, and the audit log to the Election Definition Media Device flash drive or a fully-formatted ES&S Media Device flash drive. All of the copied data, except for the audit log, is encrypted.



Reference: See Backup for the steps to follow to perform this function.

• **Export Audit Log** copies the audit log to the Election Definition Media Device flash drive or a fully-formatted ES&S Media Device flash drive. The audit log is not encrypted. If a problem occurs, or if there is a question about the exact sequence of events, the audit log copied to the flash drive can be examined on a PC.



Reference: See Export Audit Log for the steps to follow to perform this function.

Export Results

Follow the steps below to perform the Export For Results function:

1. Press **Election** to display the Election menu.

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- 2. From the Election menu, press **Results** to display the Results screen.
- **3.** From the Results screen, press **Export Results**. This displays the Searching for ES&S Media Device pop-up screen.
- 4. Insert the Election Definition Media Device flash drive or a blank ES&S Media Device flash drive into one of the scanner's USB ports. The previous pop-up screen is temporarily replaced by a *Detecting inserted device* pop-up screen. Then, the Election Code screen appears.

Menu Menu	Results	
	Export Results	
	Export Files	
	Backup	
	Export Audit Log	
	Clear All Results	
	Clear A Precinct	

Reference: See Using USB Media Devices for instructions.

5. Enter the Election Code and then press Accept.



0001 Poll No. 1 2012-03-20

Export Results Selection

Instructions:

Select the desired

Export Options

5/17/12 2:00 PM

0 💉 🖻 🐨 🚔

- **6.** Select where you would like to export the files.
 - USB Media Device
 - Network Server Folder folder located on server

Press **Export** to export the files to your USB media device.

7. When the Export Results screen appears, press Confirm to confirm that you want to export the data, or press Cancel to cancel the process. If you press **Confirm**, the DS850 clears any existing data from the media device. Then it collects the saved cast vote records that were marked for inclusion in the collection process, generates the vote results, and exports those results to the USB flash drive, along with the election definition and the audit log. While this process is occurring, a pop-up screen will display indicating that the batch data is being collected and exported.



Export Results

ES&S Media Device

Network Server Folder



Note: The saved cast vote records for ballots that are diverted to the Processed bin (bottom bin) and to the Ballots with Write-ins bin (middle bin) are marked for inclusion in the collection process. The saved cast vote records for ballots that are diverted to the Not Processed bin (top bin) are marked for exclusion from the collection process. See Bin Sorting for more information.

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8. The Export for Results screen will indicate when the data has been successfully exported. Remove the flash drive. Then press **Done** to return to the Results screen.



Export Files

Follow the steps below to perform the Export Files function:

- **1.** Press **Election** to display the Election menu.
- 2. From the Election menu, press **Results** to display the Results screen.
- **3.** From the Results screen, press **Export Files** This displays the *Searching for ES&S Media Device* pop-up screen.
- Insert the Election Definition Media Device flash drive or a blank ES&S Media Device flash drive into one of the scanner's USB ports. The previous pop-up screen is temporarily

1 Poll One 2012-02-04		2/8/12 2:50 PM 🛯 🖋 🗎 🐨 🌥
Menu	Results	(?) Heb
(Export Results	
(Export Files	
(Backup	
(Export Audit Log	
(Clear All Results	
(Clear A Precinct	

replaced by a *Detecting inserted device* pop-up screen. Then, the Election Code screen appears.



Reference: See Using USB Media Devices for instructions.

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5. Enter the Election Code and then press Accept.



- **6.** Select where you would like to export the files.
 - USB Media Device
 - Network Server Folder folder located on server
- **7.** Press **Export** to export the files to your USB media device.

l Poll One	2012-02-04		2/8/12 0 🖋	2:24 PM
	E	xport Files		(2) Help
	Export Files: Selection Instructions: Select the desired Export Option and then press 'Export'. To return to the 'Results' menu screen and avoid exporting files, press 'Cancel'.	Export Options ES&S Media Device Network Server Folder		
	Cancel	Export		

8. When the Export Files

confirmation screen appears, press Confirm to confirm that you want to export the data, or press Cancel to cancel the process. If you press Confirm, the DS850 clears any existing data from the media device. Then it collects the saved cast vote records that were marked for inclusion in the collection process, generates the vote results, and exports those results to the USB flash drive, along with the election definition, gathered ballot data (including ballot images) of any scanned ballot that was not out-stacked, and the audit log.



While this process is occurring, a pop-up screen will display indicating that the batch data is being collected and exported.



Note: The saved cast vote records for ballots that are diverted to the Processed bin (bottom bin) and to the Ballots with Write-ins bin (middle bin) are marked for inclusion in the collection process. The saved cast vote records for ballots that are diverted to the Not Processed bin (top bin) are marked for exclusion from the collection process. See Bin Sorting for more information.



Note: An option in the ElectionWare Deliver Module can be set to prevent images from being exported to a media device.



Reference: See the *ES&S ElectionWare Volume IV: Deliver User's Guide* for additional information on ElectionWare.

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9. The Export Files screen will indicate when the data has been successfully exported. Remove the flash drive. Then press **Done** to return to the Results screen.



Backup

Follow the steps below to perform the Archive Data function:

- **1.** Press **Election** to display the Election menu.
- 2. From the Election menu, press **Results** to display the Results screen.
- **3.** From the Results screen, press **Backup**. The Election Code screen appears.

1 Poll One 2012-02-04		2/8/12 2:50 PM 🛯 💉 🗎 🕏 🌥
Menu	Results	Part of the second seco
(Export Results	
(Export Files	
.(Backup	
(Export Audit Log	
(Clear All Results	
(Clear A Precinct	

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- **4.** Enter the Election Code and then press **Accept**.
- 5. When you have successfully entered the Election Code, the Backup selection screen appears.

				}	Ele	ecti	on	Co	ode	2			
				Ple	ase	enter	the e	electi	on co	ode.			
		C	_	_	_	_	_	_	_	_	_		
*		!	@ 2	#	\$ 4	% 5	6	& 7	8	()	1	1
Q	2	W	E	R	T	Y	U	1	0	Ρ	1	}	1
C		Caps Lock	Α	s	D	F	G	Н	J	К	Ĺ		
z	2	X	С	۷	в	N	М	× .	>	?	0	Sh	ift
				Clear			Space	2	Ba	cksp	ace		

- **6.** Select from one of the following options:
 - Export
 - Collect
- 7. Insert the Election Definition Media Device flash drive or a blank ES&S Media Device flash drive that you want to use as the target media device. The Detecting inserted device pop-up screen is displayed briefly. The message in red on the Archive Data selection screen disappears, and the inserted flash drive is listed in the Media Devices field.

All Fill 1781 Format 1 1 Poll One 2012-02-04		2/8/12 2:28 PM 🛯 🖋 🗟 😨 🌥
Menu Menu	Backup	Participan (1997) Help
	Firmant	
	Export	
	Collect	\supset



Reference: See Using USB Media Devices for instructions.

- **8.** Select the target device from the list in the Media Devices field, by pressing it. When you press your selection, it is highlighted in blue, as shown below.
- **9.** If you press **Confirm**, the Backup confirmation screen appears. Press **Cancel** to cancel the process.

While the process is occurring, a pop-up screen indicating that the data is being gathered and archived is displayed briefly.

10. The Archive Data screen will indicate when the data has been archived successfully. Remove the flash drive. Then press Done to return to the Results screen.



Export Audit Log

Follow the steps below to perform the Export Audit Log function:

- **1.** Press **Election** to display the Election menu.
- 2. From the Election menu, press **Results** to display the Results screen.
- **3.** From the Results screen, press **Export Audit Log**. This displays the *Searching for ES&S Media Device* pop-up screen.
- 4. Insert the Election Definition Media Device flash drive or a blank ES&S Media Device flash drive into one of the scanner's USB ports. The previous pop-up screen is temporarily replaced by a *Detecting inserted device* pop-up screen. Then, the Election Code screen appears.

d Menu	Results	Heb
	Export Results	
	Export Files	
	Backup	
	Export Audit Log	
	Clear All Results	
	Clear A Precinct	

Reference: See Using USB Media Devices for instructions.

5. Enter the Election Code and then press Accept.

							C	da					6
				Ele	ecti	on		bae					H
			Ple	ase	enter	the e	electi	on co	ode.				
	ſ	_									٦		
		-	_	_	_	_	_	_	_				
ĩ	1		#	s	%	Â	&	1	()	-	•	
0	W	E	R	4 T	Ŷ	U	í	8	P	1	}	-	
0	Caps	- A	S	D	E	G	Ĥ	ī	ĸ		-	7	
7	Lock	C	v	B	N	м	<	>	?		; Sh	ift	
	A	-	Class		-	Snac	_		/				
		-	clear	-		эрас		0.	icksp	ice			

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6. When the Export Audit Log screen appears, press Confirm to confirm that you want to export the audit log, or press Cancel to cancel the process. If you press Confirm, a pop-up screen will display indicating that the audit log is being exported.

7. The Export Audit Log screen will indicate when the audit log has been successfully exported. Remove the flash drive. Then press **Done** to return to the Results screen.





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Clearing Election Results

You can choose to clear all election results or the election results for only a specified precinct.

Clear All Results

Follow the steps below to clear all election results.

- **1.** Press **Election** to access the Election menu.
- 2. From the Election menu, press **Results** to display the Results screen.
- **3.** On the Results screen, press **Clear All Results**.

1 Poll One 2012-02-04		2/8/12 2:50 PM 🛯 🖋 둼 🐨 🌥
Menu Menu	Results	(2) Help
	Export Results	
	Export Files	
	Backup	
	Export Audit Log	
	Clear All Results	
	Clear A Precinct	

4. When prompted, enter the Override Code and then press Accept.

1 PRECINC	CT 1 3	2010-1	1-02									11	l/5/10 <i>\$</i>	2:14 P
				(Ove	erri	ide	С	ode	3				
				Ple	ase e	enter	the c	overri	de co	ode.				
	•	1	ø		5	%	^	&		()	-	•	
	Q	W	2 E	R	4 T	s Y	6 U	7	8 0	9 P	0	- } 1	=	
	0	Caps Lock	Α	s	D	F	G	н	J	к	Ĺ		i	
	Z	X	С	۷	В	Ν	М	× .	*	?	0	Sh	ift	
				Clear	-	Space Backspace								
		(Acc	ept) (Ca	ncel				
			-								_			

- When the Clear All Results confirmation screen appears, press Confirm to clear all election results, or press Cancel to cancel the clear results process.
- If you press Confirm, a pop-up screen will appear briefly to indicate that the results are being cleared. When the results have been cleared successfully, the following pop-up screen will display. Press OK to close the pop-up screen.

All counts displayed on the Main Scan Ballot screen (including the Last Export Total) are now zeroed-out.

Miami-Dade 0022 EARLY VOTING IVO 0022 2015-01-02	7/14/11 9:48 AM 0 🖋 🖻 😨 🗎
Clear All Results	() Help
Onfirm clearing of all results.	
To clear all results, press 'Confirm'. To return to the 'Results' menu screen, press 'Cancel'.	
Confirm Cancel	



Clear a Precinct's Results

Follow the steps below to clear the election results for a single precinct.

- 1. Press Election to access the Election menu.
- 2. From the Election menu, press **Results** to display the Results screen.

3. On the Results screen, press Clear A Precinct.



 When prompted, enter the Override Code and then press Accept. The initial Select Precinct screen is displayed.

1 PRECINC	Τ1	2010-1	1-02									11	./5/10 <i>\$</i>	2:14 PM
				(Ove	err	ide	С	ode	5				(?) Help
				Ple	ase e	enter	the c	overri	ide co	ode.				
		C	_	_	_	_	_	_	_	_	_			
	e L	1	@ 2	#	\$ 4	% 5	^ 6	& 7	8	(9)	-	1	
	Q	W	Ε	R	Т	Y	U	1	0	Ρ	1	} 1	1	
	0	Caps Lock	Α	S	D	F	G	Η	J	К	L	:		
	Z	X	С	۷	В	Ν	М	× .	>	?	0	Sh	ift	
				Clear	-		Space		Ba	cksp	ace			
		(Acc	ept) (Ca	ncel)		

5. From the sequence of Select

Precinct screens, search for and select the precinct whose election results you want to clear.



Reference: See the Select a Precinct section for the steps to follow to search for and select a precinct.

- 6. When the Clear A Precinct's Results screen appears, press Clear Results to clear the election results for the selected precinct, or press Cancel to cancel the clear results process.
- 7. If you press Clear Results, a pop-up screen will appear briefly to indicate that the precinct's results are being cleared. When the results for the specified precinct have been cleared successfully, the Clear A Precinct's Results screen is displayed with a message indicating that the results for the specified precinct have been cleared. Press Done to close the screen.

In the "Saved" column on the Main Scan Ballots screen, any Middle or Bottom Bin ballot counts specifically for the cleared precincts are subtracted from their respective bin counts and added to Top Bin (Not Processed) count.

1 Poll One	2012-02-04	2/8/12 2:52 PM
	Clear Precinct Results	(2) Help
	Clear the results for this Precinct? Precinct1 - Precinct 1 To clear the Precinct results, press 'Clear Results'. To return to the 'Results' menu screen, press 'Cancel'.	
	Clear Results Cancel	



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Chapter 7: Post-Election Day Tasks

This chapter identifies the maintenance and other tasks that must be performed after the Election Day tasks have been completed.



Reference: See the *ES&S DS850 System Maintenance Manual* for additional information about scanner maintenance procedures.

Shut Down and Power Off the Scanner

After the post-election day maintenance has been completed, shut down and power off the DS850, and then prepare the machine for physical storage.

Follow the steps below to shut down and power off the DS850:

- 1. Press Exit in the lower left-hand corner of the screen to display the Exit screen.
- 2. From the Exit screen, press Shutdown Scanner to access the Shutdown Scanner screen.



- On the Shutdown Scanner screen, press Shutdown to shut down the scanner, or press Cancel to leave the scanner running.
- 4. If you press Shutdown, a message will display to let you know when it is safe to turn off the machine. When the message is displayed, flip the power switch to the off position. The power switch is located on the left side of the machine.

1 Poli One 2012-02-04	2/8/12 2:53 PM
Shutdown Scanner	C. Heb
() Shutdown Scanner?	
To shutdown the scanner, press 'Shutdown'. To return to the previous menu, press 'Cancel'.	
Shutdown Cancel	

Turn Off the UPS

After you have shut down and powered off the scanner, press the power switch on the UPS to turn it off.

Perform Scanner Maintenance

After the Election Day tasks have been completed, perform the following maintenance tasks to keep your DS850 scanner in proper working order:

- Clean the rollers; see Clean the Rollers in Pre-Election Maintenance for instructions.
- Clean the cameras; see Clean the Cameras in Pre-Election Maintenance for instructions.
- Clean the scanner case; see Clean the Scanner Case in Pre-Election Maintenance for instructions.
- Clean the touch screen; see Clean the Touch Screen in Pre-Election Maintenance for instructions.

Perform UPS Maintenance

Ensure that the manufacturer's maintenance procedures are followed so that the UPS will perform as required on the next Election Day.

Recommended Steps to Prepare the DS850 for Storage

- 1. Print final copies of reports (if required).
- 2. Remove the election definition and results media.
- **3.** Remove the paper audit report from the audit printer.
- 4. Zero the scanner.
- **5.** Power off and unplug the scanner, printer and UPS.
- **6.** Secure all power cords, spare parts and election materials in the drawer of the scanner cart. Store cords and spare materials in a manner that prevents them from becoming tripping hazards.
- 7. Perform Scanner Maintenance as listed above.
- **8.** Inspect the equipment for damage.
- 9. Log any issues for follow-up with the ES&S Election Support team.
- 10. Secure the scanner output trays.
- **11.** Lock and seal all panels and scanner doors.
- **12.** Store the scanner in a secure physical location. At a minimum ES&S recommends storing the scanner in a locked room and enforcing access control on the room where the voting equipment is stored.
- **13.** Store your election definition, audit log, final results reports, final results media and any other election artifacts, in accordance with the laws of your jurisdiction. Federal voting system guidelines do require storage of this material in a secure location for a minimum of 22 months.
- **14.** Follow manufacturer recommendations for environmental storage conditions for all your election materials. (See Specifications and Cautions for storage requirements of the DS850).

Part 3: Appendix

The Appendix contains the following chapters:

- Chapter 8: Reports
- Chapter 9: DS850 Network
- Chapter 10: System Messages
- Chapter 11: Menu Structure
- Chapter 12: Troubleshooting
- Chapter 13: Revision History

Chapter 8: Reports

This chapter contains descriptions and examples of the report that can be generated on the DS850. Use the information in this chapter to become familiar with the types of reports available so that you can generate the proper reports for your jurisdiction.

The report types listed below are generated from the Reports screen, which is displayed when you select the Reports menu.

- Zero Report
- Results Report
- Batch/Bin Report
- Precincts Processed Report
- System Readiness Report
- Ballot Style Counts Report



Note: The Digital Readings and Mark Code reports cannot be generated from this Reports menu. They are generated from a different Reports screen, which is accessed through the Hardware menu. See Chapter 3: DS850 User Interface for more information on the Digital Readings and Mark Code reports.

Zero Report

Use the Zero Report to ensure all of your contests have zero votes before you begin scanning ballots. The report displays zeros for all contests, indicating that no ballots have been scanned. You cannot print this report after ballots have been scanned on the DS850.

The following is an example of the screen that is displayed when the Zero Report is selected from the Reports menu.

	Reports	C2 Help
Scanning	Please select the report to Report Type	preview/print.
Election	Zero Report	
Reports	Results Report	
System	Batch/Bin Report	
	Precincts Processed Report	
Hardware	System Readiness Report	
	Ballot Style Counts Report	

Follow the steps below to preview or print the Zero Report:

- 1. From the Reports menu, press Zero Report in the Report Type field.
- 2. Press **Preview** to the view the report on the touch screen, or press **Print** to print the report on the laser printer.

The following is an example of the Zero report.

Machine #: 850942001		BMW /English Only) DEMO
02/02/2010 16:02:25		11/02/2010 11:14:18
First Ballot Date Time: Last Ballot Date Time:	Ballots Cast Total:	0
Contest	Votes	
BEST AUTOMOBILE MANUFACTURER		
(Vote For 1)		
BMW	0	
MERCEDES	0	
GENERAL MOTORS	0	
HONDA	0	
FERRARI	0	
IAGUAR	0	
FORD	0	
VOLVO	0	
Write-In	0	
Over Votes	0	
Under Votes	0	
Total	0	
BEST VOCAL ARTIST		
(Vote For 2)		
FRANK SINATRA	0	
ELVIS	0	
PATSY CLINE	0	
JANIS JOPLIN	0	
BUDDY HOLLY	0	
BARRY WHITE	0	
BILLIE HOLIDAY	0	
STEVIE RAY VAUGHAN	0	
STEVIE RAY VAUGHAN "MAMA" CASS ELLIOT	0	
STEVIE RAY VAUGHAN "MAMA" CASS ELLIOT Wite-In	0	
STEVIE RAY VAUGHAN 'MAMA' CASS ELLIOT Write-In Write-In	0 0 0	
STEVIE RAY VAUGHAN "MAMA" CASS ELLIOT Write-In Write-In Over Votes	0 0 0 0	
STEVIE RAY VAUGHAN 'MANA' CASS ELLIOT Witte-In Write-In Over Votes Under Votes		
STEVIE RAY VAUGHAN 'MAMA' CASS ELLIOT Write-In Write-In Under Votes Under Votes Total	0 0 0 0 0 0 0	
STEVIE RAY VAUGHAN 'MAMA' CASS ELLIOT Witte-In Over Votes Under Votes Total BEST ICE-CREAM FLAVOR	0 0 0 0 0 0 0 0	
STEVIE RAY VAUGHAN MAMA ^C CASS ELLIOT Write-In Write-In Over Votes Under Votes Total BEST ICE-CREAM FLAVOR (Vote Set 1)	0 0 0 0 0 0 0 0	
STEVIE RAY VAUGHAN MAMA* CASS ELLIOT Write-In Over Votes Under Votes Total BEST ICE-CREAM FLAVOR (Vote For 1) CHOCOLATE	0 0 0 0 0 0 0 0	
STEVIE RAY VAUGHAN "MAMA" CASS ELLIOT Witte-In Witte-In Over Votes Under Votes Total BEST ICE-CREAM FLAVOR (Vote For 1) CHOCOLATE STEAM/REDBY	0 0 0 0 0 0 0 0	
STEVIE RAY VAUGHAN "MAMA" CASS ELLIOT Wilte-In Wilte-In Under Votes Under Votes Total BEST ICE-CREAM FLAVOR (Vote For 1) CHOCOLATE STRAWBERRY VANILA	0 0 0 0 0 0 0 0	
STEVIE RAY VAUGHAN MANAY CASS ELLIOT Write-In Over Votes Under Votes Total BEST ICE-CREAM FLAVOR (Vote For 1) CHOCOLATE STRAWBERRY VANILLA	0 0 0 0 0 0 0 0 0	
STEVIE RAY VAUGHAN MAMA'CASS ELLIOT Wilte-In Over Votes Under Votes Total BEST ICE-CREAM FLAVOR (Vote For 1) CHOCOLATE STRAWBERRY VANILLA Write-In Descrivers	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
STEVIE RAY VAUGHAN MANA* CASS ELLIOT Wilte-In Over Votes Under Votes Total BEST ICE-CREAM FLAVOR (Vote For 1) CHOCOLATE STRAWBERRY VANILLA Wilte-In Over Votes Linder Votes		
STEVIE RAY VAUGHAN MAMA'CASS ELLIOT Write-In Over Votes Under Votes Total BEST ICE-CREAM FLAVOR (Vote For 1) CHOCOLATE STRAWBERRY VANILLA Write-In Over Votes Under Votes Under Votes Under Votes		

ero	Re	port

2 of Z

Lero Report			
lachine #: 850942001			BMW Ginglish Only) DEMO
02/02/2010 16:02:25			11/02/2010 11:14:14
First Ballot Date Time: Last Ballot Date Time:	Ballots Cast Total:	Đ	
Contest	Votes		
PROPOSITION 1			
(Vote For 1)			
<u>YES</u>			
NO Cost Vieter			
Under Votes	ě		
Total	ō		
PROPOSITION 2 (Vote For 1)			
YES	9		
NÖ	0		
Over Votes			
Under Votes			
Total	ő		

Results Report

The Results Report contains detailed election results and is available in multiple report levels. The following are the report level options for the Results Report:

- Election Detail The report displays detailed contest totals for the whole election.
- Election Public The report displays contest totals for the whole election without including overvote and undervote information.
- Precinct by Precinct Detail The report displays detailed contest totals for the selected precinct.
- **Precinct by Precinct Public** The report displays contest totals for the selected precinct without including overvote and undervote information.

You must specify a precinct if you select the **Precinct by Precinct Detail** or **Precinct by Precinct Public** report level.

The following is an example of the screen that is displayed when the Results Report is selected from the Reports menu.

	Reports									
Scanning Election Reports System Hardware	Please select the report Type Zero Report Results Report Batch/Bin Report Precincts Processed Report System Readiness Report	Report to preview/print. Report Level Election Detail Election Public Precinct by Precinct Detail Precinct by Precinct Public All Precincts								
Exit	Ballot Style Counts Report Preview	Precinct Precincts								

Follow the steps below to preview or print the Results Report:

- 1. From the Reports menu, press **Results Report** in the **Report Type** field.
- **2.** Select the desired report level by pressing the option button to the left of the selection in the **Report Level** field.

3. If you selected the **Election Detail** or **Election Public** report level, skip to Step 4. If you selected the **Precinct by Precinct Detail** or **Precinct by Precinct Public** report level, a **Select Precinct** button is displayed. Press the **Select Precinct** button to select a precinct.



Reference: See Select a Precinct for the steps to follow to select a precinct.

4. Press **Preview** to the view the report on the touch screen, or press **Print** to print the report on the laser printer.

The following is an example of the Results Report.

				BMW DEMO
02/02/2010 16:13:20				BMW (English Only) DEMO 11/02/2010 11:14:18
First Ballot Date Time: Last Ballot Date Time:	02/02/2010 16:11:51 02/02/2010 16:12:08	Ballots Cast Total:	7	
	Contest	Votes		
	UEACTURER			
(Vote For 1)	TO ACTORES	1		
MERCEDES		0		
GENERAL MOTORS		1		
HONDA		0		
FERRARI		0		
JAGUAR		1		
FORD		0		
VOLVO				
wine-in	Quer Victor	1		
i i	Inder Votes	ô		
-	Total	7		
BEST VOCAL ARTIST				
(Vote For 2)				
FRANK SINATRA		0		
ELVIS		0		
PATSY CLINE				
JANIS JOPLIN		1		
BADDY WUITE		0		
BILLEHOLIDAY		0		
STEVIE RAY VAUGHAN		2		
'MAMA' CASS ELLIOT		0		
Write-In		3		
Write-In		4		
	Over Votes	0		
L. L.	Inder Votes Total	3		
	Total	14		
BEST ICE-CREAM FLAVO	DR.			
(Vote For 1)				
CHOCOLATE				
STRAWDERNT				
Write.In		1		
(Over Votes	1		
ι	Inder Votes	1		
	Total	7		
PROPOSITION 1				
Detail Res	sults			2 of 2
				BMW DEMO
02/02/2010 16:13:20				BMW (English Only) DEMO 11/02/2010 11:14:18
First Ballot Date Time:	02/02/2010 16:11:51	Ballots Cast Total:	7	
Last Ballot Date Time:	02/02/2010 16:12:08			
	Contest	Votes		
(Vote For 1)				

(vote for L/) 3 NO 3 Over Votes 0 Under Votes 1 Total 7 PROPOSITION 2 (Vote For 1) YES 4 NO 2 Over Votes 0 Under Votes 1 Total 7

Batch/Bin Report

The Batch/Bin reports contain ballot totals for the last batch that was saved. The totals are provided for the selected bin and report level. The following are the bin options:

- Not Processed (Top Bin) The report contains totals for ballots that have not been processed and that have been diverted to the top bin.
- Processed with Write-ins (Middle Bin) The report contains totals for ballots containing write-in votes that have been processed and diverted to the middle bin.
- **Processed (Bottom Bin)** The report contains totals for all processed ballots that have been diverted to the bottom bin.

The following are the report level options:

- Long (detailed)
- Short (summary)

1		-
4	2=	= 113
		- 7

Note: ElectionWare provides the default settings for batch/bin reporting in the election definition. By default, no batch/bin reports are printed automatically when the user saves a scanned batch of ballots. If you want reports to print automatically when you save a batch of scanned ballots, you must use the Batch/Bin Reporting screen to specify the number of reports you want printed. See Batch/Bin Reporting for more information on that screen.



Reference: See the *ES&S ElectionWare Volume IV: Deliver User's Guide* for additional information on ElectionWare.

The following is an example of the screen that is displayed when the Batch/Bin Report is selected from the Reports menu.

Scanning	Please select the	report to preview/print.
-	Report Type	Bin Selection
Election	Zero Report	Not Processed (Top Bin)
Reports	Results Report	Processed (Middle Bin)
System	Batch/Bin Report	Processed (Bottom Bin)
	Precincts Processed Report	Report Level
Hardware	System Readiness Report	Long
	Ballot Style Counts Report	Short
	<u></u>	

Follow the steps below to preview or print the Batch/Bin Report:

- 1. From the Reports menu, press Batch/Bin Report in the Report Type field.
- **2.** Select the desired bin by pressing on the option button to the left of it in the **Bin Selection** field.

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- **3.** Select the desired report level by pressing on the option button to the left of it in the **Report Level** field.
- **4.** Press **Preview** to the view the report on the touch screen, or press **Print** to print the report on the laser printer.

The following is an example of a Batch/Bin Report.

Processed Ballots Report

1 of 1

02/02/2010 16:14:04	4	BMW DEMO BMW (English Only) DEMO 11/02/2010 11:14:18
Batch:	batch_2010-02-02T16_12_08	
Total:	7	
Ballot # Range:	0001000008 - 0001000014	
Batch Started:	02/02/2010 16:11:51	
Batch Completed:	02/02/2010 16:12:08	
Count	Election District	
7	PRECINCT 1	

Precincts Processed Report

The Precincts Processed report allows you to see which precincts have been processed and which have not been processed. The options for this report are:

- Precincts Processed The report contains a list of the precincts that have been processed and the ballot counts for each.
- Precincts NOT Processed The report contains a list of the precincts that have not been processed.

The following is an example of the screen that is displayed when the Precincts Processed Report is selected from the Reports menu.

Follow the steps below to preview or print the Precincts

Processed Report:

Scanning	Please select the Report Type	report to preview/print.
Election	Zero Report	
Reports	Results Report	Listing Selection
System	Batch/Bin Report	Precincts Processed
	Precincts Processed Report	Precincts NOT Processed
ardware	System Readiness Report	
	Ballot Style Counts Report	

1. From the Reports menu, press Precincts Processed Report in the Report Type field.

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- **2.** Select the desired report option by pressing on the option button to the left of it in the **Listing Selection** field.
- **3.** Press **Preview** to the view the report on the touch screen, or press **Print** to print the report on the laser printer.

The following is an example of the Precincts Processed Report.

Precinct Processed Report		1 of 1
		BMW DEMO
		BMW (English Only) DEMO
02/02/2010 16:14	:31	11/02/2010 11:14:18
Total:	7	
First Ballot Time:	02/02/2010 16:11:51	
Last Ballot Time:	02/02/2010 16:12:08	
Code	Election District	Count
0001	PRECINCT 1	7

System Readiness Report

The System Readiness report is a descriptive list of system settings that you can use to verify that the DS850 is ready to begin ballot processing. The report prints automatically when the DS850 is powered on. The options for this report are:

The following is an example
of the screen that is
displayed when the System
Readiness Report is selected
from the Reports menu.

	Reports	(? Help
Scanning	Please select the report to preview/print. Report Type	
Election	Zero Report	
Reports	Results Report	
System	Batch/Bin Report	
	Precincts Processed Report	
Hardware	System Readiness Report	
	Ballot Style Counts Report	
Exit	Preview Print	

Follow the steps below to preview or print the System Readiness Report:

- 1. From the Reports menu, press System Readiness Report in the Report Type field.
- **2.** Select the desired report option by pressing on the option button to the left of it in the **Report Options** field.
- **3.** Press **Preview** to the view the report on the touch screen, or press **Print** to print the report on the audit log printer.

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The following is an example of the System Readiness Report.

*** SYSTEM READINESS REPORT *** 12:10:50 Tue Dec 21 2010 Unit Serial Number: 0304050607

VOTING DEVICE INFORMATION

HARDWARE CONFIGURATION Current Time Date: 12:10:50 Tue Dec 21 2010 Time Zone: America/Chicago Processor: : Intel(R) Core(TM)2 Duo CPU E6400 @ 2.13SHz Total RAM: 4009 NB Available RAM: 3841 MB RAM Test Status: OK Camera Interface: OK Touch Screen: OK Report Printer: OK Battery: OK Power Source: AC Battery Charge: 100

STORAGE

Total Data Storage: 938901 MB Available Data Storage: 890987 MB Data Storage Device Status: OK

FIRMWARE DS850 Firmware Version: 2.1.0.0j

Master Control Program: Running Tabulation Engine: Running Presentation Engine: Running

Protected Count: 15164

ELECTION LOADED

ELECTION STATUS Election Name: VARINSTR Election Date: 2005-01-16 Election EQC: Secret

*** END OF REPORT ***
Ballot Style Counts Report

The Ballot Style Counts Report provides the count of each ballot style (sequence, type, and split) within a precinct. The options for this report are:

- Precinct The report provides the count of each ballot style within a precinct organized by precinct.
- Ballot Style- The report provides the count of each ballot style within a precinct organized by ballot style.

The following is an example of the screen that is displayed when the Ballot Style Counts Report is selected from the Reports menu.

Scanning	Report Type	report to preview/print.	
Election	Zero Report		
Reports	Results Report	- Organized By:	
System	Batch/Bin Report	Precinct	
	Precincts Processed Report	Ballot Style	
Hardware	System Readiness Report		
	Ballot Style Counts Report		
			_

Follow the steps below to

preview or print the Ballot Style Counts Report:

- 1. From the Reports menu, press Ballot Style Counts Report in the Report Type field.
- **2.** Select the desired report option by pressing on the option button to the left of it in the **Organized By** field.
- **3.** Press **Preview** to the view the report on the touch screen, or press **Print** to print the report on the laser printer.

The following is an example of the Ballot Style Counts Report.

Ballot Style Cou	ints			
Machine #: 0304050607				
12/17/2013 15:53:52				NOV08GEN 12/05/2013
First Ballot Date Time:	12/17/2013 15:28:34	Total Sheets Processed:	7	
Last Ballot Date Time:	12/17/2013 15:29:09	Total Ballots Cast: Blank Sheets Cast:	7 2	
		Ballots Cast		
BAY VILLAGE -01-A				
Seq:00001 Typ:01 Spl:01		7		
BAY VILLAGE -01-B				
BAY VILLAGE -01-C				
		Page 1 of 42		

Chapter 9: DS850 Network

View, Set and Test Network IP Address and Folder Path

The network option will allow the user to send the results directly from the DS850 to process the election results.

- 1. Select **Configuration** on the Election screen to bring up the Configuration screen.
- 2. Select Network and you will be prompted to enter the Election Code.
- **3.** Enter your Election Code in the entry field then press **Accept**.

The Network setting screen will appear and this will display the Server IP Address, Folder Path and it will also show the IP Address for the scanner.

GENTEST 0018 EARLY VOTING	5 2012-04-24	4/24/12 0 🖋	3:55 PM
Menu		Network	Rela
Net Se Inst To t add Sca but To r 'Cor scree	work: ttings ructions: resses, press 'Test'. change the IP ress of <i>This</i> nmer, press its 'Edit' ton. eturn to the nfiguration' menu teen, press 'Menu'.	From the loaded Election Definition Server IP Address 10.0.013 From your save, the last save, or the initial default This Scanner IP Address 10.0.014	Edit
		Test	



Note: The system will assign an initial default of "1" for the scanner's last address number.

4. To edit the IP Address for the scanner select Edit.

- Type a number in the Address Digit-box for the scanner. Then select Save to save your changes or press Cancel to exit the screen without making any changes.
- 6. Once your IP Address is set then you can test the connection to the server, by pressing Test. The DS850 will test the folder path and IP address for the server. You will receive a message if it has been successful, then select OK to return to the Configuration screen.

GEN TEST 0018 EARLY VOTING 2012-03-20		4/25/	12 2:44 PM
N	etwork		Help
NOTE: These numbers are in loaded from the Election Definition and cannot be changed on the DS850. They can only be changed in Election/Vare and the USB media reburned. A second structure the desired address. To keep your changed address, press 'Save'. To avoid changing the current address, press 'Save'. The 'Network Settings' screen is redisplayed with either button press.	This Scanner's current 1 10.0.0 1 2 4 5 7 8 0 4 5 8 0	P Address: 10.0.0 79 3 6 9 5 6 1 6 1 6 1 6 1 6 1 6 1 6 1 6 1 6 1 6	DTE: The number can e used to uniquely entify the DS850 anner on the network. he number was eviously signed/saved then at number will appear. herwise, it will show e initial default of "1".

Note: If the test was not successful check to make sure the path and IP addresses are correct.



Note: To export results to the network server see Exporting Data section in Chapter 6: Election Day Tasks

Chapter 10: System Messages

This chapter contains a list of all system messages. If you require assistance to resolve an issue related to a system message, contact your Election Administrator to schedule technical service or a back-up machine. Election Administrators can contact ES&S support at 877-377-8683.

Viewing Messages

<u>Printed system messages</u> can be seen on the continuous-feed print-outs from the Audit Log Printer. The Audit Log Printer must be connected to the DS850, enabled and properly configured (paper loaded, plugged-in, turned on, etc.). See *Chapter 5: Pre-Election Day Tasks*, Audit Log for more information.

Logged system message can be seen within the exported audit.log file. To create this file from the DS850, first insert a blank ES&S Media Device into one of the unit's USB ports. Then, select 'Election=> Results=> Export Audit Log'. Once the audit log is successfully written to the ES&S Media Device, insert the device into a PC. The Audit log file is located in the 'Log' folder on the Device. To view the file, open the file with an application such as WordPadTM.

System Error Recovery

In the event that a critical error occurs that prevents further operation of the machine, an error number and error message are displayed, as well as the **Shutdown** button. Use the following procedure to restart the system and continue scanning ballots:

- 1. Write down the error number and message so that you can report that information to the appropriate personnel (i.e., an election official, system administrator, and/or support technician).
- **2.** Press the **Shutdown** button on the touch screen and wait for a message to display indicating that it is safe to power off the machine.



Note: If the touch screen does not respond when you press **Shutdown** after 1 minute, or if the message indicating that it is safe to power off the machine does not appear after 5 minutes, proceed to step 3.

- **3.** Flip the scanner's power switch to the off position.
- Wait 30 seconds.
- 5. Flip the power switch to the on position to restore power to the entire machine.
- **6.** On startup, make sure that any ballots for which data was lost are removed from the output bins and then re-scanned.

Numeric Messages

System Messages

Message Text	Message Displayed	Message Printed	Message Logged	Results in a System Halt	Cause	Resolution
1009001 - Unknown communications error.	Х			Х	This message appears if some unknown communication problem occurs with the	Write down the error message and notify an appropriate election official. If possible,
					User Interface.	shutdown and then turn off the Scanner. Wait 30 seconds and then turn the Scanner back on. If the problem persists, a an ES&S Service Technician will need to be contacted.
1009002 - The connection was refused by the MCP.	X			X	This message appears when the Master Control Program will not accept a connection to the User Interface.	Write down the error message and notify an appropriate election official. If possible, shutdown and then turn off the Scanner. Wait 30 seconds and then turn the Scanner back on. If the problem persists, an ES&S Service Technician will need to be contacted.
1009003 - The MCP closed the connection.	X			X	This message appears when the Master Control Program terminates its connection with the User Interface.	Write down the error message and notify an appropriate election official. If possible, shutdown and then turn off the Scanner. Wait 30 seconds and then turn the Scanner back on. If the problem persists, an ES&S Service Technician will need to be contacted.
1009004 - The UI message server was unable to be started.	X			X	This message appears when the Master Control Program is unable to start the Property Bank Message Server for the User Interface.	Write down the error message and notify an appropriate election official. If possible, shutdown and then turn off the Scanner. Wait 30 seconds and then turn the Scanner back on. If the problem persists, an ES&S Customer Service Representative will need to be contacted.

Message Text	Message Displayed	Message Printed	Message Logged	Results in a System Halt	Cause	Resolution
1009005 - MCP command syntax error.	X			Х	This message appears when a command, sent from the User Interface to the Master Control Program, cannot be understood by the Master Control Program.	Write down the error message and notify an appropriate election official. If possible, shutdown and then turn off the Scanner. Wait 30 seconds and then turn the Scanner back on. If the problem persists, an ES&S Customer Service Representative will need to be contacted.
1009006 - The client connection to MCP timed out.	X			Х	This message appears when the connection of the User Interface to the Master Control Program is terminated due to the lack of response from the User Interface when the Master Control Program queries it over a limited period of time.	Write down the error message and notify an appropriate election official. If possible, shutdown and then turn off the Scanner. Wait 30 seconds and then turn the Scanner back on. If the problem persists, an ES&S Customer Service Representative will need to be contacted.
1009007 - The system has too many open sockets.	X			X	This message appears when the Master Control Program detects that there are so many unused communication link end-points, for its connection to the User Interface, that it can no longer effectively communicate with the User Interface.	Write down the error message and notify an appropriate election official. If possible, shutdown and then turn off the Scanner. Wait 30 seconds and then turn the Scanner back on. If the problem persists, an ES&S Customer Service Representative will need to be contacted.
1009008 - MCP command unknown.	X			X	This message appears when a command, sent from the Master Control Program to the User Interface, cannot be understood by the User Interface.	Write down the error message and notify an appropriate election official. If possible, shutdown and then turn off the Scanner. Wait 30 seconds and then turn the Scanner back on. If the problem persists, an ES&S Customer Service Representative will need to be contacted.

Message Text	Message Displayed	Message Printed	Message Logged	Results in a System Halt	Cause	Resolution
1009020 - MCP was unable to connect to the tabulation engine.	X			X	This message appears when the User has selected a collect results command (e.g. 'Export for Results') and the Master Control Program cannot access the tabulation engine to perform the command.	Write down the error message and notify an appropriate election official. Try the command again. If the problem persists, shutdown the Scanner, wait 30 seconds, restart the Scanner, and try the command again. If the problem still remains, an ES&S Customer Service Representative will need to be contacted.
1009021 - No response from the tabulation engine.	x		X	X	This message appears when the User has selected a collect results command (e.g. 'Export for Results') and the Master Control Program sends the command to the tabulation engine. However, the tabulation engine does not acknowledge that it has received the command from the Master Control Program.	Write down the error message and notify an appropriate election official. Try the command again. If the problem persists, shutdown the Scanner, wait 30 seconds, restart the Scanner, and try the command again. If the problem still remains, an ES&S Customer Service Representative will need to be contacted.
1009022 - MCP was unable to send a command to the tabulation engine.	X		X	X	This message appears when the User has selected a collect results command (e.g. 'Export for Results') and the Master Control Program attempts but fails to send the command to the tabulation engine.	Write down the error message and notify an appropriate election official. Try the command again. If the problem persists, shutdown the Scanner, wait 30 seconds, restart the Scanner, and try the command again. If the problem still remains, an ES&S Customer Service Representative will need to be contacted.

Message Text	Message Displayed	Message Printed	Message Logged	Results in a System Halt	Cause	Resolution
1009050 - Unknown tabulator error during {1} command	X		X		This message appears when the User has selected a collect results command (e.g. 'Export for Results') and the tabulation engine received the command, but an error occurs during tabulation with the "{1}" process command. Note an actual process command appears in place of the "{1}".	Write down the error message and notify an appropriate election official. Try the command again. If the problem persists, shutdown the Scanner, wait 30 seconds, restart the Scanner, and try the command again. If the problem still remains, an ES&S Customer Service Representative will need to be contacted.
1009500 - Camera Interface - Initialization failed.	×		X	X	This message appears at start-up when the system initialization of the BAPis Image Processor Board fails.	Write down the error message and notify an appropriate election official. If possible, shutdown and then turn off the Scanner. Wait 30 seconds and then turn the Scanner back on. If the problem persists, an ES&S Service Technician will need to be contacted. Since the processor is a "COTS" (Commercial Off The Shelf) product, the ES&S Technician may have to contact a BAP Technician to diagnose the problem.
1009501 - Camera Interface - Undefined error	X		X	X	This message appears when the BAPis Image Processor encounters an undefined error.	Write down the error message and notify an appropriate election official. If possible, shutdown and then turn off the Scanner. Wait 30 seconds and then turn the Scanner back on. If the problem persists, an ES&S Service Technician will need to be contacted. Since the processor is a "COTS" (Commercial Off The Shelf) product, the ES&S Technician may have to contact a BAP Technician to diagnose the problem.

Message Text	Message Displayed	Message Printed	Message Logged	Results in a System Halt	Cause	Resolution
1009502 - Camera Interface - No connection	X		X	X	This message appears when the Master Control Program cannot communicate with the BAPis Image Processor Board through the MCP/BAP Interface.	Write down the error message and notify an appropriate election official. If possible, shutdown and then turn off the Scanner. Wait 30 seconds and then turn the Scanner back on. If the problem persists, an ES&S Service Technician will need to be contacted. Since the processor is a "COTS" (Commercial Off The Shelf) product, the ES&S Technician may have to contact a BAP Technician to diagnose the problem.
1009503 - Camera Interface - Not implemented	X		X	X	This message appears when the Master Control Program cannot communicate with the BAPis Image Processor Board because the MCP/BAP Interface is not operating.	Write down the error message and notify an appropriate election official. If possible, shutdown and then turn off the Scanner. Wait 30 seconds and then turn the Scanner back on. If the problem persists, an ES&S Service Technician will need to be contacted. Since the processor is a "COTS" (Commercial Off The Shelf) product, the ES&S Technician may have to contact a BAP Technician to diagnose the problem.
1009504 - Camera Interface - No image data	X		X	X	This message appears when a ballot is scanned but no image data is collected through the MCP/BAP Interface.	Write down the error message and notify an appropriate election official. If possible, shutdown and then turn off the Scanner. Wait 30 seconds and then turn the Scanner back on. If the problem persists, an ES&S Service Technician will need to be contacted. Since the BAPis Board is a "COTS" (Commercial Off The Shelf) product, the ES&S Technician may have to contact a BAP Technician to diagnose the problem.

Message Text	Message Displayed	Message Printed	Message Logged	Results in a System Halt	Cause	Resolution
1009505 - Camera Interface - Bad CRC	X		X	X	This message appears upon initialization of the BAPis Image Processor Board when the Master Control Program receives a bad CRC (cyclic redundancy check) from the board, indicating there is a problem with the accuracy of data transmitted through the MCP/BAP Interface communication link.	Write down the error message and notify an appropriate election official. If possible, shutdown and then turn off the Scanner. Wait 30 seconds and then turn the Scanner back on. If the problem persists, an ES&S Service Technician will need to be contacted. Since the BAPis Board is a "COTS" (Commercial Off The Shelf) product, the ES&S Technician may have to contact a BAP Technician to diagnose the problem.
1009506 - Camera Interface - Configuration not accepted	×		X	X	This message appears upon initialization of the BAPis Image Processor Board when the system configuration parameters, provided through the MCP/BAP Interface are not accepted by the board.	Write down the error message and notify an appropriate election official. If possible, shutdown and then turn off the Scanner. Wait 30 seconds and then turn the Scanner back on. If the problem persists, an ES&S Service Technician will need to be contacted. Since the BAPis Board is a "COTS" (Commercial Off The Shelf) product, the ES&S Technician may have to contact a BAP Technician to diagnose the problem.
1009507 - Camera Interface - Wrong device IDD	x		X	X	This message appears upon initialization of the BAPis Image Processor Board when board's returned device ID is not the one expected by the Master Control Program.	Write down the error message and notify an appropriate election official. If possible, shutdown and then turn off the Scanner. Wait 30 seconds and then turn the Scanner back on. If the problem persists, an ES&S Service Technician will need to be contacted. Since the BAPis Board is a "COTS" (Commercial Off The Shelf) product, the ES&S Technician may have to contact a BAP Technician to diagnose the problem.

Message Text	Message Displayed	Message Printed	Message Logged	Results in a System Halt	Cause	Resolution
1009508 - Camera Interface - Parameter not supported	X		X	X	This message appears upon initialization of the BAPis Image Processor Board when a system configuration parameter, provided through the MCP/BAP Interface is not supported by the board.	Write down the error message and notify an appropriate election official. If possible, shutdown and then turn off the Scanner. Wait 30 seconds and then turn the Scanner back on. If the problem persists, an ES&S Service Technician will need to be contacted. Since the BAPis Board is a "COTS" (Commercial Off The Shelf) product, the ES&S Technician may have to contact a BAP Technician to diagnose the problem.
1009509 - Camera Interface - Image ID out of range	X		X	X	This message appears when a ballot is scanned but its resulting image ID is outside the range expected by the Master Control Program.	Write down the error message and notify an appropriate election official. If possible, shutdown and then turn off the Scanner. Wait 30 seconds and then turn the Scanner back on. If the problem persists, an ES&S Service Technician will need to be contacted. Since the BAPis Board is a "COTS" (Commercial Off The Shelf) product, the ES&S Technician may have to contact a BAP Technician to diagnose the problem.
1009510 - Camera Interface - Error memory allocation	X		X	X	This message appears upon initialization of the BAPis Image Processor Board when the board cannot allocate the minimum amount of memory required to collect the ballot images.	Write down the error message and notify an appropriate election official. If possible, shutdown and then turn off the Scanner. Wait 30 seconds and then turn the Scanner back on. If the problem persists, an ES&S Service Technician will need to be contacted. Since the BAPis Board is a "COTS" (Commercial Off The Shelf) product, the ES&S Technician may have to contact a BAP Technician to diagnose the problem.

Message Text	Message Displayed	Message Printed	Message Logged	Results in a System Halt	Cause	Resolution
1009511 - Camera Interface - Error cropping	X		X	X	This message appears when a ballot is scanned, but the BAPis Image Processor Board cannot properly crop the scanned image(s).	Write down the error message and notify an appropriate election official. If possible, shutdown and then turn off the Scanner. Wait 30 seconds and then turn the Scanner back on. If the problem persists, an ES&S Service Technician will need to be contacted. Since the BAPis Board is a "COTS" (Commercial Off The Shelf) product, the ES&S Technician may have to contact a BAP Technician to diagnose the problem.
1009512 - Camera Interface - Buffer overflow	X		X	X	This message appears when a ballot is scanned and its resulting image data overflows the buffer of the BAPis Image Processor Board.	Write down the error message and notify an appropriate election official. If possible, shutdown and then turn off the Scanner. Wait 30 seconds and then turn the Scanner back on. If the problem persists, an ES&S Service Technician will need to be contacted. Since the BAPis Board is a "COTS" (Commercial Off The Shelf) product, the ES&S Technician may have to contact a BAP Technician to diagnose the problem.

Message Text	Message Displayed	Message Printed	Message Logged	Results in a System Halt	Cause	Resolution
1009513 - Camera Interface - Timeout	X		X	X	This message appears when the interaction between the BAPis Image Processor Board and the Datawin board requires a timeout to complete one or more processing steps.	Write down the error message and notify an appropriate election official. Hopefully the timeout is brief, so normal operations can resume without any User intervention. If the timeout lasts over 10 minutes, and if it is possible, shutdown and then turn off the Scanner. Wait 30 seconds and then turn the Scanner back on. If long timeouts continue to occur, an ES&S Service Technician will need to be contacted. Since the BAPis Board is a "COTS" (Commercial Off The Shelf) product, the ES&S Technician may have to contact a BAP Technician to diagnose the problem.
1009514 - Camera Interface - DMA Controller	x		X	X	This message appears if there is a problem with the DMA Controller on the BAPis Image Processor Board.	Write down the error message and notify an appropriate election official. If possible, shutdown and then turn off the Scanner. Wait 30 seconds and then turn the Scanner back on. If the problem persists, an ES&S Service Technician will need to be contacted. Since the BAPis Board is a "COTS" (Commercial Off The Shelf) product, the ES&S Technician may have to contact a BAP Technician to diagnose the problem.

Message Text	Message Displayed	Message Printed	Message Logged	Results in a System Halt	Cause	Resolution
1009515 - Camera Interface - SRAM Memory controller	X		X	X	This message appears if there is a problem with the SRAM Memory Controller on the BAPis Image Processor Board.	Write down the error message and notify an appropriate election official. If possible, shutdown and then turn off the Scanner. Wait 30 seconds and then turn the Scanner back on. If the problem persists, an ES&S Service Technician will need to be contacted. Since the BAPis Board is a "COTS" (Commercial Off The Shelf) product, the ES&S Technician may have to contact a BAP Technician to diagnose the problem.
1009516 - Camera Interface - Binarization module error	×		×	X	This message appears if there is a problem with the Binarization Module on the BAPis Image Processor Board.	Write down the error message and notify an appropriate election official. If possible, shutdown and then turn off the Scanner. Wait 30 seconds and then turn the Scanner back on. If the problem persists, an ES&S Service Technician will need to be contacted. Since the BAPis Board is a "COTS" (Commercial Off The Shelf) product, the ES&S Technician may have to contact a BAP Technician to diagnose the problem.
1009517 - Camera Interface - Skew engine error	X		X	X	This message appears if there is a problem with the Skew Engine on the BAPis Image Processor Board.	Write down the error message and notify an appropriate election official. If possible, shutdown and then turn off the Scanner. Wait 30 seconds and then turn the Scanner back on. If the problem persists, an ES&S Service Technician will need to be contacted. Since the BAPis Board is a "COTS" (Commercial Off The Shelf) product, the ES&S Technician may have to contact a BAP Technician to diagnose the problem.

Message Text	Message Displayed	Message Printed	Message Logged	Results in a System Halt	Cause	Resolution
1009518 - Camera Interface - FPGA JPEG encoder module error	X		X	X	This message appears if there is a problem with the FPGA JPEG Encoder Module on the BAPis Image Processor Board.	Write down the error message and notify an appropriate election official. If possible, shutdown and then turn off the Scanner. Wait 30 seconds and then turn the Scanner back on. If the problem persists, an ES&S Service Technician will need to be contacted. Since the BAPis Board is a "COTS" (Commercial Off The Shelf) product, the ES&S Technician may have to contact a BAP Technician to diagnose the problem.
1009519 - Camera Interface - ADV2x2 JPEG 2000 module error	×		×	X	This message appears if there is a problem with the ADV2x2 JPEG 2000 Module on the BAPis Image Processor Board.	Write down the error message and notify an appropriate election official. If possible, shutdown and then turn off the Scanner. Wait 30 seconds and then turn the Scanner back on. If the problem persists, an ES&S Service Technician will need to be contacted. Since the BAPis Board is a "COTS" (Commercial Off The Shelf) product, the ES&S Technician may have to contact a BAP Technician to diagnose the problem.
1009520 - Camera Interface - G-Link PCI error	X		×	X	This message appears if there is a G-Link PCI error on the BAPis Image Processor Board.	Write down the error message and notify an appropriate election official. If possible, shutdown and then turn off the Scanner. Wait 30 seconds and then turn the Scanner back on. If the problem persists, an ES&S Service Technician will need to be contacted. Since the BAPis Board is a "COTS" (Commercial Off The Shelf) product, the ES&S Technician may have to contact a BAP Technician to diagnose the problem.

Message Text	Message Displayed	Message Printed	Message Logged	Results in a System Halt	Cause	Resolution
1009521 - Camera Interface - FPGA self test failed	X		X	X	This message appears if the FPGA self test failed on the BAPis Image Processor Board.	Write down the error message and notify an appropriate election official. If possible, shutdown and then turn off the Scanner. Wait 30 seconds and then turn the Scanner back on. If the problem persists, an ES&S Service Technician will need to be contacted. Since the BAPis Board is a "COTS" (Commercial Off The Shelf) product, the ES&S Technician may have to contact a BAP Technician to diagnose the problem.
1009522 - Camera Interface - SDRAM self test failed	×		X	X	This message appears if the SDRAM self test failed on the BAPis Image Processor Board.	Write down the error message and notify an appropriate election official. If possible, shutdown and then turn off the Scanner. Wait 30 seconds and then turn the Scanner back on. If the problem persists, an ES&S Service Technician will need to be contacted. Since the BAPis Board is a "COTS" (Commercial Off The Shelf) product, the ES&S Technician may have to contact a BAP Technician to diagnose the problem.
1009523 - Camera Interface - SRAM self test failed	X		X	X	This message appears if the SRAM self test failed on the BAPis Image Processor Board.	Write down the error message and notify an appropriate election official. If possible, shutdown and then turn off the Scanner. Wait 30 seconds and then turn the Scanner back on. If the problem persists, an ES&S Service Technician will need to be contacted. Since the BAPis Board is a "COTS" (Commercial Off The Shelf) product, the ES&S Technician may have to contact a BAP Technician to diagnose the problem.

Message Text	Message Displayed	Message Printed	Message Logged	Results in a System Halt	Cause	Resolution
1009524 - Camera Interface - Image buffer exceeding maximum	X		X	X	This warning message appears when a ballot is scanned and its resulting image data exceeds the maximum limit of the image buffer on the BAPis Image Processor Board.	Write down the error message and notify an appropriate election official. Since a "buffer overflow" (see message 1009512) did not occur, the system should allow normal operations to resume. However, if normal operations are not allowed to resume, shutdown and then turn off the Scanner. Wait 30 seconds and then turn the Scanner back on. If the problem persists, an ES&S Service Technician will need to be contacted. Since the BAPis Board is a "COTS" (Commercial Off The Shelf) product, the ES&S Technician may have to contact a BAP Technician to diagnose the problem.
1009525 - Camera Interface - Document queue corruption detected	×		×	X	This message appears if the BAPis Image Processor Board detects corruption of the Document Queue.	Write down the error message and notify an appropriate election official. If possible, shutdown and then turn off the Scanner. Wait 30 seconds and then turn the Scanner back on. If the problem persists, an ES&S Service Technician will need to be contacted. Since the BAPis Board is a "COTS" (Commercial Off The Shelf) product, the ES&S Technician may have to contact a BAP Technician to diagnose the problem.

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1009526 - Camera Interface - Image queue corruption detected	X		X	X	This message appears if the BAPis Image Processor Board detects corruption of the Image Queue.	Write down the error message and notify an appropriate election official. If possible, shutdown and then turn off the Scanner. Wait 30 seconds and then turn the Scanner back on. If the problem persists, an ES&S Service Technician will need to be contacted. Since the BAPis Board is a "COTS" (Commercial Off The Shelf) product, the ES&S Technician may have to contact a BAP Technician to diagnose the problem.
1009527 - Camera Interface - Image format not supported	X		X	X	This message appears if the BAPis Image Processor Board does not support the format of the scanned ballot image.	Write down the error message and notify an appropriate election official. Attempt to rescan the ballot in a different orientation (e.g. back of ballot facing up). If that does not work, set that ballot aside, with an appropriate note attached, for an election official to examine later. Then resume normal operations. If this error repeatedly occurs, shutdown and then turn off the Scanner. Wait 30 seconds and then turn the Scanner back on. If the problem persists, an ES&S Customer Service Representative will need to be contacted.

Message Text	Message Displayed	Message Printed	Message Logged	Results in a System Halt	Cause	Resolution
1009528 - Camera Interface - Reset mode not supported	X		X	X	This message appears if the system cannot reset the BAPis Image Processor Board to its initialized state.	Write down the error message and notify an appropriate election official. If possible, shutdown and then turn off the Scanner. Wait 30 seconds and then turn the Scanner back on. If the problem persists, an ES&S Service Technician will need to be contacted. Since the BAPis Board is a "COTS" (Commercial Off The Shelf) product, the ES&S Technician may have to contact a BAP Technician to diagnose the problem.
1009529 - Camera Interface - Missing end of image interrupt	X		X	X	This message appears if a ballot is scanned and the BAPis Image Processor Board cannot detect the interrupt signal that indicates the end of the image has been reached.	Write down the error message and notify an appropriate election official. The system should allow normal operations to resume. If this error repeatedly occurs, shutdown and then turn off the Scanner. Wait 30 seconds and then turn the Scanner back on. If the problem persists, an ES&S Service Technician will need to be contacted. Since the BAPis Board is a "COTS" (Commercial Off The Shelf) product, the ES&S Technician may have to contact a BAP Technician to diagnose the problem.
1009530 - Camera Interface - Camera does not support TLK RGB pattern	X		X	X	This message appears if a ballot is scanned and one or both of the scan-cameras transmits the ballot image to the BAPis Image Processor Board in the form of a TLK RGB pattern, which the board cannot process.	Write down the error message and notify an appropriate election official. One or both of the scan-cameras will need to be adjusted to transmit in a different image format, so an ES&S Service Technician will need to be contacted. Since the BAPis Board is a "COTS" (Commercial Off The Shelf) product, the ES&S Technician may have to contact a BAP Technician to make the adjustment(s).

Message Text	Message Displayed	Message Printed	Message Logged	Results in a System Halt	Cause	Resolution
1009531 - Camera Interface - Cannot communicate with Virtex FPGA	X		X	X	This message appears if the BAPis Image Processor Board failed to communicate with a Virtex FPGA (field-programmable gate array) device.	Write down the error message and notify an appropriate election official. If possible, shutdown and then turn off the Scanner. Wait 30 seconds and then turn the Scanner back on. If the problem persists, the Virtex FPGA may need to be replaced. Contact an ES&S Service Technician. Since the BAPis Board is a "COTS" (Commercial Off The Shelf) product, the ES&S Technician may have to contact a BAP Technician to fix the problem.
1009532 - Camera Interface - Cannot communicate with Spartan FPGA	×		X	X	This message appears if the BAPis Image Processor Board failed to communicate with a Spartan FPGA (field-programmable gate array) device.	Write down the error message and notify an appropriate election official. If possible, shutdown and then turn off the Scanner. Wait 30 seconds and then turn the Scanner back on. If the problem persists, the Spartan FPGA may need to be replaced. Contact an ES&S Service Technician. Since the BAPis Board is a "COTS" (Commercial Off The Shelf) product, the ES&S Technician may have to contact a BAP Technician to fix the problem.

Message Text	Message Displayed	Message Printed	Message Logged	Results in a System Halt	Cause	Resolution
1009533 - Camera Interface - UART failed	X		X	X	This message appears if the BAPis Image Processor Board's UART (Universal Asynchronous Receiver/ Transmitter) Module failed to transmit data.	Write down the error message and notify an appropriate election official. If possible, shutdown and then turn off the Scanner. Wait 30 seconds and then turn the Scanner back on. If the problem persists, the UART may need to be replaced. Contact an ES&S Service Technician. Since the BAPis Board is a "COTS" (Commercial Off The Shelf) product, the ES&S Technician may have to contact a BAP Technician to fix the problem.
1009534 - Camera Interface - USB failed standard command	X		X	X	This message appears if a standard command fails to be transmitted between the BAPis Image Processor Board and the ES&S Motherboard via a USB (Universal Serial Bus) connection.	Write down the error message and notify an appropriate election official. If possible, shutdown and then turn off the Scanner. Wait 30 seconds and then turn the Scanner back on. If the problem persists, contact an ES&S Service Technician. Since the BAPis Board is a "COTS" (Commercial Off The Shelf) product, the ES&S Technician may have to contact a BAP Technician to diagnose the problem.
1009535 - Camera Interface - USB failed vendor specific command	X		X	X	This message appears if a "vendor specific" (ES&S) command fails to be transmitted between the BAPis Image Processor Board and the ES&S Motherboard via a USB (Universal Serial Bus) connection.	Write down the error message and notify an appropriate election official. If possible, shutdown and then turn off the Scanner. Wait 30 seconds and then turn the Scanner back on. If the problem persists, contact an ES&S Service Technician. Since the BAPis Board is a "COTS" (Commercial Off The Shelf) product, the ES&S Technician may have to contact a BAP Technician to diagnose the problem.

Message Text	Message Displayed	Message Printed	Message Logged	Results in a System Halt	Cause	Resolution
1009536 - Camera Interface - USB function not supported	X		X	X	This message appears if data transmission capability is lost between the BAPis Image Processor Board and the ES&S Motherboard via a USB (Universal Serial Bus) connection.	Write down the error message and notify an appropriate election official. If possible, shutdown and then turn off the Scanner. Wait 30 seconds and then turn the Scanner back on. If the problem persists, contact an ES&S Service Technician. Since the BAPis Board is a "COTS" (Commercial Off The Shelf) product, the ES&S Technician may have to contact a BAP Technician to diagnose the problem.
1009537 - Camera Interface - Processing started without image	X		X	X	This message appears if the BAPis Image Processor Board started processing without a scanned image being present.	Write down the error message and notify an appropriate election official. If possible, shutdown and then turn off the Scanner. Wait 30 seconds and then turn the Scanner back on. If the problem persists, contact an ES&S Service Technician. Since the BAPis Board is a "COTS" (Commercial Off The Shelf) product, the ES&S Technician may have to contact a BAP Technician to diagnose the problem.
1009538 - Camera Interface - Image lost	X		X	X	This message appears if the BAPis Image Processor Board started processing with a scanned image, but somehow the image was lost before the processing was completed.	Write down the error message and notify an appropriate election official. If possible, shutdown and then turn off the Scanner. Wait 30 seconds and then turn the Scanner back on. If the problem persists, contact an ES&S Service Technician. Since the BAPis Board is a "COTS" (Commercial Off The Shelf) product, the ES&S Technician may have to contact a BAP Technician to diagnose the problem.

Message Text	Message Displayed	Message Printed	Message Logged	Results in a System Halt	Cause	Resolution
1009539 - Camera Interface - Virtex FPGA generated empty interrupt	X		X		This message appears if the Virtex FPGA (field-programmable gate array) device's communication with the BAPis Image Processor Board generated an unexpected, empty interrupt.	Write down the error message and notify an appropriate election official. If possible, shutdown and then turn off the Scanner. Wait 30 seconds and then turn the Scanner back on. If the problem persists, the Virtex FPGA may need to be replaced. Contact an ES&S Service Technician. Since the BAPis Board is a "COTS" (Commercial Off The Shelf) product, the ES&S Technician may have to contact a BAP Technician to fix the problem.
1009540 - Camera Interface - Error in image processor FLASH memory	X		X		This message appears if an error occurs within the FLASH Memory of the BAPis Image Processor Board.	Write down the error message and notify an appropriate election official. If possible, shutdown and then turn off the Scanner. Wait 30 seconds and then turn the Scanner back on. If the problem persists, contact an ES&S Service Technician. Since the BAPis Board is a "COTS" (Commercial Off The Shelf) product, the ES&S Technician may have to contact a BAP Technician to diagnose the problem.
1009541 - Camera Interface - Unsupported camera command protocol	X		X		This message appears if the BAPis Image Processor Board receives an unexpected command (out of the established sequence of camera commands) to issue to the camera(s).	Write down the error message and notify an appropriate election official. If possible, shutdown and then turn off the Scanner. Wait 30 seconds and then turn the Scanner back on. If the problem persists, contact an ES&S Service Technician. Since the BAPis Board is a "COTS" (Commercial Off The Shelf) product, the ES&S Technician may have to contact a BAP Technician to diagnose the problem.

Message Text	Message Displayed	Message Printed	Message Logged	Results in a System Halt	Cause	Resolution
1009542 - Camera Interface - Invalid camera UART	X		X		This message appears if the BAPis Image Processor Board receives an invalid transmission from one of the camera UART (Universal Asynchronous Receiver/Transmitter) Modules.	Write down the error message and notify an appropriate election official. If possible, shutdown and then turn off the Scanner. Wait 30 seconds and then turn the Scanner back on. If the problem persists, the UART may need to be replaced. Contact an ES&S Service Technician. Since the BAPis Board is a "COTS" (Commercial Off The Shelf) product, the ES&S Technician may have to contact a BAP Technician to fix the problem.
1009543 - Camera Interface - Camera did not acknowledge command	X		X		This message appears if the BAPis Image Processor Board issues a camera command, but the camera does not acknowledge receipt of the command.	Write down the error message and notify an appropriate election official. If possible, shutdown and then turn off the Scanner. Wait 30 seconds and then turn the Scanner back on. If the problem persists, contact an ES&S Service Technician. Since the BAPis Board is a "COTS" (Commercial Off The Shelf) product, the ES&S Technician may have to contact a BAP Technician to diagnose the problem.
1009544 - Camera Interface - Illegal character from camera	X		X		This message appears if one of the cameras issues an illegal character in its response to a command from the BAPis Image Processor Board.	Write down the error message and notify an appropriate election official. If possible, shutdown and then turn off the Scanner. Wait 30 seconds and then turn the Scanner back on. If the problem persists, contact an ES&S Service Technician. Since the BAPis Board is a "COTS" (Commercial Off The Shelf) product, the ES&S Technician may have to contact a BAP Technician to diagnose the problem.

Message Text	Message Displayed	Message Printed	Message Logged	Results in a System Halt	Cause	Resolution
1009545 - Camera Interface - Transport Error	X		X		This message appears if the Datawin Board relays a transport error, which effects the camera interface, to the BAPis Image Processor Board.	Write down the error message and notify an appropriate election official. If possible, shutdown and then turn off the Scanner. Wait 30 seconds and then turn the Scanner back on. If the problem persists, contact an ES&S Service Technician. Since both the BAPis and Datawin Boards are "COTS" (Commercial Off The Shelf) products, the ES&S Technician may have to contact a BAP or Datawin Technician to diagnose the problem.
1009546 - Bad mode	X		X	X	This generic message appears if the BAPis Image Processor Board receives a "bad mode" indication from either the Datawin Board or one of the two cameras.	Write down the error message and notify an appropriate election official. If possible, shutdown and then turn off the Scanner. Wait 30 seconds and then turn the Scanner back on. If the problem persists, contact an ES&S Service Technician. Since both the BAPis and Datawin Boards are "COTS" (Commercial Off The Shelf) products, the ES&S Technician may have to contact a BAP or Datawin Technician to diagnose the problem.

Message Text	Message Displayed	Message Printed	Message Logged	Results in a System Halt	Cause	Resolution
1009547 - Camera not responding to Camera Interface board	X		X	X	This message appears if one of the Camera Interface Boards is receiving commands from the BAPis Image Processor Board, but the corresponding camera itself is not responding to those commands.	Write down the error message and notify an appropriate election official. If possible, shutdown and then turn off the Scanner. Wait 30 seconds and then turn the Scanner back on. If the problem persists, contact an ES&S Service Technician. Since both the Camera Interface and BAPis Boards are "COTS" (Commercial Off The Shelf) products, the ES&S Technician may have to contact a BAP or Datawin Technician to diagnose the problem.
1009548 - No cameras responding to Camera Interface board	X		×	×	This message appears if both Camera Interface Boards are receiving commands from the BAPis Image Processor Board, but the cameras are not responding to those commands.	Write down the error message and notify an appropriate election official. If possible, shutdown and then turn off the Scanner. Wait 30 seconds and then turn the Scanner back on. If the problem persists, contact an ES&S Service Technician. Since both the Camera Interface and BAPis Boards are "COTS" (Commercial Off The Shelf) products, the ES&S Technician may have to contact a BAP Technician to diagnose the problem.
1009549 - Cannot open file to write image from Camera Interface board	X		X	X	This message appears if the image file, provided by the Camera Interface Board, cannot be opened by the BAPis Image Processor Board.	Write down the error message and notify an appropriate election official. If possible, shutdown and then turn off the Scanner. Wait 30 seconds and then turn the Scanner back on. If the problem persists, contact an ES&S Service Technician. Since the BAPis Board is a "COTS" (Commercial Off The Shelf) products, the ES&S Technician may have to contact a BAP Technician to diagnose the problem.

Message Text	Message Displayed	Message Printed	Message Logged	Results in a System Halt	Cause	Resolution
1009552 - Unable to send file to Camera Interface board	X		X	X	This message appears if the BAPis Image Processor Board is unable to send a file to a Camera Interface Board.	Write down the error message and notify an appropriate election official. If possible, shutdown and then turn off the Scanner. Wait 30 seconds and then turn the Scanner back on. If the problem persists, contact an ES&S Service Technician. Since both the Camera Interface and BAPis Boards are "COTS" (Commercial Off The Shelf) products, the ES&S Technician may have to contact a BAP Technician to diagnose the problem.
1009553 - Invalid Ballot Key for Camera Interface config INI file	X		X	X	This message appears at start-up when the system attempts to initialize a Camera Interface Board using an invalid ballot key for the Board's config INI file.	Write down the error message and notify an appropriate election official. If possible, shutdown and then turn off the Scanner. Wait 30 seconds and then turn the Scanner back on. If the problem persists, an ES&S Service Technician will need to be contacted. Since the Camera Interface Board is a "COTS" (Commercial Off The Shelf) product, the ES&S Technician may have to contact a BAP Technician to diagnose the problem.
1009554 - Camera Interface thread not started	X		X	X	This message appears at start-up when the Master Control Program attempts to start a task-execution-thread for the Camera Interface process, but fails.	Write down the error message and notify an appropriate election official. If possible, shutdown and then turn off the Scanner. Wait 30 seconds and then turn the Scanner back on. If the problem persists, an ES&S Customer Service Representative will need to be contacted.

Message Text	Message Displayed	Message Printed	Message Logged	Results in a System Halt	Cause	Resolution
1009555 - Error setting ballot size	X		X	X	This message appears when an election is loaded and the BAPis Image Processor Board fails to set the ballot size.	Write down the error message and notify an appropriate election official. Repeat the Clear-Initialize and Load Election steps. If the same error reappears, shutdown and then turn off the Scanner. Wait 30 seconds and then turn the Scanner back on. If the problem persists, an ES&S Customer Service Representative will need to be contacted.
1009565 - Camera Interface - No space for image	X		X	X	This message appears when a ballot is scanned and there is no room within the buffer of the BAPis Image Processor Board to store the image.	Write down the error message and notify an appropriate election official. If possible, shutdown and then turn off the Scanner. Wait 30 seconds and then turn the Scanner back on. If the problem persists, an ES&S Service Technician will need to be contacted. Since the BAPis Board is a "COTS" (Commercial Off The Shelf) product, the ES&S Technician may have to contact a BAP Technician to diagnose the problem.
1009566 - Camera Interface - Error sending image	X		×	×	This message appears when a ballot is scanned and the Camera Interface Board fails to send the image to the BAPis Image Processor Board.	Write down the error message and notify an appropriate election official. If possible, shutdown and then turn off the Scanner. Wait 30 seconds and then turn the Scanner back on. If the problem persists, an ES&S Service Technician will need to be contacted. Since both Camera Interface and the BAPis Boards are "COTS" (Commercial Off The Shelf) products, the ES&S Technician may have to contact a BAP Technician to diagnose the problem.

Message Text	Message Displayed	Message Printed	Message Logged	Results in a System Halt	Cause	Resolution
1009567 - Camera Interface - Camera no response	X		X	X	This message appears when the Scanner attempts to scan a ballot, but the Camera Interface Board(s) senses that there is no response from one or both of the cameras.	Write down the error message and notify an appropriate election official. If possible, shutdown and then turn off the Scanner. Wait 30 seconds and then turn the Scanner back on. If the problem persists, an ES&S Service Technician will need to be contacted. Since the Camera Interface Board is a "COTS" (Commercial Off The Shelf) product, the ES&S Technician may have to contact a BAP Technician to diagnose the problem.
1009568 - Camera Interface - Transporter no response	X		X	×	This message appears when the Scanner attempts to scan a ballot, but the Camera Interface Board(s) senses that there is no response from the Ballot Transporter.	Write down the error message and notify an appropriate election official. If possible, shutdown and then turn off the Scanner. Wait 30 seconds and then turn the Scanner back on. If the problem persists, an ES&S Service Technician will need to be contacted. Since the Camera Interface Board is a "COTS" (Commercial Off The Shelf) product, the ES&S Technician may have to contact a BAP Technician to diagnose the problem.
1009700 - Input Tray: Empty	X				This message appears on the initial 'Scan Ballots' screen, just prior to scanning, when the Input Tray has no ballots to scan.	Put a stack of ballots, for the loaded election, into the Input Tray.
1009701 - Input Tray: Pick Error	X		X		During scanning, when the Scanner has trouble picking a ballot from the Input Tray, ballot scanning stops and this error appears on a 'Scan Ballots' error screen.	Select either 'Scan More' or 'Done' from the error screen and follow the on-screen instructions for clearing the error (which includes clearing the Ballot Transport Path).

Message Text	Message Displayed	Message Printed	Message Logged	Results in a System Halt	Cause	Resolution
1009702 - Input Tray: Double Pick	x				During scanning, when the Scanner picks more than one ballot from the Input Tray, ballot scanning stops and this error appears on a 'Scan Ballots' error screen.	Select either 'Scan More' or 'Done' from the error screen and follow the on-screen instructions for clearing the error (which includes clearing the Ballot Transport Path).
1009703 - Bottom Bin: Full	X				During scanning, when the Scanner diverts so many ballots to the Bottom Output Bin that they are about to exceed the maximum ballot capacity of the bin, ballot scanning stops and this error appears on a 'Scan Ballots' error screen.	Select either 'Scan More' or 'Done' from the error screen and follow the on-screen instructions for clearing the error (which includes clearing the Ballot Transport Path).
1009704 - Middle Bin: Full	X				During scanning, when the Scanner diverts so many ballots to the Middle Output Bin that they are about to exceed the maximum ballot capacity of the bin, ballot scanning stops and this error appears on a 'Scan Ballots' error screen.	Select either 'Scan More' or 'Done' from the error screen and follow the on-screen instructions for clearing the error (which includes clearing the Ballot Transport Path).
1009705 - Top Bin: Full	X				During scanning, when the Scanner diverts so many ballots to the Top Out-stack Bin that they are about to exceed the maximum ballot capacity of the bin, ballot scanning stops and this error appears on a 'Scan Ballots' error screen.	Select either 'Scan More' or 'Done' from the error screen and follow the on-screen instructions for clearing the error (which includes clearing the Ballot Transport Path).

Message Text	Message Displayed	Message Printed	Message Logged	Results in a System Halt	Cause	Resolution
1009706 - Transport: Ballot Jam	X				During scanning, when a ballot jams within the Transport Path, ballot scanning stops and an 'OK' popup	Select either 'Scan More' or 'Done' from the error screen and follow the on-screen instructions for clearing the error (which includes
					screen appears, identifying the ballots left in the Transport Path. Pressing 'OK' dismisses the popup and this error message appears on a 'Scan Ballots' error screen.	clearing the Ballot Transport Path). Selecting 'Scan More' will also provide on-screen steps for rescanning the ballots, which were left in the Transport Path.
1009707 - Transport: Ballot Length	x				During scanning, when the Scanner encounters an unexpected ballot length, ballot scanning stops and this error appears on a 'Scan Ballots' error screen.	Select either 'Scan More' or 'Done' from the error screen and follow the on-screen instructions for clearing the error (which includes clearing the Ballot Transport Path).
1009708 - Diverter: Decision Late	X		Х		During scanning, when the timing of the decision to divert a ballot to a specific output bin is too late to activate the proper diverter(s), ballot scanning stops and this error appears on a 'Scan Ballots' error screen.	Carefully read the 'Scan Ballots' error screen. Then select either 'Scan More' or 'Done' and follow the on-screen instructions for clearing the error (which includes clearing the Ballot Transport Path). Selecting 'Scan More' will also provide on-screen steps for rescanning the stack of ballots for the Current Batch.
1009709 - Diverter: Wrong Bin	X		X		During scanning, when a ballot is diverted to the wrong output bin, ballot scanning stops and this error appears on a 'Scan Ballots' error screen.	Carefully read the 'Scan Ballots' error screen. Then select either 'Scan More' or 'Done' and follow the on-screen instructions for clearing the error (which includes clearing the Ballot Transport Path). Selecting 'Scan More' will also provide on-screen steps for rescanning the stack of ballots for the Current Batch.

Message Text	Message Displayed	Message Printed	Message Logged	Results in a System Halt	Cause	Resolution
1009710 - Main Motor: Error	X		X		During ballot scanning, when the Main Transport Path Motor encounters an error, ballot scanning stops and this message appears on an error screen.	Write down the error message and notify an appropriate election official. If possible, shutdown and then turn off the Scanner. Wait 30 seconds and then turn the Scanner back on. If the problem persists, an ES&S Service Technician will need to be contacted. Since this motor is a "COTS" (Commercial Off The Shelf) product, the ES&S Technician may have to contact a Datawin Technician to diagnose the problem.
1009711 - Hopper Drive: Error	X		X		During scanning, when the mechanical drive for raising/lowering the ballot stack support plate (for either the Input Tray or the Bottom Output Bin) encounters a problem, ballot scanning stops and this error appears on a 'Scan Ballots' error screen.	Select either 'Scan More' or 'Done' from the error screen and follow the on-screen instructions for clearing the error (which includes clearing the Ballot Transport Path).
1009712 - PRECINCT LABELS: NOT SELECTED	X				This message appears on the initial 'Scan Ballots' screen, just prior to scanning, when the election Processing Mode is "By Style" and "NONE" appears in the Precinct Label field. Note: An actual name (e.g. Precinct, Borough, etc.) will appear in the place of "Precinct label.	Press the screen's 'Precinct Label' button and follow the on-screen instructions to select a precinct.

Message Text	Message Displayed	Message Printed	Message Logged	Results in a System Halt	Cause	Resolution
1009713 - Safety: Service Panel Open	X				During scanning, when the large Service Panel is opened on the back of the Scanner, ballot scanning stops and this error appears on a 'Scan Ballots' error screen.	Close the Service Panel. Carefully read the 'Scan Ballots' error screen. Then select either 'Scan More' or 'Done' and follow the on-screen instructions for clearing the error (which includes clearing the Ballot Transport Path). Selecting 'Scan More' will also provide on-screen steps for rescanning the stack of ballots for the Current Batch.
1009714 - Safety: Camera Open	X				During scanning, when the hinged, upper camera housing is opened, revealing upper the Transport Path, ballot scanning stops and this error appears on a 'Scan Ballots' error screen.	Close the upper camera housing. Carefully read the 'Scan Ballots' error screen. Then select either 'Scan More' or 'Done' and follow the on-screen instructions for clearing the error (which includes clearing the Ballot Transport Path). Selecting 'Scan More' will also provide on-screen steps for rescanning the stack of ballots for the Current Batch.
1009715 - Report Printer: Out Of Paper					Occurs when the Report Printer runs out of paper. The control panel on the Report Printer gives the only indication that the printer is out of paper.	Add paper to the Report Printer's paper tray.
1009716 - Report Printer: Not Detected					Occurs when the Report Printer is either not on or the USB cable connection between the Printer and Scanner is disconnected.	Make sure the Report Printer is turned on. Make sure the Printer's USB cable is securely connected to the Printer and to a USB port on the Scanner.

Message Text	Message Displayed	Message Printed	Message Logged	Results in a System Halt	Cause	Resolution
1009717 - Log Printer: Out Of Paper	X	X	X		Occurs when the Scanner attempts to access the Log Printer and the Printer has run out of paper. An 'OK' popup screen indicates that the Printer cannot be accessed or has run out of paper. This temporarily stops scanning, but does not result in a "system halt, which requires the DS850 to be rebooted.	Select 'OK' to dismiss the popup and add paper to the Log Printer's paper tray.
1009718 - Log Printer: Not Detected	X				Occurs when the Scanner attempts to access the Log Printer and the Printer's USB cable has been disconnected from the Scanner. An 'OK' popup screen indicates that the Printer cannot be accessed or has run out of paper. This temporarily stops scanning, but does not result in a "system halt, which requires the DS850 to be rebooted.	Select 'OK' to dismiss the popup and make sure the Printer's USB cable is securely connected to the Printer and to a USB port on the Scanner.

Message Text	Message Displayed	Message Printed	Message Logged	Results in a System Halt	Cause	Resolution
1009719 - Power: On Battery	X		X		Occurs AC power from the wall outlet to the UPS (Uninterruptible Power Supply) battery backup system is lost. The system brings the Scanner to a gentle-stop: stops picking ballots, finishes scanning picked ballots, and clears the Transport Path. An 'OK' popup screen indicates that the Scanner is on battery power, additional ballots cannot be scanned, and a forced shutdown will occur if AC power is not restored. An "open power plug" icon on the upper right side of the screen also indicates that AC power has been lost.	Select 'OK' to dismiss the popup. Select 'Done' on the 'Scan Ballots' screen and either save or delete the Current Batch. Check the power cord connecting the UPS system to the wall outlet to make sure all connections are secure and in place. Make sure the wall outlet has power; a fuse may have blown, a breaker tripped, or the outlet itself may be bad. If necessary, switch to a good, powered wall outlet. If AC power cannot be restored, eventually a forced shutdown of the Scanner will occur. If a forced shutdown does occur, notify an appropriate election official.
1009720 - Light Barrier: #02 Blocked	X				Prior to scanning, if the hinged, upper camera housing is partially or fully opened, one or more of these numbered "Light Barrier Blocked" messages will appear along with the "Safety: Camera Open" and/or "Light Barrier: Camera Blocked" messages on the initial 'Scan Ballots' screen. Each numbered light barrier represents a different transmitter-receptor device under the camera housing.	Close the upper camera housing. If ballots are in the Input Tray, the "Ready to Scan Ballots" heading should appear on the screen. If you press the 'Start' button, a Clear Transport Path process will automatically occur before ballot scanning starts.
Message Text	Message Displayed	Message Printed	Message Logged	Results in a System Halt	Cause	Resolution
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1009721 - Light Barrier: #03 Blocked	X				Prior to scanning, if the hinged, upper camera housing is partially or fully opened, one or more of these numbered "Light Barrier Blocked" messages will appear along with the "Safety: Camera Open" and/or "Light Barrier: Camera Blocked" messages on the initial 'Scan Ballots' screen. Each numbered light barrier represents a different transmitter-receptor device under the camera housing.	Close the upper camera housing. If ballots are in the Input Tray, the "Ready to Scan Ballots" heading should appear on the screen. If you press the 'Start' button, a Clear Transport Path process will automatically occur before ballot scanning starts.
1009722 - Light Barrier: #04 Blocked	X				Prior to scanning, if the hinged, upper camera housing is partially or fully opened, one or more of these numbered "Light Barrier Blocked" messages will appear along with the "Safety: Camera Open" and/or "Light Barrier: Camera Blocked" messages on the initial 'Scan Ballots' screen. Each numbered light barrier represents a different transmitter-receptor device under the camera housing.	Close the upper camera housing. If ballots are in the Input Tray, the "Ready to Scan Ballots" heading should appear on the screen. If you press the 'Start' button, a Clear Transport Path process will automatically occur before ballot scanning starts.

Message Text	Message Displayed	Message Printed	Message Logged	Results in a System Halt	Cause	Resolution
1009723 - Light Barrier: #05 Blocked	x				Prior to scanning, if the hinged, upper camera housing is partially or fully opened, one or more of these numbered "Light Barrier Blocked" messages will appear along with the "Safety: Camera Open" and/or "Light Barrier: Camera Blocked" messages on the initial 'Scan Ballots' screen. Each numbered light barrier represents a different transmitter-receptor device under the camera housing.	Close the upper camera housing. If ballots are in the Input Tray, the "Ready to Scan Ballots" heading should appear on the screen. If you press the 'Start' button, a Clear Transport Path process will automatically occur before ballot scanning starts.
1009724 - Light Barrier: #06 Blocked	X				Prior to scanning, if the hinged, upper camera housing is partially or fully opened, one or more of these numbered "Light Barrier Blocked" messages will appear along with the "Safety: Camera Open" and/or "Light Barrier: Camera Blocked" messages on the initial 'Scan Ballots' screen. Each numbered light barrier represents a different transmitter-receptor device under the camera housing.	Close the upper camera housing. If ballots are in the Input Tray, the "Ready to Scan Ballots" heading should appear on the screen. If you press the 'Start' button, a Clear Transport Path process will automatically occur before ballot scanning starts.

Message Text	Message Displayed	Message Printed	Message Logged	Results in a System Halt	Cause	Resolution
1009725 - Light Barrier: #07 Blocked	X				Prior to scanning, if the hinged, upper camera housing is partially or fully opened, one or more of these numbered "Light Barrier Blocked" messages will appear along with the "Safety: Camera Open" and/or "Light Barrier: Camera Blocked" messages on the initial 'Scan Ballots' screen. Each numbered light barrier represents a different transmitter-receptor device under the camera housing	Close the upper camera housing. If ballots are in the Input Tray, the "Ready to Scan Ballots" heading should appear on the screen. If you press the 'Start' button, a Clear Transport Path process will automatically occur before ballot scanning starts.
1009726 - Light Barrier: #08 Blocked	x				Prior to scanning, if the hinged, upper camera housing is partially or fully opened, one or more of these numbered "Light Barrier Blocked" messages will appear along with the "Safety: Camera Open" and/or "Light Barrier: Camera Blocked" messages on the initial 'Scan Ballots' screen. Each numbered light barrier represents a different transmitter-receptor device under the camera housing.	Close the upper camera housing. If ballots are in the Input Tray, the "Ready to Scan Ballots" heading should appear on the screen. If you press the 'Start' button, a Clear Transport Path process will automatically occur before ballot scanning starts.

Message Text	Message Displayed	Message Printed	Message Logged	Results in a System Halt	Cause	Resolution
1009727 - Light Barrier: #09 Blocked	x				Prior to scanning, if the hinged, upper camera housing is partially or fully opened, one or more of these numbered "Light Barrier Blocked" messages will appear along with the "Safety: Camera Open" and/or "Light Barrier: Camera Blocked" messages on the initial 'Scan Ballots' screen. Each numbered light barrier represents a different transmitter-receptor device under the camera housing.	Close the upper camera housing. If ballots are in the Input Tray, the "Ready to Scan Ballots" heading should appear on the screen. If you press the 'Start' button, a Clear Transport Path process will automatically occur before ballot scanning starts.
1009728 - Light Barrier: #10 Blocked	X				Prior to scanning, if the hinged, upper camera housing is partially or fully opened, one or more of these numbered "Light Barrier Blocked" messages will appear along with the "Safety: Camera Open" and/or "Light Barrier: Camera Blocked" messages on the initial 'Scan Ballots' screen. Each numbered light barrier represents a different transmitter-receptor device under the camera housing.	Close the upper camera housing. If ballots are in the Input Tray, the "Ready to Scan Ballots" heading should appear on the screen. If you press the 'Start' button, a Clear Transport Path process will automatically occur before ballot scanning starts.

Message Text	Message Displayed	Message Printed	Message Logged	Results in a System Halt	Cause	Resolution
1009729 - Light Barrier: #11 Blocked	X				Prior to scanning, if the hinged, upper camera housing is partially or fully opened, one or more of these numbered "Light Barrier Blocked" messages will appear along with the "Safety: Camera Open" and/or "Light Barrier: Camera Blocked" messages on the initial 'Scan Ballots' screen. Each numbered light barrier represents a different transmitter-receptor device under the camera housing.	Close the upper camera housing. If ballots are in the Input Tray, the "Ready to Scan Ballots" heading should appear on the screen. If you press the 'Start' button, a Clear Transport Path process will automatically occur before ballot scanning starts.
1009730 - Light Barrier: Camera Blocked	X				Prior to scanning, if the hinged, upper camera housing is partially or fully opened, this message, one or more numbered "Light Barrier Blocked" messages, and the "Safety: Camera Open" messages may appear on the initial 'Scan Ballots' screen.	Close the upper camera housing. If ballots are in the Input Tray, the "Ready to Scan Ballots" heading should appear on the screen. If you press the 'Start' button, a Clear Transport Path process will automatically occur before ballot scanning starts.

Message Text	Message Displayed	Message Printed	Message Logged	Results in a System Halt	Cause	Resolution
1009731 - Storage: Disk Space Low	X		X		When 'Save' is pressed to save the Current Batch, if the available memory space is low for storing data on the Scanner's internal hard drive, this error will occur and a related 'OK' popup screen will appear.	Write down the popup's error message and notify an appropriate election official. Select 'OK' to dismiss the popup. If this is the first time you have seen this popup, the save procedure should continue and be completed successfully. Go to the 'Results' menu screen, select 'Archive Data' and follow the on-screen information to export archive data to a selected Target Media Device. Once you have successfully archived the data, select 'Clear All Results' from the 'Results' menu screen. This should free-up enough memory space to allow the scanning and saving of Current Batches to continue for quite some time.
1009750 - Syslog process terminated	X			X	This message appears if the System's process of logging messages suddenly stops.	Write down the error message and notify an appropriate election official. If possible, shutdown and then turn off the Scanner. Wait 30 seconds and then turn the Scanner back on. If the problem persists, contact an ES&S Customer Service Representative for assistance.
1009751 - Unable to determine filesize for {1}	X		X		This message appears if the System is attempting to use (e.g. allot space for, save, write to, read from, etc.) a file of undetermined size. Note the actual name of the file appears in place of the "{1}".	Write down the error message and notify an appropriate election official. If this error occurred in response to an action taken on one of the DS850 screens (e.g. saving the Current Batch), attempt to repeat the action. If the problem persists, contact an ES&S Customer Service Representative for assistance.

Message Text	Message Displayed	Message Printed	Message Logged	Results in a System Halt	Cause	Resolution
1009752 - File missing	X		X		This message appears if the System is attempting to access a file that should exist but cannot be found. Note: If it is a UI file that cannot be accessed then no message is logged.	Write down the error message and notify an appropriate election official. If this error occurred in response to an action taken on one of the DS850 screens (e.g. saving the Current Batch), attempt to repeat the action. If the problem persists, contact an ES&S Customer Service Representative for assistance.
1009753 - Camera Calibration failed with error code {1}	X		X	x	This message appears when the process of calibrating the cameras fails. Note the actual calibration error code appears in place of the "{1}".	Write down the error message and notify an appropriate election official. Attempt to redo the Camera Calibration process from the 'Hardware' menu screen. If the problem persists, contact an ES&S Customer Service Representative for assistance.
1018202 - ABNORMAL SHUTDOWN: Possible Interrupted Process	X	X	X		This message appears upon power-on start-up of the DS850 when the System detects that the previous shutdown was not a normal, user-controlled shutdown. Which means, something other than the user pressing the 'Shutdown' button happened when the previous shutdown occured.	Select 'OK' to acknowledge receipt of this message and to dismiss the screen. Then resume normal Scanner operations.
7001001 - Improper input parameter.	x				This is a programming error, which is not intended for the Scanner Operator.	This needs to be resolved by a skilled ES&S Programmer. This error should never occur on a Scanner in the field, at a customer's site. If you suspect that this error has occurred, contact an ES&S Customer Service Representative.

Message Text	Message Displayed	Message Printed	Message Logged	Results in a System Halt	Cause	Resolution
7001011 - Ballot image allocation failed.	X		X	X	This is error message appears when the System attempts, but fails to allocate (set aside) a portion of memory for processing ballot images. This type of error is more likely to happen upon startup-initialization, but it could happen at anytime. It forces a machine shutdown, which may or may not include a displayed shutdown screen.	If a shutdown screen does appear, write down the displayed error message before pressing the 'Shutdown' button. Notify an appropriate election official. Shutdown and then turn off the Scanner. Wait 30 seconds and then turn the Scanner back on. If the problem persists, contact an ES&S Customer Service Representative for assistance.
7001015 - Memory allocation failed.	X		X		This is a generic error message that appears whenever the System attempts, but fails to allocate (set aside) a portion of memory to perform some operation. This type of error is more likely to happen upon startup-initialization, but it could happen at anytime. It forces a machine shutdown, which may or may not include a displayed shutdown screen.	If a shutdown screen does appear, write down the displayed error message before pressing the 'Shutdown' button. Notify an appropriate election official. Shutdown and then turn off the Scanner. Wait 30 seconds and then turn the Scanner back on. If the problem persists, contact an ES&S Customer Service Representative for assistance.
7001016 - Ballot ID party ID mismatch.			Х		When a ballot is scanned, this error is logged if its ID does not match the expected Party ID.	The Scanner should divert such a ballot to the Top Out-stack Bin, identifying it as "unknown".
7001020 - Invalid choice ID.	X		X		When an invalid precinct ID is entered on the 'Select Precinct' screen and 'Search' is pressed, this error occurs. This displays an 'OK' error popup screen.	Select 'OK' to dismiss the popup. Leave the screen's entry field empty and press 'Search'. A multi-page list of all the valid precinct IDs is made accessible, so you can page to and then select the desired precinct from the list.

Message Text	Message Displayed	Message Printed	Message Logged	Results in a System Halt	Cause	Resolution
7001066 - Invalid scanned ballot id.			X		When a ballot is scanned, this error is logged if the ballot has an invalid ballot identification.	The Scanner should divert such a ballot to the Top Out-stack Bin, listing it as "ballot ID invalid".
7001165 - Ballot processing failed.	X		X		During the 'Export For Results' process, to run poll place collection and copy the results to a Target Media Device, if the System could not successfully complete ballot processing, then this message appears on an 'OK' error popup screen.	Select 'OK' to dismiss the popup. Try the same 'Export' process again. If the error recurs, write it down and notify an appropriate election official. If possible, shutdown and then turn off the Scanner. Wait 30 seconds and then turn the Scanner back on. If the problem persists, contact an ES&S Customer Service Representative for assistance.
7003002 - Candidate data missing.			Х		When a ballot is scanned, this error is logged if required candidate data is missing from the ballot.	The Scanner should divert such a ballot to the Top Out-stack Bin, identifying it as "unknown".
7003003 - Contest data missing.			Х		When a ballot is scanned, this error is logged if required contest data is missing from the ballot.	The Scanner should divert such a ballot to the Top Out-stack Bin, identifying it as "unknown".
7003004 - Election data missing.			Х		When a ballot is scanned, this error is logged if required election data is missing from the ballot.	The Scanner should divert such a ballot to the Top Out-stack Bin, identifying it as "unknown".
7003005 - PollPlace data missing.			Х		When a ballot is scanned, this error is logged if required poll place data is missing from the ballot.	The Scanner should divert such a ballot to the Top Out-stack Bin, identifying it as "unknown".
7003006 - PRECINCT LABEL data missing.			X		When a ballot is scanned, this error is logged if required precinct label is missing from the ballot. Note: An actual name (e.g. Precinct, Borough, etc.) will appear in the place of "Precinct label.	The Scanner should divert such a ballot to the Top Out-stack Bin, identifying it as "unknown".

Message Text	Message Displayed	Message Printed	Message Logged	Results in a System Halt	Cause	Resolution
7003007 - Invalid PRECINCT ID.			X		When a ballot is scanned, this error is logged if the ballot has an invalid precinct identification. Note: An actual name (e.g. Precinct, Borough, etc.) will appear in the place of "Precinct label.	The Scanner should divert such a ballot to the Top Out-stack Bin, identifying it as "unknown".
7003008 - Ballot data missing.			Х		When a ballot is scanned, this error is logged if required ballot data is missing from the ballot.	The Scanner should divert such a ballot to the Top Out-stack Bin, identifying it as "unknown".
7003009 - Invalid ballot ID.			Х		When a ballot is scanned, this error is logged if the ballot has an invalid ballot identification.	The Scanner should divert such a ballot to the Top Out-stack Bin, listing it as "ballot ID invalid".
7003010 - Ballot style data missing.			Х		When a ballot is scanned, this error is logged if required ballot style data is missing from the ballot.	The Scanner should divert such a ballot to the Top Out-stack Bin, identifying it as an "unknown".
7003012 - Ballot image data missing.	Х		Х		When the 'Export Files' process cannot locate expected ballot image data on the Scanner, this error occurs.	Select 'Export Files' again. If this error keeps recurring, contact an ES&S Customer Service Representative for assistance.
7003013 - Business data missing.	X		X		When one of the export processes (e.g. 'Export Results'), selected from the 'Results' menu screen, cannot locate the related business data (e.g. eba.hdr file) for export, this error occurs.	Select the same export process again. If this error keeps recurring, contact an ES&S Customer Service Representative for assistance.
7003014 - Ballot data not loaded.	X		X		When loading an election from the 'Setup' screen, this error will occur if the related ballot data was not loaded as part of the Election Definition.	From the 'Setup' screen, clear and initialize the Scanner and then attempt to load the election again. If this error occurs again, a new ES&S Election Definition Media Device may be needed. Contact an ES&S Customer Service Representative for assistance.

Message Text	Message Displayed	Message Printed	Message Logged	Results in a System Halt	Cause	Resolution
7003017 - Could not store ballot.	X		X		When a ballot is scanned, this error occurs if the System could not store the ballot's data in memory. This stops ballot scanning and displays an error screen.	Write down the screen's error message and notify an appropriate election official. Follow the screen directions to clear the error. Go to the 'Results' menu screen, select 'Archive Data' and follow the on-screen information to export archive data to a selected Target Media Device. Once you have successfully archived the data, select 'Clear All Results' from the 'Results' menu screen. This should free-up enough memory space to allow the scanning and storing of ballot data to continue for quite some time.
7003018 - Could not clear votes.	X		X		When either 'Clear All Results' or 'Clear A Precinct' is selected from the 'Results' screen, this error occurs if the system could not clear the vote data. This displays an 'OK' error popup screen.	Write down the popup's error message and notify an appropriate election official. Select 'OK' to dismiss the popup. Try the same 'Clear' operation again. If the error occurs again, contact an ES&S Customer Service Representative for assistance.
7003019 - Could not clear election.	X		X		When 'Clear and Initialize' is selected from the 'Setup' screen, this error occurs if the system could not clear the currently loaded Election Definition from the Scanner. This displays an 'OK' error popup screen.	Write down the popup's error message and notify an appropriate election official. Select 'OK' to dismiss the popup. Try the 'Clear and Initialize' operation again. If the error occurs again, shutdown and then turn off the Scanner. Wait 30 seconds and then turn the Scanner back on. If the error persists when you try 'Clear and Initialize' again, contact an ES&S Customer Service Representative for assistance.

Message Text	Message Displayed	Message Printed	Message Logged	Results in a System Halt	Cause	Resolution
7003025 - Could not open report file.	X		X		When a report is selected for preview or print from the 'Reports' screen, this error will occur if the System could not open the report file. This displays an 'OK' error popup screen.	Select 'OK' to dismiss the popup. Try to preview or print the report again. If the problem reoccurs, try to preview or print a different report. If the problem persists, contact an appropriate election official. You may need to contact an ES&S Customer Service Representative for assistance.
7003039 - There was a problem accessing the ESS Memory Device. If the ESS Memory Device has been removed, please re-insert the ESS Memory Device and try again.	X		X		This error can occur for any function (e.g. 'Export For Results') requiring the insertion of an ES&S Memory Device (flash-drive / stick) into one of the Scanner's USB ports. The inserted device had been detected but it was then either removed or the System is just having trouble reading/writing to it. This displays a 'Cancel' error popup screen, with the same basic text as the error message above.	There are three options: 1). Reinsert the ES&S Memory Device; 2). Insert a different ES&S Memory Device; or 3) Select 'Cancel' to abort the function.
7003067 - Ballot layout data missing.			Х		When a ballot is scanned, this error is logged if required ballot layout data is missing from the ballot.	The Scanner should divert such a ballot to the Top Out-stack Bin, identifying it as an "unknown".
7003068 - Could not create batch data.	X		X		When 'Save' is selected from a 'Scan Ballots' screen, to save the Current Batch of scanned ballots, if the System could not create the batch data, then this message appears on an 'OK' error popup screen.	Select 'OK' to dismiss the popup. Select 'Save' again, to save the batch. If the error recurs, write it down and notify an appropriate election official. If possible, shutdown and then turn off the Scanner. Wait 30 seconds and then turn the Scanner back on. If the problem persists, contact an ES&S Customer Service Representative for assistance.

Message Text	Message Displayed	Message Printed	Message Logged	Results in a System Halt	Cause	Resolution
7003069 - Could not create resolve manifest data.	X		X		During the 'Export Files' process, to copy the scanned ballot images to a Target Media Device, if the System could not create the manifest data for the ballot images, then this message appears on an 'OK' error popup screen.	Select 'OK' to dismiss the popup. Try the same 'Export' process again. If the error recurs, write it down and notify an appropriate election official. If possible, shutdown and then turn off the Scanner. Wait 30 seconds and then turn the Scanner back on. If the problem persists, contact an ES&S Customer Service Representative for assistance.
7101004 - Clear operation requested using improper ESS Memory Device.	X		X		This error occurs if the Operator attempts to 'Clear and Initialize' the Scanner using an ES&S Media Device other than the required, valid ES&S EQC Media Device.	Replace the inserted ES&S Media Device with a valid ES&S EQC Media Device. Allow the Scanner to detect the inserted replacement device (as indicated by a temporary popup screen), then attempt the 'Clear and Initialize' process again. If you do not have a valid ES&S EQC Media Device, contact an appropriate Election Official. They in turn may need to contact an ES&S Customer Service Representative for assistance.
7101012 - EQC data invalid or missing.	X		X		This error occurs if the Operator attempts to 'Clear and Initialize' the Scanner using an ES&S EQC Media Device, that is either missing data or contains invalid data.	Replace the inserted ES&S EQC Media Device with a valid ES&S EQC Media Device. Allow the Scanner to detect the inserted replacement device (as indicated by a temporary popup screen), then attempt the 'Clear and Initialize' process again. If you do not have a valid ES&S EQC Media Device, contact an appropriate Election Official. They in turn may need to contact an ES&S Customer Service Representative for assistance.

Message Text	Message Displayed	Message Printed	Message Logged	Results in a System Halt	Cause	Resolution
7101013 - Authentication data invalid or missing.	X		X		This error occurs if the Scanner Operator attempts to either 'Clear and Initialize' or 'Load Election' using an ES&S Media Device, that is either missing authentication data or contains invalid authentication data.	Replace the inserted ES&S Media Device with the proper, valid ES&S Media Device. Allow the Scanner to detect the inserted replacement device (as indicated by a temporary popup screen), then attempt the 'Clear and Initialize' or 'Load Election' process again. If you do not have the proper, valid ES&S Media Device for the desired process, contact an appropriate Election Official. They in turn may need to contact an ES&S Customer Service Representative for assistance.

Chapter 11: Menu Structure

This chapter contains illustrations showing the Scanning, Election, Reports, System, and Hardware menus and the screens that can be accessed from each of those menus. The boxes for screens that are not currently available are shaded.

Scanning Menu



Election menu



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Reports menu



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Chapter 11: Menu Structure 187

System menu



Hardware menu



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Chapter 12: Troubleshooting

This chapter provides instructions for the steps to take for some common issues that may occur with the DS850. If these issues persist after you have attempted the troubleshooting steps, please contact your ES&S representative.

The following issues are covered in this section:

- Abnormal Scan Termination
- Loss of Power To the Facility

Abnormal Scan Termination

If an abnormal scan termination occurs, the scanner will use a predefined set of criteria to determine the scan error type. After the scanner determines the scan error type, it will display instructions for correcting the error. Carefully follow the displayed instructions.

Loss of Power To the Facility

In the event that the power to the facility is lost, the UPS will repeat a series of 4 beeps and will provide battery power long enough for you to finish scanning the current batch of ballots, save or delete the batch, and perform a controlled shutdown. If you do not shut down the system, and the UPS reaches a critically low battery level, the DS850 will initiate a controlled shutdown to prevent the system from being corrupted by an uncontrolled shutdown. When this occurs, all unsaved ballot data will be lost, and the ballots will need to be re-scanned. Scanning is not allowed while on battery power, but all other functions are available. When power to the facility is restored, scanning can resume normally. Case 4:18-cv-00529-MW-CAS Document 35-4 Filed 12/26/18 Page 196 of 199

Chapter 13: Revision History

DS850 v2.10 System Operating Procedures

Document Version 4.0 February 26, 2014

Chapter	Description	Project
All	Updated footer format.	EVS 5.2.0.0

Document Version 3.0 January 10, 2014

Chapter	Description	Project
Chapter 13: Revision History	Updated Project column.	EVS 5.2.0.0
Chapter 3: DS850 User Interface	Updated Export Batch description under Display Ballot. Updated Firmware and Reports screen images. Updated Export Current description.	EVS 5.2.0.0
All	Made all footers consistent.	EVS 5.2.0.0
Chapter 6: Election Day Tasks	Text edit (should to will).	EVS 5.2.0.0
Chapter 5: Pre-Election Day Tasks	Updated all Configuration Menu screen images and updated second Ballot Images screen	EVS 5.2.0.0
Chapter 8: Reports	Added section on Ballet Style Counts Report.	EVS 5.2.0.0

DS850 2.10 Document Version 2.10 December 11, 2013

Chapter	Description	Project
All	Updated look of Guide.	EVS 5.2.0.0
Chapter 5: Pre-Election Day Tasks	Added Results Access section.	EVS 5.2.0.0

DS850 System Operations Procedures v2.10 Document Version 1.0 October 15, 2013

Chapter	Description	Project
All	Initial Document	EVS 5.2.0.0

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FEATURES AND BENEFITS

The ES&S DS200 Digital Image Scanner offers the next generation in paper-based vote tabulation.

✓ Large Touch Screen Display

A 12" color LCD touch screen display provides easy-to-read instructions and feedback to voters. The display supports messaging that aids the voting process, system setup, and diagnostic testing.

✓ 2005 VVSG Compliant

With important usability, accessibility, and security enhancements, the DS200 is designed to be fully compliant with the more rigorous 2005 Voluntary Voting System Guidelines.

✓ Auditable Paper Trail

The DS200 retains your ballot in a secure, locked container for verification in the event of a recount.

✓ Patented Digital Image Technology

Patented image technology provides exceptional mark-recognition capability and retains individual digital ballot images for auditing and adjudication.

FOR MORE INFORMATION

Election Systems & Software, Inc. 11208 John Galt Blvd. Omaha, NE 68137 USA

Toll Free: 1-800-247-8683 Fax: 402-593-8107 **Election Systems & Software,** 11208 John Galt Blvd. Omaha, NE 68137 USA

Inc.



ELECTION SYSTEMS & SOFTWARE

QUICK START GUIDE FOR VOTERS

ES&S int Slect DS200 DIGITAL IMAGE SCANNER



Case 4:18-cv-00529-MW-CAS Document 35-5 Filed 12/26/18 Page 2 of 2 QUICK START INSTRUCTIONS FOR USING THE ES&S int Elect DS200 DIGITAL IMAGE SCANNER

1. STEP ONE: RECEIVE YOUR BALLOT.



Receive ballot from poll worker. You may also receive a privacy sleeve to shield your votes from view.

2. STEP TWO: MARK YOUR SELECTIONS.



For every contest, make the selection of your choice with the approved marking device provided. It is very important that you mark your ballot properly, please see instructions below. For write-in candidates, fill in the oval next to the words **"WRITE IN"** and write the candidate's name on the line.

3. Step Three: Insert your ballot into the ES&S DS200 Digital Image Scanner.

Insert your ballot into the ballot acceptor. The intElect DS200 will accept ballots in any orientation (backward, upside down, etc.).



4. FINAL STEP: REVIEW THE SCREEN.

Check the display screen to see whether there are any issues with the ballot such as overvoting, undervoting, and blank ballots. Press **"RETURN"** on the touch screen to get the ballot back to make changes.

If you'd like to override the on-screen message and submit your ballot as-is, select **"Accept"** on the touch screen.

The display screen will notify you when your ballot has been cast successfully.

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HOW TO MARK A BALLOT CORRECTLY.

It is important that you mark your ballot properly before inserting it into the ES&S DS200 Digital Image Scanner to ensure that your vote choices are counted correctly.





Correctly marked oval

Incorrectly marked ovals

- Mark your ballot by completely darkening the oval next to your choice. Do not use an "X" or other notation.
- Use only the approved marking device provided by election officials or found in the voting booth.
- If you make a mistake in marking your ballot, please ask the election officials for a replacement ballot.
- Do not fold your ballot before inserting it into the ballot acceptor.
- If you have any questions regarding your ballot, please ask an election official for clarification before depositing your ballot into the DS200.

ES&& Voting System 5.2.0.3 System Functionality Description Document Revision 1.0

Department Author: Certification

Released by: Director, Certification



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Document Security Level

Table of Changes

Revision	Date	Notes
0.1	06.23.2015	Initial staging for EVS5203. – CC
1.0	06.26.2015	Release for publication with TDP Rev01. – CC

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ES&S Voting System 5.2.0.3 System Functionality Description

I. INTRODUCTION

The System Functionality Description declares the overall scope of the voting system's functional capabilities.

I.1 PURPOSE

This document declares the scope of the ES&S Voting System's functional capabilities and defines the performance, design, test, manufacture and acceptance context for the system.

This document serves two purposes. Prior to release of a system for national certification testing, this document declares the scope of functionality for an identified voting system. Prior to product release to customers; ES&S product stakeholders, documentation specialists and Quality Assurance specialists can use the declared functionality to perform the following tasks:

- Define functionality for internal audit
- Define functionality for internal, Operations stakeholders
- Define functionality to be used as a work plan for production of technical and end-user documentation

After release to certification, VSTL stakeholders should use this document to:

- Define the functional scope of the voting system and scope of testing
- Define individual functional capabilities that may be used to generate testable items within a system level test plan
- Index to TDP documents that include full descriptions and procedures for implementing declared functionality, which may be used to develop test plan procedures

This document is intended for ES&S technical resources, configuration management stakeholders and VSTL review.

I.1.1 SCOPE

This document lists the ES&S voting system's functional processing capabilities, encompassing all capabilities required by the VVSG and any additional capabilities provided by the system. The System Functionality Description includes simple descriptions of system functionality. Detailed system functional descriptions are included in other TDP documentation.

The System Functionality Description reflects the functional capabilities and desired scope of testing of the system configuration(s) and capabilities declared in the *ES&S Voting System Overview*. While specific products within the system may exceed some documented system level capabilities, the document addresses only the functionality supported by the system detailed in the *ES&S Voting System Overview*.

This document heavily cross-references requirements from the 2005 Voluntary Voting System Guidelines (2005 VVSG). This document assumes reader familiarity with those guidelines.

I.1.2 TARGET AUDIENCE

The primary audience for this document is the Test Laboratory assigned to perform national certification testing and ES&S Product Development and Certification stakeholders.

The secondary audience for this document may include ES&S technical resources, configuration management stakeholders, Election Assistance Commission ("EAC"), VSTL's, state election certification officials, and ES&S Voting System 5.2.0.3 users.

I.1.3 USING THIS DOCUMENT

This document is organized to satisfy the requirements listed in the 2005 EAC Voluntary Voting System Guidelines (VVSG) and directly addresses the following requirements.

VVSG Section	Title	
V II, Section 2.2	System Functionality Description	
	Other Requirements Addressed in this Document	

VVSG Requirements Addressed in this Document

Other Requirements Addressed in this Document

Reference	Title
N/A	N/A

I.1.3.1 DOCUMENT CONVENTIONS

- Any references to additional books or documents are indicated by the document name in *serif italics*.
- External links to information, documents, or downloads are indicated as in the following example: <u>www.essvote.com.</u>
 Depending upon the delivery method of this document, some links may not be active links. In this case, copy the link manually to a web browser of your choosing to view or download the

this case, copy the link manually to a web browser of your choosing to view or download the external documentation.

• All tables within this document use the term "N/A" to indicate the entry is "Not Applicable" to the software or hardware.

Other conventions

- Capital Letters Indicate the names of keys or key sequences (CTRL, SHIFT, F1, etc).
- Plus (+) Sign A combination of keys means to hold down the first key while pressing the second key.
- Monospaced text source code listing
- Vertical Separator Bars (|) represent alternative elements
- Braces ({ }} indicate a required choice
- Brackets ([]) indicate a screen item or physical location on equipment

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ES&S Voting System 5.2.0.3 System Functionality Description

 Right Chevrons (>) – indicates the method of selecting of a sub menu or dialog item e.g.: Click File > Save... [Save Dialog] {file Name}

Notes, Cautions, and Warnings

These typographic indicators alert the reader to special information.

Note Example

NOTE The reader should take note of these suggestions or additional information not covered in this manual.

Caution Example



A caution alert indicates that possible damage can occur to the software or hardware, or improper operation of the equipment or system if the recommendations are not followed. *ES&S* shall not be responsible for any damages or injury associated with the failure to follow the recommended procedures.

Warning Example

WARNING



This warning appears next to procedures that could cause damage to the product or injury to the operator if improperly executed. Carefully read all warnings and proceed with caution if you choose to carry out the related information. *ES&S shall not be responsible for any damages or injury associated with the failure to follow the recommended procedures.*

Unsupported Functionality

This product may exceed the scope of certified functionality noted within the *System Overview*. Additional capabilities listed within this document should be considered outside the scope of certification. Wherever possible, these capabilities are identified with a gray background as in the following example:

Locale-Specific Terminology

References may be made to precincts in this document as the lowest level civil division. This naming convention differs from state to state and localities. The term "Precinct" is used in this document to denote this type of division, whether it is referred to locally as "ED" (Election District – New York), "Polling Station" (Canada), or others.

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ES&S Voting System 5.2.0.3 System Functionality Description

1. DOCUMENT OVERVIEW

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The ES&S voting system includes the following functional subsystems, defined in the ES&S Voting System Overview.

Subsystem	Component	Description
Election Management System (EMS)	Electionware™ Election Reporting Manager™ (ERM)	Managing Election Data (Electionware) Managing election data includes all tasks related to the creation and configuration of the election. The Electionware database stores all of a jurisdiction's precinct, office, and candidate information. Once an initial election database is completed, it can be recalled and edited for all following elections. System event log administration includes a series of applications that track
		all user and equipment actions throughout the election process.
		Formatting Ballots (Electionware)
		defining the image of a paper ballot and populating the ballot with contest, candidate and referendum information from the Electionware Database.
		Configuring Ballot Handling Equipment (Electionware)
		Configuring ballot handling equipment includes all tasks required to convert Electionware database information into ballot definition parameters for tabulation and ballot marking equipment.
		Within this functional subsystem, election management software users program the ballot counting rules for a specific election – the election definition - to the memory devices used to program tabulation equipment.
		Results Consolidation and Reporting (ERM)
		Results consolidation and reporting encompasses the system functions required to gather and combine results from multiple tabulators and tabulator types, and then generate paper and electronic reports for election workers, candidates, and the media.
Universal Voting System (UVS)	ES&S ExpressVote™	Universal voting system that supports vote capture functions for all voters, with independent voter verifiable paper record which is digitally scanned for tabulation. This device takes into account the full range of human diversity, including physical, perceptual and cognitive abilities, as well as different body sizes and shapes.
Precinct Ballot Tabulators (PBT)	ES&S DS200™	Precinct ballot tabulation includes the activities required to prepare, test and implement ES&S precinct ballot tabulators within a polling place environment.
Central Ballot Tabulators (CBT)	ES&S DS850™	Central ballot tabulation includes all tasks required to prepare, test and scan official ballots at a central count location.
Ballot Marking Devices (BMD)	ES&S AutoMARK™ Voter Assist Terminal	Electronic ballot marking includes all tasks related to preparing, testing and implementing ES&S' electronic ballot marking device for use in a polling place environment.

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1.1 USING THIS DOCUMENT

As suggested in VVSG 2005 Vol. 2, Sec. 2.3, Section 2 of this document is formatted as a checklist referencing functional requirements of VVSG 2005 Vol. 1, Section 2. Pre-release, ES&S product stakeholders use this checklist to define the functional capabilities of a specific voting system. Once functional capabilities are defined, ES&S documentation stakeholders review the checklist to ensure that each system function is adequately documented.

In the following sections, each functional requirement is listed in the following format:

SAMPLE REQUIREMENT

Requirement Requirement text
Source

Each requirement is followed by a table that cross-references the requirement, indicates which subsystem addresses the requirement and describes how the requirement is met.

Functional Requirement	EMS	UVS	РВТ	BMD	СВТ	Not Supported	May be bypassed or deactivated	Description
Requirement 1 cross Reference	•	•	•	•	•	•	Yes/No	The DS200 Precinct Ballot Counter employs advanced image scanning technology to quickly process ballots formatted in a variety of lengths and accurately discriminate between valid voter selection marks and extraneous ballot elements such as perforations, smudges, and folds.
								The DS200 is designed and constructed to sustain reading accuracy during the required operating period with a reliability level exceeding 99.999 percent.
Requirement 2 cross Reference	•	•	•	•	•	•	Yes/No	The DS200 reads only properly marked ballot targets that appear in the scanner's designated read area. ES&S configures the scanner's optical thresholds to ignore erasures and improperly marked targets. Marks that meet the strict requirements to be considered a valid vote and converted into digital data for vote accumulation.

Sample Description

1.1.1 Additional Requirements

Additional requirements include any functionality not directly addressed by 2005 VVSG Vol.2, Sec. 2.3. As suggested by 2005 VVSG Vol. 2, Sec. 2.3, additional requirements are organized under the same structure as 2005 VVSG Vol 1. Sec. 2 (Overall, Pre-Voting, Voting, Post-Voting) and appear under "Additional Requirements" sections following each major subsection of this document.

1.1.2 RELEASE FOR TESTING

ES&S provides this document to VSTL test stakeholders to define the functional context of the voting system. The ES&S *System Functionality Description* may be used to define the scope of functional testing for the ES&S voting system.

2. FUNCTIONAL REQUIREMENTS

2.1 OVERALL SYSTEM CAPABILITIES

CONTROLLING REQUIREMENT

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- V: 1, §2.1 Overall system capabilities describe functional capabilities that are system-wide in nature and not unique to prevoting, voting and post voting operations. The following sections describe the ES&S voting system's capabilities to support the following subcategories of overall system functionality:
 - 1. Security
 - 2. Accuracy
 - 3. Error Recovery
 - 4. Integrity
 - 5. System Audit
 - 6. Election Management System
 - 7. Vote Tabulation Program
 - 8. Ballot Counter
 - 9. Telecommunications
 - 10. Data Retention

2.1.1 SECURITY

CONTROLLING REQUIREMENT

System security is achieved through a combination of technical capabilities and sound administrative practices. To V: 1, §2.1.1 ensure security, all systems shall: Provide security access controls that limit or detect access to critical system components to guard against a. loss of system integrity, availability, confidentiality, and accountability. Provide system functions that are executable only in the intended manner and order, and only under the b. intended conditions. Use the system's control logic to prevent a system function from executing if any preconditions to the c. function have not been met. Provide safeguards in response to system failure to protect against tampering during system repair or d. interventions in system operations. Provide security provisions that are compatible with the procedures and administrative tasks involved in e. equipment preparation, testing, and operation. Incorporate a means of implementing a capability if access to a system function is to be restricted or f. controlled. Provide documentation of mandatory administrative procedures for effective system security. g.

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Functional Requirement	EMS	UVS	РВТ	BMD	СВТ	Not Supported	May be bypassed or deactivated	Description
V: 1, §2.1.1.a								 EMS In addition to the product level security features identified below, implementing physical and program level security controls to the PCs running ES&S Unity election management software is also required. Refer to the ES&S Voting System Security Specification, and Hardening the EMS PC. Further security of the installed programs as well as external access to the files is achieved through the standard use of Windows network security to limit access. Federal guidelines require that Election Administrators implement a mandatory election security program. All paper ballots and election results media must be retained to facilitate results and ensure system security. Electionware uses a built-in account management system to restrict user access. This system allows the election administrator to create user accounts with access rights for managing accounts, changing the target tabulator information and importing/exporting election data. The Electionware PostgreSQL database is password protected. The user password field is encrypted using a hash algorithm. An audit log of all user activity is stored in the Electionware, providing the user has administrative rights. Electionware, providing the user has administrative rights. Electionware also logs exception conditions that cause the application to shut down to Windows Event Log Service. ERM security as well as securing external access to files is achieved by applying Windows network security including user type, date, time, application in use, user ID and computer name. All ERM System Log Messages are written to the Windows Event using the ES&S torent Log Service. System security of ERM limits casual access to system files and election results but also depends on sound security practices at the election officials must inpose administrative and physical controls that limit access to ERM and election results to authorized personnel only. Election officials must also ensure PCs running ERM remain secu

ES&S Voting System 5.2.0.3 System Functionality Description

Functional Requirement	EMS	UVS	РВТ	BMD	СВТ	Not Supported	May be bypassed or deactivated	Description
								 Side access panel – Locking door protects access to USB ports used for media insertion, as well as switches for powering the unit off and on and switching between voter and administrative functions Ballot Access Doors – Lockable doors to provide access to the paper transport in the event of a jam are located on the front and side of the ExpressVote. Pass code protected menus – Access to test and administrative menus require the input of the proper access codes set in Electionware in addition to a toggle switch located behind a locked door. PBT The ES&S DS200 includes three locks to physically prevent unauthorized access to the internal components. The first lock secures the LCD display. This laptop type hinging display doubles as a built in security lid. When it is locked into its down or stored position, access to the scanner throat and other components are denied. The second lock, that cannot be accessed until the lid is raised, prevents unauthorized access to the DS200 Election Media, the Power, and Close Polls switches. An additional lever in this switch compartment controls access to a post election process panel. This includes a Personal Electronic Ballot well for importing results from the ES&S IVotronic (<i>Note:</i> the IVotronic function is not supported in this relase). This locking panel also contains an RI-11 jack for landline modem support. There is also an additional USB drive under this door for use of a backup polling results media USB drive or for expansion purposes. After the precinct counter is attached to the ballot box for vote tabulation, a locking door thege sinto place over the front of the counter to prevent removal of the device. This also prohibits access to an expansion USB port, described in the previous paragraph, on the back of the DS200. BMD AutoMARK Operating Software and physical controls provide security access controls that limit or detect access to critical system components and to guar

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Functional Requirement	EMS	UVS	РВТ	BMD	СВТ	Not Supported	May be bypassed or deactivated	Description
								 CBT DS850 core components, ports and switches are secured with lockable, sealable access panels to prevent unauthorized access vital functions. These include: Rear System Access Panel — Dual locks, as well as a wire-seal mechanism control access to all vital power, processing, and transport functions. Data Port Access Doors — Transparent lockable doors with wire-seal mechanisms protect all externally accessible data ports, including USB and Ethernet. Power Access Door — Transparent lockable doors with wire-seal mechanisms protect the power cable, as well as the power switch for the unit. In addition, pass code protection limits all functions beyond basic scanning. The tabulator's operating software provides security access controls to limit and detect access to critical system components and to guard against loss of system integrity, availability, confidentiality and accountability.
V:1, §2.1.1.b	•	•	•	•	•		No	 EMMS Electionware limits program access by requiring an authorized administrator to create an account (user name and password) for the intended users. Administrative and non-administrative users have different application privileges. Administrative users may access all areas of the program. Non administrative users may only open datasets and create Election Media. Electionware - Paper Ballot limits program access by requiring an authorized user to launch the application through Electionware. All administrative and non-administrative users have the same ballot creation privileges. Electionware tasks to create an election must be executed in the intended order. For example, election data must be configured in the capture module or imported prior to editing ballot formats. ERM safeguards against functions being executed out of order by displaying an error message stating that the prior function has not been completed. Also, once a new Results database is generated and equipment type(s) selected any further option selected that does not match the equipment type results in an error message referencing the invalid equipment type selected. UVS ExpressVote boots to the operating applications and only functions in the manner and order intended, and only under the intended conditions. PBT System functions will not execute if election workers do not configure the system properly and execute functions in the intended order. The ES&S DS200 is designed to guide the user through the open and close polls processes. The LCD display will only provide access to those tasks suitable for the current mode of operation.

ES&S Voting System 5.2.0.3 System Functionality Description

Functional Requirement	EMS	UVS	РВТ	BMD	СВТ	Not Supported	May be bypassed or deactivated	Description
								BMDThe AutoMARK boots to the operating applications and only function in the manner and order intended, and only under the intended conditions.CBTDS850 system functions are only executable in the manner and order intended, and only under intended conditions. System and scanning functions will not execute if election administrators do not configure the system properly. The DS850 interface guides the user through all basic operation. The LCD touch screen display and
V: 1, §2.1.1.c	•	•	•	•	•		No	 EMS Electionware and ERM prevent execution of any system function if the precondition for that function is not met. Error messages and conditionally activated interface controls prevent users from exercising an invalid workflow. UVS ExpressVote control logic prevents ballot printing executing if any preconditions to this function have not been met. PBT, CBT The DS200 and DS850 operate as standard embedded devices. A scanner operator cannot override required preconditions except those specified by the <i>Voluntary Voting System Guidelines</i> and authorized by the appropriate election official. For ballot scanning equipment used at the polling place, access to controls that change the operating mode of the scanner are physically locked between opening and closing the polls. BMD The AutoMARK's control logic prevents ballot marking executing if any preconditions to this function have not been met.
V: 1, §2.1.1.d	•	•	•	•	•		No	EMS All EMS applications provide detailed logging of events, errors, and warnings within Window's encrypted Event Manager Service database or within the Electionware encrypted log. System event logs allow an administrator to retrace all access to the EMS components and print/save the events. Event information includes the event type, date, time, ES&S application, user ID and in the case of the ERM application, the computer name. EMS component tampering is prevented through the use of passwords to access the application and subsystems within the application, depending upon the application. See product Software Design and Specifications for additional password details. See <i>ES&S System Hardening Procedures</i> and <i>ES&S Voting System Security Specification</i> for voting system security capabilities and requirements. UVS Control over physical to critical ExpressVote components is controlled by use of a combination of locks, special screws, allowances for seals to detect tampering. Operation of the unit cannot be modified and operations are access code protected.

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Functional Requirement	EMS	UVS	РВТ	BMD	СВТ	Not Supported	May be bypassed or deactivated	Description
								PBTDS200 hardware circuitry has no capability to write or otherwise change the election program once installed. The physical design of the system does not include any form of data entry keypad, providing a general safeguard for critical data. All supervisor functions are limited to the controls provided on the touch screen.BMDAutoMARK hardware includes safeguards to protect the unit against tampering during system repair, or interventions in system operations, in response to system failure. Refer to the AutoMARK
V:1,§2.1.1.e	•	•	•	•	•		Νο	 EMS Procedures for securing a PC for EMS installation appear in <i>ES&S</i> System Hardening Procedures. Hardening procedures secure the PC without affecting the ability of the EMS to execute tasks required to prepare, test or operate voting system software and equipment. UVS Access controls to ExpressVote during equipment preparation, testing and operation is provided by the appropriate ES&S system administrator prior to delivery of the system, or by election officials upon delivery. Administrative functions are password protected. System security measures and features do not limit any activity required for preparing, testing or operating equipment. PBT ES&S DS200 design prevents casual access to sensitive areas of the machine, but tabulator security ultimately depends on proper administrative procedures at the polling place and election headquarters. Supervisor functions for preparing, testing and operating equipment are limited to the controls provided in the system menus. Locking panels and system passwords protect system operating modes and system administrative functions used for preparing and testing equipment. BMD System access to AutoMARK during equipment preparation, testing and operation is provided by the appropriate ES&S system administrator prior to delivery of the system, or by election officials upon delivery. Administrative functions are password protected. System security measures and features do not limit any activity required for preparing, testing or operating equipment.

ES&S Voting System 5.2.0.3 System Functionality Description

Functional Requirement	EMS	UVS	РВТ	BMD	СВТ	Not Supported	May be bypassed or deactivated	Description
								CBT DS850 security measures and features do not limit any activity required for preparing, testing or operating equipment. DS850 design limits casual access to the machine but effective equipment security ultimately depends on election officials using best security practices at the counting location. Ballots should remain sealed in ballot boxes until counting begins. Officials should limit access to the scanner only to authorized personnel and make sure the scanner remains secure after testing and prior to the election. The DS850 does not have the ability to overwrite or change the election definition or system firmware once a precinct official installs the election program. Supervisor functions are limited to the controls provided in the operator panel. The DS850 has a ballot security measure in place to help protect against unauthorized ballots. [Not implemented in this release].
V: 1, §2.1.1.f	•	•	•	•	•		No	 EMS All activity is restricted by the Electionware account management system or Window's User Account Management system (See: item 'a', above.). See <i>ES&S System Hardening Procedures</i> for procedures for configuring Windows account management. UVS The ExpressVote's administrative menu cannot be accessed without a physical key and system access code. An additional code is needed to access the maintenance menu. PBT Electionware election and the DS200 share a robust Digital Signature and password security feature. This feature provides a high level of security on data that is transferred between the election management software and the DS200. Please see the ES&S Voting System Security Specification for more details on the public and private key management and security process. The system includes password protection to prevent unauthorized access to certain system functions. The system-operating mode is physically controlled with a physical key. BMD The AutoMARK administrative menu cannot be accessed without a physical key and system access code. An additional code is needed to access the maintenance menu.
V: 1, §2.1.1.g	•	•	•	•	•		No	EMS ES&S recommended administrative practices for securing voting equipment and the EMS PC appear in <i>ES&S Voting System Security</i> <i>Specifications</i> . Procedures for configuring Windows security settings for an EMS PC appear in <i>Hardening Procedures for the</i> <i>Election Management System PC</i> . Federal guidelines require Election Administrators to implement a mandatory election security program.

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Functional Requirement	EMS	SVU	РВТ	BMD	СВТ	Not Supported	May be bypassed or deactivated	Description
								For Electionware, Documentation of login and logout security procedures is provided in Electionware User's Guides. System user documentation provides procedures for setting up and maintaining password functions for ERM. In addition to password controls, officials must limit physical access to ERM and to stored tabulator results to authorized personnel only. Officials should also make sure that the PCs running ERM remain secure before and after each election and should compare final election results to totals generated directly from the tabulators to ensure that data was not tampered with during the results transfer. UVS Procedures for effective system security for the ExpressVote appear in the ExpressVote Operator's Guide and the ES&S Voting System Security Specification.
								 PBT, CBT Please see ES&S Voting System Security Specification for mandatory administrative procedures for securing ES&S ballot tabulators. BMD Mandatory administrative procedures for effective AutoMARK system security appear in the AutoMARK Operator's Guide and the

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ES&S Voting System 5.2.0.3 System Functionality Description

2.1.2 ACCURACY

CONTROLLING REQUIREMENT

V: 1, §2.1.2 Memory hardware, such as semiconductor devices and magnetic storage media, must be accurate. The design of equipment in all voting systems shall provide for the highest possible levels of protection against mechanical, thermal, and electromagnetic stresses that impact system accuracy. VVSG 2005 Section 4 provides additional information on susceptibility requirements. To ensure vote accuracy, all systems shall:

- a. Record the election contests, candidates, and issues exactly as defined by election officials.
- b. Record the appropriate options for casting and recording votes
- c. Record each vote precisely as indicated by the voter and produce an accurate report of all votes cast.
- d. Include control logic and data processing methods incorporating parity and checksums (or equivalent error detection and correction methods) to demonstrate that the system has been designed for accuracy.
- e. Provide software that monitors the overall quality of data read-write and transfer quality status, checking the number and types of errors that occur in any of the relevant operations on data and how they were corrected

Functional Requirement	EMS	UVS	РВТ	BMD	CBT	Not Supported	May be bypassed or deactivated	Description
V: 1, §2.1.2.a	•	•	•	•	•		No	 EMS ERM uses configuration data from the Electionware database to define the contests, candidates and issues to build an election specific results database. Results consolidation and reporting accuracy is verified through standard logic and accuracy testing. UVS ExpressVote contest, candidate, and issue data is configured in Electionware. System accuracy is verified by testing voting functions and printing a test summary card for each defined ballot style to verify all positions are correctly selectable. PBT, CBT The DS850 and DS200 read configuration data from Electionware-generated Election Media. Tabulator election definitions exactly mirror the ballot contents and issues defined within the EMS. System accuracy is verified through logic and accuracy testing. BMD AutoMARK contest, candidate, and issue data is configured in Electionware. System accuracy is verified by performing a test print on a blank ballot from each defined ballot style to verify all positions are correctly selectable.
V: 1, §2.1.2.b	•	•	•	•	•		No	EMS ES&S ballot tabulators capture all voter selections. ERM aggregates the tabulated results. ERM provides user options for the categorization and reporting of these results. UVS ExpressVote creates readable text and bar codes on a narrow format voting card that accurately captures the voter's choices. ExpressVote can read the voted card and display/read the voters original choices.

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Functional Requirement	EMS	UVS	РВТ	BMD	СВТ	Not Supported	May be bypassed or deactivated	Description
								System accuracy is tested by test marking blank test cards and then using those cards to perform L&A testing with an ES&S ballot tabulator. PBT The ES&S DS200 detects and records valid marks as well as exception conditions or ballot handling options such as overvotes and undervotes, blank contests or ballots marked too lightly for the scanner to register. Election officials have the option to program the scanner to return ballots containing exception conditions to the voter for revision. CBT The DS850 detects valid marks as well as exception conditions such as ballot misreads, ballot not recognizable, ballots that cannot be processed, ballot jams while navigating the transport, cross-voted ballots in an open primary, ballots with write-ins, overvotes and undervotes as well as blank ballots or ballots marked too lightly for the scanner to register. Initial settings for the sorting of such conditions are set in the EMS and loaded onto the DS850 as part of the election definition. Election officials have the option to change these settings after the proper access code is provided and as the laws of the particular jurisdiction allow. BMD The AutoMARK does not record votes, but accurately translates worker inverted to mark to end to trans a paper ballot
V: 1, §2.1.2.c	•	•	•	•	•		No	 EMS ERM reports all tabulator results as recorded by ES&S ballot scanning equipment. During the database update for tabulator results, ERM runs checks to ensure that votes within any office do not exceed the ballots cast and that the database does not contain more or less candidates than the tabulator. Any exception condition is reported to the user via error message. UVS ExpressVote does not record votes, but accurately captures and translates voter selections to a printed voting card. System testing verifies that ballots are marked precisely and as intended. Vote recording and reporting is handled by the tabulator and EMS reporting subsystem. PBT The ES&S DS200 accurately records all ballot targets selected by the voter. Vote totals are stored to the system's removable Election Media. Polling results are generated directly from the system's integrated thermal printer or consolidated with results from other scanners using compatible election reporting software to produce combined election totals reports. The DS200 was designed to meet or exceed the accuracy requirements of the 1.5 million-mark test. System accuracy is verified through standard logic and accuracy testing. BMD The AutoMARK does not record votes, but accurately translates voter selections into marks on an ES&S paper ballot. System logic and accuracy testing verifies that ballots are marked precisely and

ES&S Voting System 5.2.0.3 System Functionality Description

Functional Requirement	EMS	UVS	РВТ	BMD	СВТ	Not Supported	May be bypassed or deactivated	Description
								as intended. Vote recording and reporting is handled by the tabulator and EMS reporting subsystem. CBT The DS850 accurately records all ballot targets as selected by the voter. Vote accumulation records are saved to the system hard drive and can be transferred to the system's inserted ES&S Media Device. Accurate, machine level results reports may be generated directly from the system's report printer or consolidated with results from other scanners using compatible election reporting software to produce combined election totals reports. The DS850 was designed to meet or exceed the accuracy requirements of the 1.5 million-mark test. System accuracy is verified through standard logic and accuracy testing.
V: 1, §2.1.2.d	•						No	 EMS Error detection and correction is handled by PC operating system and Cobol. All data I/O is handled through the Cobol runtime and reports back any unsuccessful data I/O. Please see the Election Reporting Manager User's Guide accompanying this TDP for additional information regarding RMCOBOL errors. UVS ExpressVote does not store results to system memory. Accuracy is measured on the ballot scanner. PBT The ES&S DS200 accumulates votes to an internal running total during the Close Polls routine. This total is stored in both DRAM and the system's Election Media. After each successful ballot scan, the software performs a cross-reference check of the counts against the expected ballot. If no problems are found, the ballot information will be copied to the Election Media and the ballot fed into the ballot box to the appropriate compartment (Write-In or Non-Write-In Sections). However, if the cross-reference check fails, the ballot will be fed back out of the paper transport mechanism, and the system performs the appropriate voting process error handling function. The DS200 also collects bitmap images of all ballots. Depending options configured during election coding, the system will collect all ballot images, only images that include write-in votes or none at all. The system also includes control logic to determine if the DS200 Election Media is full, and provide the ability to gracefully shut down the tabulator. Ballot coding and identification includes parity checking to ensure accurate ballot identification is or calibrating the system screen, scanner, and manual routines for calibrating the system screen, scanner, and manual routines for calibrating the system screen, scanner, and marking device for the AutoMARK. In the case of the ExpressVote, screen and scanner calibration. Accuracy of marking of ballots can be tested using the test print function on the test menu. This also verifies read accuracy as verification of the printe

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Functional Requirement	EMIS	NN	РВТ	BMD	CBT	Not Si	May b or dea	Description
								command. See ES&S AutoMARK Operator's Guide for procedures for executing ballot printer calibration routines and for validating marked selections. CBT Industry standard error detection and correction methods are implemented at all levels of the O/S and firmware. The DS850 takes a snapshot of each ballot and saves the bitmap image on the internal hard drive. Each ballot data XML file records the ballot's votes, identifying write-ins (not the actual write-in name image), overvotes undervotes, etc. Once ballots are scanned and saved, the operator can print Results Reports or Export Results to an ES&S Media Device. Either of these options will automatically aggregate the vote data for all the ballot vote image records. Aggregated totals on the ES&S Media Device can then be transferred to a software application for reporting purposes. The user also has the option to transfer the ballot images to an ES&S Media Device for review. Electionware allows the user to define which ballot images, only those containing write- in votes, exception images only, write-in and exception images only or not at all; [not completely implemented in this release]).
V: 1, §2.1.2.e	•	•	•	•	•		No	 EMS Read-write and data quality checks are handled by PC operating system and Cobol. All data I/O is handled thru the Cobol runtime and reports back any unsuccessful data I/O. Please see the Election Reporting Manager User's Guide for a list of system generated error messages errors. UVS ExpressVote generates an error if the system detects any issues translating a voter selection to a printed card. The vote summary, provided as display or audio, prevents a voter from marking an unwanted target. ExpressVote prints the card only after the voter confirms selections. See the ES&S ExpressVote Operator's Guide for a description of the voting summary routine and a description of system error messages. PBT DS200 Election Media contains storage space for polling results. The results are written to during the Close Polls process, which accumulates data resulting in the stored ballot files. Whenever a ballot is successfully read, the ballot data is saved internally and on the Election Media During the Close polls process, totals are updated, and a CRC (an error checking method) is generated on the new results values. The counts, along with the CRC value, are stored back onto the DS200 Election Media. The DS200 records and reports the date and time of normal and abnormal events, and maintains a permanent printed audit record. The system detects and records significant events in a log stored on the Election Media Device. See the DS200 Operator's Guide for instructions for retrieving this log. BMD ES&S AutoMARK firmware generates an error message if the system detects any issues when translating a voter selection into a printed mark. A ballot summary UI provides a summary of voter

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Functional Requirement	EMS	SVU	РВТ	BMD	СВТ	Not Supported	May be bypassed or deactivated	Description
								selections in the selected ballot format; display or audio to prevent a voter from marking an unwanted ballot target. The voter must confirm selections before the system marks the paper ballot. See the ES&S AutoMARK Operator's Guide for a description of the ballot summary routine and a description of system error messages.
								The DS850 records and reports the date and time of normal and abnormal events, and maintains a permanent printed record of audit information. The system detects and records significant events and reports critical errors or errors that require user intervention to the user for appropriate action. See the DS8500 Operator's Guide for instructions for retrieving this log.

2.1.2.1 Additional Requirements for DRE Systems

CONTROLLING REQUIREMENT

V: 1, §2.1.2.f As an additional means of ensuring accuracy in DRE systems, voting devices shall record and retain redundant copies of the original ballot image. A ballot image is an electronic record of all votes cast by the voter, including undervotes

Functional Requirement	EMS	UVS	РВТ	BMD	СВТ	Not Supported	May be bypassed or deactivated	Description
V: 1, §2.1.2.f						•	N/A	N/A

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2.1.3 ERROR RECOVERY

CONTROLLING REQUIREMENT

V: 1, §2.1.2

To recover from a non-catastrophic failure of a device, or from any error or malfunction that is within the operator's ability to correct, the system shall provide the following capabilities:

- a. Restoration of the device to the operating condition existing immediately prior to the error or failure, without loss or corruption of voting data previously stored in the device.
- b. Resumption of normal operation following the correction of a failure in a memory component, or in a data processing component, including the central processing unit
- c. Recovery from any other external condition that causes equipment to become inoperable, provided that catastrophic electrical or mechanical damage due to external phenomena has not occurred.

Functional Requirement	EMS	SVU	РВТ	BMD	CBT	Not Supported	May be bypassed or deactivated	Description
V: 1, §2.1.3.a	•						Νο	 EMS Electionware does not store voting or results data. All election configuration data is stored within a relational database. If an instance of the Electionware prematurely terminates due to a crash, power loss, or hardware failure, the user's data will appear on the next Electionware start-up. If the crash affects the database, the user will be able to recover the election data using manually backed-up database files. See the save/restore process described in Electionware user documentation. Electionware database files can be backed and restored using prescribed and documented procedures from ES&S and the database vendor's standard backup techniques. The drive containing the files which make up the election data should be backed up according to the requirements of the System Security Specification so that these files may be restored in the event of hardware failure. Depending on the error encountered the user may be returned to the main ERM system screen or a prior screen within the operation. This allows the user to restart the operation. ERM has the ability to restore data from backup file and reprocess files generated from reading tabulator media or tabulator media may also be reread. DVS ExpressVote resumes the operational condition existing immediately prior to an error or failure when recovering from non-catastrophic error condition such as a paper misfeed or low battery warning. Vote data is not retained once the vote session ends or the paper card is removed. PBT The ES&S DS200 can transfer the Election Media to a back-up media device. Upon insertion of the backup unit, the DS200 validates the integrity of the memory device and initiates a recovery process that allows any replacement DS200 to continue adding ballot images and counts to the Election Media. A backup media device is available for use and housed in the locked auxiliary USB compartment located behind the front USB compartment. The backup media is automaticall

ES&S Voting System 5.2.0.3 System Functionality Description

Functional Requirement	EMS	UVS	РВТ	BMD	СВТ	Not Supported	May be bypassed or deactivated	Description
								upon polls close the results are also copied to the backup media. See System Error Recovery in the DS200 Operator's Guide for more details. BMD The AutoMARK resumes the operational condition existing immediately prior to an error or failure when recovering from non-catastrophic error condition such as a low-ink warning or low battery warning once the error condition is corrected. Voter selections are only temporarily stored until a ballot is printed. No voting data is permanently stored. CBT The DS850 stores all voting data to non-volatile memory that is tested to prove its susceptibility to failure conditions is appropriate. The user interface provides clear instructions in the event of an error or failure to indicate to the user what data has completed processing and what data was not completed when the failure occurred and must be reprocessed.
V: 1, §2.1.3.b	•	•	•	•	•		No	 EMS A jurisdiction's administrative procedures must require periodic back up of data to a secure network drive or external Read Only memory device to ensure that election data can be restored following a hardware failure. Resumption of Electionware operation is dependent upon the type of equipment failure encountered on the Windows operating system platform, which is not under control of Electionware. The cases below note the worst case scenarios: Data Import and Data Entry: If a hardware error condition occurs while importing data, the import operation is aborted and the same operation can be reinitiated. If a complete disk failure occurs, best practices involving periodic backups must be used to restore election data. Data then may be re-imported from a backup. Data Export: If a hardware error condition occurs while exporting data, reformatting the Election Media device and exporting the election data. In ERM, a warning message appears if a non-fatal error, such as the failure to generate files or save data occurs. The program explains why the error occurred and gives the operator the opportunity to resolve the problem. UVS Recovery from a mechanical failure or other error that results in damage to the paper record or re-starting after a non-recoverable system error must be done by following the procedure to spoil the paper record and re-initialize with a new activation card. PBT The ES&S DS200 backup media device provides recovery functionality in the event of a memory failure. A backup media device is available for use and housed in the locked auxiliary USB compartment located behind the front USB compartment. The backup media is automatically detected and upon polls close the results are also copied to the backup media.

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Functional Requirement	EMS	NVS	PBT	BMD	CBT	Not Supported	May be bypassed or deactivated	Description
								See System Error Recovery in the DS200 System Operator's Guide for more details. BMD To recover from a mechanical failure or other error that results in damage to the ballot or a non-recoverable system error, poll workers must follow the procedure to spoil the ballot and re- initialize the system. CBT The DS850 stores all voting data to non-volatile memory. After replacing the failed component, the DS850 is capable of resuming normal operation.
V:1, §2.1.3.c							No	 EMS Jurisdiction administrative procedures must require periodic back up of data to a secure network drive or external Read Only memory device to ensure restoration of election information following a hardware failure. All Electionware election data is stored within database files on the Windows platform. Electionware database files can be backed and restored using Electionware's built-in backup or standard PostgreSQL database tools. The drive containing the files which make up the election data should be backed up periodically so they can be restored in the event of hardware failure. For ERM users, backup files must be created at the completion of major setup sections. These can be used to recover from file corruption that may occur due to unforeseen occurrences. UVS Recovery from a mechanical failure or other error that results in damage to the paper record or re-starting after a non- recoverable system error must be done by following the procedure to spoil the paper record and re-initialize with a new activation card. PBT The DS200 backup media device provides recovery from inoperable equipment. BMD Recovery from a mechanical or other error that results in damage to the ballot or a non-recoverable system error must follow the procedure to spoil the ballot and re-initialize the system with a new ballot. CBT The DS850 is capable of recovering from external conditions that are not catastrophic, once the issue causing the equipment to be inoperable has been resolved. More serious conditions may require maintenance by a qualified DS850 technician before normal operation can be resumed.

ES&S Voting System 5.2.0.3 System Functionality Description

2.1.4 INTEGRITY

CONTROLLING REQUIREMENT

V: 1, §2.1.4

Integrity measures ensure the physical stability and function of the vote recording and counting processes.

To ensure system integrity, all systems shall:

- a. Protect against a single point of failure that would prevent further voting at the polling place.
- b. Protect against the interruption of electrical power.
- c. Protect against generated or induced electromagnetic radiation.
- d. Protect against ambient temperature and humidity fluctuations.
- e. Protect against the failure of any data input or storage device.
- f. Protect against any attempt at improper data entry or retrieval.
- g. Record and report the date and time of normal and abnormal events
- h. Maintain a permanent record of all original audit data that cannot be modified or overridden but may be augmented by designated authorized officials in order to adjust for errors or omissions (e.g., during the canvassing process).
- i. Detect and record every event, including the occurrence of an error condition that the system cannot overcome, and time-dependent or programmed events that occur without the intervention of the voter or a polling place operator.
- j. Include built-in measurement, self-test, and diagnostic software and hardware for detecting and reporting the system's status and degree of operability.

Functional Requirement	EMS	NVS	РВТ	BMD	СВТ	Not Supported	May be bypassed or deactivated	Description
V: 1, §2.1.4.a		•	•	•			No	 UVS ExpressVote does not store election results, ensuring no data is lost if equipment fails. The election definition and log data can be moved to a spare ExpressVote device for continued operation after equipment failure. PBT DS200 system firmware, election definition and terminal results are stored on the DS200 Election Media that can be removed and re-installed into a replacement DS200 system in the event of catastrophic terminal failure. BMD The AutoMARK does not store any election results, system firmware, election definition and terminal results are stored on the Flash Memory Card, which contains the election definition, can be removed or a duplicate card used and transplanted installed in a replacement BMD system in the event of catastrophic terminal failure.
V: 1, §2.1.4.b	•	•	•	•	•		No	EMS Electionware cannot protect against interruption of power as it is software running on a Windows PC. Common jurisdictional procedural processes, such as the use of an Uninterruptable Power System and frequent data backup plan protect the system in the event of a power loss.

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Functional Requirement	EMS	UVS	РВТ	BMD	СВТ	Not Supported	May be bypassed or deactivated	Description
								 UVS ExpressVote backup batteries protect against interruption of electronic power. PBT A backup battery maintains the system in the case of a power failure during the election process. The Back-up and Recovery Subsystem provides back-up in the event of a power or machine failure. The ES&S DS200 includes a 21-volt, 10 cell lithium-ion battery that needs no special maintenance. The battery obtains its charge automatically from the system power supply. It ensures complete protection from power failure and provides up to two hours of normal operation in the event of a power failure. The precinct counter can operate without the battery installed. BMD The AutoMARK is equipped with backup batteries that protect against interruption of electronic power. CBT The DS850 is equipped with a backup and recovery subsystem that provides the reliable retention of data in the event of a power failure or mechanical malfunction. ES&S recommends an Un-interruptible Power Supply (UPS) be provided during the usage, in the event that there is a loss of AC power. The UPS also provides conditioned power in the event of issues with a facility's power including spikes, surges, dips, and brown-outs.
V: 1, §2.1.4.c		•	•	•	•		No	 UVS ExpressVote hardware design protects against electromagnetic radiation as well as ambient temperature and humidity fluctuations. PBT, CBT The ES&S DS850 and DS200 comply with Rules and Regulations of the Federal Communications Commission, Part 15 "Radio Frequency Devices", Subpart J, and "Computing Devices". The DS850 embedded computer is considered a "Class B" computing system, as defined therein. BMD The hardware design of the AutoMARK unit protects each system against electromagnetic radiation and ambient temperature and humidity fluctuations.
V: 1, §2.1.4.d		•	•	•	•		No	UVS, PBT, CBT, BMD As a condition of successful voting system certification, ES&S independently tests voting system hardware to withstand storage temperatures between –4 and +140 degrees Fahrenheit. System hardware must also pass independent tests to withstand uncontrolled humidity equivalent to the procedure of MIL-STD- 810D, Method 507.2, Procedure I-Natural Hot-Humid. All ES&S voting system equipment is designed to meet the listed environmental requirements.
V: 1, §2.1.4.e	•	•	•	•	•		No	EMS Electionware data input devices consists of a standard PC and peripherals that allows simple exchange of the components if failure of a data input device occurs during creation of the

ES&S Voting System 5.2.0.3 System Functionality Description

Functional Requirement	EMS	UVS	РВТ	BMD	СВТ	Not Supported	May be bypassed or deactivated	Description
								election definition (Pre-voting). If Electionware encounters read/write failure or detects incompatibility with an election media device used to transfer configuration data from Electionware to a ballot counting or ballot marking device, the system generates an error message that describes the issue to the election worker and ceases writing data to the election media. If data is corrupted or a data input device is damaged between data being loaded in Electionware and transferred to ballot counting or marking devices, the DS200, AutoMARK and DS850 will detect incompatibilities with the input device spawn an error message for the election worker upon attempting to load data from such devices and prevent data from being loaded. Election configuration data is stored within a relational database files on the Windows platform. Electionware database files can be further protected by being backed and restored using prescribed and documented procedures noted in the Electionware User's Guide from ES&5 and the database vendor standard Windows file system techniques. The drive containing the files which make up the election data should be backed up according to the requirements of the System Security Specification so that these files may be restored in the event of hardware failure. ERM contains integrity checks that verify no office contains more votes than ballots cast and that the database does not contain more or less candidates than the tabulator. The operating system checks all standard election media data transfers. Back up data including election configurations and results data for al IEMS components must be archived for at least 22 months. UVS ExpressVote memory management protects resident memory against the failure of any data input or any attempt at improper data entry or retrieval. In addition, the unit does not permanently stores vote selections on any storage device whether internal or external removable. PBT The AutoMARK utilizes memory management that protects resident memory against the failure of any

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Functional Requirement	EMS	UVS	РВТ	BMD	СВТ	Not Supported	May be bypassed or deactivated	Description
								Device. Other provisions include protection against: generated or induced electromagnetic radiation; ambient temperature and humidity; and any attempt at improper data entry or retrieval.
V: 1, §2.1.4.f	•	•	•	•	•		No	EMS Properly configuring the EMS PC using the settings detailed in <i>Hardening Procedures for the Election Management PC</i> establishes user roles and credentials to limit access to the EMS system based on the user's assigned tasks. The Windows event log records all actions executed by the logged in user.
								Electionware protects against improper data entry or retrieval, data is verified for correctness at the time it is imported and during the setting of ballot styles and positions. User name and password are required for entry into Electionware and protect against improper access.
								ERM data is accessed through the operating system which verifies the validity of the data. ERM then checks the data during precinct update.
								ExpressVote protects against improper data entry or retrieval by limiting physical access to the system with locking panels. Users are required to enter access codes for administrative menus. Once configured for voting, removable media devices are physically secured behind key-locked panels. Poll workers and voters cannot alter the system's election programming using available menu or physical controls.
								Memory Management protects resident memory against the failure of any data input or any attempt at improper data entry or retrieval.
								PBT, CBT ES&S ballot tabulators protect against improper data entry or retrieval by limiting physical access to the system with locking panels and requiring users to enter access codes to enter administrative menus. Once configured for voting, the USB Flash drive containing the tabulator election definition is secured behind a key-locked panel. Operators and voters running the ballot tabulator cannot impact alter election definition or stored
								results. Electionware software and the ES&S DS200 and DS850 share robust digital signature and password security features. This feature provides a high level of security on data that is transferred between the election management software and the DS200/DS850.
								See the ES&S System Security Specifications for more details on the public and private key management and security process. The DS200 executes a cyclic redundancy check on any inserted media to ensure data integrity. Any loss or improper data entry is detected through the CRC check.
								BMD
								The ES&S AutoMARK protects against improper data entry or retrieval by limiting physical access to the system with locking panels. Users are required to enter access codes to enter administrative menus. Once configured for voting, removable media devices that contain an election definition are physically

ES&S Voting System 5.2.0.3 System Functionality Description

Functional Requirement	EMS	SVU	РВТ	BMD	СВТ	Not Supported	May be bypassed or deactivated	Description
								secured behind key-locked panels. Poll workers and voters cannot alter the either system's election programming using available controls. Memory Management is used to protect resident memory against the failure of any data input or any attempt at improper data entry or retrieval.
V: 1, §2.1.4.g	•	•	•	•	•		No	 EMS All activity, including application errors, log to the Electionware internal database or to the encrypted Windows Event Log through the ES&S Event Log Service. User logs record each activity including type, date, time, ES&S application, user ID and in the case of the ERM, the computer name. UVS ExpressVote diagnostic logs record and report the date and time of normal and abnormal events, system status, and degree of operability. The diagnostic log is only used for hardware and software diagnosis. Log content has no record of election results nor should the log be included in any recount considerations. PBT The DS200 maintains an election audit log on the inserted Election Media. This log is a chronological listing of events (a queue) occurring during the election process. This log is only updated if the election is not officially closed and it is not full. Each fixed-size entry contains a four-byte universal time stamp and codes that represent events, and any related information. A system audit log (that stores machine specific audit items) is kept in the NVRAM and is also shadowed on the DS200 Election Media. This log contains such items as number of system halts, last power on, and other system audit lems. BMD The AutoMARK uses diagnostic logs to record and report the date and time of normal and abnormal events, system status, and degree of operability. The diagnostic log is only used for hardware and software diagnosis. Log content has no record of election results nor should the log be included in any recount considerations. CBT An election event log that records each critical event (operator action, system response to each operator action, standard status messages, exceptions and error events, etc.) is generated and maintained by the DS850. Each event recorded includes a date/time stamp. EMS Audit log data is stored either in the Electionware exception conditions) until the election admi

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Functional Requirement	EMS	UVS	РВТ	BMD	СВТ	Not Supported	May be bypassed or deactivated	Description
								ERM utilizes the System Event Log to log all activity. This information is available through the Windows System Event Viewer. The Windows System Event Log will log each activity including type, date, time, ES&S application, user ID and computer name. UVS ExpressVote diagnostic capabilities include the recording of system audit logs. These logs are stored on each system's removable storage media in a circular buffer. ExpressVote Internal Operation and USB stick System logs are limited to approximately 500 KB. The event and the Operation (OS) log will roll over, replacing the earliest recorded events, if the limit is reached. The Operation stores to the USB stick as well as to internal memory. Both logs delete when an EQC stick is inserted and activated. System audit logs can be accessed through the system's administrative menus. PBT The DS200 records two types of event reports. One is a summary of critical events, and the other is a printout of all the election events (also known as the Audit Log Report). Each event logged includes a timestamp identifying when the event occurred and a brief description of the event. These events are stored on the DS200 Election Media. The Critical Events Report is a report of all the critical events that have occurred thus far in relation to the Election Definition. Examples of such events are Polls Opened, Clear Totals Report, Election Definition Loaded, and Election Test Mode. The Audit Report is a report of all the event total number of write-ins, reject ballots, and blank ballots. The Audit Log header contains two 32-bit Cyclical Redundancy Checks (CRCs) for both the header and the audit log entries following the header. Any fraudulent attempt to modify the log will result in a CRC error and system halt. BMD The AutoMARK diagnostic capabilities include the recording of system audit logs. These logs are stored on the system's removable storage media in a circular buffer. System audit logs can be accessed through the system's administrative menus. CBT The DS850 does no
V: 1, §2.1.4.i	•	•	•	•	•		No	EMS To detect and record every event and unrecoverable system error condition, ES&S EMS Software utilizes the Electionware internal event log or the Windows System Event Log (for ERM and Electionware exceptions) to log all activity. System logs record each activity including type, date, time, ES&S application, user ID and computer name. If the system encounters an error that cannot be overcome, EMS programs gracefully shut down and log

ES&S Voting System 5.2.0.3 System Functionality Description

Functional Requirement	EMS	UVS	РВТ	BMD	СВТ	Not Supported	May be bypassed or deactivated	Description
								the error to the system event log. EMS programs do not execute time dependent or automated features that do not require activation by an election programmer. UVS To detect and record every event and unrecoverable system error condition, ExpressVote displays all errors on-screen and logs each exception to the operations log. Error conditions that the system cannot overcome display on screen, are logged to the event log and initiate a graceful system shutdown. ExpressVote does not execute time dependent or pre-programmed events. PBT To detect and record every event and unrecoverable system error condition, all DS200 errors are displayed on the LCD and if possible, the printer. If the DS200 Election Media is installed and is readable by the tabulator, the error will be recorded in the Audit Log. Exception/Errors are divided into two categories. The first category is the non-system halting category. Errors in this category do not jeopardize the election results, and will allow
								the user to continue on using the machine. The second category is the system halt category. Errors in the system halt category may jeopardize the election results and thus the system will be shut down. If the system shuts down, the user has the option to restart the system in order to let the machine re-test itself and check the validity of the DS200 Election Media data. System halt errors are logged to the audit log prior to the system shutting down. Events that are time-dependent or programmed, such as the DS200 closing for voting at the designated polls close time, generate an on screen message and are recorded to the system audit log.
								 BMD To detect and record every event and unrecoverable system error condition, the AutoMARK displays all errors on-screen and logs each exception to an operations log. Error conditions that the system cannot overcome display an onscreen message, are logged to the event log and initiate a graceful system shutdown. ES&S ballot marking devices do not execute time dependent or pre-programmed events. CBT To detect and record every event and unrecoverable system error condition, all DS850 errors are displayed on the screen and if possible, logged to the printer. These errors are also logged to the system's internal Audit Log. Error conditions that the system cannot overcome generate an on-screen message, are logged to the event log and initiate a graceful system shutdown. The DS850 does not execute time dependent or pre-programmed events.

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Functional Requirement	EMS	UVS	РВТ	BMD	СВТ	Not Supported	May be bypassed or deactivated	Description
V: 1, §2.1.4.j	•	•	•	•	•		Νο	 EMS Windows startup routine evaluates hardware and determines system status and degree of operability. UVS Starting the ExpressVote initiates self-diagnostics for system firmware, the printer and other subcomponents. Results of system tests appear on screen with any errors initiating an error message that prompts for poll worker intervention. PBT During system start-up, the DS200 executes a series of internal system checks. Tests include checking the scanner software, checking the printer, and other system checks. There is no menu for this step, but a report of the test results is generated as the Initial State Report. If the system fails any of the tests, the menu system will jump to the main menu and the election definition will be removed. BMD Starting the AutoMARK initiates self-diagnostics that check the system firmware, printer and other system components. Results of the system tests appear on screen with any errors spawning an error message prompting poll worker intervention. CBT The DS850 executes a series of internal system checks on startup. Tests include the self-test of all critical hardware and the routine for validating the system firmware. A report of the test results will be automatically generated. If the system fails any test, an operator message indicating the detected fault is generated and the DS850 user interface will require the appropriate action be taken by the user or election administrator.

2.1.4.1 Additional Requirements for DRE Systems

CONTROLLING REQUIREMENT

V: 1, §2.1.4

k. Maintain a record of each ballot cast using a process and storage location that differs from the main vote detection, interpretation, processing, and reporting path.

I. Provide a capability to retrieve ballot images in a form readable by humans

Functional Requirement	EMS	UVS	РВТ	BMD	СВТ	Not Supported	May be bypassed or deactivated	Description
V: 1, §2.1.4.k						•	N/A	N/A
V: 1, §2.1.4.I						•	N/A	N/A

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ES&S Voting System 5.2.0.3 System Functionality Description

2.1.5 SYSTEM AUDIT

CONTROLLING REQUIREMENT

V: 1, §2.1.5 This subsection describes the context and purpose of voting system audits and sets forth specific functional requirements. Election audit trails provide the supporting documentation for verifying the accuracy of reported election results. They present a concrete, indestructible archival record of all system activity related to the vote tally, and are essential for public confidence in the accuracy of the tally, for recounts, and for evidence in the event of criminal or civil litigation.

These requirements are based on the premise that system-generated creation and maintenance of audit records reduces the chance of error associated with manually generated audit records. Because most audit capability is automatic, the system operator has less information to track and record, and is less likely to make mistakes or omissions. The subsections that follow present operational requirements critical to acceptable performance and reconstruction of an election. Requirements for the content of audit records are described in VVSG 2005 Section 5.

The requirements for all system types, both precinct and central count, are described in generic language. Because the actual implementation of specific characteristics may vary from system to system, it is the responsibility of the vendor to describe each system's characteristics in sufficient detail so that test labs and system users can evaluate the adequacy of the system's audit trail. This description shall be incorporated in the System Operating Manual, which is part of the Technical Data Package.

Documentation of items such as paper ballots delivered, paper ballots collected, administrative procedures for system security, and maintenance performed on voting equipment are also part of the election audit trail, but are not covered in these technical standards. Useful guidance is provided by the *Innovations in Election Administration #10; Ballot Security and* Accountability, available on the EAC's website.

2.1.5.1 OPERATIONAL REQUIREMENTS

CONTROLLING REQUIREMENT

Audit records shall be prepared for all phases of election operations performed using devices controlled by the jurisdiction or its contractors. These records rely upon automated audit data acquisition and machine-generated reports, with manual input of some information. These records shall address the ballot preparation and election definition phase, system readiness tests, and voting and ballot-counting operations. The software shall activate the logging and reporting of audit data as described in the following sections.
 The timing and sequence of audit record entries is as important as the data contained in the record.

- . The timing and sequence of audit record entries is as important as the data contained in the record. All voting systems shall meet the requirements for time, sequence and preservation of audit records outlined below.
- ii. Except where noted, systems shall provide the capability to create and maintain a real-time audit record. This capability records and provides the operator or precinct official with continuous updates on machine status. This information allows effective operator identification of an error condition requiring intervention, and contributes to the reconstruction of election-related events necessary for recounts or litigation.
- iii. All systems shall include a real-time clock as part of the system's hardware. The system shall maintain an absolute record of the time and date or a record relative to some event whose time and date are known and recorded.
- iv. All audit record entries shall include the time-and-date stamp.
- v. The audit record shall be active whenever the system is in an operating mode. This record shall be available at all times; through it need not be continually visible.
- vi. The generation of audit record entries shall not be terminated or altered by program controls, or by the intervention of any person. The physical security and integrity of the record shall be maintained at all times.
- vii. Once the system has been activated for any function, the system shall preserve the contents of the audit record during any interruption of power to the system until processing and data reporting have been completed. The system shall be capable of printing a copy of the audit record. A separate printer

is not required for the audit record, and the record may be produced on the standard system printer if the following conditions are met

- The generation of audit trail records does not interfere with the production of output reports
- The entries can be identified so as to facilitate their recognition, segregation and retention
- The audit record entries are kept physically secure
- b. All voting system shall meet the requirements for error messages below.
 - i. The system shall generate, store, and report to the user all error messages as they occur.
 - ii. All error messages requiring intervention by an operator or precinct official shall be displayed or printed unambiguously in easily understood language text, or by means of other suitable visual indicators.
 - iii. When the system uses numerical error codes for trained technician maintenance or repair, the text corresponding to the code shall be self-contained, or affixed inside the unit device. This is intended to reduce inappropriate reactions to error conditions and to allow for ready and effective problem correction.
 - iv. All error messages for which correction impacts vote recording or vote processing shall be written in a manner that is understandable to an election official who possesses training on system use and operation, but does not possess technical training on system servicing and repair
 - v. The message cue for all systems shall clearly state the action to be performed in the event that vote or operator response is required.
 - vi. System design shall ensure that erroneous responses will not lead to irreversible error.
 - vii. Nested error conditions shall be corrected in a controlled sequence such that system status shall be restored to the initial state existing before the first error occurred.
- c. The Guidelines provide latitude in software design so that vendors can consider various user processing and reporting needs. The jurisdiction may require some status and information messages to be displayed and reported in real-time. Messages that do not require operator intervention may be stored in memory to be recovered after ballot processing has been completed.

The voting system shall display and report critical status messages using clear indicators or English language text. The voting system need not display non-critical status messages at the time of occurrence. Voting systems may display non-critical status messages (i.e., those that do not require operator intervention) by means of numerical codes for subsequent interpretation and reporting as unambiguous text.

Voting systems shall provide a capability for the status messages to become part of the real-time audit record. The voting system shall provide a capability for a jurisdiction to designate critical status messages.

Functional Requirement	EMS	UVS	РВТ	BMD	СВТ	Not Supported	May be bypassed or deactivated	Description
V: 1, §2.1.5.1.a							N/A	N/A
V: 1, §2.1.5.1.ai	•	•	•	•	•		No	EMS The Election Management System maintains a permanent, real- time audit record of all activity in the System Event Log through the Electionware internal audit log or Windows event log. Audit log data remains in the database until the election administrator purges it. The data can be exported to a file in a format readable by third-party applications such as Microsoft Excel. Electionware enters audit data into an event log table in the Electionware database, which includes entries for application start, login/logout, election creation; data imports; modifications to election data, ballot style creation.

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ES&S Voting System 5.2.0.3 System Functionality Description

Functional Requirement	EMS	UVS	РВТ	BMD	СВТ	Not Supported	May be bypassed or deactivated	Description
								The ERM Log file contains entries for activities that take place within ERM. File is updated (records added to the end) by all ERM programs. Date, time and various codes and data are written into the records. The file is used to print the Log listings. The system log listing will look like one of the following: <date> <time> <system action="" error="" information="" or=""> <counted information=""> <date> <time> <counted information=""> NOTE: This document will only list the <system action="" or<br="">ERROR INFORMATION> and/or <counted information="">. Also note that if the log is associated with precincts information, it will usually be preceded with the precinct number, and end with (BALS=nnnn TOTS=nnn) if it exists. The nnnn represent numeric values. ERM also utilizes the Windows System Event Log to log all activity. This information is available through the Windows System Event Viewer. UVS ExpressVote records real-time logs to removable media. Logs can be accessed through the system's TEST mode. PBT The DS200 maintains a real-time audit log printable from each terminal's integrated printer and stored on the Election Media. The DS200 audit log records and reports the date and time of normal and abnormal events, and maintains a permanent printed record significant events (for example, counting a marked ballot, error conditions that cannot be disposed by the system itself). BMD The AutoMARK includes functionality to record system audit logs. These real-time logs are stored on the system's removable media. Logs can be accessed through the system audit logs. These real-time logs are stored on the system's removable media. Logs con be accessed through the system itself). BMD The AutoMARK includes functionality to record system audit logs. These real-time logs are stored on the system's removable media. Logs to be decetsed through the system itself needia. Hord c</counted></system></counted></time></date></counted></system></time></date>

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Functional Requirement	EMS	UVS	РВТ	BMD	СВТ	Not Supported	May be bypassed or deactivated	Description
V: 1, §2.1.5.1.aii	•	•	•	•	•		No	 EMS The Election Management System uses the PC System clock to date and timestamp all log entries. UVS ExpressVote uses an internal real-time clock to time-and date stamp each entry in the system audit logs. PBT The ES&S DS200 has a battery-backed; real-time clock integrated with the system motherboard used to time stamp each event recorded to the system audit log. BMD The AutoMARK uses an internal real-time clock to time-and date stamp each entry in the system audit logs. CBT The DS850 uses a battery-backed, real-time clock to record the date and time for each audit log entry.
V: 1, §2.1.5.1.aiii	•	•	•	•	•		No	EMS All EMS audit log entries are date and time stamped using the PC clock. UVS, PBT, CBT and BMD Log entries for all ES&S voting equipment include a date and time stamp.
V: 1, §2.1.5.1.aiv	•	•	•	•	•		Νο	 EMS Electionware logs all system events directly to the database Audit table(s). Logging cannot be terminated or interrupted without terminating Electionware. The audit log can be displayed at any time by the administrator in real-time using the Output pane or through the Reports menu. ERM utilizes the Windows Event Log to log all activity. This information is available through the Windows System Event Viewer. The Windows System Event Log logs each activity including type, date, time, ES&S application, user ID and computer name. UVS The audit logs for the ExpressVote automatically activate as soon as the system is powered on for use. The system's audit log is constantly updated and stored to inserted media PBT, CBT DS200 and DS850 audit logs automatically activate as soon as either system is powered on for use. Audit logs are constantly updated in the background and stored to removable Election Media for the DS200 or the internal HDD for the DS850. Log reports may be printed at any time from either system. An election official has the option to use the DS850 dedicated report printer to generate a hard copy of the electronic log. BMD The audit logs for the AutoMARK automatically activate as soon as the system is powered on for use. The system's audit log is constantly updated in the system background and stored to the inserted Flash Memory Card (FMC).

ES&S Voting System 5.2.0.3 System Functionality Description

Functional Requirement	EMS	UVS	РВТ	BMD	СВТ	Not Supported	May be bypassed or deactivated	Description
V:1, §2.1.5.1.av	•	•	•	•	•		No	 EMS Audit logging in Electionware is automatic and may not be disabled by the user. The event log is maintained in a password protected PostgreSQL database maintained by Electionware. Only the administrator may access and view the log. The log can be archived with the election. ERM logs all events to the Windows System Event Log. The log cannot be disabled by a user. ERM will shut down if the Windows Event Log is not running. UVS The system audit log cannot be bypassed or deactivated during system installation or operation by the user. PBT The DS200 audit record cannot be terminated or altered by system controls. User interaction with the system log is limited to printing and viewing the system audit report. BMD The AutoMARK system audit log cannot be terminated or altered by system controls. The operator is limited to copying the electronic log to an ES&S Media Device or generating a hard copy of the log on the dedicated report printer.
V: 1, §2.1.5.1.avi	•	•	•	•	•		No	 EMS The Electionware database audit table is updated immediately following an audit event. The database is contained in a file separate of the Electionware application. In the event of system or power failure, the event database is preserved for future access. The ERM system audit log is updated with the event upon completion of each event. If power failure where to occur during the execution of an event all prior entries in the system audit log would be preserved. UVS The ExpressVote audit record is stored on the removable USB media. Stored audit records are not affected by system power interruptions. PBT The system stores all audit information to DS200 Election Media. When the drive is removed from the tabulator, or the power is shut off, the data in the Election Media will be preserved. BMD The AutoMARK compresses and stores the system audit log to the CF card of the AutoMARK being used. The CF card maintains audit log contents during any interruption of power to the system. CBT The DS850 stores the system audit log to an internal hard drive. This storage technique is non-volatile. The audit log is preserved if power is lost.

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Functional Requirement	EMS	UVS	PBT	BMD	CBT	Not Supported	May be bypassed or deactivated	Description
							No	ENAC
V: 1, §2.1.5.1.avii	•						Νο	 EMS Viewing and printing Electionware logs is handled through the reporting engine built into Electionware. Selecting an Audit Report from the Administrator menu opens a report tab, where the log data can be viewed, printed and exported to various standard file formats. Generation of audit records does not interfere with other output reports. All log entries are in plain text and formatted to facilitate recognition, segregation and retention. Audit records are stored to the system's internal database and kept physically secure. EKM has the ability to print a system audit log at any time. This report can be printed to the system printer or displayed on the system. The Windows Event Log Viewer can also be used to view and print all ERM System Log messages. Generation of audit records does not interfere with other output reports. All log entries are in plain text and formatted to facilitate recognition, segregation and retention. Audit records are stored to the Windows Event Services and kept physically secure by jurisdiction security procedures. UVS ExpressVote does not tabulate results or generate reports. The log entry provides a numerical designation, time and date stamp, and event detail information to facilitate recognition, segregation and retention. The audit log can be viewed on the unit's touch screen panel or printed to a blank card. Each audit record is compressed and stored to the unit's removable storage media. PBT The ES&S DS200 generates audit reports using the system's thermal printer The printing of the system audit trail is user initiated and does not interfere with the production of other system reports. Audit entries scored to the system's election media are kept physically secure behind a locking panel. BMD The AutoMARK does not tabulate results or generate output reports. The log entry provides a numerical designation, time and date stamp, and event detail information to
								time. This hard copy is produced in real time on a dedicated

ES&S Voting System 5.2.0.3 System Functionality Description

Functional Requirement	EMS	UVS	РВТ	BMD	СВТ	Not Supported	May be bypassed or deactivated	Description
								printer. Additionally, the user may, upon demand, produce a duplicate copy of the event log that reflects all events up to the point of request. Generation of audit records does not interfere with other output reports. All log entries are in plain text and formatted one time stamped event per line printed to facilitate recognition, segregation and retention. Audit records are stored to the system's internal database and kept physically secure.
V:1,§2.1.5.1.b							N/A	N/A
V: 1, §2.1.5.1.bi				•	•		No	 EMS With the exception of import errors and warnings, all EMS programs display error messages to the user as they occur. All error messages require the user to select OK to continue. UVS The ExpressVote displays and stores all error messages presented as they occur to the user. Error messages are either displayed in the voter's selected language, or display the international warning symbol if intended for the poll worker or if a system general error is generated. PBT The ES&S DS200 displays all required error messages as they occur on the LCD display. Critical events are included in the Audit log and critical events report. BMD The AutoMARK displays and stores all error messages presented as they occur to the user. Error messages are either displayed in the voter's selected language, or display the international warning symbol if intended for the poll-worker or if a system general error is generated. CBT DS850 error messages display as they occur. The DS850 maintains a real-time event log in two forms – as an electronic log stored on the internal hard drive and a real-time printed copy generated from a dedicated log printer. Both logs record in real time.
V: 1, §2.1.5.1.bii	•	•	•	•	•		No	 EMS With the exception of import errors, error messages for all EMS programs explain the error to the user and provide a possible resolution. Users must select OK to continue. UVS ExpressVote displays all error messages in plain language. If an error message is intended for an official, the international warning symbol is also used. PBT DS200 error messages requiring intervention by an operator or precinct official are displayed unambiguously in easily understood text on the LCD display. Depending on the language options set in election coding software, the system supports languages other than English.

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Functional	MS	SVI	вт	DM	BT	lot Supported	Aay be bypassed or deactivated	Description
Kequirement	U I	5	•	8	0	2	20	BMD The AutoMARK displays all errors in easily understood language text. If an error message is intended for an official, the international warning symbol is also used. CBT While all attempts have been made to generate complete and easily understood messages, it is anticipated that the DS850 operator's manual will need to be occasionally referenced to clarify and provide adequate resolution for a system error
V:1, §2.1.5.1.biii			•		•		No	PBT Numeric codes intended to help technicians perform service and maintenance functions are listed in the Numeric Message section in the ES&S DS200 Operator's Guide. CBT Numeric codes for the DS850 are always accompanied by clear language indicating the condition. Troubleshooting procedures associated with each error condition appear in the ES&S DS850 Operator's Guide.
V:1, §2.1.5.1.biv	•		•		•		No	 EMS EMS error messages include descriptive information to clearly communicate the issue. PBT, CBT Error messages for which correction impacts vote recording or processing are written in a manner that is understandable to election officials with basic DS200/DS850 operational knowledge and training.
V: 1, §2.1.5.1.bv	•	•	•	•	•		No	 EMS Electionware provides Yes-No (OK/Cancel) message boxes in appropriate places to record a user response. Once a response is obtained the program performs an action based on the response. ERM error messages contain descriptive information so that the user can clearly understand the issue at hand and the user must click OK to acknowledge. UVS ExpressVote error messages clearly state the recommended action to be performed. PBT DS200 messages assist operators to determine the correct action. The DS200 Operator's Guide includes additional troubleshooting procedures. BMD AutoMARK error messages clearly state the recommended action to be performed. CBT While all attempts have been made to generate complete and easily understood messages, it is anticipated that the troubleshooting section of the <i>DS850 Operator's Manual</i> will need to be occasionally referenced to clarify a message.

ES&S Voting System 5.2.0.3 System Functionality Description

Functional Requirement	EMS	UVS	РВТ	BMD	СВТ	Not Supported	May be bypassed or deactivated	Description
V:1, §2.1.5.1.bvi	•	•	•	•	•		No	EMS Electionware ensures that erroneous responses do not lead to irreversible error in the following manner; when an error is encountered a response is requested to determine the subsequent action to be performed, or the process is terminated gracefully after an error message indicating early process termination To prevent erroneous responses from leading to irreversible error ERM has many error recovery capabilities including the ability to reset results by precinct and/or tabulator and reprocess the tabulator media. UVS, PBT, CBT, BMD The ExpressVote, DS200, DS850 and AutoMARK ensure that erroneous responses to system error codes will not lead to irreversible error.
V: 1, §2.1.5.1.bvii	•	•	•	•	•		No	 EMS Nested error conditions are controlled in a sequence such that the subsequent error messages are displayed after the first one is corrected by the user. As errors are encountered, the system requires the user to correct that error without continuing. Rectifying all the errors returns the application's state to what is was before the error(s) occurred, allowing the application to continue processing. UVS The ExpressVote system reports and displays error conditions as they are encountered. Each error condition has prescribed options for recovery. Each error condition is treated as an entity and nesting does not apply. PBT, CBT The ES&S DS200 and DS850 are designed to recover from errors such as feed jams, multiple feeds, or any other type of feed error that causes the machine to reject an individual ballot. The DS200 and DS850 will detail the nature of the error or failure condition and provide the means to correct, without loss or corruption of ballot count, data previously stored. BMD The AutoMARK system reports and displays error conditions as they are encountered. Each error condition has prescribed options for recovery. Each error condition is treated as an entity and nesting does not apply.
V: 1, §2.1.5.1.c	•	•	•	•	•		No	EMS Electionware error information is available in real time using reports or panels displaying events, errors, and warnings. Events are displayed in plain text. ERM displays status messages during various functions See the ERM Software Design and Specification for a list of Status Messages. UVS ExpressVote does not record votes or tabulate ballots. Critical status and error reporting displays on screen in the voter's selected language or in English along with the international warning symbol depending on the nature of the error at the

Functional Requirement	EMS	UVS	РВТ	BMD	CBT	Not Supported	May be bypassed or deactivated	Description
								time of occurrence. PBT The ES&S DS200 displays all system critical messages, error conditions that require user intervention and system alerts in real-time. Status and information messages that do not require immediate user attention, such as terminal power status, are stored to the system audit log. The DS200 displays and reports all critical status messages on the terminal display panel in easily understood language or with an error code that directly corresponds to error condition descriptions included in DS200 Software Design Spec manual. Codes are described with language that is understandable to election officials who possess training on system servicing or repair. Depending on the language options set in election coding software, it will also support languages other than English. All status messages and alerts are stored to the system real-time audit log. Election officials has the option to print the Audit Log at any time after opening polls and during voting by accessing the front panel and move the key switch to OPEN/CLOSE POLLS position then select AUDIT-LOG PRINT menu. Printing Audit Log by the county during voting is done in accordance to their procedure. Audit Log printing also available at any time after poll closing. BMD The AutoMARK does not record votes or tabulate ballots. Critical status and error reporting displays on screen in the voter's selected language or in English along with the international warning symbol depending on the nature of the error at the time of occurrence. CBT The DS850 displays all system critical messages, error conditions that require user intervention and system alerts in real-time. Status and information messages that do not require immediate user attention, such as terminal power status, store to the system audit log. The DS850 displays and reports all critical status messages on the screen in easily understood language. While all attempts have been made to generate complete and easily understood messages, it is anticic

2.1.5.2 Use of a Shared Computing Platform

CONTROLLING REQUIREMENT

V: 1, §2.1.2

Further requirements must be applied to Commercial-off-the-Shelf operating systems to ensure completeness and integrity of audit data for election software. These operating systems are capable of executing multiple application programs simultaneously. These systems include both servers and workstations, including the many varieties of UNIX and Linux, and those offered by Microsoft and Apple. Election software running on these systems is vulnerable to

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unintended effects from other user sessions, applications, and utilities executing on the same platform at the same time as the election software.

"Simultaneous processes" of concern include: unauthorized network connections, unplanned user logins, and unintended execution or termination of operating system processes. An unauthorized network connection or unplanned user login can host unintended processes and user actions, such as the termination of operating system audit, the termination of election software processes, or the deletion of election software audit and logging data. The execution of an operating system process could be a full system scan at a time when that process would adversely affect the election software processes. Operating system processes improperly terminated could be system audit or malicious code detection.

To counter these vulnerabilities, three operating system protections are required on all such systems on which election software is hosted. First, authentication shall be configured on the local terminal (display screen and keyboard) and on all external connection devices ("network cards" and "ports"). This ensures that only authorized and identified users affect the system while election software is running.

Second, operating system audit shall be enabled for all session openings and closings, for all connection openings and closings, for all process executions and terminations, and for the alteration or deletion of any memory or file object. This ensures the accuracy and completeness of election data stored on the system. It also ensures the existence of an audit record of any person or process altering or deleting system data or election data.

Third, the system shall be configured to execute only intended and necessary processes during the execution of election software. The system shall also be configured to halt election software processes upon the termination of any critical system process (such as system audit) during the execution of election software.

Functional Requirement	EMS	UVS	РВТ	BMD	СВТ	Not Supported	May be bypassed or deactivated	Description
V: 1, §2.1.5.2	•	•	•	•	•		Νο	 EMS Properly configuring the EMS PC using the settings detailed in <i>Hardening Procedures for the Election Management PC</i> disables unnecessary running processes and network connections on the EMS PC. Proper user authentication is executed through Windows user and password management and all operating system events are logged to the Windows Event Log and catalogued using ES&S Event Log Service. Electionware is a multi-user application. User authentication takes place on the local terminal referencing encrypted information from the local or server database. Authenticated network connections to the Electionware database, if located on a server, are handled by the network stack embedded in the Windows operating system and password protection is used for the authentication of the connecting user. Electionware logs, logins, and logouts and the events listed in the accompanying Election Appendix 1 used the Electionware database to record the event. Electionware does not execute or redirect execution to another application or non-Electionware module within the Windows operation system will halt execution of Electionware if a critical process failure occurs. Electionware - Paper Ballot is a single-user application within Electionware login referencing encrypted information from the local or server database.

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Functional Requirement	EMS	UVS	РВТ	BMD	СВТ	Not Supported	May be bypassed or deactivated	Description
								 Because Paper Ballot is a single-user application, error messages display if more than one user attempts to access Paper Ballot at the same time. Authenticated network connections to the Electionware database, if located on a server, are handled by the network stack embedded in the Windows operating system and password protection is used for the authentication of the connecting user. Paper Ballot records user logins and logouts. Event types are documented in the Electionware User's Guide. Real-time events are available in the applications. Network connection openings and closings are not applicable to this module. Paper Ballot does not execute or redirect execution to another application or module outside of normal execution within the Windows Environment. Microsoft Windows will halt execution of the Paper Ballot if a critical process failure occurs. Per ES&S installation guidelines, ERM runs in a dedicated election environment regardless of the system configuration employed: Stand-alone, peer-to-peer or Server based LAN. The Windows OS operates independently and does not allow for logging or monitoring of its errors by the running application's processes. Memory management is handled by the Java language's framework. This software will only allow the execution of the called binary module. Code corruption of a module or process will result in the immediate termination of the application. ERM will terminate if the ERM System Log messages cannot be successfully written to the Windows OS Event System. UVS, PBT and BMD ES&S voting equipment does not run on a shared platform. Devices are designed and programmed for a single purpose. Equipment does not run unnecessary or superfluous simultaneous processes and the CBT only supports network connections used for transmitting results to a central reporting PC. Voting equipment audits all system events in accordance with VVSG 2005 requirements. All devices are configured t

2.1.6 ELECTION MANAGEMENT SYSTEM

CONTROLLING REQUIREMENT

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V: 1, §2.1.6 The Election Management System (EMS) is used to prepare ballots and programs for use in casting and counting votes, and to consolidate, report, and display election results. An EMS shall generate and maintain a database, or one or more interactive databases, that enables election officials or their designees to perform the following functions:

- Define political subdivision boundaries and multiple election districts as indicated in the system documentation.
- Identify contests, candidates, and issues.
- Define ballot formats and appropriate voting options.
- Generate ballots and election-specific programs for voting equipment.
- Install ballots and election-specific programs
- Test that ballots and programs have been properly prepared and installed
- Accumulate vote totals at multiple reporting levels as indicated in the system documentation
- Generate the post-voting reports required by VVSG 2005 Subsection 2.4.
- Process and produce audit reports of the data as indicated in VVSG 2005 Subsection 5.4.

Functional Requirement	EMS	UVS	РВТ	BMD	СВТ	Not Supported	May be bypassed or deactivated	Description
V: 1, §2.1.6, bullet 1	•						No	EMS Electionware supports entry of precincts, precinct splits, districts, district types, polling places, absentee (non- geographical), early vote, and the configuration of relationships between each of these entities.
V: 1, §2.1.6, bullet 2	•						No	EMS Electionware is used to define offices, contests, candidates and issues. ERM reports contain results for each contest, candidate and issue contained on the ballot. All election definition parameters are created with Electionware and passed to ERM via XML files. No election content information can be added or deleted in ERM.
V: 1, §2.1.6, bullet 3	•						No	EMS Electionware supports the generation of ballot formats and voting options using the Paper Ballot module.
V: 1, §2.1.6, bullet 4	•						No	EMS Electionware generates ballot layouts and data used by ES&S ballot scanners to determine ballot target locations. The Electionware Package module creates and programs the memory devices with election and ballot data for used by ES&S voting equipment.

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Functional Requirement	EMS	UVS	РВТ	BMD	CBT	Not Supported	May be bypassed or deactivated	Description
V: 1, §2.1.6, bullet 5	•						No	EMS Electionware allows the Election Official to specify the targeted tabulator equipment to create configuration data incorporated on ES&S Election Media sets (USB Flash drives). The Election media set contains tabulator-specific election rules and ballot (or ballots) layout information in RSA encrypted XML format. The Election Media is hand delivered to the tabulator(s).
V: 1, §2.1.6, bullet 6	•	•	•	•	•		No	 EMS During pre-election L&A testing, all tabulated results should be processed into ERM and ERM precinct reports should be audited against tabulator results reports. UVS Proper ExpressVote program installation is verified by test marking activation cards to verify all positions are correctly selectable. Vote recording and reporting is handled by the tabulator and EMS reporting subsystem. Tabulators Logic and accuracy testing verifies that ballots and programs have been properly prepared and installed. BMD The AutoMARK does not record votes, but accurately reads voter selections to mark the appropriate target on an ES&S ballot. Proper program installation is verified by performing a test print on a blank ballot from each style to verify all positions are correctly selectable and/or logic and accuracy test ballot marking on blank test ballots and then using those BMD marked ballots to perform L&A testing with an ES&S ballot tabulator.
V: 1, §2.1.6, bullet 7	•				•		No	ERMS ERM aggregates and accumulates vote totals from all system tabulators. It provides the operator the ability to print reports at the precinct, district, and jurisdiction level. CBT The DS850 accumulates vote totals at a precinct or machine level.
V: 1, §2.1.6, bullet 8	•				•		No	EMS ERM generates post-voting reports that include aggregated vote totals from the election in various formats including precinct, summary, and canvass reports. These reports include statistical and candidate information and meet the requirements of VVSG Section 2.4. CBT The DS850 generates results reports at the election or precinct level. These reports can include or exclude overvotes and undervotes and meet the reporting requirements of VVSG Subsection 2.4.

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ES&S Voting System 5.2.0.3 System Functionality Description

Functional Requirement	EMS	UVS	РВТ	BMD	СВТ	Not Supported	May be bypassed or deactivated	Description
V: 1, §2.1.6, bullet 9	•	•	•	•	•		No	EMS Electionware generates audit reports that meet requirements of VVSG Vol. 1, Section 5.5 for data generated in Electionware. ERM has the ability to print a system audit log at any time. This report can be printed to the system printer or displayed on the system. UVS, PBT, CBT, BMD ES&S voting equipment has the ability to generate audit reports that meet the requirements of VVSG 2005 Subsection 5.4.

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2.1.7 VOTE TABULATION PROGRAM

CONTROLLING REQUIREMENT

V: 1, §2.1.7 Each voting system shall have a vote tabulation program that will meet specific functional requirements.

2.1.7.1 FUNCTIONS

CONTROLLING REQUIREMENT

V: 1, §2.1.7.1

The vote tabulating program software resident in each voting machine, vote count server, or other devices shall include all software modules required to:

- a. Monitor system status and generate machine-level audit reports
- b. Accommodate device control functions performed by polling place officials and maintenance personnel
- c. Register and accumulate votes
- d. Accommodate variations in ballot counting logic

Functional Requirement	EMS	UVS	РВТ	BMD	CBT	Not Supported	May be bypassed or deactivated	Description
V: 1, §2.1.7.1.a	•	•	•	•	•		No	 EMS ERM has the ability to print a system audit log at any time. This report can be printed to the system printer or displayed on the system. UVS, PBT, CBT, BMD All voting devices maintain a continuous system audit log and store audit and event information to each device's respective removable storage media. Machine level audit reports may be generated at any time from each of the system's administrative menus.
V: 1, §2.1.7.1.b	•	•	•	•	•		Νο	 UVS The ExpressVote test menu that is accessed with physical switch located behind a locked access panel on the side of the unit. PBT Administrative menus include a wide range of diagnostic and system test tools allowing maintenance personnel and election officials to configure, test and activate voting system equipment. Maintenance and administrative access is restricted by requiring a physical control key and pass code entry to access system maintenance functions. BMD The ES&S AutoMARK includes a poll worker selectable test menu that provides access to the control functions used by the poll worker. This menu requires a physical key to access. This menu includes a selection for accessing the maintenance menu that provides access to the maintenance functions. The maintenance menu that an operator enter a special access code not available to the poll worker.

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ES&S Voting System 5.2.0.3 System Functionality Description

Functional Requirement	EMS	UVS	РВТ	BMD	СВТ	Not Supported	May be bypassed or deactivated	Description
								CBT Administrative menus include a wide range of diagnostic and system test tools allowing maintenance personnel and election officials to execute required tasks.
V: 1, §2.1.7.1.c		•					No	 EMS ERM reports all results as tabulated. During the database update of tabulator results checks are done to ensure that votes within any office do not exceed the ballots cast and that the results database does not contain more or less candidates than the tabulator. UVS ExpressVote does not record votes. The unit accurately detects voter selections and converts those selections to a marked paper summary record. Correct registration of votes is tested by performing logic and accuracy tests on marked cards using an ES&S ballot tabulator. Vote recording and reporting is handled by the tabulator and EMS reporting subsystem. PBT The ES&S DS200 registers and tabulates polling totals at the polling place (or at designated regional sites). The DS200 system tabulates anonymous ballot data and produces a printed report of the vote count together with report data stored on DS200 Election Media. The Election Media can be removed and reinstalled to another DS200 for consolidation of vote totals. Terminal level totals can be produced directly from the scanner's integrated printer. Combined totals can be generated using compatible election reporting software. BMD The AutoMARK does not record votes. The unit accurately detects voter selections in order to mark an appropriate target on an ES&S ballot or mark a paper summary record, respectively. Correct registration of votes is tested by performing logic and accuracy test ballot marking on blank test ballots and then using those BMD marked ballots to perform L&A testing with an ES&S ballot tabulator. Vote recording and reporting is handled by the tabulator and EMS reporting subsystem. CBT The DS850 system registers and accumulates vote totals, captures vote image records and produces a printed report of the vote count together with report data stored on an ES&S Media Device. This ES&S Media Device can be removed and transported to another location for consolidation/ accumulation o
V: 1, §2.1.7.1.d	•		•		•		No	PBT, CBT ES&S tabulators support all variations in ballot counting logic described in ES&S' response to requirement 2.1.7.2 below.

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2.1.7.2 VOTING VARIATIONS

CONTROLLING REQUIREMENT

V: 1, §2.1.7.2 There are significant variations among state election laws with respect to permissible ballot contents, voting options, and the associated ballot counting logic. The following table identifies which of the following items listed in VVSG 2005 Volume I, Section 2.1.7.2 *can* and *cannot* be supported by the voting system, as well as *how* the voting system can implement the items supported:

- Closed Primaries
- Open Primaries
- Partisan Offices
- Non-Partisan Offices
- Write-in Voting
- Primary Presidential Delegation Nomination
- Ballot Rotation
- Straight party voting
- Cross-party endorsement
- Split Precincts
- Vote for N of M
- Recall issues with options
- Cumulative voting
- Ranked order voting
- Provisional or challenged ballots

Functional Requirement	EMS	UVS	РВТ	BMD	СВТ	Not Supported	May be bypassed or deactivated	Description
V: 1, §2.1.7.2, Closed Primaries	•	•	•	•	•		No	EMS Electionware supports this type of election. UVS, PBT, CBT and BMD Closed Primary voting is supported in this release.
V: 1, §2.1.7.2, Open Primaries	•	•	•	•	•		No	EMS Electionware supports this type of election. UVS, PBT, CBT and BMD Open Primary voting is supported in this release.

ES&S Voting System 5.2.0.3 System Functionality Description

Functional Requirement	EMS	UVS	РВТ	BMD	СВТ	Not Supported	May be bypassed or deactivated	Description
V: 1, §2.1.7.2, Partisan Offices	•	•	•	•	•		No	 EMS Electionware supports the creation of this type of office. Offices are assigned in the Capture module. UVS The ExpressVote supports the use of partisan offices. PBT The ES&S DS200 can distinguish between partisan and non-partisan contests on the same ballot. This support extends through closed primaries, open primaries, and general elections. CBT The DS850 can distinguish between partisan and non-partisan contests on the same ballot. This support extends through closed primaries, open primaries, and general elections. CBT The DS850 can distinguish between partisan and non-partisan contests on the same ballot. This support extends through closed primaries, open primaries, and general elections. BMD The AutoMARK supports the use of partisan offices.
V: 1, §2.1.7.2, Non-Partisan Offices	•	•	•	•	•		No	EMS Electionware supports both NY and PA style cross-endorsements through the assigning of additional parties to a candidate in the candidate dialog. UVS, PBT, CBT and BMD ES&S voting equipment supports cross party endorsement where a candidate may be associated with up to four different parties. Selection of any party associated with the candidate will result in that candidate receiving a vote.
V: 1, §2.1.7.2, Write-in Voting	•	•	•	•	•		No	EMS Electionware supports split precincts. Split precinct options are configured from Electionware-Capture. UVS, PBT, CBT and BMD ES&S voting equipment supports split precincts.
V: 1, §2.1.7.2, Primary Presidential Delegation Nomination						•	N/A	EMS Electionware supports vote for N of M (multiple vote for) contests. The number of allowed votes per contest is configured in Electionware-Capture. UVS, PBT, CBT and BMD ES&S voting equipment supports a contest with a vote for more than one.
V: 1, §2.1.7.2, Ballot Rotation	•	•	•	•	•		No	EMS Electionware supports configuration of Ballot Rotation with options. UVS, PBT, CBT and BMD The ExpressVote, DS200, DS850, and AutoMARK support Ballot rotation.
V: 1, §2.1.7.2, Straight party voting	•	•	•	•	•		No	EMS Electionware supports configuration of Straight Party voting. UVS, PBT, CBT and BMD The ExpressVote, DS200, DS850, and AutoMARK and support Straight Party voting.

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Functional Requirement	EMS	UVS	РВТ	BMD	CBT	Not Supported	May be bypassed or deactivated	Description
N 4 52 4 7 2	•	•	•	•	•		No	FMS
V: 1, 52.1.7.2, Cross-party endorsement	•	•	•	•	•		NO	Electionware supports both NY and PA style cross-endorsements through the assigning of additional parties to a candidate in the candidate dialog. UVS, PBT, CBT and BMD ES&S voting equipment supports cross party endorsement where a candidate may be associated with up to four different parties. Selection of any party associated with the candidate will result in that candidate receiving a vote
	<u> </u>							
V: 1, §2.1.7.2, Split Precincts	•	•	•	•	•		NO	EINS Electionware supports split precincts. Split precinct options are configured from Electionware-Capture. UVS, PBT, CBT and BMD
	<u> </u>			ES&S voting equipment supports split precincts.				
V: 1, §2.1.7.2, Vote for N of M	•	•	•	•	•		No	EMS Electionware supports vote for N of M (multiple vote for) contests. The number of allowed votes per contest is configured in Electionware-Capture. UVS, PBT, CBT and BMD ES&S voting equipment supports a contest with a vote for more than one.
							No	EMS
V: 1, §2.1.7.2, Recall issues with options								Electionware supports recall issue D with options. UVS, PBT, CBT and BMD ES&S voting equipment supports recall issues with options in which the contest is broken out into two parts. The first part contains a question regarding the recall, which typically contains a Yes/No response. Regardless of the selection in the first question, if the voter then marks their choice for the candidate in the second part, the vote will be tabulated. In this situation, if the voter over or undervotes the first race, the second race is ignored by the tabulator.
V: 1, §2.1.7.2, Cumulative voting						•	N/A	N/A
V: 1, §2.1.7.2, Ranked order voting	•						No	EMS Electionware supports ballot layout options for Ranked Choice Voting. Cast vote record files are exported from Electionware: Produce and processed externally from the ES&S Voting System for ranked choice voting results.
V: 1, §2.1.7.2, Provisional or challenged ballots	•	•	•	•	•		No	Provisional or challenged ballots are tabulated after each ballot is verified by the jurisdiction.

ES&S Voting System 5.2.0.3 System Functionality Description

2.1.8 BALLOT COUNTER

CONTROLLING REQUIREMENT

V: 1, §2.1.8 For all voting systems, each piece of voting equipment that tabulates ballots shall provide a counter that:

V. 1, 92.1.

- a. Can be set to zero before any ballots are submitted for tally
- b. Records the number of ballots cast during a particular test cycle or election.
- c. Increases the count only by the input of a ballot.
- d. Prevents or disables the resetting of the counter by any person other than authorized persons at authorized points.
- e. Is visible to designated election officials.

Functional Requirement	EMS	UVS	РВТ	BMD	CBT	Not Supported	May be bypassed or deactivated	Description
V: 1, §2.1.8.a			•		•		No	PBTThe ES&S DS200 can be programmed to automatically set totals to zero when a user opens the polls. Alternatively, users may set totals to zero from system administration menus. The counter automatically prints a zero totals report from the system start menu.CBTThe DS850 has the ability to clear totals at any time with safeguards that prevent the accidental clearing of totals.
V: 1, §2.1.8.b			•		•		No	 PBT The ES&S DS200 accurately records all marks on all ballots cast and reports a total ballots cast tally along with results totals. CBT The DS850 can report ballots cast on a batch basis or as an aggregate total.
V: 1, §2.1.8.c			•		•		No	 PBT The ES&S DS200 increases the ballots cast total only through the input of a ballot. The system includes a public count display that increments only when a ballot is inserted into the scanner. CBT Aggregating votes is the fundamental concept behind the design of the DS850. The operator does not have the ability to manually modify the count totals.
V: 1, §2.1.8.d			•		•		No	 PBT Access to administrative functions is restricted by a password protected menu system and a locked key panel. Once configured for official vote tabulation, the system is locked out from any operations until the precinct supervisor officially closes the polls. CBT The clearing of totals on the DS850 is protected by an override pass code. It is customer's responsibility to ensure that this pass code is disseminated to only appropriate election officials.

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Functional Requirement	EMS	UVS	РВТ	BMD	СВТ	Not Supported	May be bypassed or deactivated	Description
V: 1, §2.1.8.e			•		•		No	PBT The DS200 provides visibility using the following functions: By pressing the Open Polls button, the polling place official can activate the counter allowing for the counting of official ballots. The counter will print out a verification of poll opening with a zero report, and the LCD screen will indicate normal ballot counting mode. This mode includes a public counter, which indicates the total number voting.
								CBT DS850 visibility is provided by a real time counter, which indicates the number of ballots processed, is provided as part of the default message.

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ES&S Voting System 5.2.0.3 System Functionality Description

2.1.9 **TELECOMMUNICATIONS**

CONTROLLING REQUIREMENT

V: 1, §2.1.2 For all voting systems that use telecommunications for the transmission of data during pre-voting, voting or postvoting activities, capabilities shall be provided that ensure data are transmitted with no alteration or unauthorized disclosure during transmission. Such transmissions shall not violate the privacy, secrecy, and integrity demands of the Guidelines. VVSG 2005 Section 6 describes telecommunications standards that apply to, at a minimum, the following types of data transmissions:

Voter Authentication: Coded information that confirms the identity of a voter for security purposes for a system that transmit votes individually over a public network.

Ballot Definition: Information that describes to voting equipment the content and appearance of the ballots to be used in an election.

Vote Transmission to Central Site: For voting systems that transmit votes individually over a public network, the transmission of a single vote to the county (or contractor) for consolidation with other county vote data.

Vote Count: Information representing the tabulation of votes at any one of several levels: polling place, precinct, or central count.

List of Voters: A listing of the individual voters who have cast ballots in a specific election.

Functional Requirement	EMS	UVS	РВТ	BMD	СВТ	Results Reporting	Not Supported	May be bypassed or deactivated	Description
V: 1, §2.1.9, Voter Authentication							•	N/A	Vote transmission is not supported.
V: 1, §2.1.9, Ballot Definition							•	N/A	Vote transmission is not supported.
V: 1, §2.1.9, Vote Transmission to Central Site							•	N/A	Vote transmission is not supported.
V: 1, §2.1.9, Vote Count							•	N/A	Vote transmission is not supported.
V: 1, §2.1.9, List of Voters							•	N/A	Transmitted DS200 results do not include any information that identifies voters.

2.1.9.1 Additional Telecommunications Information

2.1.9.1.1 INTERNAL MODEMS

No modems are installed.



2.1.9.1.2 EXTERNAL MODEMS

No external modems are supported.

2.1.9.1.3 VOTER AUTHENTICATION

Not Applicable. The DS200 does not include provisions for real-time vote transmission that would require the identification of a voter. Transmission capabilities are limited to the transfer of the unofficial early results after polls close. The results are intended to be sent to a central location for vote consolidation and election reporting.

2.1.9.1.4 BALLOT DEFINITION

Not Applicable. The DS200 does not include provisions for ballot definition transmission.

2.1.9.1.5 VOTE TRANSMISSION TO CENTRAL SITE

Not Applicable. Vote transmission is not supported.

2.1.9.1.6 **VOTE COUNT**

Not Applicable. Transmission of vote counts is not supported.

2.1.9.1.7 LIST OF VOTERS

Not Applicable. Transmitted DS200 does not include any information that identifies voters.

The following data transmission attributes characterize the operational capabilities of the DS200's communication subsystem as outlined in Vol 1, Section 6.2 of the VVSG

2.1.9.1.8 ACCURACY

Not applicable. Transmission of vote counts is not supported.

2.1.9.1.9 DURABILITY, RELIABILITY, MAINTAINABILITY AND AVAILABILITY

Not Applicable. This requirement does not apply to the software.

2.1.9.1.10 **I**NTEGRITY

Not Applicable.

- a. This requirement does not apply to the software or DS200.
- b. This requirement does not apply to the software or DS200. The DS200 is not directly compatible with DSU/CSU equipment.
- c. This requirement does not apply to the software or DS200.

2.1.9.1.11 CONFIRMATION

Not Applicable. Voting transmissions is not supported.

ELECTION SYSTEMS & SOFTWARE LLC
DOCUMENT ID EVS5203_C_D_0200_SFD
REVISION -1.0

ES&S Voting System 5.2.0.3 System Functionality Description

2.1.10 DATA RETENTION

CONTROLLING REQUIREMENT

V: 1, §2.1.10 United States Code Title 42, Sections 1974 through 1974e state that election administrators shall preserve for 22 months "all records and paper that came into (their) possession relating to an application, registration, payment of poll tax, or other act requisite to voting." This retention requirement applies to systems that will be used at anytime for voting of candidates for federal offices (e.g., Member of Congress, United States Senator, and/or Presidential Elector). Therefore, all voting systems shall provide for maintaining the integrity of voting and audit data during an election and for a period of at least 22 months thereafter.

Because the purpose of this law is to assist the federal government in discharging its law enforcement responsibilities in connection with civil rights and elections crimes, its scope must be interpreted in keeping with that objective. The appropriate state or local authority must preserve all records that may be relevant to the detection and prosecution of federal civil rights or election crimes for the 22-month federal retention period, if the records were generated in connection with an election that was held in whole or in part to select federal candidates. It is important to note that Section 1974 does not require that election officials generate any specific type or classification of election record. However, if a record is generated, Section 1974 comes into force and the appropriate authority must retain the records for 22 months.

For 22-month document retention, the general rule is that all printed copy records produced by the election database and ballot processing systems shall be so labeled and archived. Regardless of system type, all audit trail information spelled out in VVSG Subsection 5.5 shall be retained in its original format, whether that be real-time logs generated by the system, or manual logs maintained by election personnel. The election audit trail includes not only in process logs of election-night and subsequent processing of absentee or provisional ballots, but also time logs of baseline ballot definition formats, and system readiness and testing results.

In many voting systems, the source of election-specific data (and ballot formats) is a database or file. In precinct count voting systems, this data is used to program each machine, establish ballot layout, and generate tallying files. It is not necessary to retain this information on electronic media if there is an official, authenticated printed copy of all final database information. However, it is recommended that the state or local jurisdiction also retain electronic records of the aggregate data for each voting machine so that reconstruction of an election is possible without data re-entry. The same requirement and recommendation applies to vote results generated by each precinct count voting machine.

Functional Requirement	EMS	UVS	РВТ	BMD	СВТ	Results Reporting	Not Supported	May be bypassed or deactivated	Description
V: 1, §2.1.10	•	•	•	•	•	N/A		No	EMS Electionware and its modules manage data stored in a PostgreSQL database file. The database file may be backed up and restored using Electionware when the election official has appropriate Electionware rights and with PostgreSQL tools and admin rights. UVS, PBT, BMD, CBT Physical ballots, stored election results and equipment election programming may be reliably stored and recovered after 22 months if the jurisdiction stores election media and materials in an environment that meets manufacturer specifications.

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2.1.11 ADDITIONAL OVERALL CAPABILITIES

CONTROLLING REQUIREMENT

	Additional	1.	Ballot Stamping Mechanism.
	Requirements	2.	Usability - The voting system shall permit the voter to verify (in a private and independent manner) the votes selected by the voter on the ballot before the ballot is cast and counted.
		3.	Usability - The voting system shall provide the voter with the opportunity (in a private and independent manner) to change the ballot or correct any error before the ballot is cast and counted (including the opportunity to correct the error through the issuance of a replacement ballot if the voter was otherwise unable to change the ballot or correct any error).
		4.	Usability - The voting system shall provide the voter with instructions on how to correct the ballot before it is cast and counted (including instructions on how to correct the error through the issuance of a replacement ballot if the voter was otherwise unable to change the ballot or correct any error).
		5.	Usability - The voting system shall ensure that any notification preserves the privacy of the voter and the confidentiality of the ballot.
		6.	Usability - Consistent with election law, the voting system should support a process that does not introduce any bias for or against any of the selections to be made by the voter. In both visual and aural formats, contest choices shall be presented in an equivalent manner.
		7.	Usability - The voting process shall be designed to minimize interaction difficulties for the voter.
		8.	Usability - The voting station shall prevent others from observing the contents of a voter's ballot.
		9.	Usability - The ballot and any input controls shall be visible only to the voter during the voting session and ballot submission.
		10.	Usability - The audio interface shall be audible only to the voter.
		11.	Usability - The voting system shall notify the voter of an attempted overvote in a way that preserves the privacy of the voter and the confidentiality of the ballot.
		12.	Usability - The accessible voting station shall be accessible to voters with partial vision. The accessible voting station shall be capable of showing all information in at least two font sizes, (a) 3.0-4.0 mm and (b) 6.3-9.0 mm
		13.	Usability - The audio interface shall be audible only to the voter.
		14.	Usability - The accessible voting station shall be accessible to voters who are blind.
		15.	Usability - The audio-tactile interface (ATI) of the accessible voting station shall provide the same capabilities to vote and cast a ballot as are provided by other voting machines or by the visual interface of the standard voting machine
		16.	Usability - The ATI shall allow the voter to have any information provided by the voting system repeated.
		17.	Usability - The ATI shall allow the voter to pause and resume the audio presentation.
		18.	Usability - The ATI shall allow the voter to skip to the next contest or return to previous contests.
		19.	Usability -The ATI shall allow the voter to skip over the reading of a referendum so as to be able to vote on it immediately.
		20.	Usability - All voting stations that provide audio presentation of the ballot shall conform to the following requirements. A sanitized headphone or handset shall be made available to each voter. The voting machine shall set the initial volume for each voter between 40 and 50 dB SPL. The voting machine shall provide a volume control with an adjustable volume from a minimum of 20dB SPL up to a maximum of 100 dB SPL, in increments no greater than 10 dB. The audio system shall be able to reproduce frequencies over the audible speech range of 315 Hz to 10 KHz.
		21.	Usability - The voting process shall be accessible to voters who lack fine motor control or use of their hands All keys and controls on the accessible voting station shall be operable with one hand and shall not require tight grasping, pinching, or twisting of the wrist. The force required to activate controls and keys shall be no greater 5 lbs. (22.2 N).
		22.	Usability - The accessible voting station controls shall not require direct bodily contact or for the body to be part of any electrical circuit.
		23.	Telecommunications and Data Transmission VVSG V:1 S:7.5.5a: If the voting system provides access to incomplete election returns and interactive inquiries before the completion of the official count, the system shall:
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I	Proprietary Comn	nercia p	l Information – Contains trade secret information, including, but not limited to, drawings, processes, methods or rocedures developed by ES&S. Approved for internal and ES&S authorized VSTL use only.

Be designed to provide external access to incomplete election returns (for equipment that operates in a central counting environment), only if that access for these purposes is authorized by the statutes and regulations of the using agency. This requirement applies as well to polling place equipment that contains a removable memory module or that may be removed in its entirety to a central place for the consolidation of polling place returns.

24. **VVSG Vol 1, Sec. 5.4.3.d** - In process audit records document system operations during diagnostic routines and the casting and tallying of ballots. At minimum, the in-process audit records shall contain: a.iii. Machine generated error and exception messages to demonstrate successful recovery. Examples include but are not limited to: The identification code and number of occurrences for each hardware and software error or failure.

Functional Requirement	EMS	UVS	РВТ	BMD	СВТ	Results Reporting	Not Supported	May be bypassed or deactivated	Description
1.			•					Yes	PBT The ES&S DS200 has a solenoid mechanism for the use with a ballot stamp. This stamping mechanism is activated in this release.
2.		•		•				Νο	 UVS ExpressVote summarizes the voting session using the same language and interface options selected during voting. The summary allows the voter to verify the selections made before finalizing the voting card. ExpressVote can scan a printed card and display selections using an on-screen or audio summary. BMD The AutoMARK provides a ballot summary at the end of the voting session using the same language and interface options selected during voting to allow the voter to verify the selections made before the marks are printed on a paper ballot. Additionally, the AutoMARK has an optional post print verification that allows them to visually validate the data that is read of the marked ballot or card before it is cast.
3.		•		•				No	UVS, BMD From an equipment summary screen, a voter can return to any contest and change selections before finalizing a ballot. If an incorrect selection or error is discovered after the ballot is marked, poll workers initiate a spoiled ballot procedure and provide the voter a new ballot.
4.		•		•				No	UVS, BMD ExpressVote and AutoMARK provide instructions in the selected language in both text and audio formats while on the summary screen.
5.		•		•				No	UVS, BMD ExpressVote and AutoMARK generate all notifications and instructions using the language and interface selected by the voter to preserve the privacy and confidentiality of the voting card. If a spoiled voting card or ballot procedure must be followed to obtain a replacement voting card or ballot, the voting card or ballot can be transferred to the poll worker in a privacy sleeve to prevent any breach of privacy.

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Functional Requirement	EMS	UVS	РВТ	BMD	СВТ	Results Reporting	Not Supported	May be bypassed or deactivated	Description
6.		•		•				No	 UVS, BMD ExpressVote and AutoMARK provide presentation equivalence by: Font defaults can be set up for each ballot to ensure that each candidate in a contest is displayed using the same font, font size, and emphasis. Each candidate in a contest is allocated the exact same amount of screen space on the touch screen. The name of each candidate is read without added emphasis to any particular candidate. Tempo and volume options are universal and affect the audio presentation of each candidate name the same. Color coding shall not be used as the sole means of conveying information, indicating an action, prompting a response, or distinguishing a visual element. The system does not use color coding as the sole means of conveying information. All text intended for the voter should be presented in a sans serif font. The minimum figure-to-ground ambient contrast ratio for all text and informational graphics (including icons) intended for the voter shall be 3:1. The system meets the minimum required contrast ratio in all modes and provide a high contrast mode if maximum contrast is desired.
7.		•		•				No	UVS, BMD No voting equipment key or control has a repetitive effect as a result of being held in its active position The interactive touch screen areas on the ExpressVote and AutoMARK activate upon release of the touch screen area rather than the initial press in order to avoid accidental repetition. Keypad keys activate once upon being pressed and will not activate again until the key is released and re-pressed.
8.		•		•				No	UVS, BMD When configured with the privacy shield in place and the ballot inserted, all voting information and input controls are visible only to the voter during the voting session. If AutoCAST is not used to place the printed ballot in a secure compartment and if the voter requires assistance to transfer the completed ballot from the ExpressVote or AutoMARK to the tabulator, a privacy sleeve can be placed to contain the ejected voting card so voting secrecy is preserved.

ES&S Voting System 5.2.0.3 System Functionality Description

Functional Requirement	EMS	UVS	РВТ	BMD	СВТ	Results Reporting	Not Supported	May be bypassed or deactivated	Description
9.		•		•				No	UVS, BMD When configured with the privacy shield in place and a ballot inserted, all voting information and input controls are visible only to the voter. If AutoCAST is not used to place the printed ballot in a secure compartment and if the voter requires assistance to transfer a ballot to the tabulator, a privacy sleeve can be placed to contain the ejected ballot so voting secrecy is preserved.
10.		•		•				No	UVS, BMD The audio interface is accessible through headphones. Equipment headphones have low sound leakage to preserve privacy.
11.		•		•				No	UVS, BMD Overvote warnings are presented in the normal method with text presentation on the touch screen and audio over the headphones. With privacy shields in place and headphone use, the privacy of the voter is maintained.
12.		•		•				No	UVS, BMD ExpressVote and AutoMARK screen magnification meets the low and high text height standards.
13.		•		•				No	UVS, BMD The audio interface for supported equipment is accessible through headphones. Headphones have low sound leakage to preserve privacy.
14.		•		•				No	UVS, BMD Audio interfaces used by supported equipment provide the same voting capabilities for voters who are blind as those provided for voters who are sighted.
15.		•		•				No	UVS, BMD The ATIs used by the ExpressVote and AutoMARK provide the same capabilities to vote and cast a ballot as are provided by other voting machines.
16.		•		•				No	UVS, BMD Supported equipment can repeat any audio by pushing a dedicated Repeat key included on the tactile keypad.
17.		•		•				No	UVS, BMD Audio can be paused by pressing and holding the Repeat key for 2 seconds. Audio is resumed by pressing the Repeat key a second time.
18.		•		•				No	UVS, BMD Navigation controls can be used to skip a contest or return to a previous contests.
19.		•		•				No	UVS, BMD The ExpressVote and AutoMARK allow a voter to skip immediately to the candidates or choices before the reading of a contest or referendum is complete.

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Functional Requirement	EMS	UVS	РВТ	BMD	СВТ	Results Reporting	Not Supported	May be bypassed or deactivated	Description
20.		•		•				No	UVS, BMD Headphones and sound output for supported equipment meets VVSG audio presentation requirements. Headphones are intended to be used with disposable coverings that can be provided for any voter who requires them.
21.		•		•				No	UVS, BMD ExpressVote and AutoMARK keys and controls are operable with one hand and with direct forward- directional force. Required force is no greater than 5 lbs
22.		•		•				No	UVS, BMD ExpressVote and AutoMARK require pressure only to operate and do not require direct bodily contact of any part of the electrical circuit.
23.	•		•		•	•		Νο	 EMS ERM results are stored locally to a PC or secure shared storage and not susceptible to "external access." PBT The DS200 does not allow access to results before polls close and allows only the mandatory printing and optional transmission of the polling place results after polls close. CBT The DS850 does not allow external access. The machine is physically segregated from unauthorized users with no connection to a telecommunications network. DS850 units networked locally to a central reporting PC can only send results to that system and cannot be accessed from the reporting PC. In-progress reports are initiated and controlled by authorized election officials.
24.	•		•		•			No	 EMS ERM results are stored locally to a PC or secure shared storage and not susceptible to "external access." PBT The DS200 does not allow access to results before polls close and allows only the mandatory printing and optional transmission of the polling place results after polls close. CBT The DS850 does not allow external access. The machine is physically segregated from unauthorized users with no connection to a telecommunications network. DS850 units networked locally to a central reporting PC can only send results to that system and cannot be accessed from the reporting PC. In-progress reports are initiated and controlled by authorized election officials.

2.2 PRE-VOTING CAPABILITIES

CONTROLLING REQUIREMENT

V: 1, §2.2

2 This section of the ES&S Voting System Functionality Description defines the ES&S Voting System's capabilities for supporting the following:

- 1. Ballot Preparation
- 2. Election Programming
- 3. Ballot and Program Installation and Control
- 4. Readiness Testing
- 5. Verification at the Polling Place
- 6. Verification at the Central Counting Place
- 7. This section also addresses requirements to ensure compatible interfaces with the ballot definition process and the reporting of election results.

2.2.1 BALLOT PREPARATION

CONTROLLING REQUIREMENT

V: 1, §2.2.1

Ballot preparation is the process of using election databases to define the specific contests, questions, and related instructions to be contained in ballots and to produce all permissible ballot layouts. Ballot preparation requirements include:

- General capabilities
- Ballot formatting
- Ballot production

2.2.1.1 GENERAL CAPABILITIES

CONTROLLING REQUIREMENT

V: 1, §2.2.1.1

All systems shall provide the general capabilities for ballot preparation. All systems shall be capable of:

- a. Enabling the automatic formatting of ballots in accordance with the requirements for offices, candidates, and measures qualified to be placed on the ballot for each political subdivision and election district.
- b. Collecting and maintaining the following data
 - i. Offices and their associated labels and instructions.
 - ii. Candidate names and their associated labels.
 - iii. Issues or measures and their associated text.
- c. Supporting the maximum number of potentially active voting positions as indicated in the system documentation
- d. For a primary election, generating ballots that segregate the choices in partisan contests by party affiliation
- e. Generating ballots that contain identifying codes or marks uniquely associated with each format.
- f. Ensuring that vote response fields, selection buttons, or switches properly align with the specific candidate names and/or issues printed on the ballot display, ballot card or sheet, or separate ballot pages.

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Paper-based voting systems shall also meet the following requirements applicable to the technology used:

- g. Enable voters to make selections by making a mark in areas designated for this purpose upon each ballot sheet
- h. For marksense systems, ensure that the timing marks align properly with the vote response fields.

Functional Requirement	EMS	UVS	РВТ	BMD	СВТ	Not Supported	May be bypassed or deactivated	Description
V: 1, §2.2.1.1.a	•						No	EMS The Paper Ballot module of Electionware allows the user to define default ballot formatting using templates and style sheets that can be applied to the ballot styles. Formatting of multiple items across all ballots, based upon the same style (First name, Last Name, etc.), is possible as well as individual elements within a ballot cell without affecting others by creating a unique element style.
V: 1, §2.2.1.1.bi-iii	•						No	EMS Electionware captures all jurisdictional data and election-specific data such as offices, contests, candidates, languages, rotation, issues, retention and all other information necessary for creating ballot styles.
V: 1, §2.2.1.1.c	•		•		•		No	EMS The maximum number of voting positions is specified in Electionware-Capture on a per-contest basis. The Paper Ballot module allows the use of various ballot sizes, which control the maximum number of voting positions on the ballot. Both landscape and portrait ballot layouts are supported. Ballot sizes and voting position limitations appear in the Voting System Overview.
V: 1, §2.2.1.1.d	•		•		•		No	 EMS Electionware-Capture produces ballot styles specific to individual political parties for primary elections. Using Electionware - Paper Ballot, ballots can be formatted separately for each political party in a primary election. PBT CBT ES&S ballot scanners fully support tabulation of ballots containing contests segregated by party affiliation for primary elections. See the <i>Electionware User's Guides</i> for a complete discussion of ballot formatting capabilities.
V: 1, §2.2.1.1.e	•		•		•		No	EMS Each ballot style is assigned a unique ballot identification number. "Code Channels" along the edge of ballot (created by Electionware's Paper Ballot module) identify the ballot style.
V: 1, §2.2.1.1.f	•	•	•	•	•		No	EMS Electionware – Paper Ballot is used to position and configure ballot contents and targets. Ballots formatted with Electionware's Paper Ballot module can be generated in PDF format for comprehensive proofreading by election officials prior to printing the official ballot run. See the Electionware documentation for a discussion of ballot target alignment and

ES&S Voting System 5.2.0.3 System Functionality Description

Functional Requirement	EMS	UVS	РВТ	BMD	СВТ	Not Supported	May be bypassed or deactivated	Description
								formatting capabilities. Electionware – Paper Ballot accurately places each target on the ballot in positions readable by ES&S AutoMARK and DS200 and DS850 ballot tabulators. UVS For ExpressVote, ballot targets for the voter interface are formatted with Electionware. Target accuracy is tested by executing a test print from the test menu on a blank voting card of each style and/or logic and accuracy testing on the vote capture device and ballot scanning equipment. PBT, CBT ES&S ballot scanners include system tests to ensure that paper ballots formatted for the system meet all requirements for readability – including the alignment of ballot targets and thresholds for mark detection. BMD For AutoMARK, ballot targets for the voter interface are formatted with Electionware. Target accuracy is tested by executing a test print from the test menu on a blank ballot of each style and/or logic and accuracy testing on the Ballot Marking Device and ballot scanning equipment.
V: 1, §2.2.1.1.g	•	•	•	•	•		No	 EMS Target positions for every vote-able response area are defined in Electionware; these include candidate, write-in, issue response, and straight party choice. Target positions are stored in the Electionware database, which is used by the Electionware Framework to program ES&S ballot tabulators. UVS Voters select ballot options by touching the target associated with their selection on a visual interface, or selecting an option corresponding to an audio selection using ATI keys. All markings occur on the screen Via touch screen, navigation buttons, or sip-n-puff interfaces. The marked ballot contains readable text and matching bar codes. PBT, CBT ES&S ballots include clearly defined oval targets to illustrate where a voter should mark a ballot in order to designate the selection of a specific candidate or ballot option. BMD Voters select ballot options by touching the target associated with their selection on a visual interface, or selecting an option corresponding to an audio selection using ATI keys.
V: 1, §2.2.1.1.h	•		•	•	•		No	EMS ES&S ballots include a series of black rectangles printed around the perimeter of the page to designate acceptable rows where ballot targets may be placed. The black rectangles, called timing marks, are configured Electionware - Paper Ballot to facilitate accurate mark detection by the ES&S AutoMARK, DS200 and DS850 ballot tabulators.

Functional Requirement	EMS	UVS	РВТ	BMD	СВТ	Not Supported	May be bypassed or deactivated	Description
								PBT, CBT and BMD ES&S ballots include a series of black rectangles printed around the perimeter of the page to designate acceptable rows where ballot targets may be placed. Normal operating procedures for ES&S voting equipment include a series of readiness tests designed to identify any problems with ballot contents or printing.

2.2.1.2 BALLOT FORMATTING

CONTROLLING REQUIREMENT

V: 1, §2.2.1.2 Ballot formatting is the process by which election officials or their designees use election databases and voting system software to define the specific contests and related instructions contained on the ballot and present them in a layout permitted by state law. All voting systems shall provide a capability for:

- a. Creation of newly defined elections.
- b. Rapid and error-free definition of elections and their associated ballot layouts.
- c. Uniform allocation of space and fonts used for each office, candidate, and contest such that the voter perceives no active voting position to be preferred to any other.
- d. Simultaneous display of the maximum number of choices for a single contest as indicated by the vendor in the system documentation.
- e. Retention of previously defined formats for an election.
- f. Prevention of unauthorized modification of any ballot formats.
- g. Modification by authorized persons of a previously defined ballot format for use in a subsequent election.

Functional Requirement	EMS	UVS	РВТ	BMD	СВТ	Not Supported	May be bypassed or deactivated	Description
V: 1, §2.2.1.2.a	•						No	EMS The user must create a new election in Electionware. The number of elections is limited solely to the hard drive capacity. A new election must be created before prior to entering election- specific data. See Electionware user documentation for procedures.
V: 1, §2.2.1.2.b	•						No	EMS Election data is entered or imported using Electionware-Capture. Data is checked for errors as it is imported, entered and during ballot style generation. Users can use the many proofing reports or PDFs to check that the election data was entered properly. Electionware's Paper Ballot module provides election definition and ballot layout services to election officials.

ES&S Voting System 5.2.0.3 System Functionality Description

Functional Requirement	EMS	UVS	РВТ	BMD	СВТ	Not Supported	May be bypassed or deactivated	Description
V: 1, §2.2.1.2.c	•						No	EMS The Electionware Paper Ballot module provides ballot layout with uniform font and space allocation, unless and otherwise specified
								by the user.
V: 1, §2.2.1.2.d	•						No	EMS The Electionware Paper Ballot "ballot view" simultaneously displays all choices for a single contest.
V: 1, §2.2.1.2.e	•						No	EMS The Electionware database retains previous election data and ballot configuration for re-use in defining subsequent elections.
V: 1, §2.2.1.2.f	•						No	EMS Ballot formats can only be modified using Paper Ballot and only by users who are assigned the appropriate access levels by an election administrator.
V: 1, §2.2.1.2.g	•						No	EMS Previously defined ballot format and election data can be modified by authorized users for use in subsequent election by authorized persons.

2.2.1.3 BALLOT PRODUCTION

CONTROLLING REQUIREMENT

V: 1, §2.2.1.3

Ballot production is the process of converting ballot formats to a media ready for use in the physical ballot production or electronic presentation.

The voting system shall provide a means of printing or otherwise generating a ballot display that can be installed in all voting equipment for which it is intended. All voting systems shall provide the capabilities below

- a. The electronic display or printed document on which the user views the ballot is capable of rendering an image of the ballot in any of the languages required by The Voting Rights Act of 1965, as amended.
- b. The electronic display or printed document on which the user views the ballot does not show any advertising or commercial logos of any kind, whether public service, commercial, or political, unless specifically provided for in State law. Electronic displays shall not provide connection to such material through hyperlink.
- c. The ballot conforms to vendor specifications for type of paper stock, weight, size, shape, size and location of punch or mark field used to record votes, folding, bleed through, and ink for printing if paper ballot documents or paper displays are part of the system.

Vendor documentation for marksense systems shall include specifications for ballot materials to ensure that vote selections are read from only a single ballot at a time, without detection of marks from multiple ballots concurrently (e.g., reading of bleed-through from other ballots).

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Functional Requirement	EMS	SVU	РВТ	BMD	СВТ	Not Supported	May be bypassed or deactivated	Description
V: 1, §2.2.1.2.a	•	•	•	•	•		No	SystemSee the conformity statement submitted with ES&S' application for submission a list of languages supported by this voting system.NOTE: The languages to be certified in this release may represent a subset of languages ES&S products are capable of supporting. The product's Software Design and Specification document may contain additional references to an expanded list of languages only supported by that component.
V: 1, §2.2.1.2.b	•	•	•	•	•		No	System ES&S ballot layout software does not restrict election officials from placing logos or other advertisements on ballot faces should an election official choose to do so. The system relies on sound practices by election officials to prevent placement of restricted materials.
V: 1, §2.2.1.2.c	•	•	•	•	•		No	System See the ES&S Ballot Production Handbook for printing ES&S paper ballots. Partner printers and election officials must adhere to ES&S' provided standards to ensure ballot readability. Ballot layout positioning of the mark fields is executed in Electionware-Paper Ballot
V: 1, §2.2.1.2, vendor doc								System See the ES&S Ballot Production Handbook.

2.2.2 ELECTION PROGRAMMING

CONTROLLING REQUIREMENT

V: 1, §2.2.2 Election programming is a process handles in upstream applications in the Unity Software applications. Election Programming is the process by which election officials or their designees use election databases and vendor system software to logically define the voter choices associated with the contents of the ballots. All systems shall provide:

- a. Logical definition of the ballot, including the definition of the number of allowable choices for each office and contest
- b. Logical definition of political and administrative subdivisions, where the list of candidates or contests varies between polling places.
- c. Exclusion of any contest on the ballot in which the voter is prohibited from casting a ballot because of place of residence, or other such administrative or geographical criteria
- d. Ability to select from a range of voting options to conform to the laws of the jurisdiction in which the system will be used.
- e. Generation of all required master and distributed copies of the voting program, in conformance with the definition of the ballots for each voting device and polling place, and for each tabulating device.



ES&S Voting System 5.2.0.3 System Functionality Description

Functional Requirement	EMS	NVS	РВТ	BMD	СВТ	Not Supported	May be bypassed or deactivated	Description
V: 1, §2.2.2.a	•						No	EMS Electionware-Capture builds the election data that defines the contents of all ballots in the election. Configurable data includes the number of allowable choices for each contest, including write-in candidates.
V: 1, §2.2.2.b	•						No	EMS Electionware-Capture defines the political parties, precincts, precinct splits, and districts, which determine the contests and candidates that appear on each ballot style.
V: 1, §2.2.2.c	•						No	EMS Ballots are organized by ballot styles. Ballot styles formatted for a jurisdiction or political or geographic subdivisions include only the contests and ballot choices valid for that subdivision. Through ballot style definition, Electionware prevents the inclusion of any contest that a voter is not permitted to vote.
V: 1, §2.2.2.d	•						No	 EMS Electionware-Capture controls the options which define all aspects of the election including but not limited to: Election type Contests on ballot Vote for n of m how contests may be voted (ex. vote for one, vote for more than one, straight party, etc.) candidate order/rotation candidate group rotation write-in control instructions and other which data items that appear the ballot contest order how ballot styles are determined ability to combine equivalent ballot styles to reduce printing costs passwords for administrative functions assignment of ballot identification numbers enabling and location of stubs tabulation statistics
V: 1, §2.2.2.e	•						No	EMS Electionware defines and generates ballot styles and vote-able positions which are stored in the Electionware database and used to configure the various voting devices supported by ES&S. Following ballot layout and formatting, Paper Ballot saves all vote- able positions in the Electionware database. This data is used by Electionware to create the DS200 and DS850 Election Media for the target voting equipment and tabulators.

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2.2.3 BALLOT PROGRAM INSTALLATION AND CONTROL

CONTROLLING REQUIREMENT

V: 1, §2.2.3

All systems shall provide a means of installing ballots and programs on each piece of polling place or central count equipment in accordance with the ballot requirements of the election and the requirements of the jurisdiction in which the equipment will be used. All systems shall include the following at the time of ballot and program installation:

- a. A detailed work plan or other documentation providing a schedule and steps for the software and ballot installation, which includes a table outlining the key dates, events and deliverables.
- b. A capability for automatically verifying that the software has been properly selected and installed in the equipment or in programmable memory devices, and for indicating errors.
- c. A capability for automatically validating that software correctly matches the ballot formats that it is intended to process, for detecting errors, and for immediately notifying an election official of detected errors.

Functional Requirement	EMS	UVS	РВТ	BMD	СВТ	Not Supported	May be bypassed or deactivated	Description
V: 1, §2.2.3.a	•	•	•	•	•		No	EMS The Electionware Administrator's Guide includes a sample work plan that outlines phases of election preparation with key dates and deliverables; including software and ballot installation. Electionware user manuals detail the steps necessary to create ballot styles for use on the various tabulators and include descriptions of the steps necessary to import, modify election data, and create tabulator and accessible ballot marking device media, and configuration files for Election Reporting Manager. UVS, PBT, CBT and BMD Sample work plans are included in ES&S Operators Guides for the universal voting system, tabulators and the BMD and ES&S User's Guides for voting system software.
V: 1, §2.2.3.b	•	•	•	•	•		No	EMS The Electionware installer verifies file contents prior to executing installation. Electionware also verifies that a proper Module start has occurred and continually updates the Electionware Audit Log with any errors. The software loaded on to tabulator or ballot marking device media is verified by using hashing algorithms. Paper Ballot is installed by the Electionware installer The installer verifies the file contents prior to installation. Paper Ballot also validates its operation by updating the Audit Log with any errors. UVS, PBT, CBT and BMD Self-diagnostic tests verify that firmware is properly installed upon system startup. Initial state reports identify the installed election program and firmware versions. Any errors loading system firmware or election programming result equipment shutdown with a clear error message. See ES&S <i>Operator's Guides</i> for a description of equipment startup procedures and instructions for printing and reading equipment initial state reports.

ES&S Voting System 5.2.0.3 System Functionality Description

Functional Requirement	EMS	UVS	РВТ	BMD	СВТ	Not Supported	May be bypassed or deactivated	Description
V: 1, §2.2.3.c	•	•	•	•	•		No	EMS Logic and Accuracy test procedures for ES&S tabulators verify that system election programming correctly selects the proper ballot formats when creating the election media. See ES&S <i>Operator's Guides</i> for ballot scanners and ballot marking devices for Logic and Accuracy test procedures. UVS, PBT, CBT and BMD
								The Test Print capability on the ExpressVote and AutoMARK in conjunction with system Logic and Accuracy test procedures verify that system election programming correctly matches defined ballot formats. Universal Voting Systems, Ballot Tabulators and Ballot Marking Devices automatically notify election officials when scanned test ballots do not match installed ballot programming. See ES&S voting equipment <i>Operator's Guides</i> for test procedures.

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2.2.4 READINESS TESTING

CONTROLLING REQUIREMENT

V: 1, §2.1.2 Election personnel conduct voting equipment and voting system readiness tests prior to the start of an election to ensure that the voting system functions properly, to confirm that voting equipment has been properly integrated and to obtain equipment status reports. All voting systems shall provide the capabilities to:

- a. Verify that voting equipment and precinct count equipment is properly prepared for an election, and collects data that verifies equipment readiness.
- b. Obtain status and data reports from each set of equipment.
- c. Verify the correct installation and interface of all voting equipment.
- d. Verify that hardware and software function correctly.
- e. Generate consolidated data reports at the polling place and higher jurisdictional levels.
- f. Segregate test data from actual voting data, either procedurally or by hardware/software features.

Resident test software, external devices and special purpose test software connected to or installed in voting equipment to simulate operator and voter functions may be used for those test provided that the following standards are met:

- g. These elements shall be capable of being tested separately, and shall be proven to be reliable verification tools prior to their use
- h. These elements shall be incapable of altering or introducing any residual effect on the intended operation of the voting device during any succeeding test and operational phase

Paper-based systems shall:

- i. Support conversion testing that uses all potential ballot positions as active positions.
- j. Support conversion testing of ballots with active position density for systems without pre-designated ballot positions.

Functional Requirement	EMS	UVS	РВТ	BMD	СВТ	Results Reporting	Not Supported	May be bypassed or deactivated	Description
V: 1, §2,2,4,a		•	•	•	•			No	UVS
									The ExpressVote is verified prior to election by executing the test print function on a blank voting card of each style. Each style tested is logged.
									РВТ, СВТ
									Operating procedures for ES&S ballot scanning equipment include provisions for system logic and accuracy testing. Please see ES&S <i>Operators Manuals</i> for instructions for preparing and testing equipment.
									BMD
									The AutoMARK is verified prior to election by executing the test print function on a blank ballot of each style. Each style tested is logged. AutoMARK marked ballots may also be used to run logic and accuracy tests on ES&S tabulators.

ES&S Voting System 5.2.0.3 System Functionality Description

Functional Requirement	EMS	UVS	РВТ	BMD	СВТ	Results Reporting	Not Supported	May be bypassed or deactivated	Description
V: 1, §2.2.4.b	•	•	•	•	•			No	 EMS Users can view machine log files for ES&S ballot scanners from in the Electionware-Acquire module. UVS ExpressVote executes automated diagnostics during system startup and displays system status information for the election worker. The operation log, scan log and service log can be printed from the system's administrative menu. PBT The ES&S DS200 automatically prints an Initial State Report each time a user turns on the terminal, or installs a valid election definition. This report includes identification of the system firmware, the installed election definition and details the machine's operating status and options selected in the scanner's election program. BMD The AutoMARK executes automated diagnostics on system startup and display system status information for the election worker. The system's operation log, scan log and service log can be printed from the system's administrative menu. CBT The DS850 automatically prints a System Readiness Report each time a user activates the unit. This report identifies system firmware and the installed election definition, details the machine's operating status and lists the options
V: 1, §2.2.4.c V: 1, §2.2.4.d	•	•	•	•	•			No	EMS Election Reporting Manager software is used to verified interfaces between equipment prior to an election by generated consolidated results reports from Logic and Accuracy test data generated from ES&S ballot scanners. These results ensure that the proper election program is installed on both the tabulators and reporting software and that the election programming for both is in synch. UVS, PBT, CBT and BMD The universal voting system and ballot marking device are verified prior to election by running the system logic and accuracy test for the marking device and using those marked ballots to run logic and accuracy tests on ES&S tabulators. This test ensures that the proper election program is installed on both the BMD and tabulator and the election programming for both is in synch. EMS Pre-election L&A testing should include the processing of tabulated test results with ERM and the audit of these results against reports generated by ballot scanning equipment.

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Functional Requirement	EMS	UVS	РВТ	BMD	CBT	Results Reporting	Not Supported	May be bypassed or deactivated	Description
									UVS, PBT, CBT and BMD
									Readiness and logic and accuracy tests verify the functionality and operating status of system hardware and software. ES&S recommended test procedures are included in voting equipment <i>Operator's Guides</i> .
V: 1, §2.2.4.e	•		•		•	•		No	 EMS ES&S ballot scanning equipment provides machine level results reports. All other levels of jurisdiction reporting (ex. Polling place, precinct and jurisdiction/county totals) are provided by consolidated results reports generated using ERM. PBT The ES&S DS200 generates terminal level results reports from the unit's integrated thermal printer. Consolidated reports may be printed at election headquarters using Election Reporting Manager Software. CBT The DS850 generates precinct and election level results reports from the laser printer attached to the tabulator. Consolidated reports may be printed at election headquarters using the DS850 generates precinct and election level results reports from the laser printer attached to the tabulator.
	•		•		•			No	FMS
V. 1, 92.2.4.1									By procedure, all pre-election L&A test data must be cleared from all voting devices and from ERM. Evidence of this removal is provided by generating "zero reports" on all voting devices and in ERM. Procedures for clearing test data are included in ES&S <i>Operator's Guides</i> and ES&S software <i>User's Guides</i> . PBT When testing a scanner in Election Test Mode, counts are stored on the DS200 Election Media. When the operator exits the Election Test, the DS200 forces the counts to be cleared before the operator can proceed. If Election Media is removed from the device before exiting Election Test Mode (an unlikely event), the totals will remain. But if the operator attempts to open polls with the Election Media, the system will warn that counts exist on the drive, and will force the user to decide whether text results are kept or cleared before polls can be opened. CBT The election official must create and employ procedures that guarantee the segregation of test data from actual voting data. Procedures for clearing vote totals from the DS850 are included the system's <i>Operator's Guide</i> .
V: 1, §2.2.4.g							•	N/A	N/A
V: 1, §2.2.4.h							•	N/A	N/A

ES&S Voting System 5.2.0.3 System Functionality Description

Functional Requirement	EMS	UVS	РВТ	BMD	СВТ	Results Reporting	Not Supported	May be bypassed or deactivated	Description
V: 1, §2.2.4.i		•	•	•	•			No	UVS, PBT, CBT and BMD Conversion testing with all ballot targets marked is accomplished by testing "all fill" ballots during logic and accuracy testing. Conversion testing on the ExpressVote and AutoMARK is accomplished by activating the test print function on a blank voting card or ballot of each style. See ES&S tabulator and BMD <i>Operator's Guides</i> for Logic and Accuracy test procedures.
V: 1, §2.2.4.j							•	N/A	N/A

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2.2.5 VERIFICATION AT THE POLLING PLACE

CONTROLLING REQUIREMENT

V: 1, §2.2.5 Election officials perform verification at the polling place to ensure that all voting systems and voting equipment function properly before and during an election. All voting systems shall provide a formal record of the following, in any media, upon verification of the authenticity of the command source:

- a. The election's identification data
- b. The identification of all equipment unit
- c. The identification of the polling place.
- d. The identification of all ballot formats.
- e. The contents of each active candidate register by office and of each active measure register at all storage locations (showing that they contain only zeros).
- f. A list of all ballot fields that can be used to invoke special voting options.
- g. Other information needed to confirm the readiness of the equipment, and to accommodate administrative reporting requirements.

To prepare voting devices to accept voted ballots, all voting systems shall provide the capability to test each device prior to opening to verify that each is operating correctly. At a minimum, the tests shall include:

- h. Confirmation that there are no hardware or software failures.
- i. Confirmation that the device is ready to be activated for accepting votes.

If a precinct count system includes equipment for the consolidation of polling place data at one or more central counting locations, it shall have means to verify the correct extraction of voting data from transportable memory devices, or to verify the transmission of secure data over secure communication links

Functional Requirement	EMS	SVU	РВТ	BMD	СВТ	Not Supported	May be bypassed or deactivated	Description
V: 1, §2.2.5.a		•	•	•			No	 UVS Initial system diagnostics for the ExpressVote display the identification code for the installed election. PBT A DS200 Initial State Report automatically generates when a user activates the system and includes identification of the system's installed election definition. BMD Initial system diagnostics for the AutoMARK display the identification code for the installed election.
V: 1, §2.2.5.b		•	•	•			No	 UVS An equipment serial number is displayed on startup and included in the operation log printed from the test mode. PBT The DS200 Initial State Report identifies the system firmware version. BMD An equipment serial number is displayed on startup and included in the operation log printed from the test mode.

ES&S Voting System 5.2.0.3 System Functionality Description

Functional Requirement	EMS	UVS	РВТ	BMD	СВТ	Not Supported	May be bypassed or deactivated	Description
V: 1, §2.2.5.d		•	•	•			No	 UVS Election programming accommodates ballot variations and formats for all polling places. Any device program may be used at any polling place if the definition includes all possible ballot formats. The log identifies the polling place as named in the election definition stored on a device's removable memory. PBT The DS200 Initial State Report identifies the Poll place by print name and number. BMD A BMD election program for the AutoMARK accommodates ballot variations and formats for all polling places. Any ballot marking device program may be used at any polling place if set up this way. The log identifies the polling place as named in the election definition stored on a device's removable memory.
V: 1, §2.2.5.d		•	•	•			No	 UVS The election program for the ExpressVote can accommodate voting card variations and formats for all polling places. PBT The DS200 Initial State Report identifies the supported ballot size and number of sides for the installed election definition. BMD The election program for the AutoMARK can accommodate ballot variations and formats for all polling places.
V: 1, §2.2.5.e			•				No	PBT The ES&S DS200 automatically generates a zero report during the poll opening process to verify counts begin at zero.
V: 1, §2.2.5.f			•				No	PBT Ballot fields that may be used to invoke special voting options – such as a single target used to cast a straight party ballot – are clearly identified on the paper ballot.
V: 1, §2.2.5.g		•	•	•			No	 UVS Display of the system ready screen confirms that the unit passed all internal diagnostics and is prepared for voting. PBT In addition to the DS200 zero report; a configurable certification report can be generated for poll worker signatures. Once the system executes all required self-test and initialization actions, the display screen automatically enters the Vote mode, which includes voter instructions indicating that the system is ready for use. BMD The appearance of the AutoMARK system ready screen confirms that the unit passed all internal diagnostics and is prepared for voting.

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Functional Requirement	EMS	NVS	РВТ	BMD	СВТ	Not Supported	May be bypassed or deactivated	Description
V: 1, §2.2.5.h		•	•	•			No	UVS, PBT, BMD If hardware or firmware failures are encountered during initial testing ES&S polling place equipment terminates operation, displays an error message and logs the event. See ES&S <i>Operator's Guides</i> for pre-election Logic and Accuracy test procedures and a list of error messages with troubleshooting instructions.
V: 1, §2.2.5.i		•	•	•			No	UVS, PBT, BMD Successful completion of pre-election logic and accuracy testing confirms that ES&S devices are ready for accepting ballots. See ES&S <i>Operator's Guides</i> for pre-election Logic and Accuracy test procedures. After successful initialization, each item of ES&S polling place equipment displays a system ready screen with a voter-facing message that indicates that the system is ready for use.
V: 1, §2.2.5, results consolidation	•		•				No	EMS and PBT System audit logs for both the ES&S DS200 terminal and <i>Election</i> <i>Reporting Manager (ERM)</i> software verify the correct extraction of voting data from the Election Media depending on the consolidation method used by the jurisdiction. See ES&S <i>Operator's Guides</i> for precinct count equipment and the <i>User's</i> <i>Guide</i> for ES&S reporting software for procedures for consolidating vote data and generating audit reports.

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2.2.6 VERIFICATION AT THE CENTRAL COUNT LOCATION

CONTROLLING REQUIREMENT

V: 1, §2.2.6

Election officials perform verification at the central location to ensure that vote counting and vote consolidation equipment and software function properly before and after an election. Upon verification of the authenticity of the command source, any system used in a central count environment shall provide a printed record of the following:

- a. The election's identification data
- b. The contents of each active candidate register by office and of each active measure register at all storage locations (showing that they contain all zeros).
- c. Other information needed to ensure the readiness of the equipment and to accommodate administrative reporting requirements.

Functional Requirement	EMS	UVS	РВТ	BMD	СВТ	Not Supported	May be bypassed or deactivated	Description
V: 1, §2.2.6a	•				•		No	EMS To verify election data, the current election information is displayed in the ERM screen title bar and included on all ERM displayed and printed reports. CBT To verify system election data, the DS850 generates a system readiness report each time the scanner is initialized. This report includes an election identification block that is unique for each and every election. In addition, the election is identified on the system display.
V: 1, §2.2.6b	•				•		No	EMS To verify that initial counts are set to zero, each time a user starts ERM, the first user screen after the copyright display lists the current election name, and total ballots totaled at the time ERM is started. After pre-election L&A testing, all results must be cleared and the appropriate "zero report" generated to validate that all candidate counters are set to zero prior to live counting. CBT To verify initial scanner totals are set to zero, prior to official ballot tabulation, the DS850 memory can be cleared. The election official can then produce a standard set of reports that verify that system counters are set to zero.
V: 1, §2.2.6c	•				•		No	 EMS ERM readiness tests include all information required to verify the operational status of system reporting software. See the <i>ERM User's Guide</i> for descriptions of system readiness tests procedures. CBT Each time the system is started, the DS850 generates a system readiness report that verifies equipment readiness. Should the readiness test fail, the DS850 provides a visual warning; generates a hard copy report of the issue encountered; and then enters a non-tabulating standby mode.

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2.2.7 ADDITIONAL PRE-VOTING CAPABILITIES OR REQUIREMENTS

CONTROLLING REQUIREMENT

Functional 1. DS200 Status Barcode Display Requirements

Functional Requirement	EMS	UVS	РВТ	BMD	СВТ	Not Supported	May be bypassed or deactivated	Description
1.			•				Yes	PBT (Optional) This setting allows the DS200 to display system health status in a QR 2D barcode that can be scanned to pass the data back to a central administration site in preparation for opening the polls. A poll worker can take a picture of the code with their smartphone and use the smartphone-based scanning application to pass the data to a central administration site.

ES&S Voting System 5.2.0.3 System Functionality Description

2.3 VOTING CAPABILITIES

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V: 1, §2.3 All voting systems shall support:
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- Opening the polls
- Casting a ballot

Additionally, all DRE systems shall support:

- Activating the ballot
- Augmenting the election counter
- Augmenting the life-cycle counter

2.3.1 **OPENING THE POLLS**

CONTROLLING REQUIREMENT

V: 1, §2.3.1

The capabilities required for opening the polls are specific to individual voting system technologies. At a minimum, the systems shall provide the functional capabilities indicated below.

2.3.1.1 PRECINCT COUNT SYSTEM

CONTROLLING REQUIREMENT

V: 1, §2.3.1.1

To allow voting devices to be activated for voting, all precinct count systems shall provide:

- a. An internal test or diagnostic capability to verify that all of the polling place tests specified in Subsection 2.2.5 has been successfully completed.
- b. Automatic disabling of any device that has not been tested until it has been tested.

Functional Requirement	EMS	UVS	РВТ	BMD	СВТ	Not Supported	May be bypassed or deactivated	Description
V: 1, §2.3.1.1.a		•	•	•			No	 UVS Display of the system ready screen confirms completion of self diagnostics. The ExpressVote does not accept, tabulate or store votes. The system converts vote selections into printed marks on a paper voting card. PBT During system initialization and poll opening, a series of internal system checks execute. These checks include the automatic printing of the initial state report, and zero report, which provide all information required by the VVSG to verify equipment readiness. See the <i>DS200 Operator's Guide</i> for sample system readiness reports. BMD Display of the system ready screen confirms completion of self diagnostics. The AutoMARK does not accept, tabulate or store votes. The system converts vote selections into printed marks on a paper ballot.

Functional Requirement	EMS	NUS	РВТ	BMD	СВТ	Not Supported	May be bypassed or deactivated	Description
V: 1, §2.3.1.1.b		•	•	•			No	UVS Failure of any startup diagnostics for the ExpressVote will halt the boot process and display an error message. PBT If any system test fails, or a DS200 fails to print the necessary reports, the unit will not allow voting until the issue is resolved and internal tests successfully complete. BMD Failure of any startup diagnostics for the AutoMARK will halt the boot process and display an error message.

2.3.1.2 PAPER-BASED SYSTEM REQUIREMENTS

CONTROLLING REQUIREMENT

V: 1, §2.3.1.2

To facilitate opening the polls, all paper-based systems shall include:

- a. A means of verifying that ballot marking devices are properly prepared and ready to use.
- b. A voting booth or similar facility, in which the voter may mark the ballot in privacy
- c. Secure receptacles for holding voted ballots.

In addition to the above requirements, all paper-based precinct count equipment shall include a means of:

- d. Activating the ballot counting device.
- e. Verifying that the device has been correctly activated and is functioning properly.
- f. Identifying device failure and corrective action needed.

Functional Requirement	EMS	UVS	РВТ	BMD	СВТ	Not Supported	May be bypassed or deactivated	Description
V: 1, §2.3.1.2.a		•	•	•	•		NO	The ExpressVote and AutoMARK have a test print function that prints the expected target selections and candidate names on the ballot for each candidate in each contest to ensure the paper ballot matches the AutoMARK election programming. By executing this test for a blank ballot of each style it confirms the full election setup. PBT, CBT and BMD The AutoMARK provides ballot marking support for voters with disabilities. Logic and accuracy testing ES&S ballot marking devices and precinct ballot scanners verify that each ballot marking device is properly prepared and ready for use. Logic and accuracy testing verifies that black levels of AutoMARK marked
								scanner's sensors.

ES&S Voting System 5.2.0.3 System Functionality Description

Functional Requirement	EMS	UVS	РВТ	BMD	СВТ	Not Supported	May be bypassed or deactivated	Description
								Logic and accuracy testing ES&S DS200 and DS850 ballot scanners verifies that black levels of hand marked ballot targets fall within the read tolerance range of the scanner's sensors.
V: 1, §2.3.1.2.b		•	•	•	•		No	UVS, PBT, CBT and BMD The ES&S voting system does not specify a voting booth. Several types of voting booths are available for purchase through the ES&S supply store. Each booth provides a private and secure environment for voters to mark a paper ballot. It is the responsibility of the jurisdiction to procure voting booths that meet the privacy and security requirements for their jurisdiction.
V: 1, §2.3.1.2.c		•	•	•	•		No	UVS, PBT, BMD ES&S offers two ballot boxes for use with polling place ballot scanners, a steel model, and a plastic mode. Each box integrates with the DS200. Each box includes lockable ballot compartments for storing counted ballots; and an auxiliary compartment for storing marked ballots in the event of system failure. If the AutoCAST feature is being used with the AutoMARK, a secure ballot receptacle is attached to the unit.
V: 1, §2.3.1.2.d			•				No	PBT The DS200 is poll worker activated. When unlocking and raising the DS200 display, the system initializes and then displays the Poll Open screen. The poll worker presses the Open Polls button, and after the unit prints the zero and certification reports, the system is prepared for ballot tabulation.
V: 1, §2.3.1.2.e		•	•	•			No	UVS, PBT, BMD For ES&S precinct voting equipment (ExpressVote, DS200, AutoMARK), poll workers verify that systems are correctly activated and functioning by confirming that system ready screens appear after self-diagnostics complete.
V: 1, §2.3.1.2.f		•	•	•			No	 UVS Device failures are identified by the display of error messages. See the ExpressVote Operator's Guides for a detailed list of error messages and recommended corrective actions. PBT Device failures are identified by the display of error messages. Recommended corrective action for messages appears in the ES&S DS200 Operator's Guide. The display screen is also used extensively to identify failures and offer corrective actions. BMD Device failures are identified by the display of error messages. See the AutoMARK Operator's Guides for a detailed list of error messages and recommended corrective actions.



2.3.1.3 DRE SYSTEM REQUIREMENTS

CONTROLLING REQUIREMENT

V: 1, §2.3.1.3 To facilitate opening the polls, all DDRE systems shall include:

- a. A security seal, a password, or a data code recognition capability to prevent the inadvertent or unauthorized actuation of the poll-opening function.
- b. A means of enforcing the execution of steps in the proper sequence if more than one step is required.
- c. A means of verifying the system has been activated correctly.
- d. A means of identifying system failure and any corrective action needed.

Functional Requirement	EMS	UVS	РВТ	BMD	СВТ	Not Supported	May be bypassed or deactivated	Description
V: 1, §2.3.1.3.a						•	N/A	N/A
V: 1, §2.3.1.3.b						•	N/A	N/A
V: 1, §2.3.1.3.c						•	N/A	N/A
V: 1, §2.3.1.3.d						•	N/A	N/A

2.3.2 ACTIVATING THE BALLOT (DRE SYSTEMS)

CONTROLLING REQUIREMENT

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V: 1, §2.3.2 To activate the ballot, all DRE systems shall:

- Enable election officials to control the content of the ballot presented to the voter, whether presented in printed form or electronic display, such that each voter is permitted to record votes only in contests in which that voter is authorized to vote.
- b. Allow each eligible voter to cast a ballot.
- c. Prevent a voter from voting on a ballot to which he or she is not entitled.
- d. Prevent a voter from casting more than one ballot in the same election.
- e. Activate the casting of a ballot in a general election.
- f. Enable the selection of the ballot that is appropriate to the party affiliation declared by the voter in a primary election.
- g. Activate all portions of the ballot upon which the voter is entitled to vote.
- h. Disable all portions of the ballot upon which the voter is not entitled to vote.

Functional Requirement	EMS	UVS	РВТ	BMD	СВТ	Not Supported	May be bypassed or deactivated	Description
V: 1, §2.3.2.a						•	N/A	N/A
V: 1, §2.3.2.b						•	N/A	N/A
V: 1, §2.3.2.c						•	N/A	N/A
V: 1, §2.3.2.d						•	N/A	N/A
V: 1, §2.3.2.e						•	N/A	N/A
V: 1, §2.3.2.f						•	N/A	N/A
V: 1, §2.3.2.g						•	N/A	N/A
V: 1, §2.3.2.h						•	N/A	N/A

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2.3.3 CASTING A BALLOT

CONTROLLING REQUIREMENT

V: 1, §2.3.3 Some required capabilities for casting a ballot are common to all systems. Others are specific to individual voting technologies or intended use. Systems must provide additional functional capabilities that enable accessibility to disabled voters as defined in VVSG Subsection 3.2.

2.3.3.1 COMMON REQUIREMENTS

CONTROLLING REQUIREMENT

V: 1, §2.3.3.1

To facilitate casting a ballot, all systems shall:

- a. Provide text that is at least 3 millimeters high and provide the capability to adjust or magnify the text to an apparent size of 6.3 millimeters.
- b. Protect the secrecy of the vote such that the system cannot reveal any information about how a particular voter voted, except as otherwise required by individual state law.
- c. Record the selection and non-selection of individual vote choices for each contest and ballot measure.
- d. Record the voter's selection of candidates whose names do not appear on the ballot, if permitted under state law, and record as many write-in votes as the number of candidates the voter is allowed to select.
- e. In the event of a failure of the main power supply external to the voting system, provide the capability for any voter who is voting at the time to complete casting a ballot, allow for the successful shutdown of the voting system without loss or degradation of the voting and audit data, and allow voters to resume voting once the voting system has reverted to back-up power.
- f. Provide the capability for voters to continue casting ballots in the event of a failure of a telecommunications connection within the polling place or between the polling place and any other location.

Functional Requirement	EMS	NVS	РВТ	BMD	СВТ	Not Supported	May be bypassed or deactivated	Description
V: 1, §2.3.3.1.a		•	•	•	•		No	 UVS ExpressVote ballot magnification meets VVSG text size requirements. Font size and zoom percentage are adjustable when creating the election in Electionware. PBT and CBT Voters marking paper ballots have the option to use a magnifying glass or ES&S ballot marking device. BMD The AutoMARK provides a ballot zoom option that meets VVSG text size requirements. Font size and zoom percentage are adjustable when creating the election in Electionware, but a hard limit is applied to ballot text sizes in order to prevent the settings from exceeding the boundaries of the required text sizes.
V: 1, §2.3.3.1.b		•	•	•	•		No	UVS ExpressVote does not permanently store information reflecting a particular voter's ballot selections. Voting selections temporarily record to volatile memory during a voting session until they are printed on the physical paper ballot or summary card. Votes are recorded using a ballot tabulator.

ES&S Voting System 5.2.0.3 System Functionality Description

Functional Requirement	EMS	UVS	РВТ	BMD	СВТ	Not Supported	May be bypassed or deactivated	Description
								 PBT and CBT All ES&S vote counting equipment (DS200 and DS850) protects voter privacy through a combination of physical and procedural measures at the polling place as well as safeguards built in to the each ballot scanner's operating firmware. At the polling place, the ES&S DS200 ballot box and voting booths can be arranged to maintain ballot secrecy. The DS200 display does not indicate how a voter marked a ballot when the ballot is cast. The only visible change in system status after a voter casts a ballot is the visible addition to the public count, which is a running numeric total of ballots cast on the terminal. BMD The AutoMARK does not permanently store information reflecting a particular voter's ballot selections. Voting selections are only temporarily recorded in volatile memory during a voting session until they are printed on the physical paper ballot or summary card. Votes are recorded on a polling place ballot
V: 1, §2.3.3.1.c		•	•	•	•		No	 UVS ExpressVote does not electronically record vote selections. Vote selections only reside in memory during the voting session. Once all vote selections are made, the completed ballot is reviewed by the voter and individual vote choices are then accurately marked on the paper ballot. When the voting session ends, the ExpressVote clears ballot selections from system memory. PBT and CBT The ES&S DS200 and DS850 accurately record all ballot selections as ballots pass through each scanner's read paths. If a scanner detects a contest that does not include a valid selection, such as a blank vote, the DS200 may be programmed to automatically return the ballot to the voter for revision, or, in the case of the DS850, out-stack the ballot for assessment. Both the DS200 and DS850 may also be programmed to accept the ballot as cast. BMD The AutoMARK does not electronically record vote selections. Vote selections are made, the completed ballot is reviewed by the voter and individual vote choices are then accurately marked on the paper ballot. When the voting session ends, the AutoMARK clears ballot selections from system memory.
V: 1, §2.3.3.1.d		•	•	•	•		No	 UVS ExpressVote supports the appropriate number of write-in votes for each contest with the write-in name input using the onscreen keyboard or accessible device. The write-in name is printed on the paper ballot when the ballot is marked. PBT, CBT All ES&S ballot scanning equipment include provisions for handling write-in selections. Ballot tabulators recognize that a write-in oval has been filled, and record the total number of write-in votes. Individual unidentifiable ballot images are stored

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Functional Requirement	EMS	UVS	РВТ	BMD	СВТ	Not Supported	May be bypassed or deactivated	Description
								for each ballot, which allows for the easy retrieval and recording of write-ins. These physical write-in ballots can also be identified by the ballot stamping feature installed on the ES&S DS200. If a steel ballot box is used, the write-ins can be segregated into a separate write-in ballot bin by a diverter (this option is enabled through Electionware). Write in ballots tabulated on the DS850 can be out stacked during counting for assessment by the jurisdiction's adjudication board. BMD The AutoMARK supports the appropriate number of write-in votes for each contest with the write-in name input using the on- screen keyboard or accessible device. The write-in name is printed on the paper ballot when the ballot is marked.
V: 1, §2.3.3.1.e		•	•	•	•		No	 UVS ExpressVote seamlessly reverts to the backup battery if power is lost. Voting can continue on battery power for at least two hours before power must be restored. PBT ES&S DS200 backup systems include a backup battery capable of maintaining operation for at least two hours. The battery "floats" on the system, meaning that the battery kicks in immediately when main power is lost without impacting the system. Immediately before the battery is depleted, the system executes a controlled shutdown to ensure that no ballots are being scanned or data is being written to the DS200 Election Media during shut off. When power returns, a recovery procedure allows voting to continue where it left off and the battery will resume charging. The ES&S ballot box has an auxiliary ballot bin for temporary storage of voted ballots so that voting can continue until power is restored. CBT Although the Central Ballot Tabulator is not voter-facing, the system may be instrumental in post-counting of voters preferences and provides reliability in the counting process. In the event that facilities power is lost, an Uninterruptible Power Supply (UPS) will repeat a series of 4 beeps to indicate initialization and provides battery power long enough to complete a batch that is scanning, save or delete the batch, and then perform a controlled, graceful shutdown. BMD The AutoMARK reverts to the backup battery if external power is lost. Ballot marking can continue on battery power for at least
V: 1, §2.3.3.1.f						•	No	two nours for each system before power must be restored.

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2.3.3.2 PAPER-BASED SYSTEM REQUIREMENTS

CONTROLLING REQUIREMENT

- V: 1, §2.3.3.2 All paper-based systems shall:
 - a. Allow the voter to easily identify the voting field that is associated with each candidate or ballot measure response.
 - b. Allow the voter to mark the ballot to register a vote.
 - c. Allow either the voter or the appropriate election official to place the voted ballot into the ballot counting device (for precinct count systems) or into a secure receptacle (for central count systems)
 - d. Protect the secrecy of the vote throughout the process.

In addition to the above requirements, all paper-based precinct count systems shall:

- e. Provide feedback to the voter that identifies specific contests for which he or she has made no selection or fewer than the allowable number of selections (e.g., undervotes).
- f. Notify the voter if he or she has made more than the allowable number of selections for any contest (e.g., overvotes).
- g. Notify the voter before the ballot is cast and counted of the effect of making more than the allowable number of selections for a contest.
- h. Provide the voter opportunity to correct the ballot for either an undervote or overvote before the ballot is cast and counted

Functional Requirement	EMS	UVS	РВТ	BMD	СВТ	Not Supported	May be bypassed or deactivated	Description
V: 1, §2.3.3.2.a	•	•		•			No	EMS Ballot targets are accurately associated with ballot responses though correct ballot formatting using Electionware. Vote targets are placed directly in line with corresponding selection text on a paper ballot. On screen targets for ES&S ballot marking devices are also configured and positioned using Electionware. UVS The ExpressVote screen layout accurately associates a target in line with the ballot text. The printed ballot utilizes complete phrases to indicate the voter's choices. BMD For an AutoMARK using standard ballots, selection targets appear directly in line with the selection target's corresponding ballot
V: 1, §2.3.3.2.b		•	•	•	•		No	UVS The ExpressVote lists the voters selections using phrases on the ballot after the voter accepts the voting summary. PBT, CBT The ES&S DS200 and DS850 recognize ballot selections marked in the appropriate target positions with approved marking devices. Ballots do not require a frame or fixture to be marked. BMD The AutoMARK marks voter selections on the paper ballot once the voter accepts the AutoMARK ballot summary.

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Functional Requirement	EMS	UVS	РВТ	BMD	СВТ	Not Supported	May be bypassed or deactivated	Description
V: 1, §2.3.3.2.c	•	•	•	•	•		No	UVS, PBT and BMD The voting system was designed for either voter or poll worker ballot insertion into the polling place ballot scanners. For voters who require assistance physically casting a ballot, privacy sleeves are available to preserve the secrecy of the ballot. Alternatively, the ExpressVote and AutoMARK allow for ballots to be AutoCAST into an attached secure container for subsequent tabulation by an ES&S ballot scanner. CBT For voters who require assistance physically depositing a cast ballot into a ballot box, privacy sleeves are available to preserve the secrecy of the ballot in transit to the ballot scanner. EMS
v. 1, y2.5.5.2.U								To protect voter secrecy, ERM does not record or provide any data that can be used to identify the ballot selections of a specific voter. UVS When properly set up; all ballot information and input controls are visible only to the voter during the voting session. If the voter requires assistance to transfer the completed ballot from the ExpressVote to the tabulator, a privacy sleeve can be placed to catch the ejected ballot so ballot secrecy is preserved in transit to the ballot scanner. The audio interface is accessible through headphones. ExpressVote headphones have low sound leakage to preserve privacy. PBT To maximize vote secrecy, the ES&S DS200, ballot box, and voting booths can be arranged at the polling place to screen onlookers and maintain ballot secrecy. Privacy sleeves are available for voters who require assistance physically casting a ballot. BMD In order to meet requirements to provide a facility to allow marking the ballot in privacy, if not provided by the physical arrangement of the unit(s) at the poll, the Precinct/Jurisdiction may purchase an AutoMARK Table and privacy shield for each terminal. A <i>Privacy Shield</i> can be inserted into the slots of the AutoMARK table to prevent onlookers from viewing the AutoMARK screen. When properly set up with the privacy shield in place and the ballot inserted; all ballot information and input controls are visible only to the voter during the voting session. If the voter requires assistance to transfer the completed ballot from the AutoMARK to the tabulator, a privacy sleeve can be placed to catch the ejected ballot scanner. The audio interface is accessible through headphones. AutoMARK headphones have low sound leakage to preserve privacy.

ES&S Voting System 5.2.0.3 System Functionality Description

Functional Requirement	EMS	UVS	РВТ	BMD	СВТ	Not Supported	May be bypassed or deactivated	Description
V: 1, §2.3.3.2.e		•	•	•			Yes	 UVS Ballot handling rules programmed in Electionware determine how the ExpressVote alerts the voter when the voter has selected fewer candidates or choices than are allowed for a contest. PBT Undervotes are identified through the DS200 applying ballot handling rules. The system can be programmed in Electionware to execute specific actions when the system encounters a ballot that may be mismarked. These rules determine the scanner's behavior for ballots that appear blank, overvoted, cross-voted, undervoted, or have marginal (barely scan-able) voter marks. For each ballot condition, the scanner can be programmed for unconditional acceptance, unconditional rejection, or query, which informs voters of the ballot's condition and allows the voter to choose whether to correct the ballot or cast the ballot without revision. Configuring ballot marking and scanning equipment to unconditionally accept undervoted ballots causes ballots to be tabulated as marked, which may result in undervotes and overvotes appearing on final results reports. BMD Ballot handling rules programmed in Electionware determine how the AutoMARK alerts the voter when the voter has selected fewer candidates or choices than are allowed for a contest
V: 1, §2.3.3.2.f							Yes	 UVS ExpressVote does not allow overvotes. Any attempt to overvote a multiple vote for contest prevents the selection and generates a warning. For a contest that allows only one selection, depending on the election definition setting, a new selection either automatically removes the previous selection or behaves the same as a contest that allows multiple target selections. PBT Overvotes are identified through the DS200 applying ballot handling rules. The system can be programmed in Electionware to execute specific actions when an overvote is encountered. The scanner can be programmed to unconditionally accept or unconditionally reject overvoted ballots, or query the voter whether to return the ballot for revision or cast as marked. Configuring the DS200 to unconditionally accept an overvoted ballot will cause the ballot to be tabulated as marked. BMD The AutoMARK does not allow overvotes. Any attempt to overvote a multiple vote for contest will prevent the selection and generate a warning prompting the voter to remove a selection prior to selecting another choice. For a contest that allows only one selection, depending on the election definition setting, a new selection either automatically removes the previous selection or behaves the same as a contest that allows multiple target selections.

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Functional Requirement	EMS	UVS	РВТ	BMD	CBT	Not Supported	May be bypassed or deactivated	Description
V: 1, §2.3.3.2.g		•	•	•			Yes	 UVS ExpressVote does not allow overvotes. Any attempt to overvote a contest generates a warning message that prompts the voter to change selections. PBT The notification supplied to a DS200 voter if the system encounters an overvote differs based on selected ballot handling rules. If the system is configured to unconditionally reject overvoted ballots, the DS200 returns any overvoted ballot to the voter without processing selections and displays a message describing the exception condition. If configured to query the voter prior to acceptance, the DS200 displays a message describing the exception condition, indicates that overvoted contests will not be counted with election totals, and prompts the voter to either revise the ballot or cast as marked. If configured to unconditionally accept, the inserted ballot will be tabulated as marked, which may result in the inclusion of undervotes and/or overvotes in system totals. BMD The AutoMARK does not allow overvotes. Any attempt to overvote a contest generates a warning message that prompts the voter to change selections.
V: 1, §2.3.3.2.h		•	•	•			Yes	 UVS Universal voting system equipment provides voters the opportunity to revise selections by displaying a summary of the selections made by the voter for revision or final approval before the ballot is marked for tabulation. ExpressVote prevents voters from overvoting any contest. PBT The process for returning and correcting a ballot differs based on the configuration of DS200 ballot handling rules set up in Electionware. If the DS200 is configured to unconditionally reject an exception ballot, the system returns the ballot to the voter without processing selections and displays a message describing the exception condition. If configured to query the voter prior to acceptance, the DS200 displays a message describing the exception condition. If configured to unconditionally accept, the inserted ballot will be tabulated as marked, which may result in the inclusion of undervotes and/or overvotes in system totals. BMD Ballot marking equipment provides voters the opportunity to revise selections by displaying a summary of the selections made by the voter for revision or final approval before the ballot is marked for tabulation. The AutoMARK prevents voters from overvoting any contest.

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2.3.3.3 DRE SYSTEM REQUIREMENTS

CONTROLLING REQUIREMENT

: 1, §2.3.3.3	In additio	n to the above common requirements, DRE systems shall:
,	a.	Prohibit the voter from accessing or viewing any information on the display screen that has not been authorized by election officials and preprogrammed into the voting system (i.e., no potential for display of external information or linking to other information sources).
	b.	Enable the voter to easily identify the selection button or switch, or the active area of the ballot display, which is associated with each candidate or ballot measure response.
	с.	Allow the voter to select his or her preferences on the ballot in any legal number and combination.
	d.	Indicate that a selection has been made or canceled.
	e.	Indicate to the voter when no selection, or an insufficient number of selections, has been made for a contest (e.g., undervotes).
	f.	Notify the voter if he or she has made more than the allowable number of selections for any contest (e.g., overvotes).
	g.	Notify the voter before the ballot is cast and counted of the effect of making more than the allowable number of selections for a contest.
	h.	Provide the voter opportunity to correct the ballot for either an undervote or overvote before the ballot is cast and counted.
	i.	Notify the voter when the selection of candidates and measures is completed
	j.	Allow the voter, before the ballot is cast, to review his or her choices and, if the voter desires, to delete or change his or her choices before the ballot is cast.
	k.	For electronic image displays, prompt the voter to confirm the voter's choices before casting his or her ballot, signifying to the voter that casting the ballot is irrevocable and directing the voter to confirm the voter's intention to cast the ballot.
	١.	Notify the voter after the vote has been stored successfully that the ballot has been cast.
	m.	Notify the voter that the ballot has not been cast successfully if it is not stored successfully, including storage of the ballot image, and provide clear instruction as to the steps the voter should take to cast his of her ballot should this event occur.
	n.	Provide sufficient computational performance to provide responses back to each voter entry in no more than three seconds.
	0.	Ensure that the votes stored accurately represent the actual votes cast.
	p.	Prevent modification of the voter's vote after the ballot is cast.
	q.	Provide a capability to retrieve ballot images in a form readable by humans [in accordance with the requirements of Subsections $2.1.2$ (f) and $2.1.4$ (k) and (l)].
	r.	Increment the proper ballot position registers or counters.
	s.	Protect the secrecy of the vote throughout the voting process.
	t.	Prohibit access to voted ballots until after the close of polls.
	u.	Provide the ability for election officials to submit test ballots for use in verifying the end-to-end integrity o the voting system.
	v.	Isolate test ballots such that they are accounted for accurately in vote counts and are not reflected in official vote counts for specific candidates or measures.

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Functional Requirement	EMS	UVS	РВТ	BMD	CBT	Not Supported	May be bypassed or deactivated	Description
V: 1, §2.3.3.3.a						•	N/A	N/A
V:1,§2.3.3.3.b						•	N/A	N/A
V: 1, §2.3.3.3.c						•	N/A	N/A
V: 1, §2.3.3.3.d						•	N/A	N/A
V: 1, §2.3.3.3.e						•	N/A	N/A
V: 1, §2.3.3.3.f						•	N/A	N/A
V: 1, §2.3.3.3.g						•	N/A	N/A
V: 1, §2.3.3.3.h						•	N/A	N/A
V: 1, §2.3.3.3.i						•	N/A	N/A
V: 1, §2.3.3.3.j						•	N/A	N/A
V: 1, §2.3.3.3.k						•	N/A	N/A
V: 1, §2.3.3.3.I						•	N/A	N/A
V: 1, §2.3.3.3.m						•	N/A	N/A
V: 1, §2.3.3.3.n						•	N/A	N/A
V: 1, §2.3.3.3.0						•	N/A	N/A
V: 1, §2.3.3.3.p						•	N/A	N/A
V: 1, §2.3.3.3.q						•	N/A	N/A
V: 1, §2.3.3.3.r						•	N/A	N/A
V: 1, §2.3.3.3.s						•	N/A	N/A
V: 1, §2.3.3.3.t						•	N/A	N/A
V: 1, §2.3.3.3.u						•	N/A	N/A
V: 1, §2.3.3.3.v						•	N/A	N/A

2.3.4 ADDITIONAL VOTING CAPABILITIES OR REQUIREMENTS

CONTROLLING REQUIREMENT

Functional	1.	Ballot Image	Storage
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Requirement

- 2. Segregation of ballots with write-ins
- 3. Ballot Online[™] (BOL) Pocket Ballot QR Code

Functional Requirement	EMS	NVS	РВТ	BMD	СВТ	Not Supported	May be bypassed or deactivated	Description
1.	•		•		•		No	EMS Ballot images captured by the DS200 and DS850 can be viewed in Electionware. PBT, CBT The ES&S DS200 and DS850 collect bitmap images of both the
								back and front of each successfully scanner ballot. Ballot insertion may be in any orientation. These images are stored to each scanner's Election Media. Each image is assigned a random ID with a random Date/Time stamp. These images can be retrieved and reviewed using The Electionware Acquire module.
2.	•						Yes	EMS (Optional) The ballot diverter can be disabled/enabled when programming the election within Electionware. The ballots with Write Ins can be filtered from other ballots in Electionware.
3.	•	•					Yes	 EMS, UVS Allows a voter to make candidate selections using Ballot Online[™] (or BOL) via web browser and produce: 1) a printable pocket ballot with bar code and 2) a Ballot Online[™], ExpressVote scannable bar code sent to a mobile phone. The voter can take either bar code (printed or mobile phone) to their polling place and load their selections to an ExpressVote session using a barcode scanning device attached to the ExpressVote. The selections the voter made during their BOL session will be presented on the ExpressVote summary screen. The voter will then be able to proceed with the ExpressVote session as normal (making/changing selections, printing selections, etc.)

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2.4 POST-VOTING CAPABILITIES

CONTROLLING REQUIREMENT

V: 1, §2.4

All voting systems shall provide capabilities to accumulate and report results for the jurisdiction and to generate audit trails. In addition, precinct count voting systems must provide a means to close the polls including generating appropriate reports. If the system provides the capability to broadcast results, additional standards apply.

2.4.1 CLOSING THE POLLS

a.

CONTROLLING REQUIREMENT

V: 1, §2.4.1 These requirements for closing the polls and locking voting systems against future voting are specific to precinct count systems. The voting system shall provide the means for:

- b. Preventing the further casting of ballots once the polls have closed.
- c. Providing an internal test that verifies that the prescribed closing procedure has been followed, and that the device status is normal.
- d. Incorporating a visible indication of system status.
- e. Producing a diagnostic test record that verifies the sequence of events, and indicates that the extraction of voting data has been activated.
- f. Precluding the unauthorized reopening of the polls once the poll closing has been completed for that election.

Functional Requirement	EMS	UVS	РВТ	BMD	СВТ	Not Supported	May be bypassed or deactivated	Description
V: 1, §2.4.1.a			•				No	РВТ
								No additional ballots can be cast after the Close Polls routine initiates. The polls can only be reopened if the user knows the proper pass code and has access to the terminal's physical key.
V: 1, §2.4.1.b			•				No	РВТ
								The system performs the polls closed routine and prints final results report(s) and a certification report to complete the operation. Once the polls close routine successfully completes, the display screen indicates that the unit is in the Closed Polls mode.
V: 1, §2.4.1.c			•				No	PBT System status is indicated through various status indicators on the display. See the <i>DS200 Operator's Guide</i> for a description of system status indicators.
V: 1, §2.4.1.d			•				No	PBT Diagnostic records are provided by system audit log reports that detail the sequence of events executed during polls close and include entries that verify the extraction or transfer of voting data. See <i>DS200 Operator's Guide</i> for a description of the process for printing the system audit report and a description of data that is logged.

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DOCUMENT ID EVS5203_C_D_0200_SFD
REVISION -1.0

ES&S Voting System 5.2.0.3 System Functionality Description

Functional Requirement	EMS	UVS	РВТ	BMD	СВТ	Not Supported	May be bypassed or deactivated	Description
V: 1, §2.4.1.e			•				No	PBT The system protects against unauthorized reopening the polls by
								requiring a valid pass code and physical control key to execute the re-opening process.

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2.4.2 CONSOLIDATING VOTE DATA

CONTROLLING REQUIREMENT

V: 1, §2.1.2

All systems shall provide a means to consolidate vote data from all polling places, and optionally from other sources such as absentee ballots, provisional ballots, and voted ballots requiring human review (e.g., write-in votes).

Functional Requirement	EMS	UVS	РВТ	BMD	СВТ	Results Reporting	Not Supported	May be bypassed or deactivated	Description
V: 1, §2.4.2	•		•		•	•		No	EMS ERM is the accumulation and reporting application for all ES&S equipment. ERM consolidates vote data from all tabulators and voting systems used by a jurisdiction. The software can read and store results from the precinct ballot counting media and accumulate the results. ERM can also import and consolidate results from ES&S's central count systems with precinct unit results. Hard copy reports will reflect the results that exist at the time of report creation. Because ERM is a software system used in conjunction with the ballot tabulation system for accumulation and reporting, the system requires external interfaces for uploading data from precinct or central ballot counting results media via serial communications. PBT CBT
									Consolidating results from ES&S DS200 scanners and absentee ballots is executed using Election Reporting Manager (ERM). Results from the precinct's DS200 Election Media can be physically read by ERM using a serial media reader. The results data format from precinct count equipment and ES&S central count equipment is compatible and can be combined using ERM. Refer to the <i>Election</i> <i>Reporting Manager User's Guide</i> for procedures.

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ES&S Voting System 5.2.0.3 System Functionality Description

2.4.3 PRODUCING REPORTS

CONTROLLING REQUIREMENT

V: 1, §2.4.3 All systems shall be able to create reports summarizing the vote data on multiple levels.

All systems shall provide capabilities to:

- a. Support geographic reporting, which requires the reporting of all results for each contest at the precinct level and additional jurisdictional levels.
- b. Produce a printed report of the number of ballots counted by each tabulator.
- c. Produce a printed report for each tabulator of the results of each contest that includes the votes cast for each selection, the count of undervotes, and the count of overvotes.
- d. Produce a consolidated printed report of the results for each contest of all votes cast (including the count of ballots from other sources supported by the system as specified by the vendor) that includes the votes cast for each selection, the count of undervotes, and the count of overvotes.
- e. Be capable of producing a consolidated printed report of the combination of overvotes for any contest that is selected by an authorized official (e.g., the number of overvotes in a given contest combining candidate A and candidate B, combining candidate A and candidate C, etc.)
- f. Produce all system audit information required in VVSG 2005 Subsection 5.4 in the form of printed reports, or in electronic memory for printing centrally.
- g. Prevent data from being altered or destroyed by report generation, or by the transmission of results over telecommunications lines.

In addition, all precinct count voting systems shall:

- h. Prevent the printing of reports and the unauthorized extraction of data prior to the official close of the polls.
- i. Provide a means to extract information from transportable programmable memory device or data storage medium for vote consolidation.
- j. Consolidate the data contained in each unit into a single report for the polling place when more than one voting machine or precinct tabulator is used.
- k. Prevent data in transportable memory from being altered or destroyed by report generation, or by the transmission of official results over telecommunications lines.

Functional Requirement	EMS	UVS	РВТ	BMD	СВТ	Results Reporting	Not Supported	May be bypassed or deactivated	Description
V: 1, §2.4.3.a	•		•		•			No	EMS ERM supports geographic reporting by aggregating election totals from all ES&S voting equipment to produce precinct reports, canvass reports and jurisdictional canvass reports. PBT Each ES&S DS200 scanner prints terminal level results tapes from an integrated thermal printer. Consolidated results reports from multiple scanners and additional ES&S voting equipment are generated at election headquarters using ES&S's Election Reporting Manager (ERM). ERM generates results reports for each contest at the precinct level and additional jurisdictional levels.

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Functional Requirement	EMS	UVS	РВТ	BMD	СВТ	Results Reporting	Not Supported	May be bypassed or deactivated	Description
									CBT The DS850 has the capability of generating reports at either the precinct level or as an aggregate total for the specific tabulator.
V: 1, §2.4.3.b	•		•		•			No	EMS The ERM System Log contains includes the total number of ballots cast on each tabulator as audit entries created during processing and updating of DS200 election results. PBT The ES&S DS200 automatically generates a printed scanner totals report during the device's polls close routine. In addition to scanner totals, the DS200 can produce a precinct by precinct report that details ballots cast for each precinct included on the DS200 election configuration program. Additional reports can be printed by the precinct official. An audit report can also be printed during the polls close process. CBT DS850 reports are restricted to the scanner totals for the specific machine; however, DS850 results transferred to ERM can be consolidated with results from other ES&S voting equipment to provide additional report variations.
V: 1, §2.4.3.c	•		•		•			No	EMS Each tabulator has the ability to print a results report that includes candidate votes, undervotes and overvotes. The ERM application generates aggregated totals from all tabulators used in the election. PBT Detailed, terminal results reports include undervote and overvote tallies. CBT The DS850 has the capability of generating such a report at either the precinct level or as an aggregate scanner totals report; however, the report is restricted to results processed by the specific tabulator. Results are transferred to ERM for additional report variations.
V: 1, §2.4.3.d	•		•		•			No	 EMS ERM generates consolidated, printed reports that include all required information. Report varieties include an election summary report and various canvass reports. Each report includes details ballots cast, candidate/ballot target selection totals, over votes and undervotes of aggregated election totals. PBT CBT Consolidated results reports are produced externally from the ES&S DS200 and DS850 systems using Election Reporting Manager (ERM). ERM fully supports the generation of such reports and the inclusion of overvote and undervote tallies with election results. See ERM system documentation for a list of available report formats and included information.

ES&S Voting System 5.2.0.3 System Functionality Description

Functional Requirement	EMS	UVS	РВТ	BMD	СВТ	Results Reporting	Not Supported	May be bypassed or deactivated	Description
V: 1, §2.4.3.e	•		•		•			No	EMS ERM Precinct, Summary and Canvass Reports satisfy this requirement. These report variants provide options to specify which contest(s) are to be included. These reports also provide options to include overvote and undervote reporting at the contest level. PBT, CBT Consolidated results reports are produced externally from the DS200 and DS850 systems using ERM. ERM fully supports the generation of such reports and the inclusion of overvote and undervote tallies with election results. See <i>ES&S Election Reporting Manager User's Guide</i> for a list of available report formats and a description of information included on each report.
V: 1, §2.4.3.f	•		•		•		•	No	 EMS ERM logs all system audit information required under VVSG 1.0 Subsection 5.4 to the Windows System Event Log. This information is available through the Windows System Event Viewer. The Windows System Event Log will log each activity including type, date, time, ES&S application, user ID and computer name. A report may be generated from ERM or the information exported from the Windows System Event Viewer. The ERM audit report may be printed from the reports menu. All Electionware audit files are stored in the Electionware database. The Electionware-Acquire Module allows users to view and print machine log reports read from DS200 and DS850 results media. Reports may be printed from Electionware reports menus. PBT System audit reports may be printed and reprinted at any time from the ES&S DS200 terminal after the system is closed for voting. The full system audit record is also saved to the inserted Election Media. CBT The DS850 allows the appropriate election official to both generate a printed copy of the event log and/or transfer a copy of the event log to an ES&S Media Device.
V: 1, §2.4.3.g	•		•		•			No	EMS The process of printing results reports from ERM accesses the results database in a "read only" mode, ensuring that this process does not alter or destroy data. All results are stored to DS200 Election Media and not altered during results transfer. PBT Results data sent Via a wired or wireless communications link is transmitted securely by an authenticated SFTP connection. The results are encrypted and the files signed.

Functional Requirement	EMS	UVS	РВТ	BMD	СВТ	Results Reporting	Not Supported	May be bypassed or deactivated	Description
									CBT The DS850 can transfer election data to an ERM reporting PC over a local network or can generate reports directly from the scanner. In the either case, the DS850 does not alter or destroy data during data transmission.
V: 1, §2.4.3.h			•					No	PBT The ES&S DS200 design prevents reports from printing until the DS200 polls close. To prevent unauthorized extraction of data, the memory device that stores scanner election data is stored under a locked panel, with loop holes available for applying additional numbered security seals.
V: 1, §2.4.3.i	•		•					No	EMS ERM is the subsystem that extracts results from the transportable memory devices for ES&S ballot scanning equipment and combines results for reporting. PBT The DS200 Election Media can be safely removed after closing the polls, for physical transportation and consolidation at a central location.
V: 1, §2.4.3.j	•		•					No	EMS ERM is used to consolidate results from each terminal to report the precinct total. PBT Data from multiple DS200's used in a polling place are consolidated using ERM.
V: 1, §2.4.3.k	•		•			•		No	EMS When ERM reads data from a precinct tabulator memory device, the contents are accessed in "read only" mode and then written to a working folder on the ERM PC or Server drive. PBT The ES&S DS200 has no capability to alter or destroy data on the portable memory during report generation.

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ES&S Voting System 5.2.0.3 System Functionality Description

2.4.4 BROADCASTING RESULTS

CONTROLLING REQUIREMENT

V: 1, §2.4.4

.4.4 Some voting systems offer the capability to make unofficial results available to external organizations such as the news media, political party officials and others. Although this capability is not required, systems that make unofficial results available shall:

- a. Provide only aggregated results, and not data from individual ballots.
- b. Provide no access path from unofficial electronic reports or files to the storage devices for official data.
- c. Clearly indicate on each report or file that the results it contains are unofficial.

Functional Requirement	EMS	UVS	РВТ	BMD	СВТ	Not Supported	May be bypassed or deactivated	Description
V: 1, §2.4.4.a	•						No	EMS
								ERM includes functionality to transmit results to media outlets or run a scrolling results display for public view. These results are
								always supplied as aggregated totals with no information that can be used to determine how individual ballots are voted.
V: 1. §2.4.4.b	•						No	EMS
								The voting system includes no access path from unofficial files to the storage devices for official data. ES&S central count equipment and reporting subsystem is segregated in a dedicated physical environment for official results reporting. All broadcasting of election results is done from a secondary results database that is created from, but not connected to, the "live" ERM database.
V: 1, §2.4.4.c	•						No	EMS
								All ERM reports include user-definable labels that can be used to indicate whether results are unofficial or official.

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2.4.5 ADDITIONAL POST-VOTING CAPABILITIES OR REQUIREMENTS

CONTROLLING REQUIREMENT

Functional Requirement 1. ES&S tabulators collect both back and front bitmap images of each successfully scanner ballot. Ballot insert orientation may be either direction.

- 2. Poll Close Reports
- 3. Canceling Reports
- 4. Sorting of blank, over-voted and miss-marked ballots
- 5. Ballot Imprinter Mechanism
- 6. Electionware Produce
- 7. Electionware Resolve

Functional Requirement	EMS	UVS	РВТ	BMD	CBT	Not Supported	May be bypassed or deactivated	Description
1.			•		•		No	These images are stored on tabulator Election Media. There are assigned a random ID with a random Date/Time stamp.
2.	•		•		•		Yes	Reports that print automatically when the polls are closed can be deactivated when programming the USB drive in Electionware.
3.	•		•		•		Yes	Certain Reports can be bypassed or canceled at the request of the operator.
4.			•		•		Yes	The ES&S DS200 and DS850 tabulators can be programmed to unconditionally accept these ballots. The ballot will be tabulated as marked, which may contain undervotes and overvotes.
5.					•		Yes	The DS850 has an inkjet print head capable of printing a 10 digit, human-readable number on the ballot NOTE: Ballot imprinting is not supported with the current system configuration.
6.	•						No	The Produce module is used to: View and filter the list of provisional and non-provisional ballots included in loaded results Filter ballots for viewing. View scanned images captured by the DS200 and DS850 of paper ballots and facsimiles of Non-Provisional audio ballots Print copies of ballots for archive purposes Process provisional ballots by flagging them as accepted or rejected, or escalated for further review View, save, and print HTML and XML versions of the Election Summary Results report Export decrypted ballot images for FOIA purposes.
7.	•						Yes	Resolve allows users to display the scan images of voted ballots, view the DS200's and DS850's interpretation of the voter's marks on these ballots and, for each contest that meets an exception condition, review and either accept, reject, or change the interpreted results. When ballots have been adjudicated and saved, election results are re-totaled to include the adjudicated results Resolve is not supported in the current voting system release.

2.5 MAINTENANCE, TRANSPORTATION AND STORAGE

CONTROLLING REQUIREMENT

V: 1, §2.5

All systems shall be designed and manufactured to facilitate preventive and corrective maintenance, conforming to the hardware standards described in VVSG 2005 Subsection 4.1.

All vote casting and tally equipment designated for storage between elections shall:

- a. Function without degradation in capabilities after transit to and from the place of use, as demonstrated by meeting the performance standards described in Subsection 4.1.
- b. Function without degradation in capabilities after storage between elections, as demonstrated by meeting the performance standards described in Subsection 4.1.

Functional Requirement	EMS	UVS	РВТ	BMD	СВТ	Not Supported	May be bypassed or deactivated	Description
V: 1, §2.5.a		•	•	•	•		No	UVS, PBT, BMD and CBT Properly stored and maintained ES&S voting system hardware has a functional life of at least ten years without degradation of system capabilities. Items must be maintained, stored and transported according to guidelines included in system specification and maintenance documentation. See voting system equipment <i>Maintenance Guides</i> for voting system hardware for storage and operating requirements. All ES&S voting equipment must pass non-operating hardware tests in Sub-Section 4.1, including tests responsible for simulating transportation and extreme storage conditions as a condition of successful voting system certification testing.
V: 1, §2.5.b		•	•	•	•		No	 UVS, PBT, BMD and CBT Properly stored and maintained ES&S voting system hardware has a functional life of at least ten years without degradation of system capabilities if items are maintained, stored and transported according to guidelines included in system specification and maintenance documentation. See Maintenance Guides for voting system hardware for storage and operating requirements. All ES&S voting equipment must pass non-operating hardware tests in Sub-Section 4.1, including tests responsible for simulating transportation and extreme storage conditions as a condition of successful voting system certification testing.

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2.5.1 ADDITIONAL MAINTENANCE, TRANSPORTATION AND STORAGE REQUIREMENTS

CONTROLLING REQUIREMENT

Functional 1. N/A Requirement

Functional Requirement	EMS	UVS	РВТ	BMD	СВТ	Not Supported	May be bypassed or deactivated	Description
1.							N/A	N/A

A. Key Terms

Terms used in this document conform to company standards set forth herein and to definitions included in the EAC 2005 *Voluntary Voting System Guidelines*. Other definitions are consistent with those found in *ANSI/IEEE Std 610.12-1990*, *IEEE Standard Glossary of Software Engineering Terminology*.

Term	Definition
BMD	Ballot Marking Device
BOL	Ballot On Line
СВТ	Central Ballot Tabulator
Central Ballot Tabulator (central scanner, central tabulator)	A <i>central counter</i> or <i>central scanner</i> is a high-speed ballot tabulator that is used to scan ballots and accumulate voter selections. Jurisdictions that use central scanners transport ballots from various polling places to a central count location where the ballots are scanned and tabulated. Some jurisdictions mix systems and use central scanners to count absentee ballots and precinct counters to scan ballots that are cast on Election Day. The DS850 is an example of a central scanner that is available from ES&S.
CVR	Cast Vote Record
DS200 Election Media or Election Media	A portable USB 2.0 flash media device used to store application code and election data in encrypted form. The devices are utilized to transfer data to and from ES&S equipment.
Election Management System	A single application or suite of applications used to assist the Election Authorities to define an election. ES&S's application suite typically consists of Electionware for Election defining and adjudication and hardware configuration, and ERM (Election Reporting Manager) for reporting the voter's preferences.
ELS	Event Log Service
EMS	Election Management System
EQC	Election Qualification Code
EQSC	Election Qualification Security Code
ERM	Election Reporting Manager
ES&S	Election Systems and Software
EV	ExpressVote
EVS	ES&S Voting System
EW	Electionware
GB	Gigabyte
L&A	Logic and Accuracy
OS	Operating System
РВТ	Precinct Ballot Tabulator

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Term	Definition
Precinct Ballot Tabulator	A device used to accumulate voter's selections at the precinct or polling place level. In small jurisdictions or smaller elections, these precinct ballot tabulators can serve as a central ballot tabulator. The DS200 is an example of a precinct scanner that is available from ES&S.
QA	Quality Assurance
QAP	Quality Assurance Program
QR	Quick Response (QR code)
SOP	System Operations Procedures
TDP	Technical Data Package
Technical Data Package (TDP)	A <i>Technical Data Package</i> includes all voting system documentation sent to a <i>Voting System Test Laboratory</i> . A <i>TDP</i> contains all of the documentation for a voting system including, but not limited to, user manuals, software and hardware specifications, software change releases and system drawings.
UVS	Universal Voting System
Universal Voting System (UVS)	A universal vote capture device designed for all voters, with independent voter verifiable paper record which is digitally scanned for tabulation.
VAT	Voter Assist Terminal. The AutoMARK is a Voter Assist Terminal.
Voting System Test Laboratory (VSTL)	Test laboratory accredited by the National Voluntary Laboratory Accreditation Program (NVLAP) to be competent to test voting systems.
VSTL	Voting System Test Laboratory
VVSG	Voluntary Voting System Guidelines

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B. REFERENCES

The following resources are referenced from this publication or were considered in drafting this document. The latest revisions apply. Printed copies of these items are considered out of date.

Document Identifier	Document Title
EVS5200_C_D_0200_SFD	System Functionality Description for ES&S Voting System 5.2.0.0
EVS5203_C_D_1000_SysOvr	Voting System Overview
AQS-18-5000-001-F	AutoMARK ESS System Hardware Specification
DS200HW_M_SPC_0313_HWSpec	DS200 System Hardware Specifications v1.3
DS850HW_M_SPC_0310_HWSpec	DS850 System Hardware Specifications
AQS-18-5001-002-R	AutoMARK ESS Operating Software Design and Specification
EVS5203_CM_SPC00_SysSecuritySpec	ES&S Voting System Security Specification
EVS5203_CM_SPC01_ HardeningProcedures	Hardening the Election Management System PC
EVS5203_DOC_SOP_AMVAT	AutoMARK Operator's Guide
EVS5203_DOC_SOP_ExpressVote	ExpressVote Operator's Guide
EVS5203_DOC_SOP_DS200	DS200 Operator's Guide
EVS5203_DOC_SOP_DS850	DS850 Operator's Guide
EVS5203_DOC_SOP_ERM	Election Reporting Manager User's Guide
EVS5203_DOC_SOP_Electionware	Electionware User's Guides
EVS5203_DOC_SOP_BPG	ES&S Ballot Production Handbook

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AUDIT USA

Americans United for Democracy, Integrity and Transparency in Elections

Exhibit #27. AUDIT USA White Paper Images are automatically generated (captured, created) by digital ballot scanners and therefore must be persevered.

1. See Exhibit 7, Affidavit of Susan Pynchon

On November 12, 2018, Plaintiff Susan Pynchon spoke by telephone to Mr. Ken Carbullido, former Director of Development for Election Systems & Software (ES&S). Mr. Carbullido told me that he was "part of a team" that developed the ES&S digital scan voting system. Ms. Pynchon asked Mr. Carbullido if the voting system automatically creates ballot images and he responded, "Yes, of course it does. That's how the system works."

2. "Ballots are scanned exactly as an optical scan ballot would be – only with digital scanners, ballot images are captured while the ballot is tabulated."

The above sentence is an excerpt from the ES&S Website, half way down the page: Link: <u>https://www.essvote.com/blog/our-technology/election-systems-and-equipment-101/</u>, taken from the following paragraph, or

Exhibit #28 Website ES&S, Election Systems and Equipment 101 - Images are automatically generated:



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AUDIT USA

Americans United for Democracy, Integrity and Transparency in Elections

3. "The DS200...captures the voter's selections and digitally images the ballot."

The sentence is from "Florida Qualification Test Report" of the ES&S digital voting system, January 2018: <u>https://dos.myflorida.com/media/698873/ess_evs45301v1_test-report_01182018_4publication.pdf</u>, from the following paragraph, or

Exhibit #29 on Page 5:

The DS200 is a voter interface device used to scan paper ballots. It is a precinct tabulator that can also be used for tabulating vote-by-mail ballots (formerly known as absentee ballots). This tabulator captures the voter's selections and digitally images the ballot. The DS200 uses a universal serial bus (USB) drive for downloading the election definition, provides an option to capture cast ballot images on the USB, and provides the election results on the USB. The results data can be directly uploaded into ERM or the DS200 can transmit results via secure wireless or analog network telecommunications into ERM.

4. *"The DS850 uses digital cameras to image paper ballots, capture voter selections on the image, and evaluate results."* The above sentence is an excerpt from

Exhibit #29 Page 6: "Florida Qualification Test Report" of the ES&S digital voting system, January 2018, or <u>https://dos.myflorida.com/media/698873/ess_evs45301v1_test-</u>report_01182018_4publication.pdf, from the following paragraph found on Page 6:

The DS850 optical tabulator is a high-speed scanner for use with vote-by-mail ballot tabulation or contest/race recounts. The DS850 uses digital cameras to image paper ballots, capture voter selections on the image, and evaluate the results. It uses a USB drive for downloading the election definition, captures the cast ballot images on the USB, and provides the results on the USB. The results data are uploaded into ERM. The DS850 also uses two commercial off-the-shelf (COTS) printers, one for printing reports and the other for recording and printing an audit log.

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5. "The DS850 takes a snapshot of each ballot and saves the bitmap on the internal hard drive." (And) "...allows the user to define which ballot images are to be copied to the ES&S Media Device (all ballot images, only those containing write-in votes...or not at all)..."

The above two sentences are excerpts from

Exhibit 26, ES&S Voting System Functionality Description, 2015, in the following paragraph on page 17:

The DS850 takes a snapshot of each ballot and saves the bitmap image on the internal hard drive. Each ballot data XML file records the ballot's votes, identifying write-ins (not the actual write-in name image), overvotes undervotes, etc. Once ballots are scanned and saved, the operator can print Results Reports or Export Results to an ES&S Media Device. Either of these options will automatically aggregate the vote data for all the ballot vote image records. Aggregated totals on the ES&S Media Device can then be transferred to a software application for reporting purposes. The user also has the option to transfer the ballot images to an ES&S Media Device for review. Electionware allows the user to define which ballot images are to be copied to the ES&S Media Device (all ballot images, only those containing writein votes, exception images only, write-in and exception images only or not at all; [not completely implemented in this release]).

6. "The ES&S DS200...After each successful ballot scan, the software performs a cross-reference check of the counts against the expected ballot."Excerpt from

Exhibit #26, ES&S Voting System Functionality Description, 2015, found in the following paragraph, on page 16:

The ES&S DS200 accumulates votes to an internal running total during the Close Polls routine. This total is stored in both DRAM and the system's Election Media. After each successful ballot scan, the software performs a cross-reference check of the counts against the expected ballot. If no problems are found, the ballot information will be copied to the Election Media and the ballot fed into the ballot box to the appropriate compartment (Write-In or Non-Write-In Sections). However, if the cross-reference check fails, the ballot will be fed back out of the paper transport mechanism, and the system performs the appropriate voting process error handling function.

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7. Florida Voting System Standards and they require the preservation of ballot images for 22 months. Here are two snippets from the Standards (attached as PDF and linked here: <u>https://dos.myflorida.com/media/693718/dsde101.pdf</u>)

Exhibit #29 p13, 19. Florida Division of Elections- Voting System Qualification Test Report, ballot images must be persevered.

Page 13

The voting system shall include the capability to produce records, generated by the system components, or in some cases, by the system operators, from which all operations may be audited. Except for the storage of vote images, which shall be maintained in a random sequence, the records shall be created and maintained in the sequence in which the operations were performed.

Page 19:

The generation of reports by the system shall be performed in a manner, which does not erase or destroy any ballot image, parameter, tabulation or audit log data. The system shall provide a means for assuring the maintenance of data integrity and security for a period of at least 22 months after closing of the polls.

8. Florida Department of State General Records Schedule GS3 for Election Records; ballot images must be persevered.

Exhibit #2, Page 4, Item #11

BALLOTS, OFFICIAL: FEDERAL ELECTIONS

ltem #11

This record series consists of voted ballots, including absentee ballots, ballots cast at the polls or at early voting, provisional ballots, and ballots cast at assisted living facilities or nursing homes per Section 101.655, *Florida Statutes*, Supervised voting by absent electors in certain facilities. This series also includes overvoted, undervoted, spoiled, duplicated, cancelled, or rejected ballots, and test ballots created pursuant to Section 101.151, *Florida Statutes*, Specifications for ballots. The retention period is pursuant to Title 42, U.S.C. 1974, Retention and preservation of records and papers by officers of elections.

RETENTION:

a) Record copy. 22 months after certification of election.

b) Duplicates. Retain until obsolete, superseded, or administrative value is lost.

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Election Systems and Equipment 101

August 26, 2015

An Introduction To Voting Systems And Equipment

From showing up to your "polling place" and declaring your vote in the 1800s, to filling out ovals on a ballot that's scanned upon completion, voting has taken many forms over the years. As our government has matured, the way people exercise their democratic right to vote has evolved with it.

Jurisdictions now have many options when thinking about how voters will cast their vote. Below is an overview of the different types of voting equipment/systems used in the United States (past and present) and how technology is changing the way Americans vote at the polls.

Good old fashioned voting



Hand counted ballots- While not a popular method of tabulating votes, many jurisdictions manually count paper ballots cast in polling places by hand to this day. Even more jurisdictions manually count their absentee and/or provisional ballots as they receive a smaller number of each

(Slight) improvements are made



Lever machines- Introduced in the 1890's many states adopted this mechanized voting system. Each candidate and ballot issue is assigned to a particular lever. To start the vote session, a voter pulls a separate lever that closes a privacy curtain. The voter then pulls smaller levers corresponding to their vote selections. The machine records each vote as well as how many votes were cast on each lever machine. Once a voter is done selecting their choices, they reopen

the privacy curtain and the vote levers return to their original positions. These machines were used in some locations as recently as 2010 and are still in use by certain municipalities today.



Punch cards- Originally designed to tabulate statistics; the punch card voting system consists of a card attached to a small, sturdy board. Voters punch holes with a provided stylus either next to their vote selection or next to a number that corresponds to their vote choice. After voting, each voter can place their ballot into a secure ballot box or feed it through an in-precinct tabulation device. The two types of punch card systems were the Votomatic, which had numbers listed on

the ballot instead of candidates (the corresponding candidates and ballot issues appeared elsewhere in the voting booth), and the Datavote.

Technology in elections



Optical Scan- Referred to as both mark-sense and optical scan, this voting system is commonly used in elections today. Voters receive a preprinted ballot consisting of candidates and ballot issues after checking-in at the poll. They then fill out a circle, oval or rectangle (some systems have voters complete an arrow) indicating their choices. The completed ballot can either be scanned by an in-precinct tabulator or collected securely and later scanned at Election Central by a central scanner. These computerized tabulators scan the ballot, guided by track marks also printed on each ballot, recognizing common voter marks to determine intent and tabulate results. Many jurisdictions prefer these voting system as tabulation can happen quickly and the paper ballot can serve as a record during later review or recount periods.



Direct Recording Electronics (DREs) – Direct Recording Electronics, or DREs as they're commonly known, eliminate the paper ballot in the voting process. A voter inputs their selections using one of three basic interfaces (push button, touchscreen or dial) where it is tabulated and stored using a memory chip, disk or SD card. Typically a keyboard is provided for write-in votes, though some jurisdictions handle this portion manually.



Ballot marking devices- Created to assists voters with disabilities in marking paper ballots, most ballot marking devices (BMD) provide a touch-screen interface combined with audio and other accessibility features. A voter is still provided a paper ballot, marks their choices with the assistance of the BMD then scans their ballot according to their jurisdiction's practices. Similar to a DRE, but no vote selections are stored interval.

a DRE, but no vote selections are stored internally; the marked ballot still has to be tabulated. Plaintiffs' Exhibit #28, page 1 Map of Voting Equipment Types Used in the 2012 Presidential Election by State

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VVPAT: Voter Verified Paper Audit Trail Printers Data from verifiedvoting.org

Truly modernized voting

Technology has played a key role in improving election systems and the voter experience since the introduction of optical scan and DREs. Today's voting system vendors are looking for ways to push this envelope even further, creating new innovations in the elections industry such as the ones below.



Digital scan tabulators- Digital scan tabulators were the next logical improvement to optical scan. Ballots are scanned exactly as an optical scan ballot would be — only with digital scanners, ballot images are captured while the ballot is tabulated. These images can then be used during recounts or review periods, saving election officials the hassle of tracking down physical ballots.



Ballot markers that can also tabulate – Vendors are also focusing on the next iteration of voting machines: ExpressVote BMDs that can also tabulate. These hybrids create a streamlined Election Day experience while safeguarding voter intent as paper records are still available.

No matter what types of equipment a jurisdiction uses, one thing's for sure: the ways in which we vote have come a long way from our forefathers. Curious about a particular voting system? Contact ES&S for a more inclusive look at voting systems and equipment currently on the market.



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Voting System Qualification Test Report Election Systems & Software, LLC EVS Release 4.5.3.0, Version 1

For Publication

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Executive Summary

Election Systems & Software, LLC submitted an application requesting Florida certification of the *EVS Release 4.5.3.0, Version 1* voting system. This release is a modification to the *EVS 4.5.2.0, Version 1* release (certified on June 15, 2016). Specifically, *EVS 4.5.3.0, Version 1* provides a new central count high-speed scanner, the DS450[®]; the election management system (EMS) was revised to accommodate the new scanner model. In addition, changes in ExpressVote[®] and the EMS allow ExpressVote to display candidates in a contest in dual columns, as well as other minor enhancements. The Election Reporting Manager[®] (ERM) has undergone optimization within the archiving process.

The voting system application submitted for certification includes an election management system known as ElectionWare[®]; a precinct scanner (DS200[®]); two devices for Florida voters with disabilities—a precinct ballot marking device (AutoMARK[®]) and a vote capture device with a verifiable paper record that is digitally scanned for tabulation (ExpressVote); and two models of high-speed central count scanner (Model DS850[®] and the new Model DS450). Precinct results may be uploaded to the election management system manually, or via wireless or landline modems.

BVSC conducted the certification testing in two phases. Phase I consisted of verifying the setup of the two configurations of the election management system, restoration/import of two elections (general and primary elections), creation of two elections (municipal and presidential preference primary elections), a physical audit, and a functional audit. BVSC then conducted mock elections and election cycle events, such as loading the tabulators with the requisite media, opening and closing of polls, feeding ballots, central count tabulation, and election night and post-election reporting. BVSC performed tests to verify compliance with standards for accessibility. Phase II consisted of conducting contest recounts, conducting mass ballot count testing for the DS450 central count scanner, and conducting additional tests as necessary to observe the voting system's capabilities.

Qualification test results affirm that the voting system under test, *EVS Release 4.5.3.0, Version 1*, met applicable requirements of the Florida Voting Systems Standards, Florida Statutes and Rules, and the Help America Vote Act for usability and accessibility. BVSC, therefore, recommends certification of the referenced voting system.

Introduction

Election Systems & Software, LLC (ES&S) submitted an application requesting Florida voting systems certification of the *EVS Release 4.5.3.0, Version 1* voting system. This release is a modification to the certified *EVS Release 4.5.2.0, Version 1* (certified on June 15, 2016).

EVS 4.5.3.0, Version 1 provides a new central count high-speed scanner, the DS450[®]; and changes to the election management system (EMS) to accommodate the new scanner model. In addition, changes in ExpressVote[®] and the EMS allow ExpressVote to display candidates in a contest in dual columns, as well as other minor enhancements. The Election Reporting Manager[®] (ERM) has undergone optimization within the archiving process.

The scope of the certification effort included verifying that the voting system under test met the applicable standards, rules, statutes, and federal laws for use in the state of Florida. Testing included qualification testing, regression testing on machines that did not change, such as the DS850[®], DS200[®], ExpressVote, and AutoMARK[®], and a mass ballot count test of the DS450. Volume testing of any voting machines or marking devices is considered to be outside the scope of this certification. Testing was completed on December 19, 2017.

System Overview

EVS 4.5.3.0, Version 1 is a paper-based voting system with an element for compliance with the Help America Vote Act (HAVA) provisions for precinct voting. The Florida certified voting system includes the Election Management System (EMS), a precinct scanner, Americans with Disabilities Act (ADA)-compliant accessibility devices, and central count scanners.

The EMS hardware platform is configured as either a stand-alone or a server/client configuration. The stand-alone configuration includes the election management system and the election results reporting manager; whereas, the server/client configuration includes one or more workstations (clients) which interconnect with a server. The system includes an option to upload election results wirelessly or using an analog modem.

The EMS software configuration includes:

- ElectionWare[®] an election management system that integrates the jurisdiction, districts, contests, and candidate databases as the main pre-voting phase and post-voting phase that allows ballot images to be viewed. It provides the method to configure elections, create ballot design, add languages (including audio), export ballot/election definitions and view ballot images.
- Election Reporting Manager a client application used for integrating the acquisition, consolidation, and reporting of election results. Additional ERM clients can be configured to display scrolling results and over the Intranet.
- Regional Results Transfer an optional application that allows results files accumulated on DS200
 media devices at remote polling locations to be sent to the county's central office from sites
 around the county that collect several local, or "regional," precinct results. The results files are
 loaded from the DS200 media devices into the Regional Results Transfer station at each regional
 site, which in turn sends the results to the county's central office.
- ExpressLink[®] an ancillary on-demand application that prints a voter's ExpressVote activation card with the appropriate ballot style information (using the ExpressVote Activation Card Printer).

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ExpressLink can run in either a standalone mode or in monitor mode¹ where it monitors requests from a voter registration system over a shared network folder.

The voting equipment includes the DS200, ExpressVote, AutoMARK Voter Assist Terminal, the DS850, and introduces the DS450.



The DS200 is a voter interface device used to scan paper ballots. It is a precinct tabulator that can also be used for tabulating vote-by-mail ballots (formerly known as absentee ballots). This tabulator captures the voter's selections and digitally images the ballot. The DS200 uses a universal serial bus (USB) drive for downloading the election definition, provides an option to capture cast ballot images on the USB, and provides the election results on the USB. The results data can be directly uploaded into ERM or the DS200 can transmit results via secure wireless or analog network telecommunications into ERM.



The ExpressVote is a voter interface device approved in Florida for use by voters with special needs. This system combines paper-based voting with touch screen technology to produce an independent voter-verifiable paper record that is digitally scanned for tabulation. The voter uses the ExpressVote to navigate the ballot through touchscreen, physical keypad, assistive support peripherals such as a sip and puff device, or other assistive equipment such as a two position switch. The ExpressVote includes a mandatory vote summary screen that requires voters to confirm or revise selections prior to printing the summary of ballot selections using the internal thermal printer. Once printed, ES&S ballot scanners process the vote summary card.



The ExpressVote rolling kiosk houses the ExpressVote. This hard-sided enclosure provides voter privacy screens, angle adjustment to accommodate seated or standing voters, and a secure repository for marked ExpressVote vote summary cards to be tabulated at a later time.

¹ Monitor mode testing with voter registration systems is outside the scope of Florida certification testing.

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The AutoMARK Voter Assist Terminal (VAT) is a voter interface device that allows a voter to mark a blank, preprinted ballot or assists a voter with contest selections via visual display, audio, or both. The voter uses the AutoMARK to navigate the ballot through touchscreen, physical keypad, assistive support peripherals such as sip and puff device, or other assistive equipment such as a two position switch. Also, the voter can use the AutoMARK to review a marked ballot and either to cast the ballot into an optical scan tabulator (like the DS200) or, if available, to deposit the ballot into an attached ballot box, known as the AutoCAST[™], for later tabulation.



The DS850 optical tabulator is a high-speed scanner for use with vote-by-mail ballot tabulation or contest/race recounts. The DS850 uses digital cameras to image paper ballots, capture voter selections on the image, and evaluate the results. It uses a USB drive for downloading the election definition, captures the cast ballot images on the USB, and provides the results on the USB. The results data are uploaded into ERM. The DS850 also uses two commercial off-the-shelf (COTS) printers, one for printing reports and the other for recording and printing an audit log.



This certification application introduces the DS450 high-throughput scanner and tabulator. The DS450 is very similar to the DS850. It is used for vote-bymail ballot tabulation or contest/race recounts and employs the same technology for capturing ballot images, evaluating voter selections, downloading the election definition, and uploading results. The DS450 also uses two commercial off-the-shelf (COTS) printers, one for printing reports and the other for recording and printing an audit log.

Components under Review

The components of the voting system being reviewed for certification include the following:

- Upgraded ElectionWare election management system
- Upgraded Election Reporting Manager (ERM)
- Upgraded ExpressVote (ballot marking device for voters with disabilities)
- Upgraded ExpressVote Previewer (EMS component)
- An optional DS450 central count tabulator/scanner

Conduct of Tests / Findings

The test objective was to verify that the *EVS Release 4.5.3.0, Version 1* voting system meets the applicable requirements of the Florida Voting Systems Standards (FVSS), Florida Statutes and Administrative Rules, and HAVA for usability and accessibility.

The FVSS qualification examination for this effort encompassed a physical and functional audit of the components under review. BVSC conducted additional tests to verify compliance with standards for sound pressure levels and to observe ballot sensitivity. In addition, BVSC conducted a mass ballot count test on the new DS450 central count tabulator, as well as regression testing on other voting equipment to ensure that system modifications did not affect unchanged procedures.

Physical Audit

BVSC conducted a physical audit to verify that the voting system under test matched the specifications described in the application and the technical data package (TDP) documentation. The audit covered the election management system in both the standard and the standalone configurations, all precinct and central count scanners, and all accessible voting devices.

Findings:

BVSC found no issues with the setup of the ElectionWare voting system configurations or the configurations of the scanners or accessible voting devices.

Functional System Audit

BVSC conducted a functional system audit to verify that all components of the voting system operated as described in the TDP.

Voting Equipment Menus – Administrative and Diagnostic Reports

BVSC performed a functional audit by testing all available menu options and administrative reports as well as systems functions in the course of testing.

Mock Elections

BVSC conducted mock elections incorporating multiple-card ballots of varying ballot lengths (11-inch to 19-inch). BVSC used four election types: presidential preference primary (PPP), municipal, primary, and general. The tests included both hand marked and machine marked ballots, as well as those cast via the accessible voting ballot marking devices (AutoMARK and ExpressVote), and used single-card and multi-card elections. All activities simulating an election were conducted using all equipment, from initial preparations and L&A, through voting, election night and precinct level reporting, as well as recounts and post-election audit activities. BVSC used ballot test decks and pre-determined results to compare to actual results.

Pre-Election Activities

Pre-election activities included coding or verifying the coding of the election database for each of the four election types (PPP, municipal, primary, and general), preparing the election media, preparing the ballot

Plaintiffs' Exhibit #29, page 7

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test decks, preparing and validating the expected results, and preparing the voting equipment. A universal primary contest (UPC) was included in the primary election definition.

Election Activities

Election activities included opening polls, casting ballots using prepared test decks, and closing polls.

Post-Election and Reporting Activities

BVSC examined test results against expected results. Post-election activities included producing extensible mark-up language (XML) election night and precinct-level results files and generating system reports.

Activities included uploading election results and verifying results in the ERM by defined election group (vote-by-mail voting, early voting, Election Day voting, and provisional voting). BVSC uploaded results directly, since modem testing was done in a separate test.

As an ancillary component of the voting system, the XML file utility, which produces the partial and complete summary XML files and the 30-day precinct-level XML files, was examined in a separate environment using an in-house developed program to verify that the tool could produce these files as expected.

Findings:

The system performed as indicated in the vendor's TDP and in accordance with FVSS, Florida Statutes, and Administrative Rules.

Staff was able to verify that the XML utility correctly produced the files in the specified XSD format and that the vote totals (candidate, total precinct votes, and total precinct groups) matched the report totals.²

Central Count Tabulator Mass Ballot Count

BVSC conducted a mass ballot count with three DS450 central count scanners using a primary election definition. The minimum requirement is a ballot count of 192,000 ballots. The number of scanners to be used for this activity is at the vendor's discretion. The test deck contained 20 precincts (including three split precincts), with 16 ballot cards for each precinct and/or precinct split, and four political parties. Staff ran the test deck through three DS450 units fifteen times, for a total of 192,000 ballots.

Specific details follow:

² Since content is user driven by each county who defines distinctly its election in the tabulation system, the content was not programmatically validated.

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Table 1. Mass Ballot Count details for DS450		
Election definition used:	Primary Election	
Ballot length:	14 inches	
Number of scanner units used:	3	
Number of test deck sets:	40	
Number of runs per test deck:	15	
Number of ballots per deck:	320	
Number of cards per ballot:	1	
Total number of ballots cast:	192,000	
Total number of vote targets:	10,876,800	

Findings

The mass ballot count test was successful. The tested DS450s met the acceptance criteria for the central count scanner mass ballot count. No anomalies were observed. BVSC satisfactorily scanned 192,000 ballots with 10,876,800 vote targets.

Acceptance criteria are shown in the table below:

Table 2. Acceptance criteria for DS450

DS450 Mass Ballot Count – Acceptance Criteria	Expected	Accepted
Did the memory registers overflow?	No	✓
Did the public counters increment appropriately?	Yes	✓
Did the tabulated results agree with predetermined vote totals?	Yes	✓
Number of errors (must not exceed 1 in 1,000,000 vote targets). An error is defined as a target scan that produces a result other than the expected result.	≤ 1/1M vote targets	✓
Number of multiple feeds (must not exceed 1 in 5,000 ballots). A multiple feed occurs when the machine pulls multiple ballots and does not "catch" the error.	≤ 1/5K ballots	✓
Number of incorrect rejections of ballots (must not exceed 3%)	≤ 3% total ballots	~

Contest Recounts

BVSC conducted a recount to verify compliance with section 102.141(7), F.S., and Rule 1S-2.031, Florida Administrative Code (governing recount procedures). BVSC selected one countywide race and one district-

wide race in the general election, and suppressed the results of all other races, as per rule. The recount was conducted using a DS450 high throughput tabulator.

Findings:

BVSC found that the voting system under test complied with applicable statutes and standards. ElectionWare allows the user to report results from only the affected races. Furthermore, a recount can be conducted on more than one race at a time, as demonstrated by processing both the countywide race and district-wide race in one recount.

Folded Ballots

Although Florida law and FVSS do not require this test, BVSC conducted a folded-ballot test to simulate the processing of vote-by-mail ballots. The objective was to observe the behavior of the DS450 tabulator when folded ballots are scanned.

BVSC created a test deck with 11-inch PPP election ballots and 17-inch primary election ballots. Different fold types were included in each test deck.

BVSC cast ballots into the DS450 and compared the results.

Findings:

The DS450 scanner operated as expected. It accepted all ballots it was programmed to accept, and rejected ballots it was programmed to reject, such as overvoted, undervoted, and write-in³ ballots.

Scanner Sensitivity

BVSC subjected the DS450 to scanner sensitivity testing. Since neither the DS850 nor the DS200 underwent a firmware change, these tabulators were not included in this test activity. Florida law and FVSS have no requirements for this test, so results are obtained for information purposes only. The purpose of the scanner sensitivity test is to observe the scanner's ability to read marks made by various types of marking instruments (pens, pencils, highlighters, etc.). The sensitivity test also demonstrates the scanner's ability to detect a marking when the vote target is not fully or properly marked (such as " $\sqrt{"}$, " χ ", "O", etc.).

BVSC created the test decks by marking the first position on blank ballots with various marking instruments. The test deck included two ballots for each marking instrument: a baseline ballot with selected ovals fully marked (), and a test ballot marked with a horizontal line 1 millimeter thick through the center of the target ($\boxdot{}$).

For testing the scanners' ability to detect a variety of improperly marked targets, BVSC marked the target using the vendor's approved pen (VL Ballot Pen - a BIC Grip Roller ball point pen (.7mm), Part# 6100). These results were compared to a baseline of the same targets, fully marked (), using the same pen.

Findings:

BVSC observed that the DS450 central count scanner is able to detect a wide variety of marks made by several different marking instruments. However, the scanner consistently detected marks by marking instruments limited to softer grades of pencil (2B to 6B), a black felt tip pen, and the vendor's

³ Write-ins are not included in primary election ballots; they were included in this test for observation purposes and to maximize test resources.

recommended pen (VL Ballot Pen). As such, the vendor clearly documents in its user manual and other documentation the recommended marking device(s).

Accessibility – Force

The force test is used to determine compliance with section 101.56062(1)(I), F.S., which requires that "the force required to operate or activate the controls must be no greater than 5 pounds of force." BVSC conducted the force test during an accessible-voting session on the ExpressVote using a calibrated Dillon model GL digital force gauge and multiple voter input methods: the touchscreen and the audio tactile keypad.

Findings:

No measurement exceeded the maximum of 5 pounds of force. BVSC found that the ExpressVote complied with section 101.56062(1)(I), F.S.

Accessibility – Sound Pressure Level

The sound pressure level test is conducted to verify conformance to section 101.56062(1)(g-i), F.S., which describes the sound pressure level standards for a voting system's audio voting features. BVSC conducted a sound pressure level test on the ExpressVote, whose firmware version changed since the last certification. BVSC tested the ExpressVote using the AVID brand audio headsets supplied by the vendor.⁴

BVSC used an ITU-T P.50⁵ test signal that was incorporated into an election definition. The test signal replaced the initial sound file normally heard by a voter at the beginning of an accessible voting session. The election definition repeated the test signal as a loop. BVSC captured instrument readings for the duration of the loop.

Findings:

BVSC found that the ExpressVote complies with the applicable statute. The results of the sound pressure level tests for the ExpressVote are in the table below.

Sound Pressure Level Test Results – ExpressVote				
	Average Maximum Volume (dBA) ⁶	Average Default Volume (dBA)	Gain (dBA) ⁷	Intermediate Level (dBA) ⁸
Right Headphone	100.98	63.10	37.88	76.40
Left Headphone	101.88	63.50	38.38	75.90

Table 3. Sound pressure level test results - ExpressVote

⁴ The vendor's application for certification lists "AVID [brand] stock headphones" in the Component Version List. The TDP recommends "3.5mm" headphones (ExpressVote Maintenance Manual, Firmware Version 1.4, Document Revision 1.0, September 15, 2017, pg. 8). The vendor supplied the following: AVID educational headphones (unmarked).

⁵ ITU-T P.50 - "ITU-T" is the telecommunication standardization sector of the "ITU," which is the International Telecommunication Union. ITU is a United Nations specialized agency for information and communication technologies. The "P.50" represents one of their "P Series" objective transmission standards/measures used for testing the transmission quality of artificial voices.

⁶ Must be greater than 97 dB (decibels weighted).

⁷ Maximum volume minus default volume. Must be greater than 20 dB.

⁸ Must be between (Default volume + 12 dB) and 97 dB.

Accessibility – Voter Interface

BVSC verified that the ExpressVote satisfies requirements for voter interface and interactions in accordance with applicable statutes and standards. Characteristics of the system such as ballot appearance, languages, input methods and feedback were examined.

Findings:

BVSC found that the ExpressVote complied with applicable statutes and standards.

Simulated Failure / System Recovery

BVSC tested the ability of both the ExpressVote and the DS450 to shut down in a controlled manner according to specifications, and recover from a simulated systems failure when the equipment is disconnected from the electrical outlet.

For the ExpressVote, BVSC staff powered up the unit and disconnected the AC adapter. The equipment was left running on battery power until the unit drained the battery and performed a shutdown operation. Ballots were marked at a rate of 8 ballots/hour during the test. BVSC reconnected the AC adapter and reviewed the audit log to determine the length of time the machine remained in a usable state before complete drainage of the battery power occurred. The table below reflects the outcome of this test.

Table 4. ExpressVote battery life test results

ExpressVote Battery Life Test Results			
	Battery Life per TDP	Actual Battery Life	
ExpressVote	At least 2 hours	5 hours 3 minutes	

The DS450 has no internal battery; however, ES&S recommends that the equipment be connected to an uninterruptable power supply (UPS)⁹ which will, according to TDP documentation, provide the ability to complete an interrupted run, initiate a controlled shutdown, and correctly save and disposition data on re-start.

Findings:

- The ExpressVote battery pack powered the device for longer than the stated minimum battery life. It is expected that in a real-world scenario, in which the unit would be utilized during the battery interval, battery power would drain quicker relative to the number of ballots processed.
- The DS450 unit successfully powered up, retained all counts and tabulation, and operated as expected. The DS450 does not allow ballot tabulation while the unit is on backup power. The unit displays a series of warnings and gives instructions for the user to save any unsaved data and manually power down the machine. In addition, the backup power supply emits a series of beeps at about 30-second intervals and the machine displays a final warning 60 seconds before performing a final shutdown.

⁹ ES&S recommended UPS specification: APC Back UPS RS 1500 or Back UPS Pro 1500

Modems

BVSC conducted regression testing of the ability of the voting system to report and accumulate results from precinct scanners via modem communication. Staff used the general election definition and test deck from the General mock election¹⁰, used earlier in this certification. Staff tested six DS200 precinct scanners, each using a different modem carrier or technology (landline, AT&T[®], Sprint[®], and Verizon Wireless[®]). Staff also used the PPP mock election test deck for a second modem test on a primary election.

Findings:

BVSC verified that the voting system performed as expected.

Source Code Review

BVSC examined the source code with Klocwork[®] static source code analysis tool. BVSC determined that *EVS 4.5.3.0, Version 1* source code posed no significant safety, security, or operational risks.

Conclusion

Qualification test results affirm that the voting system under test, *EVS Release 4.5.3.0, Version 1*, met applicable requirements of the Florida Voting Systems Standards, Florida Statutes and Administrative Rules, and HAVA for usability and accessibility. The Florida Division of Elections, Bureau of Voting Systems Certification, therefore, recommends certification of the referenced voting system.

¹⁰ The General mock election was conducted using the 2012 Miami-Dade County election definition. The vendor selected the election definition for testing based on requirements as stipulated in the test plan. Copies of this election definition were used to conduct additional testing, such as the modem test, due to availability and other test design considerations.

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ADA	Americans with Disabilities Act
BVSC	Bureau of Voting Systems Certification
CF	Compact Flash (memory cards)
COTS	Commercial off the Shelf (software/hardware)
EAC	U.S. Election Assistance Commission
EMS	Election Management System
ESS	Election Systems & Software, LLC
EVS	ElectionWare Voting System
F.S.	Florida Statutes
FVSS	Florida Voting Systems Standards
GB	Gigabytes
HAVA	Help America Vote Act
LAN	Local Area Network
L&A	Logic and Accuracy (voting system test)
MB	Megabytes
РРР	Presidential Preference Primary election
TDP	Technical Data Package
USB	Universal Serial Bus
VVSG	Voluntary Voting Systems Guidelines
XML	Extensible Markup Language
XSD	XML Schema file

Appendix B – Acronyms

Appendix C – Component Version List

The component version list describes in detail the components of the voting system.

[Redacted pursuant to section 282.318, Florida Statutes, and to the U.S. Department of Homeland Security's designation of elections as a critical infrastructure.]



Florida Department of State KEN DETZNER Secretary of State

Plaintiffs' Exhibit #29, page 17

Florida Voting System Standards



Florida Department of State Glenda E. Hood Secretary of State

Published by: Division of Elections Bureau of Voting System Certification

Form DS-DE 101, Eff. 1-12-05

Plaintiffs' Exhibit #30, page 1

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INTRODUCTION

Scope

This document is intended to serve as:

- a guide to applicants seeking certification or provisional certification of voting systems.
- a source of information on Florida's requirements and evaluation methods for voting system certification and provisional certification.

Section 101.015, Florida Statutes requires the Department of State, Division of Elections to establish minimum standards for the certification or provisional certification of hardware and software for electronic and electromechanical voting systems.

This document sets forth the required minimum standards, and:

• provides procedures for testing to determine if those standards have been met,

• provides procedures for certifying compliance with the minimum standards; and

• is intended to complement the provisions of Sections 101.015, 101.017, 101.56042, 101.5605, 101.5606, 101.56062, 101.5607, and 101.5608, Florida Statutes

No electronic or electromechanical voting system may be used by any county or municipality in Florida unless the Division of Elections has issued a certification or provisional certification of the voting system's compliance with Florida's requirements pursuant to the application and evaluation processes described in this document.

Definition of a Voting System

Section 97.021(39), Florida Statutes, states:

"Voting system" means, a method of casting and processing votes that functions wholly or partly by use of electromechanical, or electronic apparatus or by use of paper ballots and includes, but is not limited to, the procedures for casting and processing votes and the programs, operating manuals, tabulating cards, printouts and other software necessary for the system's operation.

A voting system consists of a configuration of specific hardware and software components, procedures and expendable supplies; configured into a system which allows votes to be cast and tabulated. No single component of a voting system, such as a precinct tabulation device, meets the definition of a voting system. Sufficient components must be assembled to create a configuration,

which will allow the system as a whole to meet all the requirements described for a voting system in this publication.

History of Voting System Certification in Florida

The 1989 Florida Legislature, in Chapter 89-348, Laws of Florida, passed groundbreaking legislation requiring:

- the Department to establish standards for electronic and electromechanical voting systems,
- all voting systems purchased on or after January 1, 1990, to comply with these standards, and
- all voting systems used on or after July 1, 1993, to comply with these standards

In response, the Department of State:

- began staffing the Voting System Section in January 1990,
- promulgated rules on Certification of Electronic or Electromechanical Voting Systems, Chapter 1S-5, Florida Administrative Code, effective March 28, 1990, and
- issued the first certification under the new law on April 19, 1990

The 1990 Florida Legislature, in Chapter 90-315, Laws of Florida, effective January 1, 1991, passed additional legislation requiring:

- the Department to establish standards for provisional approval of voting systems for innovative use,
- limitation of provisional approval to no more than two years,
- specific authorization by the Department for provisional use of a system in any election,
- contracts for use of provisionally certified systems to be approved by the Department, and
- a prohibition of Florida Counties and Municipalities entering into contracts for title to provisionally certified systems

In response, the Department of State:

- promulgated rules on provisional approval of Electronic or Electromechanical Voting Systems, Chapter 1S-7, Florida Administrative Code, effective February 1, 1993, and
- Issued the first provisional certification of a voting system on January 28, 1994.

In June 1998, the Division of Elections, Voting System Section, published the "Florida Voting Systems Standards" in an attempt to make the requirements for, and process of, certification and provisional certification easier to understand.

In November 2001 the Florida Voting Systems Standards were revised in compliance with Chapter 2001-40, Laws of Florida, the "Florida Election Reform Act of 2001."

In May of 2004, the Florida Voting Systems Standards were again revised to include accessibility requirements as provided in section 101.56062, Florida Statutes.

Federal Election Commission Voting Systems Standards

In January 1990, the Federal Election Commission published "Performance and Test Standards for Punch card, Marksense, and Direct Recording Electronic Voting Systems", also known as the "FEC Voting Systems Standards". Mr. Robert Naegele developed the FEC standards, under contract to the Federal Election Commission. In addition, Mr. Naegele also consulted with the Florida Department of State in the development of Rule Chapter 1S-5, Florida Administrative Code. For this reason there are numerous similarities between the FEC Voting Systems Standards and the Florida Voting Systems Standards.

A major rewrite of the Federal Election Commission Voting Systems Standards was published April 30, 2002.

As of this revision to the Florida Voting Systems Standards, the National Institute of Standards and Technology, NIST has begun work under the Help America Vote Act (HAVA) on the next generation of Federal Voting Systems Standards.

Applicants for Florida Certification and for Provisional Certification are cautioned. Compliance with the FEC Voting Systems Standards does not establish compliance with the Florida Voting Systems Standards. Some of the work product necessary to establish compliance with the FEC standards can be used to establish compliance with some of the Florida requirements. The staff of the Division of Elections, Voting Systems Section is available to assist you with any questions on application of the standards.

Independent Test Authorities

In May 1992, the National Association of State Election Directors, (NASED) published criteria for the accreditation of Independent Testing Authorities (ITAs) for voting system qualification testing.

NASED then seated an ITA Accreditation Committee charged with identifying and certifying ITA's capable of performing testing for compliance with the FEC Voting Systems Standards.

At publication of this document there are three NASED certified ITA's. They are CIBER, Inc., Systest, and Wyle Laboratories.

Wyle Laboratories and Systest conduct qualification testing for compliance with the standards in hardware and firmware components.

CIBER, Inc. and Systest conduct qualification testing for compliance with the standards in software components.

The United States Election Assistance Commission (EAC) administers the ITA testing program. Applicants desiring ITA qualification may contact any of the ITAs or the EAC to apply. Applicants for Florida Certification are cautioned; ITA qualification will not satisfy requirements for Florida Certification. It is imperative that applicants for Florida Certification notify the ITAs that the ITA test plans are to include specifications for the Florida Voting Systems Standards. The staff of the Department's voting system section is available to assist in the design of test plans to meet these standards.

Addresses for the EAC and the ITAs are:

U.S. Election Assistance Commission 1225 New York Avenue, NW, Ste. 1100 Washington, DC 20005 Telephone (202) 566-3100

www.eac.gov

CIBER, Inc. 7501 South Memorial Parkway, Suite 107 Huntsville, AL 35802 Telephone (256) 882-6900

Systest 1630 Welton St., Suite 500 Denver, CO 80202 Telephone (303) 575-6881

Wyle Laboratories 7800 Highway 20 West Huntsville, Alabama 35807-7777 Telephone (256) 837-4411

Florida Certification is Required

No governing body in this state shall use an electronic or electromechanical voting system until the Division has issued it a certificate of certification or provisional certification.

No governing body in this state may purchase or otherwise take title to any electronic or electromechanical voting system until the Division has issued it a certificate of certification.

No governing body in this state may use a provisionally certified system in any election, including any municipal election, without the authorization of the Division, pursuant to section 101.015(5)(c), Florida Statutes.

Release Control

Certifications and Provisional Certifications are issued for a specific configuration of components. The Division is required to be able to examine any system in any county and determine if it is a Florida Certified Voting System. In order to meet this requirement, copies of all source code, object code and hardware identification characteristics are retained by the Division for all certified and provisionally certified systems.

Any change to any component or to the configuration of the components creates a revised or new system, which must be again certified or provisionally certified before it can be used in any election. Where changes to certified systems are well documented and easily identifiable, it is much easier (and therefore less expensive for the applicant) to evaluate the resulting revised or new system.

Bureau of Voting Systems Certification

The Florida Voting System Certification program is administered by the Bureau of Voting System Certification, in the Division of Elections.

Address: Bureau of Voting System Certification Division of Elections Room 231, The Collins Building Tallahassee, Florida 32399-0250 Telephone 850 245-6220; Fax 850 245- 6236 E-Mail: <u>Votesys@mail.dos.state.fl.us</u> Website: <u>http://election.dos.state.fl.us</u>

CERTIFICATION PROCEDURES

Application for Certification or Provisional Certification

An applicant for certification or provisional certification must complete the Division's "Application for Certification or Provisional Certification of Voting System" Form: DS DE 71 (7-98). A copy may be found on the last page of this document. Additional copies are available from the Voting System Section. The applicant or the applicant's authorized representative shall sign each application, which will be accompanied by the following material:

- A schedule detailing the cost of acquisition and operation of the system includes, but is not limited to, the following component level information:
 - 1. Make, model number, and description of each major subsystem or component comprising the voting system submitted for certification, and stipulation to whether this is a required or optional subsystem or component.
 - 2. Specification as to whether items are new, used, or refurbished.
 - 3. Unit purchase price for each item listed including any quantity discounts that may be offered.
 - 4. Types of all available maintenance programs and cost for each type.
 - 5. Names and addresses of maintenance providers for all system components.
 - 6. Training costs including all on-site and off-site courses offered.
 - 7. Commercially available ballot card readers, printers, processors, and software.
 - 8. Supplies, services, and any other items of expense.

(NOTE: Applicants for provisional certification are not required to provide the information in items 3 through 6 above.)

- A statement of the current and future interchangeability of all sub-components.
- Technical data package, or TDP, which includes:
 - 1. System operator's manual
 - 2. Environmental requirements for storage, transportation, and operation, including temperature range, humidity range and electrical supply requirements

(If the applicant is requesting certification of a system, which includes components manufactured by others, environmental requirements as specified by the original equipment manufacturer must be included.)

- 3. User manuals detailing system functionality
- 4. Identification of all Independent Test Authority (ITA) qualification testing of the voting system or its components
- 5. Although it is not necessary for ITA tests to be conducted prior to filing an application for certification or provisional certification, all ITA qualification testing completed or in process at the time of application must be identified
- 6. Copy of a letter from the applicant, to each ITA, which;
 - a. Directs the ITA to send a copy of the completed ITA qualification report to the Division,
 - b. Authorizes the ITA to discuss their procedures and findings with the Division, and
 - c. Authorizes the ITA to allow the Division to review all records of any qualification testing conducted on the voting system or its components
- 7. The Approved Parts List (APL) for all elements of the system
- 8. Software and firmware documentation, information, and materials, including the following:
 - a. A copy of the release software, firmware, utilities, hardware, and instructions required to install, operate and test the voting system.
 - Diskettes, tapes, or compact disks containing copies of all source code files required to develop the system object code and firmware; with any utilities, hardware, and instructions required for the Division to read the source code on a personal computer with a MS-DOS or Microsoft Windows operating system;
 - c. System flow chart describing information flow; entry and exit points; and the relationship of programs, device drivers, data files, and other program components;
 - d. Identification of version, release, and modification levels of all software and firmware components;
 - e. Identification of the steps and procedures required to generate all program modules providing system functions for which certification or provisional certification is requested
 - f. Identification of all compilers, assemblers, development libraries, device drivers, operating systems, and monitors required to generate and operate the executable programs

- g. Identification of all program elements which are static and not subject to change in either content or use when distributed for sale, during testing, or during operation;
- h. Identification of all program elements which are not static and therefore are subject to change in content or use when distributed for sale, during testing, or during operation; and
- i. Procedures, hardware, and software required to compare program codes, pursuant to section 101.5607(1)(a), Florida Statutes, and, for purposes of verification, pursuant to section 102.141(5)(b), Florida Statutes.
- j. Description of all major subsystem interfaces between the election management system, voter interface devices, the absentee ballot subsystem, the results accumulation system, and the results reporting subsystem. This information must be in a format, which may be disclosed and available to the public.
- k. A complete revision history for all software and firmware modules.
- I. Entity Relationship (ER) diagrams and data dictionaries for all databases included in the system.

Materials enumerated above which have been filed for a previously certified version of a system, if identical for the system configuration in a current application may be specifically referenced in the technical data package in lieu of being filed again.

Review of Application

Upon receipt of a signed application form, and the required supporting material, for certification or provisional certification, the Division shall review the filing to determine if the application is complete. If the application is not complete, the applicant shall be notified, within 10 workdays of receipt of the filing with a letter of additional materials or information that must be included for the application to be considered complete.

Applicants have 30 days from receipt of the Division's notification to remedy any deficiencies in their application. If the application is not complete at the end of that time, the Division will deny certification. Such denial will be without prejudice toward future applications.

When the application is complete, the applicant will be notified of completion within 10 workdays of receipt of the last filing.

Examination of the Voting System

The Division shall examine all documentation and other material accompanying the application or provided by an ITA, to determine whether the voting system complies with the requirements the Florida Voting Systems Standards. If this examination cannot determine compliance with the Florida Voting Systems Standards, the Division will

request additional documentation from the applicant, or an ITA, or will require qualification testing to demonstrate the voting system's compliance with the standards.

Qualification Test Plans

If it determines that additional qualification testing is required, the Division shall prepare and present to the applicant a Phase One Qualification Test Plan, which will encompass:

- All tests and procedures to be conducted by the Division to determine compliance with the Florida Voting Systems Standards,
- All tests and procedures to be conducted by an ITA to determine compliance with the Florida Voting Systems Standards,
- An estimate of the costs of certification for which the applicant will be required to reimburse the Division, and
- Suggested times and locations for individual tests.

Phase Two tests and procedures are dependent on the outcome and experience gained in Phase One testing. Within 10 workdays of the successful conclusion of Phase One testing the Division shall prepare and present to the applicant a Phase Two Qualification Test Plan, which will include:

- All tests and procedures to be conducted by the Division to determine compliance with the Florida Voting Systems Standards,
- All tests and procedures to be conducted by an ITA to determine compliance with the Florida Voting Systems Standards,
- An estimate of the costs of certification for which the applicant will be required to reimburse the Division, and
- Suggested times and locations for individual tests.

A more comprehensive description of Phase One and Phase Two testing can be found beginning on page 65.

Qualification Test of the System

Upon receipt of the applicant's written agreement to the provisions of the Qualification Test Plan, the Division will conduct or arrange for examinations in accordance with the requirements of sections 101.5605 and 101.5606, Florida Statutes, and the Qualification Test Plan. Applicants for certification are expected to test their systems prior to the Division testing in order to avoid delays in the issuance of certifications.

Qualification Test Report

Within 10 workdays of the conclusion of each round of testing, the Division will issue a report stating whether the system has passed or was unsuccessful in the qualification testing, and detailing the specifics of any deficiencies. Should there be deficiencies, applicants have 60 days to file an amended certification application, which must

disclose the reasons for the insufficiencies, and detail the changes necessary to remedy them.

Within 10 workdays after completion of all successful qualification testing the Division shall issue a Qualification Test Report which documents the conduct of tests, results of tests and the Division's findings of compliance.

Upon receipt of the Qualification Test Report the applicant will file, with the Division, a copy of the entire voting software and firmware program in the format and type of media which will be released to the end-users of the system in the State of Florida.

Issuance of Certificates

Upon determining that the voting system complies with the requirements of the Florida Voting Systems Standards and that all required filings have been received in good order, the Division shall issue to the applicant a certificate of certification or provisional certification which attests that the electronic or electromechanical voting system complies with The Florida Election Code and Florida Voting Systems Standards.

The certificate shall include the name and release level of the voting system and shall identify the name and release level of the major components included in the voting system configuration for which certification or provisional certification is granted.

If the Division is unable to determine that the electronic or electromechanical voting system meets the requirements of The Florida Election Code and Florida Voting Systems Standards, it shall not issue a certificate of certification or provisional certification. The system will be removed from the Division's lists of certifications in progress. If the applicant requests a written report of the facts and law supporting the Division's conclusion, the Division shall provide such a report within 30 days of receipt of the applicant's written request.

Retention of Materials

All materials and equipment submitted to the Division pursuant to the certification procedures will be retained by the Division until:

- A minimum of 24 months after an applicant files written notification with the Division that it is abandoning efforts to seek certification or provisional certification of a voting system, or
- A minimum of 24 months after the last use of a system in the state of Florida, and upon notification by the system vendor and all end-users, that the system will no longer be utilized. At such time, the Division may cancel the certification if the materials are not needed to support certification of later versions of the system.

THE STANDARDS

Applicability

The Florida Voting Systems Standards are applicable to all voting systems which are submitted to the Division for certification or for provisional certification.

Because provisional certification is designed to allow for the approval of hardware and software for innovative use as well as new systems for actual election use, voting systems submitted to the Division for provisional certification are not required to have undergone the Hardware Qualification Tests prescribed in these standards.

Voting systems which have previously been issued provisional certification and which are submitted to the Division for certification must meet all applicable requirements of the Florida Voting Systems Standards.

Any modification made to any component or the configuration of a voting system which has already completed the qualification testing and met the requirements for certification or provisional certification will constitute a new release of the system and require a new certification or provisional certification.

If any personal computer, operating system, monitor, or other hardware and software products, that are available to the general public, are shown to be compatible with the operational and administrative requirements of the election programming, polling place or central counting environment, then they will be acceptable for election use. Such products are not required to have undergone the Hardware Qualification Tests prescribed in these standards.

Special purpose or limited-use products, including software and firmware monitors and operating systems that are developed solely for elections use, are required to undergo the testing prescribed in these standards.

Acceptance of Independent Test Authority Reports

All ITA (Independent Test Authority) qualification reports which are material to the Division's determination that a voting system may be certified will be evaluated to determine if the test procedures, records of testing, and reporting of results meet the requirements of the Florida Voting Systems Standards.

The evaluation process may include reviews of the ITA's records and interviews with the personnel of the ITA who designed, conducted, monitored or reported on the systems qualification testing.

If the Division cannot determine that the testing and reporting of an ITA meets the requirements of the Florida Voting Systems Standards, then the ITA qualification report shall not be used in determining whether a voting system can be certified by the State of Florida.

Within 10 workdays of determining that the testing and reporting of an ITA do not meet the requirements of the Florida Voting Systems Standards, the Division shall give written notification to the applicant and to the ITA. This notification shall state which requirements of the Florida Voting Systems Standards have not been satisfied, and describe the facts supporting the conclusion.

General Functional Requirements

Voting system functional requirements include all of the operations necessary to prepare the system for an election, to conduct an election, and to preserve the system for future election use. For the purpose of Florida Certification, the sequence of operations is divided into three phases:

- 1. "Pre-Voting" (operations which precede an election)
- 2. "Voting Functions" (election day and follow-up operations)
- 3. "Maintenance & Storage"

The functional requirements of a voting system shall begin with the definition and description of political subdivisions and offices within the jurisdiction. The requirements will conclude with the production of reports, which describe all system setups, configuration parameters, operational events, and tabulation results in hard copy, all of which should be secured in a transportable data storage medium.

The voting system shall include the capability to produce records, generated by the system components, or in some cases, by the system operators, from which all operations may be audited. Except for the storage of vote images, which shall be maintained in a random sequence, the records shall be created and maintained in the sequence in which the operations were performed.

Pre-Voting Functions

Ballot Definition

The system shall allow the user to produce or define ballots that conform to the specifications set forth in the sections 101.141 through 101.191, Florida Statutes.

Ballots generated by the system must contain identifying codes or marks, which are uniquely associated with their formats.

Audit record requirements of the ballot definition function shall be generated by the system. As a minimum, the records shall include, a record of the offices, the candidates, the measures provided for each ballot, valid responses, which voters are entitled to make, and a report, which identifies each of the ballot formats generated.

Ballot Installation

Provisions shall be made to assure that a ballot display format is properly selected for the polling place where it will be used and that it is matched to the programming device required to correctly interpret it.

Audit record requirements of the ballot installation function shall include, as a minimum, an acknowledgment or verification that the ballot display corresponds with the device required to interpret it.

Programming and Software Installation

A voting system shall provide a means of programming each piece of precinct count or central count equipment in accordance with the ballot requirements of the election and the jurisdiction in which the equipment will be used.

The programming must include a means for validating the correctness of the program and the correctness of its installation in the equipment or in a programmable memory device.

The system must provide a means to assure that non-resident or resident software installed for any election was properly selected and installed and that it correctly matches the ballot formats that it is intended to process.

The system shall support the use of test ballots to verify the correct interpretation of the ballot formats that it is programmed to process and to verify that voting data processing is accurate and reliable.

Provision shall be made, either procedurally or by hardware/software features, to assure that test data are segregated from actual voting data.

Audit records for this function shall be generated by the system and shall include the number of test ballots cast, the results generated from the test ballots, and a report, which identifies the version, modification, or release number of the resident and non-resident software.

Equipment Readiness Tests

Each component of the voting system shall contain provisions for verifying it is functioning correctly and, where operation of the component is dependent upon instructions specific to that election

Provisions for these tests shall include either manual or automatic execution of test and diagnostic procedures.

Audit records for this function shall be generated by the system and shall include an identification of the component or components, which produced unacceptable test results.

Consolidation and Verification of Precinct Results

Precinct count systems must include equipment for the consolidation of precinct polling place data at one or more central counting places and must make provisions for tests to verify the correct extraction of voting data from transportable memory devices or for the acquisition of such data over a communications link.

Verification shall include the use of manual security procedures and communications security devices, which will be used with the consolidation of actual voting data. In

addition, other tests may be necessary to assure the readiness of the equipment to accommodate administrative reporting requirements.

All systems shall generate, upon verification of the authenticity of the commands, a printed record of the following election identification data:

- The ballot format identification,
- The contents of each active candidate register by office and of each active measure register,
- An identification of all ballot fields which can be used to invoke special voting options such as write-in candidates, and
- Any other information as may be necessary to assure the readiness of the equipment and to accommodate administrative reporting requirements

All systems shall support the use of test ballots or other test devices to verify the correct interpretation of the ballot formats, which will be processed, and to verify the voting data processing is accurate and reliable.

Provisions shall be made, either procedurally or by hardware/software features, to assure that test data are segregated from actual voting data.

All documents related to or produced by this function shall become part of the audit record.

Verification at the Polling Place

Precinct count systems shall generate, upon verification of the authenticity of the commands:

- A printed record of the election identification data,
- The equipment unit identification,
- The ballot format identification,
- The contents of each active candidate register by office and of each active measure register,
- An identification of all ballot fields which can be used to invoke special voting options, and
- Any other information as may be necessary to assure the readiness of the equipment and to accommodate administrative reporting requirements

The documents relating to or produced by this function shall become part of the audit record.

Voting Functions

Polling Place Verification

Precinct count systems shall provide a means of verifying that:

• equipment has been installed at the correct polling place,

- equipment is in its initialized state, and
- equipment is ready for the casting of ballots or the processing of voted ballots

The proper execution of these functions shall be verified by means of an equipment-generated record, which must be retained as part of the audit record.

Party Selection

All voting systems shall provide a means, in a primary election, of enabling a voter to cast a ballot containing votes for the candidate of the party of his choice and for any and all non-partisan candidates and measures, while preventing the voter from voting for a candidate of another party.

The system shall provide a means in a general election of enabling the voter to select any candidate for any office, in the number allowed for the office, and to select any measure on the ballot.

Ballot Subsetting

In the event that the ballot contains candidates or measures for whom or upon which not all voters will be entitled to vote, the system shall provide a means of disabling that portion of the ballot for which the voter is not entitled to vote.

Enabling the Ballot

Upon the proper selection of the ballot to which a voter is entitled, the system shall provide a means of enabling the recording of votes.

Candidate and Measure Selection

All systems shall provide a method of voting, which complies with section 101.5606, Florida Statutes.

Standards For Electronic Voter Interfaces

The standard requires that system configurations must support installation of electronic voter interfaces at all precincts and central locations. All electronic voter interfaces provide the following voter functionalities:

- The audio ballot and video ballot must be able to work both separately and simultaneously. During such simultaneous operation, the audio ballot must clearly notify the voter that the video ballot is enabled.
- After the initial instructions, which the system requires election officials to provide to each voter, the voter should be able to independently operate the voter interface through the final step of casting a ballot without assistance.
- The voter must be able to determine the races, which he or she is allowed to vote in and to determine which candidates are available in each race.
- The voter must be able to determine how many candidates may be selected in each race.
- The voter must be able to determine whether the physical or vocal inputs given to the system have selected the candidates, which he or she intended to select.
- The voter must be able to review the candidate selections, which he or she has made.

- Prior to the act of casting the ballot the voter must be able to change any selection previously made and confirm the new selection.
- The system must communicate to the voter the fact that the voter has failed to vote in a race (under vote) or has failed to vote the number of allowable candidates in any race (under vote) and require the voter to confirm his intent to under vote before casting the ballot.
- The system must prevent the voter from over voting any race.
- The voter must be able to write in a candidate name in races, which allow write-in candidates.
- The voter must be able to review their write-in input to the interface, edit that input, and confirm that the edits meet their intent.
- There must be a clear, identifiable action, which the voter takes to "cast" the ballot. The system must make clear to the voter how to take this action, such that the voter has minimal risk of taking the action accidentally, but when the voter intends to cast the ballot, the action can be easily performed.
- Once the ballot is cast, the system must confirm to the voter that the action has occurred and that the voter's process of voting is complete.
- To ensure wheelchair accessibility, the voting booth will be a minimum of 30" wide and 19" deep. Inside the voting booth, voter operable controls will rest at a minimum height of 36" above the finished floor with a minimum knee clearance of 27" above the floor, or the voter interface device must be designed so as to allow their use on top of a table. Tabletop installations must include adequate privacy.
- Voter operable controls must be operable with one hand, including a closed fist. The force required to operate these controls will be no greater than 5 pounds and will not require and pinching or twisting of the wrist.
- Once the ballot is cast, the system must preclude the voter from modifying the ballot cast or voting or casting another ballot.

Audio Ballots

Electronic voter interfaces, which provide the voter with an audio presentation of the ballot and which allow the voter to communicate his or her intent to the voting system through vocalization or physical actions will hereafter be known as audio ballots. The standards, which apply to electronic voter interfaces, shall also apply to audio ballots. Voter operable controls on the audio ballot interfaces shall be discernable tactilely without actuating the controls. All audio ballot voter interfaces shall provide a voter-operated volume control that provides an amplitude of at least 97 dB SPL. If the volume control can exceed 120 dB SPL, the volume control will automatically reset to less than 120 dB SPL after every use.

Video Ballots

Electronic voter interfaces, which provide the voter with a video display and which allow the voter to communicate his or her intent to the voting system through vocalization or physical actions will hereafter be known as video ballots. The standards, which apply to electronic voter interfaces, shall also apply to video ballots. All video ballot voter interfaces must offer the election official who programs the system, prior to its being sent to the polling place, the capability to set the font size, as it appears to the voter, from a minimum of 14 points to a maximum of 24 points. Video ballots shall be designed so as to not require color perception. All text and graphics shall be in black or dark colors on a white or light-colored background.

Multilingual Capabilities

All system configurations must support all voter interface functions in at least the following languages English, Spanish, and Haitian Creole.

Undervotes and Overvotes

Marksense systems shall reject blank ballots and ballots with overvoted races. Electronic voter interfaces shall prevent a voter from over voting a race, and shall provide a means of indicating, to the voter, any races that may have been under voted before the last step necessary to cast the ballot.

Casting a Ballot

All systems shall provide a means for the voter to signify that the selection of candidates and measures has been completed.

The voter shall place the voted ballot into the ballot counting equipment or into a secure receptacle, or the system shall record an image of the completed ballot and signify to the voter that the ballot has been cast, in which case the system shall disable any further attempt to vote until it has been reset.

Post-Voting Functions

Closing the Polling Place

Precinct count systems shall provide a means for disabling further voting or counting of ballots at the time voting is no longer permitted.

The system shall produce a machine-generated record of the time the voting system was closed.

If counters are incorporated in the voting system, the readings of the public counter and the protective counter shall become a part of the audit record upon disabling of the equipment to prevent further voting.

Obtaining Polling Place Reports

Precinct count systems shall provide a means for obtaining a printed report of the votes counted on each voting device, and they shall provide a means for extracting this information to a transportable programmable memory device or data storage medium.

The printing of a report or the extraction of data shall be disabled until the proper sequence of events associated with closing the polling place is completed.

The system must incorporate provisions for telecommunicating the results of each precinct's tabulation to other data processing, reporting, or display equipment either locally or at a remote location.
The printed report shall contain the device audit log, which shall contain all exception conditions encountered while the voting device is enabled for voting or for counting ballots.

In the event that more than one voting device is used in a polling place, the system shall provide a means for consolidating the data contained in each voting device into one report for the polling place.

The generation of reports by the system shall be performed in a manner, which does not erase or destroy any ballot image, parameter, tabulation or audit log data. The system shall provide a means for assuring the maintenance of data integrity and security for a period of at least 22 months after closing of the polls.

Obtaining Precinct Reports

The system shall provide a means for centrally obtaining a printed report of the votes counted for each precinct.

The printed report may contain all information generated by the system audit log.

The generation of reports by the system shall be performed in a manner, which does not erase or destroy any ballot image, parameter, tabulation or audit log data. The system shall provide a means for assuring the maintenance of data integrity and security for a period of at least 22 months after closing of the polls.

Obtaining Consolidated Reports

The system shall provide a means for consolidating the data of all-polling places and absentee voter ballots into one report. This may include consolidation at one or more regional or remote sites.

Intermediate consolidation shall comply with the same security and procedural requirements as apply to the system as a whole and to the individual voting devices.

System Audit Log

The system audit log shall contain sufficient information to allow the auditing of all operations related to central site ballot tabulation, results consolidation, and report generation. It shall include:

- an identification of the program and version being run
- an identification of the election file being used
- a record of all options entered by the operator
- a record of all actions performed by the subsystem
- a record of all tabulation and consolidation input

The system audit log must be created and maintained by the system in the sequence in which operations were performed.

Access to Election Data

Provisions shall be made for authorized access to election results after closing of the polls and prior to the publication of the official canvass of the vote.

All systems must be capable of generating an export file to communicate results from the election jurisdiction to the Division of Elections on election night both during the accumulation of results and after all results have been accumulated.

The system may be designed so that results may be transferred to an alternate database or device. Access to the alternate file shall in no way affect the control, processing, and integrity of the primary file or allow the primary file to be affected in any way.

Early Processing of Absentee Ballots

If the voting system includes the facility for the early processing of absentee ballots as described in section, 101.68(2)(a), Florida Statutes, then the system must include restrictive controls which prevent the accidental or intentional release of results prior to 7:00 p.m. on election day.

The phrase "restrictive controls" refers to any of those features of a voting system, which when properly configured and used, will allow the canvassing board of elections to prevent any one person, acting alone, from reporting election result data in any form or medium which could be read by any person before 7:00 P.M.

Examples of such controls are passwords, keys, and specially coded ballots such as end cards which when withheld from the system and the console operator will make it impossible to output results.

Security

All voting system functions shall prevent unauthorized access to them and preclude the execution of authorized functions in an improper sequence.

System functions shall be executable only in the intended manner and order of events and under the intended conditions.

Preconditions to a system function shall be logically related to the function so as to preclude its execution if the preconditions have not been met.

Accuracy

A voting system must be capable of accurately recording and reporting votes cast.

Accuracy provisions shall be evidenced by the inclusion of control logic and data processing methods, which incorporate parity, and checksums or other equivalent error detection and correction methods.

Techniques employed for determining, from ballot images, whether a vote response is counted as valid shall be specified. Where a method is employed to interpret a valid

vote response from a range of sensed values, valid ranges or procedures for determining valid ranges shall be specified.

Data Integrity

A voting system shall contain provisions for maintaining the integrity of voting and audit data during an election and for a period of at least 22 months thereafter.

These provisions shall include protection against:

- the interruption of electrical power, generated or induced electromagnetic radiation
- ambient temperature and humidity
- the failure of any data input or storage device
- any attempt at an improper data entry or retrieval procedure

All voting systems shall be capable of re-tabulating voted ballots, which have been maintained as required above.

Software used in all voting systems shall monitor overall data read-write and transfer quality status, such as the number and types of errors which occur in any of the relevant operations on data.

Any uncorrectable error shall cause device operation to halt in a condition from which all previously stored data and system status are recoverable and shall provide an appropriate message to the voter and polling place official or device operator.

If an error causes device operation to halt in a condition from which previously stored data and system status cannot be recovered, then the operation of the device shall be suspended until the condition generating the errors is corrected.

Performance Characteristics

General Characteristics

Performance shall be specified by means of a single value or by two values. When a single value is specified, it shall be interpreted as an upper or lower single-sided 90% confidence limit, depending upon whether it is a lower bound on acceptable performance or an upper bound on unacceptable performance. When two values are specified, they shall consist of a Nominal Specification Value (NSV) which is the desired value of the characteristic, and the Minimum or Maximum Acceptable Value (MAV), and these values shall be interpreted as a two-sided 90% confidence interval.



For the purposes of	2. Ballot Definition
Florida Voting Systems	3. Control
Standards the following	4. Recording
SUBSYSTEMS will be	5. Conversion
examined:	6. Processing
	7. Reporting

Environment Subsystem

The Environment Subsystem includes shelter, space, furnishings and fixtures, supplied energy, environmental control equipment, and external telecommunications services.

The material supplied by the applicant shall include a statement of all requirements and restrictions regarding environmental protection, electrical service, telecommunications service, and any other facility or resource required for the installation, operation, and storage of the voting system.

- *Shelter*: All precinct count systems shall be capable of being stored in any enclosed facility ordinarily used as a warehouse and operated in any facility ordinarily used as a polling place.
- *Space*: There is no restriction on space allowed for the installation or erection of a voting system, except that the arrangement of the system shall not impede performance of the duties by polling place officials or the orderly flow of voters through the polling place.
- *Furnishings and Fixtures:* Any furnishings or fixtures provided for use with the voting system, and any components which are not a part of the system, but which are used to support its storage, transportation, or operation, shall comply with the Safety and Human Engineering requirements of the Florida Voting Systems Standards.
- *Electrical Supply:* Precinct Count systems shall operate with the electrical supply ordinarily found in polling places (120vac/60hz/1 phase). Central Count systems shall operate with the electrical supply ordinarily found in central tabulation facilities or computer room facilities (120vac/60hz/1 phase, 208vac/60hz/3 phase or 240vac/60hz/2 phase).
- *Environmental Control:* All voting systems shall be capable of being stored and of operation in the temperature ranges specified in the Environmental Conditions section of Florida Voting Systems Standards.
- *Data Networks:* Any voting system may utilize a local or remote data network. If a data network is used, all components of the network must comply with the environmental requirements for the voting system.

Ballot Definition Subsystem

The Ballot Definition Subsystem consists of hardware and software required to accomplish the functions outlined below.

System databases contained in the Ballot Definition Subsystem may be constructed individually, or they may be integrated into one database. These databases are treated as separate databases to identify the necessary types of data which must be handled and to specify, where appropriate, those attributes that can be measured or assessed for determining compliance with the requirements of this standard.

Administrative Database

The subsystem shall allow the user to generate and maintain an administrative database containing the definitions and descriptions of political subdivisions and offices within the jurisdiction. The environment in which all databases in the subsystem are maintained shall include all necessary provisions for security and access control.

The subsystem shall provide for the definition of political and administrative subdivisions where the list of candidates or contests may vary within the polling place and for the activation or exclusion of any portion of the ballot upon which the entitlement of a voter to vote may vary by reason of place of residence or other such administrative or geographical criteria.

Any database may be generated and maintained in any file structure suitable to the requirements of the jurisdiction. It is the intent of the database hierarchy described herein to ensure that data entry, updating, and retrieval be effectively integrated and controlled. Any structure, which provides the required functional capability, security, and privacy, is acceptable.

For each election, the subsystem shall allow the user to generate and maintain a candidate and contest database and provide for the production or definition of properly formatted ballots and software. This database shall be used by the system with the administrative database to format ballots or edit formatted ballots within the jurisdiction.

Ballot Generation

The subsystem shall provide a software capability for the creation of newly defined elections, for the retention of previously defined formats in that election, and for the modification of a previously defined ballot format.

- Such systems shall be designed so as to facilitate error-free definition of elections and their associated ballot layouts.
- The subsystem shall be capable of handling at least 500 potentially active voting positions, arranged to identify party affiliations in a primary election, offices and their associated labels and instructions, candidate names and their associated labels and instructions, and issues or measures and their associated text and instructions.
- The ballot display may consist of a matrix of rows or columns assigned to political parties or non-partisan candidates and columns or row assigned to offices and contests. The display may consist of a contiguous matrix of the entire ballot, or it may be segmented to present portions of the ballot in succession.

Election Programming

The subsystem shall provide a facility for the definition of the ballot, including the definition of the number of allowable choices for each office and contest, and for special voting options such as write-in candidates. It shall provide for all voting options and specifications as provided for in Chapter 101, Florida Statutes.

The subsystem shall generate all required masters and distributed copies of the voting program in conformance with the definition of the ballot for each voting device and polling place.

The distributed copies, resident or installed in each voting device, shall include all software modules required to monitor system status and generate machine-level audit reports, to accommodate device control functions performed by polling place officials and maintenance personnel, and to register and accumulate votes.

Ballot Validation

The subsystem shall provide a facility for executing test procedures which validate the correctness of election programming for each voting device and polling place and insure that the ballot display corresponds with the installed election program.

Control Subsystem

The Control Subsystem consists of the physical devices and software, which accomplish and validate the following operations.

Equipment Preparation - The Control Subsystem shall encompass the hardware and software required to prepare precinct voting devices and memory devices for election use. Precinct election preparation includes all operations necessary to install ballot displays, software, and memory devices in each voting device.

The Control Subsystem shall be designed in such a manner as to facilitate the automated validation of ballot and software installation and to detect errors arising from their incorrect selection or improper installation.

Predelivery Testing - Prior to delivery to the polling place or at any location where diagnostic and maintenance support are available, voting devices prepared as in the foregoing paragraph shall be subjected to a series of tests.

The Control Subsystem for all precinct count systems shall include hardware and software required to support these tests and the collection of data that verifies device readiness.

Resident test software, external devices, and special purpose test software connected to or installed in voting devices to simulate operator and voter functions may be used for these tests, provided that they have been separately tested and have proven to be reliable verification tools. They must be incapable of altering or introducing any residual effect on the intended operation of the voting device during any succeeding test and operational phase.

Tests at the Polling Place - The Control Subsystem includes hardware and software required to enable opening of the polling place, which includes preparing precinct count voting devices to accept voted ballots.

Prior to opening the polling place, the Control Subsystem shall test each device to verify its operational status. This test shall include, at a minimum:

- the production of a diagnostic test record indicating the number of hardware or software failures,
- the identification of the device and its designated polling place location,
- a record of the data stored in memory locations reserved for voting data,
- an indication that all tests were completed successfully or whether errors were encountered, and
- an indication that the device is ready to be activated for voting

Opening the Polling Place - The Control Subsystem includes hardware and software required to open the polling place by allowing voting devices to be enabled for voting. This hardware and software shall include an internal test or diagnostic capability to verify that all of the polling place tests specified in the preceding section have been successfully completed and, if they have not, to disable the device from voting until it has been tested and all tests successfully completed.

Enabling a Ballot - The Control Subsystem includes hardware and software required to enable the casting of a ballot in a general election and, in a primary election, to select the party affiliation declared by the voter, to enable all portions of the ballot upon which the voter is entitled to vote, and to disable all portions of the ballot upon which the voter is not entitled to vote.

Error Recovery - The Control Subsystem includes the hardware and software to enable recovery from a non-catastrophic failure of a device or any error or malfunction that is within the operator's ability to correct. Recovery shall mean the restoration of the device to the operating condition existing prior to the error or failure without loss or corruption of voting data previously stored in the device.

- This capability shall permit resumption of normal operation following the correction of a failure in a memory component or in a data processing component including the central processing unit.
- For systems other than DRE equipment, check pointing may be acceptable provided it occurs frequently enough to minimize the amount of reprocessing needed to recover from an error condition.
- This capability shall include recovery from any other external condition, which causes a voting device to become inoperable provided that catastrophic electrical or mechanical damage due to an external phenomenon has not occurred.

Closing the Polling Place - The Control Subsystem shall include hardware and software required to enable closing of the voting system, which includes disabling the casting of additional ballots and enabling the production of voting data reports. After closing, each device shall be tested to verify that the prescribed closing procedure was followed and that the device status is normal. This test, which may be automated, shall

include the production of a diagnostic test record that verifies the sequence of events and indicates that the extraction of voting data has been enabled.

Polling Place Reports - If a report of voting data for the polling place is required, the Control Subsystem shall include hardware and software required to produce a report of consolidated data from all devices in the polling place.

Recording Subsystem

For marksense precinct and absentee voter interfaces the Recording Subsystem consists of ballot cards or sheets and marking devices and electronic ballot interfaces.

It includes compartments or booths in which ballots may be conveniently voted and which screen the ballot from the view of others. It also includes secure containers for the collection of voted ballots.

For electronic voter interfaces, the Recording Subsystem consists of the video ballot display, audio ballot or tactile ballot and the mechanical, electro-optical, or electronic devices which are used to present the voter with the ballot and which can be actuated by the voter.

Marking Devices - Marking devices shall be capable of producing the geometrical or spectral properties required by the Conversion Subsystem, which interprets them.

Voting Booths - Voting booths, whether integral with the voting system or supplied as components of the voting system, shall comply with the following requirements:

- The booth shall be an enclosure which is integral with or which makes provision for the installation of the ballot marking or other interface device.
- The structure of the booth shall ensure its stability against movement or overturning during entry, occupancy, and egress by the voter.
- The booth shall provide privacy while it is occupied, and it shall be designed in such a way as to prevent observation of the ballot by any person other than the voter.
- The booth shall provide interior space and lighting sufficient to make the process of vote recording convenient and accessible to voters with or without physical handicap.

Ballot Boxes (and Ballot Transfer Boxes) - Secure containers shall be provided for the storage and transportation of voted marksense ballots. These containers shall be of a size, shape, and weight commensurate with their intended use. They shall provide for locks and seals as required by section 101.24, Florida Statutes.

Ballot boxes for precinct count systems may contain separate compartments for the segregation of unread ballots and ballots containing write-in votes or any irregularity which may require special handling or processing.

In lieu of compartments, the conversion subsystem may cause such ballots to be marked to facilitate manual segregation.

Conversion Subsystem

The Conversion Subsystem shall contain all mechanical, electromechanical, and electronic devices required to read or accept marks, or signals used to signify a voted

ballot and create input for the Processing Subsystem. This subsystem performs two major functions, ballot handling and ballot reading as follows:

Ballot Handling - This function consists of the acceptance of a ballot and its movement through the read station and into a collection station or receptacle. The applicant must cite ballot handling speed and capacity capabilities.

The ballot handling function must be able to detect conditions, which prevent the ballot from being read, such as misfeed, multiple feed, or a damaged ballot. When conditions are detected that prevent reading of the ballot, the system shall provide a warning message that indicates the error detected and how the error has affected the count.

If an error is detected, the reader shall halt in a condition, which permits the ballot causing the error to be removed or to be processed manually. The tabulation may then be continued or canceled and restarted.

As an alternative to halting the system, the system may use outstack handling which refers to the ability of the ballot reader to divert ballots when they are not read or when some condition is detected which requires that the ballots be segregated from normally processed ballots and given special handling according to the operating procedure for the system.

When detected, such ballots may be marked to facilitate their identification and removal. If multiple feed is detected, the ballot reader shall halt in a condition, which permits the operator to remove the unread ballots causing the error, and reinsert them in the input hopper. Frequency of multiple feed shall not exceed 1 per 5,000 feed cycles.

Ballot Reading - This function is limited to the conversion of the physical ballot image into an analogous electronic image; the interpretation of the electronic image is the function of the processing subsystem. Requirements for the ballot reading function include accuracy and reliability as defined below.

Accuracy

"Accuracy" refers to the inherent capability of the read heads to respond to marks and to distinguish between valid marks and extraneous marks, smudges, folds, etc.

It includes the conversion of the output of the read head electronic circuitry (in response to the presence or absence of a valid voting punch or mark and not to the presence of signals which fail to meet the detection criteria of a valid punch or mark) into digital signals which are transmitted to the processing subsystem.

Accuracy requirements apply both to the presence and to the absence of a punch or mark in any active ballot field.

Valid punches or marks shall be detected, invalid punches or marks shall be rejected, and no detection signal shall be accepted in the absence of a valid punch or mark.

The error rate measured by this criterion shall not exceed one part in 1,000,000.

Reliability

"Reliability" of this subsystem refers to its ability to sustain accuracy during the required operating period.

The conversion subsystem shall reliably read ballots which meet the printing tolerances specified for the system and which contain vote marks meeting the system's criteria for placement, size, and intensity. The rate of rejection of voted ballots, which meet these criteria, shall not exceed 3 percent.

Processing Subsystem

The processing subsystem contains all mechanical, electromechanical, and electronic devices required to perform the logical and numerical functions of interpreting the electronic image of the voted ballot and assigning votes to the proper memory registers.

Attributes of the processing subsystem, which affect its suitability for use in a voting system, are accuracy, speed, reliability, and maintainability. Subsystem reliability and maintainability requirements are contained in the Design, Construction and Maintenance Characteristics section of the Florida Voting Systems Standards.

Accuracy - Processing accuracy refers to the ability of the subsystem to receive electronic signals produced by vote marks and timing information, to perform logical and numerical operations upon these data, and to reproduce the contents of memory when required without error. Processing subsystem accuracy shall be measured as bit error rate, the ratio of uncorrected data bit errors to the number of total data bits processed when the system is operated at its nominal or design rate of processing in a time interval of 4 hours. The bit error rate shall include all errors from any source in the processing subsystem.

For all types of systems, the Maximum Acceptable Value (MAV) for this error rate shall be 1 part in 1,000,000, and the Nominal Specification Value (NSV) shall be 1 part in 100,000,000.

Memory Stability - Memory devices which are used to retain control programs and data shall have demonstrated at least a 99.5 percent probability of error-free data retention for a period of six months under the environmental conditions for operation and non-operation contained in the Environmental Conditions section of the Florida Voting Systems Standards.

Reporting Subsystem

The reporting subsystem contains all mechanical, electromechanical, and electronic devices required to print reports of the tabulation.

The subsystem also may include data storage media and communications devices for transportation or transmission of data to other sites.

Removable Storage Media - Storage media such as:

• programmable read only memory (PROM)

- random access memory (RAM) with battery backup
- magnetic tape or disk media which can be removed from the system and transported to another location for readout and report generation
- PCMCIA Cards

Such removable storage media shall utilize devices with demonstrated memory stability equal to at least a 99.95 percent probability of error-free retention for a period of six months under the environmental conditions for operation and non-operation contained in the Environmental Conditions section of the Florida Voting Systems Standards.

Communications Devices - Devices which may be incorporated in or attached to components of the system for the purpose of transmitting tabulation data to another data processing system, printing system, or display device shall not be used for the preparation or printing of an official canvass of the vote unless they conform to a data interchange and interface structure and protocol which incorporates some form of error checking.

Printers - All printers used to produce reports of the vote count shall be capable of producing alphanumeric characters and election, office, and measure substance, as well as alphanumeric entries generated as part of the audit log.

Design, Construction, and Maintenance Characteristics

Materials, Processes, and Parts

The approach to design shall be unrestricted, and it may incorporate any form or variant of technology, which is capable of meeting the performance requirements, and other attributes specified herein.

Precinct count voting systems - shall be designed in accordance with best commercial practice for microcomputers, process controllers, and their peripheral components.

Central count voting systems - and equipment used in a central tabulating environment shall be designed in accordance with best commercial and industrial practices.

The frequency of equipment malfunctions and maintenance requirements shall be reduced to the lowest level consistent with cost constraints. Applicants are encouraged but not required to use MIL-STD-454, "Standard General Requirements for Electronic Equipment," which is hereby adopted and incorporated by reference, as a guide in the selection and application of materials and parts.

Applicants shall prepare an Approved Parts List (APL) for submission as part of the technical data package. No unit submitted for qualification testing or any production units submitted for sale, shall contain parts or components not included in the APL.

Ballots - Ballots may be of any material and configuration consistent with the requirements of the system which can be used to prepare ballots meeting the requirements of the Florida Election Code.

Durability

Precinct count systems, their components, and associated vote recorders shall have a useful life of at least 8 years.

Central count sub-systems and their components shall have a useful life of at least 12 years.

Reliability

Reliability refers to the ability of the voting system and its components to operate correctly over a period of time. The measurement applied to this value is the Mean Time between Failure (MTBF) and is defined as the value of the ratio of operating time to the number of failures, which have occurred. A failure is defined as any event, which results in the loss or unacceptable degradation of one or more of the system functions.

The MTBF demonstrated during qualification testing, should be at least 163 hours. An event shall not be counted as a failure provided that the function can be fully restored within one-half hour for precinct count systems or one-quarter hour for central count systems. Restoration of function may be accomplished either by repair or by replacement of the defective components.

Maintainability

The design and physical characteristics of equipment determine the ease with which maintenance actions can be performed. Maintenance actions include all scheduled and unscheduled events, which are performed to:

- determine the operational status of the system and its elements
- adjust, align, or service circuits and components
- replace a circuit or component having a specified operating life or replacement interval
- repair or replace a circuit or component which exhibits a predetermined physical condition or performance degradation
- repair or replace a circuit or component which has failed and verify the restoration of the circuit, a component or the system to operational status

Qualitative measures of maintainability include:

- the ease of access to internal components
- the presence of labels
- the identification of test points,
- the provision of built-in test and diagnostic circuitry or physical indicators of condition
- the ease with which adjustment and alignment can be performed

• the ease with which electrical and mechanical interfaces may be disconnected to facilitate the removal and replacement of circuits and components

Quantitative measures of maintainability include the following indices:

Mean Time to Repair (MTTR) - MTTR is the average time required to perform a corrective maintenance task. Corrective maintenance task time is actual repair time, *excluding* logistic or administrative delays.

Corrective maintenance may also consist of substitution of the complete device or component, or it may consist of on site repair.

MTTR attributes of systems and components shall be sufficient to achieve, in combination with their MTBF, the required reliability and availability.

Maximum Repair Time (MAX) - The frequency distribution of active repair times for precinct count systems must demonstrate less than a 1 percent probability, and for central count systems less than a 5 percent probability, that an unscheduled maintenance action shall require more than 1.0 hour to complete.

In the event that this requirement is not met for any component or for the complete system, then an equivalent component or system shall be provided and placed in a ready standby state throughout the operating period.

Maintenance Ratio (MR) - Maintenance ratio is the ratio of total maintenance man-hours (MMH) to total operating hours (OH).

MMH shall equal the sum of the scheduled and unscheduled maintenance man-hours spent on all units of equipment in the system, and OH shall include the nominal time of system operation, including the time required to prepare the system for an election and the time required to conduct post-election operations.

The maintenance ratio for any type of system shall not exceed 0.25 MMH/OH.

Availability (Ai) - Availability is the probability that the system will respond to an operational demand.

It is the ratio of the time during which the system is operational (up time) to the total time period (up time plus down time).

System availability as here defined shall be at least 0.99, calculated based on the following formula: Ai = (MTBF)/(MTBF + MTTR)

Environmental Conditions

The environmental conditions applicable to the design and operation of voting systems consist of three categories:

1. The **NATURAL** environment It includes the effects of temperature, humidity, and atmospheric pressure.

2. The INDUCED environment

It includes both the effects of use, such as the proper and improper operation and handling of the system and its components during the election processes, and the effects of transportation and storage.

The ELECTROMAGNETIC SIGNAL environment It includes the exposure to and the generation of radio frequency energy.

Temperature

Voting systems of all types shall withstand exposure to the following temperature conditions during operation and non-operation.

Ambient Temperature Ranges			
(Degrees Fahrenheit)			
Operating		Non-Operating	
Maximum	Minimum	Maximum	Minimum
100	40	130	-15

Vibration

Voting systems shall withstand the vibration environment accompanying handling and transportation. The equipment shall have, or be provided with, a protective container enabling it to withstand, the conditions specified in the Vibration Test Procedure of this document.

Shock

Voting systems shall be capable of withstanding the conditions specified in the Test Procedure for Transit Drop and Bench Handling in this document.

Electromagnetic Radiation

Voting systems shall comply with the Rules and Regulations of the Federal Communications Commission Title 47, Part 15, Subpart J of the Code of Federal Regulations, incorporated herein by reference.

As defined therein, Precinct count voting systems shall be considered a "Class B" and Central count systems shall be considered a "Class A" computing device.

[Code of Federal Regulations, Title 47, Parts 0 through 19, is available from the Superintendent of Documents, U. S. Government printing office, Washington, D. C. 20402. Telephone (202) 512-1800]

Product Marking

Components of voting systems shall be identified by means of a permanently affixed nameplate or label containing the name of the manufacturer or applicant, the name of

the device, its part or model number, its revision letter, and its serial number. Power requirements, if any, shall also be specified.

A separate data plate shall be similarly affixed which contains a schedule for and list of operations required to service or to perform preventive maintenance on the component, if there are any such requirements. Caution and warning advisory instructions required to assure safe operation of the equipment and to avoid exposure of the voter or operating and maintenance personnel to hazardous electrical voltages and moving parts shall be provided.

Workmanship

Workmanship standards for voting systems shall meet or exceed standard commercial and industrial practice.

Interchangeability

Applicants for certification or provisional certification of voting systems and components shall utilize design and construction features, which maximize interchangeability and thereby facilitate maintenance and the incorporation of product revisions or improvements.

Safety and Human Engineering

Voting systems and components shall be designed so as to eliminate physical hazard to personnel or to the equipment itself.

Equipment design for personnel safety shall equal or exceed the appropriate requirements of the Occupational Safety and Health Act (OSHA) as identified in Title 29, part 1910 of the Code of Federal Regulations, incorporated herein by reference

(Code of Federal Regulations, Title 29, Parts 1900-1910.999, Revised July 1, 1997, Stock Number 869-004-00108-8, is available from the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402. Telephone (202) 512-1800)

Voting systems and components shall be designed and constructed to simplify and to facilitate the functions required and to eliminate the likelihood of erroneous stimuli and responses on the part of the voter or operator.

Controls and Displays

All controls used by the voter or equipment operator shall:

- be conveniently located,
- utilize designs which are consistent with their functions, and
- be clearly labeled

Instruction plates shall be provided if they are necessary to avoid ambiguity or incorrect actuation.

Information or data displays other than video ballot electronic voter interfaces shall be large enough to be readable by a person with normal eyesight from a normal operating distance with the level of ambient lighting suitable for equipment operation.

Status displays shall meet the same requirements as data displays, and they shall also follow conventional industrial practice with respect to color:

Colo	r	Indic	Indication	
	• • •	Green Blue White	en Normal status te	
	•	Amber	Warnings or marginal status	
	•	Red	Error conditions or equipment states which may result in damage to equipment or in hazard to personnel.	

Unless the equipment is designed to halt under conditions of incipient damage or hazard, an audible alarm shall also be provided.

Documentation

Product documentation shall be provided with voting systems or components. This documentation shall be sufficient to serve the needs of the VOTER and the USER for purposes of defining elections, voting, and operating and maintaining the system.

Voter Information

This documentation shall include instructions for voting.

User Information

This documentation shall include a description of all steps taken to install the system.

This documentation shall include a description of all steps taken to operate the system; including, at minimum:

- instructions for energizing the equipment
- verifying operational status
- identifying all abnormal equipment states,
- defining and verifying election programming
- processing and tabulating ballots
- controlling the tabulation process
- monitoring system status
- recovering from any error conditions that might arise in the process
- preparing the reports from the system

User Maintenance Information

This documentation shall contain:

 a complete physical and functional description of the equipment; how the processes of ballot handling and reading are performed, and how test and diagnostic information is acquired and used;

- a complete parts and materials list shall be provided which contains sufficient descriptive information to identify all parts by type, size, value, or range, and manufacturer's designation; and
- technical illustrations and schematic representations of electronic circuits shall be provided with indications of all test and adjustment points, fault detection, isolation, diagnostic, and correction procedures for commonly occurring operational abnormalities shall be provided.

Logistics

The applicant shall identify all operating and support requirements of the system or component. These requirements include material, facilities, and personnel.

Maintenance

The applicant shall identify all corrective and preventive maintenance tasks and the level at which they shall be performed.

Levels of maintenance shall include OPERATOR tasks, MAINTENANCE personnel tasks, and FACTORY repair.

Operator Tasks

Operator tasks shall be limited to the activation of controls to identify irrecoverable error conditions and to the replenishment of consumables such as printer ribbons, paper, and the like.

Maintenance Personnel Tasks

Maintenance personnel tasks shall include all field maintenance actions, which require access to internal portions of the equipment. They shall include the conduct of tests to localize the source of a malfunction; the adjustment, repair, or replacement of malfunctioning circuits or components; and the conduct of tests to verify restoration to service.

Factory Repair Tasks

Factory repair tasks shall be minimized. They shall only include complex and infrequent maintenance functions that require access to proprietary or to specialized facilities and equipment that cannot be obtained by the user. They shall not number more than 2 percent of all maintenance tasks, and their frequency shall not exceed 5 percent of the total frequency for all corrective maintenance tasks.

Supplies

The applicant shall recommend a standard complement of supplies, spares, and repair parts that will be required to support system operation. This list shall include the identification of these materials and their individual quantities, as well as sources from which they may be obtained. Supplies that are only available from the system vendor should be clearly identified.

Facilities

The applicant shall identify and specify all facilities, furnishings, fixtures, and utilities that will be required to support system operation, maintenance, and storage.

Personnel & Training

The applicant shall identify by function all personnel required to operate and support the system.

For each functional category, the number of personnel and their skills and skill levels shall be specified.

The applicant shall specify requirements for training of each category of operating and support personnel.

The applicant shall prepare and provide all proprietary materials required in the training activity and shall provide or otherwise arrange for the provision of qualified instructors on proprietary topics.

Subsystem Interfaces

In order to facilitate the use of components from various suppliers into voting system configurations, the system user documentation shall include documentation of all interfaces between the system's major subsystems. This documentation will include at minimum, the interfaces between the:

- election management system and voter interface devices,
- election management system and the absentee ballot subsystem,
- election management system and the results accumulation system,
- voter interface devices and the results accumulation system,
- absentee ballot subsystem and the results accumulation system

FLORIDA QUALIFICATION TESTS (TYPE, CRITERIA, EVALUATION & CONDITIONS)

- A Each Qualification Test is performed to evaluate the degree to which a system complies with the requirements of the Florida Voting Systems Standards
- The scope of each Qualification Test encompasses the entire range of environmental and operational factors that constitute the intended operating domain.
- Successful completion of each Qualification Test implies that the system or its components has met all applicable standards.

Physical Configuration Examination (PCE) this is a prerequisite to all testing.

The Physical Configuration Examination is an examination of the voting system configuration and the applicant's specifications for configuration. It is intended to verify that the voting system presented for testing is consistent with the configurations and support characteristics documented in the certification application.

Functional Configuration Examination (FCE) this is a prerequisite to all testing.

A Functional Configuration Examination is an examination to verify that the software complies with the applicant's documentation and the functional requirements of the Florida Voting Systems Standards. It is conducted so as to identify, inventory and document all elements of system functionality.

There are two categories of Qualification Tests. The order or sequence in which the individual tests within those categories are conducted is arbitrary, provided that the requisite preconditions of each test have been accomplished before it is begun.

The two categories are non-operating and operating:

Non-Operating Tests

These tests require the use of an environmental test facility. These tests are intended to evaluate the ability of the system hardware to withstand exposure to the various environmental conditions incidental to voting system storage, maintenance, and transportation. The procedures are based on test methods contained in Military Standard MIL STD 810D.

• Operating Tests

These tests are performed partly in an environmental facility and partly in a nominal test laboratory or shop environment. They involve operation for an extended period of time under various environmental conditions. The period of operation is sufficient to assure with confidence that the hardware meets or exceeds the minimum requirements for reliability and data accuracy contained in the Florida Voting Systems Standards. The procedure emphasizes equipment operability and data accuracy.

Testing Criteria

All equipment and computer programs used in a voting system shall be examined to determine their suitability for elections use and tested according to the procedures contained in the Florida Voting Systems Standards.

Equipment to be tested shall be equivalent in form and function with production units.

Engineering or developmental prototypes are not acceptable unless the applicant can show that the equipment to be tested will perform in all respects the same as, and are constructed in a manner representative of, standard production units.

Qualification tests shall not be required for the following types of equipment, and their suitability for election use shall be determined by functional tests that integrate them with the remainder of the system:

Standard production models of general purpose data processing equipment previously qualified with respect to the relevant requirements of the Florida Voting Systems Standards, or otherwise shown to be compatible with these requirements and with the voting system.

Any ancillary components which do not perform or interact with the performance of voting system programming, ballot reading, data processing, or the production of voting system output.

Qualification tests shall be used to determine compliance with applicable performance standards for the system and its components. The general procedure for these tests shall:

- **Verify**, by means of applicant's standard operating procedure, that the equipment is in a normal condition and status.
- **Establish** the standard test environment or the special environment required to perform the test.
- **Invoke** all operating modes or conditions necessary to initiate or to establish the performance characteristic to be tested.
- **Measure & Record** the value or the range of values of the performance characteristic to be tested.
- **Verify** all required measurements have been obtained, and that the equipment is still in a normal condition and status

Performance Evaluation

Test data shall be evaluated to determine compliance with the requirements of this standard. No system or component shall be judged acceptable unless it meets or exceeds all performance criteria specified in the Florida Voting Systems Standards and successfully completes the procedures contained in the remainder of this section.

If any malfunction or data error is detected that would be classified as a relevant failure defined by the test procedure, its occurrence and the duration of operating time preceding it shall be recorded for inclusion in the analysis and the test shall be interrupted. If corrective action is taken to restore the equipment to a fully operational condition within 8 hours, then the test may be resumed at the point of suspension.

If the test must be suspended for an extended period of time, a record of the procedures that have been satisfactorily completed shall be prepared. When testing is resumed at a later date, repetition of the successfully completed procedures shall not be required if:

- there has been no design or manufacturing change that would invalidate the applicability of the earlier test results,
- there has been no discovery of new or additional information about the system that would invalidate the earlier test plan or results, and
- data and records from the first test exist and can be used to restore the system to the state which it was in when testing was suspended so that the test may be continued from the point where testing was suspended

If a deficiency is apparent during testing, all failures which occurred as a result of the deficiency shall be classified as purged, and the test results shall be evaluated as though the failure or failures had not occurred, if the following are done:

- The applicant submits a design, manufacturing, or packaging change notice to correct a deficiency together with test data to verify the adequacy of the change;
- The examiner of the equipment agrees that the proposed change will correct the deficiency; and
- The applicant certifies that the change will be incorporated in all existing and future production units.

If corrective action cannot be successfully taken as outlined, the test shall be terminated, and the equipment shall be rejected.

Test Conditions

Qualification tests may be performed in any facility capable of supporting the test environment.

When a test is to be performed at "standard" or "ambient" conditions, this requirement refers to a nominal laboratory or office environment, with a temperature in the range of 68 to 75 degrees Fahrenheit, and prevailing atmospheric pressure and relative humidity.

Otherwise, all tests shall be performed at the required temperature and electrical supply voltage regulated within the following tolerances:

Temperature ±4 degrees F

Electrical supply voltage ±2 vac

Data Requirements

A test log of the procedure shall be maintained. This log shall identify the system and equipment by model and serial number. All test environment conditions shall be noted.

All operating steps, the identity and quantity of simulated ballots, annotations of output reports, the elapsed time for each procedure step, and observations of performance shall be recorded.

In the event that a deviation to requirements pertaining to the test environment, equipment arrangement and method of operation, the specified test procedure, or the provision of test instrumentation and facilities is required, this deviation shall be recorded in the test log together with a discussion of the reason for the deviation and a statement of the effect of the deviation on the validity of the test procedure.

Hardware Qualification Tests

Environmental Tests

(Non-Operating)

A suite to include the following sequences.... Transit Drop, Bench Handling, Vibration, Low Temperature, High Temperature, Humidity, Rain Exposure, and Sand & Dust Exposure

Environmental tests of non-operating equipment are intended to simulate exposure to shock and vibration associated with handling and transportation by surface and air common carriers and to temperature conditions associated with storage in an uncontrolled warehouse environment.

The procedures and conditions of these tests correspond generally to those of MIL STD 810D, "Environmental Test Methods and Engineering Guidelines," 19 July 1983, which is hereby adopted and incorporated by reference; however, the severity of the test conditions has, in most cases, been reduced to reflect commercial and industrial, rather than military and aerospace, practice.

(MIL-STD-810D is available from the Standardization Documents Order Desk, Building 4, Section D, 700 Robbins Avenue, Philadelphia, Pennsylvania 19111.)

All equipment shall be operated in a manner and environment that simulates election use to verify the initial functional status of the system. Prior to conducting each of the environmental and extended operational tests defined below, a test shall be made to determine that the operational state of the equipment is within acceptable performance limits.

The equipment may then be prepared as if for actual transportation or storage and subjected to one or more of the following procedures, as required. After each procedure has been completed, the equipment status shall again be operated in a manner and environment that simulates election use to verify the initial functional status of the system.

The following requirements for equipment preparation, functional tests, inspections, and data acquisition shall apply to each of the non-operating test procedures:

Pretest Data

The test technician shall verify that the equipment is capable of normal operation by means of the procedure described above in the Functional Tests section of the Florida Voting Systems Standards.

Equipment identification, environmental conditions, equipment configuration, tests instrumentation, operator tasks, time-of-day or tests time, and test results shall be recorded.

Preparation for Test

The equipment shall be prepared as for shipping or storage and shall include any protective enclosures or internal restraints normally used for transportation and handling.

Mechanical Inspection & Repair

After the test has been completed, the devices shall be removed from their containers, and internal restraints, if any, shall be removed. The exterior and interior of the devices shall be inspected for evidence of mechanical damage, failure, or dislocation of internal components. Devices shall be adjusted or repaired, if necessary.

Electrical Inspection & Adjustment

After completion of the mechanical inspection and repair, routine electrical maintenance and adjustment may be performed according to the manufacturer's standard procedure.

Test Data

A test log of the procedure shall be maintained. This log shall identify the system and equipment by model and serial number. All operating steps and observations of equipment condition and performance shall be recorded.

Transit Drop Test

All systems and components that are designed to be transported from place to place within a normal cycle of use, such as precinct tabulation equipment, shall meet the requirements of this test.

This test is equivalent to the Transit Drop Test for equipment weighing between 100 and 1000 pounds (corner drop), MIL STD 810D, Method 516.3, Procedure IV, except that the drop height specified in Table 516.3-II therein is reduced to 12 inches. Drops shall be made from a quick-release hook or drop tester.

Step #1	Arrange the system for normal operation.	
Step #2	Turn on power, and allow the system to reach design-operating temperature.	
Step #3	Perform any servicing and make any adjustments necessary to achieve operational	
	status.	
Step #4	Operate the equipment in all modes, demonstrating all functions and features that	
	would be utilized during election operations.	
Step #5	Verify that all system functions have been correctly executed.	
Step #6	Install each piece of equipment on the drop test fixture, positioned so that the point	
	of impact will be a corner of the container, and so that a vertical line through the	
	point of impact will pass through the center of gravity.	
Step #7	Perform the drop from a height of 12 inches.	
Step #8	Inspect the container. Record any evidence of damage.	
Step #9	Reposition the equipment and repeat steps 6 through 8, until a drop has been	
	performed on each corner, a total of eight drops.	
Step #10	Arrange the system for normal operation.	
Step #11	Turn on power, and allow the system to reach design-operating temperature.	
Step #12	Perform any servicing and make any adjustments necessary to achieve operational	
	status.	
Step #13	Operate the equipment in all modes, demonstrating all functions and features that	
	would be utilized during election operations.	
Step #14	Verify that all system functions have been correctly executed.	

Bench Handling Test

All systems and components shall meet the requirements of this test. This test is equivalent to the procedure of MIL STD 810D, Method 516.3, Procedure VI.

Step #1	Arrange the system for normal operation.
Step #2	Turn on power, and allow the system to reach design-operating temperature.
Step #3	Perform any servicing and make any adjustments necessary to achieve operational status.
Step #4	Operate the equipment in all modes, demonstrating all functions and features that would be utilized during election operations.
Step #5	Verify that all system functions have been correctly executed.
Step #6	Place each piece of equipment on a level floor or table as for normal operation or servicing.
Step #7	Make provision, if necessary, to restrain lateral movement of the equipment or its supports at one edge of the device. Vertical rotation about that edge shall not be restrained.
Step #8	Using that edge as a pivot, raise the opposite edge to an angle of 45 degrees and to a height of four inches above the surface or until the point of balance has reached, whichever occurs first.
Step #9	Release the elevated edge so that it may drop to the test surface without restraint.
Step #10	Repeat steps 7, 8, and 9 for a total of six events.
Step #11	Repeat steps 6, 7, 8, 9, and 10 for the other base edges, for a total of 24 drops for each device.
Step #12	Arrange the system for normal operation.
Step #13	Turn on power, and allow the system to reach design-operating temperature.
Step #14	Perform any servicing and make any adjustments necessary to achieve operational status.
Step #15	Operate the equipment in all modes, demonstrating all functions and features that would be utilized during election operations.
Step #16	Verify that all system functions have been correctly executed.

Vibration Test

All systems and components shall meet the requirements of this test. This test is equivalent to the procedure of MIL STD 810D, Method 514.3, Category 1 -- Basic Transportation.

Step #1	Arrange the system for normal operation.
Step #2	Turn on power, and allow the system to reach design-operating temperature.
Step #3	Perform any servicing and make any adjustments necessary to achieve operational status.
Step #4	Operate the equipment in all modes, demonstrating all functions and features that would be utilized during election operations.
Step #5	Verify that all system functions have been correctly executed.
Step #6	Attach instrumentation as required to measure the applied excitation.
Step #7	Mount the equipment on a vibration table with the axis of excitation along the vertical axis of the equipment.
Step #8	Apply excitation as shown in MIL-STD810D, Method 514.3, Figure 514.3-1, "Basic transportation, common carrier, vertical axis," with low frequency excitation cutoff at 10 Hz., for a period of 30 minutes.
Step #9	Repeat steps 7 and 8 for the transverse and longitudinal axes of the equipment with the excitation profiles shown in Figures 514.3-2 and 514.3-3, respectively. Note: The total excitation period equals 90 minutes with 30 minutes excitation along each axis.
Step #10	Arrange the system for normal operation.
Step #11	Turn on power, and allow the system to reach design-operating temperature.
Step #12	Perform any servicing and make any adjustments necessary to achieve operational status.
Step #13	Operate the equipment in all modes, demonstrating all functions and features that would be utilized during election operations.
Step #14	Verify that all system functions have been correctly executed.

Low Temperature Test

All systems and components shall meet the requirements of this test. This test is equivalent to the procedure of MIL-STD-810D, Method 502.2, Procedure I Storage. The minimum temperature shall be -15 degrees F.

Step #1	Arrange the system for normal operation.
Step #2	Turn on power, and allow the system to reach design-operating temperature.
Step #3	Perform any servicing and make any adjustments necessary to achieve operational
	status.
Step #4	Operate the equipment in all modes, demonstrating all functions and features that
	would be utilized during election operations.
Step #5	Verify that all system functions have been correctly executed.
Step #6	Arrange the equipment as for storage. Install it in the test chamber.
Step #7	Lower the internal temperature of the chamber at any convenient rate but not so
	rapidly as to cause condensation in the chamber and in any case no more rapidly
	than 10 degrees F. per minute until an internal temperature of -15 degrees F. has
	been reached.
Step #8	Allow the chamber temperature to stabilize. Maintain this temperature for a period of
	4 hours after stabilization.
Step #9	Allow the internal temperature of the chamber to return to standard laboratory
	conditions at a rate not exceeding 10 degrees F. per minute.
Step #10	Allow the internal temperature of the equipment to stabilize at laboratory conditions
	before removing it from the chamber.
Step #11	Remove the equipment from the chamber and from its containers, and inspect the
	equipment for evidence of damage.
Step #12	Arrange the system for normal operation.
Step #13	Turn on power, and allow the system to reach design-operating temperature.
Step #14	Perform any servicing and make any adjustments necessary to achieve operational
	status.
Step #15	Operate the equipment in all modes, demonstrating all functions and features that
	would be utilized during election operations.
Step #16	Verify that all system functions have been correctly executed.

High Temperature Test

All systems and components shall meet the requirements of this test. This test is equivalent to the procedure of MIL STD 810D, Method 501.2, Procedure I Storage. The maximum temperature shall be 130 degrees F.

Step #1	Arrange the system for normal operation.
Step #2	Turn on power, and allow the system to reach design-operating temperature.
Step #3	Perform any servicing and make any adjustments necessary to achieve operational status.
Step #4	Operate the equipment in all modes, demonstrating all functions and features that would be utilized during election operations.
Step #5	Verify that all system functions have been correctly executed.
Step #6	Arrange the equipment as for storage. Install it in the test chamber.
Step #7	Raise the internal temperature of the chamber at any convenient rate, but in any case no more rapidly than 10 degrees F. per minute, until an internal temperature of 130 degrees F. Has been reached.
Step #8	Allow the chamber temperature to stabilize. Maintain this temperature for a period of 4 hours after stabilization.
Step #9	Allow the internal temperature of the chamber to return to standard laboratory conditions, at a rate not exceeding 10 degrees F. per minute.
Step #10	Allow the internal temperature of the equipment to stabilize at laboratory conditions before removing it from the chamber.
Step #11	Remove the equipment from the chamber and from its containers, and inspect the equipment for evidence of damage.
Step #12	Arrange the system for normal operation.
Step #13	Turn on power, and allow the system to reach design-operating temperature.
Step #14	Perform any servicing and make any adjustments necessary to achieve operational status.
Step #15	Operate the equipment in all modes, demonstrating all functions and features that would be utilized during election operations.
Step #16	Verify that all system functions have been correctly executed.

Humidity Test

All systems and components shall meet the requirements of this test to evaluate the ability of the equipment to survive exposure to an uncontrolled temperature and humidity environment during storage.

This test is similar to the procedure of MIL STD 810D, Method 507.2, Procedure I -- Natural. The equipment shall be in a non-operating storage configuration, and a protective cover or enclosure shall be in place if the system configuration includes one.

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Step #1	Arrange the system for normal operation.
Step #2	Turn on power, and allow the system to reach design-operating temperature.
Step #3	Perform any servicing and make any adjustments necessary to achieve operational
	status.
Step #4	Operate the equipment in all modes, demonstrating all functions and features that
	would be utilized during election operations.
Step #5	Verify that all system functions have been correctly executed.
Step #6	Install the equipment in the test chamber. Adjust the chamber conditions to those
	given in MIL-STD-810D, Table 507.2-I for the time 0000 of the Hot-Humid cycle
	(Cycle 1).
Step #7	Perform a 24-hour cycle with the time and temperature-humidity values specified in
	Figure 507.2-1, Cycle 1.
Step #8	Repeat Step 7 until 5 24-hour cycles have been completed.
Step #9	Continue with the test commencing with the conditions specified for time = 0000
	hours.
Step #10	At any convenient time in the interval between time = 120 hours and time = 124
	hours, place the equipment in an operational configuration, and perform a complete
	functional test.
Step #11	If the equipment satisfactorily completes the functional test, continue with the sixth
	24-hour cycle.
Step #12	Perform 4 additional 24-hour cycles, terminating the test at time = 240 hours.
Step #13	Remove the equipment from the test chamber and inspect it for any evidence of
	damage.
Step #14	Arrange the system for normal operation.
Step #15	Turn on power, and allow the system to reach design-operating temperature.
Step #16	Perform any servicing and make any adjustments necessary to achieve operational
	status.
Step #17	Operate the equipment in all modes, demonstrating all functions and features that
	would be utilized during election operations.
Step #18	Verify that all system functions have been correctly executed.

Rain Exposure Test

All systems and components which are designed to be transported from place to place within a normal cycle of use, such as precinct tabulation equipment, shall meet the requirements of this test to evaluate the ability of the equipment to survive exposure to falling water from condensation, to leakage from upper surfaces, and to rain for a brief period of time incidental to transportation between a storage facility or polling place and a covered vehicle.

This test is similar to the procedure of MIL STD 810D, Method 506.2, Procedure II -- Drip. The equipment shall be in a non-operating, transportable configuration, and a protective cover shall be in place if the system configuration includes one.

Step #1	Arrange the system for normal operation.
Step #2	Turn on power, and allow the system to reach design-operating temperature.
Step #3	Perform any servicing and make any adjustments necessary to achieve operational
	status.
Step #4	Operate the equipment in all modes, demonstrating all functions and features that
	would be utilized during election operations.
Step #5	Verify that all system functions have been correctly executed.
Step #6	Install the equipment in the test facility. Provide a means of dispensing water at a
	rate of 7 gallons per square foot per hour, as illustrated in MIL-STD-810D, Figure
	506.2-1.
Step #7	Subject the equipment to water falling from a height of approximately 3 feet for a
	period of 15 minutes.
Step #8	At the conclusion of the 15-minute exposure, remove the equipment from the test
	facility. Open or remove panels as necessary to allow the interior to be inspected.
Step #9	Inspect the test item for evidence of water intrusion.
Step #10	Arrange the system for normal operation.
Step #11	Turn on power, and allow the system to reach design-operating temperature.
Step #12	Perform any servicing and make any adjustments necessary to achieve operational
	status.
Step #13	Operate the equipment in all modes, demonstrating all functions and features that
_	would be utilized during election operations.
Step #14	Verify that all system functions have been correctly executed.

Sand & Dust Exposure Test

All systems and components that are to be transported from place to place within a normal cycle of use, such as precinct tabulation equipment, shall meet the requirements of this test.

This test is similar to the procedure of MIL STD 810D, Method 510.2, Procedure I Blowing Dust. This test is intended to evaluate the ability of the equipment to survive exposure to dust and fine sand that may penetrate into cracks crevices, switches, display surfaces, and electromechanical parts. The equipment shall be in a non-operating, stowed configuration, and a protective cover shall be in place if the system configuration includes one.

Procedure

Step #1	Arrange the system for normal operation.		
Step #2	Turn on power, and allow the system to reach design-operating temperature.		
Step #3	Perform any servicing and make any adjustments necessary to achieve operational		
	status.		
Step #4	Operate the equipment in all modes, demonstrating all functions and features that		
	would be utilized during election operations.		
Step #5	Verify that all system functions have been correctly executed.		
Step #6	Install the equipment in a test facility that meets the requirements of MIL-STD-810D,		
	Method 510.2, Section II, and Subsection II-1.1.1.		
Step #7	Adjust the test section temperature to 23 degrees C. (73 degrees F.) and the relative		
	numidity to less than 30 percent. Maintain this relative numidity throughout the		
Stop #9	Adjust the air velocity to 1.5 meters per second (200 feet per minute)		
Step #0	Adjust the dust food control for a dust concentration of 10.6 + 7 grams per cubic		
Step #9	Adjust the dust feed control for a dust concentration of 10.0 \pm 7 grams per cubic meter (0.3 \pm 0.2 grams per cubic foot)		
Sten #10	Maintain the conditions of Steps 2 through 4 for at least 6 hours		
Step #10	Ston the dust feed and increase the test section air temperature to 32 degrees C		
Step #11	(90 degrees F) Maintain this condition until the internal temperature of the		
	equipment has stabilized.		
Step #12	Adjust the air velocity as in Step 3. Restart the dust feed to maintain the dust		
•	concentration as in Step 4.		
Step #13	Continue the exposure for at least 6 hours.		
Step #14	Turn off all chamber controls and allow the equipment to return to room		
	temperature.		
Step #15	Remove accumulated dust from the equipment by brushing, wiping, or shaking,		
	taking care to avoid introducing additional dust into the equipment. Do not remove		
	dust by air blast or vacuum cleaning.		
Step #16	Inspect the interior of the equipment for evidence of dust intrusion and damage.		
Step #17	Arrange the system for normal operation.		
Step #18	Turn on power, and allow the system to reach design-operating temperature.		
Step #19	Perform any servicing and make any adjustments necessary to achieve operational		
	status.		
Step #20	Operate the equipment in all modes, demonstrating all functions and features that		
	would be utilized during election operations.		
Step #21	Verify that all system functions have been correctly executed.		

Environmental Tests

(Operating)

Applicability

All systems and components shall meet the requirements of this test.

Test Design

This test is similar to the low temperature and high temperature tests of MIL STD 810D, Method 502.2 and Method 501.2, with test conditions that correspond to the requirements of the Performance Standard.

The temperature range for equipment operation

Ambient Temperature		
Ranges		
(Degrees Fahrenheit)		
Minimum Maximum		
40	100	

This test procedure is a Probability Ratio Sequential Test (PRST). The test design does not assess the specific values of test parameters. It provides decision criteria for accepting or rejecting one of two test hypotheses; namely, that the equipment demonstrates performance at least as good as the Nominal Specification Value (NSV) for the parameter or that it fails to demonstrate performance equal to or better than the Minimum Acceptable Value (MAV).

The probability ratio is derived from the exponential probability distribution. This distribution implies a constant hazard rate. Therefore, two or more systems may be tested simultaneously to accumulate the required number of test hours, and the validity of the data is not affected by the number of operating hours on a particular unit of equipment. However, no unit shall be subjected to less than two complete 24-hour test cycles.

Decision Risks

There are two decision risks associated with the PRST. One of these is called the "producer's risk"; it is the probability that a system will be rejected when, in fact, it is acceptable. The other is the "consumer's risk"; it is the probability that a system will be accepted when, in fact, it is unacceptable. In this procedure, values of 0.10 are used for both risks. Consequently, there is at least a 90 percent probability that the system will be accepted if its MTBF is as great as or greater than the NSV, and there is at least a 90 percent probability that the system will be rejected if its MTBF is as or lower than the MAV.

Test Materials

This test shall be performed with test ballots and a counting program which are sufficient to accomplish the procedural steps listed below and to demonstrate the data accuracy required by the acceptance criteria of this section.

Test Ballots

Test ballots shall be punched or marked so that a statistically significant number of votes will be obtained. A pattern of votes chosen to facilitate visual recognition of the reported totals is recommended, and this pattern need not exercise all possible voting locations and all ballot interpretation logic features.

Test decks should include at least 100 ballots, each with a minimum of 10 votes. A test deck will be read ten or more times per vote counting cycle, as specified below.

Counting Program

The ballot counting program for this test may be a simplified one, sufficient to process the test deck described above. However, the test ballot counting program shall enable system features such as data quality tests, error logging, and procedure tracking audit reports.

Procedure

This procedure involves system operation under various environmental conditions. Operation will consist of ballot counting cycles that vary with system type. The generation of an output report after each counting cycle is optional; however, the interval between reports is to be no more than 4 hours in order to keep the time between the occurrence of a failure or data error and its detection at a practical minimum.

Test Ballots per Counting Cycle		
Precinct Count Systems	100	
Central Count Systems	300	

The system shall be energized for the entire period of this test, and power may be disconnected only if necessary when the system is removed from the test chamber.

During each 12-hour segment of the following procedure, the equipment will be operated for at least 12 ballot-counting cycles, and it is recommended that the interval between successive operations not exceed 2 hours.

Each operation shall consist of the processing of the number of ballots indicated above for a ballot counting cycle. The performance shall be observed and recorded in detail and quantity sufficient to permit determination of the achieved level of performance for each characteristic.

Step #1	Arrange the equipment in the test chamber. Connect as required and provide for
	power, control, and data service through enclosure wall.
Step #2	Set supply voltage at 117 vac.
Step #3	Energize the equipment and perform functional tests.
Step #4	Set the chamber temperature at the low operating limit, observing precautions
	against thermal shock and condensation.
Step #5	Begin 24-hour cycle.
Step #6	At $T = 4$ hrs, lower the supply voltage to 105 vac.
Step #7	At $T = 8$ hrs, raise the supply voltage to 129 vac.
Step #8	At T = 11:30 hrs, return supply voltage to 117 vac. and return chamber temperature
-	to lab ambient, observing precautions as in Step 4.
Step #9	At $T = 12:00$ hrs, set the chamber temperature at the high operating limit.
Step #10	Repeat Steps 5 thru 8, with temperature at the high operating limit, complete at
-	T=24 hrs.
Step #11	Set the chamber temperature at the low operating limit as in Step 4.
Step #12	Repeat the 24-hour cycle as in Steps 5-10, complete at $T = 48$ hrs.
Step #13	After completing the second 24-hour cycle, disconnect power from the system and
-	remove it from the chamber.
Step #14	Reconnect the system as in Step 2, and continue testing until the ACCEPT/REJECT
	criteria of this section have been met.

Successful completion of the "Environmental, Operating" test shall be determined by two criteria.... The NUMBER OF FAILURES and the ACCURACY OF VOTE COUNTING

Failure Criteria

System acceptance or rejection on failures is determined by observing the number of relevant failures that occur during equipment operation.

Failure Acceptance Criteria			
Number of	ACCEPT	REJECT	
FAILURES	(if time greater than)	(if time less than)	
0	163 Hours		
1	245 Hours		
2	327 Hours		
3	409 Hours (a)	84 Hours (b)	
(a) truncate and ACCEPT (b) truncate and REJECT			

The test is terminated and an ACCEPT decision is reached when the cumulative number of equipment hours in the second column has been reached and the number of failures is equal to or less than the number shown in the first column.

The test is terminated and a REJECT decision is reached when the number of failures occurs in less than the number of hours tabulated in the third column.

In the event that no decision has been reached by the times shown in the last table entries, the test shall be terminated and the decision shall be declared as indicated therein.

Data Accuracy Criteria

Data accuracy criteria demonstrate that the accuracy requirements of these standards were achieved by the system under test. Test ballots for this test may be of any format which is capable of generating a large number of voting marks in each counting cycle. Ballot reading logic capability is not exhaustively tested by the procedure.

Procedure

In the event of discrepancy among the totals for any ballot position obtained on each of the ballot counting cycles or among the sums of the totals for all of the ballot positions, the following procedure shall apply.

Step #1	For each ballot position, compute the difference between the largest and the
	smallest totals.
Step #2	Sum the differences for all ballot positions.
Step #3	Sum the totals for all ballot positions on each counting cycle.
Step #4	Compute the sum of all ballot positions on all counting cycles.
Step #5	Compute the ratio of the sum of the differences from Step 2 to the sum of all votes
	from Step 4.
Step #6	If the ratio from Step 5 is less than 1/300,000, accept the system and terminate the
	test; otherwise proceed to Step 7.
Step #7	If the ratio from Step 5 is equal to or greater than 1/167,000, reject the system;
-	otherwise proceed to Step 8.
Step #8	If the Division and the applicant agree that the cause of the discrepancy can be
-	identified and corrected and if this corrective action is taken, repeat the test in its
	entirety; otherwise, reject the system.
System Qualification Tests

The applicant's source code and documentation shall be reviewed to verify that the software conforms to the documentation and that the documentation is sufficient to enable the Division to design and conduct all tests at any level of the software structure to verify that the software meets the requirements and objectives of its design specification.

Either the division staff or the ITA, which will conduct software qualification tests, shall witness compilation of the source code into baseline object code. The baseline object code and the object code tested must be identical. The object code tested and certified must be identical to the object code released. A copy of the baseline object code will be retained by the Division and used to verify that the baseline code, tested code, and the release code are identical.

Once the Division has conducted a review of system software and documentation, test plans shall be designed to exercise all system functions controlled by software under nominal load and data conditions and throughout the range of conditions for which performance is claimed.

The first phase of Florida System Qualification Testing is designed to evaluate the system software's functionality, and to establish baselines for the system being tested. Phase One testing typically consists of the following types of activities:

Audit of software and hardware configurations

- Audit object code against software to be used in testing, and verify installation CD's to be used in test against ITA final installs
- perform system configuration audits on all equipment
- delete software from test PC
- install system software
- print a directory of all software on test PC

Database construction

- enter election specifications for primary, and general elections
- enter jurisdiction, party, precinct, and polling place descriptions
- create ballot styles, and design a ballot face which incorporates all voting positions
- load election definitions onto PCMCIA cards
- test ballots on marksense or DRE system

At the conclusion of Phase One testing, copies of all program, and data files will be made and kept by the Division. These files will serve as a baseline for Phase II testing. Upon successful completion of all Phase I testing requirements, applicants may make arrangements for Phase II testing. Should anomalies arise during Phase I testing, any remedial measures undertaken by an applicant will be reviewed, and tested as a part of Phase II testing.

Phase II testing is designed to test for total system functionality. The following are among the functions which will normally be tested during Phase II of Florida's Qualification testing:

- casting the primary and general election ballots which were generated during Phase I testing
- voting absentee ballots
- tabulation of votes cast
- precinct closing
- results accumulation and consolidation
- transmission of results over communications link
- error recovery techniques
- manual editing of results, audit log production
- election night reporting
- high volume ballot processing test (if required)

Detailed information regarding specific tests, which may be required as a part of Florida System Qualification Testing, is provided to assist applicants in preparing for Qualification Testing ahead of time.

Precinct Count System Software

Qualification tests for **PRECINCT COUNT SYSTEM** software shall verify proper performance of all system functions and ballot counting logic. The number of test ballots processed by each precinct tabulator shall be at least 9,900.

Ballots counted during hardware test procedures may serve to satisfy all or part of this requirement provided that the ballots were marked and counted by procedures equivalent to one or more of the procedures listed below.

Туре	Testing Objectives	Procedures to be followed		
Precinct Count Systems	To prepare election programs	 (a) Validate resident firmware, if any. (b) Prepare software or firmware to simulate all ballot format and logic options for which the system will be used. (c) Validate program memory device content. (d) Procure test ballots with formats and voting patterns sufficient to verify performance of the test election programs. 		
	To program ballot counters	 (a) Install program and data memory devices, or verify presence if resident. (b) Verify functional status of hardware. 		
	To simulate opening of the polls.	 (a) Perform procedures required to prepare hardware for election operations. (b) Obtain "zero" printout or other evidence that data memory has been cleared. (c) Verify audit record of pre-election operations. (d) Perform procedure required to open the polling place and enable ballot counting. 		
	To simulate counting ballots	 (a) Cast test ballots in a number sufficient to demonstrate proper processing, error handling and audit log entry generation. 		
	To simulate the closing of the polls	 (a) Perform hardware operations required to disable ballot counting and close the polls. (b) Obtain data reports and verify correctness. (c) Obtain audit log and verify correctness. 		

Central Count System Software

Qualification tests for central count system software shall verify proper performance of all system functions and ballot counting logic. The number of test ballots processed by each central count system shall be at least 192,000 ballots. Ballots counted during hardware test procedures may serve to satisfy all or part of this requirement provided that the ballots were marked and counted by procedures equivalent to one or more of the procedures listed below.

Туре	Testing Objectives	Procedures to be followed		
Central Count Systems	To prepare election programs	 (a) Validate resident firmware, if any. (b) Prepare software or firmware to simulate ballot format and logic options sufficient to demonstrate proper processing, error handling, and audit log entry generation from at least 10 polling places or precincts. (c) Validate program memory device content. (d) Procure test ballots with formats, voting patterns, and format identifications sufficient to verify performance of the test election counting programs. 		
	To prepare for ballot counting	(a) Install program and data memory devices, or verify presence if resident.(b) Verify functional status of hardware.		
	To simulate counting ballots	 (a) Count test ballots in a number sufficient to demonstrate proper processing, error handling, and audit log entry generation. 		
	To simulate election reports	 (a) Obtain reports at polling place or precinct level. (b) Obtain consolidated reports, if this is a feature of the system. (c) Provide query access, if this is a feature of the system. (d) Verify correctness of all reports and queries. (e) Obtain audit log and verify correctness. 		

System-Level Tests

System level qualification tests require the integrated operation of both hardware and software. They include two examinations: an examination of the **PHYSICAL** attributes of the system and an examination of the **FUNCTIONAL** attributes.

Physical Configuration Examination

The Physical Configuration Examination (PCE) is an examination of the voting system configuration and the applicant's specifications for configuration to establish a configuration baseline for approval.

If the software is to be run on any equipment other than a standard data processing system mainframe, minicomputer, or microcomputer, the PCE shall include an examination of all drawings, specifications, technical data, and test data associated with the system hardware.

All subsequent changes to the system, which may result in a change in its operation, shall also be subject to re-examination.

Support

The applicant shall provide a list of all documentation and data to be examined, and applicant technical personnel shall be available to assist in the performance of the PCE.

Technical Data

The applicant shall provide the following technical data:

#1	Identification of all items which are to be parts of the software release.
#2	Identification of all hardware which interfaces with the software.
#3	Configuration baseline data for all hardware.
#4	Copies of all software documentation which is intended for users, including program listings, specifications, operator manuals, user manuals, and software maintenance manual.
#5	User acceptance test procedure and acceptance criteria.
#6	An identification of any changes between the physical configuration of the submittal and the configuration submitted for the FCE and a statement that these differences do not degrade the functional characteristics.
#7	In the event that changes are being submitted to previously qualified systems, a description of all changes and the results of all tests performed to verify the proper function of the changes.

Examination Procedure

The source code and documentation shall be reviewed to verify that the software conforms to the documentation and that the documentation is sufficient to enable the user to install, validate, operate, and maintain the voting system.

The review shall also include an inspection of all records of the baseline version against the release control system to establish that the configuration being qualified conforms to the engineering and test data.

Acceptance test procedures and data shall be reviewed to assess their adequacy against the system's functional specifications. These procedures shall be executed during the qualification test and any discrepancy or inadequacy in the applicant's plan or data shall be resolved prior to the initiation of the qualification test.

Functional Configuration Examination (FCE)

A Functional Configuration Examination shall be performed to verify that the software complies with the applicant's documentation and the functional requirements of the Florida Voting Systems Standards.

Test data may be used in partial fulfillment of this requirement; however, the Division or a representative of the Division shall perform or supervise the performance of additional tests to verify nominal system performance in all operating modes and to validate the applicant's test data reports.

Developer Support

The software developer shall provide a list of all documentation and data to be examined, and applicant technical personnel shall be available to assist in the performance of the FCE.

Technical Data

The software developer shall provide the following technical data:

#1	Copies of all procedures used for module or unit testing, integration testing, and
	system testing.
#2	Copies of all test cases generated for each module and test, sample ballot formats, or
	other test cases used for system tests.

Examination Procedure

The software developers test procedures and test results shall be reviewed to verify that all functional requirements contained in the Florida Voting Systems Standards have been adequately tested.

This review shall include an assessment of the adequacy of test cases and input data to exercise all system functions and to detect program logic and data processing errors if such be present, and shall also include an examination of all test data which is to be used as a basis for qualification, and all test data obtained from any procedure which is intended to be used as a basis for acceptance.

Appendix- Definitions

The following words and phrases shall be construed as follows when used in the Florida Voting Systems Standards:

- "Acceptance Test." The examination of a voting system and its components by the purchasing authority to determine if delivered units perform in accordance with procurement requirements.
- "Audio Ballot" A voter interface which provides the voter with audio stimuli and allows the voter to communicate intent to the voting system through vocalization or physical actions.
- "Audit Log." A system-generated record, in either machine readable or printed format, providing a record of activities and events relevant to initialization of election software and hardware, identification of files containing election parameters, initialization of the tabulation process, processing of voted ballots, and termination of the tabulation process.
- "Ballot Definition Subsystem." This subsystem consists of hardware and software required to define ballot layouts for an election and to prepare election-specific software and firmware.
- "Ballot Image." A corresponding representation in electronic form of the marks, or vote positions of a ballot.
- "*Baseline.*" The software configuration at the time of certification under this rule chapter. Future configurations of the software may be identified in terms of the baseline and the approved changes thereto.
- "*Bit Error Rate.*" The number of errors divided by the total bits that are processed, which is the gauge of system accuracy.
- "*Central Count System*." A voting system which tabulates marksense absentee ballots at a regional consolidation or central counting place.
- "*Certification*." Means the certification of the Division attesting that the voting system complies with the requirements of Sections 101.5605 and 101.5606, FS, rule chapter 1S-5. Florida Administrative Code and this document.
- "*Checkpointing*." A recovery method designed with the system, which saves all information necessary to define the state of the system at some specified point in time.
- "*Computer Program.*" A collection of instructions coded in a specific sequence according to specific rules that a computer can execute directly or that can be translated into object code that the computer can execute.

- "*Control Subsystem.*" This subsystem is resident in the voting or ballot counting device. It controls the readying of equipment and software for election use, pre-election validation testing, and readiness testing prior to opening the polling place.
- "*Conversion Subsystem.*" This subsystem is applicable only to marksense systems and consists of all devices and circuitry that are required to convert voting punches or marks into electronic signals.
- "Data Accuracy." A term that refers to the system's ability to process voting data free of internal system generated errors.
- "Data Integrity." A term that refers to the invulnerability of the system to incidental or deliberate manipulation that would induce processing errors.
- "DRE" or "Direct Recording Equipment Voting System." A DRE voting system is one that record votes by means of a ballot display provided with mechanical or electro-optical devices which can be actuated by the voter.
- "Division." The Department of State, Division of Elections.
- *"Driver."* A program or subprogram designed to control the operation of a specific piece of peripheral hardware, such as a card reader, printer, or disk drive. The driver takes into account the specific characteristics unique to the device.
- "Electronic Voter Interface." A subsystem within a direct recording equipment voting system which communicates ballot information to a voter in Video, Audio, or Braille form and which allows the voter to select candidates and issues by means of vocalization or physical actions.
- "*Functional Test.*" A test performed to verify or validate the accomplishment of a function or a series of functions.
- "ITA" or "Independent Test Authority." A provider of engineering, testing, or evaluation services, certified by the National Association of State Election Directors as qualified to conduct qualification testing on voting systems, or providers of engineering, testing, or evaluation services who can demonstrate to the Division that they have adequate facilities, personnel, experience, and quality control systems, to conduct qualification tests and report test results in compliance with the requirements of this rule.
- "*Marksense Voting System.*" A system where votes are recorded by filling in designated response fields on a paper ballot with pen or pencil.
- "*Modified System.*" Voting system which was previously certified or otherwise met the requirements of sections 101.5605 and 101.5606, Florida Statutes, but due to modifications of the system, must be reviewed to determine continued compliance.
- "*Monitor.*" A computer program that detects, interprets, and executes a function designated by closure of a switch or by keyboard input. An operating system is a more elaborate program (including a monitor) that also performs or controls other system functions.

- "*Object Code.*" The binary code produced by a compiler or assembler that can be executed directly by a computer without further simplification. A machine-language program is written in object code.
- *"Precinct Count System."* A voting system which tabulates ballots at the polling place. Typically, this system is used to process ballots after they are voted and programmed to print the results of the tabulation after the close of polling.
- "Processing Subsystem." This subsystem consists of hardware and software required to accumulate voting data for all candidates and measures at the machine and polling place levels, to consolidate the voting data at a central level or levels, to generate and maintain audit records, to detect and disable improper use or operation of the system, and to monitor overall system status.
- "*Qualification Testing*." The examination and testing of a voting system by the Division, a representative of the Division, or an ITA to determine if the system complies with applicable standards.
- "*Register.*" An internal memory location dedicated for use as a mathematical accumulator or storage of critical system values.
- "Source Code." A computer program written in a programming language and used to generate machine instructions through the use of assemblers or compilers.
- "*Validation*." A test to find errors in hardware or software. The test is executed in a real environment, i.e., during acceptance tests.
- "*Verification*." A test to find errors in hardware or software. The test is executed in a simulated environment, i.e., during system qualification.
- *"Video Ballot."* An electronic voter interface which presents ballot information and voting instructions as video images.



Florida Department of State Division of Elections Application for Certification or Provisional Certification of Voting System

Name of Applicant				
Address				
Address				
City		State	Zip Code	
Person to Contact				
Telephone	FAX		E-Mail	
Name and Release Level of Voting Syste	em			
Brief Description of Voting System				
Name and Release Level of Major Hardw	vare, Firmware and So	ftware Components	of the Voting System Config	guration

This application is for (check one):

- Image: Certification of a voting system
- Certification of modification to a previously certified voting system
- Provisional certification of a voting system

In making application for certification of the voting system listed above, I assert that the system meets the requirements of the Florida Election Code and the Florida Voting Systems Standards. I agree to reimburse the Department of State an amount equal to the actual costs incurred in examining the system.

Name (Print or Type)	Title	
Signature	Date	

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