

MODEL 100, 550 AND 650

**Election Systems and Software Unity Version 2.4.3,
Model 100 Version 5.0.0.0, Model 550 Version 2.1.1.0
and Model 650 Version 1.2.0.0**

Administrative Review and Analysis

**Prepared by:
Secretary of State Elections Division
September 3, 2004**

Table of Contents

I. Summary of the Application	3
II. Summary of the System	3
III. Testing Information and Results	5
IV. Compliance with State and Federal Laws and Regulations	5
V. Additional Considerations	16
VI. Public Comment	17
VII. Recommendation	17

I. SUMMARY OF THE APPLICATION

Procedures, hardware, firmware and software developed by Election Systems and Software (ES&S) for use with Unity v. 2.4.3, Model 100 v. 5.0.0.0, Model 550 v. 2.1.1.0 and Model 650 v. 1.2.0.0.

II. SUMMARY OF THE SYSTEM

This proposed system would be a modification to the currently certified Unity software package and Model 100, Model 550 and Model 650 optical scan voting systems. The application consists of four voting system components.

1. Unity v. 2.4.3

Unity is an election management system software package. Before an election, Unity is used by a jurisdiction to create the ballot definition for an election. Unity is then used to program the various media used by the different vote counting components. After the election, Unity is used to compile and tabulate election returns from throughout the jurisdiction. Finally Unity contains a series of additional reporting functions.

Unity actually is not a single program but a group of subcomponents. The following of these subcomponents were included in the California testing:

- Audit Manager 7.0.2.0
- EDM 7.2.1.0
- ESSIM 7.2.0.0
- HPM 5.0.3.0
- ERM 6.4.3.0

The modifications to the Unity software package in the 2.4 series fall into three categories:

- A. Modifications to improve or add functionality to the system. Three of these are of note in California. First, 2.4.3 adds support for the California primary. Second, it supports larger elections and ballots. Third, it adds absentee ballots cast to the Statement of Vote header.
- B. Modification to correct identified anomalies. Specifically, 2.4.3 corrects the error that resulted in the failed testing of version 2.4.2. This error caused the system to misreport results on longer or more complicated ballots.
- C. Modifications to bring the suite of programs into compliance with 2002 federal coding standards. Specifically, the modification brings the

programs associated with the Model 100, Model 550 and Model 650 into compliance with the new standards.

2. Model 100

The second component of the application is the Model 100 v. 5.0.0.0 voting system. The Model 100 is a precinct count optical scan voting system. The scanner is programmed using a removable PCMCIA memory card. The scanner is mounted on one of two different types of ballot boxes at the polling place. A voted ballot is then run through the machine and the vote stored on the aforementioned memory card. At the close of the polls the memory card is removed so the results can be added to the central tabulation system.

The Model 100 includes a built in printer to produce zero reports, close reports, audit reports, etc.

The modifications to the Model 100 improve or add functionality to the equipment. Some of these changes of note are improved detection of ballot problems including counterfeit ballots, improved handling of two-sided ballots, improved calibration reports and support for larger elections.

3. Model 550

The third component of the application is the Model 550 v. 2.1.1.0 voting system. The Model 550 is a central count optical scan voting system. The scanner is programmed using a removable EPROM memory chip. Ballots are then run through the scanner. Once scanning is completed, a floppy disk is used to store the results so that they can be added to the central tabulation system.

The Model 550 includes two attached printers used to produce zero reports, close reports, audit reports, etc.

The modifications to the Model 550 allow for more ballot styles per precinct. This is a specific requirement for the California primary.

4. Model 650

The final component of the application is the Model 650 v. 1.2.0.0 voting system. The Model 650 is a central count optical scan voting system. The scanner is programmed using a removable zip disk. Ballots are then run through the scanner. Once scanning is completed, results are stored to the aforementioned zip disk so that they can be added to the central tabulation system.

The Model 650 includes two attached printers used to produce zero reports, close reports, audit reports, etc.

The modifications to the Model 650 allow for more ballot styles per precinct. This is a specific requirement for the California primary.

III. TESTING INFORMATION AND RESULTS

1. Federal Testing

Letters have been received from the Independent Testing Authorities (ITAs) confirming the successful completion of federal testing. Testing reports have been received for hardware and firmware testing on the Model 100, 550 and 650. The Secretary of State's office has not yet received an ITA report on Unity 2.4.3.

A NASED # has not yet been issued. While some system components were tested against the 1990 standards, the final qualification will be to the 1990 standards.

The Model 100 v. 5.0.0.0, Model 550 v. 2.1.0.0 and Model 650 v. 1.2.0.0 were previously qualified with Unity v. 2.4.2.

2. State Testing by the Secretary of State and Consultant.

Unity v. 2.4.2 and the Model 100 v. 5.0.0.0 and Model 650 v. 1.2.0.0 were unsuccessfully tested in Omaha, Nebraska in conjunction with the state's technical expert, Mr. Steve Freeman. Unity 2.4.3, the Model 100 v. 5.0.0.0, the Model 550 v. 2.1.1.0 and the Model 650 v. 1.2.0.0 were successfully tested in Sacramento, California on August 19, 2004 and August 22, 2004 by Secretary of State staff and Mr. Freeman.

IV. COMPLIANCE WITH STATE AND FEDERAL LAWS AND REGULATIONS

The Secretary of State of California has developed and promulgated a procedure for approving, certifying, reviewing, modifying, and decertifying voting systems, vote tabulating systems, election observer panel plans, and auxiliary equipment, materials and procedures.

Four sections of this procedure, Sections 103, 104, 504, and 601, describe in detail the requirements any voting system must meet in order to be approved for use in California elections. These sections will be described in detail and the system will be analyzed for compliance in this Administrative Review and Analysis of the system.

1. §103 (a) (1): The machine or device and its software shall be suitable for the purpose for which it is intended.

The system meets this requirement.

2. §103 (a) (2): The system shall preserve the secrecy of the ballot.

The system meets this requirement.

3. §103 (a) (3): The system shall be safe from fraud or manipulation.

See section V of the staff report.

4. §103 (a) (4): The system shall be auditable for the purposes of an election recount or contest procedure.

The system meets current requirements relating to audits for the purposes of an election recount or contest procedures.

5. §103 (a) (5): The system shall comply with all appropriate federal and California laws and regulations.

The system meets this requirement.

6. §103 (a) (6): The system shall have been certified, if applicable, by means of qualification testing by a Nationally Recognized Test Laboratory (NRTL) and shall meet or exceed the minimum requirements set forth in the *Performance and Test Standards for Punch Card, Mark Sense, and Direct Recording Electronic Voting Systems*, or in any successor voluntary standard document, developed and promulgated by the Federal Election Commission.

The system has not yet received a federal qualification number.

7. §103 (b): In addition to the requirements of subdivision (a) of this section, voting systems, procedures, and equipment approved and certified by the Secretary of State shall promote accessible voting opportunities for persons with physical disabilities.

The system is no more or less accessible than the current system being used.

8. §104 (a): Certification consists of three separate levels of testing: qualification, certification and acceptance.

Qualification was completed to the 1990 qualification standards.

A technical consultant to the Secretary of State performed state certification testing.

Acceptance testing would be conducted by the county elections official once a county takes receipt of the modifications.

9. §104 (b): Certification tests shall include functional tests and qualitative assessment to ensure that the system operates in a manner that is acceptable under federal and state law and regulations.

It is the opinion of the expert technical consultant that the scope of the certification test was adequate to make basic recommendations and observations about the logical accuracy, some user friendliness issues, and compliance with state law.

10. **§104 (c): Certification tests shall enhance public confidence by assuring that the system protects the secrecy of the ballot and the security of the voting process, and records and counts votes accurately.**

See section V of the staff report.

11. **§104 (d): Certification tests shall promote public confidence that the system is easy to use or ‘voter friendly.’**

The proposed system is not any less voter friendly than the currently certified system.

12. **§104 (e): Certification testing shall demonstrate that the system creates an audit trail showing both that the voter was able to vote for the candidate or for or against a measure of his or her choice and that the system correctly and consistently interpreted the voter’s votes.**

The basic audit trail is adequate.

13. **§504: The Evaluation shall include a review of California Elections Code sections, which address the application.**

A review of the appropriate Elections Code sections was conducted.

§15360. During the official canvass of every election in which a voting system is used, the official conducting the election shall conduct a public manual tally of the ballots tabulated by those devices cast in 1 percent of the precincts chosen at random by the elections official. If 1 percent of the precincts should be less than one whole precinct, the tally shall be conducted in one precinct chosen at random by the elections official.

In addition to the 1 percent count, the elections official shall, for each race not included in the initial group of precincts, count one additional precinct. The manual tally shall apply only to the race not previously counted.

The system meets this requirement.

§19300 Permit the voter to vote for all the candidates of one party or in part for the candidates of one party and in part for the candidates of one or more other parties.

The system meets this requirement.

§19301. A voting machine shall provide in the general election for grouping under the name of the office to be voted on, all the candidates for the office with the designation of the parties, if any, by which they were respectively nominated.

The designation may be by usual or reasonable abbreviation of party names.

The system meets this requirement.

§19302. The labels on voting machines and the way in which candidates' names are grouped shall conform as nearly as possible to the form of ballot provided for in elections where voting machines are not used.

The system meets this requirement.

§19303. If the voting machine is so constructed that a voter can cast a vote in part for presidential electors of one party and in part for those of one or more other parties or those not nominated by any party, it may also be provided with: (a) one device for each party for voting for all the presidential electors of that party by one operation, (b) a ballot label therefore containing only the words "presidential electors" preceded by the name of the party and followed by the names of its candidates for the offices of President and Vice President, and (c) a registering device therefore which shall register the vote cast for the electors when thus voted collectively.

If a voting machine is so constructed that a voter can cast a vote in part for delegates to a national party convention of one party and in part for those of one or more other parties or those not nominated by any party, it may be provided with one device for each party for voting by one operation for each group of candidates to national conventions that may be voted for as a group according to the law governing presidential primaries.

No straight party voting device shall be used except for delegates to a national convention or for presidential electors.

The system complies with these requirements.

§19304. A write-in ballot shall be cast in its appropriate place on the machine, or it shall be void and not counted.

The systems allows for write-in votes.

§19320. Before preparing a voting machine for any general election, the elections official shall mail written notice to the chairperson of the county central committee of at least two of the principal political

parties, stating the time and place where machines will be prepared. At the specified time, one representative of each of the political parties shall be afforded an opportunity to see that the machines are in proper condition for use in the election.

The party representatives shall be sworn to perform faithfully their duties but shall not interfere with the officials or assume any of their duties. When a machine has been so examined by the representatives, it shall be sealed with a numbered metal seal. The representatives shall certify to the number of the machines, whether all of the counters are set at zero (000), and the number registered on the protective counter and on the seal.

The system complies with this requirement.

§19321. The elections official shall affix ballot labels to the machines to correspond with the sample ballot for the election. He or she shall employ competent persons to assist him or her in affixing the labels and in putting the machines in order. Each machine shall be tested to ascertain whether it is operating properly.

The system complies with this requirement.

§19322. When a voting machine has been properly prepared for an election, it shall be locked against voting and sealed. After that initial preparation, a member of the precinct board or some duly authorized person, other than the one preparing the machines, shall inspect each machine and submit a written report. The report shall note the following: (1) Whether all of the registering counters are set at zero (000), (2) whether the machine is arranged in all respects in good order for the election, (3) whether the machine is locked, (4) the number on the protective counter, (5) the number on the seal. The keys shall be delivered to the election board together with a copy of the written report, made on the proper blanks, stating that the machine is in every way properly prepared for the election.

The system complies with this requirement.

§19340. Any member of a precinct board who has not previously attended a training class in the use of the voting machines and the duties of a board member shall be required to do so, unless appointed to fill an emergency vacancy.

The system complies with this requirement.

§19341. The precinct board shall consist of one inspector and two judges who shall be appointed and compensated pursuant to the general election laws. One additional inspector or judge shall be appointed for each additional voting machine used in the polling place.

The system complies with this requirement.

§19360. Before unsealing the envelope containing the keys and opening the doors concealing the counters the precinct board shall determine that the number on the seal on the machine and the number registered on the protective counter correspond to the numbers on the envelope.

Each member of the precinct board shall then carefully examine the counters to see that each registers zero (000). If the machine is provided with embossing, printing, or photography devices that record the readings of the counters the board shall, instead of opening the counter compartment, cause a “before election proof sheet” to be produced and determined by it that all counters register zero (000).

If any discrepancy is found in the numbers registered on the counters or the “before election proof sheet” the precinct board shall make, sign, and post a written statement attesting to this fact. In filling out the statement of return of votes cast, the precinct board shall subtract any number shown on the counter from the number shown on the counter at the close of the polls.

The system complies with this requirement.

§19361. The keys to the voting machines shall be delivered to the precinct board no later than 12 hours before the opening of the polls. They shall be in an envelope upon which is written the designation and location of the election precinct, the number of the voting machine, the number on the seal, and the number registered on the protective counter. The precinct board member receiving the key shall sign a receipt.

The envelope shall not be opened until at least two members of the precinct board are present to determine that the envelope has not been opened.

At the close of the polls the keys shall be placed in the envelope supplied by the official and the number of the machine, the number written on the envelope.

The system complies with this requirement.

§19362. The exterior of the voting machine and every part of the polling place shall be in plain view of the election precinct board and the poll watchers.

Each machine shall be at least four feet from the poll clerk's table.

The system complies with this requirement.

§19363. Voters shall not remain in or occupy the booths or compartments longer than is necessary to mark their ballots, which shall not exceed five minutes. However, where no other voter would be inconvenienced, a longer period shall be allowed.

The system complies with this requirement.

§19370. As soon as the polls are closed, the precinct board, in the presence of the watchers and all others lawfully present, shall immediately lock the voting machine against voting and open the counting compartments, giving full view of all counter numbers. A board member shall in the order of the offices as their titles are arranged on the machine, read and distinctly announce the name or designating number and letter on each counter for each candidate's name and the result as shown by the counter numbers. He or she shall also in the same manner announce the vote on each measure.

If the machine is provided with a recording device, in lieu of opening the counter compartment the precinct board shall proceed to operate the mechanism to produce the statement of return of votes cast record in a minimum of three copies, remove the irregular ballot, if any, record on the statement of return of votes cast record. The irregular ballot shall, be attached to the statement of result record of votes cast for the machine and become a part thereof. One copy of the statement of return of votes cast for each machine shall be posted upon the outside wall of the precinct for all to see. The statement of return of votes cast for each machine for the precinct shall constitute the precinct statement of result of votes cast.

The system complies with this requirement.

§19371. Before adjourning, the precinct board shall seal the operating lever with the seal provided and lock the machine so that the voting and counting mechanism may not be operated.

It shall remain locked and sealed against operation until the time for filing a contest of election has expired, which shall not exceed a period of 30 days following the declaration of the result of the election by the body canvassing the returns.

Does not apply.

§19380. During the reading of the result of votes cast, any candidate or watcher who may desire to be present shall be admitted to the polling place. The proclamation of the result of the votes cast shall be distinctly announced by the precinct board who shall read the name of each candidate, or the designating number and letter of his or her counter, and the vote registered on the counter. The board shall also read the vote cast for and against each measure submitted. The board shall not count votes cast for write-in candidates, but shall have these counted by the elections official. During the proclamation, many opportunities shall be given to any person lawfully present to compare the result so announced with the counter dials of the machine, and any necessary corrections shall immediately be made by the precinct board, after which the doors of the voting machine shall be closed and locked.

If the machine is provided with a recording device, the alternate procedures in Section 19370 may be used.

The system complies with this requirement.

§19381. In each election district where voting machines are used, statements of the results of the vote cast shall be printed to conform with the type of voting machine used.

The designating number and letter on the counter for each candidate shall be printed next to the candidate's name on the statements of result of the vote cast. Two such statements shall be used in each election district.

The system complies with this requirement.

§19382. The statement of the result of votes cast, which shall be certified by the precinct board, shall contain:

- (a) The total number of votes cast.**
- (b) The number of votes cast for each candidate and measure as shown on the counter.**
- (c) The number of votes for persons not nominated.**
- (d) Printed directions to the precinct board for their guidance before the polls are opened and when the polls are closed.**
- (e) A certificate, which shall be signed by the election officers before the polls are opened, showing:**
 - (1) The delivery of the keys in a sealed envelope.**
 - (2) The number on the seal.**
 - (3) The number registered on the protective counter.**
 - (4) Whether all of the counters are set at zero (000).**
 - (5) Whether the public counter is set at zero (000).**

- (6) Whether the ballot labels are properly placed in the machine.
- (f) A certificate that shall be filled out after the polls have been closed, showing:
- (1) That the machine has been locked against voting and sealed.
 - (2) The number of voters as shown on the public counter.
 - (3) The number on the seal.
 - (4) The number registered on the protective counter.
 - (5) That the voting machine is closed and locked.

The system complies with this requirement.

§19383. A member of the precinct board shall enter the vote, as registered, on the statements of result of votes cast, in the same order on the space that has the same name or designating number and letter, after which another member shall verify the figures by calling them off in the same manner from the counters of the machine.

The counter compartment of the voting machine shall remain open until the official returns and all other reports have been fully completed and verified by the precinct board.

If the machine is provided with a recording device, the alternate procedures in Section 19370 may be used.

The system complies with this requirement.

§19384. The precinct board shall, before it adjourns, post conspicuously on the outside of the polling place a copy of the result of the votes cast at the polling place. The copy of the result shall be signed by the members of the precinct board.

If the machine is provided with a recording device, the statement of result of vote's cast produced by operating its mechanism may be considered the "result of the votes cast" at the polling place.

The system is capable of printing a copy of the results.

§19385. The precinct board shall immediately transmit unsealed to the elections official a copy of the result of the votes cast at the polling place, the copy shall be signed by the members of the precinct board, and shall be open to public inspection.

The system complies with this requirement.

§19386. Before proceeding to canvass the returns of an election at which voting machines have been used to register the votes cast, the board authorized to canvass returns shall open the counter compartment and compare the records of votes cast for the several candidates voted for and for

and against the several measures voted upon shown on each machine with those recorded on the statement of results of votes cast prepared from that machine by the precinct board. Any errors found on the statement shall be corrected by crossing out the recorded incorrect number, and recording the correct number nearby.

The system complies with this requirement.

14. §504 (b): A review of federal statutes or regulations, which address the application.

The Voting Rights Act of 1965, as amended (42 U.S.C. 1973), requires all elections in certain covered jurisdictions to provide registration and voting materials and oral assistance in the language of a qualified language minority group in addition to English. Currently in California, there are six VRA languages (Spanish, Chinese, Japanese, Vietnamese Korean and Tagalog) as prescribed under the law.

Information can be printed in additional languages as required by the jurisdiction for all required languages.

The National Voter Registration Act of 1993 (42 U.S.C. 1973gg and 11 CFR 8) allows for the casting of provisional ballots through Fail-Safe Voting procedures.

The system allows for the casting of fail-safe or provisional ballots on the Model 100, 550 and 650. Provisional ballots for which the voter is deemed to have been eligible in only some portion of the ballot can be counted by remaking the ballot using existing procedures.

The Voting Accessibility for the Elderly and Handicapped Act of 1984 (42 U.S.C. 1973ee through 1973ee-6) requires each political subdivision conducting elections within each state to assure that all polling places for federal elections are accessible to elderly and handicapped voters, except in the case of an emergency as determined by the state's chief election officer or unless the state's chief election officer: (1) determines, by surveying all potential polling places, that no such place in the area is accessible or can be made temporarily accessible, and (2) assures that any handicapped voter assigned to an inaccessible polling place will, upon advance request under established state procedures, either be assigned to an accessible polling place or be provided an alternative means of casting a ballot on election day.

The system is no more or less accessible than the current system being used.

The Retention of Voting Documentation (42 U.S.C. 1974 through 1974e) statute applies in all jurisdictions and to all elections in which a federal candidate is on a ballot. It requires elections officials to preserve for 22 months all records and papers which came into their possession relating to an application, registration, payment of a poll tax, or other act requisite to voting. Note: The US Department of Justice considers this law to cover all voter registration records, all poll lists and

similar documents reflecting the identity of voters casting ballots at the polls, all applications for absentee ballots, all envelopes in which absentee ballots are returned for tabulation, all documents containing oaths of voters, all documents relating to challenges to voters or absentee ballots, all tally sheets and canvass reports, all records reflecting the appointment of persons entitled to act as poll officials or poll watchers, and all computer programs used to tabulate votes electronically. In addition, it is the Department of Justice's view that the phrase "other act requisite to voting" requires the retention of the ballots themselves, at least in those jurisdictions where a voter's electoral preference is manifested by marking a piece of paper or by punching holes in a computer card.

The system allows for the retention of the paper record of the ballots.

15. 504 (c): A copy of the approved Qualification Test results released directly to the Secretary of State by a Nationally Recognized Test Laboratory (NRTL).

Qualification test results have been received for the Model 100, Model 550 and Model 650. A letter confirming successful testing on the Unity software package has been received but the ITA has not released its final report.

16. §504 (d): A review, if applicable, of transcripts or other materials from prior meetings or hearings on the proposed system, procedure, or modification, either in whole or in part.

The relevant documentation has been reviewed.

17. §504 (e): A review, if applicable, of any procedures manuals, guidelines or other materials adopted for use with the system addressed by the application.

The procedures for use with this system have been reviewed.

18. §504 (f): A review of any effect the application will have on the security of the election system.

See section V of the staff report.

19. §504 (g): A review of any effect the application will have on the accuracy of the election system.

The system was tested by federal and state testers and deemed to record votes accurately.

20. §504 (h): A review of any effect the application will have on the ease and convenience with which voters use the system.

The proposed system is not any less voter friendly than the currently certified system.

21. §504 (i): A review of any effect the application will have on the timeliness of vote reporting.

The proposed system would not affect the timeliness of reporting.

22. §504 (j): A review of any effect the application will have on the overall efficiency of the election system.

The proposed system is at least as efficient than the currently certified system.

23. §504 (k): A Description of Deposit Materials showing that the Ballot Tally Software Source Code has been deposited in Escrow with an Escrow Company approved pursuant to Chapter 6, Division 7, Title 2 of the California Administrative Code, beginning with Section 20630.

Proof of Escrow documents have been received by the Secretary of State's office.

24. §601: The Secretary of State shall not approve a proposed item without a finding that the item conforms to all applicable laws, procedures and regulations, including the right to a secret ballot, does not compromise the accuracy, security or integrity of the election process, nor interferes with the voter's ease and convenience in voting.

The proposed system provides improved security while maintaining the secrecy of the ballot, the accuracy and integrity of the elections process and not interfering with the voter's ease and convenience in voting at least as effectively as the currently certified system.

V. ADDITIONAL CONSIDERATIONS

1. Current Certification of System Components

While the Model 100, 550 and 650 have all been state certified at some point, the Secretary of State's office has been unable to verify the certification of all the firmware versions currently in use in California.

2. System Security

The report from the State's technical consultant identified several potential security concerns. The vendor had previously submitted updated procedures, including a revised security section. Staff is currently reviewing and revising these procedures to address the concerns raised in Freeman's report. These revised procedures will be distributed along with a supplemental security report upon their completion.

VI. PUBLIC COMMENT

In response to the public meeting notice being issued and allowing for written submissions, we have received one correspondences specific to this application. The correspondence related to questions about the ability of the system to handle instant runoff voting and cumulative voting. A copy of the correspondence is attached.

VII. RECOMMENDATION

Staff recommends the certification of the Election System and Software's Unity v. 2.4.3 (Audit Manager v. 7.0.2.0, EDM v. 7.2.1.0, ESSIM v. 7.2.0.0, HPM v. 5.0.3.0, ERM v. 6.4.3.0), Model 100 v. 5.0.0.0, Model 550 v. 2.1.1.0 and Model 650 v. 1.2.0.0 with the following conditions:

1. The vendor must submit final reports from the federal Independent Testing Authorities for all system components prior to their use in a California election.
2. The vendor must obtain and submit a copy of federal qualification for all system components prior to their use in a California election.
3. Elections System and Software shall replace at its cost any system component for the Model 100, Model 550 or Model 650 identified by the Secretary of State's office as lacking state certification in all client jurisdictions in the State with the certified components contained herein prior to the November 2004 General Election.

The Model 100 v. 5.0.0.0, Model 550 v. 2.1.1.0 and Model 650 v. 1.2.0.0 would only be certified for use with Unity v. 2.4.3.