Voting System Examination
Election Systems & Software (ES&S)

Prepared for the
Secretary of State of Texas

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Designee of the Attorney General

This report conveys the findings of the Attorney General's designee from an examination of the equipment listed, pursuant to Title 9, Chapter 122 of the Texas Election Code, section 122.036(b).

Examination Date	May 26, 2004
Report Date	June 19, 2004

ES&S offers a complete line of products for every aspect of conducting an election, including election setup, DRE, optical scanning, punch-card reading, tallying and reporting.

Components Examined	Version	NAESED Number
Unity Hardware Programming Manager	5.0.3.0c	Pending
Unity Data Acquisition Manager	5.0.3.1a	Pending
Unity Election Reporting Manager	6.4.3.0a	Pending
iVotronic DRE Voting Station	8.0.1.0r	Pending
iVotronic PEB Smart Ballot Memory	PEB1.07	Pending
Model 150/550 Scanners	2.1.0.0q	Pending

Voting: Characteristics of the Votronic and iVotronic DRE

Election Setup	Personalized Electronic Ballots (PEB) and separate flash memory cards are created with Unity software. Nothing is pre-programmed in the terminals; all the election information is in the PEB and flash memory. Anything that is precinct specific goes in the PEB. The flash memory is only required if the election is large or there are image or audio files.
Zero-total report	On the thermal printer in the communication pack.

Authorization to vote / Ballot selection	There are two modes: • At the voting station, the voter inserts a PEB, which was initialized at a Supervisor station using a supervisor PEB. (The supervisor PEB and station are both red, to distinguish them from voting stations and voter PEB's.) The voter's PEB cannot be reused without re-activation. • Poll worker inserts a supervisor PEB into a voting station, immediately removes it, and selects the appropriate ballot. The supervisor PEB is retained by the poll worker and is reusable without re-activation.
View / Vote	LCD display / touch screen
Vote Storage	Three redundant flash memories
Precinct Consolidation	Allowed using PEB's. An audit log of this is kept in memory and can be printed at the precinct.
Transfer Results	PEB transported or data transmitted by modem to Unity software (or a regional site from which data is sent to the Unity software at central counting). The data is protected by a Cyclical Redundancy Check (CRC).
Print precinct results	On the thermal printer in the communication pack.
Straight party / crossover	Yes. A straight-party vote cannot cancel crossover votes that have already been selected, which protects the voter against mistakenly canceling a crossover vote.
ADA	Yes, but ADA capability is verified separately by the Secretary of State's office, so it was not demonstrated to the examiners. Because it is battery-powered, the iVotronic can be taken to the curbside for voting.

Setup & Tabulation: Characteristics of the Unity System

Tamper Resistance	Cyclical Redundancy Check (CRC) on each record in the election files.
OS access	Not permitted during tabulation.
Real-Time Audit Log	Yes.
Data Integrity	There are no special transaction-processing features. According to ES&S, there is no need for such features because all the data is written in a single write statement, making it impossible for partial results to be entered into the database. Also, it is easy to recalculate everything if a problem is suspected, and everything is automatically re-calculated when you request a canvass report. Since a canvass report would always be requested, this is satisfactory. In short, it is nearly impossible to get an incorrect result and not know it.
Notes	• The Data Acquisition Manager is used in regional centers to collect precinct data for forwarding to central counting by modem or by carrying a PEB. • The Data Acquisition Manager does not need to know election-specific data or understand the results. It does not tabulate, but merely stores packets and then forwards them.

Items Corrected from Previous Exams

1. Previously, when the Election Reporting Manager was exited, no entry was made on the real-time audit log printer. This has been corrected and was verified during the exam.

Concerns

2. ES&S presented us with two sets of software change logs, one with their initial submission and another when they added additional equipment to be examined. The changes listed appeared to be completely different, even though the logs were for the same product and in some cases covered the same version range and the same date range. This examiner attempted to match the changes listed in two reports, on the assumption that they were the same changes but were reported in a different order and worded slightly differently, but found almost no duplication between the reports. ES&S told us that the newer reports are the accurate ones, but they offered no satisfactory explanation of where the other reports came from. At the exam, they submitted a third set of reports that were consistent with the second set, the only differences being some entries for additional changes made since the second set of reports.

   Example: There is almost nothing in common in the first two documents entitled *Election Reporting Manager: Change Release Summary,* both for version 6.4.3.0a and both dated April 9, 2004. It was necessary to mark the two reports with a pen to remember which report was the new one, since they bore the same date and title. There were similar problems with most of the change reports we received.

   Recommendation: Certification should be denied unless there is a satisfactory explanation. A development process that produces reports with contradictory information is not acceptable, and the integrity of the examination process relies on examiners receiving correct information from vendors.

3. In the Election Reporting Manager, an election can be configured to receive precinct data in "Add mode" or in "Replace mode." In Replace Mode, which is more frequently used, only the last data submitted from a precinct is included in the tally, and a confirmation is normally required before the old data is replaced. In Add Mode, no warning is given and multiple submissions for the same precinct are added together. Therefore Add Mode carries the risk that precincts could be counted twice.

   Recommendation: Add Mode should not be permitted in Texas. The software should refuse to configure any Texas election in Add Mode. Only temporary certification (say for one year) should be granted until this is fixed and re-examined.

4. The ES&S system allows the polls to be opened without printing a zero tape or clearing the totals, so both these requirements must be enforced by manual procedures.

   Recommendation: Clearing totals and printing a zero tape should be performed automatically when an election is opened the first time for actual voting. Election systems should not rely on fallible manual procedures to perform required actions that can be automated.

5. During the exam, there was a problem reading diskettes produced by both the Model 150 and the Model 550 scanners. This problem went away when the Election Reporting Manager was re-started, and then it could not be reproduced.

Recommendation: ES&S should investigate the problem and report to the examiners what they find.

6. When a diskette containing votes counted by a Model 150 or Model 550 scanner is inserted into the Election Reporting Manager twice, the data from the second attempt is ignored. There is no entry at all in the real-time audit log and there is no indication on the screen that duplicate data has been presented.

   Recommendation: This is a significant event that is required to be logged. Messages should be given both on the screen and in the real-time audit log. Provisional certification should be granted, but it should expire after approximately one year. After that time, certification should be denied until this problem is fixed.

7. Both scanners (Model 150 and Model 550) sometimes failed to read marks that appeared clear to the examiners.

   Recommendation: This problem is not serious enough to require that these machines be removed from service (at least not in the short term), and I understand that these scanners are no longer being sold. However, this does underscore the advantages of DRE equipment, which is inherently more accurate than paper-based systems. Jurisdictions should move toward DRE equipment.

8. Multiple provisional ballots can be assigned the same ID. If this were to happen, all ballots with the same ID would have to be counted or none would be counted.

   Recommendation: The ES&S system should reject a second provisional ballot with the same ID, and force the election workers to assign another, unique ID.

   Until this change is made, certification should carry the following conditions:

   a) The following procedure should be required: Labels should be preprinted with unique provisional ballot IDs. When such an ID is used, its label should be removed and placed on the documentation in the provisional envelope, thus preventing its accidental re-use.

   b) Certification should expire in approximately one year. After that time, certification should be denied unless the system is changed to reject duplicate use of the same provisional ballot ID.