OMB Control # 3265-0024.
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Voting System Anomaly Root Cause Analysis Template v2.0

Root Cause Analysis for:

VV40ECT-203: VxScan VxScan system did not trigger an error on start up - Rev. 1
VxSuite, Version 4.0 and EAC Certification #VXS4

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Introduction

This RCA documents an anomaly during VxScan hardware investigations, where an attempt was made to intentionally trigger an error on screen warning of a disconnected scanner. To attempt this, the poll worker door and scanner access door were opened, and a contact image sensor cable on top of the scanner was disconnected. After powering the unit off and on, at startup no error was immediately shown.

Anomaly Description

Complete all sections. Descriptions must be as detailed as possible, while being clear and concise since the anomaly is the source of the entire RCA. This detail should include a complete list and/or description of the "symptoms" of the anomaly and the conditions present which the symptoms occurred.

Date of Anomaly: September 11, 2025	Time of Anomaly: 4:04pm
Place of Anomaly: SLI, Wheat Ridge, CO	Person identifying Anomaly: Jessica Myers, VotingWorks
Expected Results of actions leading up to anomaly: Investigators expected the VxScan unit to show an error on-screen at startup indicating a disconnected scanner or similar warning.	
Detailed description of the event / anomaly: A cable was pulled inside the VxScan unit SC-11-006, in an attempt to trigger error messages on screen indicating scanner disconnection or similar warnings. To do this, the poll worker door and scanner access door were opened while the VxScan was powered on, and the contact image sensor (CIS) ribbon cable on top of the scanner was disconnected. It was noted that no errors appeared on screen at that time. The system was powered off and then on again with the CIS cable still disconnected. At reboot the VxScan unit did not show an error. An error was given only when a ballot was cast in an activated voting state, where the scanner failed to function properly.	

If the anomaly is repeatable, provide step by step instructions to recreate it:

1. Open the poll worker door and scanner access door in the VxScan unit (requiring breaking a seal if in use).
2. Disconnect the top CIS sensor now exposed on top of the scanner. Firmly pull the plastic CIS ribbon terminal out of its port, gripping at the plastic head. *Note:* Doing so increases the likelihood of damaging the unit, especially if the unit is powered on at the time.
3. Power on the unit and observe its function.

Chronology of Events / Timeline

Provide a detailed chronology of the events leading up to, and following, the anomaly. Add additional events if necessary.

ID	Date/Time	Description	Entity Org/person	Result / Notes
1	9/11/25, 4:04pm Mountain Time	Hardware investigations of VxScan unit SC-11-006 included pulling a CIS cable from the scanner while in use. The effects were relayed to VotingWorks.	Jessica Myers VotingWorks; with SLI	Initial observations at SLI were that no errors were indicated or warnings given about a disconnected scanner. Rebooting the unit also did not immediately show any errors. Errors were only given when attempting to scan. Discussions continued between VotingWorks and SLI to clarify that the CIS ribbon cable is not the scanner data connection or communication cable. It was known that disconnecting a different cable triggers an error about a disconnected scanner, not the CIS cable nor other cables under the sealed scanner access door that election managers can access.
2	9/15/25, 1:23pm	VotingWorks prepares strategies to explain when the scanner is disconnected and not to pull cables inside the scanner access door.	Jessica Myers, Jesse DeWald, VotingWorks	A few information-based tasks were prepared. First, instructions were prepared for testers on how to intentionally trigger an on-screen error saying that the scanner is disconnected; it involves opening up the VxScan unit further with tools and disconnecting the scanner data cable. Second, the VxScan instruction manual was updated with warnings against disconnecting any cables inside VxScan or under the scanner access door; normally only trained election managers who can break the seal of VxScan will access these cables. Finally plans were made to apply a

				warning label inside the unit on the scanner to prevent any disconnection of the cables on the scanner under the scanner access door.

Investigative Team and Method

This section shall describe how the investigative team is assembled by the voting system manufacturer, who it consists of, and how it gathers the data to be used in the analysis. Include the RCA method employed by the manufacturer in conducting the analysis and why this method was used.

Names and Positions of members of the investigation team:
Jessica Myers - Head of Compliance
Jesse DeWald - Head of Hardware
Describe the data gathering process: Jessica Myers received reports of the anomaly and coordinated the initial communications about the scanner function. Jesse DeWald provided more context on how the scanner works, and he coordinated expanding the information that VotingWorks shares about VxScan and these cables.

EAC (Election Assistance Commission) Root Cause Analysis

Describe which methodology(s) is used to conduct the root cause analysis:

An efficient and minimal process was used on initial reports of the anomaly, asking why the scanner disconnection error would not appear as desired. Communication with the tester revealed quickly that the scanner was not actually disconnected from the system, but instead a subcomponent cable – the CIS ribbon cable – was disconnected. This confirmed that the lack of error message was behavior that should be expected. Also scanner failures were expected since the CIS cable is a powered subcomponent of the scanner whose disconnection causes scanning problems, even though the scanner itself is still connected to the system.

Findings and Root Cause

Describe the findings of the investigation and explain the root cause(s) based on these findings. If the RCA results in findings that are not directly related to the root cause of the anomaly, these should also be captured as manufacturer product/process improvement steps in an effort to improve the voting system.

The root cause of the lack of errors appearing on screen after disconnecting the CIS cable was that the scanner was not actually disconnected from the system. It just rendered the scanner unable to scan, while the scanner could still communicate with the internal system.

A secondary root cause is that current documentation and labeling did not more clearly explain that the cables under the scanner access door should never be disconnected, and that users have no reason to disconnect the cables.

A related key finding was the confirmation in this unit that disconnecting the CIS cable while the power is on and continuing to use the system would cause failures.

Corrective Action(s)

Three actions were taken to address the anomaly:

1. User Manual updates to more clearly explain never to disconnect the cables under the scanner access door. This is included in explicit “Warnings” under the VxScan maintenance section here: https://docs.voting.works/vxsuite-user-manual-v4/system-maintenance/vxscan-maintenance-manual
2. Warning label to be applied to the internal scanner top surface under the scanner access door indicating with words and colors not to disconnect the cables there.
3. Communications with the investigators on how to intentionally trigger the scanner disconnection error by disconnecting the internal scanner data cable instead of the CIS cable.

Solution Management

The purpose of this section is to manage the corrective action(s) moving forward. This should detail all process changes to manage those corrective actions, and steps taken to ensure the actions eliminate the anomaly over time.

User instructions referenced during training will now explicitly warn against disconnecting the cables under the scanner access door. Election managers and other system administrators who have access to these cables will be more aware of this.

The hardware production process will include applying a warning label on the scanner. Standard build and QC processes will also check for this.