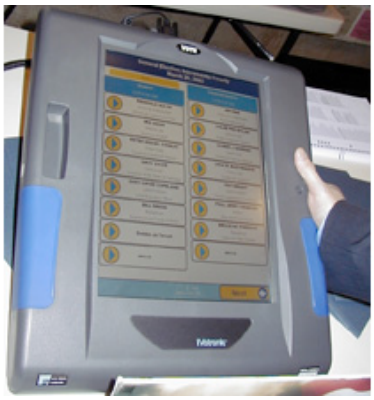
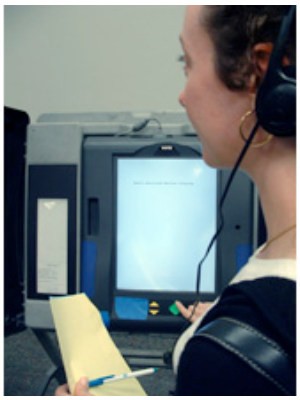
# Electronic Voting Machine Information Sheet

## *Election Systems & Software — iVotronic*

**Name / Model:** iVotronic[1]
**Vendor:** Election Systems & Software, Inc. (ES&S)
**Federally-Qualified Voter-Verified Paper Audit Trail Capability:** Yes.



**Brief Description:** ES&S' iVotronic Touch Screen Voting System is a poll worker activated, portable, multilingual touchscreen system that records votes on internal flash memory. A poll worker uses a device called a Personal Electronic Ballot (PEB; pictured above at left) to turn the machine on and enable voting. Voters choose their ballot language and then make their selections using a touchscreen, much in the same way that modern ATMs work. The iVotronic can be equipped with a VVPAT printer, called the RTAL (Real-Time Audit Log) which will record the voter's choices, in real-time as opposed to at the end of the session. When the polls close, poll workers move summary data from each machine onto the PEB. The PEBs, and RTAL rolls, if any, are then transported to election headquarters or their contents transmitted via a computer network.

**Detailed Voting Process:** When the voter enters the polling place, a poll worker first confirms the voter is registered. Then the poll worker walks with the voter to an iVotronic and inserts the PEB in the PEB slot (visible as the rectangular slot in the upper left corner of the middle image above). The PEB communicates with the iVotronic using infrared signals, much like a TV remote control works, except that the PEB and iVotronic will not communicate unless the PEB is completely inserted. If the election requires a party-specific ballot, the poll worker chooses this for the voter. Activation by the PEB enables the iVotronic to vote once.

The voter then selects a ballot language and makes decisions using the touchscreen. When the voter is done, he or she presses a small "vote" button at the very top of the iVotronic to cast the vote. The vote is then recorded to three internal flash memories that reside inside the machine. A fourth memory is a removable card, called a "compact flash" (CF) card; note that CF is the same technology used in many digital cameras to store



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photos. During the election, the CF card holds audio files (for those with visual disabilities) and ballot definitions; vote data is written to the CF card when the machine is closed.

If the iVotronic is equipped with a RTAL printer, the voter's choices are recorded to paper as the voter makes those choices. If the voter changes a choice, a message voiding the previous selection and then a message indicating the new selection are both written to the RTAL tape.

A poll worker closes the polls by using the PEB with a password to enter a supervisor menu on each iVotronic. After closing the election for a given machine, summary vote data are transmitted to the PEB via infrared signals.[1] After the PEB is used to close all the iVotronic machines, it contains all the summary data for the precinct. Depending on local regulations and procedures, poll workers can use a "printer kit" at this point to print the result summary from the PEB on to paper. The PEB for that precinct, any printouts and the CF cards are then either physically transported to a central tabulation facility or its contents sent over a computer network using a laptop running ES&S' Unity software.

**Past Problems**

**November 2005:** *Pennsylvania.* Flawed ballot programming of straight-ticket votes hands the race to the wrong candidate for magisterial district judge. Straight-ticket Democrat votes were given to the Republican candidate. Straight-ticket Republican votes were not counted at all.[2]

**March 2005:** *Wisconsin.* Inaccurate programming by ES&S caused all straight-party votes to be lost, affecting approximately 27% of the ballots.[3]

**November 2004:** *Ohio.* An election turnout of 131% tipped off the election officials that the optical scanners had been adding phantom votes to the totals. Officials concluded that ballots had been counted twice and speculated that some ballots had been fed through machine more than once.[4]

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[1] Note that the vote data transmitted to the PEB at the closing of a machine is summary vote data instead of raw vote data; that is, it is a summary of the votes recorded rather than each individual electronic ballot as stored inside the iVotronic's internal memory. In order to do a proper recount or error analysis, one would need to remove the CF cards from the iVotronics and seal the CF cards for a precinct with the PEB and any printouts. This information is courtesy of Doug Jones of the University of Iowa.

[2] See http://www.votersunite.org/info/ES&Sinthenews.pdf

[3] Id.

[4] Id.

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**November 2004:** *Florida.* Among the election equipment foul-ups in Florida, vote tabulating software reached its 32,767 capacity and began counting backwards.[5]

**November 2004:** *Indiana.* The electronic voting machines reported 300 votes in every precinct, eliminating over 50,000 voters.[6]

**November 2004:** *South Carolina.* Officials can't figure out how to retrieve 200 electronic votes from a malfunctioning iVotronic electronic voting machine.[7]

**October 2004:** *North Carolia & Texas.* Voters' choices register incorrectly on the touch screen.[8]

**September 2004:** *Arizona.* The original totals for State Representative in District 20 showed Anton Orlich in the lead over John McComish by four votes, and the close margin required a recount. The optical scan recount found nearly 500 additional votes for the five candidates in the race and changed the outcome, giving McComish the lead by 13 points.[9]

**August 2004:** *Florida.* The iVotronic touch-screen machines -- the ones with the software bugs that caused an uproar last May -- showed evidence of the same problems in the August primary. Not only was the low battery problem (which ES&S claimed was repaired) still impacting the elections, problems also showed up with the features that are supposed to allow blind voters to vote independently. The county received 14,253 voter complaint forms about these and other election-day problems.[10]

**August 2004:** *Wyoming.* The Unity Election Management System, used to tally votes from both optical scan machines and paperless electronic voting machines, failed to tally votes correctly.[11]

**January 2004:** *Florida.* In a special election for the State House District 91 seat, with only one item on the ballot, ES&S electronic voting machines showed a total of 134 undervotes – that is, 134 ballots in which voters did not select a candidate even though it was a single-race election. The winner received 12 more votes than the runner-up. Florida law requires a manual recount of invalid votes when the winning margin is less than one quarter of one percent. However, election officials determined that no recount was

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[5] Id.
[6] Id.
[7] Id.
[8] Id.
[9] Id.
[10] Id.
[11] Id.


required because the 134 invalid votes were cast on electronic voting machines, and there is no record of the original votes.[12]

**May 2003:** *Florida.* An internal review of election results by a Miami-Dade county election official found that a DRE system sold by ES&S and used in the May 20, 2003 North Miami Beach runoff election (as well as in earlier elections) was "unusable" for auditing, recounting or certifying an election due to a "serious bug" in the software.[13]

**November 2002:** *North Carolina.* At two early-voting locations in Wake County, North Carolina (Raleigh), iVotronics failed to record 436 ballots. This was due to a problem in the firmware of the machines.[14] Firmware is a kind of software loaded on read-only memory so that it cannot be easily changed.

**October 2002:** *Texas.* Democrats said they received several dozen complaints from people who said that they selected a Democratic candidate but that their vote appeared beside the name of a Republican on the screen. Some votes cast for Republicans were counted for Democrats.[15]

**September 2002:** *Florida.* A spot check of machines revealed two problems. First, several Miami-Dade precincts, each with hundreds of voters, are listed as showing one or even no votes cast on election day. Second, differences arose within the same precincts between vote totals produced by the main tabulation system and a backup system.[16]

**NASED Qualification Status:**[17]
**06/28/01:** (hardware) iVotronic DRE Ver. 1
**07/02/02:** (firmware) Firmware Rel 7.4.1.0
**02/19/04:** iVotronic DRE Ver. 2.4.2, Firmware v. 8.0.0.0
**08/27/04:** iVotronic DRE Ver. 2.4.3, Firmware v. 8.0.1.0
**01/09/05:** iVotronic DRE Ver. 2.5, Firmware v. 9.0.0.0
**10/14/05:** iVotronic DRE Ver. 3.0, Firmware v. 9.1.2.0
**03/08/06:** iVotronic DRE Ver. 2.4.3.1, Firmware v. 8.0.1.0

**References:**

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[12] "Electronic Vote Recount Stumps Broward Officials." SUN-SENTINEL, January 10, 2004.
[13] "Count Crisis? Election Officials Warn of Glitches that May Scramble Vote Auditing." MIAMI DAILY BUSINESS REVIEW, May 16, 2004. "Glitch Forces Change in Vote Audits." THE MIAMI HERALD, May 15, 2004.
[14] "Electronic Ballots Fail To Win Over Wake Voters, Election Officials; Machines Provide Improper Vote Count At Two Locations," WRAL-TV RALEIGH-DURHAM, Nov. 2, 2002.
[15] "Area Democrats say early votes miscounted," THE DALLAS MORNING NEWS, Oct. 22, 2002.
[16] "Leahy: Unskilled workers to blame," MIAMI HERALD, Sept. 12, 2002.
[17] *NASED Qualified Voting Systems (11/18/2005).* National Association of State Election Directors. See: http://www.nased.org/certification.htm.

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"DRE Security Assessment, Volume 1, Computerized Voting Systems, Summary of Findings and Recommendations," InfoSENTRY, 21 Nov. 2003. See: http://www.sos.state.oh.us/sos/hava/files/InfoSentry1.pdf

"Direct Recording Electronic (DRE) Technical Security Assessment Report," Compuware Corporation, 21 Nov. 2003. See: http://www.sos.state.oh.us/sos/hava/files/compuware.pdf



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