STATE OF NEW JERSEY
DIVISION OF ELECTIONS

MANDATORY
PRE-ELECTION TESTING PROTOCOLS:
AVC Edge 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 AVC Edge 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. Maintenance Diagnostics

A. Biyearly Requirement

The county commissioner of registration must ensure that "Maintenance Diagnostics" is performed on each voting machine twice a year, at a minimum. The AVC Edge is equipped with diagnostic tools that test the voting machine's internal software and hardware, such as the CPU (central processing unit), LCD display, printer and calibration. It is to be performed when the voting machine is not in "election mode" and must be done in a time frame that allows for any necessary repairs and upgrades to be completed before any upcoming election.

B. Additional Requirements

In addition to the bi-yearly requirement, the Maintenance Diagnostics tests must be performed if there is any change to a voting machine's hardware and/or software. Furthermore, if any of the main components of a voting machine are replaced, such as the CPU, the following steps must be taken after Maintenance Diagnostics is done. As more fully explained below, Setup Diagnostics must be performed on the voting machine, which must then be subjected to a "mock election" in official election mode. The voting machine should stay in this mode, powered off overnight, and then powered on the following day to complete the examination.

IV. Pre-election Testing Sequence

A. Step One – "Election Setup"

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

THE FOLLOWING TASKS MUST BE PERFORMED IN MAINTENANCE DIAGNOSTICS BEFORE LOADING THE RESULTS CARTRIDGE.

- Select the "System Reset" button to reset the voting machine.
- Verify the Date and Time are correct.
- Select the LCD Button to Calibrate the Voting machine.

The AVC Edge will load the ballot information for the specific election from the programmed results cartridge when it has been inserted into the results port. All valid election data will be loaded to the Audit Trail Memory on the voting machine. When prompted, open Pre-LAT polls by moving the polls switch to "open".

1.) Troubleshooting

If a voting machine problem arises during Ballot load, notification of the specific problem will be listed on the front LCD screen and the test will not continue. In such case, the technician immediately must report the problem to the supervisor.

The supervisor must take the following steps:

a.) Refer to the *AVC Edge Maintenance Manual* to diagnose and resolve the problem.

b.) If the problem is resolved, Election Setup must be restarted from the beginning.

c.) If the problem cannot be resolved, the voting machine must be set aside for further examination.

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 visually determine if the voting machine displays accurate Election Information. The Technician shall verify all contests and candidates are present and in the correct order. If a voting machine has an audio component, the technician must use this component to assure the accuracy of the audio file.

The Ballot Verification Process requires the technician to:

- Verify all contest headings are displayed correctly and in the correct order.
- Verify the spelling and order of candidate names and/or public question(s).
- Verify all candidate and/or public question positions are fully operational.
- If the voting machine has an audio component, the technician must listen to the audio file.
- If applicable, load the Election files to the Card Activator. Verify the Date and Time are correct on the Card Activator and Activate a Voter Card to be tested on the voting machine.

If no issues arise during this process, the technician shall sign the Pre-LAT Zero Proof Report and proceed to Test Voting.

1.) <u>Troubleshooting</u>

If at any point during the ballot verification process an issue arises it must be immediately brought to the supervisor for further review and appropriate action. The supervisor must determine if it is a hardware or programming issue.

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

1. Coordinate the repair or replacement of the hardware.
2. Restart the process at Maintenance Diagnostics.

b**.) If it is a programming issue, the supervisor must:**

1. Correct the programming.
2. Create a new cartridge.
3. Restart the process at Election Setup.

C. <u>Step Three – Test Voting</u>

<u>NOTE</u>: TEST VOTING MUST BE COMPLETED ON ALL VOTING MACHINES PRIOR TO USE IN EACH ELECTION.

Test voting provides for the testing and simulation of an election in the Pre-Election Logic and Accuracy Test (Pre-LAT) mode using the same ballot control logic that will be used to conduct the official election. 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, an identical test pattern (e.g. 1-2 pattern for a 2 candidate contest) shall not be

repeated in those contests. Each contest on the ballot must use a unique voting pattern to allow an opportunity for vote total discrepancies arising from database programming problems to appear.

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. Because Contest 1 and Contest 3 are both a vote-for-one and have the same number of candidates, a change to the test pattern must be made to Contest 3, as follows.

- The first candidate in Contest 3 will receive two votes.
- The second candidate in Contest 3 will receive three votes.
- The third candidate in Contest 3 will receive four votes.
- The fourth candidate in Contest 3 will receive five votes.

4. 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	X												
Donna Jackson			X	X	X									
Ronald Morgan						X	X	X	X					
Write-in										X	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. **Because Contest 1 and Contest 3 are both a vote-for-one and have the same number of candidates a change to the test vote pattern must be made in Contest 3, as follows.**

    - The first candidate in Contest 3 will receive five votes.
    - The second candidate in Contest 3 will receive four votes.
    - The third candidate in Contest 3 will receive three votes.
    - The fourth candidate in Contest 3 will receive two votes.

4. 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													
Donna Jackson						X	X	X	X									
Ronald Morgan										X	X	X						
Write-in													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 in Pre-LAT mode, 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, the results report will be printed and must be compared to the test voting pattern.

If the results match the test voting pattern and there are no other issues, the technician must sign the Pre-LAT results report to complete the pre-election testing.

The signed report is a certification that:

- All contest headings, candidate names and public question(s) are spelled correctly;
- All sequences of contests and candidate names are correct;
- All audio playbacks are correct (if applicable to the machine);
- If applicable, card activator has been loaded and voter cards have been activated and tested on the machine.
- Every candidate on the report has received the correct number of votes as determined by the test vote plan.

(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. Perform a System Reset.
2. Create a new cartridge.
3. Perform Election Setup.
4. Perform Ballot Verification.
5. Perform Test Voting.

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

1. Perform a System Reset.
2. Coordinate the repair or replacement of the hardware.
3. Create a new cartridge.
4. Perform Maintenance Diagnostics.
5. Perform Election Setup.
6. Perform Ballot Verification.
7. Perform Test Voting.

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

1. Perform a System Reset.
2. Correct the programming.
3. Create a new cartridge.
4. Perform Election Setup.
5. Perform Ballot Verification.
6. Perform Test Voting.

3). <u>Vote Simulation</u>

Vote Simulation is a means by which a county commissioner of registration can partially automate the Pre-LAT testing of the AVC Edge. Software external to the voting machine is configured with a pre-determined vote pattern. The software is utilized to create a vote simulation cartridge that is placed in the voting machine. **The Vote Simulation process is faster than casting votes by hand and minimizes the potential for human error in the casting process.**

If Vote Simulation is used, the technician must still cast one manual vote for every candidate in every contest. For example, if an ascending test vote pattern is chosen in which six candidates in a contest receive 1-2-3-4-5 & 6 votes; in the Vote Simulation process, the addition of one manual vote for each candidate would produce a Pre-LAT results report showing 2-3-4-5-6 & 7 votes.

Note: Vote Simulation is only available in the Pre-Election and Post-Election testing modes. The AVC Edge is not capable of using Vote Simulation in the official election mode.