ES&S REPORT

DS200 Audit

Audit Date - April 4th 2012
Unit Serial Number – DS02103430445
Customer Unit number – 418 of 663
ES&S Evaluation Team
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The customer reported that the unit read ballots correctly when the unit was first powered on but after the unit had been left on for several hours it began to read ballots incorrectly creating over voted ballots on ballots that were not over voted.

Ballots used to evaluate the unit were sent to Omaha for evaluation to rule out the ballots as cause of the issue. The ballots were determined to be with in all specifications.

Physical condition of units - Before the unit was powered on the unit's physical condition was evaluated.

Overall condition of unit

1. Scratches – No major
2. Dents – None
3. Cracks - None
4. Dirt – Unit was very clean
5. Top CIS cable – Installed properly
6. Static brushes – Installed slightly high on one side. Not critical.
7. Paper dust, build up – Some build up on the static brushes, nothing major.

Overall condition of ballot box

1. Scratches – No major
2. Dents - None
3. Cracks - None
4. Dirt – Overall the unit was very clean
5. Fingers – Configured properly new style
6. Power cord installation – Proper with cord guard
7. Exit Door – New door with tapered edge installed
8. Wire ballot guide – Installed properly

Open back cover check

1. CIS cable – Routed correctly
2. Top and bottom read head alignment - Correct
3. Complete latch engagement - Correct
4. Screws and fasteners tight – No loose or missing fasteners noted
5. Belt tension - Correct

Open the transport and examine:

1. CIS glass – Slight smudge
2. Spring plate color, tension, and flatness – Some toner streaking
3. Mylar Tabs – Left tab was set in slightly, no issues on feeding
4. Roller tension - Correct
5. CIS height - Correct
6. Ultrasonic sensors – tight snap rings installed on unit
7. Page sensors – Clean and dust free

Overall the unit was found to be in good physical condition. The unit appeared to have been well maintained by the customer, with no physical signs of abuse or miss use.

After the physical examination a temperature probe was placed in the unit through the power switch door. Room temperature was 82° F. The temperature inside the unit was the same since it was powered off for several days. After the installation of the temperature probe, the unit was powered on. The CIS light was verified as green.

Firmware versions:

Scanner Firmware: 2.13.0.0
Power Management Firmware: 1.2.2.0
DS200 Firmware Version: 2.1.0.0

The customer's election was loaded onto the unit with newly prepared thumb drives. Using the customers ballots, ballots were scanned continuously for 1 hours without issue. On ballot number 152 marks were detected on a blank ballot. The internal temperature of the unit was 135° F. The same ballot was fed repeatedly with intermittent results. No other ballots seemed to be reading incorrectly.

During Lunch the unit remained on, with no ballots being feed. Lunch was about an hour in duration. The internal temperature of the unit was 139° F. After lunch almost every ballot read incorrectly, in all orientations, even ballots that had read correctly just before lunch. The CIS and white spring plates were cleaned. The unit continued to read ballots incorrectly.

The unit CIS and white plates were cleaned and the scanner calibration routine was run on the unit. The unit ran all ballots correctly from that point on. Over 300 hundred ballots were feed by ES&S, State, and Borough personnel, with all ballots being read correctly. The unit was powered off and the covers removed for about 30 minutes during the testing to cool the unit. No issues were noted after calibration.

The following day it was requested that Borough staff run the calibration routine on the unit after the unit was powered off all night, at the start of the work day. The unit would then be left on for at least 4 hours, and tested with the same election and ballots. The Borough reported that the unit read correctly during this test.

Conclusion

After this DS200 warmed up it read ballots incorrectly. Proper scanner calibration preformed on the unit resolved the issue. The temperature of the unit at the time of the calibration was not a factor. Ensuring that the CIS and white spring plates are cleaned before a scanner calibration is critical.

The CIS analog outputs were close to the black white pixel thresholds, as the unit warmed up the slight variation in the analog circuit caused pixels to become black, causing shadowing in the ballot image. The shadowing caused the ballot images to be interpreted incorrectly. Proper cleaning of the CIS and white spring plates will allow for proper scanner calibration that is tolerant to the slight variations in the analog circuitry with expected internal temperature variation.

Recommendations

1. Before performing scanner calibration ensure that the CIS and White spring plates on the DS200 are proper cleaned.
2. Before performing L&A testing on DS200s power the units on for at least 1 hour to allow the units to be at operating temperature. This will catch any units that were not clean and calibrated correctly.