



LOGIC AND ACCURACY TESTING

A Logic and Accuracy (L&A) test is:

- A step-by-step documented review of a voting device's ability, prior to use in any election, to accurately produce voter choice for the candidates and ballot measures in an election
- A test that ensures that the election has been programmed correctly by casting votes for all offices and ballot questions and issues that are on the ballot on a representative sampling of voting equipment.
- A test that ensures the voting system will accurately count all types of ballots (mail, provisional, VSPC, BMD, and audio ballots).

The L&A test ensures that:

- The election is programmed correctly
- The voting equipment is functioning properly, and
- The voting equipment is counting ballots accurately.

The test is conducted in public so that the public knows their votes are being counted accurately.

Several members from the public participate in the L&A test, either as members of the Testing Board or as observers. An important part of the election process is to be open and transparent when preparing for an election.

Each major political party, minor political party, ballot issue committee that has an issue on the ballot, and the coordinating entity may designate one person who must be allowed to witness all public tests and the counting of pretest votes.

The county clerk must conduct the Logic and Accuracy Test no later than the 18th day before an election.

The Testing Board

The Testing Board must consist of one registered elector from each of the major political parties. The electors must be registered voters in the county.

Hardware Diagnostic Test

Prior to conducting a L&A test, one must conduct a Hardware Diagnostic Test on each device that will be used in the election (including back up devices) to ensure all mechanical components are working correctly. This test includes (but is not limited to) the following:

- All input and output devices
- Communication ports
- System printers
- System modems (if applicable)
- System screen displays
- Boot performance initializations
- Firmware loads
- Software loads
- Display of firmware/software hash value (MD5 OR SHA-1) when possible
- Confirmation that screen displays are functioning
- Date, time and calibration of system



Public Notice

The DEO must give public notice of the L&A Test. The notice shall be placed in the designated place for posting notices in the county for at least seven days before the public test and shall indicate

- The general time frame during which the test may take place, and
- The manner in which members of the public may obtain specific information about the time and place of the test.

Example:

Notice is hereby given that a public Logic and Accuracy Test will take place on ***(DATE and TIME)*** at ***(LOCATION)*** in the County Clerk's Office. The public may obtain information about the test by calling the county clerk at ***(Contact Information)***.

Preparation for the test

Several days before testing the members of the Testing Board are given 25 ballots each. The members secretly vote their test ballots in accordance with the instructions on the ballot, and retain a tally of the votes. This creates a predetermined outcome for their ballots.

The county clerk may provide the Testing Board with tally sheets. The County must provide test ballots.

These test ballots must include:

- At least one ballot from every precinct
- Enough ballots to represent a vote for every position on each ballot style
- At least one ballot that is fully marked (all overvotes)
- At least one ballot that is blank (all undervotes)
- Enough ballots to vote all patterns in a "vote for more than one" race.

The number of ballots a county is required to use depends upon the number of candidates and the number of choices in the most complex race, and/or the number of precincts. The size of the county is not a factor.

The Ballot position calculator on Clerk's Corner can be used to assist in marking ballots.

Note: County test ballots may be printed and marked by a vendor or in-house by the county.

Equipment Records

Records of all previous testing on all devices used in any election must be available for inspection and reference by anyone in attendance during public testing.

Records can be maintained in electronic or paper format.

Note: One does not have to keep test ballots and tapes forever, but one must keep the signoff documents or some record that includes at least: the date, time, and place of the test; names of the people who tested; each device tested; and the results for each device (outlined in 1-7-509(5)).

Storing Testing Material

As the Testing Board conducts the tests, make sure that all test material, when not in use, are sealed up in a metal box with more than one member of the Testing Board signing off on the seal(s). The DEO is the custodian of the box but must not open them or use the material outside the presence of the Testing Board. The DEO may also affix his/her own seal.



Testing materials may include but are not limited to:

- Voted ballots
- Hand tally sheets
- Reports from voting devices
- Oaths

Additional preparation for the test

Before you begin the Logic and Accuracy Test, you should have:

- Conducted your Hardware Diagnostic Test
- Appointed a Testing Board
- Given notice of the test 7 days prior to the test
- Given the Testing Board at least 25 ballots and had them tally the votes
- Prepared the county's test deck of ballots.
- Retrieved your testing records from previous years.
- Prepared a box or boxes for the storage for the testing materials, including seals and logs.

Colorado conducts all elections by mail. Counties are required to have Voter Service and Polling Centers (VSPC) available in the days before the election and on Election Day.

Nearly every county uses some type of electronic equipment to count its mail ballots.

Steps for mail ballot equipment testing.

Step 1: Select the equipment

Step 2: initialize the equipment

Step 3: Run groups of ballots individually through the equipment

Step 4: Verify the results

Step 5: Reset and seal the equipment

Of the equipment used to count mail ballots, one must be selected for testing but no more than five. The testing board will verify that the public counter on the equipment is set to zero.

BMD (ballot marking device)

- The Testing Board selects at least one but no more than five BMDs.
- The Testing Board verifies that the public counter of each selected DRE is set to zero.
- At least two members of the Testing Board must use the selected BMD to mark and print at least twenty- five ballots in the same manner that the test board member manually marked his or her test ballots.
- At least two members of the Testing Board must mark at least one of his or her test ballots using the audio ballot playback and accessible input devices.
- Each Testing Board member must verify that the results report generated from the scanner exactly corresponds to the testing board member's tally of votes on the manually marked paper ballots comprising his or her test ballots.
- Reset the public counters to zero and seal the equipment.



Verification of Results

Run each group of ballots individually through the equipment. Make sure that for each group of ballots the machine count matches the hand count. If the totals do not match, re-check the hand tallies. Often, human error can account for the discrepancy. If the hand tally is correct, proceed to troubleshoot the machine problems.

Potential Issues and Solutions

One problem one may encounter is a software or ballot programming error. The Testing Board must report the error to the DEO. The DEO must correct the error.

Something like this may occur when:

- A race or candidate is left off the ballot
- A “vote for two” is only programmed to count a single vote

Once the error is corrected, restart the Logic and Accuracy Test from the beginning. An errorless count must be made before equipment is approved.

Hardware Issues

- Simple hardware failure (replace machine)
 - Fails to power on or has a dead battery
 - Fails to display the ballot
 - Has a problem with calibration
 - Any other hardware failure

The Test Board will mark the device as unsatisfactory and replace it with a different device.

- Complex hardware failure (Replace/repair - redo test)

AN ERRORLESS COUNT MUST BE MADE BEFORE THE EQUIPMENT IS APPROVED.

Testing Board’s Written Statement

The Testing Board and DEO must sign a written statement attesting to the following:

- Each Device was successfully tested.
- The number of the seal attached to the voting device at the end of each test.
- Any problems discovered.

Counties may create their own written statement in the form of a letter, certificate, etc. This record must be maintained and available for inspection the next time the county conducts a logic and Accuracy Test.