

Certifying a RB-10 Bantam Lite Portable Testing Solution with the RS703  
or RS933 Laboratory Calibration System

### *Hardware and Software Requirements*

- 1) RB-10 Bantam Lite Portable Meter Test Solution (Device Under Test – DUT)
- 2) RS703 or RS933 Automated Laboratory Test System
- 3) 120V VAC Auxilliary Power Input Cable (Radian part no. 194015)
- 4) Bantam Lite Test Cable (Radian part no. 196115)
- 5) BNC – BNC Cable (Radian part no. 100003)

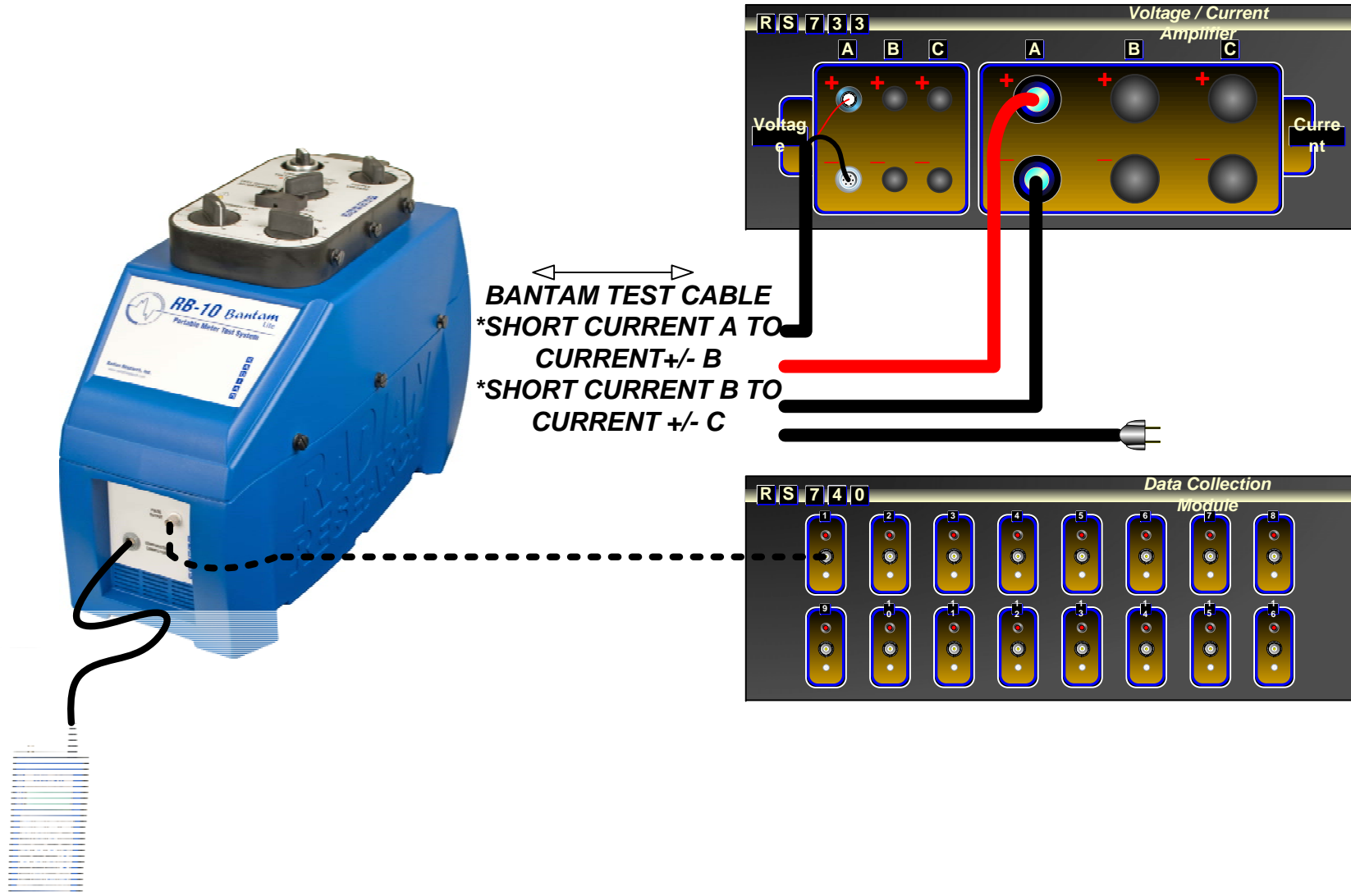
Any work with the RS-703A Automated Calibration System, RS-703A accessories, energized standards and energized meters can present the danger of electrical shock. The RS-703A and its accessories should be operated by qualified personnel. The information provided in this instruction set is intended to serve as a guide for properly qualified electric utility personnel. This instruction set is not intended to replace existing electric utility safety procedures and those listed in the Handbook for Electricity Metering.

Operation of the RS-703A should not be conducted if the work area is wet or damp. Operation should also not be conducted if flammable gases or fumes are present in the work area. When using the RS-703A never make voltage and current connections/disconnections when the system is live. For service or repairs to the RS-703A contact Radian Research, Inc. Do not attempt to service or make modifications to the RS-703A due to the risk of electrical shock.

Radian Research, Inc. assumes no liability for failure to comply with existing applicable safety precautions as well as those listed in this warning statement.

## Hardware Setup

1. With the 703/933 System completely powered OFF, ensure the following:
  - a) the external potential and current cables are securely connected to the front panel
  - b) the control PC's monitor, mouse, and keyboard are connected
  - c) the 703/933's main power cable is connected to the power source
  
2. Make all the necessary hardware connections, as shown in the diagram below.



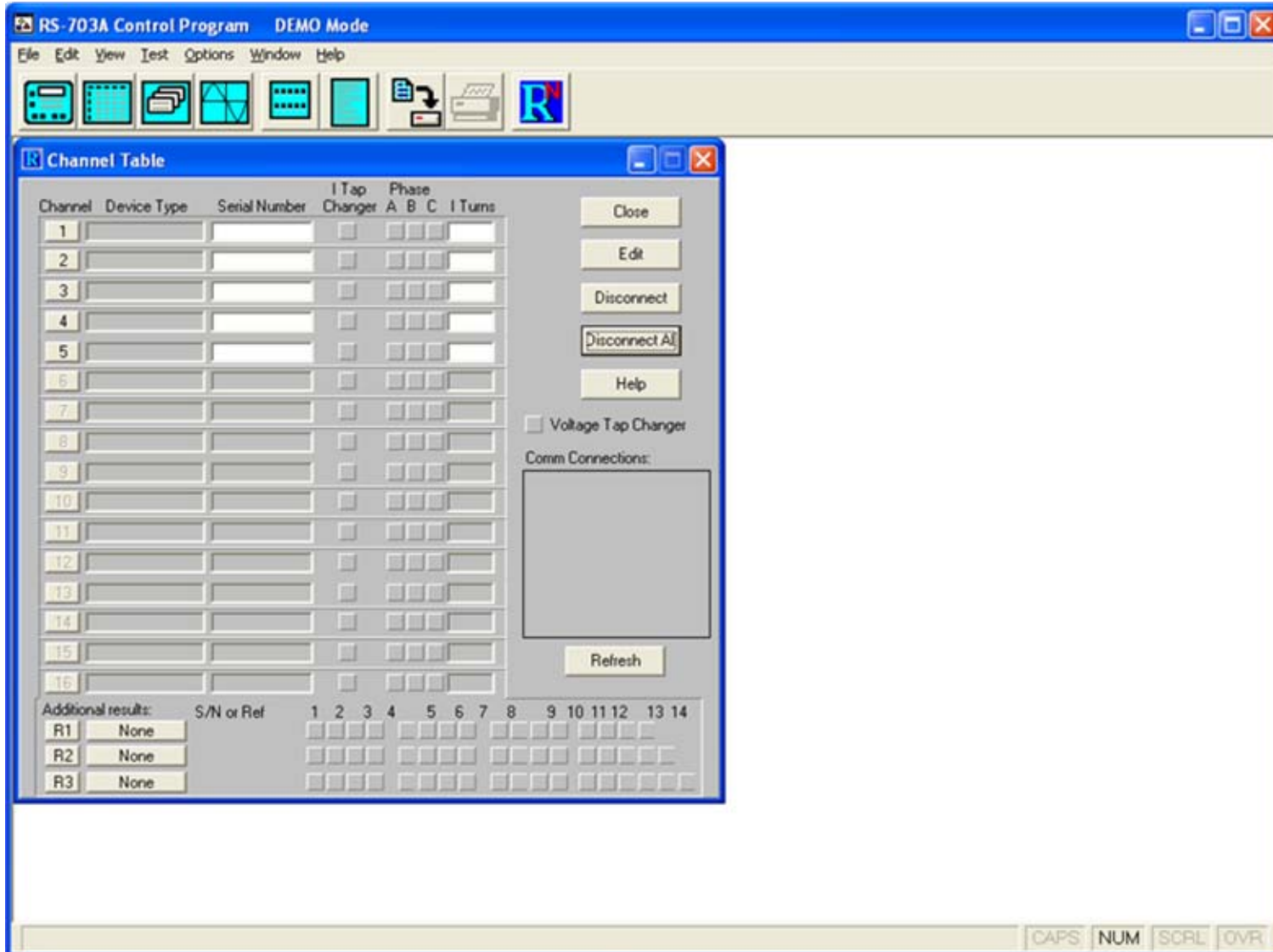
## *Hardware Setup*

- 2.a. Connect the Automated Comparator to the COMPARATOR CONNECTOR on the front panel.
- 2.b. Connect the RB-10 Test Cable to the TEST CABLE CONNECTOR on the rear panel.
- 2.c. Connect the 120V VAC Auxilliary Power Input Cable to the Test Cable's AUXILLIARY POWER leads.
- 2.d. Using a BNC-BNC cable, connect the PULSE OUTPUT port of the DUT to channel one of the RS-740/RS-940 front panel.
- 2.e. On the Test Cable, short the CURRENT A lead to the CURRENT +/- B lead. Also, short the CURRENT B lead to the CURRENT +/- C lead.
- 2.f. Using the 703/933 External Current Cable and the DUT Test Cable, connect the DUT's CURRENT +/- A lead to the 703/933's high side phase-A Current output. Connect the DUT's CURRENT C lead to the 703/933's low side phase-A Current output.
- 2.g. Using the 703/933 External Potential Cable and the DUT Test Cable, connect the DUT's Potential leads to the 703/933's phase-A Potential ouput.
- 2.h. Ensure that the DUT's top panel controls are configured as follows (consult the reference standard's operations manual for details):
  - a) LINE VOLTAGE: OFF
  - b) SUPPLY VOLTAGE: 480
  - c) TEST CURRENT ADJUSTMENT: FULLY COUNTER CLOCK-WISE
  - d) POWER SWITCH: OFF
  - e) TEST CURRENT TAP: 30
  - f) ELEMENTS: ABC
- 2.i. Power the RB-10 by plugging in the 120V VAC Auxilliary Power Input Cable to a standard wall outlet. Turn the LINE VOLTAGE switch to the the ON position. Set the POWER SWITCH to the 1.0PF position.
- 2.j. Turn on the Automated Comparator. Select 4 PREFERENCES, 1 RS232-Mode, and 2 RD-2x Bypass.

## Software Setup

Opening Application:

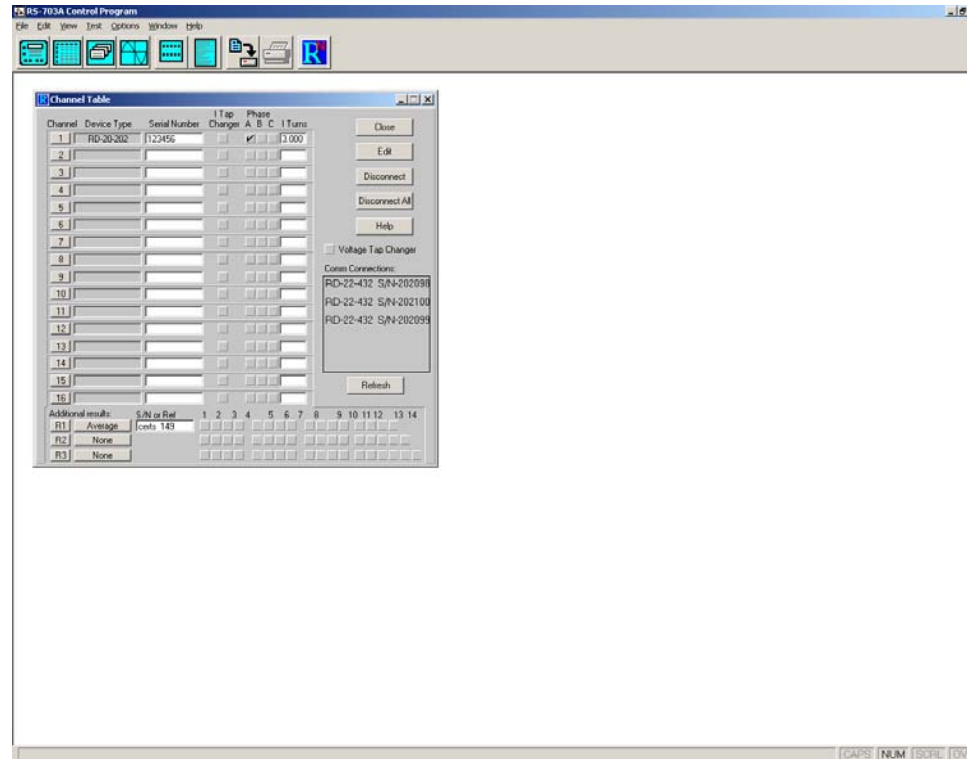
1. Open the 703/933 Control Software by double-clicking the application's icon, located on the computer's desktop. A pop-up screen will briefly flash on the screen, and a short delay will follow. The control application will then open and proceed with a self diagnostic routine.
2. Wait until the diagnostic routine is completely finished. The application opens with the *Channel Table* window open.



## Software Setup

Associate DUT's to Channels:

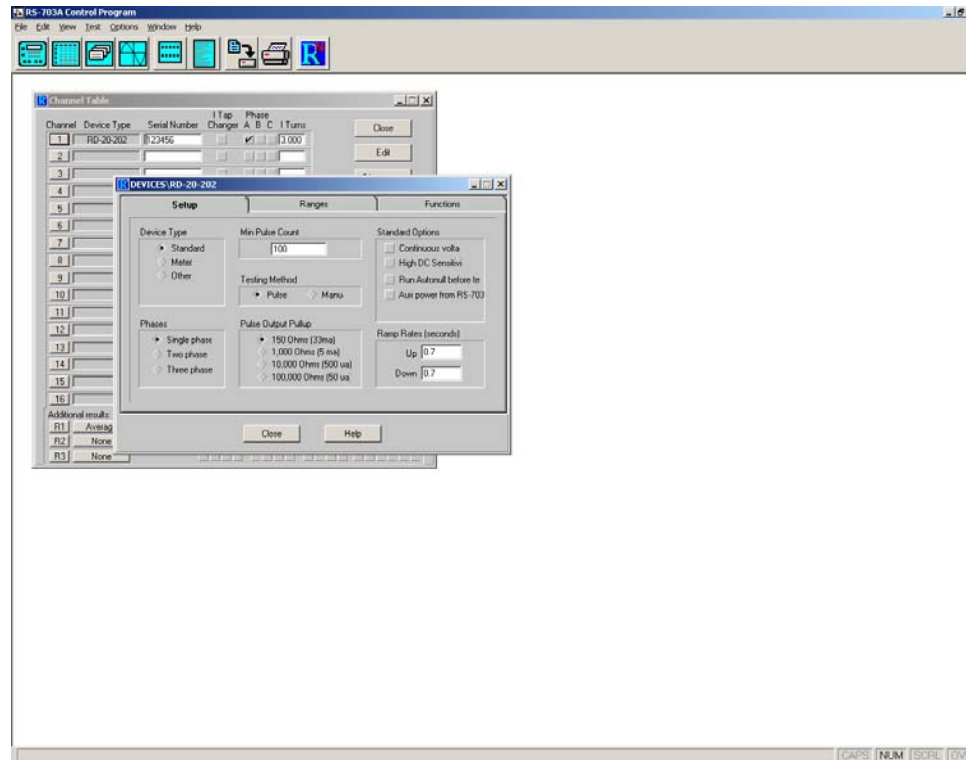
1. Click on the *Channel 1* selection box. A *Select Device* window will appear. From this window, select the applicable device name, based on the model number of the standard that is installed in the RB-10. (If one does not exist for the DUT to be tested, select *New* - Follow the process for creating a new device, located in Appendix 1.) Select *OK*. This action will associate the specific device type with Channel 1.



## Software Setup

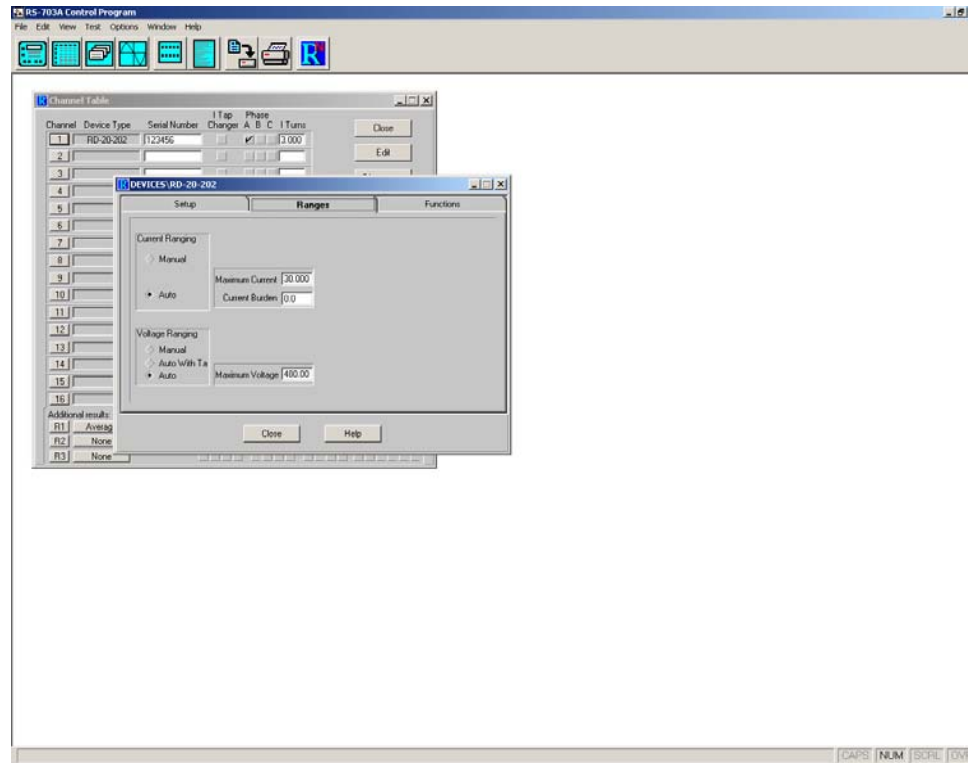
2. Re-click on the *Channel 1* selection box. The associated device's configuration card will be displayed. Ensure that the device is configured as follows:

Setup tab:  
 Device Type: Standard  
 Phases: Single phase  
 Min Pulse Count: 100  
 Testing Method: Pulse  
 Pulse Output Pullup: 150 Ohms (33ma)  
 Standard Options:  
 Ramp Rates (seconds): Up = 0.7, Down = 0.7



## Software Setup

Ranges tab:  
 Current Ranging: Auto  
 Maximum Current: 30  
 Current Burden: 0.0  
 Voltage Ranging: Auto  
 Maximum Voltage: 480





## Software Setup

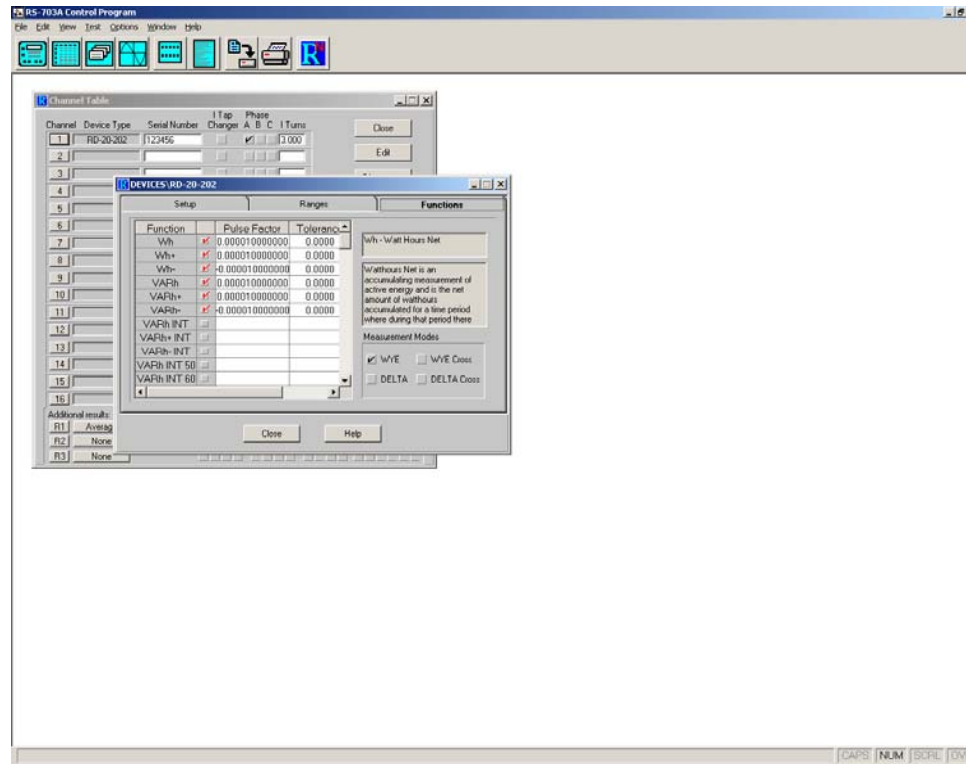
Functions tab:

Function: select functions applicable to DUT's supported measurement parameters

Pulse Factor: 0.00001

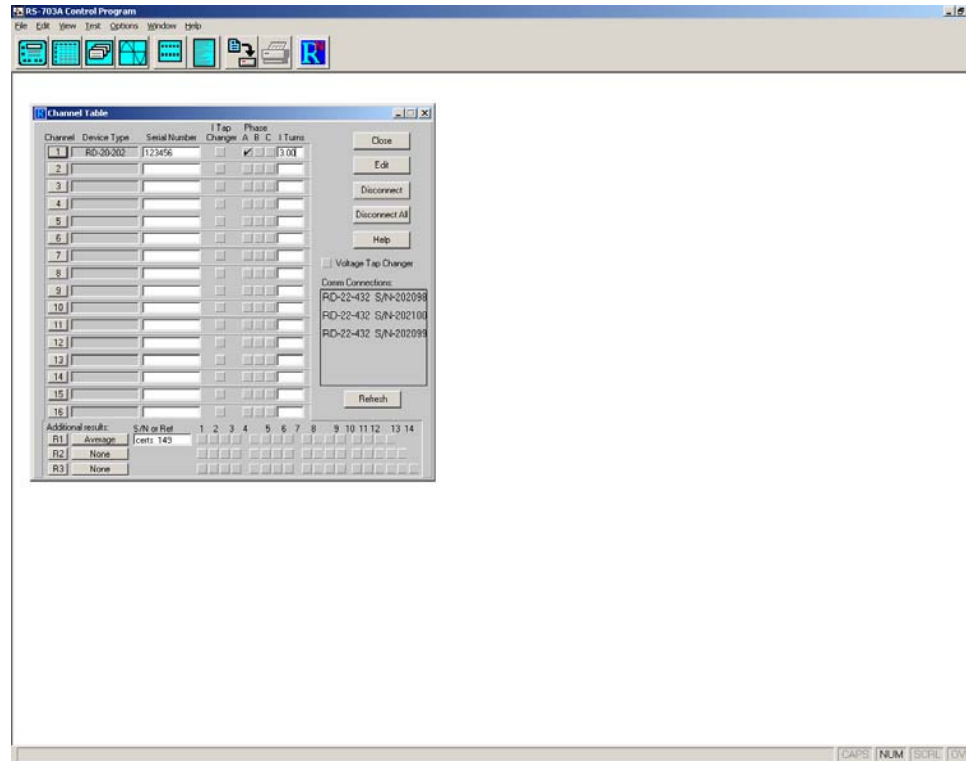
Tolerance: as specified by DUT's specifications

Measurement Modes: check Wye only



## Software Setup

3. Select *Close*. If prompted, save any unsaved changes.
4. Enter the DUT's serial number.

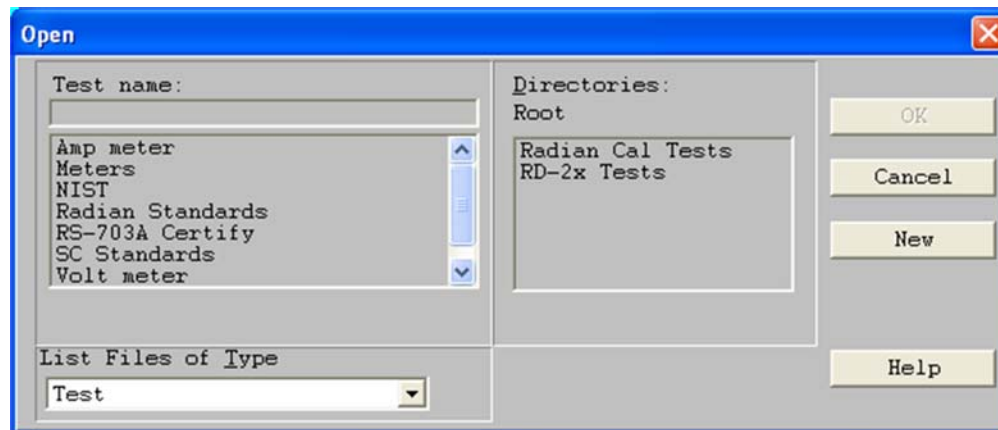
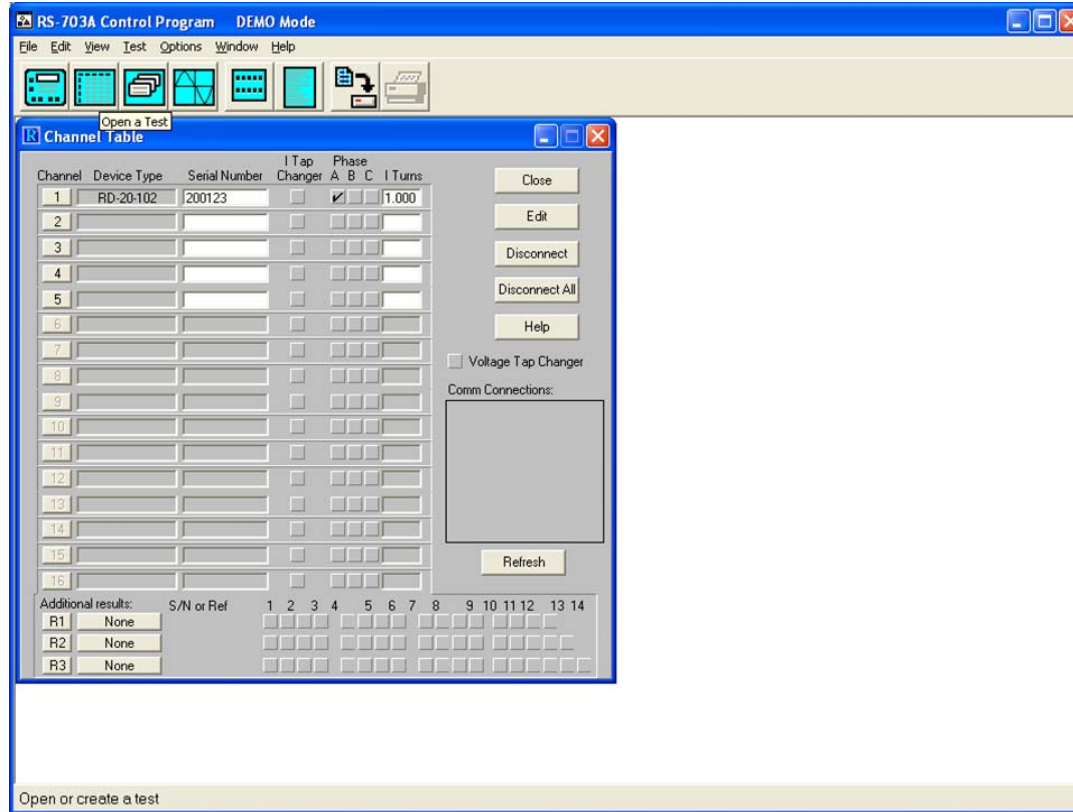


5. Ensure that *I Tap Changer* is unchecked, only *Phase A* is checked, and *I Turns* is set to 3.000.

## Software Setup

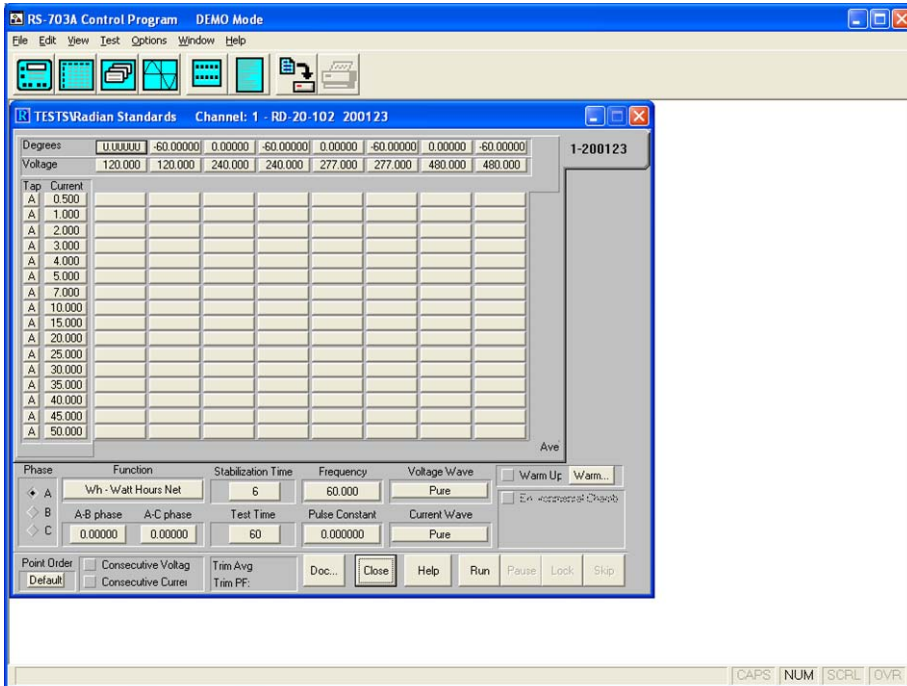
Test Setup:

1. From the icon menu bar, select the *Open a Test* icon. A *Open* window will appear.

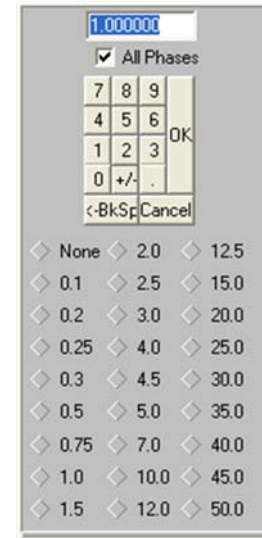


## Software Setup

2. From this window, select "Radian Standards" from the list provided. Select *OK*. The selected *Test* window will appear, with the previously associated DUT's serial number listed on the right-hand tabs.



3. This *Test screen* will include all the test points to be executed. Any of the Current, Voltage, and/or Phase values can be modified by clicking on that particular value.



4. Ensure that the test options are configured as follows:

- Phase: A
- Point Order: select per user's preference
- Function: Wh - Watt Hours Net
- A-B phase: 0.0
- A-C phase: 0.0
- Consecutive Voltage: unchecked
- Consecutive Current: unchecked
- Stabilization Time: select per user's preference
- Test Time: select per user's preference
- Frequency: 60.000 (US); 50.000 (International)
- Pulse Constant: 0.00001
- Voltage Wave: Pure \*see Appendix 3
- Current Wave: Pure \*see Appendix 3
- Warm Up: unchecked

## *Running A Test*

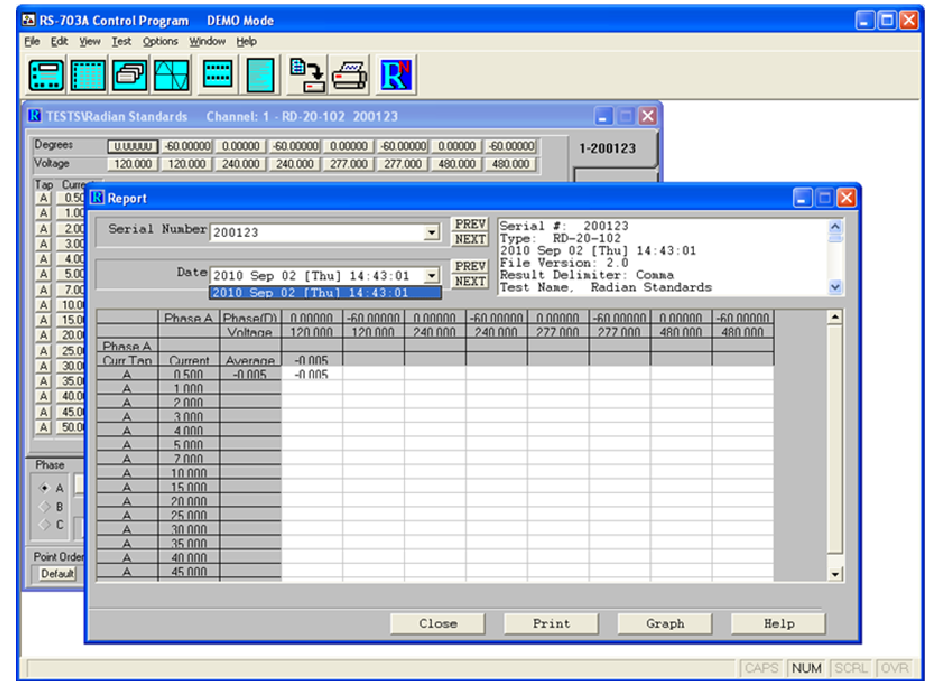
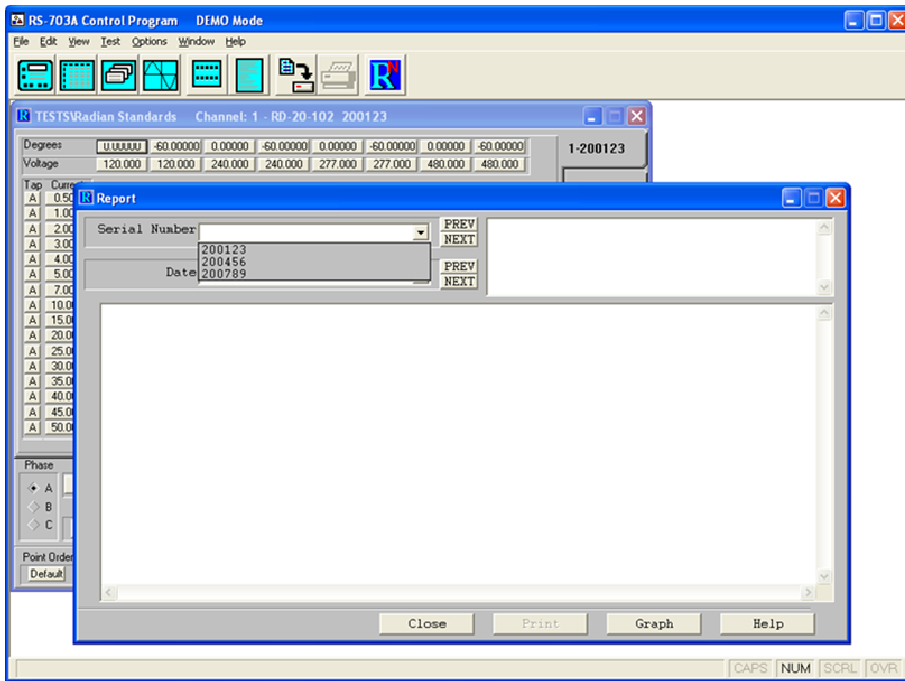
1. Select *Run*. The test will automatically start with the first test point and continue until all test points have been executed.



## Saving, Viewing, and Exporting Results Data

2.a. From the *Serial Number* drop-down menu, select the desired serial number.

2.b. From the *Date* drop-down menu, select the desired date. The desired results data will appear.

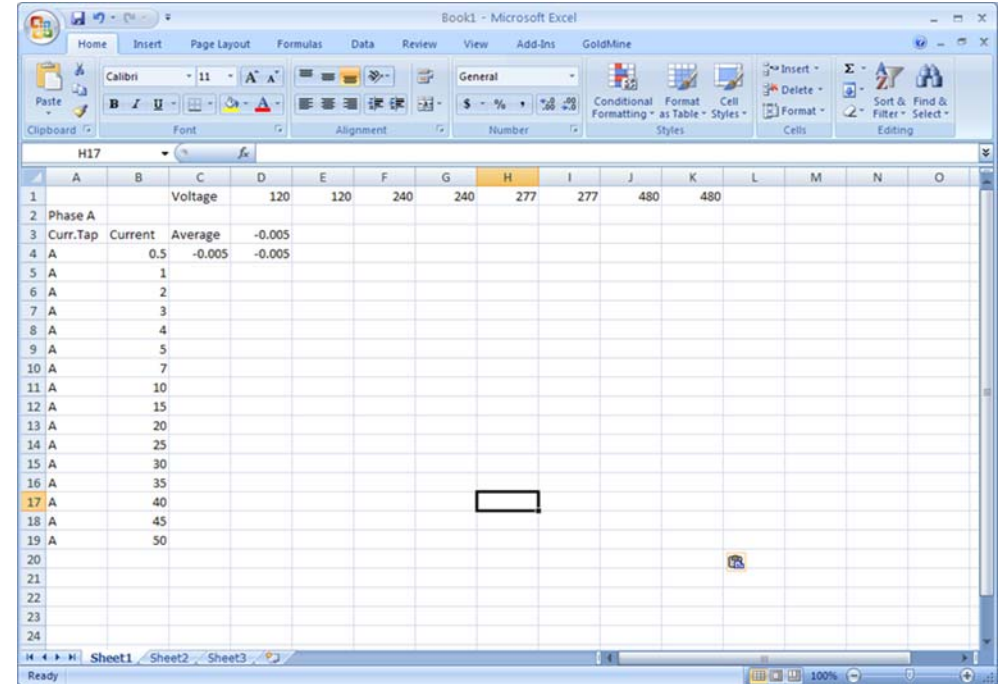
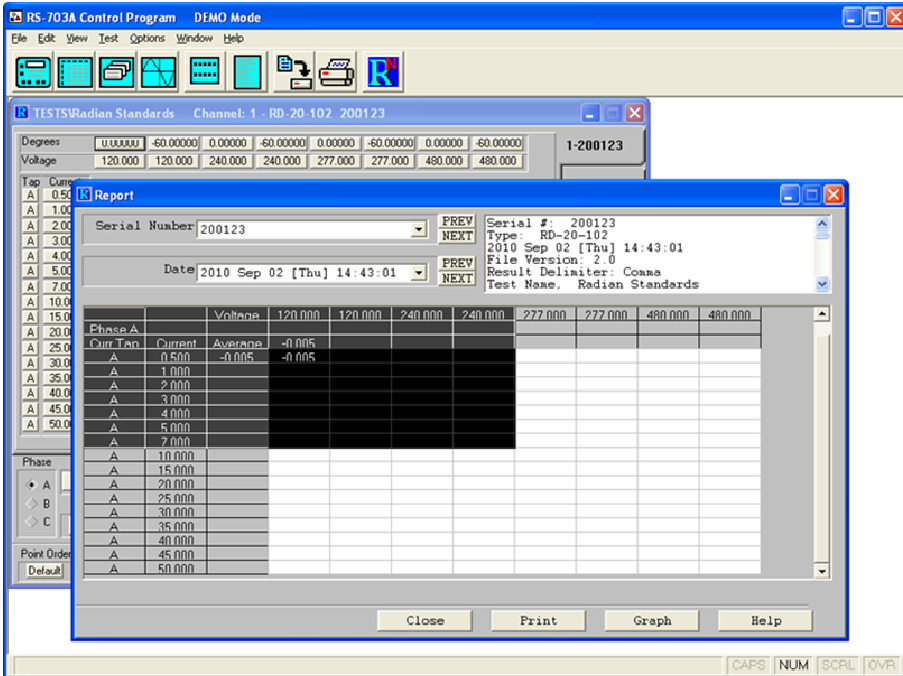


## Saving, Viewing, and Exporting Results Data

3. To export the data into an Excel spreadsheet, use the mouse to highlight the entire test results grid. Copy the data by simultaneously pressing the [Ctrl] key and the [C] key.

4. Open a new Microsoft Excel spreadsheet.

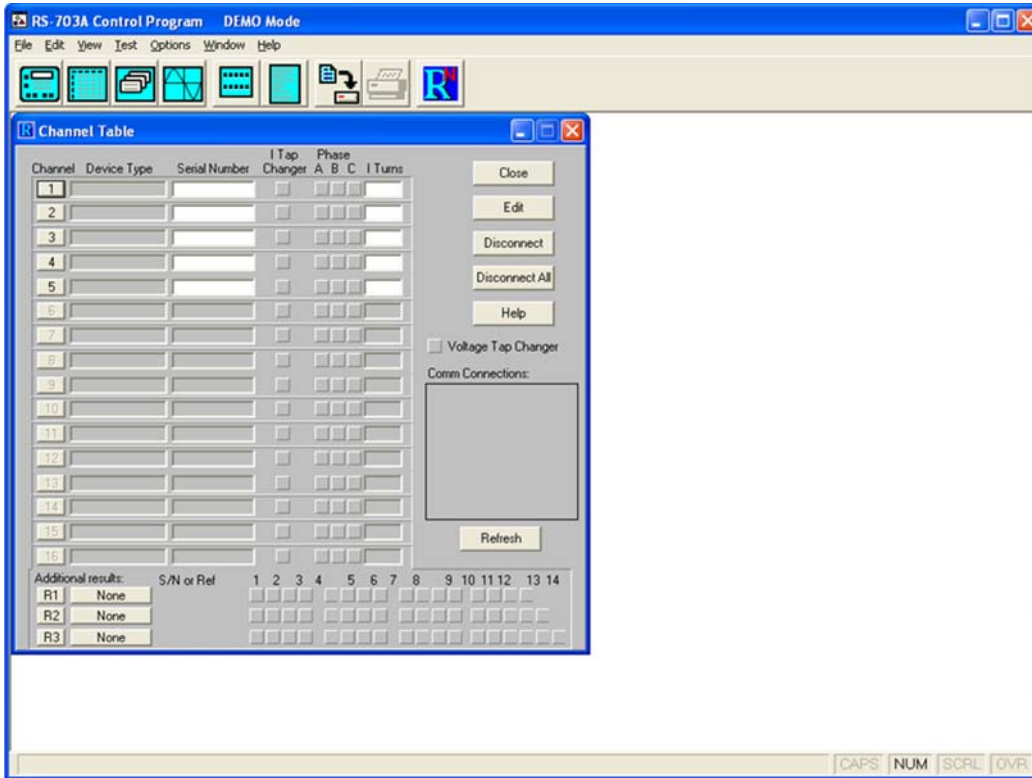
5. Paste the data by simultaneously pressing the [Ctrl] key and the [V] key.



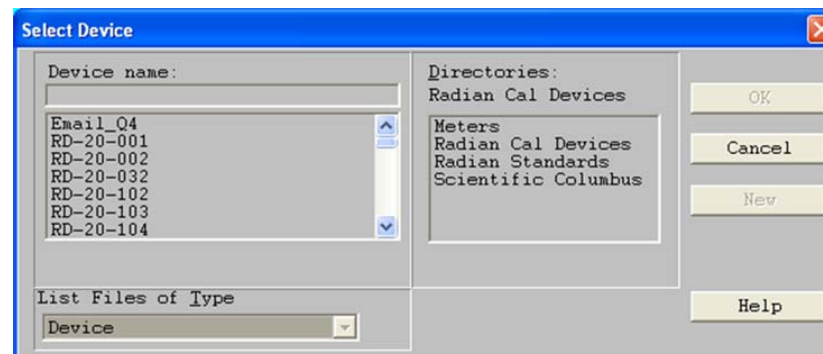


## Appendix 1: Creating and Configuring a New Test Device

1. To create a new test device, click on the *Channel 1* selection box. A *Select Device* window will appear.



2. From this window, select the *New* button. A *new device* configuration window will appear.



## Appendix 1: Creating and Configuring a New Test Device

3. Ensure that the device is configured correctly:

Setup tab:

Device Type: Standard

Phases: Single phase

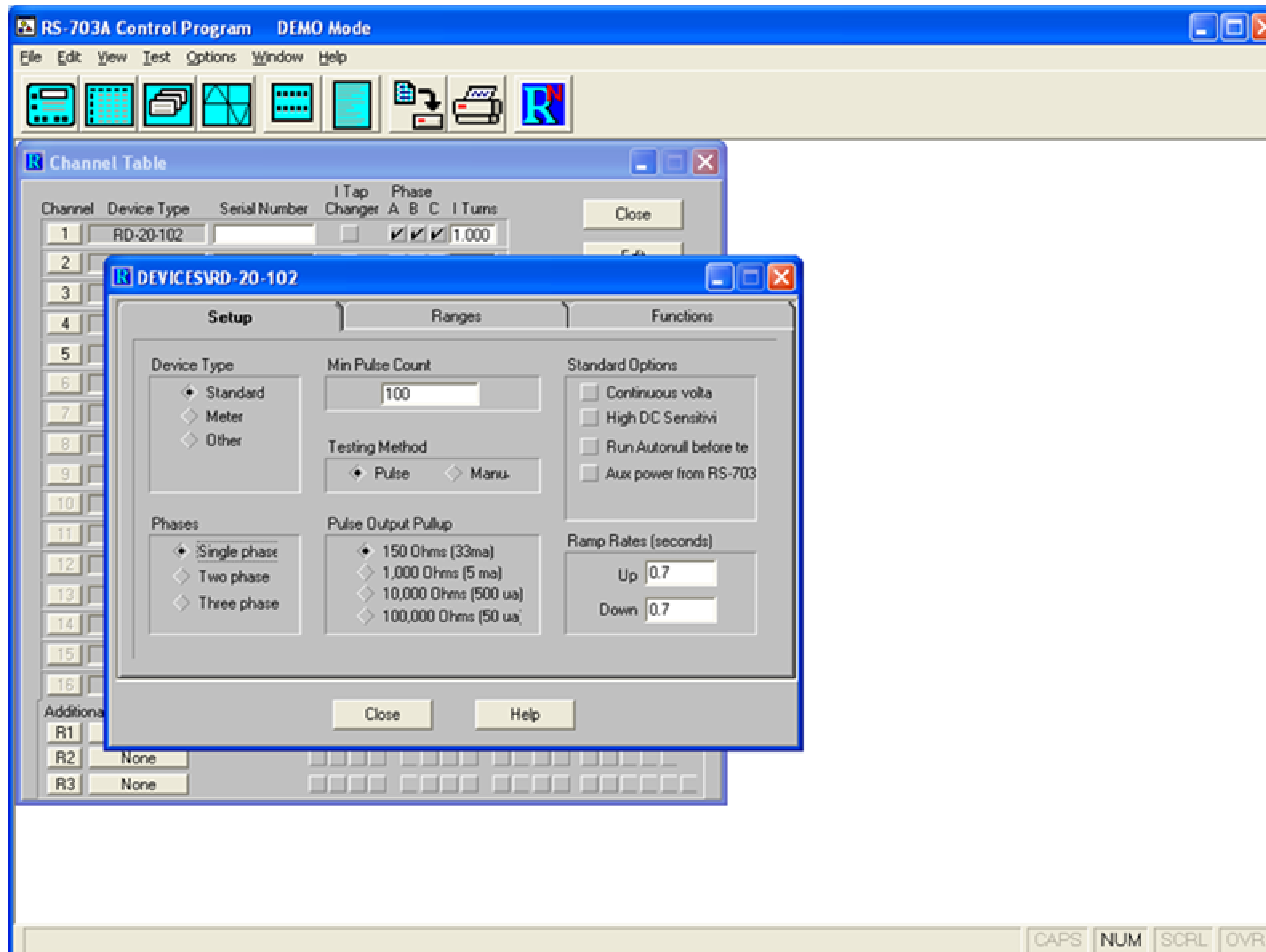
Min Pulse Count: 100

Testing Method: Pulse

Pulse Output Pullup: 150 Ohms (33ma)

Standard Options:

Ramp Rates (seconds): Up = 0.7, Down = 0.7



## Appendix 1: Creating and Configuring a New Test Device

Ranges tab:

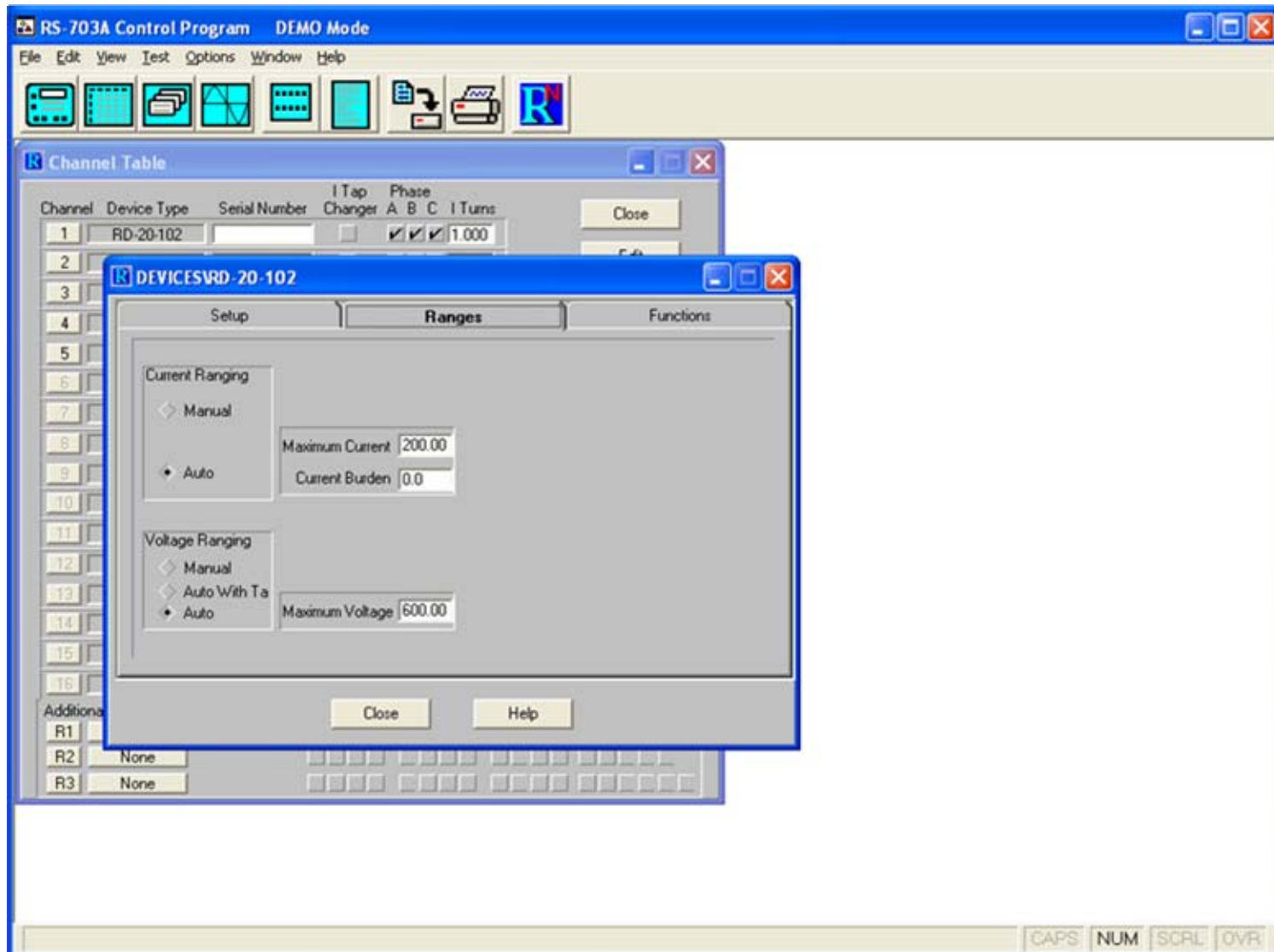
Current Ranging: Auto

Maximum Current: as specified by DUT's specifications

Current Burden: 0.0

Voltage Ranging: Auto

Maximum Voltage: as specified by DUT's specifications



## Appendix 1: Creating and Configuring a New Test Device

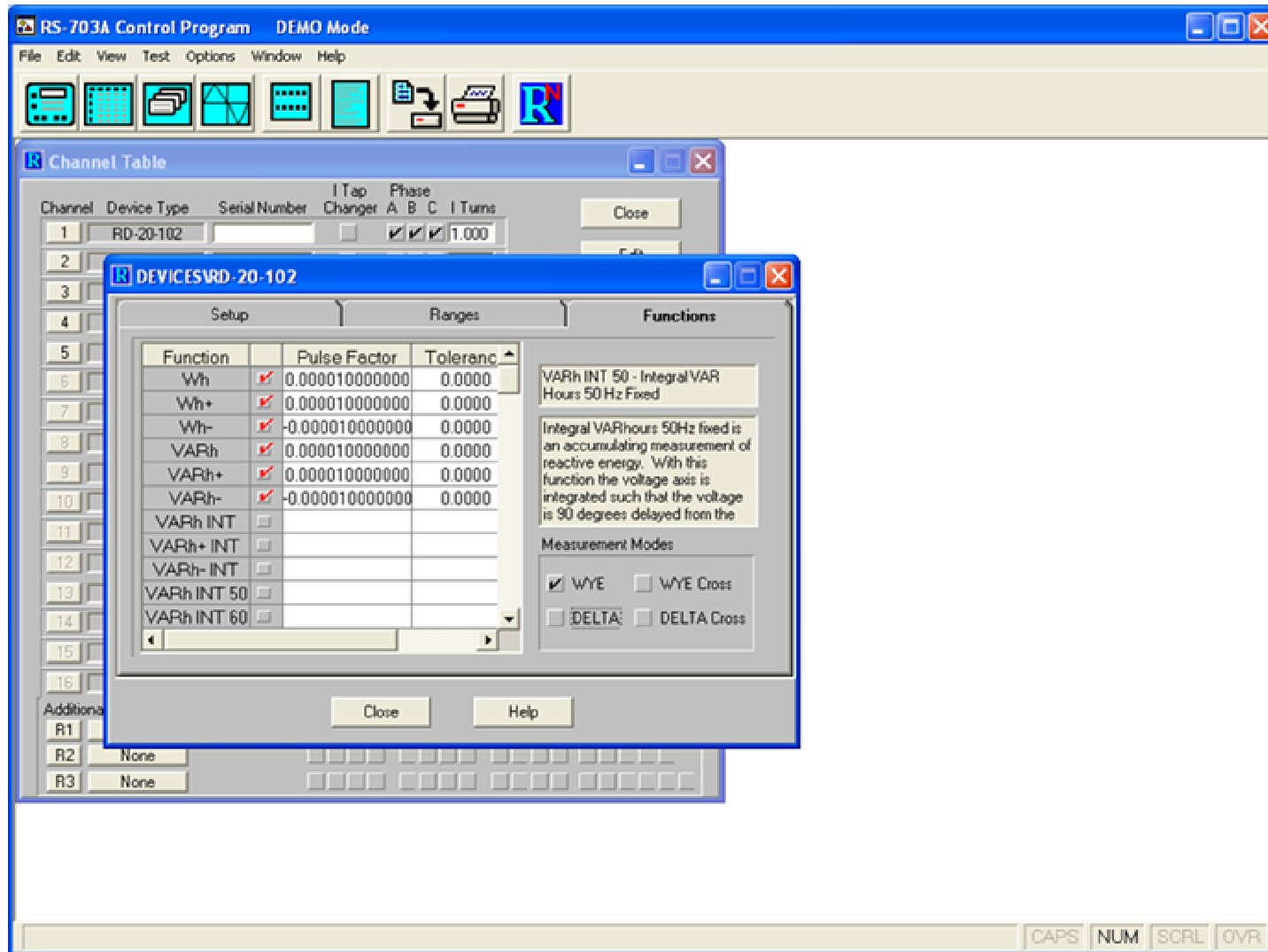
Functions tab:

Function: select functions applicable to DUT's supported measurement parameters

Pulse Factor: 0.00001

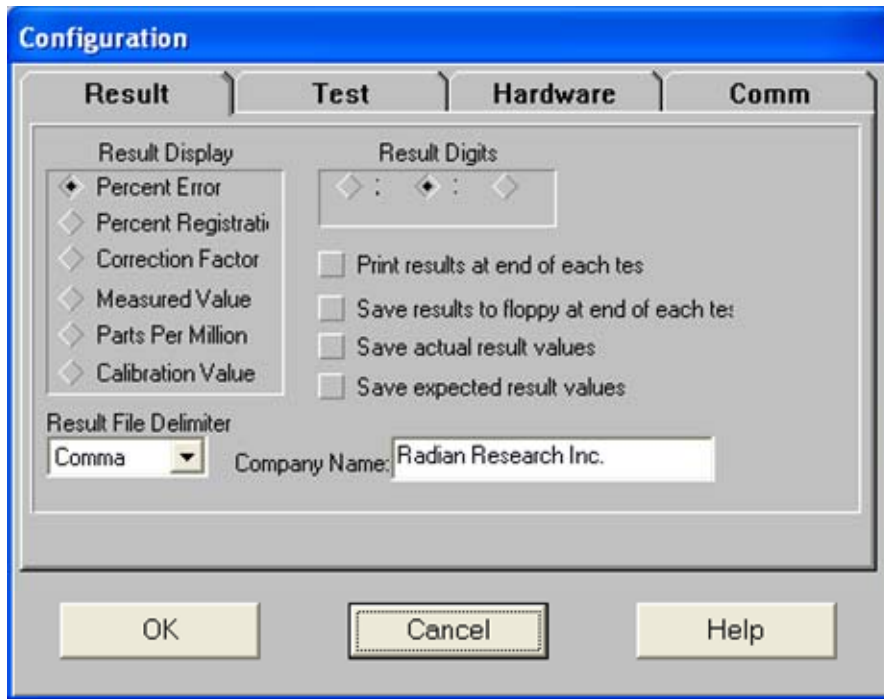
Tolerance: as specified by DUT's specifications

Measurement Modes: check Wye only

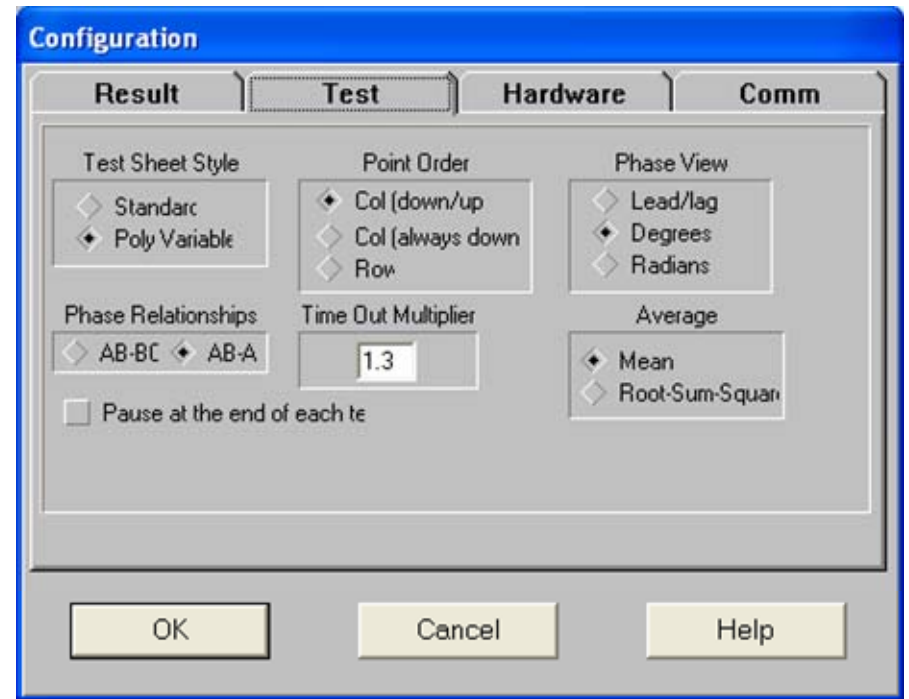


4. Select Close. If prompted, save any unsaved changes.

*Appendix 2: Options/Configure Menu*

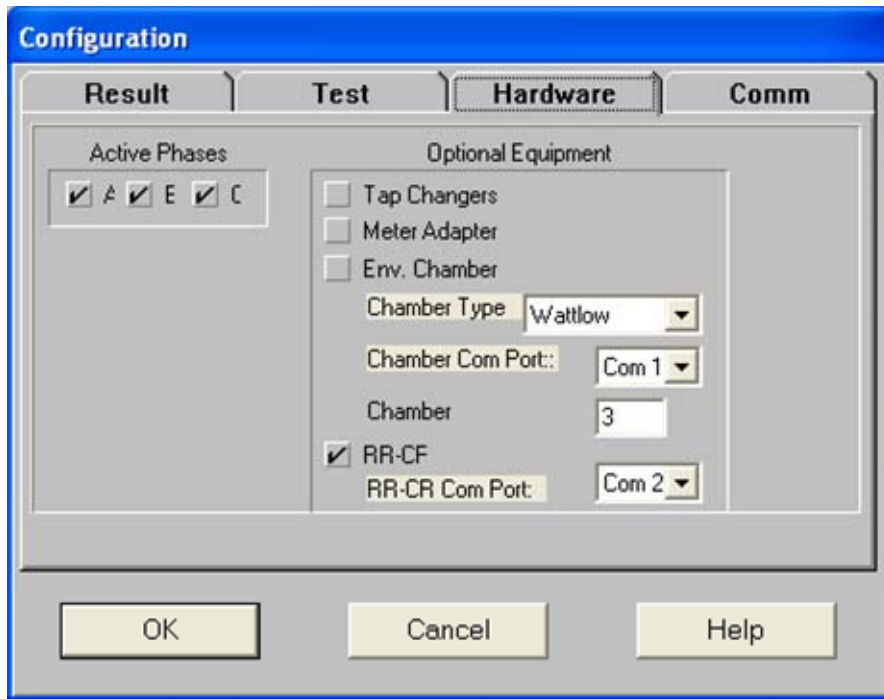


This screen allows the user to select how the resulting data will be displayed, the file type, the number of significant digits in the results data, and the company name.

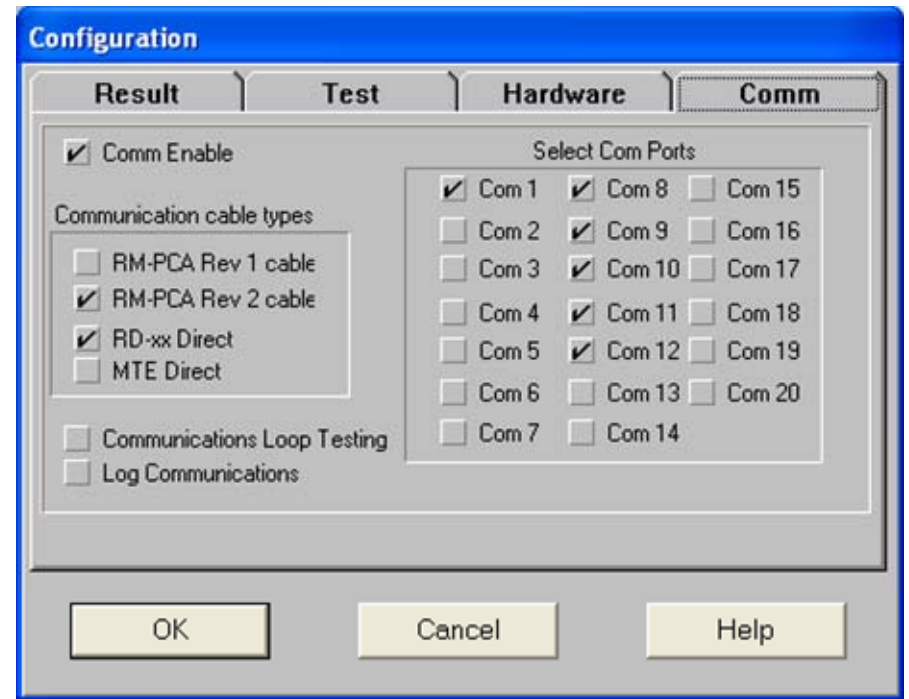


This screen allows the user to select the type of test (standard and poly-variable), the phase relationships, the test point order, the time-out delay, the power factor display, and the averaging method.

*Appendix 2: Options/Configure Menu*



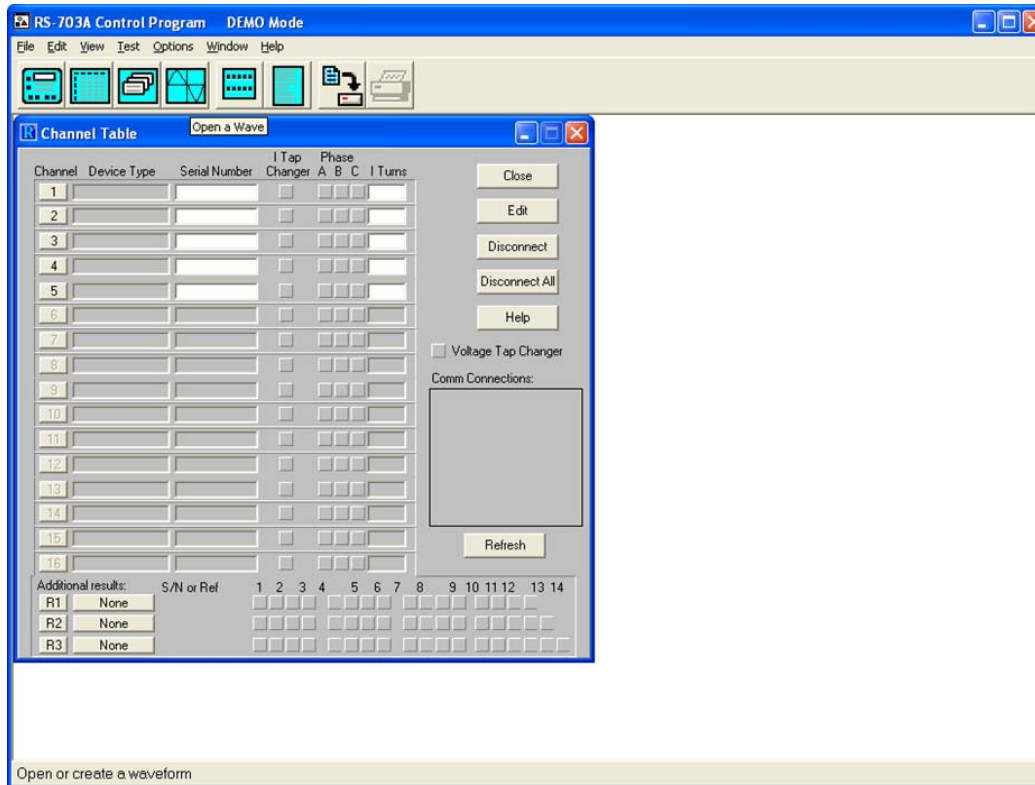
This screen allows the user to select the active phases and configure a temperature chamber control.



This screen allows the user to configure the serial communications to the devices under test.

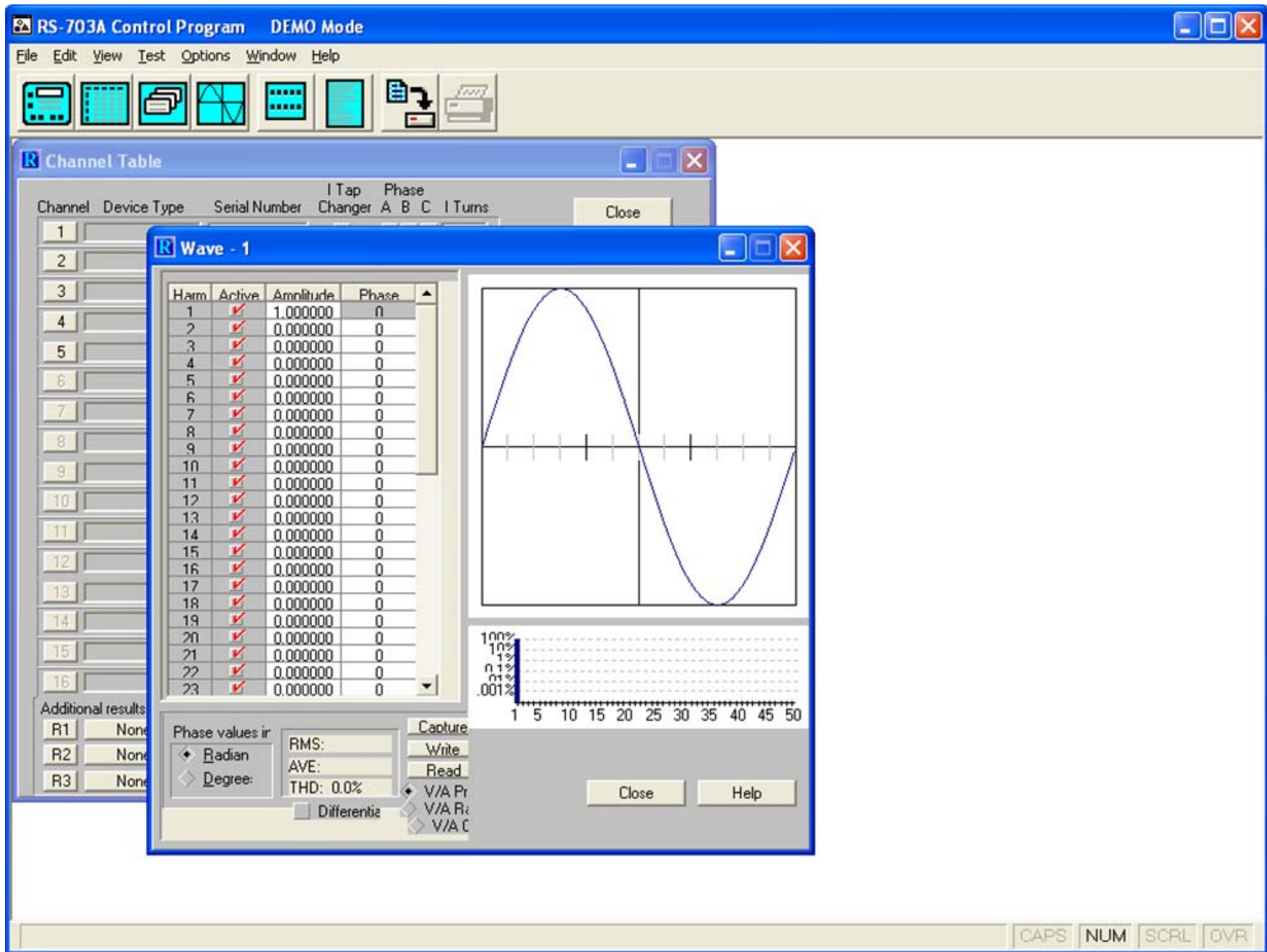
### Appendix 3: Creating Voltage and Current Signals with Harmonic Content

1. Click on the *Open a Wave* icon. A *Open* window will appear.



*Appendix 3: Creating Voltage and Current Signals with Harmonic Content*

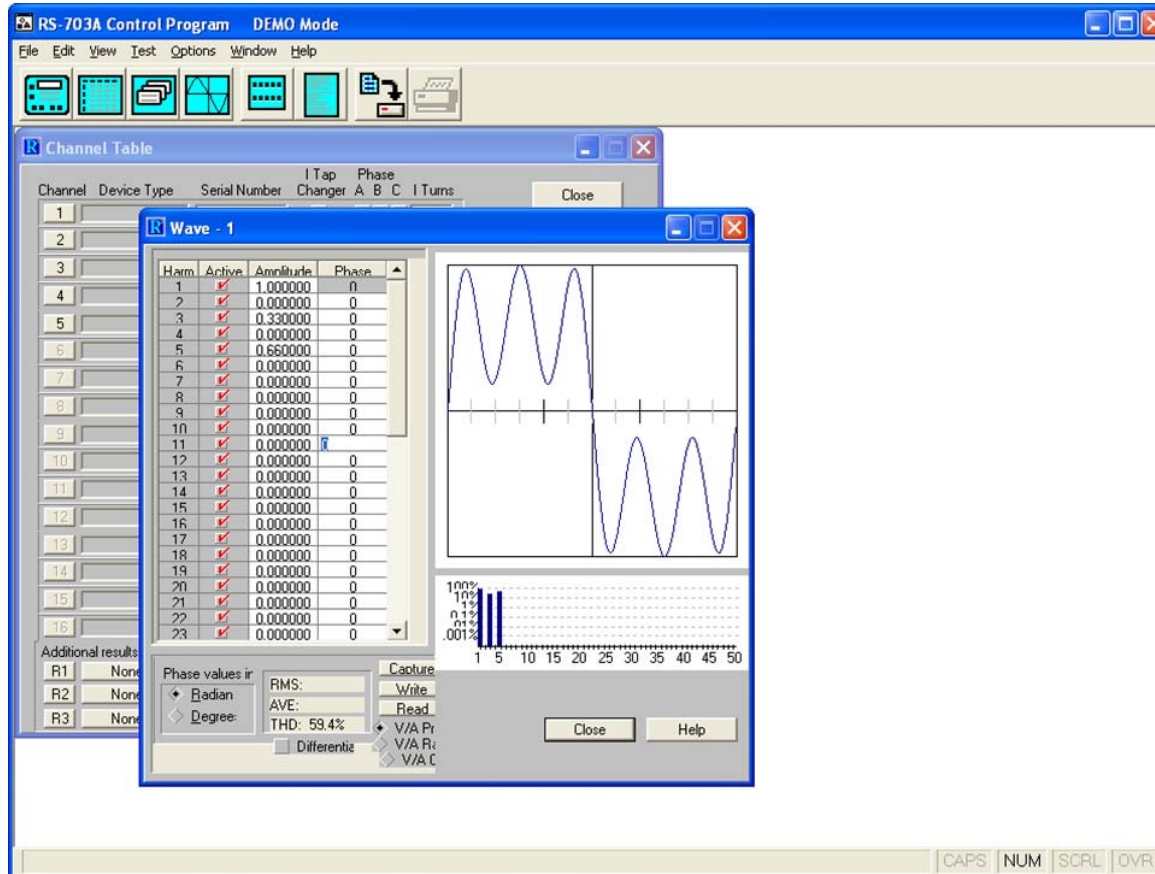
2. Select the *New* button. A new *Wave* configuration window will appear.





### Appendix 3: Creating Voltage and Current Signals with Harmonic Content

3. Enter the harmonic amplitude and phase parameters. The displayed waveform will change accordingly. Select the *Close* button and save changes when prompted.



#### Limited resources or need a solution quickly?

If you need additional information about your project just contact us, we are here to help. We can support you at any level from telephone support, or on-site solutions for a reasonable price. Contact us at [radian@radianresearch.com](mailto:radian@radianresearch.com) or call 765-449-5500. Be assured that we want to be your partner in success!