

# Cable Testing Management System (CTMS)

## User Manual



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# Introduction

Authorized and funded by the National Shipbuilding Research Program (NSRP), this software was developed to solve specific data quality issues surrounding the cable testing procedures currently utilized by Ingalls Shipbuilding. Specifically, it incorporates a custom communications driver that utilizes the remote capabilities of select test equipment. By sending and receiving data directly from the test equipment, the software is able to eliminate errors surrounding bad data transcription, acquire the data from the test equipment itself, and save it into the handheld unit.

## Using the Cable Testing User Manual

The purpose of this user manual is to provide a reference to assist with using the Cable Testing Management System (CTMS). It discusses the hardware connections, the import/export procedures, and the specific proof of concept procedure the system was developed to employ.

## Hardware and connections

The software utilizes the following hardware:

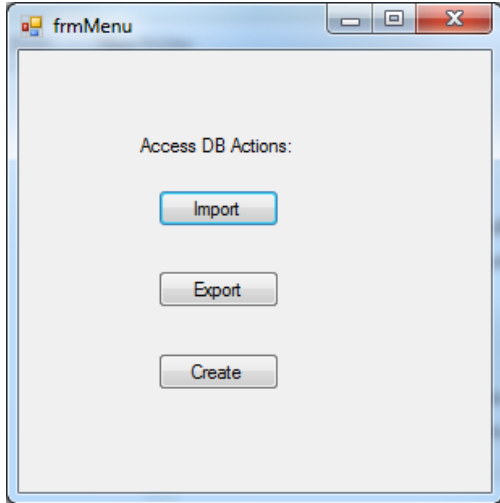
1. Intermec CN3 Handheld Computer – The CTMS software resides on this unit, and utilizes a database to store all data imported, acquired, and processed.
2. Intermec AA17 RS-232 Serial Adapter – This adapter attaches to the bottom of the CN3 unit, adding a 9-pin serial port to the peripherals.
3. Anritsu Site Master S820D – The broadband cable and antenna analyzer utilized by the Ingalls Test & Trials Department to test specified electrical cables.
4. Serial Cable (9-pin RS-232 Female to Female) – Communications cable from AA17 to S820D.

Connection diagram:



# Import/Export Tool

Included with the software is a custom import/export tool designed to move data between the MS Access database used by the Test & Trials Department and the CN3. Running the software, you are presented with a simple menu:

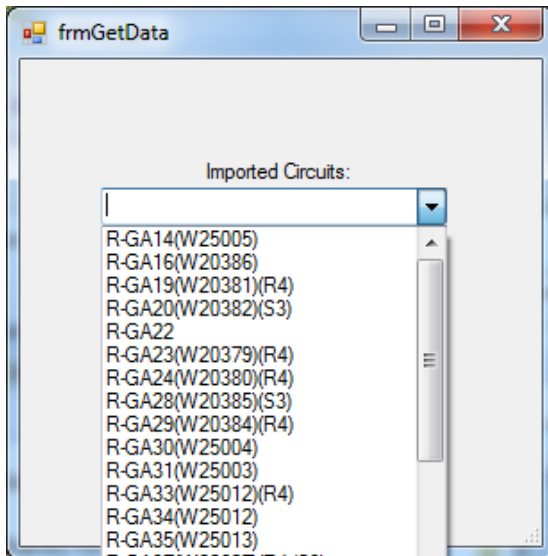


## Creating the Initial Database

Click the 'Create' button to generate a database and register it on the PC. This should only need to be done the first time the software is run.

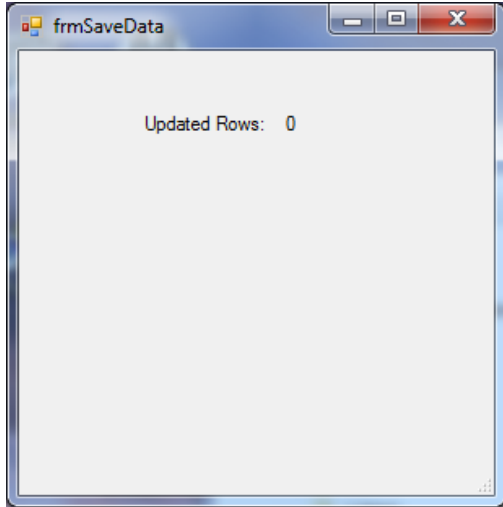
## Importing Access Data

Click the 'Import' button to import data into the database. A file open dialog will open, allowing you to choose the Access database you wish to import from. Once selected and processed, a window with a dropdown will appear, listing the circuits that were imported:



## Exporting Access Data

Click the 'Export' button to export data into the database. A file open dialog will open, allowing you to choose the Access database you wish to export to. Once selected and processed, a window will open, displaying the number of records imported:



## Copying Database To/From CN3

Use ActiveSync to copy the two OracleLite DB files:

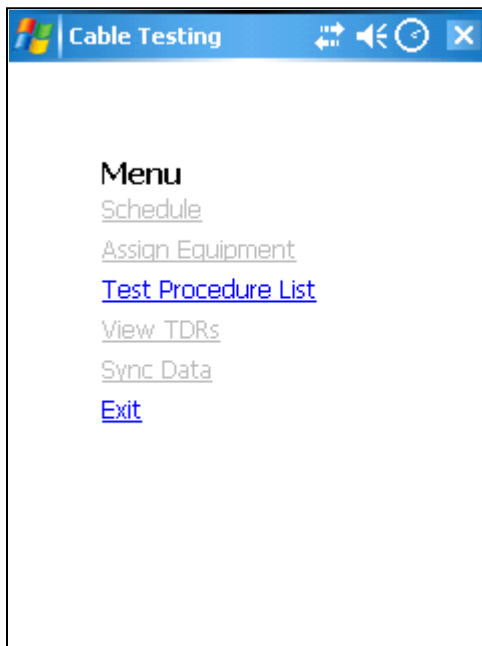
- Cabletesting.obs (schema file)
- Cabletesting.odt (data file)

The default PC directory is c:\oracle\_light\.

The default CN3 directory is \<Device Name>\SD Card\.

# Using the Software

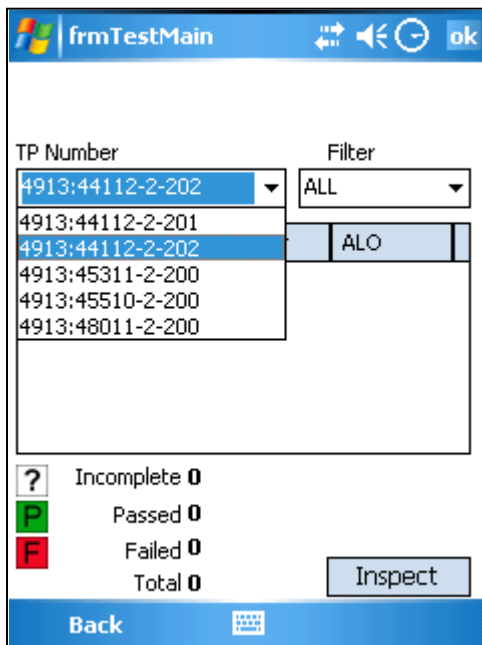
When run, the user is presented with a simplified menu:



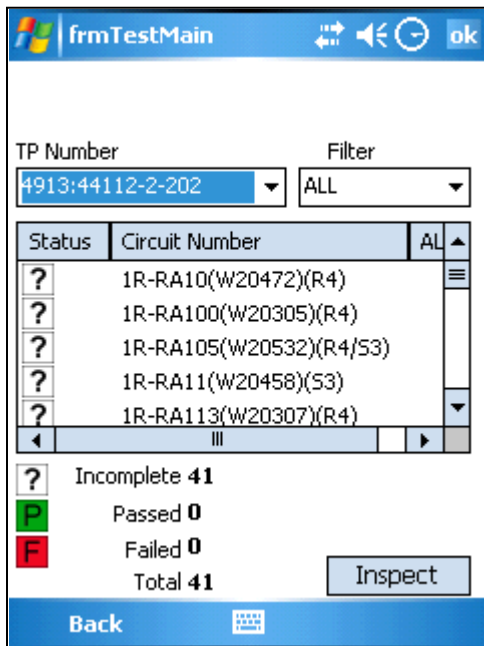
In order to focus on the precise testing procedure outlined by the Test & Trials Department, the only option available is 'Test Procedure List'. (The other options are examples of potential future functionality.)

## Select Test Procedure

Click the 'Test Procedure List' from the Menu to view the available Test Procedures:



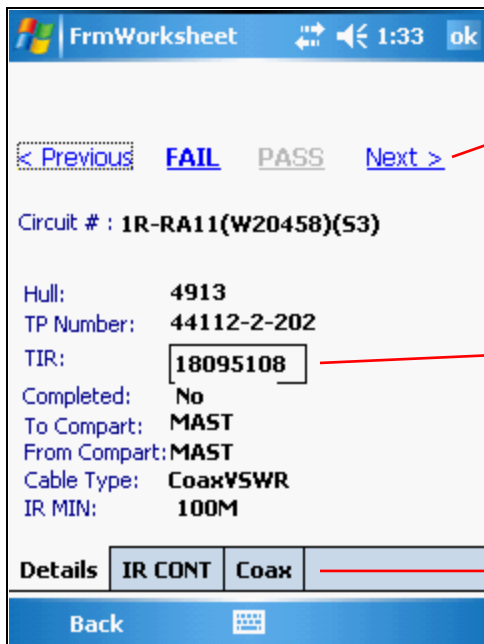
Selecting the desired TP will show the circuits on that Test Procedure:



In addition to seeing the specific circuits associated with the Test Procedure selected, a summary of the circuits' status will be listed to assist in knowing when the Test Procedure is complete.

## Select Circuit

Select a circuit and click '*Inspect*' to begin a test sequence. A screen displaying the circuit information will be displayed:



**Circuit Menu:** Quickly navigate to Previous and Next circuits, as well as *FAIL* or *PASS* the circuit. NOTE: To *PASS* a circuit, all values must have valid entries.

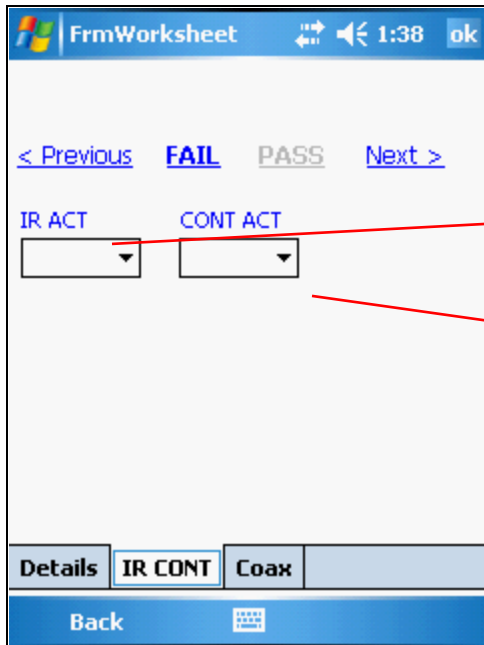
**TIR Number:** The TIR number is auto generated. If you have been provided a different TIR number to associate with the circuit, enter it now.

**Testing Tabs:** The *IR CONT* and *Coax* tabs contain entry fields for those tests.



## IR CONT Tab

Click on the '*IR CONT*' tab to enter IR test values.

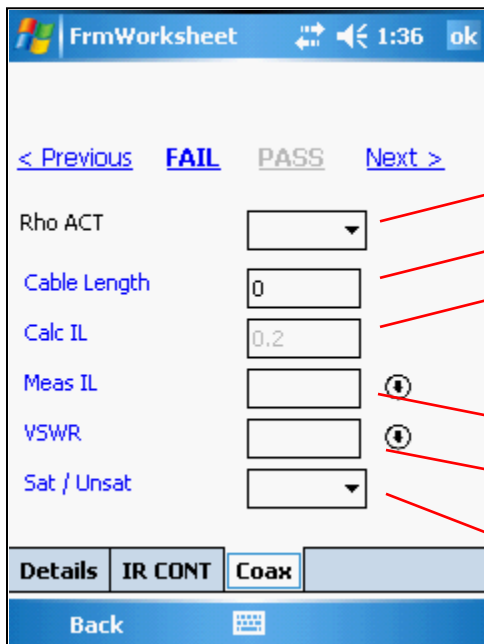


**IR ACT:** Sat/Unsat

**CONT ACT:** Sat/Unsat

## Coax Tab


Click on the '*Coax*' tab to start the Coax tests.




**Rho ACT:** Sat/Unsat

**Cable Length:** Length determined by TDR.

**Calc IL:** Calculated automatically from entered Cable Length value and stored coefficients from database.

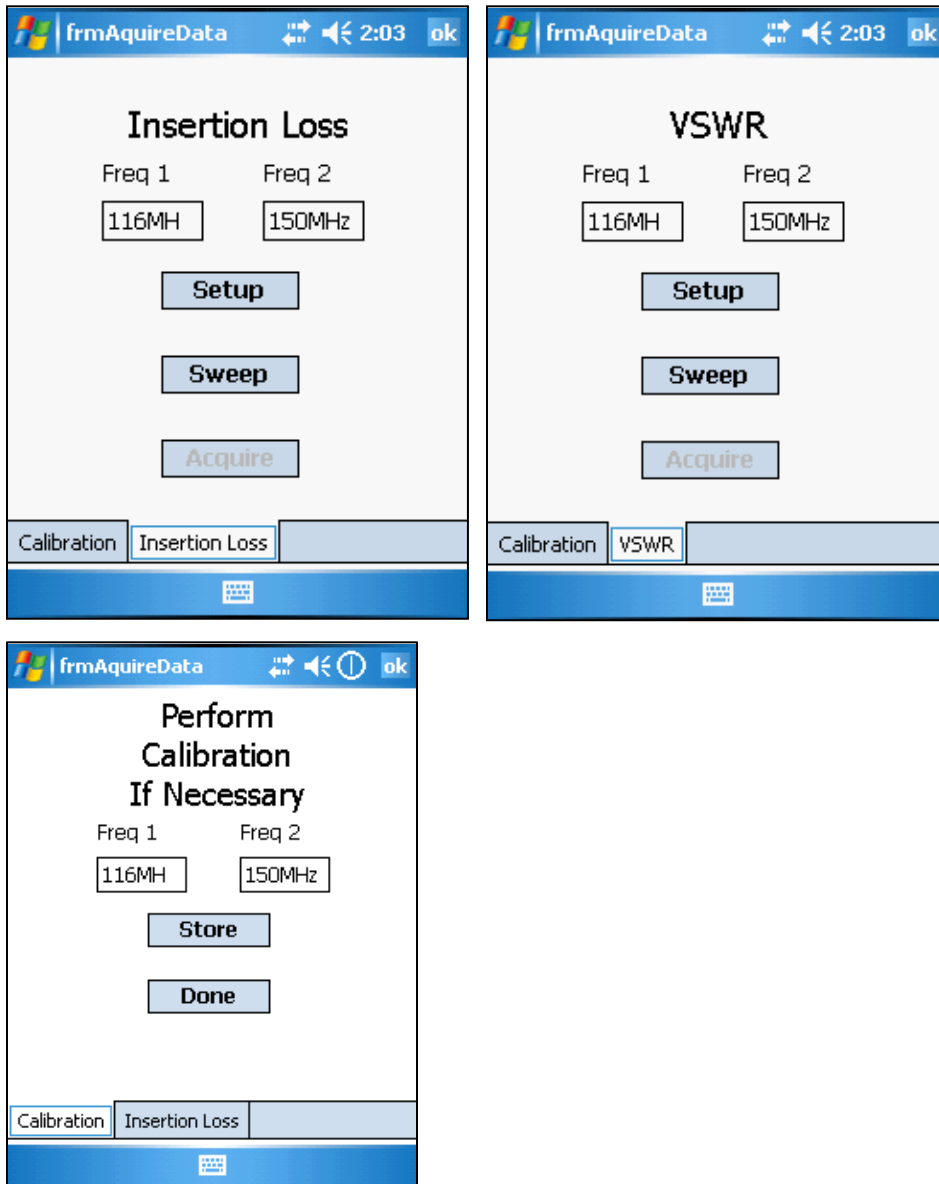
**Meas IL:** Click  to acquire from Site Master.

**VSWR:** Click  to acquire from Site Master.

**Sat / Unsat:** Once all data is entered, this will select Sat if all data is valid.

## Site Master Data Acquisition

Once  button is clicked, the Data Acquisition window is displayed:



**Freq 1:** The lower setpoint to be sent to the Site Master.

**Freq 2:** The upper setpoint to be sent to the Site Master.

**Setup:** Setup the Site Master with the current Mode and Frequencies, and start your Calibration (bottom diagram).

**Sweep:** Once Setup and Calibrated, click Sweep to trigger a sweep trace, scale the display window, and place a Marker. This can be done several times in order to validate sweep data and ensure a good sweep.

**Acquire:** Once a valid sweep is visible on the Site Master, click Acquire to capture the Marker data, and download the sweep into the CN3.

## Pass / Fail

If valid data is entered into all fields, the **PASS** link on the Menu is visible:

The screenshot shows the 'FrmWorksheet' application window. At the top, there is a title bar with the Windows logo, the text 'FrmWorksheet', and navigation icons (back, forward, home, refresh) along with a clock showing '2:15' and an 'ok' button. Below the title bar, there is a menu with four items: '< Previous', 'FAIL', 'PASS', and 'Next >'. The 'PASS' item is highlighted in blue. Below the menu, there are several input fields with labels: 'Rho ACT' (dropdown menu with 'SAT' selected), 'Cable Length' (text box with '250'), 'Calc IL' (text box with '3.4'), 'Meas IL' (text box with '2.1' and a help icon), 'VSWR' (text box with '20' and a help icon), and 'Sat / Unsat' (dropdown menu with 'SAT' selected). At the bottom of the form, there are four tabs: 'Details', 'IR CONT', 'Coax', and an unlabeled tab. The 'Coax' tab is selected. Below the tabs is a blue bar with a 'Back' button and a keyboard icon.

Clicking **FAIL** will mark the circuit as failed, while clicking **PASS** will mark it as passed:

The screenshot shows the 'frmTestMain' application window. At the top, there is a title bar with the Windows logo, the text 'frmTestMain', and navigation icons (back, forward, home, refresh) along with a clock showing '2:15' and an 'ok' button. Below the title bar, there are two dropdown menus: 'TP Number' (with '4913:44112-2-202' selected) and 'Filter' (with 'ALL' selected). Below these is a table with three columns: 'Status', 'Circuit Number', and 'AL'. The table contains five rows of data. The first four rows have a question mark '?' in the Status column. The fifth row has a green 'P' in the Status column, indicating it is passed. Below the table, there is a summary section with a question mark '?' and the text 'Incomplete 40', a green 'P' and 'Passed 1', a red 'F' and 'Failed 0', and 'Total 41'. There is an 'Inspect' button to the right of the summary. At the bottom of the form, there is a blue bar with a 'Back' button and a keyboard icon.

Status	Circuit Number	AL
?	1R-RA10(W20472)(R4)	
?	1R-RA100(W20305)(R4)	
?	1R-RA105(W20532)(R4/S3)	
P	1R-RA11(W20458)(S3)	
?	1R-RA113(W20307)(R4)	

Using this process, proceed through each circuit in the Test Procedure.

## Circuit Filters

You can also select a filter to easier find the circuits. The diagrams below show filters activated for circuits that are Passed, Failed or Incomplete (or Not Started)

The following tables represent the data shown in the four screenshots of the frmTestMain application.

**Screenshot 1: Filter ALL**

Status	Circuit Number	ALO
?	1R-RA10(W20472)(R4)	
?	1R-RA100(W20305)(R4)	
?	1R-RA105(W20532)(R4/S3)	
P	1R-RA11(W20458)(S3)	
?	1R-RA113(W20307)(R4)	

Summary: Incomplete 40, Passed 1, Failed 0, Total 41

**Screenshot 2: Filter PASSED**

Status	Circuit Number	ALO
P	1R-RA11(W20458)(S3)	
P	1R-RA4(W20304)(S3)	

Summary: Incomplete 0, Passed 2, Failed 0, Total 2

**Screenshot 3: Filter FAILED**

Status	Circuit Number	ALO
F	1R-RA10(W20472)(R4)	

Summary: Incomplete 0, Passed 0, Failed 1, Total 1

**Screenshot 4: Filter INCOMPLETE**

Status	Circuit Number	ALO
?	1R-RA100(W20305)(R4)	
?	1R-RA105(W20532)(R4/S3)	
?	1R-RA113(W20307)(R4)	
?	1R-RA12(W20466)(S3)	
?	1R-RA13(W20456)(R4)	

Summary: Incomplete 38, Passed 0, Failed 0, Total 38

## Transfer results to MS Access

At this point the updated test result data is stored on the CN3 in the files noted earlier in this manual. Dock the CN3 in a cradle networked to a PC then copy these files to the PC. The results can then be imported into the Test & Trials MS Access database for processing per normal procedures.