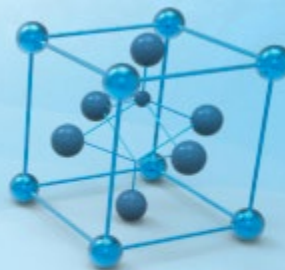


RADIANT
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✓ Vision 5

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Main Vision Manual

User guide
2021

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Introduction

Vision Program for Precision Testers

The Precision Family of Ferroelectric Testers

The Precision Materials Analyzer family of ferroelectric testers provides a full range of high-speed, high-precision ferroelectric material characterization instruments to meet every budget and research need. A comparison of model cost, speed and voltage capability is given at [Vision Testers](#). All systems are capable of internally-generated sample stimulus voltages of 10.0 Volts¹. Most systems include internal amplifiers that allow 100.0-Volt measurements. 200.0-Volt and 500.0-Volt options are also available. Voltages of up to 10,000 Volts can be used by adding an accessory High Voltage Amplifier (HVA) and High Voltage Interface (HVI). The researcher may connect any existing amplifier, provided a logic unit (known as an ID Module) is obtained from RTI. The latest HVI model, released in 2017, has the ID module built into the instrument. It is programmed for delivery at Radiant Technologies, Inc., but may be reprogrammed at any time by the user.

The Vision Program

A single, unifying program, called Vision, provides a consistent compatible interface across all hardware architectures. It is designed with the understanding that what is important in ferroelectric testing is maintaining a complete and accurate history of the signals applied to, and the responses of, a sample. The researcher has the capability to create custom experiments that are as simple or elaborate as required. Experiments can be run, rerun, reconfigured and repeated. As an experiment is executed, it is saved along with the measured data to be recalled for reuse. Data can easily be recalled for examination. On-board tools are available to provide data analysis and comparison of multiple data vectors. Data may be exported directly to Excel, Word, text files or a printer for analysis and publication. Data are organized into archives that hold both the data and the experiments that produced them. These archives are uniquely named and are written to individual files that may be sorted and stored in any way that is most logical to the researcher. These files can be emailed or written to an external data storage (USB drive, CD, etc.) for use by other researchers that are running the Vision program. Vision can be installed on non-tester computers for the purpose of recalling and reviewing data or creating experimental Test Definitions.

This manual provides a complete description and set of instructions for the use of Vision Version 5.x.x. (As of this writing, Vision 5.26.4 is being shipped.) The system is large and complex, but is designed so that the new user can begin to get immediate results without exhaustive training. Much of the detail of the program is segmented into Tasks that perform specific functions. Tasks may be very simple or very complex, but the user need only learn to use the Tasks that are important to the research at hand. The manual gives a complete overview of the program, a number of tutorial sessions, step-by-step operating procedures for the most common operations in Vision and a detailed description of each Task including a discussion of every control that appears on every dialog. The Task descriptions are also available using the *Click For [Task Instructions](#)* button on any dialog associated with the Task.

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The Vision program, its Tasks and its drivers, as well as these help pages, are under constant development. In order to use the most up-to-date and efficient release of the Vision program please visit the [Vision download form](#) regularly. The current Vision version and release date are noted near the top of the form. If an update is in order, fill in the form and click *Submit*. You will be linked to the Vision installer download page. Review the information on the page. Then click the installer download button and install or update per the instructions on the page.

A Note on Vision Structure and Versioning

The Vision program is a framework program that provides services to Vision Tasks. Tasks are semi-independent agents that perform the work within the program. Tasks loaded by Vision at runtime into the Task Library. Some Tasks are also loaded into the Vision QuikLook Menu.

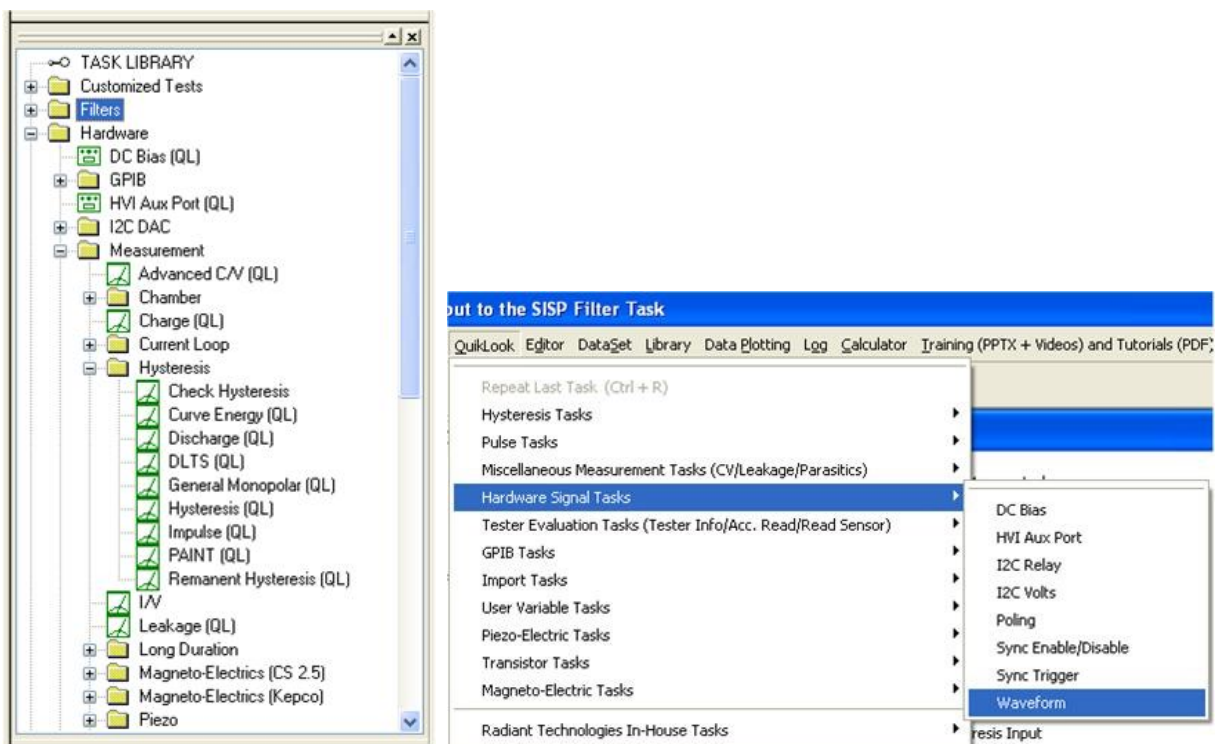


Figure 1 - Tasks in the Task Library and Figure 2 - Task in the QuikLook Menu.

The Vision program version is divided into three sections. The first is the main version. It represents major changes or additions to the program that occur infrequently. The current version is "5". The second digit represents changes to the main framework program that happen frequently but are of significant influence on the program. At this writing the second digit in the Vision version is "12". In some cases these changes will not be apparent to the customer. The final digit (currently "10") represents minor changes. In all cases, changes to the Vision version number refer only to changes to the framework program, not to changes to individual Tasks or groups of

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Tasks. The Vision version can be seen by going to Help->About Vision. Note that the "(R)" in the version number indicates that this is a release compilation of the program for customers.



Figure 3 - The "About Vision" Dialog.

As a semi-independent agent, each Task has its own version. The first two numbers of the Task version will always agree with the first two digits of the Vision program version. When the Vision version was updated to "5.12.0" all Tasks were also updated to "5.12.0". After that point, the Vision program version - representing changes to the framework - and the Task version will diverge as changes are made to individual Tasks. Task versions will also differ from each other. The configuration dialog for each Task will show the Task version, the date of the version and the initial release year. Measurement Tasks that present data in a dialog will show the same information on that dialog.

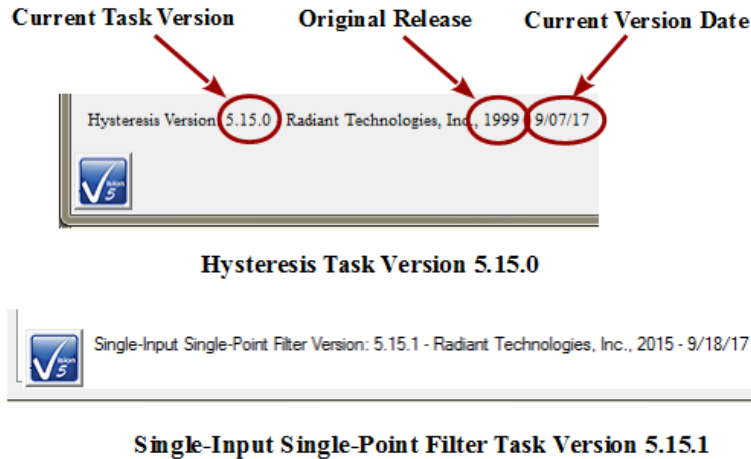


Figure 4 - Task Versions.

The "About Vision" dialog of **Figure 3** also shows a "Driver Version". The Driver is a Windows DLL program that takes input from Vision and formats it so that it can be understood by the tester. It communicates the information to the tester and receives tester response. The response is reformatted for, and passed back to, the Vision program. The driver program version will generally resemble the Vision version but is completely independent.

If you are having trouble with your tester, your Vision program or with Windows interface to either we will often ask you for the Vision and/or Driver version. Vision provides tools that make it easy for you to obtain that information in a suitable format and send it to us. If we need such information we will guide you to those tools.

Licensing

Vision is freely distributed to any and all parties who have an interest without further license. The program may be downloaded any number of times and may be installed on any number of host computers. The practical uses of the program are limited without a Precision tester, but the program is fully operational with or without a tester. With no tester present, data-collecting Tasks will generate meaningless synthetic data. Any party can register a DataSet taken by any other party to review archived data and investigate the construction of the experiment (Test Definition).

Licensing Custom Task Suites

A number of groups of Vision Tasks, known as Custom Task Suites must be purchased and licensed before they will operate. The Tasks are freely distributed with Vision. Any user can open the Task configuration dialog for review and to access the Task Instructions. Any user can review Custom Task data collected by a licensed installation of the Custom Task. However, to operate the Task it must be licensed. The license is in the form of a file named Security.sec that is placed in C:\Program Files (x86)\Radiant Technologies\Vision\System. The Task is coded to the Task Suite or Task Suites being purchased. It is also coded to an embedded ID in the tester for which it is purchased. In order for a Custom Task to operate, the security.sec file must be in

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place and the specified tester must be connected to the Vision host and powered.

The security.sec file may be copied to any number of host computers. However, it cannot be transferred to any other Precision Tester.

Task Suites include:

- Chamber (Pyroelectric): Set Temperature/Measure at a series of temperatures. This offers automatic control of a variety of thermal controllers.
 - Chamber: Measure using PUND.
 - Remanent Chamber: Measure using Remanent Hysteresis.
- Piezo: Measure the sample polarization ($\mu\text{C}/\text{cm}^2$) and displacement response. The displacement response is measured by an external displacement detector and captured as a voltage at the SENSOR port.
 - Piezo: Basic measurement. Normally used for bulk samples. There are minimal onboard noise reduction tools.
 - Advanced Piezo: Normally used for thin film samples with data taken from an AFM. There are advanced noise reduction tools and extensive data processing.
 - Piezo Filter: Gather, operate on, store and plot Piezoelectric data from one or more Piezo and/or Advanced Piezo Task.
- Transistor: Capture transistor drain current as a function of V_{Source} and V_{Gate} .
 - Transistor Current: Transistor response at a single V_{gs} and V_{ds} .
 - Transistor IV: Transistor response at a single V_{ds} over a range of V_{gs} .
 - Transistor Curve Trace: Series of Transistor responses at a single V_{ds} over a range of V_{gs} . V_{ds} changes at each sweep.
- Magneto-Electric: Capture sample polarization ($\mu\text{C}/\text{cm}^2$) as a function of a variable magnetic field provided by a Helmholtz coil. Older installations used a KEPCO BOP 36 current amplifier to provide stimulus to the Helmholtz coil. These also used a Lakeshore 425 Gaussmeter to calibrate the field at the sample. Later measurements use the RTI CS 2.5 current source to drive the Helmholtz coil. Hall Effect sensors are built into a shield box to directly detect the magnetic field at measurement time. M.E. Tasks are divided into Kepco and CS 2.5 groups.
 - Magneto-Electric Response: Hysteresis style polarization ($\mu\text{C}/\text{cm}^2$) over a periodic magnetic field (G).
 - DC Field: Set and hold a fixed DC magnetic field (G) for a user-specified period of time (s).
 - Single-Point C/V (MR): measure sample small-signal capacitance (nF) using a magnetic field (G) stimulus.

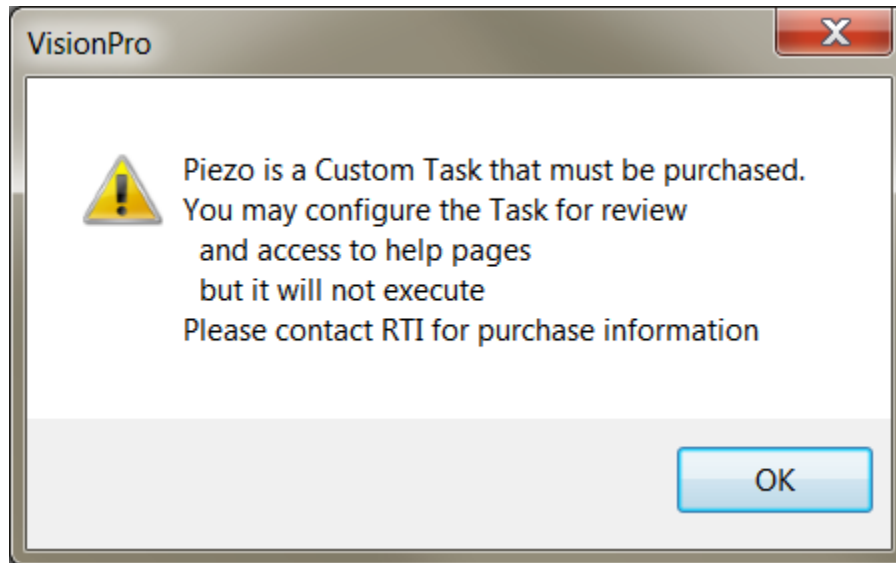


Figure 5 - Notice Appears when Unlicensed Piezo is Accessed. The Configuration Dialog will Open when the Notice is Closed.

A small note on text format in these Help pages.

There is not a large list of various textual representations in the Vision help pages. However, these few rules do apply:

1. Vision key words are always capitalized, as in Task, DataSet or Test Definition.
2. Names of controls on dialogs are italicized as in *Task Name* , *VMax* or *Comments* .
3. Text within controls is specified in quotations. For example '...' and set *Task Name* to "5.0-Volt Hysteresis".'
4. References to figures and tables with in text are set in bold type as in '... **Figure 7** represents...!'

A small note on Vision documentation

This collection of documents forms the main Vision manual. It, along with Task-specific and dialog-specific help, accessed by clicking *Click For Task Instructions/Click For Dialog Instructions* on any Vision dialog, form the complete set of program documentation. The Vision program changes frequently. Documentation will normally lag behind program updating, sometimes by significant periods of time. One consequence is often that an image of a dialog or set of controls in the documents to not exactly resemble the program windows being discussed. Nevertheless, Vision is designed to grow naturally so that older documentation will still be correct and helpful, even where it may be incomplete.

Note that Task Instructions will provide more detailed Task-specific information that is also likely to be more up-to-date than these general Vision help pages. The Task Instructions should form the major reference for the Vision program.

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System Requirements

All modern Windows-based host computers have sufficient resources to install and operate the Vision program. Vision should install and operate correctly under 32-bit and 64-bit Windows operating system from Windows XP through Windows 10. However Radiant Technologies, Inc. can no longer provide customer support for installations on Windows versions older than Windows 7.

Maintaining Vision

The Vision program does not have tools installed on the host computer to search for version updates. However, the Vision program is upgraded very frequently. Two or three version updates in a week are not unheard of. Often these updates include significant improvements or important fixes. Furthermore, the first request when you are asking Radiant Technologies, Inc. for assistance will be to ensure that you are running the latest Vision.


To update Vision, go to http://www.ferrodevices.com/1/297/download_vision_software.asp, fill in the form and click *Submit*. You will be linked to the Vision Installer Download page. Review the information on the page and click the download button. Acknowledge all warning. Allow the file to download and then run it. The installer will quickly update most installations. Older Vision installations must be uninstalled before the installer will write the newer version. Uninstalling using the standard Windows program uninstall tool will leave custom files such as security.sec and custom DataSets in place.

All fields required (unless otherwise noted)

Organization:	<input type="text" value="Radiant Technologies, inc."/> (optional)
Name:	<input type="text" value="Scott Chapman"/>
Phone #:	<input type="text" value="5058428007"/>
Your Email:	<input type="text" value="radiant@ferrodevices.com"/>
Confirm Email:	<input type="text" value="radiant@ferrodevices.com"/>
Address:	<input type="text" value="2835 Pan American Fwy NE"/>
Address 2:	<input type="text" value="Suite C"/>
City:	<input type="text" value="Albuquerque"/>
State:	<input type="text" value="NM"/>
Zip/Postal Code:	<input type="text" value="87107"/>
Country:	<input type="text" value="USA"/>

Tester Type:	<input type="text" value="Precision Premier II"/> <input type="button" value="v"/> (optional)
Serial Number:	<input type="text" value="PPM0317-999"/> (optional)

Comments (optional):



Please enter the numbers above.

Figure 6 -Vision Install/Update Form.

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Vision 5 Presentation and Installer



Announcing the Release of Vision 5.0

The instructions in this document have been updated as of 21 March 2017

This page is used to install the latest version of the Vision program - Vision 5.12. Use the installer on this page to install Vision to host computers that have never had Vision installed or to update computers that have older versions of the program already installed.

Requirements

Vision may be installed on any Windows host computer running Windows 7. These include Windows 7, Windows 8, Windows 8.1 and Windows 10. Windows XP and Windows Vista are no longer supported. The same installer can be used for 32-Bit and 64-Bit host computers. For documentation purposes, 64-Bit host computers are assumed.

The Vision program installed from this page will operate all Precision Testers, regardless of model or age, that connect to a separate host computer through a USB cable. It does not operate the Precision Workstation or original Precision Pro/Premier with internal CPUs.

The Vision 5.6.x release offered a more up-to-date installer than previous versions. Changes include:

- New look.
- No random "Disk Space Errors"
- C++ Manifest installation is embedded instead of executing after the installation. The installation may require a reboot, but will only execute on initial installation. Updates will not require a re-installation of the manifest.
- Vision 5.6.x included a data plotting library update. The data plotting appearance is slightly different. The right-click Export bug has been repaired.
- Installer updates to Version 5.6.8 and later do not need to have the previous Vision installation uninstalled. Just download the installer and run it. Older files will be updated by date and new files will be written.

To Update Existing Vision Installations:

- Copy C:\DataSets\explorerdb.cpu and C:\DataSets\Editor List.EL to temporary locations. You may not find all three of these files, depending on your use of Vision. C:\DataSets\explorerdb.cpu is the important file. **NOTE: If the existing Vision Version is 4.9.2 or later this step does not need to be taken.**
- Go to Start->Settings->Control Panel and select "Add or Remove Programs..." **NOTE: If you are updating from Vision 5.6.8 or later, this step and the next step do not need to be taken. The latest installer will update the existing installation**
- When the program list is populated, scroll down to and double-click "Vision". Allow the program to completely uninstall.
- Download the installer under the Vision 5 download button below.
- Run the downloaded installer. Acknowledge all warnings and allow the installation to proceed. At the end of the installation a separate Microsoft Visual C++ program will run that will update Windows files to run with the Vision program. Allow this program to run to completion.
- Return the backed up explorerdb.cpu, and Editor List.EL to C:\DataSets\, overwriting the files from the installer. Note that you will not need to repeat the backup or restore steps in the future. **NOTE: If the Vision Version being updated is 4.9.2 or later this step does not need to be taken.**

To Install Vision to a Fresh Host Computer:

Note that you must install Vision before connecting your Precision tester for the first time. Simply download the installer under the Vision 5 download button below, and run the installer. Acknowledge all warnings and allow the installation to proceed.



Latest Vision Installer - Vision 5.12.10 - 21 March 2017

Support for Windows XP and Vista has ended.

NOTE: This installer is not for use with the Precision Workstation or original Precision Premier/Pro with on-board

Figure 7 - Vision Installer Download Page

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www.ferroelectric testers.com	Precision Testers

Getting Started

Introduction

This topic discusses the installation and initial validation of the Precision tester and the Vision program that controls it. The topics are presented, in order as:

1. Vision Software Installation
2. Precision Tester Installation
3. System Startup and Validation

The topic addresses only the installation of the Precision tester and Vision software. It does not present any information on installation or operation of accessory equipment such as High-Voltage Interfaces (HVIs) and High-Voltage Amplifiers (HVAs), thermal controllers, magneto-electric response equipment, displacement detectors or Atomic Force Microscopes (AFMs). These are each considered in other documentation in these help pages.

NOTE: These instructions are intended for initial installation, or update, of the Vision program for Precision pMEMS, Premier II, Multiferroic, LC, LC II, RT66B, RT66C, RT66I, SC and FH testers of any age. These are testers that connect to a host computer over a USB interface. The modern distribution of the Vision program is not intended to be installed on the original Precision Pro, Premier or Workstation testers that have on-board computers.

Requirements

The Vision program and Precision Tester will operate on any modern host computer with USB connectors. An attempt has been made to allow the program to be accessible to users of laptops with smaller displays, however displays smaller than 19" may not completely display all dialogs in the program. The system will not operate with tablet computers or cell phones. Vision operates only under the Microsoft Windows operating system. The program will operate equally well in 32-bit and 64-bit environments. Vision operates on Window 7, 8, 8.1 and 10.0. Windows XP and Vista is are longer supported, though Vision should install and operate properly on these operating systems. A 64-bit host computer is recommended.

Vision Installation

Vision Program Installation

Before attaching the Precision Tester to the host computer the Vision program must be installed. As with most programs, installation is done by running a standard installer program. The installer version at the time of this writing is 5.26.4. (Please see the note, below, on program and installer [versioning](#).) Installation will proceed as usual for program installers, but there are a few unique aspects to the Vision installation that the user must be aware of.

A: Procedures

1. Run the installation program Vision x.x.x (y).exe, where "x.x.x" is program/installer version and "(y)" is a letter indicating the release of the installer. The installer may have been delivered on a DVD. Otherwise, it can be obtained by going to www.ferrodevices.com/1/297/download_vision_software.asp. Fill in the form and click *Submit*. You will be directed to the Vision installer download page. Review the information on the page. Click the button to download the installer and execute the file per these instructions.
2. Run the program Vision.x.x.x (y).exe. If prompted allow the execution to continue.



Figure A.1 - Acknowledge the Security Warning.

3. Depending on programs already installed on the host computer, the Vision installer may require the Microsoft Visual C++ 2005 SP1 Redistributable to be installed with the program. Vision will not operate without this redistributable

package installed. Click *Install* to continue.

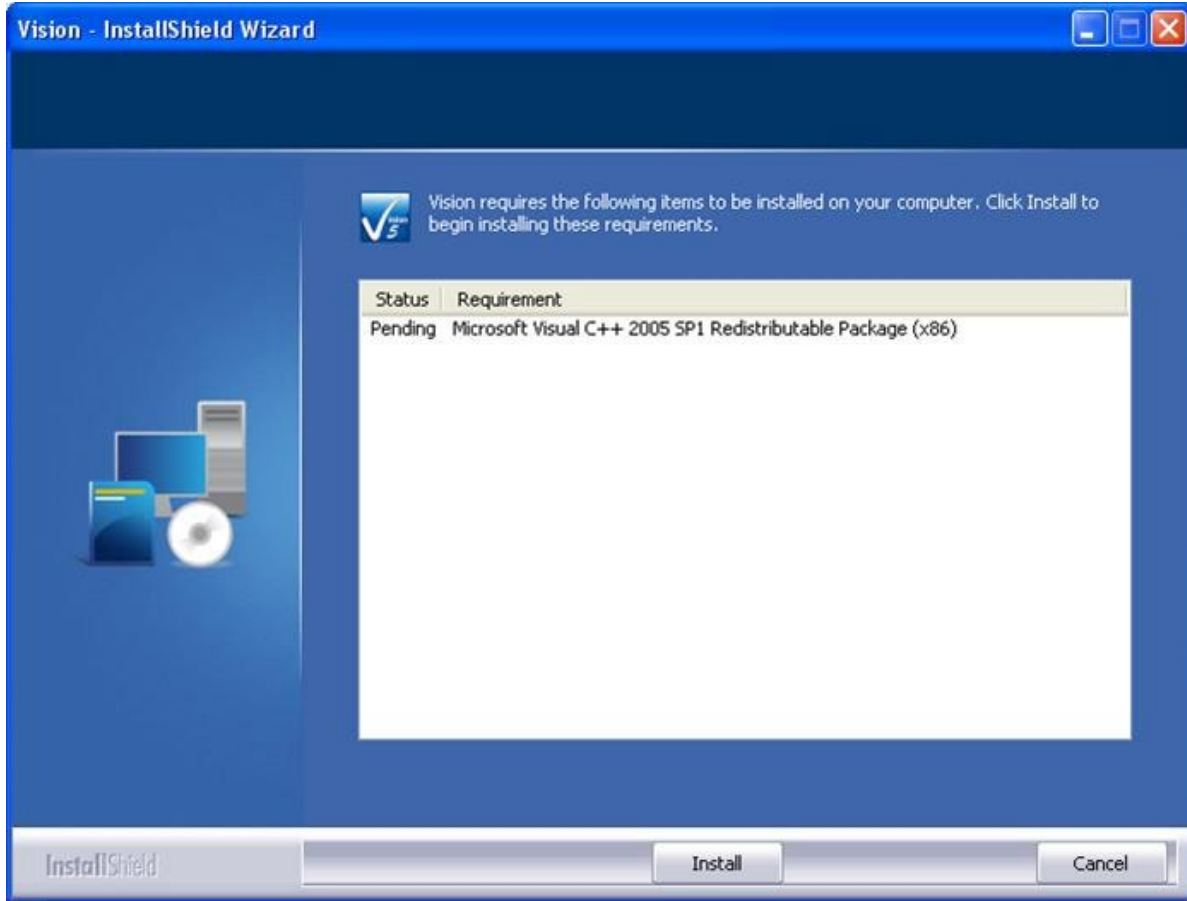


Figure A.2 - Visual C++ 2005 Redistributable Installation.

4. The wizard will open. Click Next >.

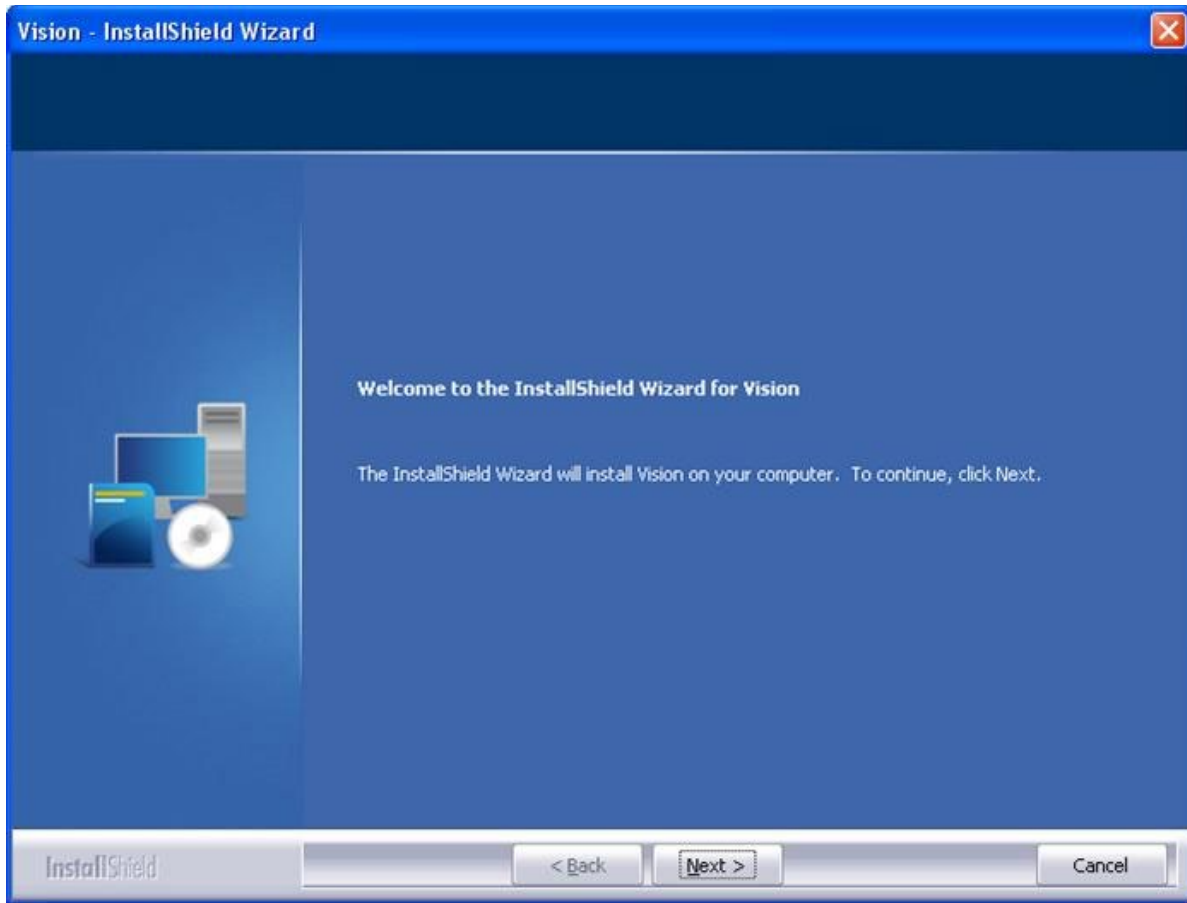


Figure A.3 - Initiate Vision Installation.

5. A license page will appear. The license will list recent updates to the program. There is no legal verbiage to agree to. Vision is freely licensed to any user and may be installed on as many host computers as needed. Click Yes.

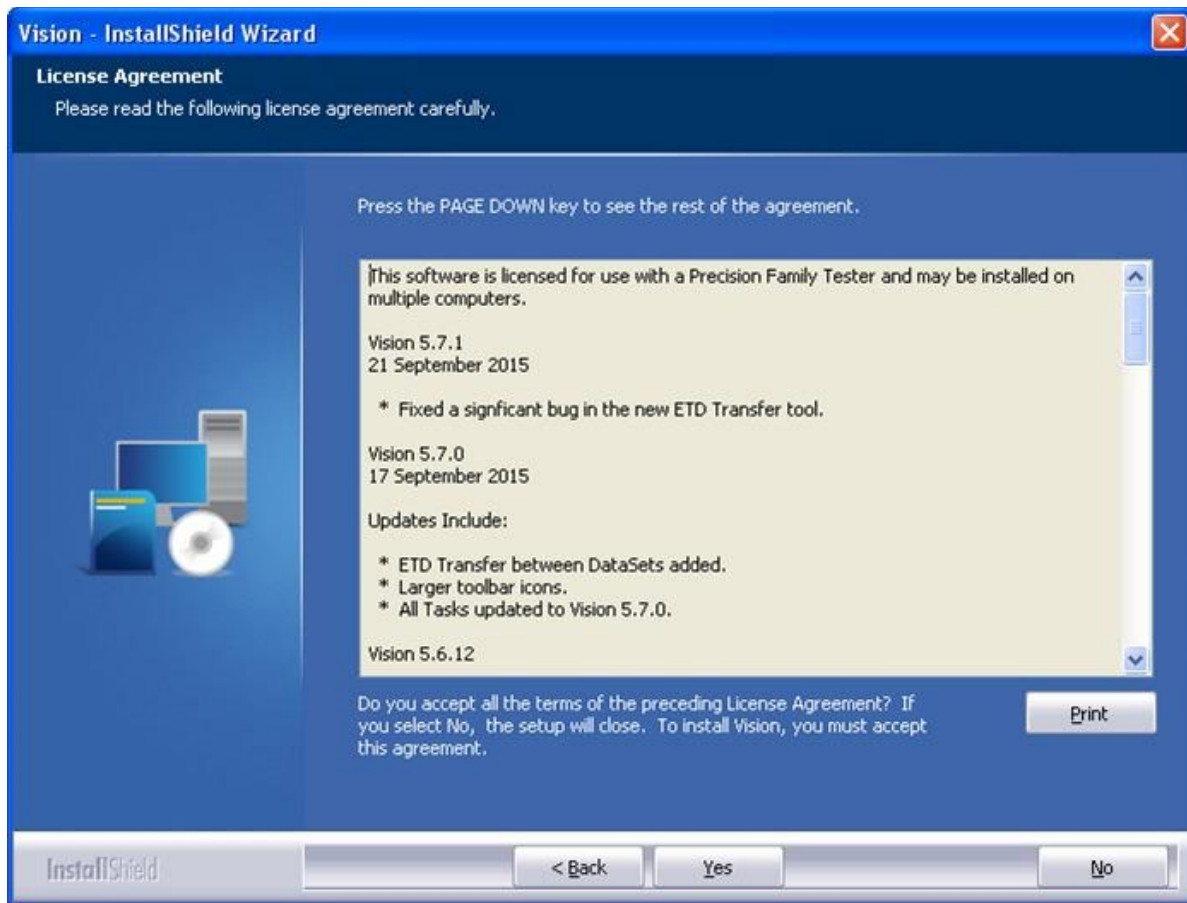


Figure A.4 - Vision License.

6. The installer will begin writing files to the host computer hard disk. A progress dialog details the actions as they occur. During this process the installer will.
 - Create the folders and write files to C:\Program Files (x86)\Radiant Technologies\Vision¹ and below. Never move or remove files unless instructed by Radiant Technologies, Inc.
 - Create the folder and write files to C:\RT_USB. Never move or remove files unless instructed by Radiant Technologies, Inc.
 - Create the folders and write files to C:\DataSets and below. Never move or remove files unless instructed by Radiant Technologies, Inc.
 - Create the registry key HKEY_CURRENT_USER\Software\Radiant Technologies and create and initialize keys and string values below this key. Never move or remove keys or string values.
 - Install and register DAO (Data Access Object) database engines.

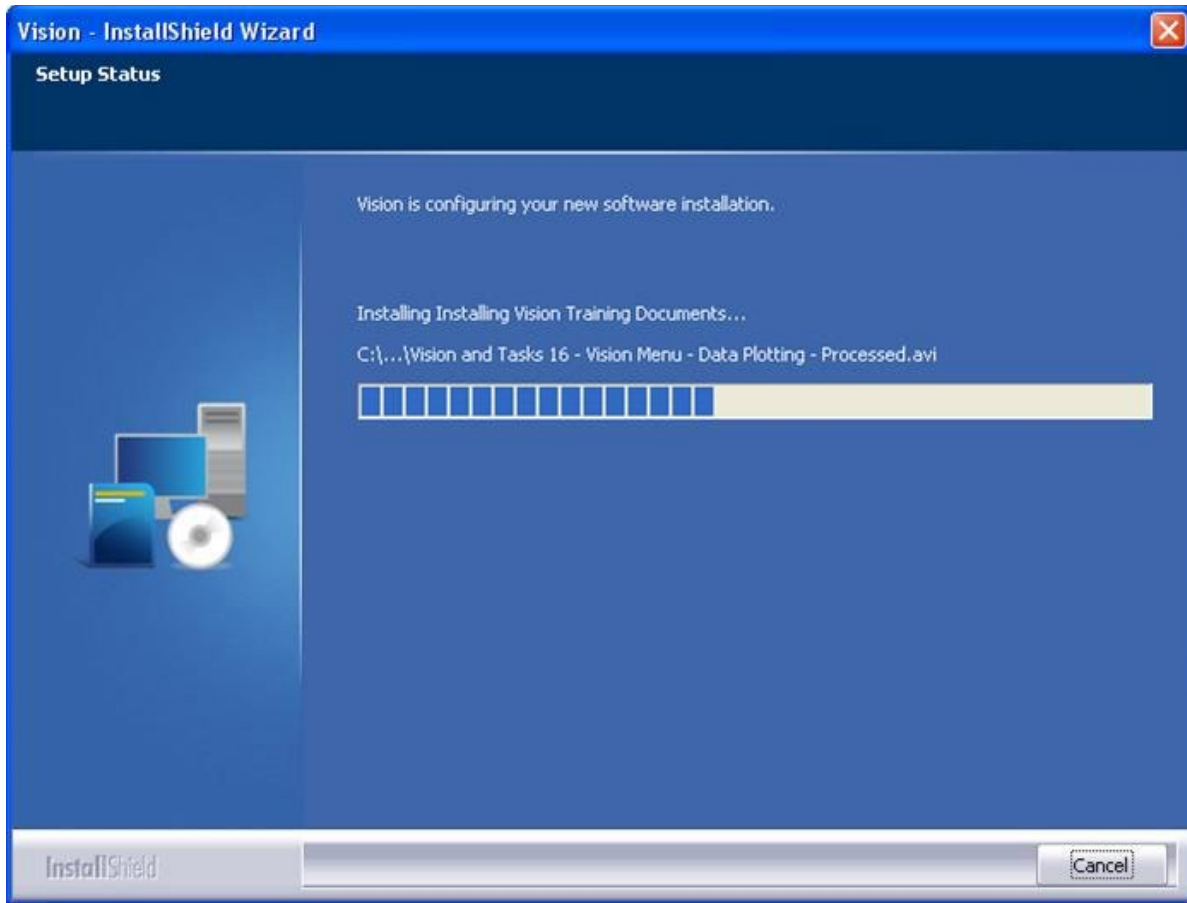


Figure A.5 - Installation Progress.

7. The Vision installer will open the host computer default browser. If the host is connected to the internet, the browser will open to the Radiant Technologies, Inc. YouTube home page at <https://www.youtube.com/user/ferrodevices/featured>. The page contains links to Vision training videos.

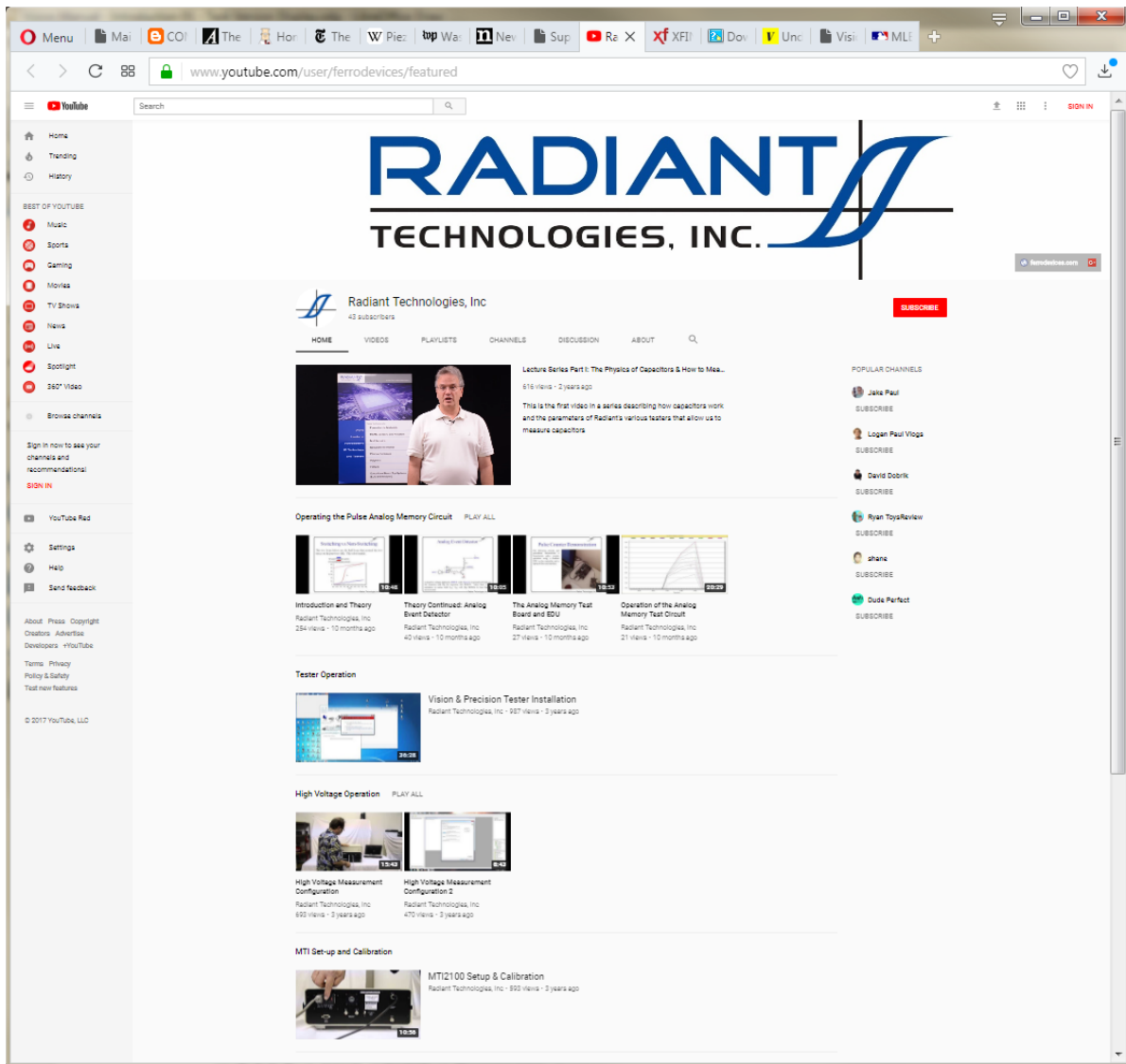


Figure A.6 - Radiant Technologies, Inc. YouTube Home Page.

8. The final wizard page shows that installation is complete. Click *Finish* to close the wizard.

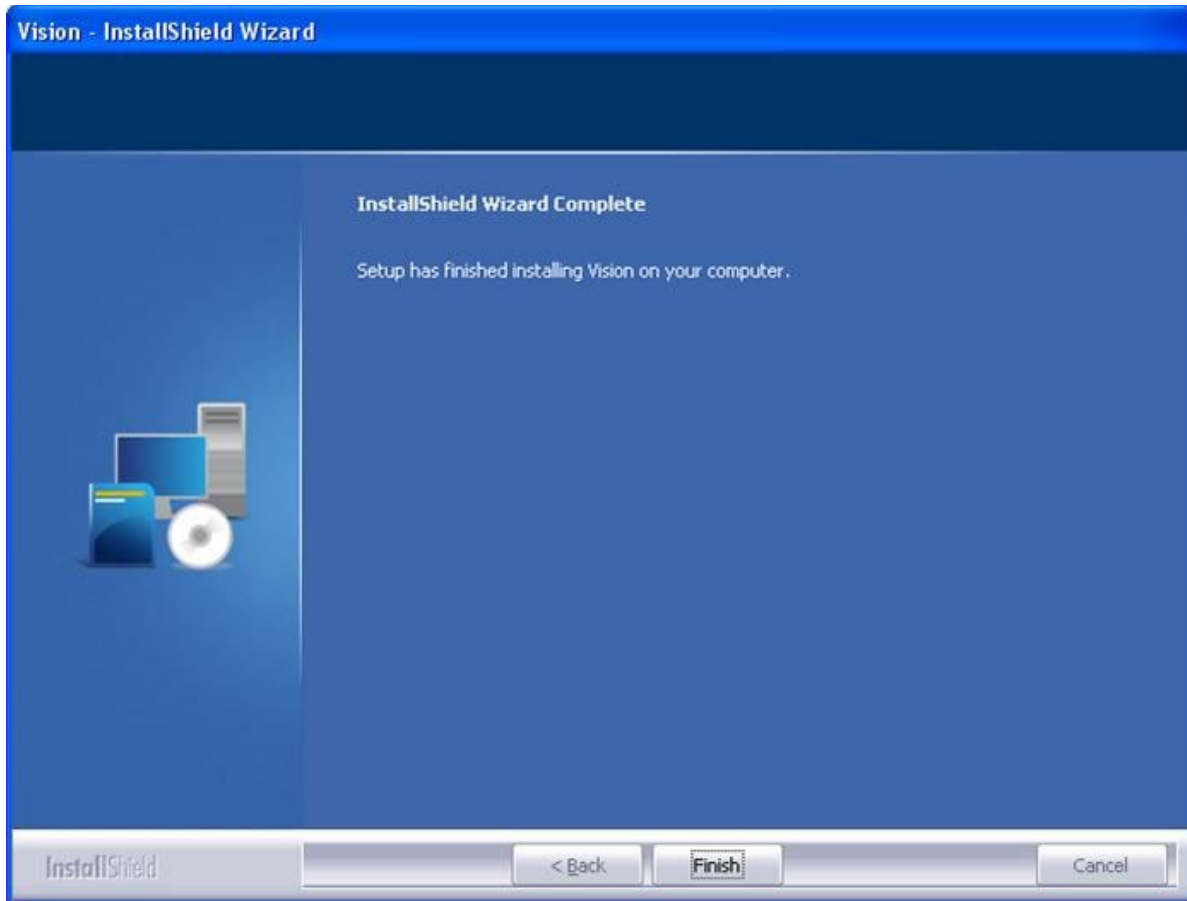


Figure A.7 - Installation is Complete.

B - Vision Update

Once Vision has been installed, it is important to keep in mind that the program is updated very frequently. The website should be checked regularly for new installers that will update existing Vision installations. Go to www.ferrodevices.com/1/297/download_vision_software.asp. Fill in the form and click *Submit*. You will be directed to the Vision installer download page. Review the information on the page. Click the button to download the installer and execute the file per these instructions.

C - A Note on Versioning

The Vision version number consists of three parts arranged, left-to-right, in descending order of significance. The version, as of this writing, is 5.15.2. '5' is the major release. It first appeared in February 2014. Changes in this number indicate a significant reworking of the program and/or inclusion of major new features. There is usually a period of several years between changes in this index. '10' indicates a moderate change that will usually be appar-

ent to the user, though perhaps not immediately. Vision releases that involve changes in this index are irregular and can be spaced days to months apart. The '10' index indicates a very routine maintenance change to the Vision program. Such changes may not be apparent to the user or may be so slight that they will not be noticed. The installer version will take on the Vision program version in its file name. Vision 5.15.2.exe is the installer version as of this writing.

As you will learn as you work through this manual, and from other sources, the Vision program is a framework that provides services to a group of semi-independent agents, known as "Tasks", that are loaded into Vision at startup. Tasks are configurable operations that perform the functions required by the researcher. These should be regarded as programs in their own right. Each Task is independently versioned. It will always take on the first two indices of Vision. When Vision 5.12.0 was released, all Tasks were updated to 5.12.0. From that point, Task versions may depart, independently from the main Vision program. Although Vision is now 5.12.10, Tasks may have version 5.12.0, 5.12.3, 5.12.12, etc. Tasks and their version numbers are updated, individually or in groups, very frequently. Changes may be immediately apparent to the user. They may also be subtle or completely transparent.

D - What is Installed

1. C:\Program Files (x86)\Radiant Technologies\Vision: This is the location of the main Vision program file, VisionPro.exe. Several other very important files are also written to this location. Do not disturb files in this location.
2. C:\Program Files (x86)\Radiant Technologies\Vision\System: This is the location for the Tasks' files *.vlr. On startup, Vision searches this location for all files with the *.vlr extension and loads them into Vision. If you are provided updates to specific Tasks, the updated files should be written to this location, overwriting existing files. If you find that Vision displays warnings - perhaps repeated warnings - on startup, it may be finding files, here, that do not match the current version of the program. Sort by date and remove any files that do not match the distribution date. (Generally older files.) Notify Radiant Technologies, Inc. with the file names of files that have been deleted. This location also holds a template for DataSets (tdb.dst) and a file named SD.dll that provides dialogs that are repeated among Tasks. tdb.dst may be very old. SD.dll should match or nearly match the dates on the Task files.
3. C:\Program Files (x86)\Radiant Technologies\Vision\System\TC, \FC, \LCR: These folders hold DLLs that refer to specific thermal controllers, magnetic field controllers or LCR meters. They are accessed by Tasks that automatically set temperatures and/or magnetic field and/or measure LCR properties.
4. C:\Windows\SysWOW32: The Precision hardware driver NGS_USB_Driver.dll file is written to this location.
5. C:\RT_USB: This folder contains the driver installation file ,NGS.inf, that is used by Windows to install the Precision tester and associate it with the

NGS_USB_Driver.dll file. This folder also contains tester firmware that is written into the tester EEPROM at startup or on hardware refresh. The firmware files are *.hex files and there is a separate file for each tester type.

6. C:\DataSets: This is the default file path for user's DataSets (*.dst). It contains the tutorial DataSet files that are distributed with the program. Editor List.el contains the sequence of files that are used to restore the Test Definition in the EDITOR on program startup. xplorerdb.cpu contains the names, file names and file paths of all registered DataSets. It is used to restore the DataSet Explorer on startup. Customized Tasks (*.udt) are all written to this location. Graph annotations and Executed Test Definition (ETD) notes (if any of either are present) are stored in subfolders. Distribution documents, User-Printable Help user training videos and other miscellaneous items are also written to subfolders in this location. Many of the terms used in this discussion will become familiar as you work through the tutorials and Main Help Pages in this help project.
7. Registry - HKEY_CURRENT_USER/Software/Radiant Technologies/VisionPro/Settings - This contains a number of default entries that are modified as the user customizes Vision to his/her needs.
8. Desktop:
 - Vision - A shortcut to C:\Program Files (x86)\Radiant Technologies\Vision\VisionPro.exe¹. Double-click to execute the program.
 - DataSets - A shortcut to C:\DataSets. Double-click to open a Window Explorer to this location.
 - Tasks & Customized Tests - A shortcut to C:\Program Files (x86)\Radiant Technologies\Vision\System¹. Double-click to open a Window Explorer to this location
 - User-Printable Help. - A shortcut to C:\DataSets\User-Printable Help. Double-click to open a Window Explorer to this location.

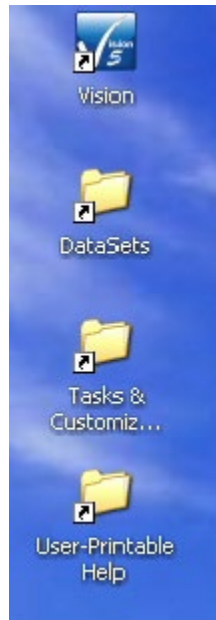


Figure D.1 - Vision Icons Installed to the Desktop.

Vision Update

The Vision program is in a constant state of growth. The program is designed and updated to meet the needs of Radiant engineers and the requests of users. Most of the capabilities of Vision have been provided in response to users' requests.

The Vision program changes rapidly. Updates to the program are posted very frequently. It is simple and important to keep the program up-to-date. In order to allow Radiant engineers to provide prompt and accurate customer support, the engineers will expect the program to be up-to-date. If the program is being updated from a much older version there may be some complexities to the upgrade. However, once the program is updated, future updates will be a simple matter of downloading and running the updated installer. A monthly check for Vision updates is recommended.

If you are updating from a version that is earlier than 5.6.0, you should first uninstall your existing version. Please note that uninstalling will not affect registered DataSets that you have created, license files or other files that are found in the C:\DataSet and/or C:\Program Files (x86)\Radiant Technologies paths that were not added by the original installer. To uninstall, open the uninstall tool that pertains to the Windows version on the host computer. Select the Vision program and allow it to uninstall. **Figure 1** shows this for Windows 7. Note that once the most up-to-date version of Vision is installed, future updates will no longer need to uninstall the program. If you have a version later than 5.6.0 installed, you do not need to uninstall the program.

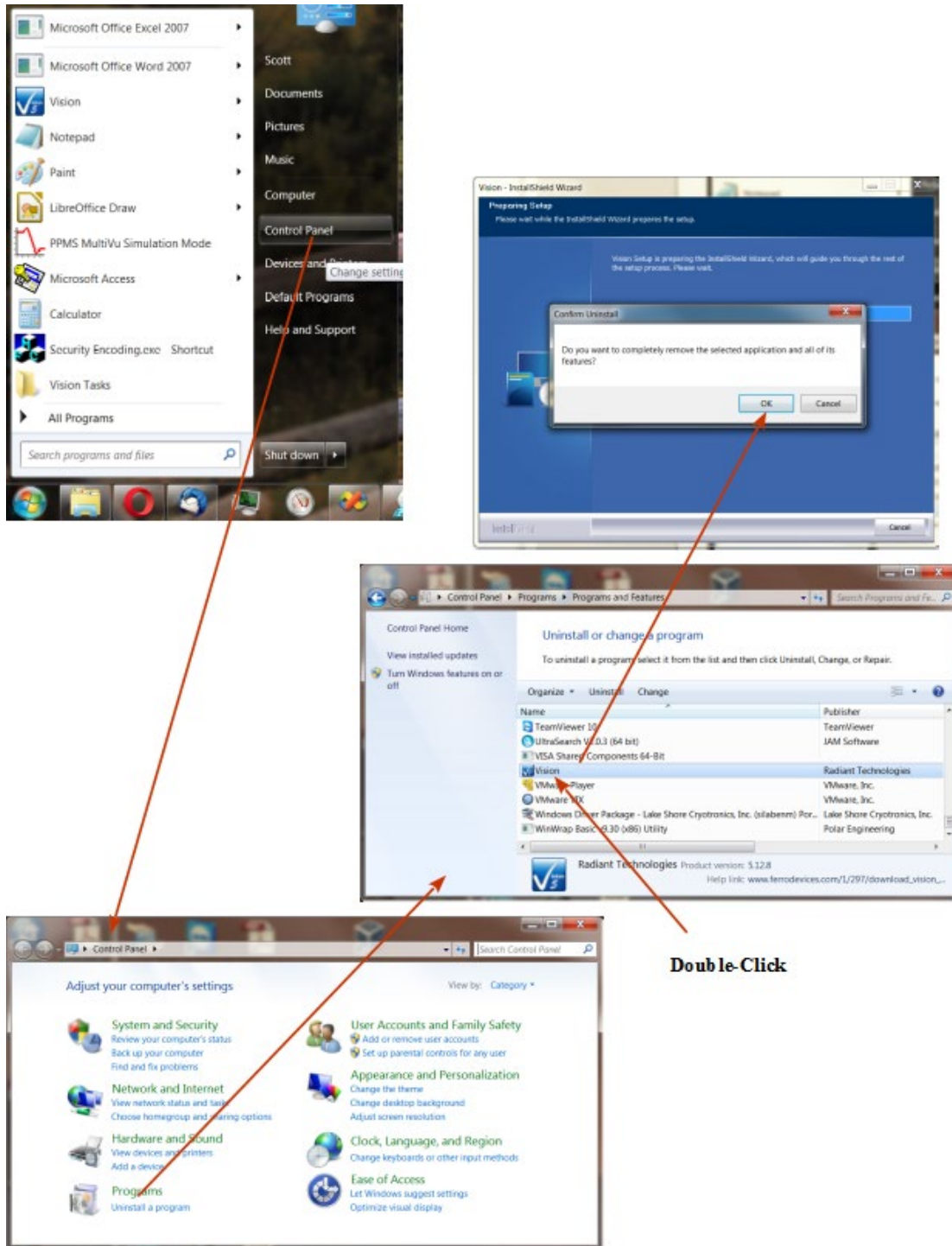


Figure 1 - Uninstall Vision.

Once Vision is uninstalled, or if updating from a version that is 5.6.0 or later, go to www.ferrodevices.com/1/297/download_vision_software.aspx, fill in the form and click *Submit*.

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Vision Date and Version

Current Installer Version: 5.15.1
Current Installer Date: 15 September 2017

Check the Latest Version

Windows XP and Vista Support Has Ended

All fields required (unless otherwise noted)

Organization:	Radiant Technologies, inc. (optional)
Name:	Scott Chapman
Phone #:	5058428007
Your Email:	radiant@ferrodevices.com
Confirm Email:	radiant@ferrodevices.com
Address:	2835 Pan American Fwy NE
Address 2:	
City:	Albuquerque
State:	NM
Zip/Postal Code:	87107
Country:	United States

Tester Type: Multiferroic II (optional)

Serial Number: PMF1012-313 (optional)

Comments (optional):
Demonstration for the Main Vision help pages

1890 1890
Please enter the numbers above.

Submit Reset

Figure 2 - Vision Web Form.

The browser will be taken to the Vision Installer Download page. For completeness, review all of the information on the page. Then click the installer download button and allow to install. Note that the installer is quite large. Download may take several minutes depending on the browser and internet connection speed.

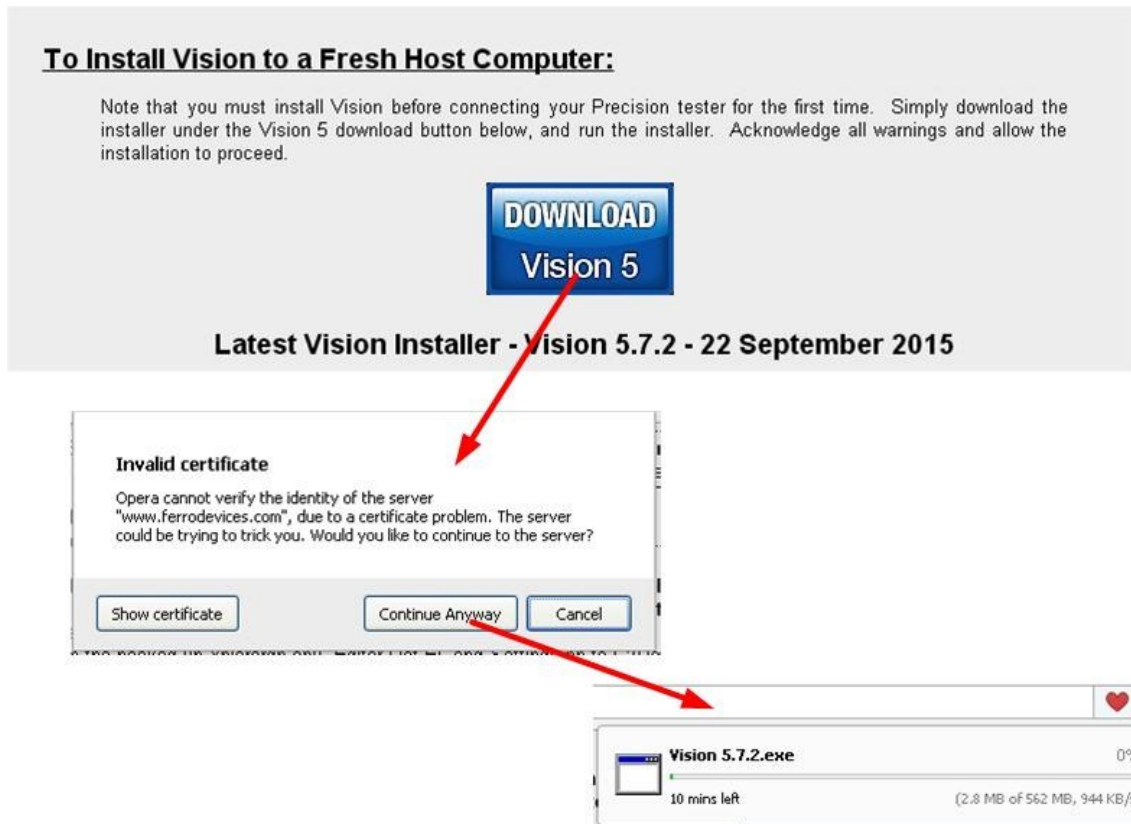


Figure 3 - Do the Download.

When the download has completed, double-click the downloaded installer file to run it. If you have uninstalled Vision you will be doing a new installation of the program. Please see [Vision Installation](#) for the procedures. If you are updating an existing installation that is newer than 5.6.0, the installer will do a simple update of files that have newer dates or do not yet exist in the Vision installation paths. Double-click the downloaded Installer to initiate. You will probably have a warning. Click Run or acknowledge the warning to continue the installation.

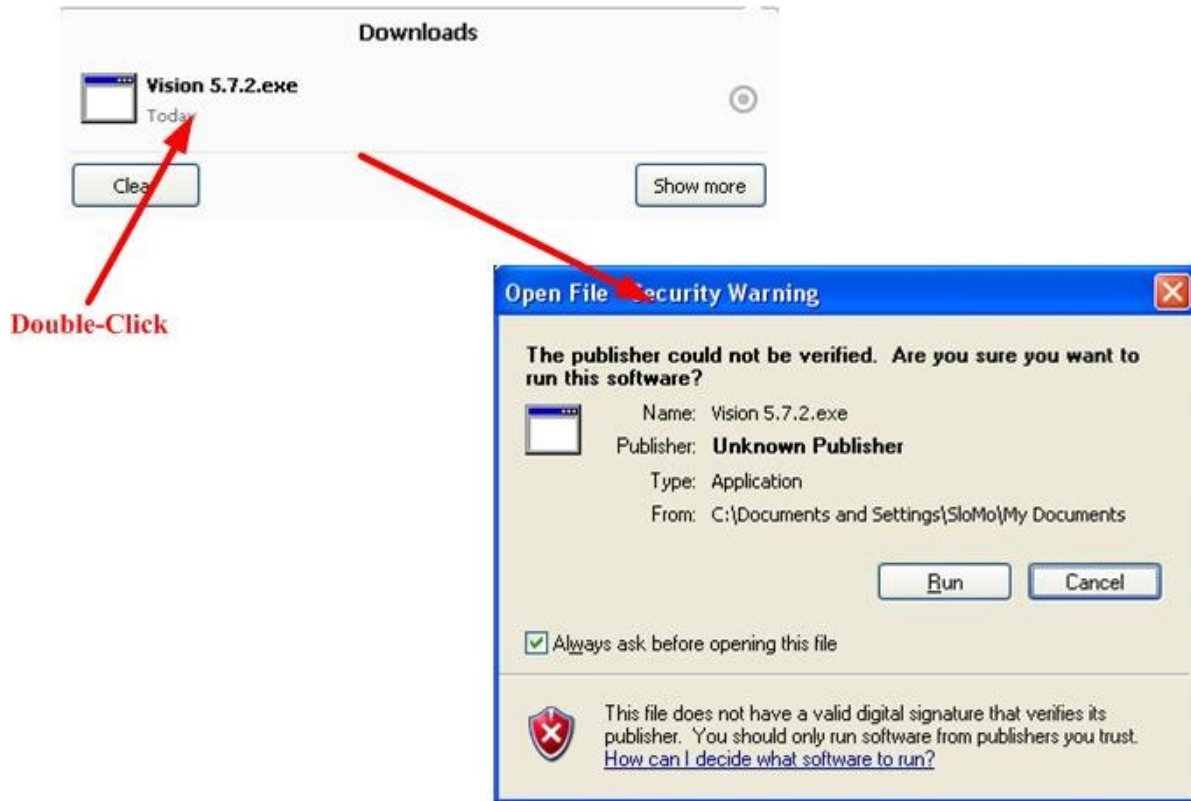


Figure 4 - Initiate the Installation.

After some initialization the installer wizard update panel will appear. Click *Next* > to start the update.

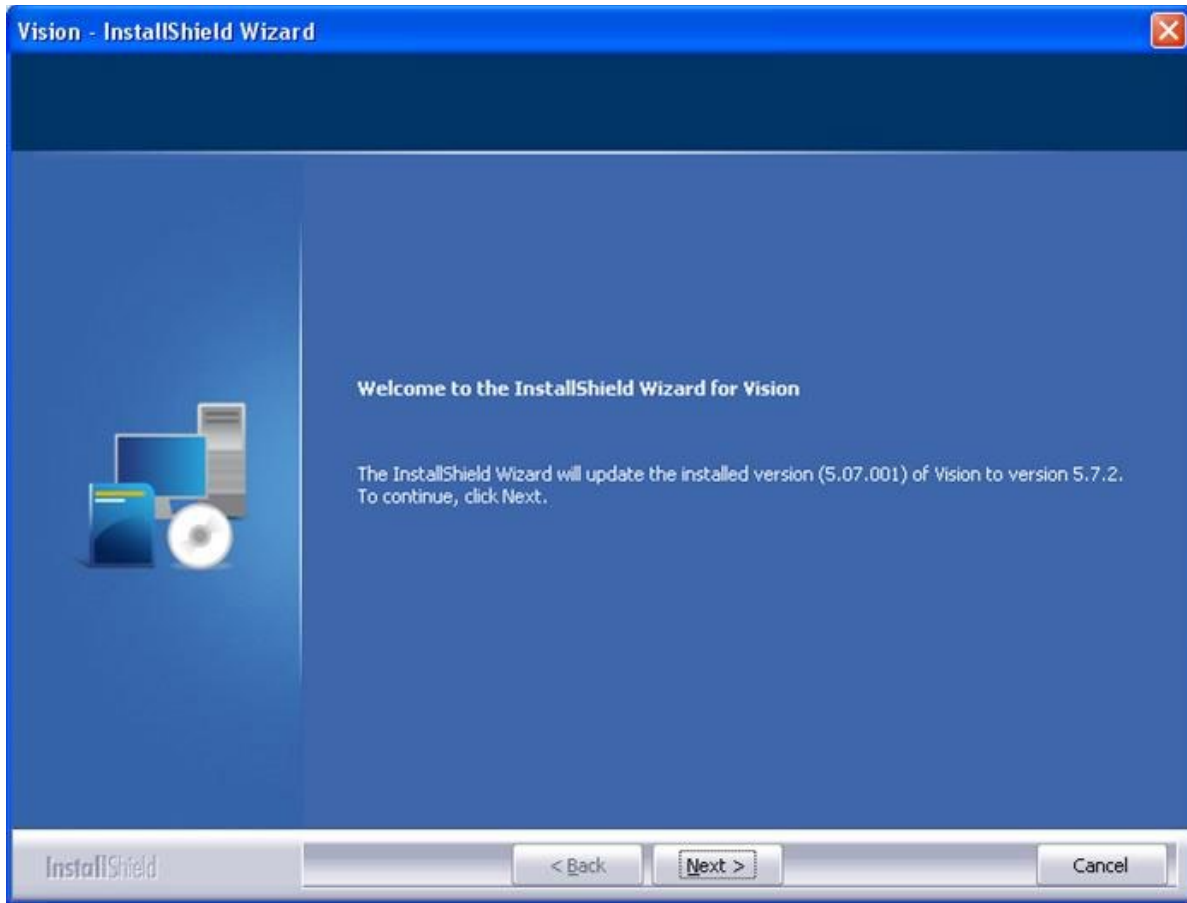


Figure 5 - Update Panel in the Installation Wizard.

The update will proceed with a progress panel. When it has completed, the "Update Complete" panel will appear. The updated Vision installation is ready to run.

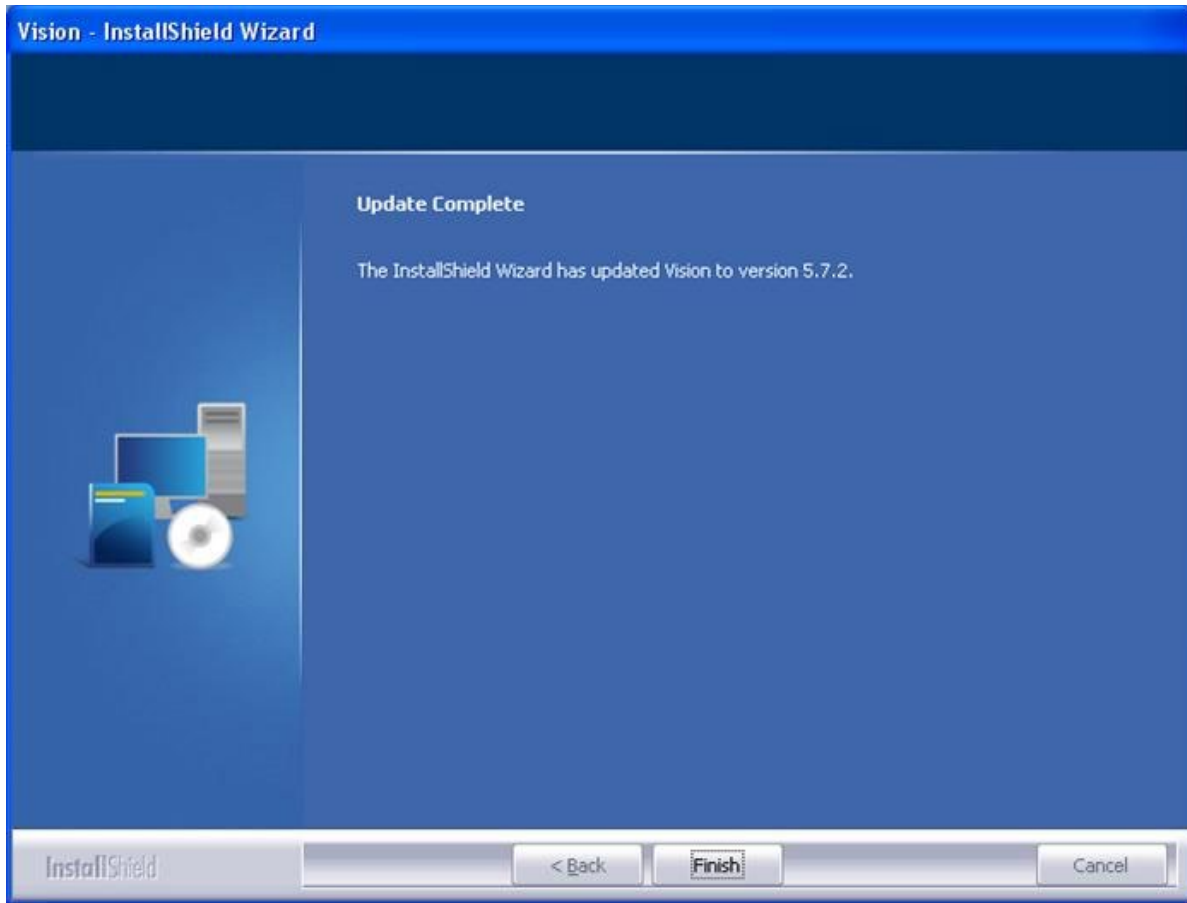


Figure 6 - Update Complete.

Precision Tester Installation

At the time of this writing, Windows 10 is the dominant operating system for new Vision program and Precision tester installations. This is a 64-bit operating system. Vision, its installer and the Precision tester are equally matched to 32-bit operating systems (Windows XP, Windows Vista) and 64-bit operating systems (Windows 7, Windows 8 and Windows 8.1). Note, though that Windows XP and Windows Vista installations can no longer be supported by Radiant Technologies, Inc.

Precision Premier II, Multiferroic, LC II and RT66C testers shipped after July 2014 will install themselves to Windows 8, Windows 8.1 and 10 hosts with no further action by the user. This is not true for older operating systems. RT66B testers and all testers older than July 2014 must be installed by the user after the Vision program has been loaded onto the host computer. All testers, including those newer than July 2014, must be installed by the user to Windows 7. The process differs between operating systems. The following is a brief discussion of each installation. Please refer to detailed installation documents shipped with the tester for more in-depth, step-by-step instruction.

A - Windows 7

Connect the tester and power up. Windows will detect the new hardware and try to install it automatically. It will fail. You must go to the Device Manager, locate the icon for the unknown hardware, right-click and locate the "Update Drivers..." button. You must then do a manual installation in which you browse to the C:\RT_USB folder where Windows will find the hardware installation file NGS.inf.

B - Windows 8, Windows 8.1 and Windows 10

Before installing the connecting the hardware, Window must be rebooted with Driver Signature Enforcement temporarily disabled. This is simple to do, but the sequence of steps to cause this to happen are intentionally hidden behind several layers of "Setup" menu. Furthermore, the sequence is different for Windows 8, Windows 8.1 and 10. Please see the installation documents for details. Procedures can also be found online. Once the computer is rebooted you will be provided with a series of startup options. On startup, press '7' to disable Driver Signature Enforcement. Once the tester is installed, rebooting will re-enable Driver Signature Enforcement. With the restriction enabled, you will need to go through the same steps as for Windows 7 to install your tester. Precision Premier II, Multiferroic, LC II and RT66C testers shipped after July 2014 will automatically install themselves in Windows 8, 8.1 and 10 and these actions do not need to be taken.

Initial Operation

With the Precision tester connected to the host computer turn the tester on. The green LED on the front panel should start to blink at 1/2 Hz with a 50 % duty cycle.

Double-click the Vision icon.



Figure 1 - Start Vision from the Desktop Icon.

As the program starts it will:

1. Upload the specify tester's firmware to the tester EEPROM. (The tester firmware is a file named C:\RT_USB\xxx.hex, where "xxx" is a file name that is specific to the tester being started.)
2. Start the firmware running. The green LED will start to blink at 1 Hz rate with a 90% duty cycle.
3. Configure the tester to its initial state.
4. Search C:\Program Files (x86)\Radiant Technologies\Vision\System for all files with a *.vlr extension. These are the Task Dynamic Link Library files (DLL), one per Task. The DLLs are started and, based on Task configuration, loaded into the appropriate location of the Vision Task Library. The Task may also be placed in the Vision QuikLook menu if it indicates that it is a member of that menu.
5. Read the Windows registry for user preferences for Vision configuration.
6. Read C:\DataSets\EditorList.El and restore the previous Test Definition to the EDITOR, if Vision is configured to restore the Test Definition

Note that for some host computers, the first-time startup may be slow. Nothing should appear on the Windows desktop during the procedures, above.

When the program is fully started, the Tester Selection dialog appears. The dialog lists the connected Precision Tester under *Attached Tester*. The tester is listed by name. The tester will be indicated with " (X)" appended to its name. The name of the tester is stored in the tester EEPROM and can be changed by editing *Tester Name (32 Characters Max.)* and clicking *Rename Tester*.

Note that multiple testers are no longer supported by Vision. *Select Tester* and *ID Tester* remain enabled and operational. But neither need to be used to identify or select the tester to be used.

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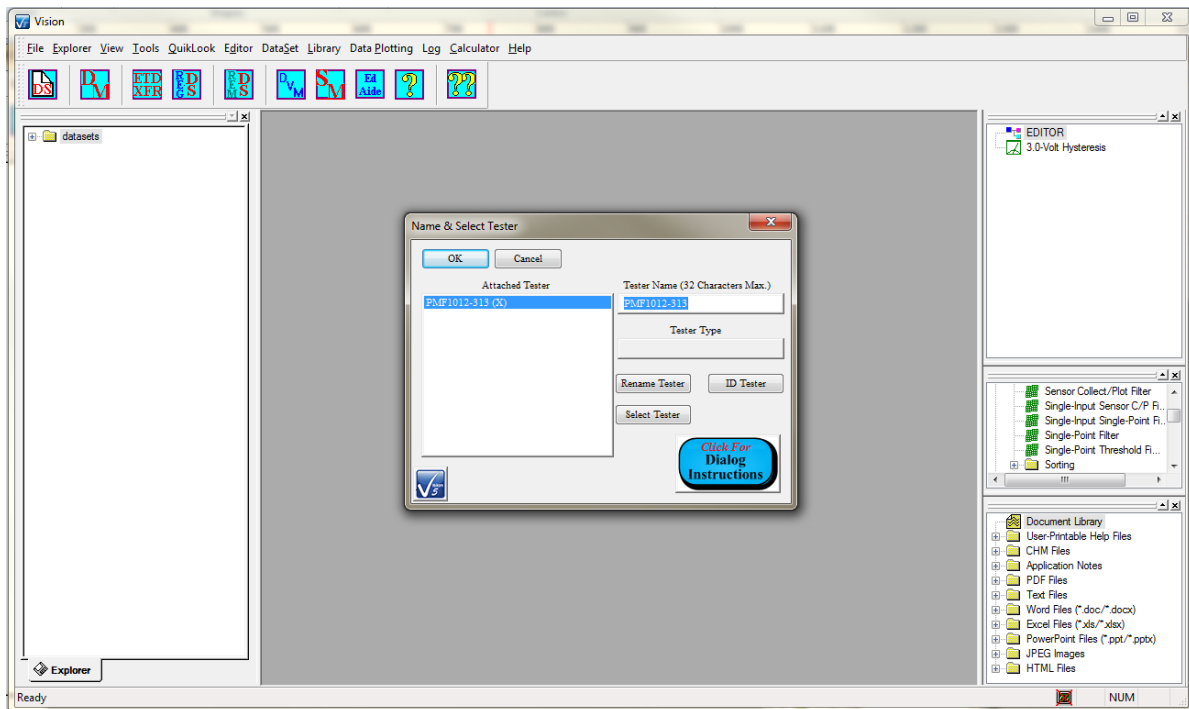


Figure 3 - Initial Vision Program Display & Tester Selection Dialog.

Click *OK* to close the dialog. A message will appear that indicates that a calibration period will follow. The message indicates that cables are to be disconnected from the tester DRIVE ports. Note that if the tester is connected to a High-Voltage Interface (HVI), especially in a rack mount, the DRIVE does not need to be disconnected to perform the calibration. The message may be disabled for future executions.

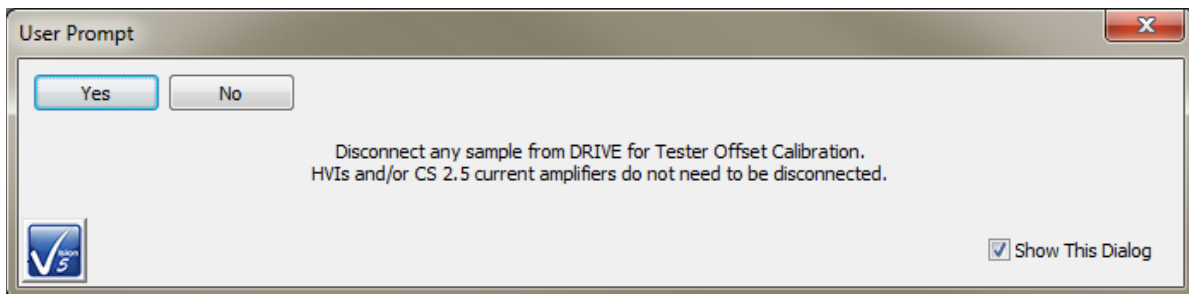


Figure 4 - Ensure the Tester is Configured for Calibration.

Click *OK*. The calibration will start. A *Stop Measure Ramp Offsets?* button will appear. The Status Bar will show "Zeroing Tester Output... Standby...". When calibration is finished, the button will clear and the Status Bar will show "Ready".

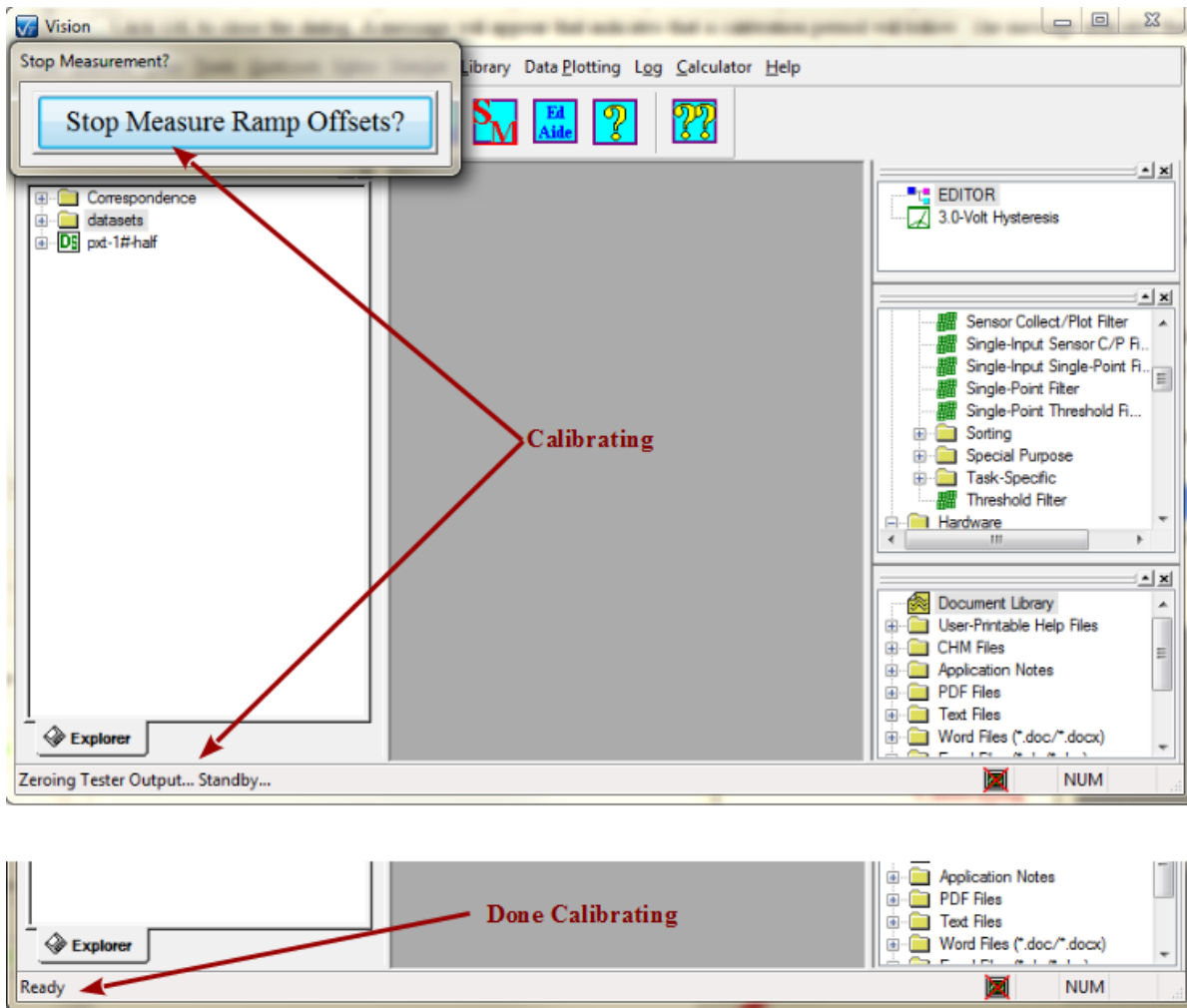


Figure 5 - Tester Calibration.

If the program is started with no tester connected or powered, the Tester Selection dialog will show "No Tester Attached". Cancel closes the dialog.

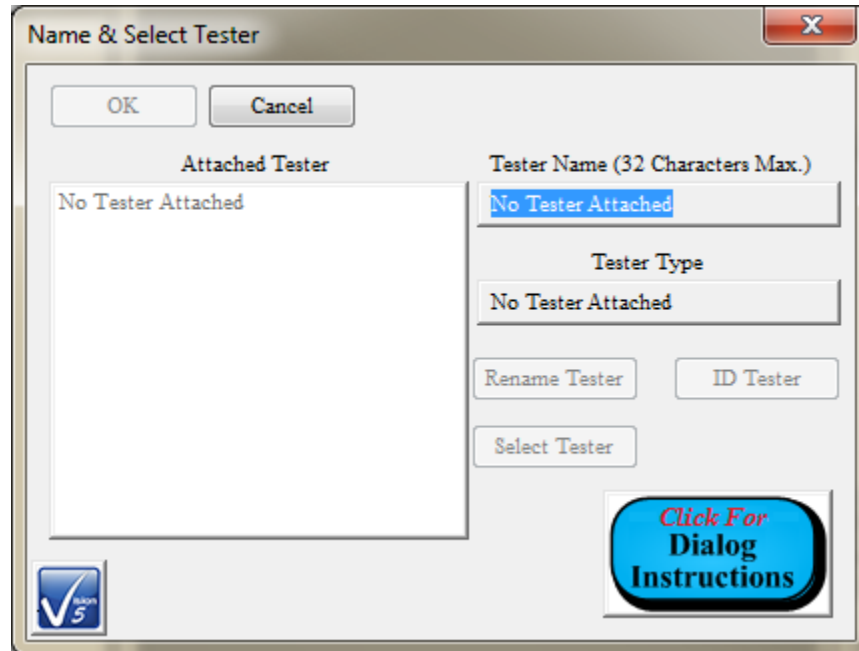


Figure 6 - No Hardware Found.

The tester may be connected and/or powered with Vision running. However, Vision must be told that the tester is present by doing a Hardware Refresh. Go to " Tools-> Hardware Refresh (Alt + W)", or click <Alt-W> to initiate the process. The firmware upload and tester initialization will occur. Vision will then do the sequence of **Figures 3** through **5** . Anytime there is a change to the configuration of the hardware attached to the Vision host computer, the hardware must be re-freshed in this way. Such changes include:

1. Adding or removing a tester.
2. Adding or removing a High-Voltage Interface (HVI).
3. Adding or removing a CS 2.5 current source.
4. Adding or removing any equipment connected to a tester through an I2C connection.

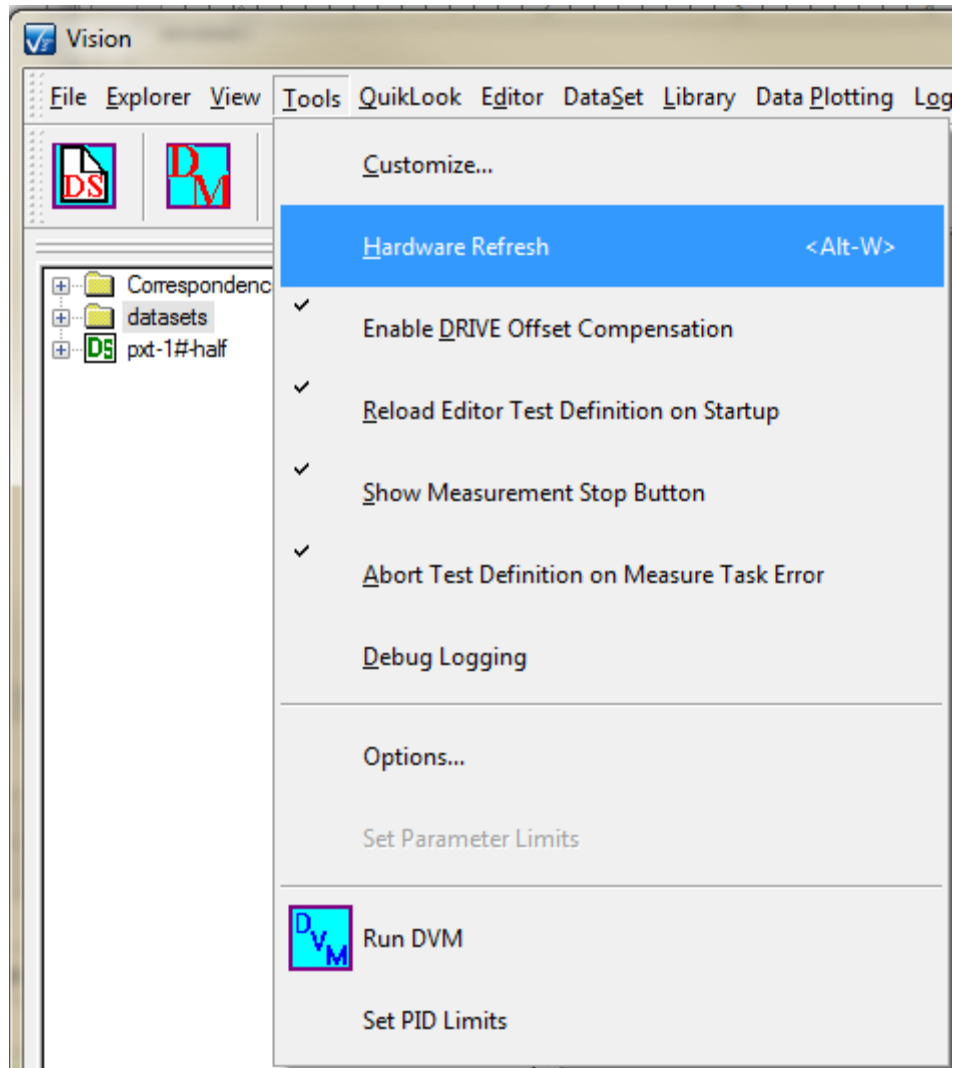


Figure 7 - Tools-> Hardware Refresh.

Most Precision testers are shipped with internal reference test elements that can be switched into the measurement signal path and serve as reference devices with known responses. References, by tester type, include:

1. Precision pMEMS, Premier II, Precision Multiferroic, Precision LC II, RT66C:

- 1.0 nF commercial linear capacitor.
- 2.5 M-Ω commercial linear resistor.
- RTI-manufactured type AB reference ferroelectric capacitors. Two capacitors are provided - Cap. A and Cap. B. These can be independently selected or switched in, together, in parallel.

2. Precision LC

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- 1.0 nF commercial linear capacitor.
 - 2.5 M- Ω commercial linear resistor.
3. Precision RT66B/Precision RT66I
- No internal reference elements are available in these instruments.

Ensure that nothing is connected to the tester DRIVE or RETURN ports, front or rear. The only cables connected to the tester should be the USB cable and the A/C power cable. However, for RT66B owners, an external linear capacitor of known value should be connected between DRIVE and RETURN since no internal reference elements are available. Note that, for testers with internal reference elements, any sample connected between DRIVE and RETURN will be measured in parallel with any selected internal elements. If multiple internal elements are selected, these will also be measured in parallel with each other. Each parallel element will provide an additive signal to the measurement.

For initial tester validation, perform a 5.0-Volt/10.0 ms Hysteresis measurement, from the QuikLook menu, on the 1.0 nF commercial linear capacitor. Go to QuikLook->Hysteresis Tasks->Hysteresis.

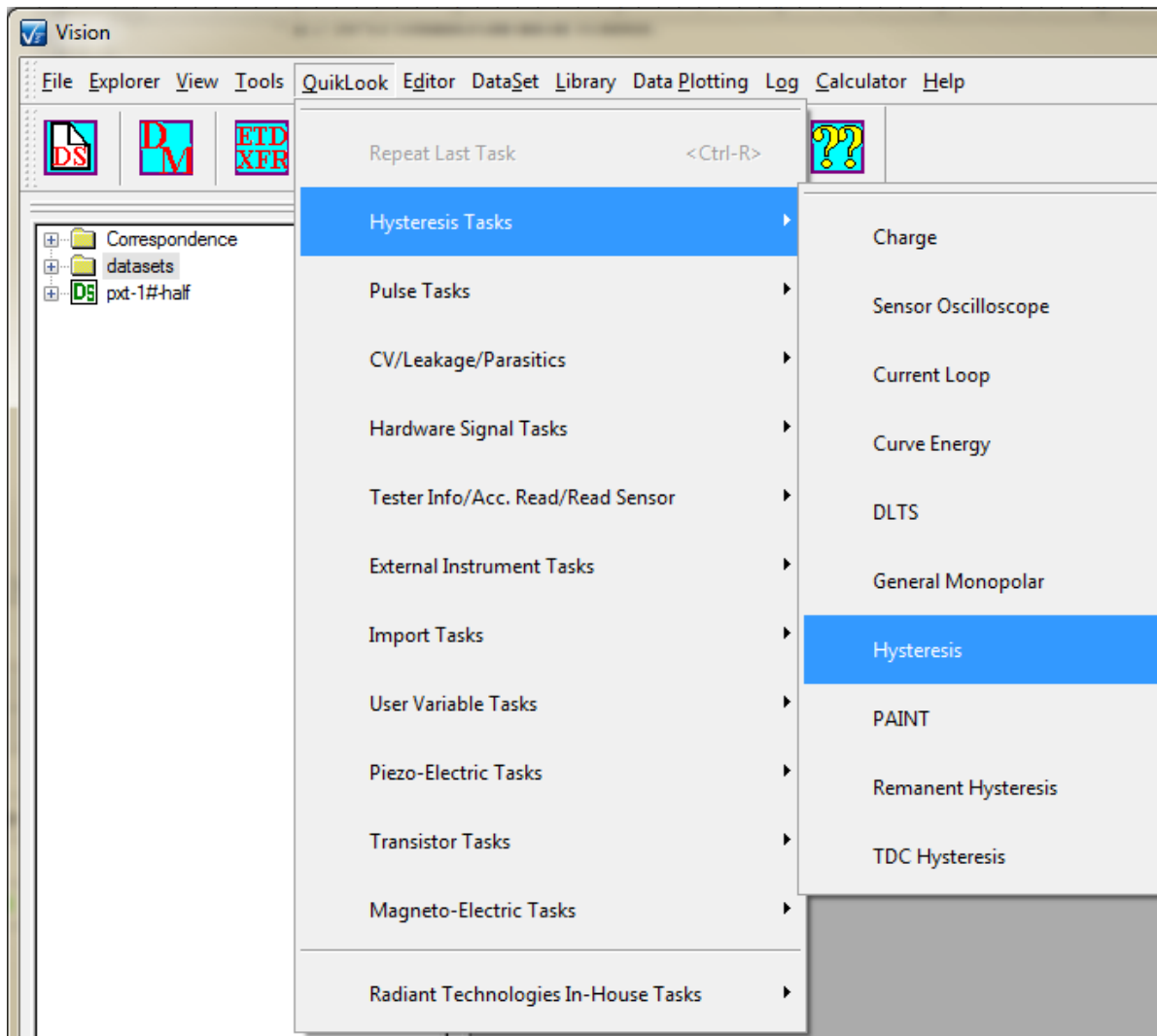


Figure 8 - Access the Hysteresis Task in the QuikLook Menu.

The Hysteresis Task QuikLook Configuration Dialog will open. Configure the Task as follows:

<i>Task Name:</i>	"5.0-Volt/10.0 ms Validation"
<i>Max Voltage:</i>	5.0
<i>Hysteresis Period (ms):</i>	10.0
<i>Enable Ref. Cap.:</i>	Checked

Leave all other values at default.

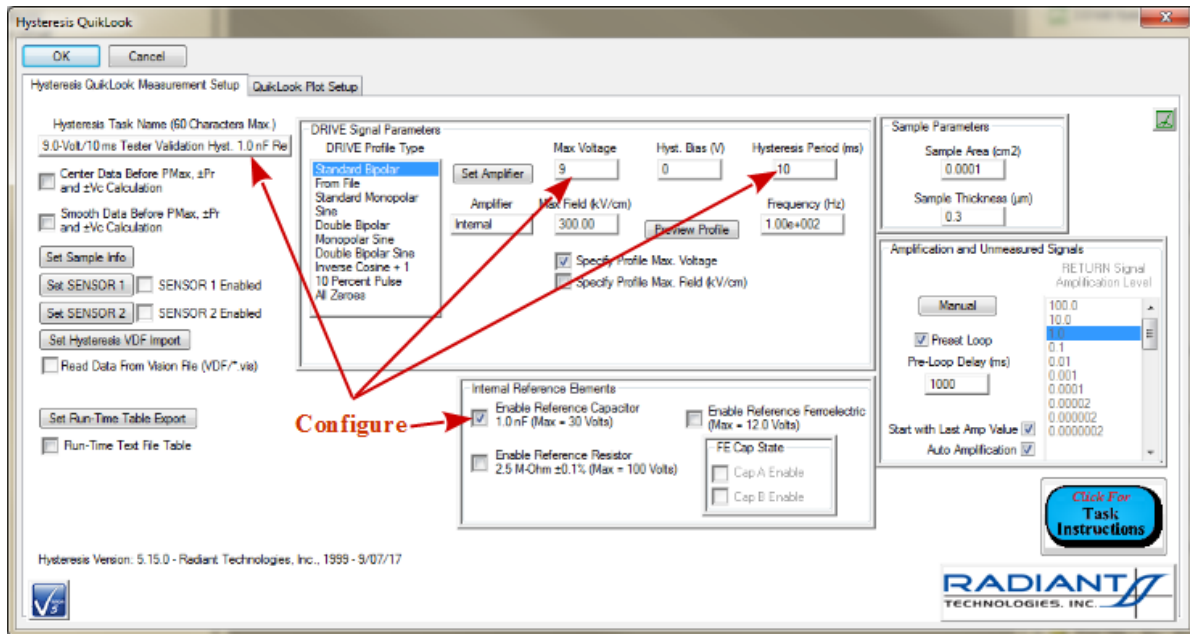


Figure 9 - Main Hysteresis Configuration.

If desired, click the "QuikLook Plot Setup" tab to configure data plot titles.

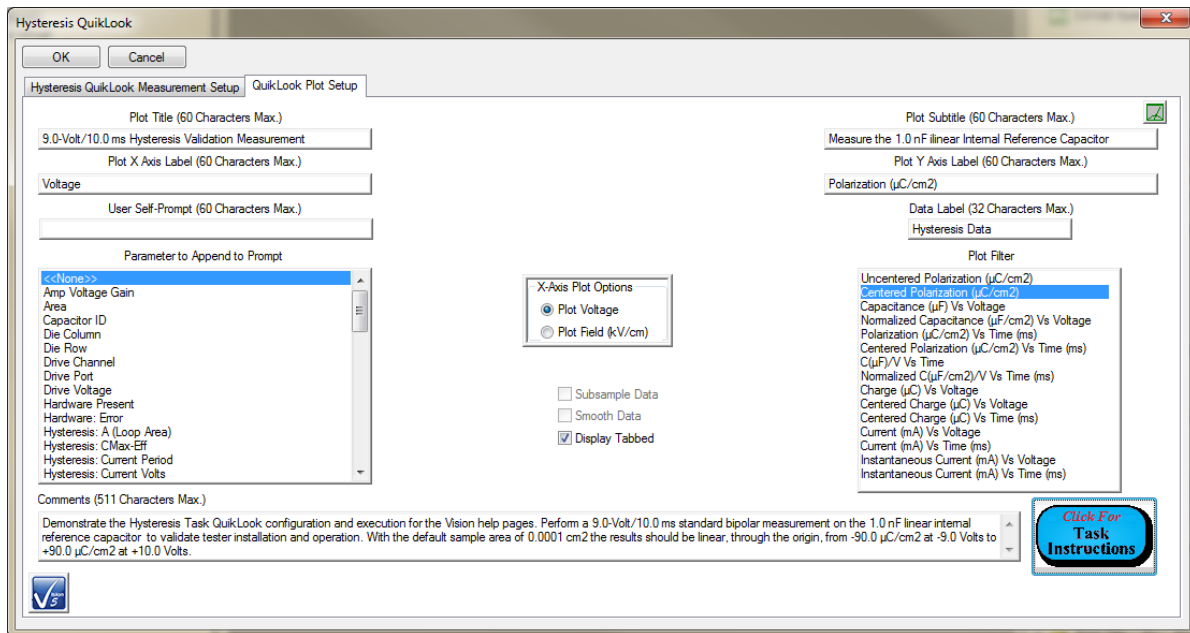


Figure 10 - Hysteresis Task Plot Configuration.

Click *OK* to make the measurement. During the Measurement, the *Stop Hysteresis Measurement?* button will appear to allow the measurement to be manually halted..

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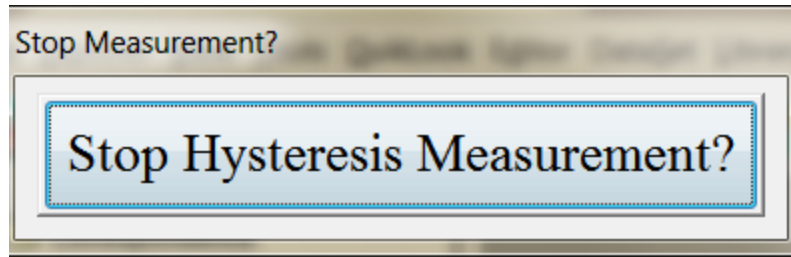


Figure 11 - *Stop Hysteresis Measurement?* Button.

When the measurement is complete, the measured data will be plotted as Polarization ($\mu\text{C}/\text{cm}^2$) vs Voltage. The data should extend linearly from $-50 \mu\text{C}/\text{cm}^2$ at -5.0 Volts, through the origin, to $+50 \mu\text{C}/\text{cm}^2$ at $+5.0$ Volts. The display is in a single, "full", dialog.

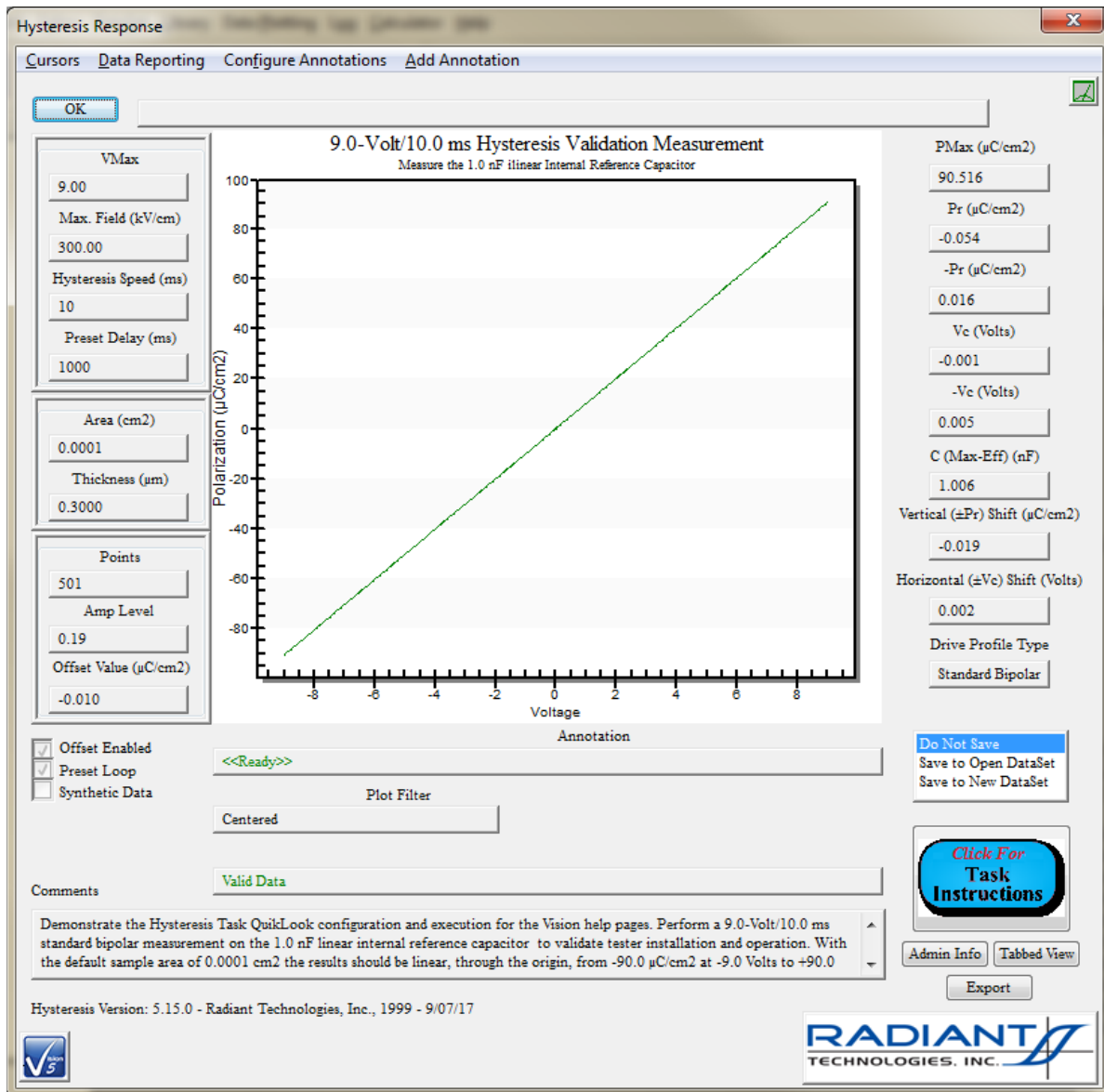


Figure 12 - Hysteresis Results - Full Display.

For users of laptops or other, smaller, displays, the data can be presented in a tabbed dialog with the plotted data in the first tab and the textual presentation in the second. This can be selected at configure time by checking *Display Tabbed* in the plot configuration dialog of **Figure 10**. It can also be switched two directly by clicking *Tabbed View* on the Data Presentation dialog of **Figure 12**. Once Tabbed View is selected it is persistent for all future data displays for all Tasks, even between executions of Vision. The tabbed display can only be disabled by unchecking *Display Tabbed* in a future configuration dialog of any Task that displays data in this way.

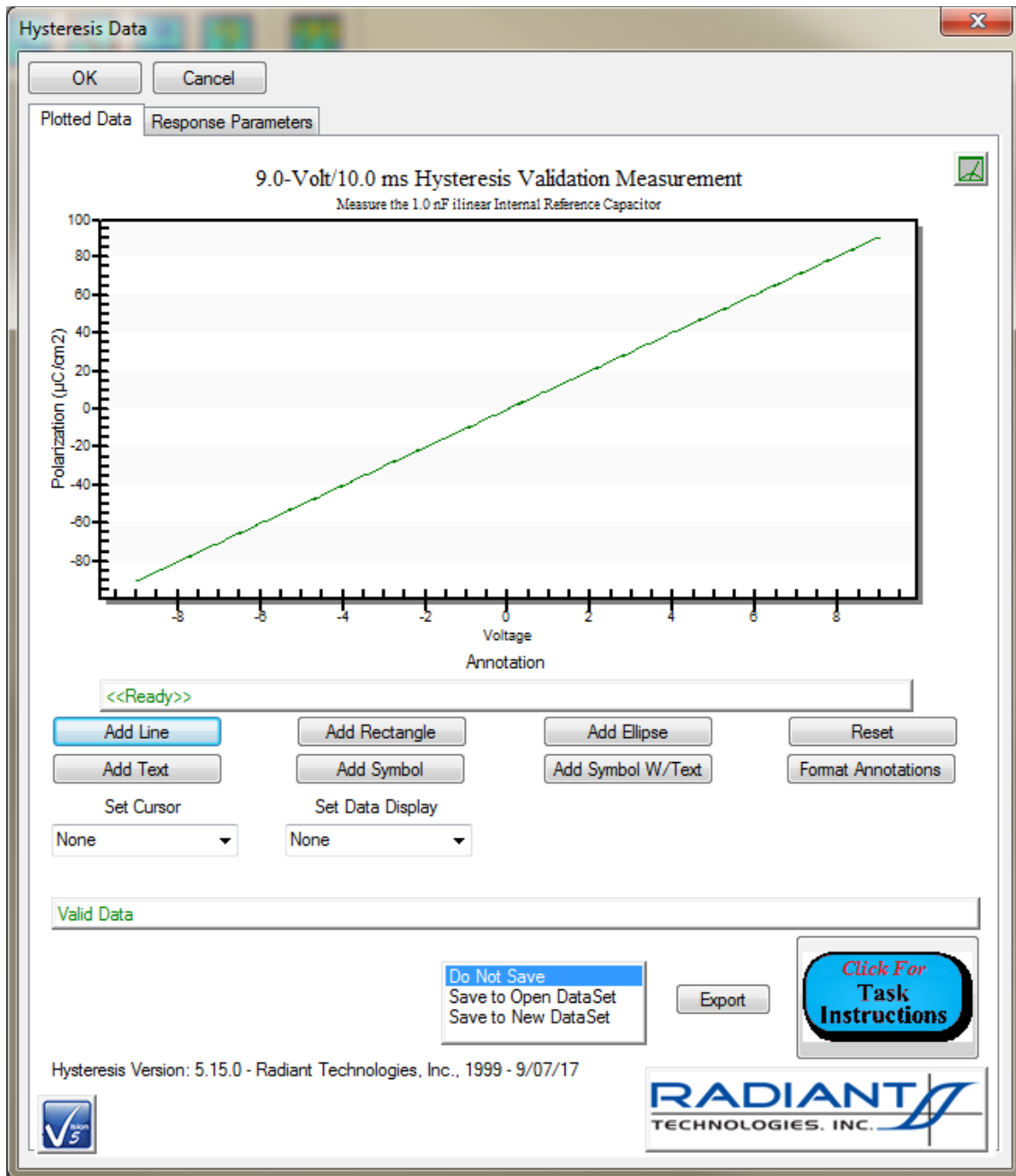


Figure 13 - Hysteresis Results - Tabbed Display - Plot.

The screenshot shows the 'Hysteresis Data' dialog box with the following parameters and settings:

- VMax:** 9.00
- Max. Field (kV/cm):** 300.00
- Hysteresis Speed (ms):** 10
- Preset Delay (ms):** 1000
- Drive Profile Type:** Standard Bipolar
- Points:** 501
- Area (cm²):** 0.0001
- Thickness (μm):** 0.3000
- A (Loop Area - μC/cm²-Volts):** 0.04
- Amp Level:** 0.19
- Offset Value (μC/cm²):** -0.010
- PMax (μC/cm²):** 90.516
- Pr (μC/cm²):** -0.054
- Pr (μC/cm²):** 0.016
- Vc (Volts):** -0.001
- Vc (Volts):** 0.005
- C (Max-Eff) (nF):** 1.006
- Vertical (±Pr) Shift (μC/cm²):** -0.019
- Horizontal (±Vc) Shift (Volts):** 0.002
- Plot Filter:** Centered
- Offset Enabled:**
- Preset Loop:**
- Synthetic Data:**
- Comments:** Demonstrate the Hysteresis Task QuikLook configuration and execution for the Vision help pages. Perform a 9.0-Volt/10.0 ms standard bipolar measurement on the 1.0 nF linear internal reference capacitor to validate tester installation and operation. With the default sample area of 0.0001 cm² the results should be linear, through the origin, from -90.0 μC/cm² at -9.0 Volts to +90.0 μC/cm² at +10.0 Volts.
- Buttons:** Admin Info, Click For Task Instructions

Figure 14 - Hysteresis Results - Tabbed Display - Text.

For users with a 100.0-Volt, 200.0-Volt or 500.0-Volt internal amplifier, the measurement on the internal reference capacitor can be made up to 30.0 Volts. Press <Ctrl-R> to recall the last QuikLook Task to be configured and executed. Adjust the controls as follows:

<i>Task Name:</i>	"30.0-Volt/10.0 ms Validation"
<i>Max Voltage:</i>	30.0. Note that 30.0 Volts is the maximum allowable voltage with <i>Enable Ref. Cap</i> . checked. For higher-voltage alternatives, <i>Enable Ref. Resistor</i> can be selected up to 100.0 Volts. For Voltages above 100.0 Volts, the internal reference elements must be disabled and measurements must be

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made on externally-connected devices.

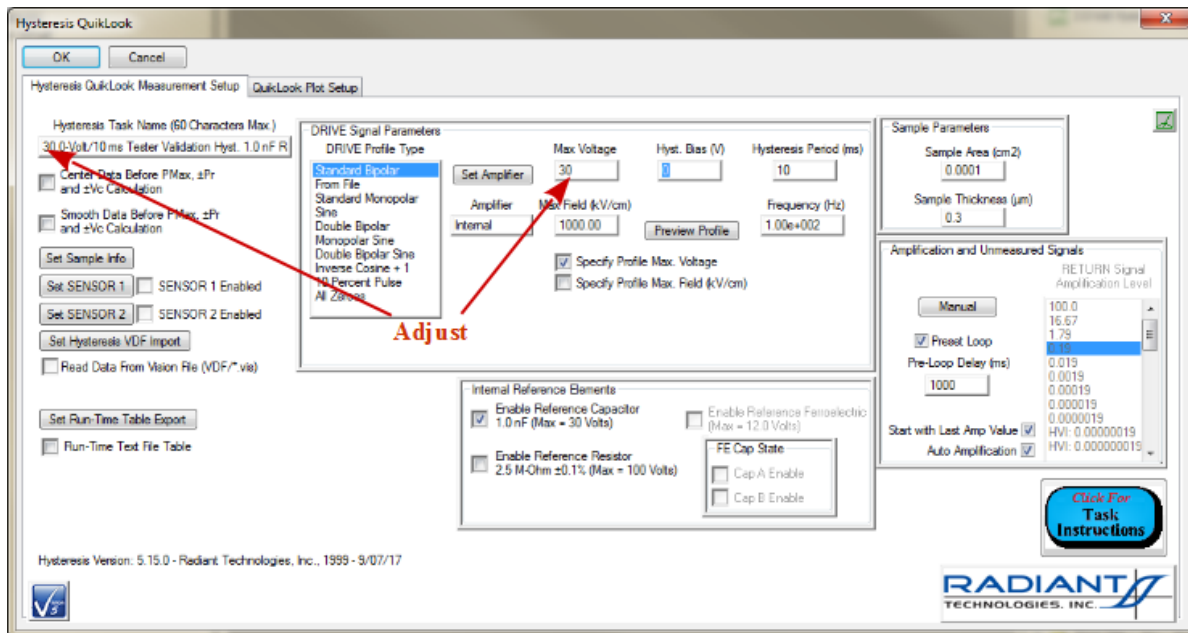


Figure 15 - Configure a 30.0-Volt Measurement.

Adjust the plot configuration as appropriate. Note that *Display Tabbed* has been actively unchecked in **Figure 16**. The action of producing **Figures 13** and **14** had left it checked for this configuration.

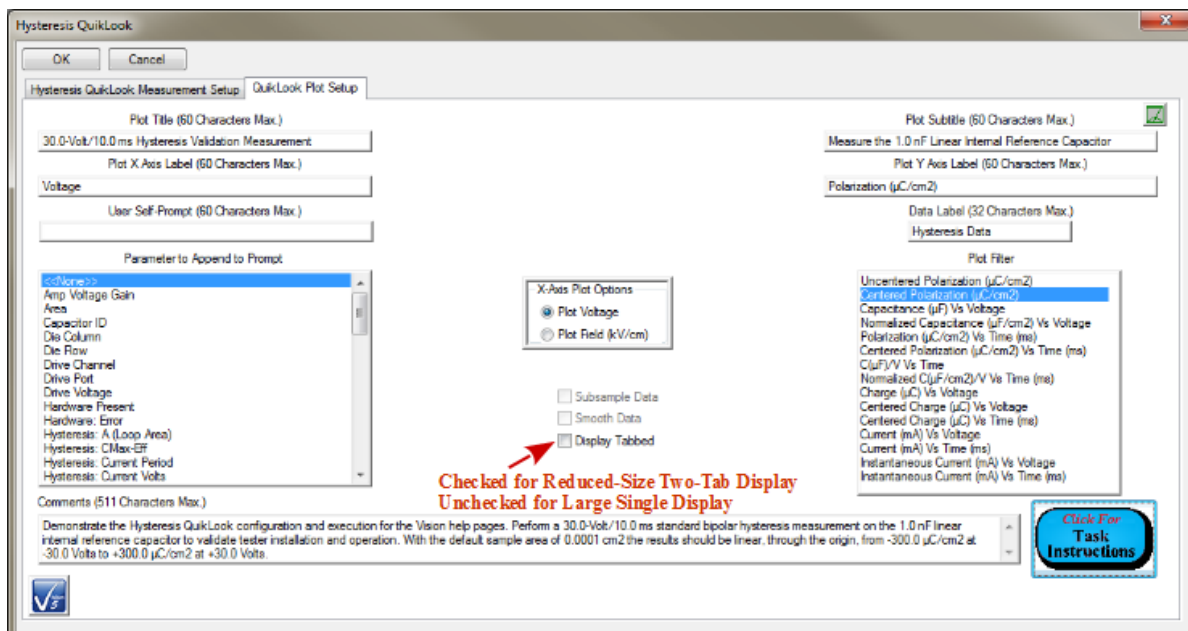


Figure 17 - Adjust the Plot Configuration.

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Click *OK* to make the measurement. Data between from $-300 \mu\text{C}/\text{cm}^2$ at -30.0 Volts through $+300 \mu\text{C}/\text{cm}^2$ at $+30.0$ Volts are expected. The internal amplifier is enabled, increasing the noise slightly.

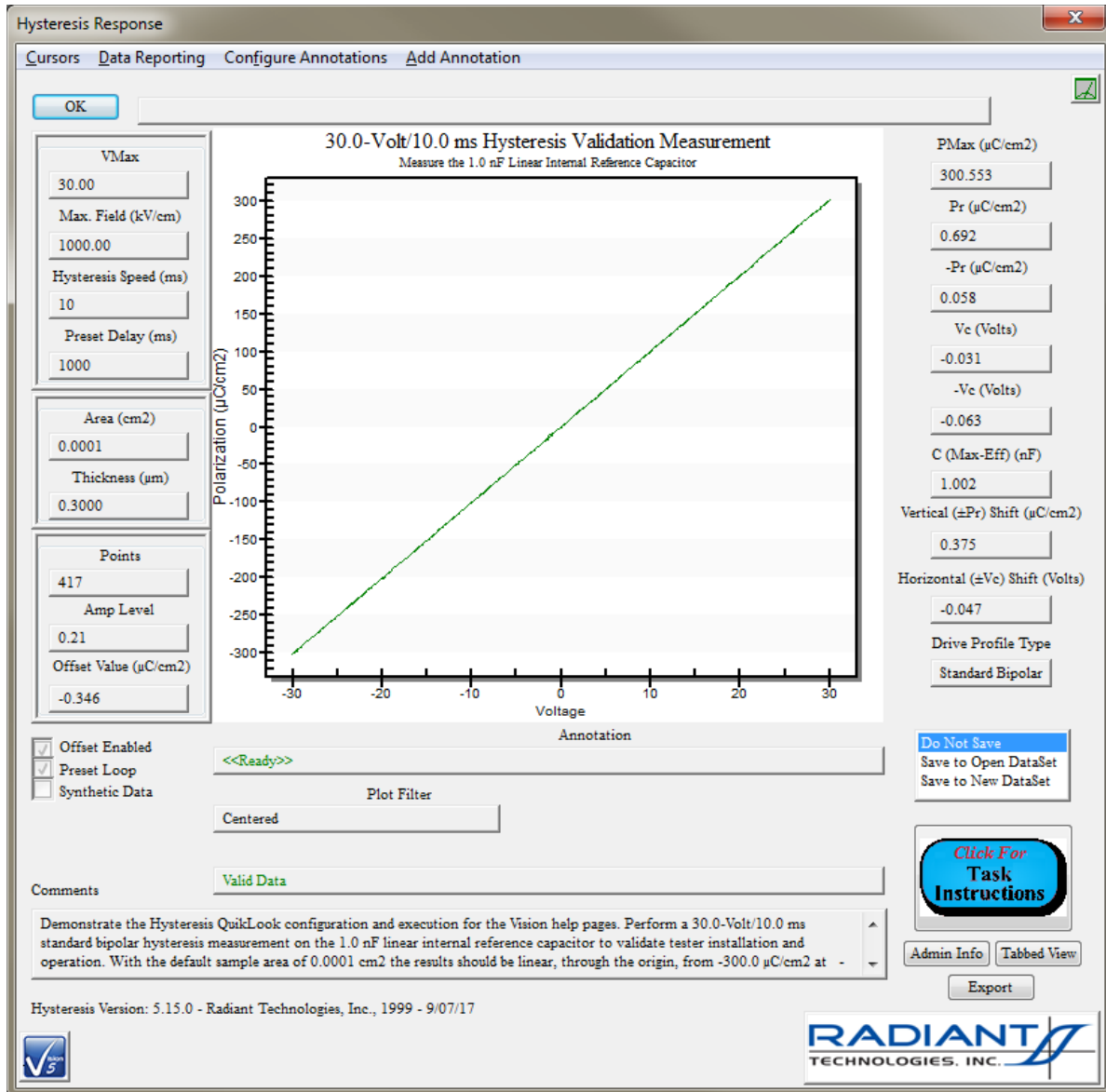


Figure 17 - 30.0-Volt Hysteresis Data.