EVT

Election Verification Toolkit

Guide to understanding our testing

Office of Cook County Clerk David Orr
Cook County, Illinois - Summer, 2013

PreLAT:
Pre-election Logic & Accuracy Testing

a. Ensure that machines are functioning

b. Programming is correct

Two Independent Proofs

a. Logic = programming

b. Accuracy = mechanics of machines & ballots

Logic (programming) ** some potential errors*

a. That challenged candidate – did he really get taken off in the final database?

b. Ballot Style found in new precinct – was it added correctly

c. Late changes to core databases (street data, voter files, candidate filing) that can get out of synch with the database that has created your ballots and programmed your machines.

d. Random issues introduced by programmers

e. Hacks

Accuracy ** some potential errors*

a. Misplacement of the "Crease Gap"
   - (the space set aside for the fold line on prefolded mail ballots)

b. Printing company error

c. Miscalibrated touchscreens

d. Bad read heads or poor 'darkness calibration' of paper ballot scanners

Patterned results

a.	Gore	1
b.	Bush	2
c.	Mickey Mouse	3
d.	Nader	1
e.	Tancredo	2
f.	Donald Duck	9

Method of Analysis
Visual Scan

a. Special election with two candidates in a county of 40 precincts
    - Check 80 lines for a 1, 2 pattern

b. Cook County Federal/Gubernatorial General
    - 1673 precincts
    - 70 judicial retention contests (yes/no)
        - 140 lines per precinct
    - Avg. of 30 regular contests (Federal, State, local & judicial) x 2-3 candidates
        - 60 lines per precinct

Method of Analysis
Visual Scan *(continued)*

334,600 lines (200 / precinct x 1673 pcts.

a. Would your staff notice an error? Would you yourself?

b. You might catch 1, 2, 3, 1, 3, 3 …

c. But would you catch a contest that was present in a precinct where it didn't belong?

Method of Analysis
Electronic Verification

a. Expected results
   - Build a database
   - Electronically compare results
   - Look at merely 100 or 200 lines with discrepancies

Database Build - linkages to build the "Expected Results" table

a. Precinct to ballot style

b. Ballot style to district

c. District to contest

   - Village of Markham, with Mayor's contest, but also Clerk and Treasurer contests

d. Contest to candidate

e. Candidate to votes

Database Build comparing Prelat Results to Expected Results

a. Import prelat results

b. Where prelat results are accurate, the Expected Result minus the Prelat Result = 0

Candidate	Prelat	Expected	Discrepancy
Gore	1	1	0
Bush	2	2	0
Mickey Mouse	2	3	-1
Nader	1	1	0
Tancredo	2	2	0
Donald Duck	9	3	-6

Discrepancy Analysis

Why did Donald get 6 extra votes?

a. "he's just popular"

b. Staff accidentally included a bunch of extra ballots in the test deck

c. There were 3 other candidates, who should have received 1, 2 and 3 votes, but the ballot counting machine added those 6 votes to Donald's.

Discrepancy Analysis

Why did Mickey get one vote too few?

a. The paper ballot was marked too lightly

b. The read head on the ballot counter is wrongly calibrated, and it missed a mark that we believe it should have read.

c. The printer left two other candidates on the ballot above Mickey's name who have been removed; Mickey shows up as candidate number 5, and staff naturally gave him 2 votes instead of 3.

Discrepancy Analysis

Prove it

a. It's not enough to assume you know why.
   - Find the ballot that's mismarked.
   - Is the 'ballots counted' total off? That could prove a ballot was accidentally run twice

b. Check Touchscreen Paper Trails

Break from the Pattern Intentionally

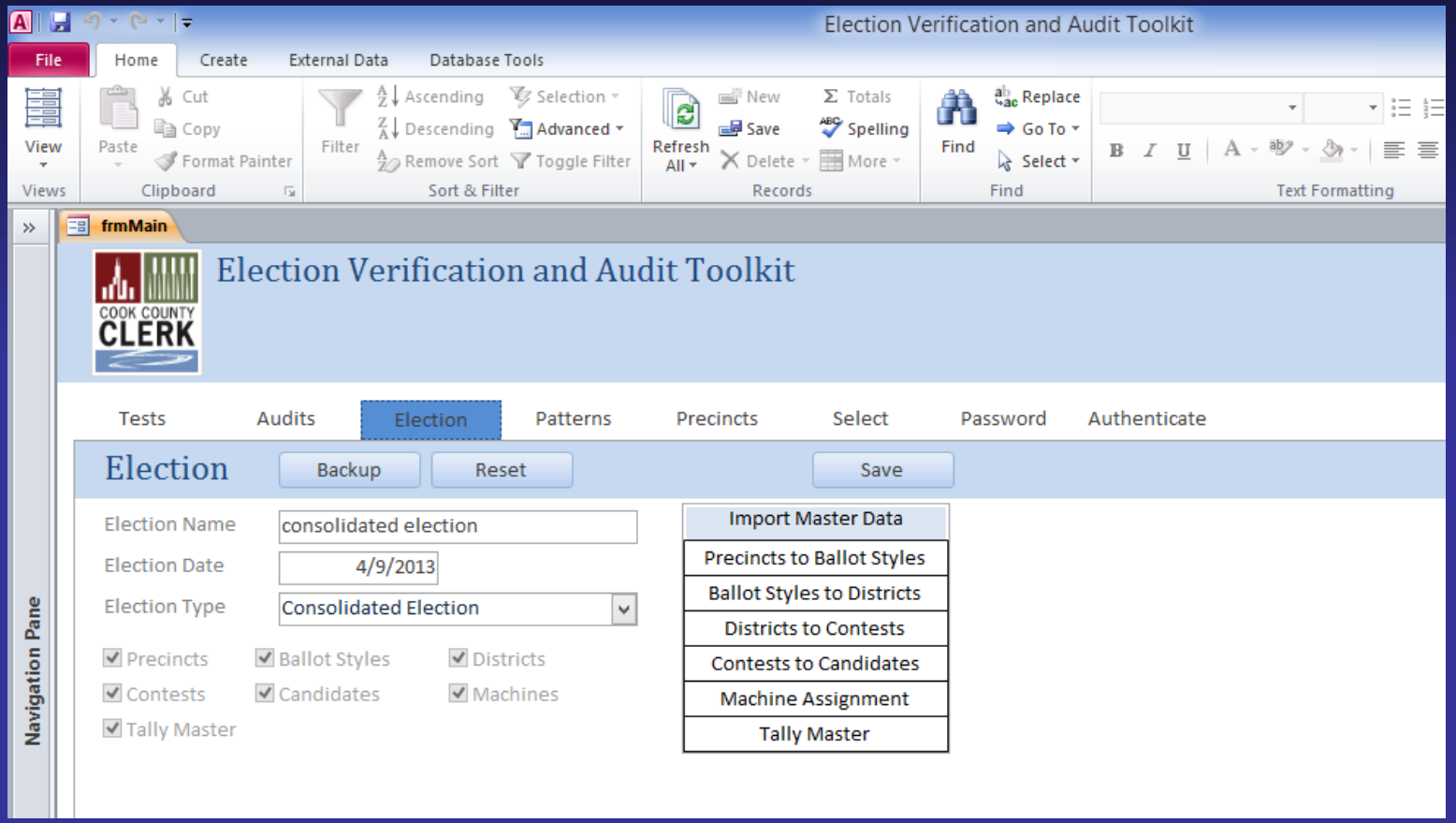
a. If anyone has hacked you, a 1-2-3 prelat pattern isn't hard to fake

b. Introduce a handful of extra ballots or mismarked ballots, misvoted touchscreens.

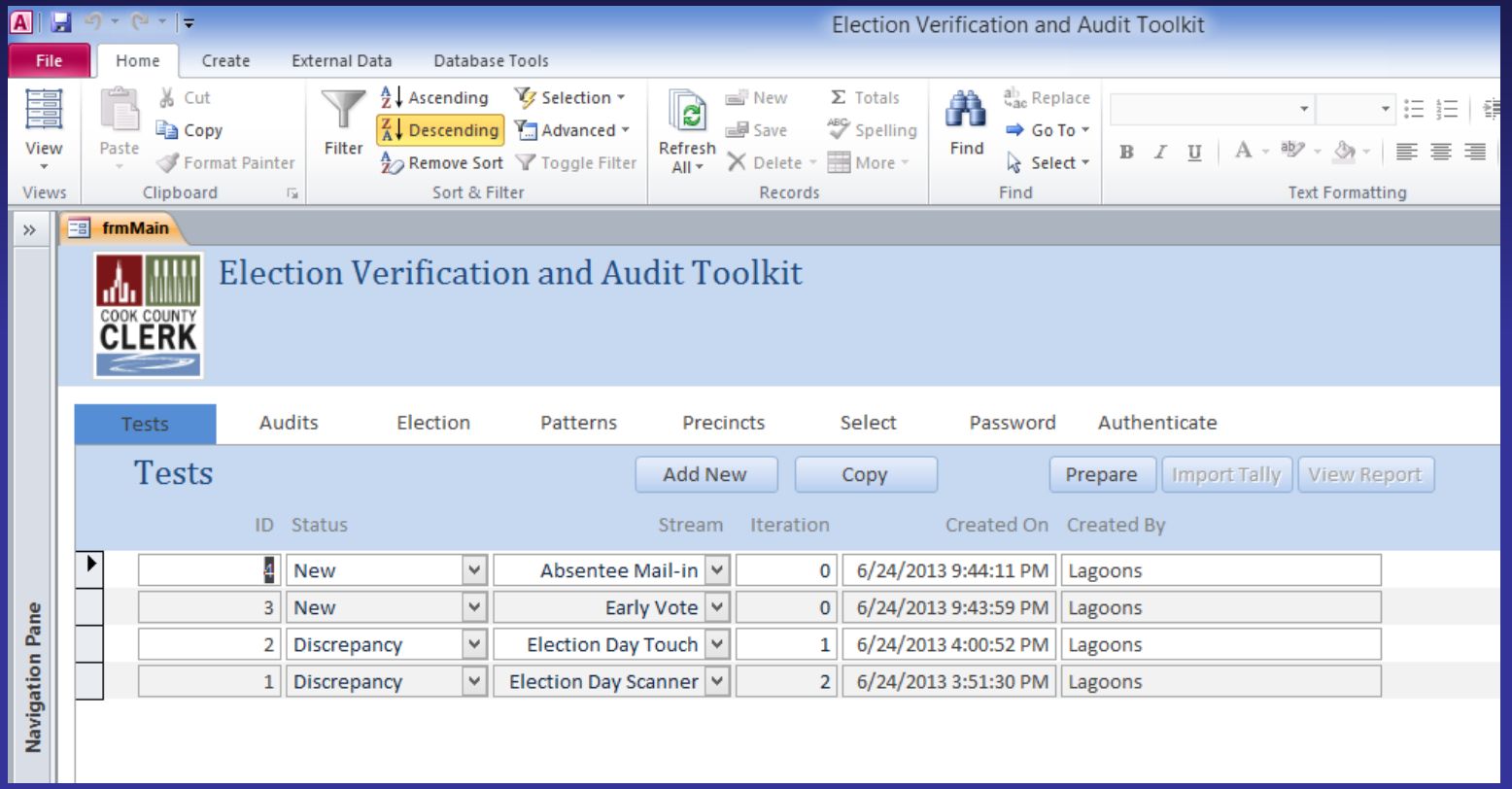
c. Verifying that some discrepancies reflect your intentional breaks from pattern gives you greater confidence that the machines are counting correctly

d. Intentional errors can be easier to verify on touchscreens than inadvertent ones – you can pull the touchscreen immediately and check the results tape.

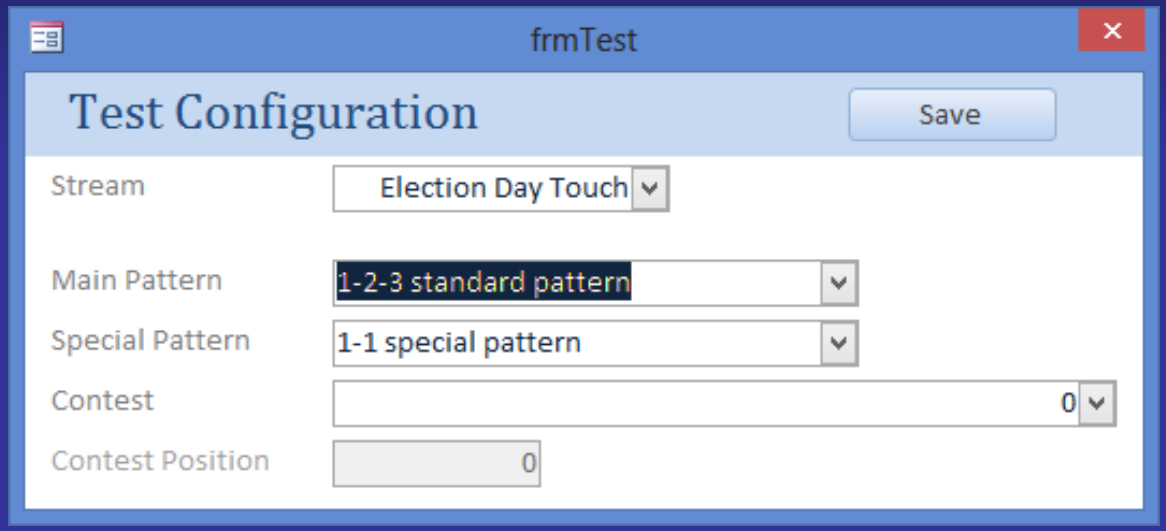
Building the Prediction – check marks by words at lower left indicate tables that have loaded



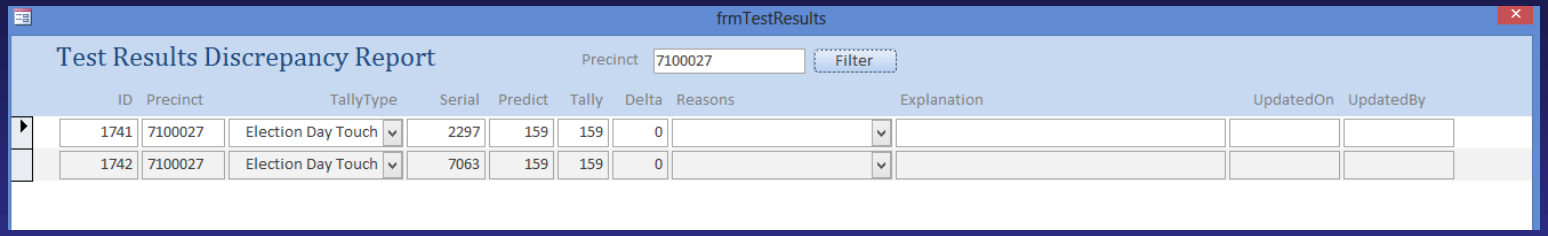
Adding / Defining Tests (for touchscreen data, scanner data, etc.)



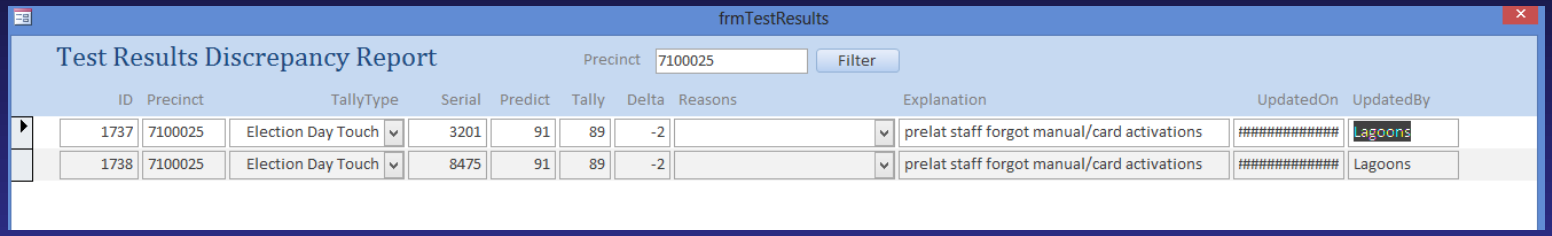
Our test pattern for touchscreens includes a basic 1-2-3 repeating pattern, and a 'special pattern' of 1 additional vote for each of the first two candidates on the ballot (the manual- and card-activated votes)



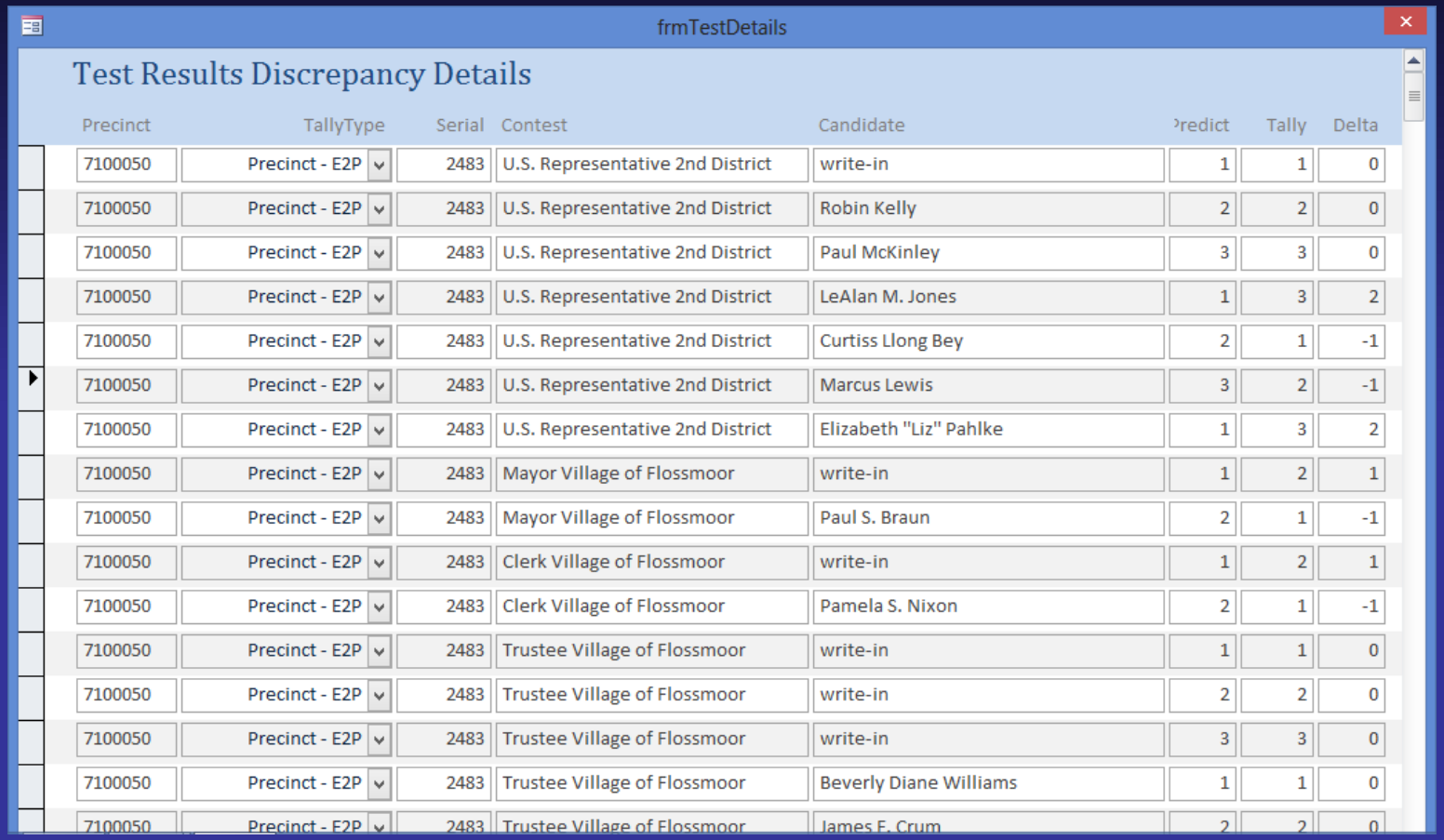
Filtering a discrepancy report to show the summary for one precinct with two touchscreens and no errors.



The discrepancy report filtered to show one precinct with an error.



A precinct with some problems:

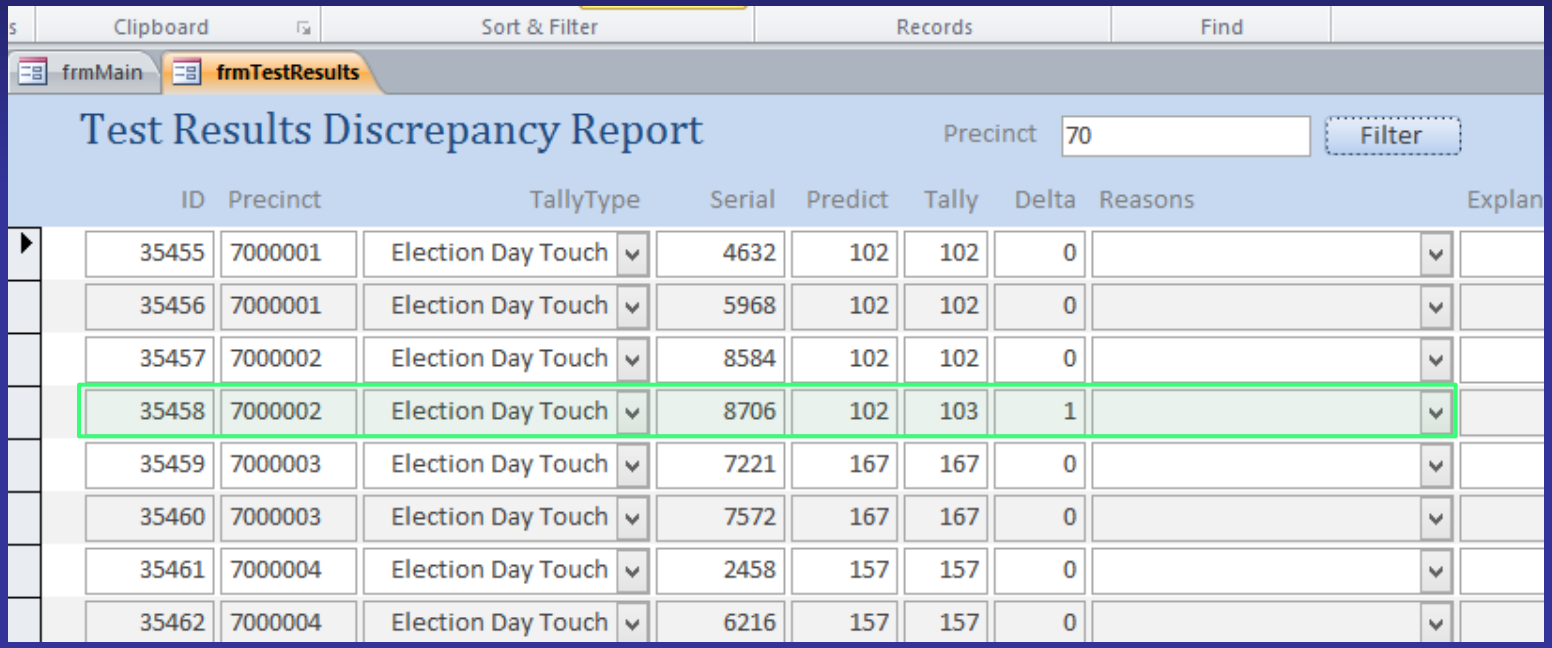


frmTestDetails

Test Results Discrepancy Details

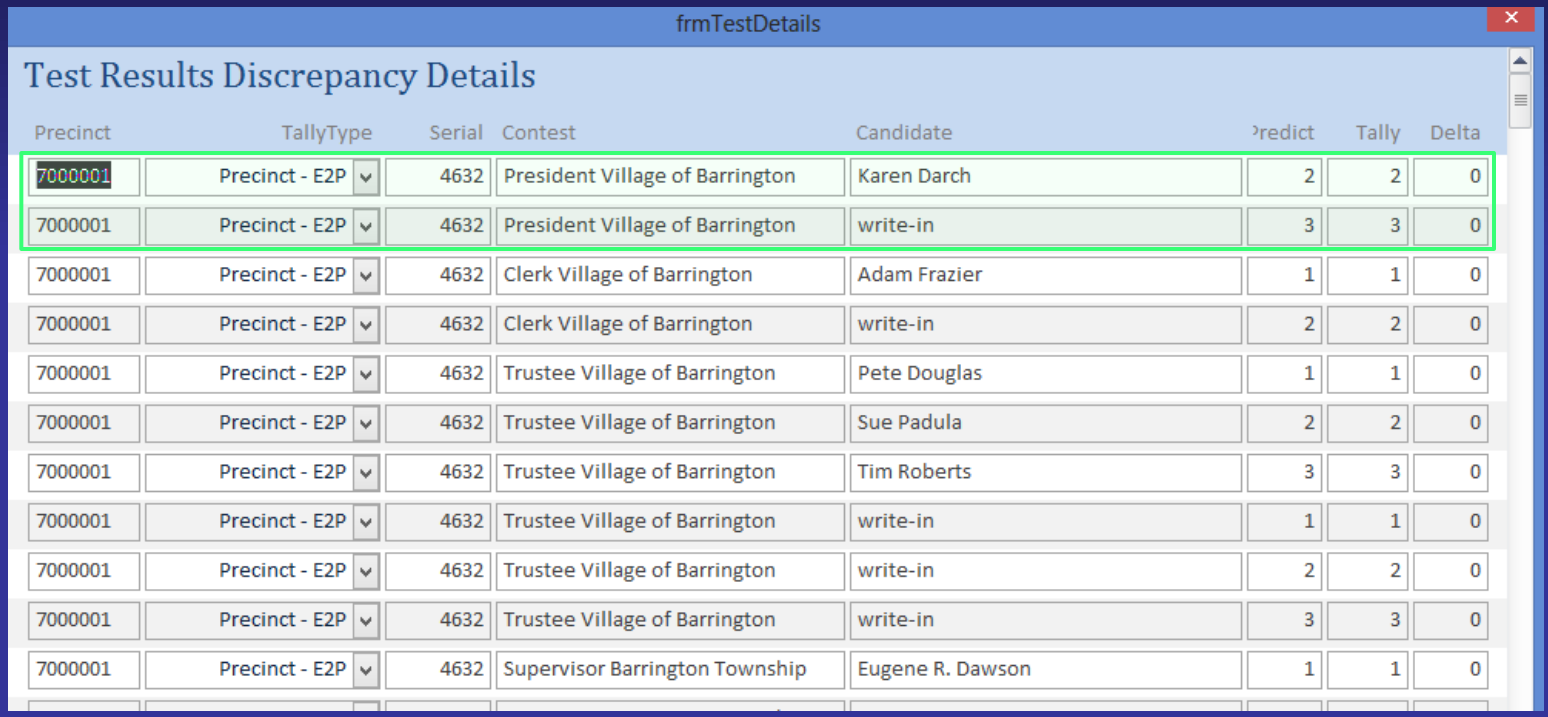
Precinct	TallyType	Serial	Contest	Candidate	Predict	Tally	Delta
7100050	Precinct - E2P	2483	U.S. Representative 2nd District	write-in	1	1	0
7100050	Precinct - E2P	2483	U.S. Representative 2nd District	Robin Kelly	2	2	0
7100050	Precinct - E2P	2483	U.S. Representative 2nd District	Paul McKinley	3	3	0
7100050	Precinct - E2P	2483	U.S. Representative 2nd District	LeAlan M. Jones	1	3	2
7100050	Precinct - E2P	2483	U.S. Representative 2nd District	Curtiss Llong Bey	2	1	-1
7100050	Precinct - E2P	2483	U.S. Representative 2nd District	Marcus Lewis	3	2	-1
7100050	Precinct - E2P	2483	U.S. Representative 2nd District	Elizabeth "Liz" Pahlke	1	3	2
7100050	Precinct - E2P	2483	Mayor Village of Flossmoor	write-in	1	2	1
7100050	Precinct - E2P	2483	Mayor Village of Flossmoor	Paul S. Braun	2	1	-1
7100050	Precinct - E2P	2483	Clerk Village of Flossmoor	write-in	1	2	1
7100050	Precinct - E2P	2483	Clerk Village of Flossmoor	Pamela S. Nixon	2	1	-1
7100050	Precinct - E2P	2483	Trustee Village of Flossmoor	write-in	1	1	0
7100050	Precinct - E2P	2483	Trustee Village of Flossmoor	write-in	2	2	0
7100050	Precinct - E2P	2483	Trustee Village of Flossmoor	write-in	3	3	0
7100050	Precinct - E2P	2483	Trustee Village of Flossmoor	Beverly Diane Williams	1	1	0
7100050	Precinct - E2P	2483	Trustee Village of Flossmoor	James F. Crum	2	2	0

A screen showing the touchscreen test for Barrington precincts. Each line reflects a single touchscreen. Most of them have no discrepancies. Look at precinct 2, where there is a discrepancy of 2 on one of the touchscreens. We'll go to see where the discrepancy was in a moment.



ID	Precinct	TallyType	Serial	Predict	Tally	Delta	Reasons	Explan
35455	7000001	Election Day Touch	4632	102	102	0		
35456	7000001	Election Day Touch	5968	102	102	0		
35457	7000002	Election Day Touch	8584	102	102	0		
35458	7000002	Election Day Touch	8706	102	103	1		
35459	7000003	Election Day Touch	7221	167	167	0		
35460	7000003	Election Day Touch	7572	167	167	0		
35461	7000004	Election Day Touch	2458	157	157	0		
35462	7000004	Election Day Touch	6216	157	157	0		

Here we've zeroed in on touchscreen 4632 in Barrington Precinct 1. We see that there every candidate got the predicted number of votes. Notice the first two lines – Karen Darch and the write-in line for Barrington Village President – instead of 1 / 2, the pattern is 2 / 3.

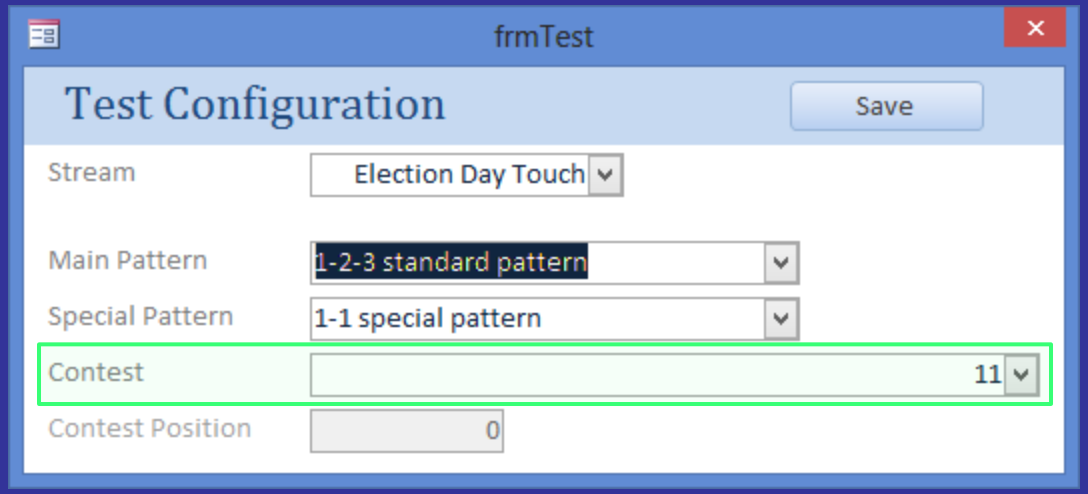


frmTestDetails

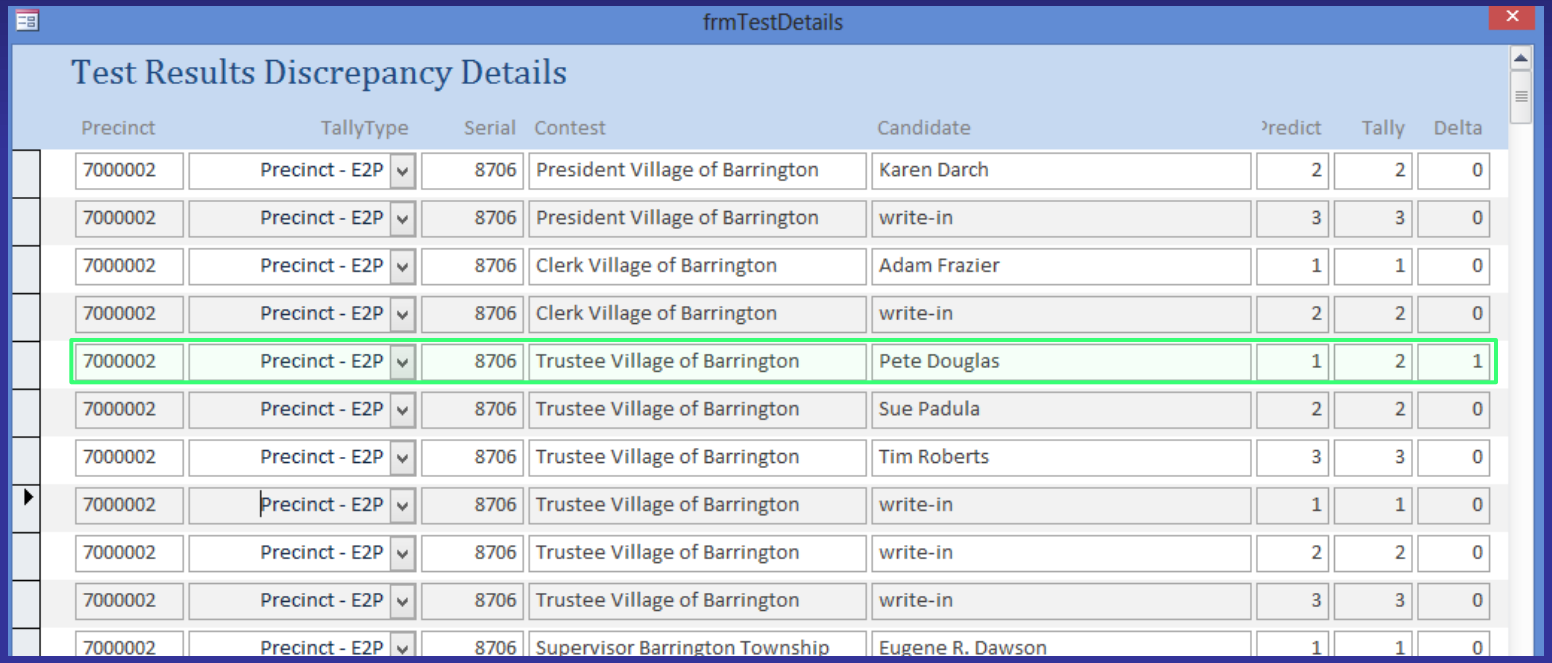
Test Results Discrepancy Details

Precinct	TallyType	Serial	Contest	Candidate	Predict	Tally	Delta
7000001	Precinct - E2P	4632	President Village of Barrington	Karen Darch	2	2	0
7000001	Precinct - E2P	4632	President Village of Barrington	write-in	3	3	0
7000001	Precinct - E2P	4632	Clerk Village of Barrington	Adam Frazier	1	1	0
7000001	Precinct - E2P	4632	Clerk Village of Barrington	write-in	2	2	0
7000001	Precinct - E2P	4632	Trustee Village of Barrington	Pete Douglas	1	1	0
7000001	Precinct - E2P	4632	Trustee Village of Barrington	Sue Padula	2	2	0
7000001	Precinct - E2P	4632	Trustee Village of Barrington	Tim Roberts	3	3	0
7000001	Precinct - E2P	4632	Trustee Village of Barrington	write-in	1	1	0
7000001	Precinct - E2P	4632	Trustee Village of Barrington	write-in	2	2	0
7000001	Precinct - E2P	4632	Trustee Village of Barrington	write-in	3	3	0
7000001	Precinct - E2P	4632	Supervisor Barrington Township	Eugene R. Dawson	1	1	0

The reason for the different pattern is that we run a vote simulation which creates a 1-2-3 pattern in every contest, and then we add a manual-activated vote to the first candidate on the ballot and a card-activated vote to the second. Darch and the write-in both received one extra vote. Here is where we let the program know about the 'special' portion of our expected vote pattern (the contest involved is contest 11 – notice way over to the right of the contest drop-down you'll see that we've clicked to indicate contest 11.)



Here is the test for the touchscreen with the discrepancy in Precinct 2. You can see that Pete Douglas, a trustee candidate, received 1 extra vote. We were able to go to that touchscreen and determine that a staffer had misinterpreted the manual activation instructions and added an unexpected vote for Douglas on this touchscreen – it showed up in the paper trail.



Precinct	TallyType	Serial	Contest	Candidate	Predict	Tally	Delta
7000002	Precinct - E2P	8706	President Village of Barrington	Karen Darch	2	2	0
7000002	Precinct - E2P	8706	President Village of Barrington	write-in	3	3	0
7000002	Precinct - E2P	8706	Clerk Village of Barrington	Adam Frazier	1	1	0
7000002	Precinct - E2P	8706	Clerk Village of Barrington	write-in	2	2	0
7000002	Precinct - E2P	8706	Trustee Village of Barrington	Pete Douglas	1	2	1
7000002	Precinct - E2P	8706	Trustee Village of Barrington	Sue Padula	2	2	0
7000002	Precinct - E2P	8706	Trustee Village of Barrington	Tim Roberts	3	3	0
7000002	Precinct - E2P	8706	Trustee Village of Barrington	write-in	1	1	0
7000002	Precinct - E2P	8706	Trustee Village of Barrington	write-in	2	2	0
7000002	Precinct - E2P	8706	Trustee Village of Barrington	write-in	3	3	0
7000002	Precinct - E2P	8706	Supervisor Barrington Township	Eugene R. Dawson	1	1	0

Post-Election Audit – verifying that votes are counted accurately

a. Vote Canvass ensures accurate reporting of what machines counted

b. Ballot Canvass ensures ballot count matches voter count, or discrepancies are explained

Why Audit the Election

a. Judges make errors
b. Judge might feel tempted to cheat.
c. Contacting judges to learn more about even innocent discrepancies shows you're watching, providing a powerful deterrent against cheating
d. Let's you engage in "micro-training" by identifying and training on places where specific judges miss specific things

Vote Canvass

a. Reading published results against machine tapes
b. Was a wrong cartridge version entered into results?
c. Was anything garbled through machine or human error
d. In our experience, errors rarely if never found

Ballot to Voter Canvass

a. Comparing votes counted to voters who signed in

b. Tracking discrepancies

- We find small discrepancies occasionally

- Most are obviously innocent

Completely benign errors

a. Misnumbered applications

b. Math errors

- In a year with a 2nd card for our judicial ballot, our ballot count may consist of

  Touchscreen A + Touchscreen B + Touchscreen C + (Scanner Count) / 2

- a lot of judges stumble on that "divided by 2"

Real Problems

a. "Hidden Touchscreen Falloff"
b. Scanner Breakdown Mistakes
c. Wrong ballot box
d. Judges cheating

Hidden Touchscreen Falloff = Voters leaving a touchscreen without remembering to cast a ballot

a. If you've ever left your ATM card in a machine, you should sympathize

Scanner Breakdown Mistakes

a. Case A – The scanner is repaired or begins working again, but judges don't notice that when it comes back on, the previously counted votes are still there, so they re-run these ballots.

b. Case B – The scanner breaks down and judges set aside ballots until it's repaired. After repair, they forget to rerun the set aside ballots, though they run other ballots

c. Case C – The scanner breaks down and is never fixed; judges fail to notify us and simply assume we'll count the rest of the paper ballots turned in.

Wrong Precinct's Ballot Box

Nuff said.

Judges stuffing the ballot box

a. Would you catch a judge who voted extra ballots?

b. If not for our Ballot to Voter Canvass, we fear we might not.

A method of judge assessment

a. Did the judge pool in precinct 12 fail to balance their votes and voters properly more than once?

b. Do they understand the record keeping requirements?

c. Do they know we are watching.

d. It's time for a new judge or two, or closer oversight from office staff.

Office of Cook County
Clerk David Orr