

9 April, 2009

From: Scott P. Chapman
Radiant Technologies, Inc.
To: Precision RT66I Precision RT66A Tester Interface Owners
Subj: Tester Interface Configuration and Software Installation

Dear Precision RT66I/RT66A System Owner,

The information in this letter is essential to getting your Precision RT66I interface test system fully operational with your existing RT66A tester. Please review all of the information below carefully.

This letter accompanies the delivery of your new Precision RT66I Ferroelectric Test System and its associated Vision software. The RT66I allows your existing RT66A tester to be connected to any host computer with a USB interface, running Windows 2000 or Windows XP. It replaces your existing DT2811 interface board and your DOS-based RT66A software. Vision Version 4.1.0 is the same software that runs on all Precision test systems. It has had six years of development and maturity and has shown itself to be versatile and stable. Data produced on any Precision test system can be reviewed using the Vision installed on your Precision RT66I interface host.

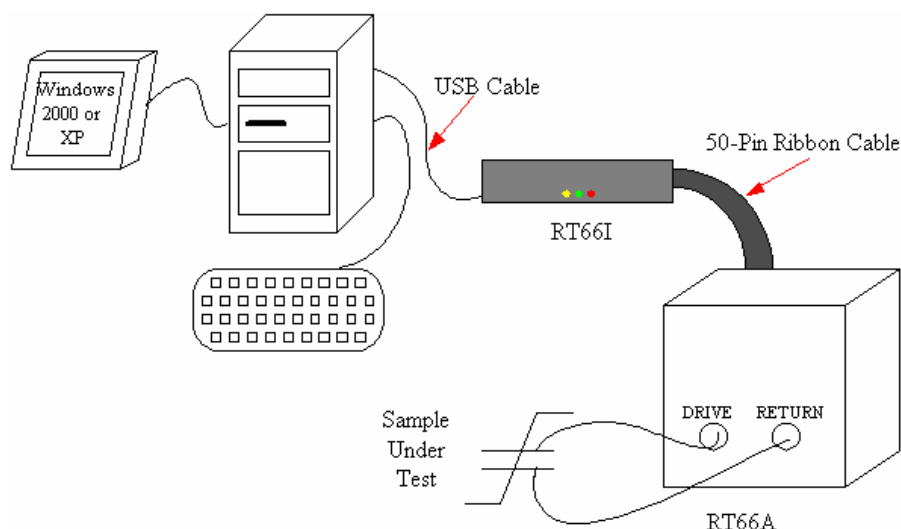


Figure 1 – Connecting the RT66A Tester to a Host Computer Using the Precision RT66I.

grams. New to the configuration is a High-Voltage ID Module that is connected to the rear panel of the RT66I. This module must be purchased in conjunction with the RT66I. It is an EEPROM that contains information specific to the HVA that is being used. That information must be provided by the user on system purchase. The information contained in the ID Module is used to properly configure the measurement in the Vision software running on the host computer.

Precision RT66I - Vision/USB Interface for the RT66A Tester

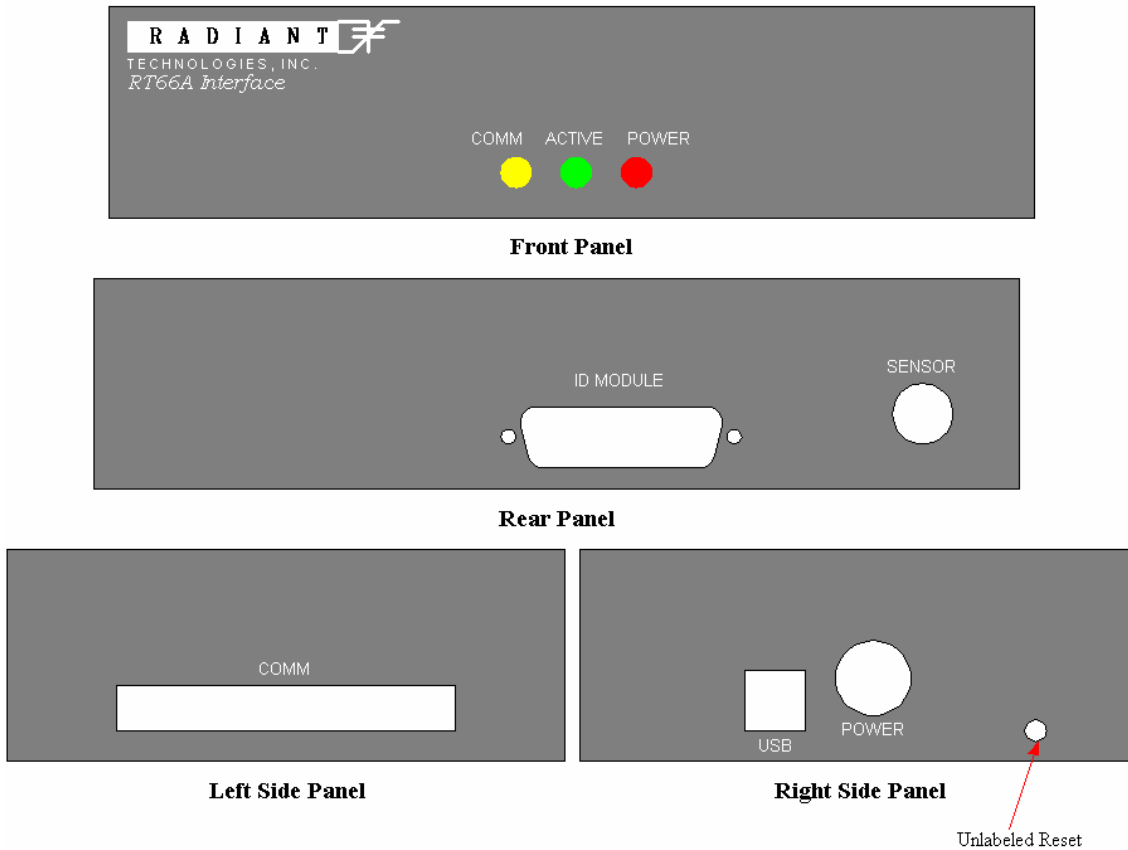


Figure 3 – Details of the Four Panels of the RT66I Interface.

Figure 3 shows a detail of the various panels of the RT66I. Table 1 presents a description of the connections shown on these panels.

Panel	Item	Description
Front	COMM	Yellow LED. This lamp flashes when communications is occurring between the host computer RT66I driver and the firmware in the RT66I
	ACTIVE	Green LED. This lamp is normally illuminated. It extinguishes when voltage is being applied by the RT66A. In a single measurement, the LED may reilluminate and reextinguish several times.
	POWER	Red LED. Indicates that power is applied to the RT66I.
REAR	ID MODULE	DB-25 Connector. An ID Module is connected at this port when the

		tester is to be used in conjunction with an HVI and an HVA to make high-voltage measurements. The ID Module is an EEPROM that contains information specific to the HVA being used. The information is used by Vision to construct a proper drive profile. The information is provided by the user when the RT66I is purchased.
	SENSOR	Any signal in the ± 10.0 -Volt range may be captured simultaneously with any measurement at the SENSOR port. The signal is normally generated by an externally-attached instrument and may represent anything such as temperature, pressure, light intensity, etc. This port is often used to attach a displacement meter in order to make piezo-electric measurements.
Left Side	COMM	50-pin ribbon connector. This connector is attached to the rear panel of the RT66A and provides power and data communications to and from the tester.
Right Side	USB	Standard 4-pin USB connector. This provides standard USB communications to and from the host computer.
	POWER	The power supply, provided with the RT66I, is connected to the RT66I at this port.
	Reset (unlabeled)	This is a recessed pin that can be used to reset the RT66I if it locks up.

Table 1 – Details of the RT66I Connections and Indicators.

NOTE: Do not turn on the Precision RT66I until the Vision software has been installed.

Software Installation

The following pages present a detailed discussion of the installation process along with figures showing dialogs that appear at the various stages. A refined set of step-by-step instructions appears on page 18.

Note that during the execution of the installer an error dialog will appear that indicates that certain files have failed to self-register. This is an uncorrected bug in the installer and will not affect the installation process or Vision software execution.

Software installation is primarily accomplished by running the installer program Vision.exe on the enclosed CD. Go to the CD and run “Installer – RT66I\Vision.exe”. The Vision program is quite sophisticated and includes well over 100 files. Files are installed in the following directories.

- C:\ - File is xplorerDB.CPU. Holds configuration information for Vision
- C:\DataSets – Contains the DataSets and Word export file templates. DataSets are Vision database archives.
- C:\Program Files\Radiant Technologies\Vision – Contains the primary executable file. Also contains several program configuration files.
- C:\Program Files\Radiant Technologies\Vision\System – Primarily contains the Vision Tasks. Tasks are the basic operational functions of Vision. These are independent programs that are automatically loaded by Vision, provided they have a *.vld ex-

tension and are located in this file. The file also contains Customized Tasks. These are collections of Tasks configured by the user and stored for reuse as Tasks. There is also a template used to construct a DataSet's database. If the user has purchased any custom Tasks a file named Security.sec will appear in this directory and will allow the Task to be executed on the user's RT66I Interface.

- C:\Program Files\Radiant Technologies\Vision\Help – This folder contains all of the Vision documentation in HTML format. Help can be read by accessing any of these files directly or by pressing a *Help* button within Vision. Please see the discussion on Help, below.
- C:\User-Printable Help – This folder contains the entire Vision help pages saved in 90 Word-format documents. This is provided for the customer that prefers a printed manual. These files have been edited from the original export from HTML to Word and represent a reduced number of pages, with no loss of information. However, if all pages are printed, the resulting document is approximately 2700 pages. Care should be taken to ensure that only those files that are to be reviewed are printed.
- C:\WinNT\System32 – RTS_USB_Driver.DLL is written to this file. This is the USB driver that is specific to the RT66I
- C:\RT66I USB – USB Drivers specific to the USB communications hardware internal to the Precision RT66I Interface.

Do not attempt to move or rename any files or directories or install Vision into any but the default directory. In addition to creating and writing files to these directories, the installer performs the following actions:

- It places a Vision “Eye” icon on the desktop linked as a shortcut to the executable.
- It places a “Radiant Technologies->Vision” path in the start menu and links it to the executable.
- It writes critical file path information into the registry. Vision will not function properly without this information.
- It writes DAO database information into the registry. Vision will not save data without this information.
- It places shortcuts to various Vision folders – DataSets, System and User-Printable Help – on the desktop for easy access.

If you have purchased any Custom Tasks, these will be included in the shipment as a self-extracting executable on a separate floppy. When executed, the file will automatically extract the Task(s) and the Security.sec files to C:\Program Files\Radiant Technologies\Vision\System. Custom Tasks are:

- Piezo – Measures sample displacement concurrently with polarization response. This measurement requires that the user provide a displacement meter. The meter must output a voltage that is linearly related to the measured displacement. The voltage must fall in the ± 10.0 Volt range. Radiant Technologies, Inc. recommends the MTI 2000 displacement meter.

NOTE: If you have purchased the DOS-based RT66A Piezo software for your RT66A, you should receive the Piezo Task on a floppy automatically. If you do not, please notify Radiant Technologies, Inc. immediately. Vision will no longer make use of the multichannel extension attached to your RT66A or the computer board to which the multichannel extension connects. These can be removed or ignored. In order to run the Piezo Task under Vision, you will need to connect the displacement meter output to the SENSOR port on the rear panel of the RT66I.

- Piezo-D – Measures polarization switched in a sample in response to a force applied to the sample. This installation requires the purchase of a force meter/actuator that is being designed by Radiant Technologies.
- Custom Measurement – Performs a Hysteresis Loop using a variable-speed custom drive profile under the user’s control. Please see the documentation in the help pages for more detail.
- Chamber and Remanent Chamber – This set of Tasks measure sample thermal dependence of dielectric constant and spontaneous polarization to determine the pyroelectric coefficient. Measurements are made using either Pulse or Hysteresis test profiles, depending on the program. Both programs are provided to users that purchase Chamber. For proper use, the host computer must be connected to the thermal controller using a National Instruments GPIB board and NI-488.2 software. The connection may be direct or through a GPIB-RS232 converter. Please see the help pages for more detail.

Documentation and Help

As with all modern software systems, Vision relies on manuals that are electronic rather than printed. These manuals are created in HTML format and may either be accessed directly as individual files in C:\Program Files\Radiant Technologies\Vision\Help, or through the *Help* menu or *Help* buttons within Vision. If accessed through Vision, the Help will be directed to the immediate topic in question.

In order for Help to operate properly, some configuration beyond the installer is required. The host computer must have Windows Internet Explorer Version 4.0 or later installed. For Windows 2000 or Window XP, this will not be an issue. For older installations of Windows NT 4.0, an upgrade may be required. The Internet Explorer update may be downloaded at www.microsoft.com. With the updated Internet Explorer installed, go to the Update_Help directory on the CD. First run the HHUPD.exe program. This is the basic help installation and takes just a few seconds. Then copy the HHActiveX.dll file to C:\WinNT\System. (Note, this is not C:\WinNT\System32. For Windows XP, the directory will be C:\Windows\System.). Go to “Start->Run” and run “regsvr32 hhactivex.dll”. Help is now ready for use.

If you require printed documentation, the help files have been extracted and edited in Microsoft Word formatted documents. These are located on the CD in the “User-Printable Help” folder. They are also installed in C:\User-Printable Help.

USB Driver Installation

Note that the installation presented below was performed in Windows 2000. Dialogs presented in Windows XP may vary. In particular a dialog may appear that indicates that the hardware being installed has not been certified by Microsoft. You will be asked if you want to continue installation. You must indicate that the installation is to continue. Although dialogs may appear different to those shown, except for the certification, Windows XP installation will proceed in a fashion very similar to that described here.

When the Vision installer is finished executing, power up the RT66I Interface before running Vision. Windows will indicate that new USB hardware has been detected (**Figure 4**) and start a “New Hardware” wizard.. You must load the driver. Follow the “New Hardware” wizard that appears. (**Figure 5** – The figures below are taken from the Windows 2000 wizard. Windows XP may differ somewhat.) On the wizard second page use the default option (**Figure 6**). On the third page, de-select *Floppy disk drives* and *CD-ROM Drives*. Select *Specify a location* (**Figure 7**). In the next dialog, click the “Browse...” button (**Figure 8**). In the browser, browse to C:\RT66I USB. This directory was loaded by the installer. Select the RT66I.inf file. This is reflected in **Figure 9**. Click Open to select the driver as shown in **Figure 10**. Close the Browser (*OK*). Click Next > in the wizard page of **Figures 11** and *Finish* **Figure 12**.

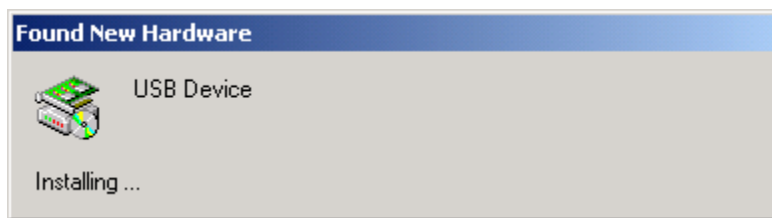


Figure 4 – Windows 2000 Found New Hardware Message.



Figure 5 – Windows 2000 New Hardware Wizard – Initial Page



Figure 6 – Windows 2000 New Hardware Wizard – Page 2 – Choose Installation Type

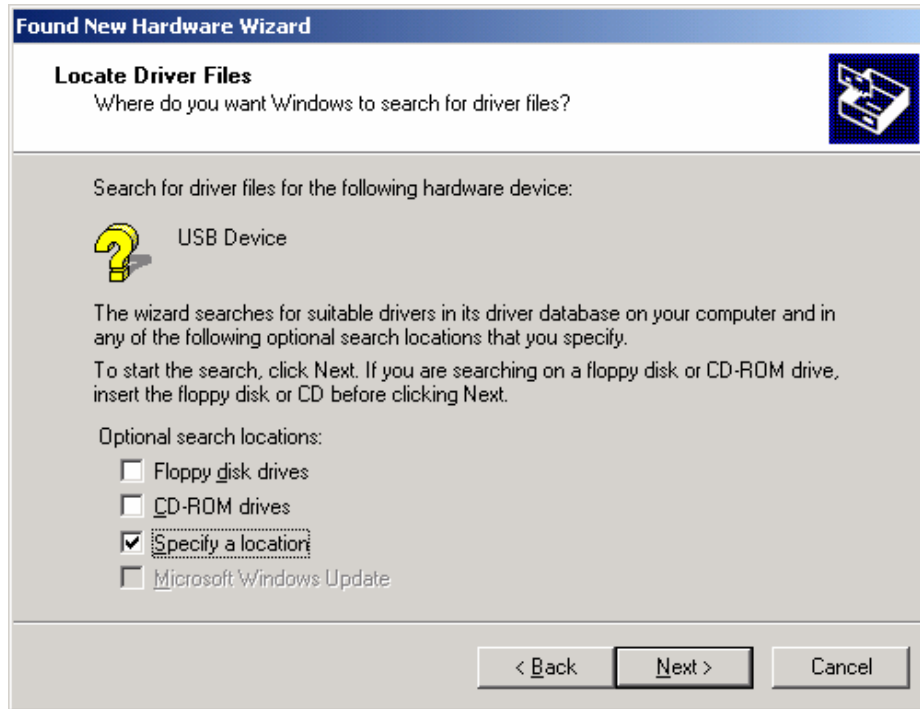


Figure 7 – Where to Look For the Driver.

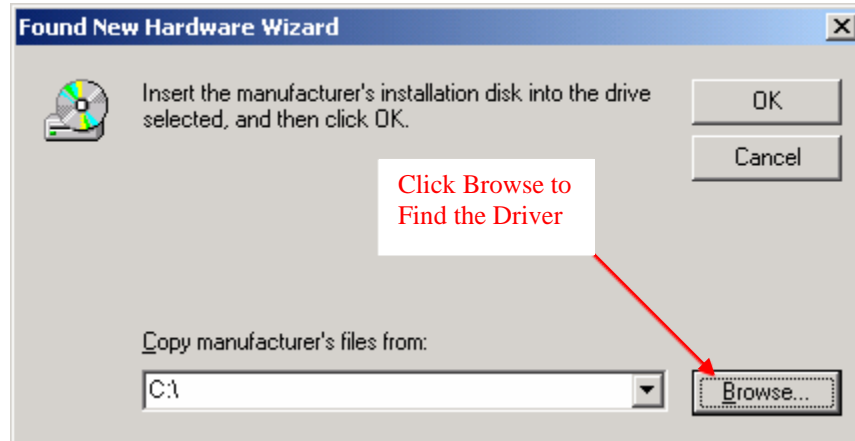


Figure 8 – Driver Search Wizard Page.

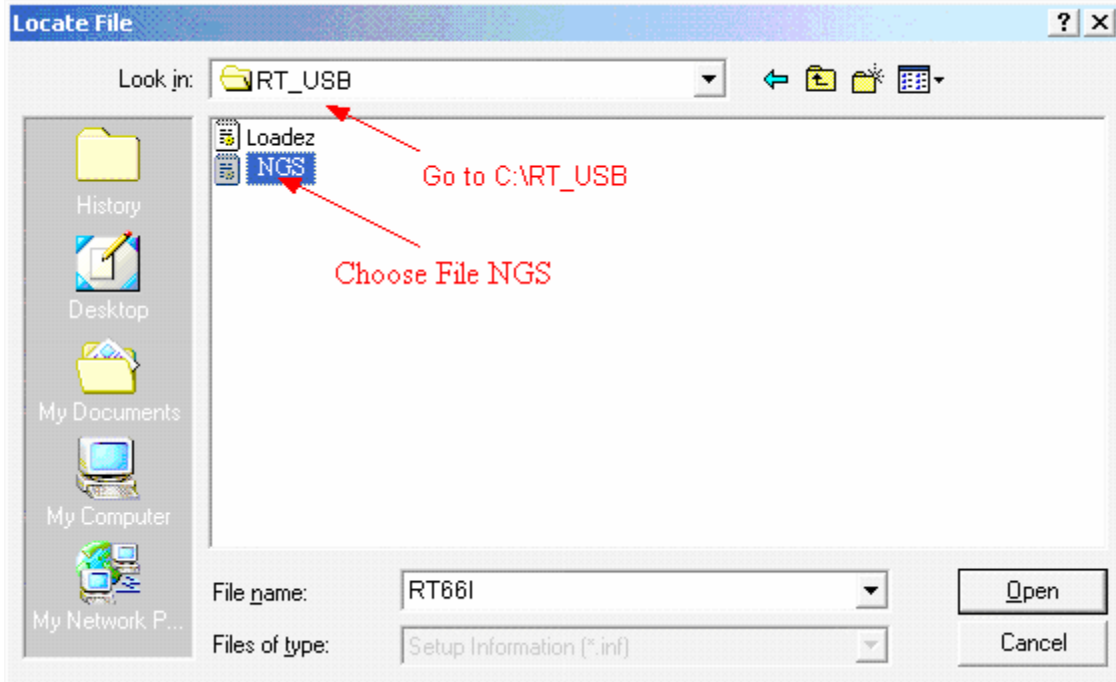


Figure 9 – The Browser Window. Go to C:\RT_USB and Select NGS.inf.



Figure 10 – Wizard Search Page After Browsing.



Figure 11 – Driver Load Page.

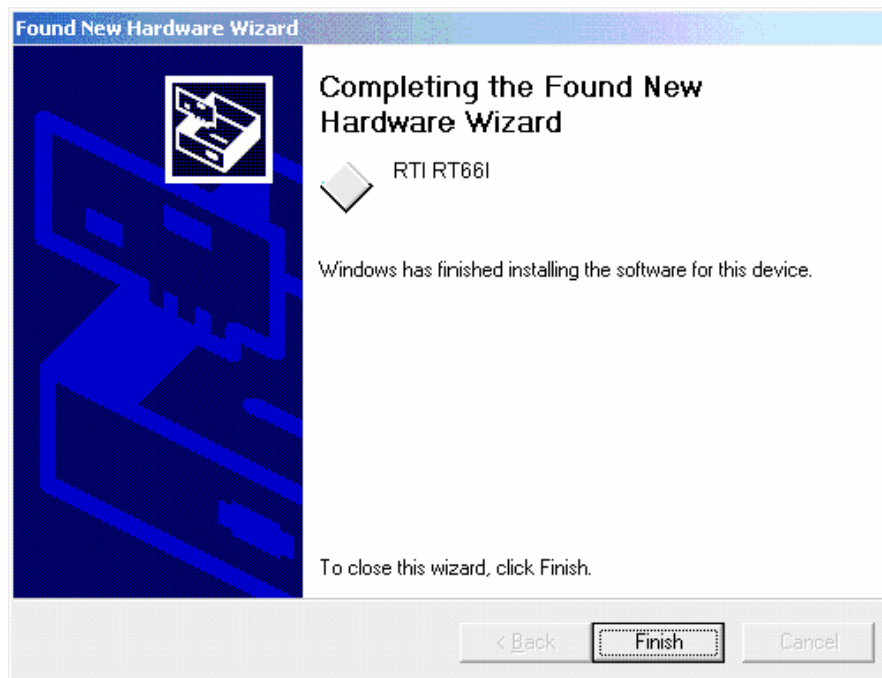


Figure 12 – Final Wizard Page.

Vision Execution

NOTE: A Second document is shipped to you with the Precision RT66I Interface system. This is a Vision training outline that is presented to customers during site training. That document provides a more in-depth discussion to supplement this section. Neither this section nor the companion document should be considered replacement training tools for the Vision help pages.

Before Vision is executed, the Precision RT66I Interface must be powered on. Otherwise a message will appear that indicates that the RT66I USB driver was not found. In this case, Vision will operate normally, but Measurement Tasks will present meaningless synthetic data when executed

On first Vision execution, a dialog will appear that indicates that the database has been created. This appears to be a warning, but is normal operation. Acknowledge the message and Vision will start. When Vision is started the yellow ACTIVE light on the rear of the tester will begin to blink rapidly. This is an indication that the software was properly installed and both the software and the tester are operating normally.

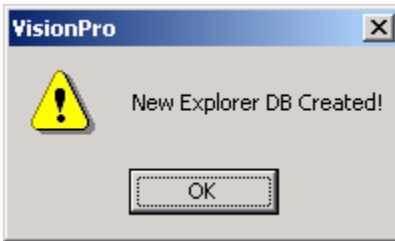


Figure 13 – New Database Message on First Vision Startup.

Vision is shipped with two tutorial DataSets. These will not appear in the DataSet Explorer. They must be registered. Go to Explorer->Register DataSet... (Figure 14). A dialog will open that will, by default, point to C:\DataSets. Select "tutorial2a.dst" (Figure 15) and click *Open*. The tutorial2a DataSet will appear in the Explorer (Figure 16). Repeat for tutorial1a.dst.

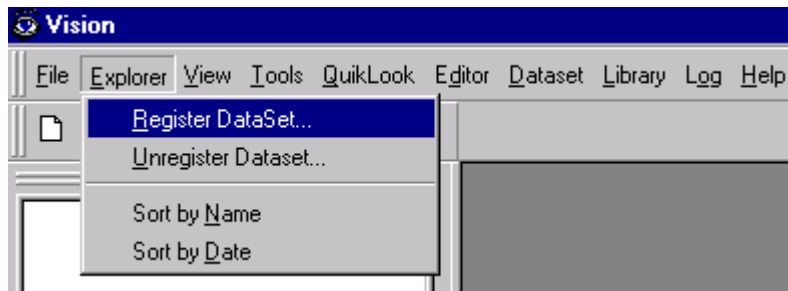


Figure 14 – Register a DataSet

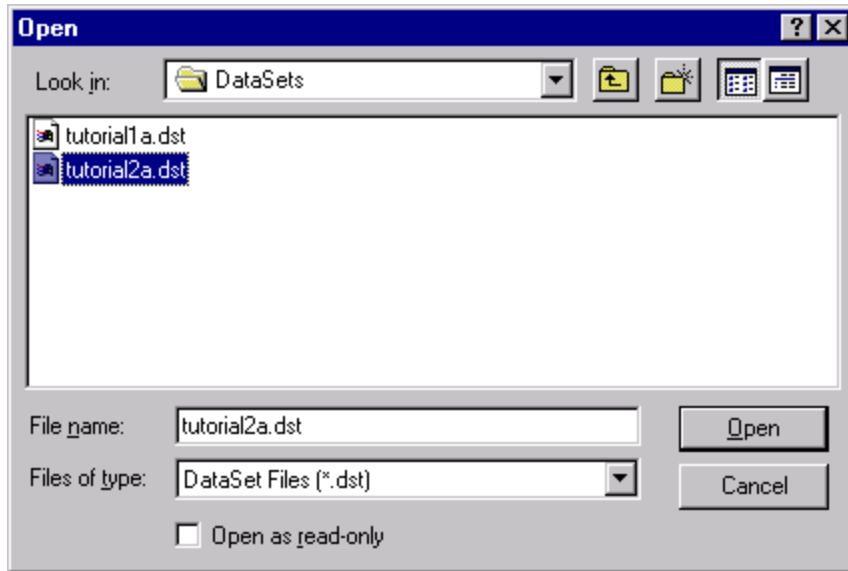


Figure 15 – Browse to the DataSet

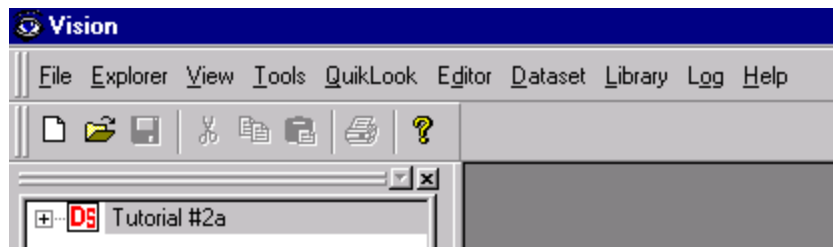


Figure 16 – DataSet in the DataSet Explorer

The next step is to verify the tester operation by making a QuikLook Hysteresis measurement. Attach a commercial linear 1.0 nF capacitor to the RT66A tester as in **Figure 1**, with one terminal connected to the tester DRIVE port and the other to the tester RETURN Port. In Vision, select QuikLook->Hysteresis as in **Figure 17**.

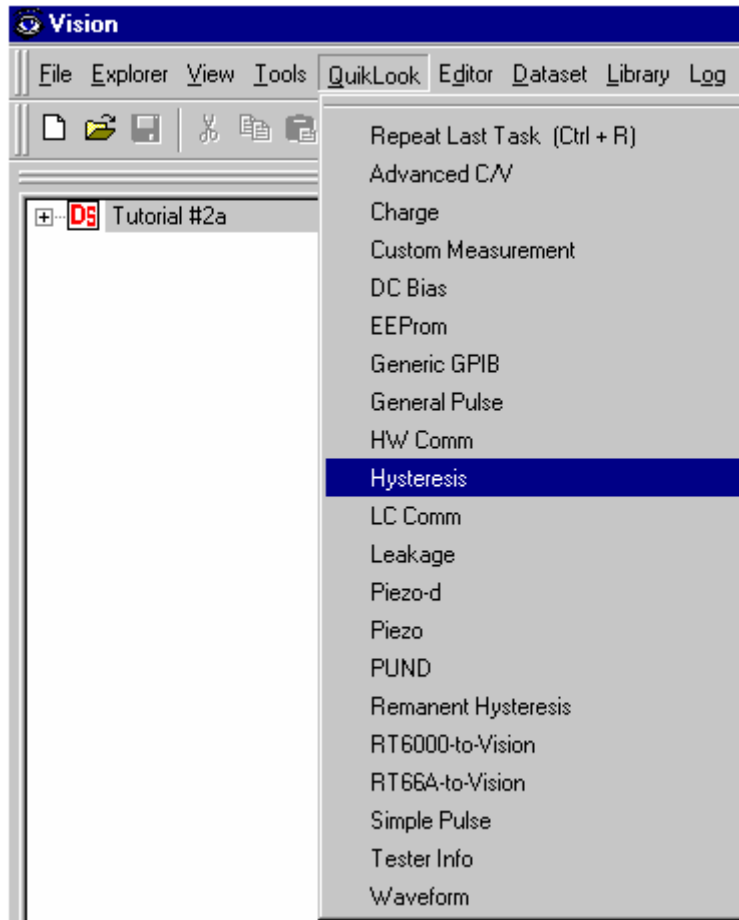
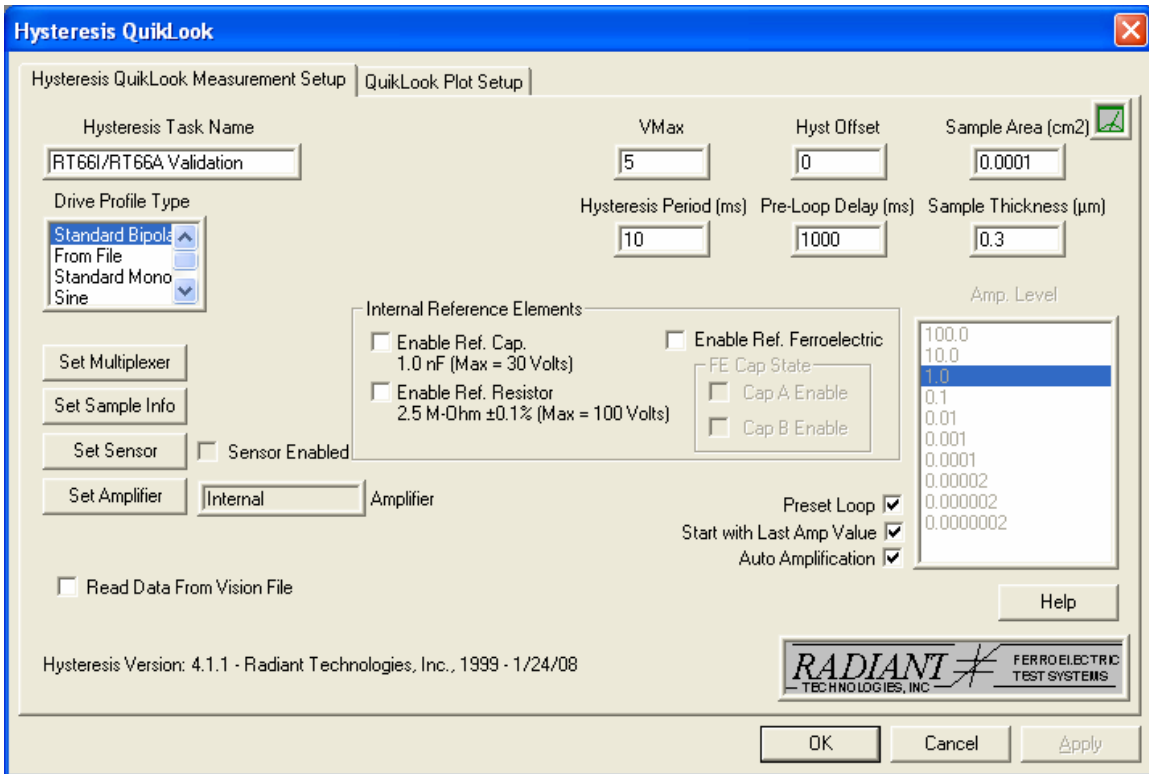


Figure 17 – Select the Hysteresis Task from the QuikLook Menu.

The Hysteresis Task configuration dialog will appear as in **Figure 18**. Set the Task Name, if desired, but do not adjust any controls. Click *OK* to start the measurement.



**Figure 18 – Hysteresis Task QuikLook Configuration Dialog.
Enable the Reference Capacitor.**

The software will pause while a Hysteresis measurement is made. Once the measurement is finished, the data will be displayed in a dialog as shown in **Figure 19**. The data will be linear going from $-50.0 \mu\text{C}/\text{cm}^2$ at -50.0 volts to $+5.0 \mu\text{C}/\text{cm}^2$ at $+5.0$ Volts as seen in the Figure. If the data differ in any way, please contact Radiant immediately. (Note that the results shown on Figure 19 are taken on a 100 pF capacitor and produce maximum polarization values at $\pm 5.0 \mu\text{C}/\text{cm}^2$.)

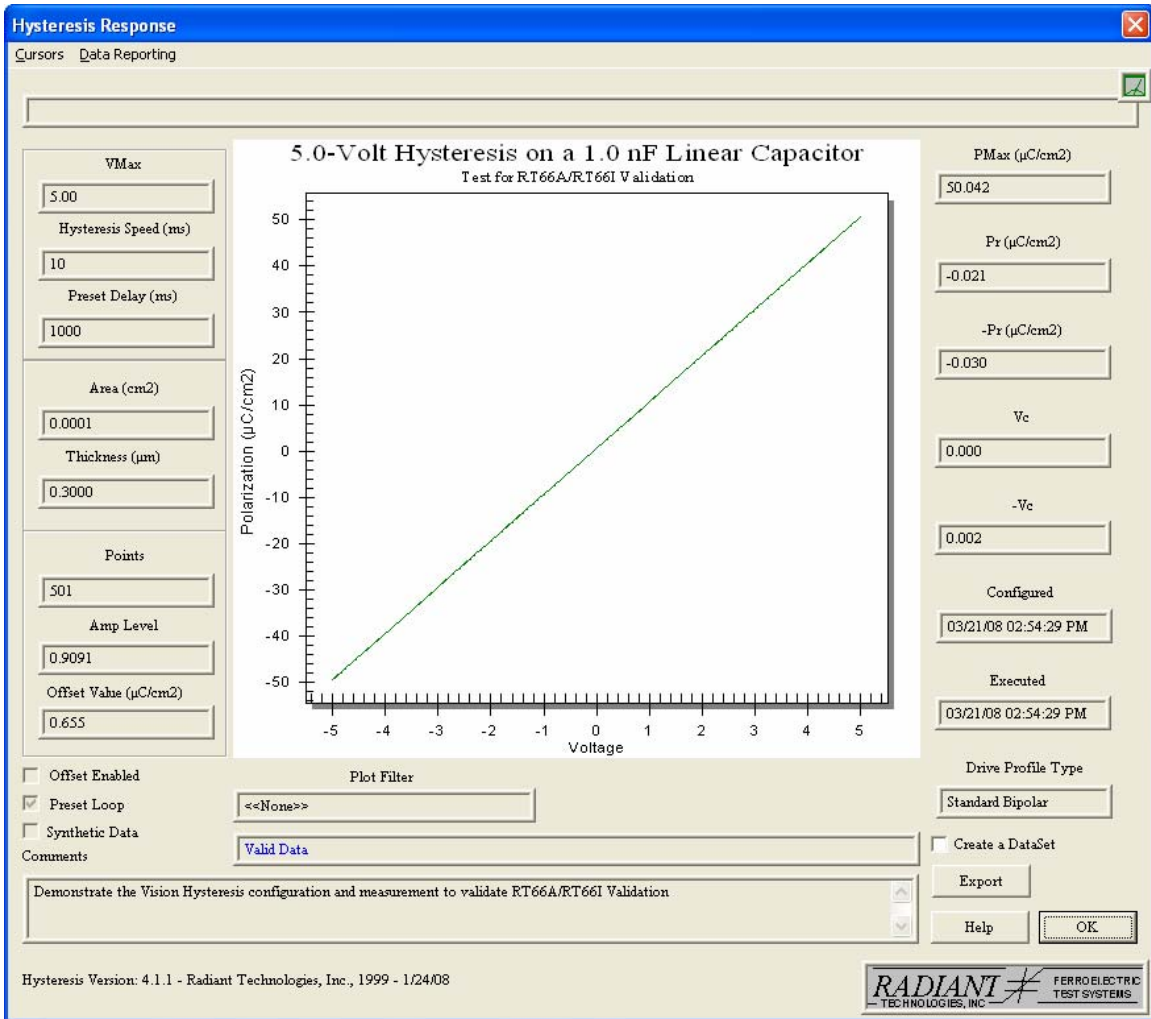


Figure 19 – Hysteresis Task Measurement Results.

Once you have made this first measurement, the next step is to begin to investigate the capabilities of Vision and to learn to use them. Your next visit should be to the help pages. These pages are detailed and extensive. However, they are arranged so that the user that begins with the earliest entries will be guided simply through the Vision learning process. Go to Help->Help Topics in the Vision menu as in **Figure 20**.

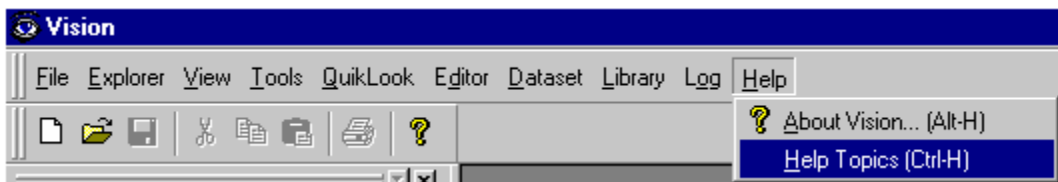


Figure 20 – Accessing Vision Help Pages.

The first topic, an introduction, will appear along with a Table of Contents. The hardware specification should presents comparative specifications for older RTI tester families, but does not yet include the Precision RT66I Interface. The Main Manual will discuss program structure, terminology and execution. This should be the first point of your review. Each Task is detailed in this document, so that some sections may require only a cursory review at this time. This is an excellent starting point for an overall view of the program. The next main heading is a Tutorials section. These tutorials guide you through simpler, then more advanced DataSet and Customized Task operations. As you work through them you will be constructing duplicates of the DataSets and Customized Tasks found in your installation. With the tutorials you will very quickly become familiar with the capabilities and general operation of Vision. The next Help section presents a series of step-by-step instructions for performing Vision's most common operations. These three sections will form the basis of a full Vision education.

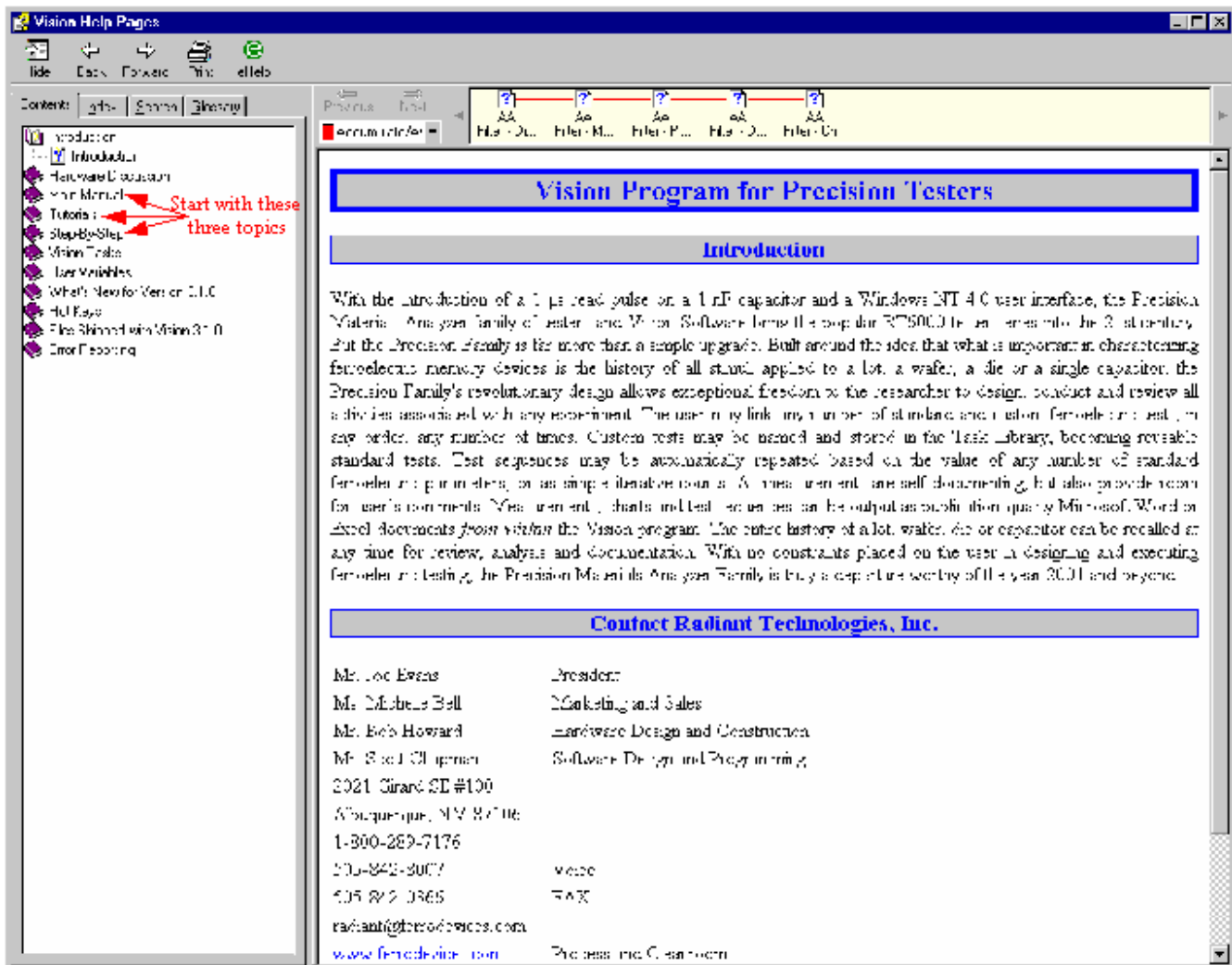


Figure 21 – Vision Help Pages.

Subsequent sections of the Help pages present detailed Task configuration, execution and data analysis discussions in a formatted fashion. Every control on every dialog is presented in detail. Where pertinent, theory is presented with the Task discussion. These pages should be reviewed on an as-needed basis. As you have seen with the Hysteresis QuikLook configuration dialog, the configuration can be elaborate. Task-specific help can be accessed directly by clicking the *Help* button of any Task dialog.

Step-by-Step Installation

1. Connect the RT66I Interface to the host computer, and the RT66A tester to the RT66I, as described on page 1. Leave the tester turned off.
2. Insert the installation CD.
3. From the “Installer – RT66I” directory on the CD run “Vision.exe”.
4. Proceed through the various dialogs until the installation is complete. Note that at one point you will see an error message indicating that some files have not self-registered. This is a bug in the installer, but will not affect the installation. Acknowledge the message and proceed.
5. If you have ordered custom Tasks such as Piezo or Chamber, insert the supplemental floppy in the host computer and run the self-extracting executable files located there.
6. From the CD “Update Help” directory run “HHUpd.exe”.
7. From the CD “Update Help” directory copy “HHActiveX.dll to either C:\WinNT\System (for Windows NT 4.0 and Windows 2000) or C:\Windows\System (for Windows XP).
8. Go to “Start->Run” and type “regsvr32 hhactivex.dll”.
9. Turn on the Tester.
10. Windows will detect the new hardware and run a Wizard that installs the driver.
11. When the wizard reaches the screen that needs to specify a file location, browse to C:\RT66I USB and select the RT66I file. (See pages 7 through 11 for a detailed view of the wizard for Windows 2000.
12. With the Precision RT66I Interface turned on, run Vision. Note that if you run Vision with the RT66I turned off, a message will appear that the driver is not found. This is normal. Vision will execute normally, but will replace measured values with meaningless synthetic data when measurement Tasks are executed. Note that when Vision is executed for the first time, a message will appear that a new Explorer DB has been created. This is also normal.
13. In Vision select Explorer->Register DataSet... In the browser dialog that appears select “tutorial2a.dst” and click *Open*. The browser will close and the Tutorial DataSet will appear in the DataSet Explorer.
14. Repeat 13 and open “tutorial1a.dst”.
15. Open a tutorial DataSet by double-clicking on it. Ensure that the DataSet opens without error. A log window will appear and a second tab will appear on the DataSet Explorer. If errors occur they are an indication that the database entries in the registry were not properly entered during installation. Contact me at Radiant Technologies, Inc. immediately.
16. Attach a 1.0 nF commercial linear capacitor to the tester DRIVE and RETURN ports. From the Vision main menu, select QuikLook->Hysteresis. A 5.0-Volt Hysteresis

measurement will be made on the sample. Once the measurement is made, the results will be displayed on a dialog. The plotted values should be linear and range from $-50.0 \mu\text{C}/\text{cm}^2$ at -5.0 volts to $+50.0 \mu\text{C}/\text{cm}^2$ at $+5.0$ Volts, passing through the origin. If you do not see these results and/or if the measurement indicates an error, contact Radiant Technologies, Inc. immediately.

17. The Precision RT66I Interface and RT66A Tester are now ready for your use. Vision is a complex and highly capable program that allows you to construct your own experiments. To begin to learn to use the program, click on “Help->Help Topic (Ctrl-H)”. A complete set of help pages will appear. The first several topics in the Table of Contents will provide in-depth discussion and training of the program. Main Manual presents a complete overview. In the Tutorials, you will recreate, step-by-step, the DataSets that are installed in your system, showing simple, then advanced Vision usage. The Step-by-Step section shows how to accomplish specific operations. Topic entries further down in the help pages discuss each Task in detail and describe every dialog control.

With the completion of the steps presented in this letter, you will have a fully configured Precision RT66I Interface and will be operating its associated Vision software. You will have begun to understand the operation of the program and know where to go to find information. We wish you the best of luck in your research and experimentation. Please do not hesitate to contact me if you have concerns, questions, comments or difficulties.

Sincerely,

Scott P. Chapman
Computer Engineer