STATE OF NEW JERSEY
DIVISION OF ELECTIONS

MANDATORY
PRE-ELECTION TESTING PROTOCOLS:
iVotronic Voting Machines

I. Introduction

It is the legal obligation of each county Commissioner of Registration in the State of New Jersey to prepare all voting machines to be used in an election in a thorough manner that will assure that all votes cast at an election are accurately recorded. Accordingly, the Secretary of State, in her capacity as New Jersey's Chief Election Official, issues the following mandatory iVotronic testing protocols.

II. Technician Qualifications

Only those technicians who have received the seal-use protocol training under the auspices of the Division of Elections are permitted to perform the pre-election testing protocols on the county's voting machines. It is the obligation of the county commissioner of registration to ensure such compliance.

III. Preventative Maintenance

A. Requirement – The county Commissioner of Registration must ensure that "Preventative Maintenance" is performed on each voting machine every other year at a minimum. Preventative Maintenance is a process that tests the voting machine's internal software and hardware and must also be performed in a time frame that does not interfere with the preparations of any upcoming election.

B. Additional Requirements – In addition to the scheduled Preventative Maintenance, individual Preventative Maintenance must be performed following any repairs made to the voting machines during the calendar year. Pre-Election Validation, as more fully explained below, must be performed on the repaired voting machines prior to use in an election.

IV. Pre-Election Testing Sequence

Each iVotronic automatically performs a self-diagnostic test when it is activated by a Personal Electronic Ballot (PEB). This test confirms that the machine's internal software and hardware is operating properly.

A. Step One - Pre-Election Validation

NOTE: PRE-ELECTION VALIDATION MUST BE COMPLETED ON ALL VOTING MACHINES PRIOR TO USE IN EACH ELECTION.

Pre-Election Validation is the verification phase that evaluates the iVotronic terminal settings and tests the touch screen calibration to ensure that the voting machine will properly perform during an election. This is the first step in preparing the voting machines for an election as it verifies the correct firmware is loaded on the iVotronic and the PEB, the audio files are loaded properly and it records the protective count.

If no issues arise during this process, the technician shall sign the Pre-Election Validation Report and proceed to Ballot Verification/Test Voting.

1.) Troubleshooting

If any issues arise during the Pre-Election Validation, the technician will "Clear and Test" the iVotronic, a process which clears all components of the machine and leaves a "blank slate". The technician will then repeat the Pre-Election Validation. If the issue continues, a Return Material Authorization (RMA) form is completed and that machine is sent to the vendor for further testing and repair.

B. Step Two – Ballot Verification

NOTE: BALLOT VERIFICATION MUST BE COMPLETED ON EVERY BALLOT STYLE PRIOR TO USE IN EACH ELECTION.

Ballot Verification is the process by which the technician will test each ballot style to be used in the current election.

1.) County Clerk

The County Clerk's office certifies that all ballot information is correct for the election, including the spelling of candidate names and/or public questions and the candidate order in each contest. This also includes listening to the audio file and ensuring its accuracy.

2.) Board of Election

A. Visual Verification of Candidate Choices

Using an "All District" PEB, two technicians will manually open each ballot style used in the election and select each position to visually verify that the programming is operating properly.

C. Step Three – Test Voting

NOTE: TEST VOTING MUST BE COMPLETED ON EVERY MASTER PERSONAL ELECTRONIC BALLOT (PEB) PRIOR TO USE IN EACH ELECTION.

Test voting provides for the testing and simulation of an election using the same MASTER PEB that will be used to conduct the official election voting. Test voting patterns can be an ascending pattern, descending pattern or any combination, but must have each candidate and/or public question listed on the ballot receive at least one vote. No two candidates for the same office or public question options ("yes" or "no") can receive the same number of votes.

When any contest on the ballot contains the same number of candidates, or there is more than one public question on the ballot, a unique voting pattern must be used to allow an opportunity for vote total discrepancies arising from database programming problems to appear. The technician is required to perform "Manual Test Voting" which is further outlined on page 7 of this document.

An additional blank ballot must be cast to test the ability of the iVotronic to accept and accurately record an unvoted ballot.

1.) Illustration of the Two Alternate Test Voting Patterns by use of this following Mock Ballot:

CONTEST 1 (Vote for One)	President
Candidate 1	John Smith
Candidate 2	Peter Jones
Candidate 3	Sarah Edwards
Write-in	
CONTEST 2 (Vote for Two)	Freeholder
Candidate 1	Tim Johnson
Candidate 2	Todd Murphy
Candidate 3	Jane Adams
Candidate 4	Mary Larsen
Write-in	
Write-in	
CONTEST 3 (Vote for One)	Mayor
Candidate 1	William Harrison
Candidate 2	Donna Jackson
Candidate 3	Ronald Morgan
Write-in	
CONTEST 4	Proposal 1
Response	Yes
Response	No

Example # 1-Ascending Test Pattern

This test pattern is developed in the following order:

1. Determine the largest number of candidates in any one contest, including write-ins.

- Contest 1 has four candidates (including Write-ins)
- Contest 2 has six candidates (including Write-ins)
- Contest 3 has four candidates (including Write-ins)
- Contest 4 has two candidates ("Yes" and "No" for public questions are to be treated as "candidates" therefore Contest 4 is considered to have two candidates)

Result: Contest 2 has the largest number of candidates: six.

2. Assign the number of votes each candidate must receive in each contest, as follows:

- The first candidate in each contest will receive one vote.
- The second candidate in each contest will receive two votes.
- The third candidate in each contest will receive three votes.
- The fourth candidate in each contest will receive four votes.
- The fifth candidate in each contest will receive five votes.
- The sixth candidate in each contest will receive six votes.

3. Make a table showing how each test voter must vote to execute the Test Vote plan.

CONTEST	VOTER

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
President (Vote for One)														
John Smith	X													
Peter Jones		X	X											
Sarah Edwards				X	X	X								
Write-in							X	X	X	X				
Freeholder (Vote for Two)														
Tim Johnson	X													
Todd Murphy	X	X												
Jane Adams		X	X	X										
Mary Larsen			X	X	X	X								
Write-in					X	X	X	X	X					
Write-in							X	X	X	X	X	X		
Mayor (Vote for One)														
William Harrison	X													
Donna Jackson		X	X											
Ronald Morgan				X	X	X								
Write-in							X	X	X	X				
Proposal 1														
Yes	X													
No		X	X											

Example #2- Descending Test Pattern

This test pattern is developed in the following order:

1. Determine the largest number of candidates in any one contest, including Write-ins.

- Contest 1 has four candidates (including Write-ins)
- Contest 2 has six candidates (including Write-ins)

- Contest 3 has four candidates (including Write-ins)
- Contest 4 has two candidates ("Yes" and "No" for public questions are to be treated as "candidates" therefore Contest 4 is considered to have two candidates)

Result: Contest 2 has the largest number of candidates: six.

2. Assign the number of votes each candidate must receive in each contest as follows.

- The first candidate in each contest will receive six votes.
- The second candidate in each contest will receive five votes.
- The third candidate in each contest will receive four votes.
- The fourth candidate in each contest will receive three votes.
- The fifth candidate in each contest will receive two votes.
- The sixth candidate in each contest will receive one vote.

3. Make a table showing how each test voter must vote to execute the test vote plan.

CONTEST	VOTER

	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**
President (Vote for One)																		
John Smith	X	X	X	X	X	X												
Peter Jones							X	X	X	X	X							
Sarah Edwards												X	X	X	X			
Write-in																X	X	X
Freeholder (Vote for Two)																		
Tim Johnson	X	X	X	X	X	X												
Todd Murphy		X	X	X	X	X												
Jane Adams							X	X	X	X								
Mary Larsen									X	X	X							
Write-in											X	X						
Write-in												X						
Mayor (Vote for One)																		
William Harrison	X	X	X	X	X	X												
Donna Jackson							X	X	X	X	X							
Ronald Morgan												X	X	X	X			
Write-in																X	X	X
Proposal 1																		
Yes	X	X	X	X	X	X												
No							X	X	X	X	X							

2).Implementation of either Test Pattern

Once either test table is completed, Test Voting can begin, as follows:

- First, a zero results report will be printed and must be signed by the technician.
- Second, the votes from the test pattern must be cast on the machine.
- Third, a results report is printed from the Master PEB to verify that the test voting is accurate as compared to the test pattern.
- All test results shall be reviewed and signed by the technician, Senior Election Technician, and the Administrator.

(a.) Troubleshooting

If the results do not match the test voting pattern the results report must be immediately brought to the supervisor for further review and appropriate action.

The supervisor must determine if the test voting pattern was followed correctly or if it is a hardware or programming issue.

(1.) If the supervisor determines that the Test Voting should be redone, the following steps must be done:

1. Clear & Test the iVotronic.
2. Clear all votes from the Master PEB.
3. Perform Test Voting.

(2.) If it is a hardware issue, the supervisor must:

1. Coordinate the repair or replacement of the hardware.
2. Perform Preventative Maintenance.
3. Perform Pre-Election Validation.
4. Perform Ballot Verification
5. Perform Test Voting.

(3.) If it is a programming issue, the supervisor must:

1. Correct the programming.
2. Perform Pre-Election Validation.
3. Perform Ballot Verification
4. Perform Test Voting.

Manual Test Voting

If a ballot has more than one contest with the identical number of candidates, further testing is necessary to allow an opportunity for vote total discrepancies to appear. Technicians will open the test iVotronic and manually vote an ascending or descending pattern as demonstrated below:

Example # 1-Ascending Test Pattern

Contest #1

Candidate 1 – one vote
Candidate 2 – two votes
Candidate 3 – three votes
Candidate 4 – four votes

Contest #2

Candidate 1 – two votes
Candidate 2 – three votes
Candidate 3 – four votes
Candidate 4 – five vote

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
President (Vote for One)														
John Smith	X													
Peter Jones		X	X											
Sarah Edwards				X	X	X								
Write-in							X	X	X	X				
Mayor (Vote for One)														
William Harrison	X	X												
Donna Jackson			X	X	X									
Ronald Morgan						X	X	X	X					
Write-in										X	X	X	X	X

Example # 2-Descending Test Pattern

Contest #1

Candidate 1 – four vote
Candidate 2 – three votes
Candidate 3 – two votes
Candidate 4 – one votes

Contest #2

Candidate 1 – five votes
Candidate 2 – four votes
Candidate 3 – three votes
Candidate 4 – two vote

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
President (Vote for One)														
John Smith	X	X	X	X										
Peter Jones					X	X	X							
Sarah Edwards								X	X					
Write-in										X				
Mayor (Vote for One)														
William Harrison	X	X	X	X	X									
Donna Jackson						X	X	X	X					
Ronald Morgan										X	X	X		
Write-in													X	X

Implementation of either Manual Test Pattern

Once the test table is completed, Test Voting can begin, as follows:

- First, a zero results report will be printed and must be signed by the technician.
- Second, the votes from the test pattern must be cast on the machine.
- Third, a results report is printed from the Master PEB to verify that the test-voting is accurate as compared to the test pattern.
- All test results shall be reviewed and signed by the technician, Senior Election Technician, and the Administrator.

(a.) Troubleshooting

If the results do not match the test voting pattern the results report must be immediately brought to the supervisor for further review and appropriate action.

The supervisor must determine if the test voting pattern was followed correctly or if it is a hardware or programming issue.

(1.) If the supervisor determines that the Test Voting should be redone, the following steps must be done:

1. Clear & Test the iVotronic.
2. Clear all votes from the Master PEB.
3. Perform Test Voting.

(2.) If it is a hardware issue, the supervisor must:

1. Coordinate the repair or replacement of the hardware.
2. Perform Preventative Maintenance.
3. Perform Pre-Election Validation.
4. Perform Ballot Verification
5. Perform Test Voting.

(3.) If it is a programming issue, the supervisor must:

1. Correct the programming.
2. Perform Pre-Election Validation.
3. Perform Ballot Verification
4. Perform Test Voting.

Completing the Pre-Election Testing

The technician must clear all the Logic & Accuracy Test Votes from each Master PEB.

A "Polling Location Zero Report" must be printed to confirm that all activity on the PEB has been erased. The technician, Senior Election Technician and the Administrator must review and sign all zero reports prior to each election.

3). Vote Simulation

Vote Simulation is a means by which a county commissioner of registration can partially automate the Logic and Accuracy testing of the iVotronic. Each ballot is loaded from the Master PEB onto to the iVotronic and an Automatic Logic and Accuracy Test is performed. **The Vote Simulation process is faster than casting votes by hand and minimizes the potential for human error in the casting process.**