

Universal Ranked Choice Voting Tabulator (URCVT) Logic & Accuracy (L&A) Test Procedures

URCVT v.1.2.0 11-NY L&A Testing v.1.0.0 document is solely for use in the State of New York. This document can be expanded or updated as is necessary or required. Any recommendations listed in this document should not supersede user jurisdiction procedures or other controlling governance entities.

URCVT v.1.2.0 11-NY L&A Testing v.1.0.0

The Logic & Accuracy Test is designed to verify that the Universal Ranked Choice Voting Tabulator (URCVT) is correctly configured and operating properly. Logic & accuracy tests should always be conducted on the URCVT prior to its use in an election as part of the user jurisdiction's full logic & accuracy tests for each election. Post-election logic & accuracy testing should also be performed where possible and in keeping with the established policies and procedures of the user jurisdiction.

MATERIALS REQUIRED. In addition to the following, you must know the correct version of your operating system and your URCVT. The vendor can provide assistance in determining the correct version. Users can also find that information in the *URCVT v.1.2.0 200-NY Installation Instructions for Universal RCV Tabulator - Windows OS v.1.0.0* documentation. The following components of a voting system are required to complete the acceptance testing procedures:

1. One Computer with URCVT installed. Installation instructions can be found in the *URCVT v.1.2.0 200-NY Installation Instructions for Universal RCV Tabulator - Windows OS v.1.0.0* document.
2. General use directed connected printer (this includes necessary printer cable and power supply).
3. Recommended battery backup if user jurisdiction facility does not have generator capabilities in the event of a power failure.
4. One flash drive containing a CVR from your voting system with ranked-choice voting results.
5. One additional storage device that can be used for saving summary files.
6. Access to the Election Data Form ([see appendix](#)) or comparable user jurisdiction prepared form. This form may be completed digitally and may be required to be printed and stored as part of the election record.

The URCVT computer system, consisting of items 1 through 3 above, should have been set up and tested before beginning this test. IT staff may do this part of the setup if properly supervised

by election staff who have been trained in accordance with procedures laid out in the personnel documentation.

VERIFY CORRECT OPERATING SYSTEM AND URCVT SOFTWARE.

Turn on the URCVT computer. As the computer boots up, verify that the correct versions of the operating system and the URCVT software are installed. Compute the hash codes for the URCVT voting system software and compare them with the hash value provided with the trusted build. Refer to the **URCVT v.1.2.0, System Hardware Specification v.1.0.0** document and the **URCVT v.1.2.0 200-NY Installation Instructions for Universal RCV Tabulator - Windows OS v.1.0.0** document for procedures and more information.

VERIFY URCVT HARDWARE.

Verify that all hardware components of the URCVT computer are turned on and functioning properly. This includes checks of the printer(s), flash drives, USB port, etc.

LOGIC & ACCURACY PROCEDURES - the procedures should be done with all assigned personnel in no less than bipartisan teams of two who have received the recommended vendor-led training. All vendor recommended and jurisdiction-required security procedures should be observed at all times during this process.

1. **Assemble all required materials.** The next step will cover exporting a CVR from EMS to a flash drive if this step has not already been completed as part of the voting system L&A.
2. **Export CVR File from EMS System.** This step assumes the user has completed logic & accuracy checks on all parts of their voting system, including EMS as recommended by the system vendor.
 - a. Following L&A testing procedures conducted in EMS, export the L&A CVR file from the ES&S EMS System and save the file to an empty USB flash drive. Please see the appropriate ES&S EMS procedures for the specific steps of this process.
 - b. Take the USB containing the exported CVR to the hardware where the URCVT software is installed.
3. **Transfer the CVR File to the PC.**
 - a. Create a folder on the hard drive of the URCVT PC. The vendor recommends a name associated with the specific election (sample: "LA - RCV Election 11-5-2019"). The vendor recommends the user specifically identify the folder as LA to avoid any confusion with outdated CVRs or other data. See point 14, page 7 for further information.
 - b. Insert USB into the hardware where the URCVT software is installed and open the file with Excel
 - c. Copy the CVR export file from the USB to the new folder.
 - d. Enter the file path of the CVR file into the Election Data Form.
 - e. Remove the USB from the USB port and attach a label with the election name.
 - f. Place the USB in a secure storage location.

4. **Enter Data into the Election Data Form.** Entering this information will make interacting with the URCVT faster and lessen the chances that information will be entered incorrectly. All entries should be carefully reviewed by at least two bipartisan team members assigned to work with the URCVT software. Using your Election Data Form, record the following information:
 - a. Contest Name: Name of the election – sample: LA-General Election, Primary Election, Municipal Election
 - b. Contest Date: Date of the actual election – sample: 11-05-2019
 - c. Contest Jurisdiction: Actual voting jurisdiction – sample: LA-Johnson County, City of Peoria, Town of Salem
 - d. Contest Office: RCV office being tabulated – sample: LA-City Council, County Commissioner
 - e. Decide if you are going to print Precinct Reports and enter Y or N on the Election Data Form.
 - f. Indicate on the Election Data Form if you are generating a CDF JSON file for export totals (Y or N). Generally, this setting will be left unchecked as it is not required in most tabulations.
 - g. Record the file path of the CVR as noted in step 3f, page 2, if you have not already done so.
 - h. Enter the Rules into the Election Data Form The settings entered here must be in full compliance with the governing guidelines for ranked-choice voting elections in the jurisdiction. (check with City, County or State for guidance)
5. **Open CVR File and Review**
 - a. Locate the CVR file in the election folder you created in step 3a and right-click, scroll down, and hover over “Open with.” Select Excel to view the file.
 - b. Locate the Column where the First Vote is and enter the Column in the Election Data Form.
 - c. Locate the Row where the First Vote is and enter the Row in the Election Data Form.
 - d. Locate the ID Column (leave blank if not used) and enter the Column in the Election Data Form.
 - e. Locate the Precinct Column and enter the Column in the Election Data Form
 - f. Exit the CVR file.

Before moving to step 6, your Election Data Form should be completed with the exception of the Configuration File Name and required signatures. Confirm and enter any missing information before proceeding.

6. **Creating the Configuration File**
 - a. Start the Universal RCV Tabulator - The Universal RCV Tabulator will start ready to create a new config file.
 - b. Contest Info Tab

- i. On the tab labeled “Contest Info,” enter the Contest Name, Contest Date, Contest Jurisdiction, and Contest Office. For Rules Description, enter a name that is easy to remember as this can be used as the name for your final configuration file.
 - ii. Only the Contest Name is required for this tab; however, we recommend all fields be completed to assist in identifying output files in the future.
 - c. CVR Files Tab
 - i. Select the voting system provider from the drop-down menu.
 - ii. Using the “Select” button, locate the CVR file in the election folder and load the CVR file path.
 - iii. Enter the remaining required information from the Election Data Form into the remaining fields and click Add
 - iv. The added information should populate in the listing just below the entry fields.
 - d. Candidates Tab
 - i. Click on the “Candidates” tab. Enter the first candidate name and press Add. Enter all candidates.
 - ii. If you are using Code, you can return to each name and enter Code, and press enter on the keyboard.
 - iii. You will not enter Exclude unless instructed to do so by the Election Administration Team.
 - e. Winning Rules Tab
 - i. Use the completed Election Data Form to enter all applicable rule selections here.
 - ii. Depending on the required settings you enter, some options may remain grayed out and unselectable by the user. This is normal and should be expected as all fields may not require input.
 - iii. If there are any questions or concerns about the information needed to complete this tab, STOP and consult your controlling governing body for additional guidance about the jurisdiction’s particular ranked-choice voting requirements.
 - f. Voter Error Rules
 - i. Use the completed Election Data Form to enter all applicable rules selections here.
 - ii. Depending on the required settings you enter, some options may remain grayed out and unselectable by the user. This is normal and should be expected as all fields may not require input.
 - iii. If there are any questions or concerns about the information needed to complete this tab, STOP and consult your controlling governing body for additional guidance about the jurisdiction’s particular ranked-choice voting requirements.
 - g. Output Tab

- i. In the output directory field, enter the file path to your election folder set up in 3a. This will place all tabulation files in this folder once the tabulation is complete.
 - ii. If you are tabulating by precinct, check the box labeled “Tabulate by Precinct.”
 - iii. If you are generating a CDF JSON, check the box labeled Generate CDF JSON. Generally, this setting will be left unchecked as it is not required in most tabulations.
7. Validating the Configuration File
 - a. Click on “Tabulation” at the top of the software window.
 - b. Click on “Validate”
 - c. Refer to the log box at the bottom of the application. If the message “Contest config validation successful.” appears, your contest configuration has been successfully completed.
 - d. If any error messages appear in the log box, refer to 430-NY Universal RCV Tabulator Operator Log Messages and messages in the log box for how to resolve errors. If the error persists, restart URCVT software.
8. Saving the Configuration File
 - a. Click on “File” at the top of the software window.
 - b. Click on “Save...”
 - c. Select a location to save the configuration file. The vendor suggests users save the configuration file to the same location set in the Output Directory setting.
 - d. Refer to the log box at the bottom of the application. If the message “Successfully saved file: Filepath” your configuration .json file has been successfully saved.
 - e. If any error messages appear in the log box, refer to 430-NY Universal RCV Tabulator Operator Log Messages documentation and messages in the log box for how to resolve errors. If the error persists, restart URCVT software.
9. Once a configuration is saved, the user is ready to run a tabulation.
 - a. Click on “Tabulation” at the top of the software window.
 - b. Click on “Tabulate”
 - c. Tabulation will begin.
 - d. If all the above steps were successfully completed, tabulation will run until complete.
 - e. The Tabulator log box will update with messages as Tabulation proceeds.
 - f. Once complete, the Tabulator log box will display a message stating “Results written to: [filepath from Output Directory]”
10. Output files will be:
 - a. .csv contest summary files
 - i. Whole-contest summary files
 - b. .json contest summary files
 - i. Whole-contest summary files
 - c. .log audit files

- i. .log audit files are exported in 50MB sections. If a .log file exceeds 50MB, an additional .log file is started by the URCVT
- 11. Users can then navigate to “File” and click “Exit” if all contests are tabulated.
- 12. Users should produce and record hash codes for results files and configuration files from each successful use of the URCVT.
 - a. Open the Start Menu
 - b. Type in Command Prompt. Press enter to launch the Command Prompt.
 - c. Type in certutil -hashfile [filename]
 - d. To insert the file name: locate the folder in Windows Explorer, including the files you want to produce hash files for.
 - e. Click on the file you want to produce a hash for, and while continuing to hold the mouse down, drag the file to the Command Prompt window and place after -hashfile.
 - i. Example: certutil -hashfile C:\Users\user\Desktop\Rcv-Results\2021-04-24_20-13-56_summary.csv
 - f. Type in SHA512 at the end of the line
 - i. Example: certutil -hashfile C:\Users\user\Desktop\Rcv-Results\2021-04-24_20-13-56_summary.csv SHA512
 - g. Press enter. A hash file will appear in the Command Prompt.
 - h. Record this hash file value
- 13. If any errors arise in the use of URCVT, refer to the relevant documentation for the source of the error. URCVT errors should refer to URCVT v. 1.2.0, 430-NY Universal RCV Tabulator Operator Log Messages, v. 1.0.0. Errors arising out of any hardware or software other than the URCVT should refer to the URCVT Maintenance Procedures and any relevant user and maintenance manual.
- 14. We recommend that the configuration file be set up fully each time the user accesses the URCVT. Starting a new configuration file each time will lessen the chances that outdated CVRs or other data is inadvertently introduced into the system.

Document Revision History

Date	Version	Description	Author
04/27/2021	1.0.0	L&A Testing Procedures	Rosemary F. Blizzard

Universal RCV Tabulator (URCVT) Election Data Form

Use this form to collect the needed data to set up the Ranked Choice Voting contest for tabulation. You will need to obtain a CVR export file from the vendor voting system after the ballot is set up. To determine which selections should be made in the Winning Rules and Voter Error Rules tabs, you will need to consult the approved guidelines and policies for your particular jurisdiction. Items marked with an asterisk (*) are required data fields. Questions about this form can be made to the Ranked Choice Voting Resource Center at info@rcvresources.org or by calling 1-833-868-3728.

Contest Info			
Contest Name*:		Contest Date:	
Contest Jurisdiction:		Contest Office:	
Rules Description:			
CVR Files			
Provider*:		<i>Enter Vendor (ES&S, etc.)</i>	
File Path*:		<i>Location of the cvr export file.</i>	
First Vote Column Index*:		<i>Enter the Column where the First Vote is in the CVR export file.</i>	
First Vote Row Index*:		<i>Enter the Row where the First Vote is in the CVR export file.</i>	
ID Column Index:		<i>Enter the ID Column (if being used)</i>	
Precinct Column Index:		<i>Enter the Precinct Column in the CVR export file.</i>	
Overvote Label		<i>ES&S will default to "overvote"</i>	
Undervote Label		<i>ES&S will default to "undervote"</i>	
Undeclared Write-In Label		<i>User will define. Must match case and spelling with CVR</i>	
Treat Blank as Undeclared WI	Y	N	<i>Circle One</i>
Candidates			
Name*:		<i>Obtain a list of candidates from the EMS System (Attach the list of candidates to this form)</i>	
Code:		<i>Enter the Code for each candidate (if being used) example: DDE</i>	
Excluded:		<i>Check box if a candidate is not being counted in this tabulation</i>	
Winning Rules			
Winner Election Mode*			Any user jurisdiction guidelines which identify the specific rules for ranked choice voting elections should be attached to this form for easy reference. Please see the URCVT User Guide for more information about the available selections that can be made.
Maximum # of Ranked Candidates*			
Minimum Vote Threshold			
Use Batch Elimination	Y	N (Circle One)	
Continue until Two Candidates Remain	Y	N (Circle One)	
Tiebreak Mode*			

Random Seed*		Any user jurisdiction guidelines which identify the specific rules for ranked choice voting elections should be attached to this form for easy reference. Please see the URCVT User Guide for more information about the available selections that can be made.	
Number of Winners*			
Percentage Threshold*			
Threshold Calculation Method*			
Most Common Threshold			
HB Quota			
Hare Quota‡			
Decimal Places for Vote Arith (MW ONLY)*			
Voter Error Rules			
Overvote Rule*		Choose one of the three available options.	
Skip to next rank			
Exhaust Immediately			
Exhaust if mult. cont.			
Consecutive Skip Ranks Allowed		Enter the number of consecutive skipped rankings or check Unlimited if permitted.	
Exhaust on multi ranks for same candidate	Y N (Circle One)	Check if multiple ranks for the same candidate are not permitted.	
Output			
Output Directory (where should results file go on PC?):			
Tabulate by Precinct:	Y N (Circle One)	Generate CDF JSON:	Y N (Circle One)
Configuration File Name:			
Date of Test:		Passed?: YES NO	
Signatures of URCVT Operators (There must be at least two!)			
Signature 1		Signature 2	

‡Disclaimer: The Hare Quota tabulation option in the Universal RCV Tabulator software has not been thoroughly tested in a controlled testing lab environment. Do not attempt to implement this option without first testing in a non-operational environment. Please contact the Ranked Choice Voting Resource Center for additional information.

