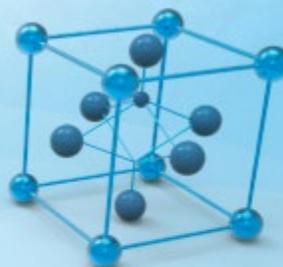


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✓ Vision 5

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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.

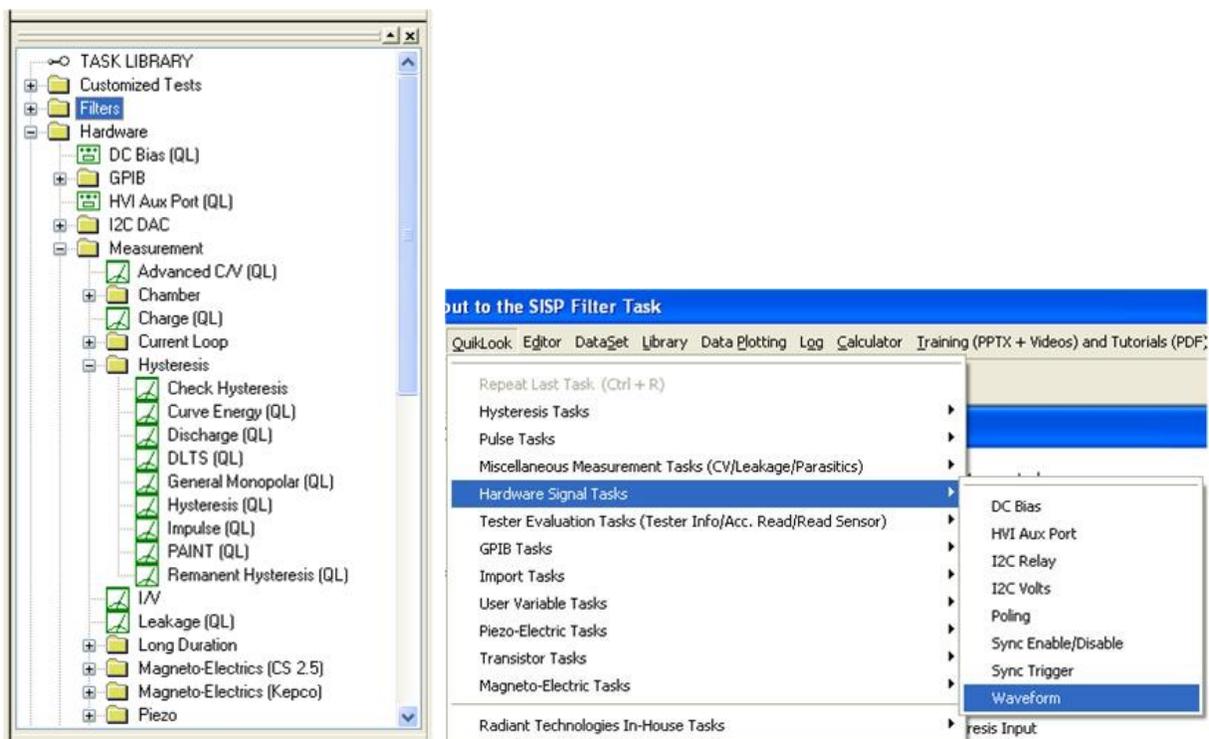


Figure 1 - Tasks in the Task Library and Figure 2 - Task in the QuikLook Menu.

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.

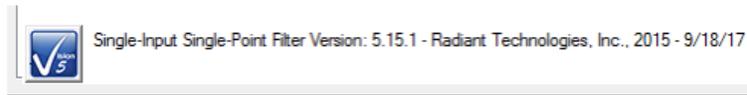
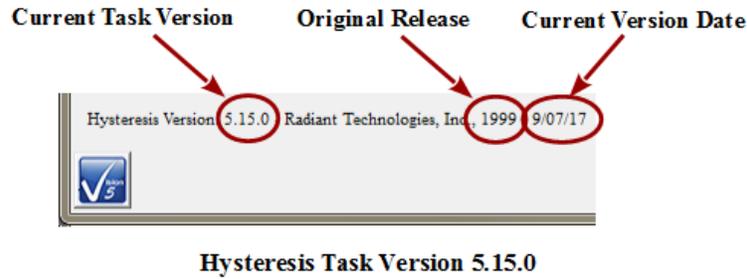


Figure 4 - Task Versions.

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.

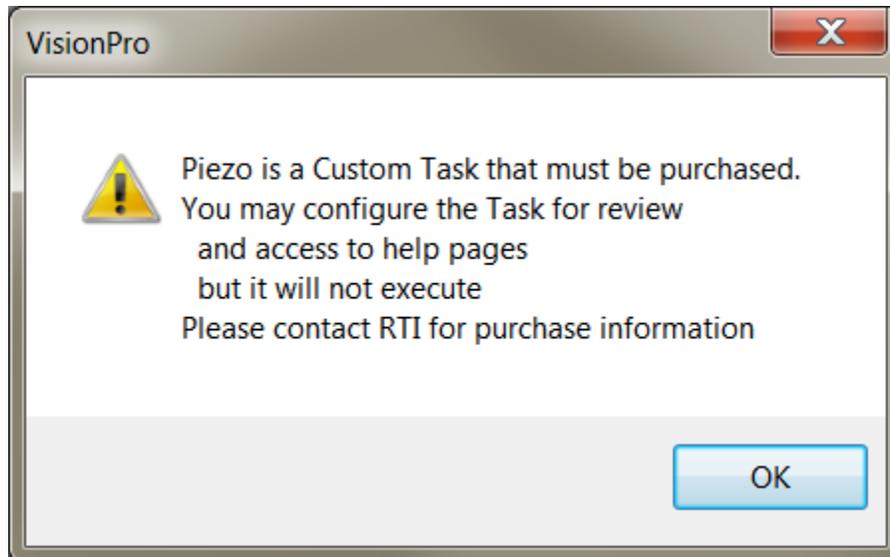


Figure 5 - Notice Appears when Unlicensed Piezo is Accessed. The Configuration Dialog will Open when the Notice is Closed.

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.

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.ferrodevices.com	Process and Clean Room
www.ferroelectric testers.com	Precision Testers

Step-By-Step

QuikLook

QuikLook Execute

Step-By-Step: QuikLook Task Configuration and Execution

Step 1: Under the QuikLook menu, select the desired Task. (The Hysteresis Task is selected here for the demonstration.)

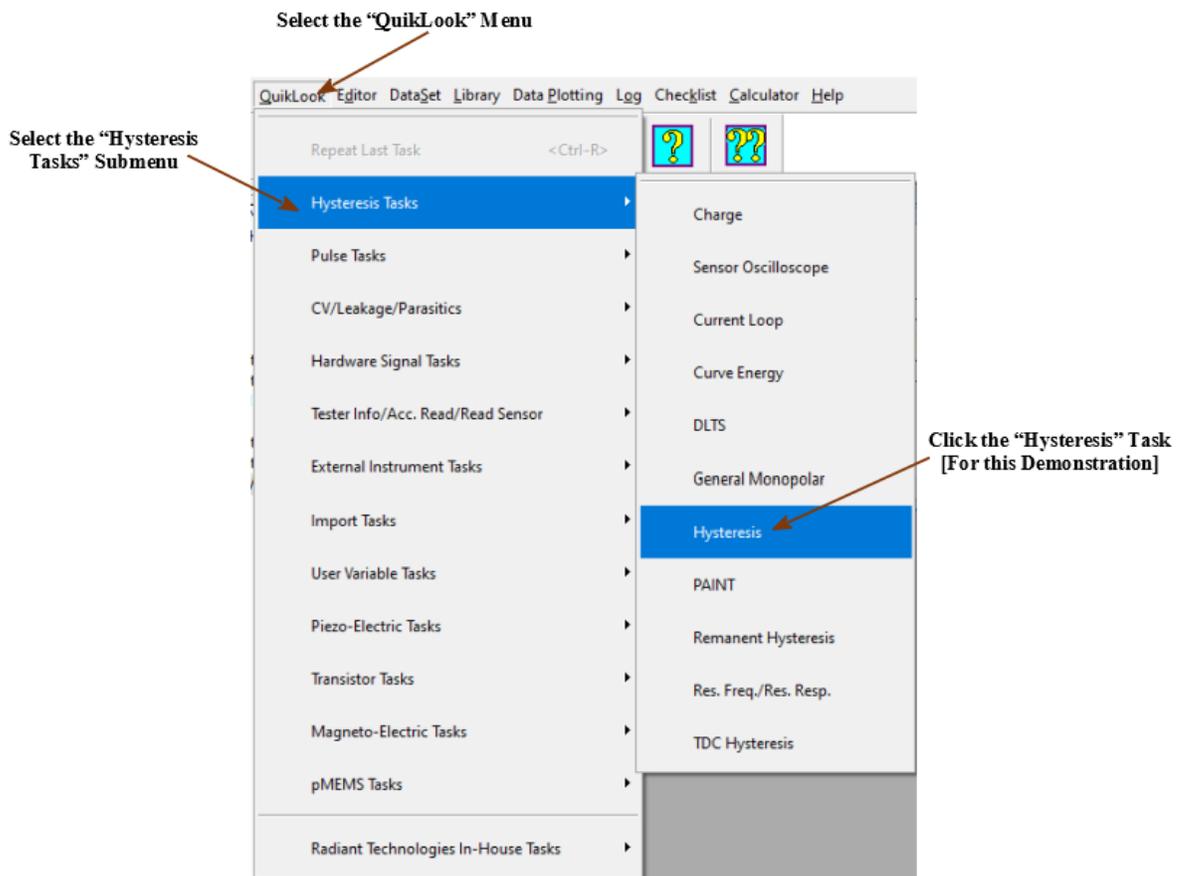


Figure 1 - Select the Hysteresis Task from the QuikLook Menu.

Alternatively, locate the Task in the TASK LIBRARY and double-click the Task icon or right click the Task icon and select "QuikLook Execute". Note that Tasks that appear in the QuikLook menu are designated in the Task Library with "(QL)" appended to the Task name.

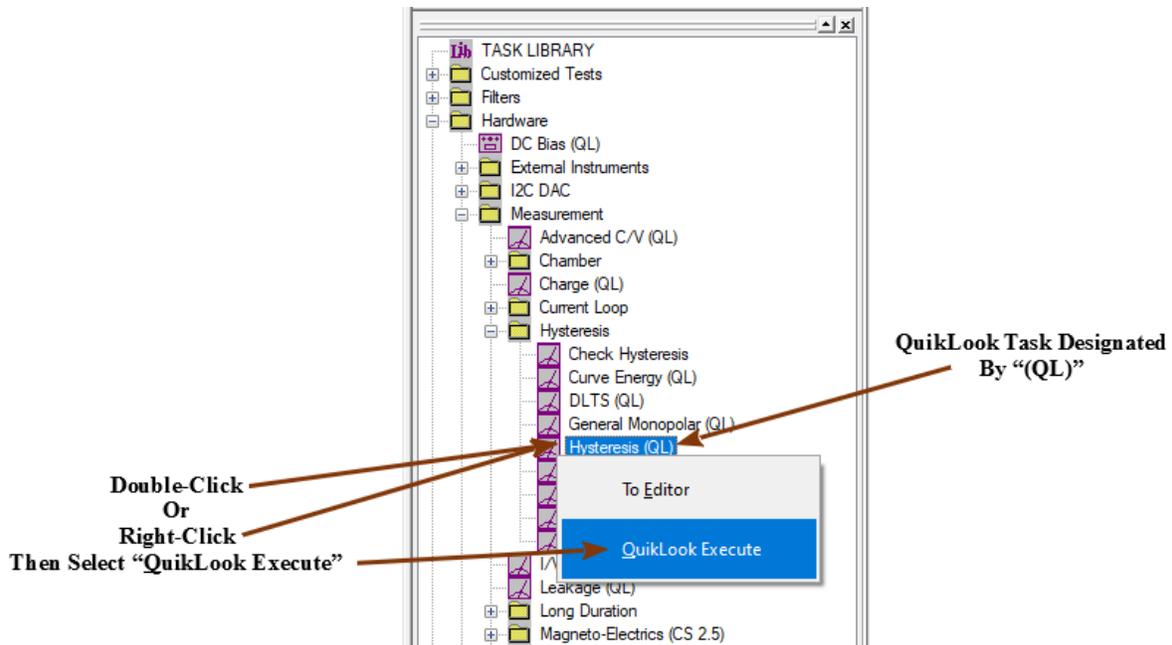


Figure 2 - Access the Hysteresis QuikLook Configuration from the Task Library.

Step 2: Configure the Task as necessary. (Note that, for this demonstration, a 100 μm X 100 μm 4/20/80 PNZT sample is measured at 8.0 Volts. Your measurement may be made on your own sample or on an internal reference element as described in the next [Step-by-Step](#) section.)

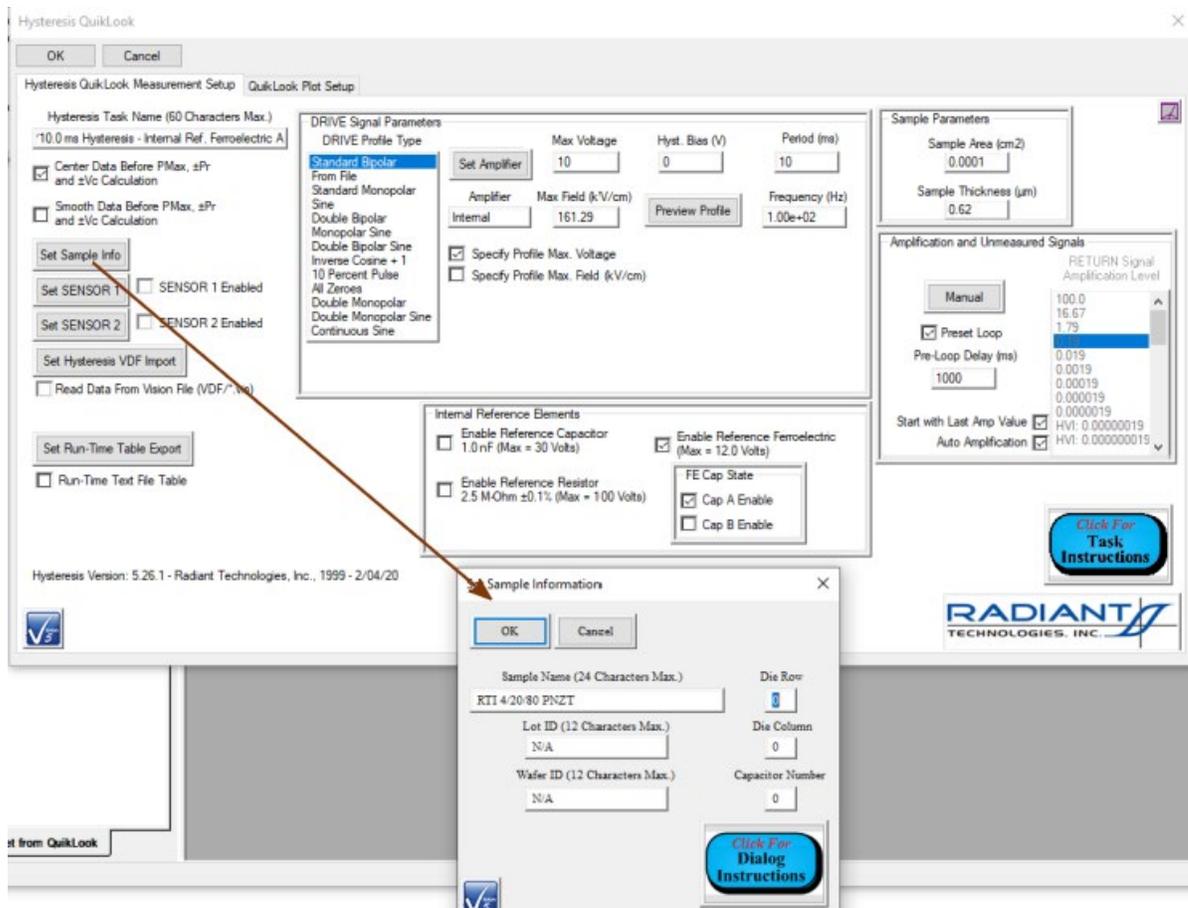


Figure 3 - Configure the Hysteresis Task.

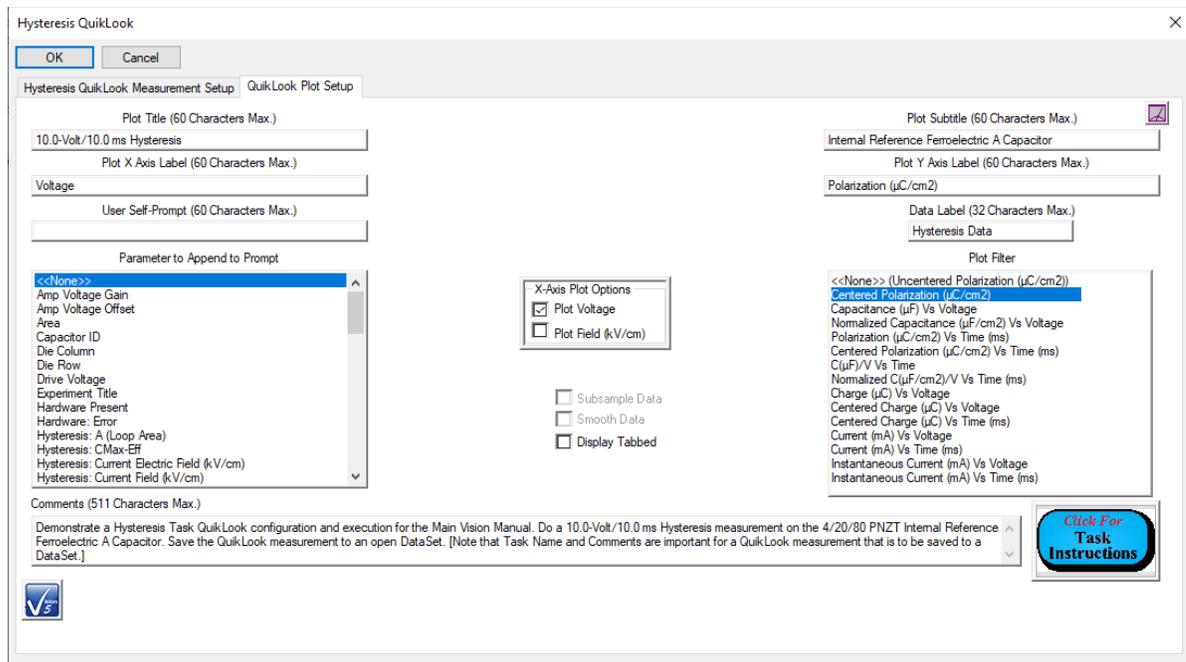


Figure 4 - Configure the Hysteresis Data Plot.

Step 3: Press *OK* to execute the Task. (*Cancel* stops the QuikLook execution.)

Step 4: Review the acquired data.

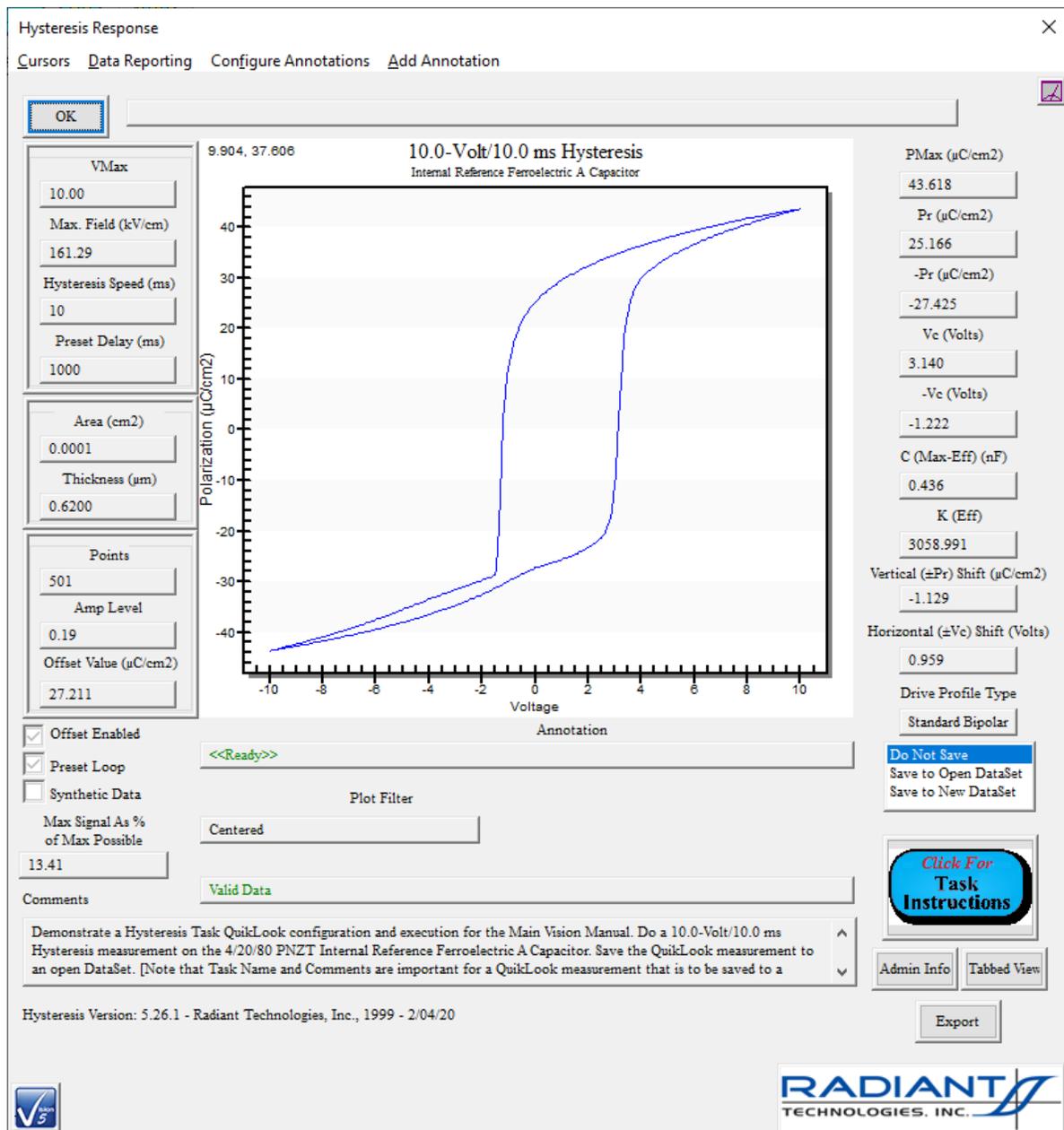


Figure 5 - Hysteresis QuikLook Results.

Step 5: If you would like to store the data into Vision, a [DataSet](#) must be created. To do this, select "Save to Open DataSet" or "Save to New DataSet" before closing the dialog. When the results dialog is closed, the process to create a DataSet will be initiated, with these data as the first entry in the Archive. Data can also be appended to an existing DataSet. If the DataSet check box is not checked, no DataSet will be created, and all data will be lost. See the following Step-by-Step topic for detailed instructions.

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Step 6: Data can be exported to targets outside Vision from the dialog in **Figure 5**. Click the *Export* button to begin. See the Step-by-Step topics under "Exporting" for detailed instructions.



QuikLook Data to DataSet

Step-by-Step: Creation of a DataSet from a QuikLook Measurement

The QuikLook menu option is intended to provide the user with quick access to a subset of the Measurement Tasks for a "let's see what we've got" look at a sample. It is not intended to serve as an experiment and does not normally save data. However, methods are in place to allow data to be saved when a measurement turns out to be critical. Exporting data allows them to be sent to locations external to Vision such as a printer, a text file or an Excel file. This topic addresses a method of saving data within Vision. Once acquired data can be saved in a new or existing DataSet.

Note that Vision training normally begins with the introduction of QuikLook measurements. This topic moves from that introductory subject to the more advanced subject of DataSets. That topic has not yet been introduced into these Step-by-Step help pages. You may wish to skip this help page until you have exercised the [Step-by-Step pages](#) related to DataSets or have proceeded through the Tutorials.

Step 1: Execute the QuikLook Hysteresis as in the previous Step-by-Step instructions.

Step 2: With the Hysteresis Results dialog visible, select "Save to New DataSet".

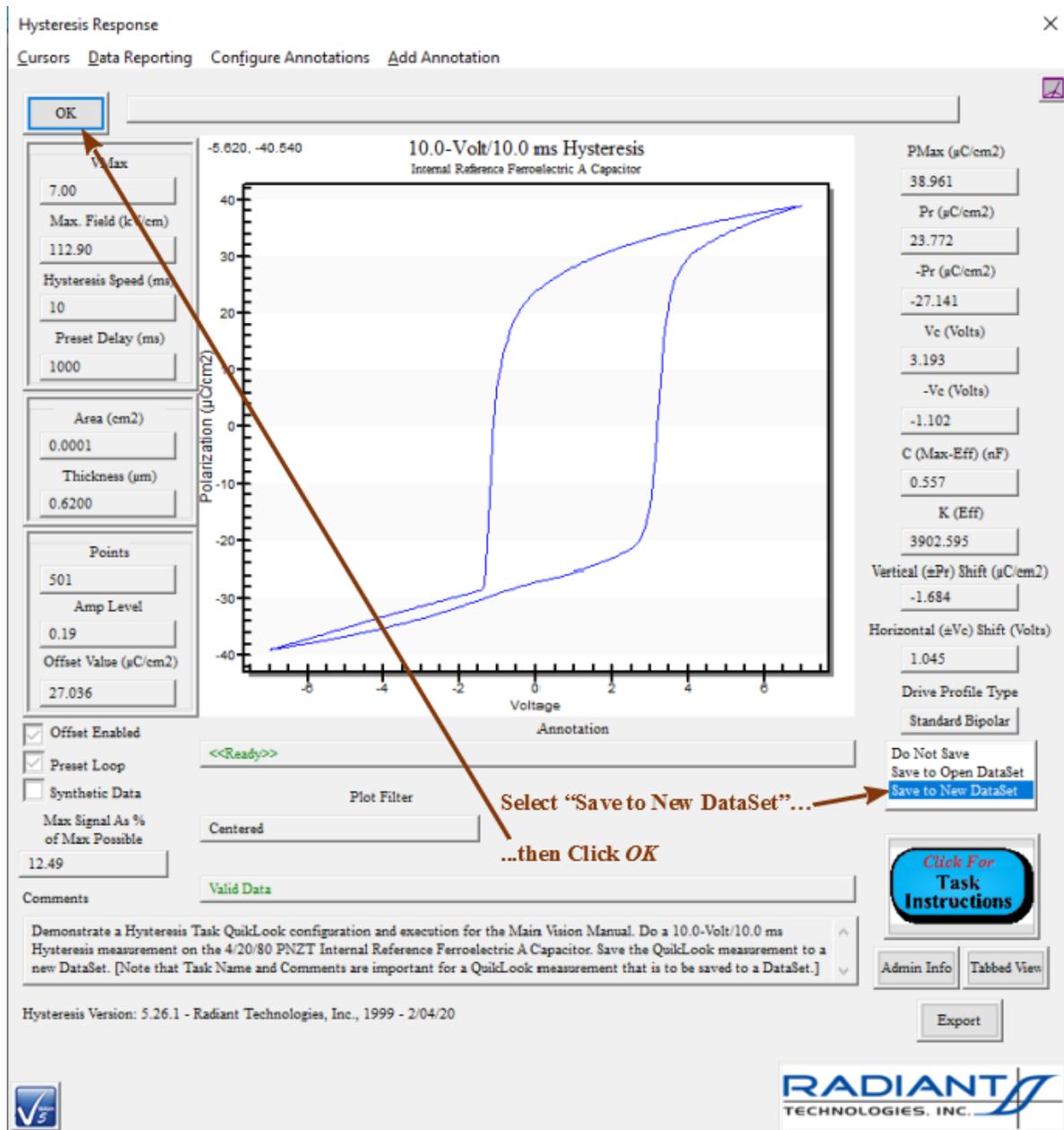


Figure 1 - Initiate the DataSet. Select "Save to New DataSet" Before Closing.

Step 3: Close the Results dialog. The standard DataSet Creation dialog will appear. Configure the DataSet appropriately.

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Figure 2 - Configure the DataSet.

NOTE: The *DataSet Path* control is automatically updated to assign the *DataSet Name* value as the *DataSet File Name*, with a *.dst extension. If the *DataSet Name* control is edited, the *DataSet Path* is automatically fully updated to be "<Default Path>*DataSet Name*". (Here "<Default Path>" is the last-used *DataSet* path. "C:\DataSets" is the default folder.) This automatic updating may be defeated by using the *Browse* button to assign the file path and file name or by editing directly in the *DataSet Path* control. It will be replaced in further updates to the *DataSet Path* control if it is changed using the *Browse* button or by editing directly into the *DataSet Path* control. Folders in the *DataSet Path* control need not exist when the *DataSet* is created. The folders will be created if they are not found. This feature was added at the request of Tohoku University and Michio Ohata-san of Nippon Ferro Technologies.

Step 4: Click *OK*. The *DataSet* will be created and opened. A dialog will appear in which to name the Current Test Definition (CTD) and form the base name for the Executed Test Definition (ETD - **Figure 3**). The Hysteresis Task, configured as it was in the QuikLook execution, will appear as the single Task in the Current Test Definition (CTD). A single Executed Test Definition (ETD) will appear in the Archive. The ETD holds the single Hysteresis Task, configured as in, and containing data measured by, the QuikLook execution. The *DataSet Log* window will open and will contain an indication that the Hysteresis Task was added to the *DataSet*.

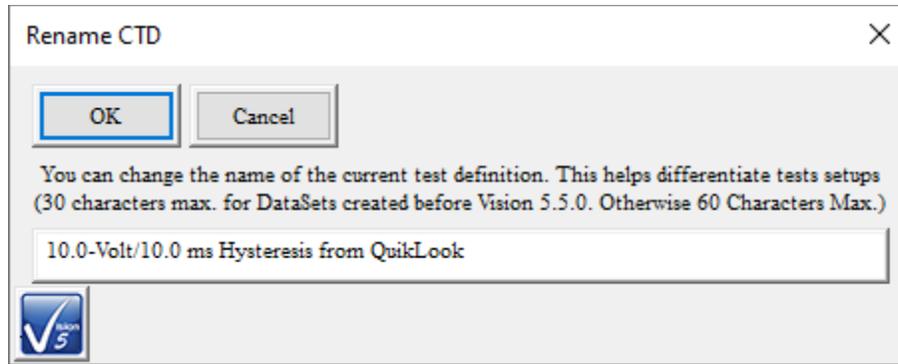


Figure 3 -Name the CTD.

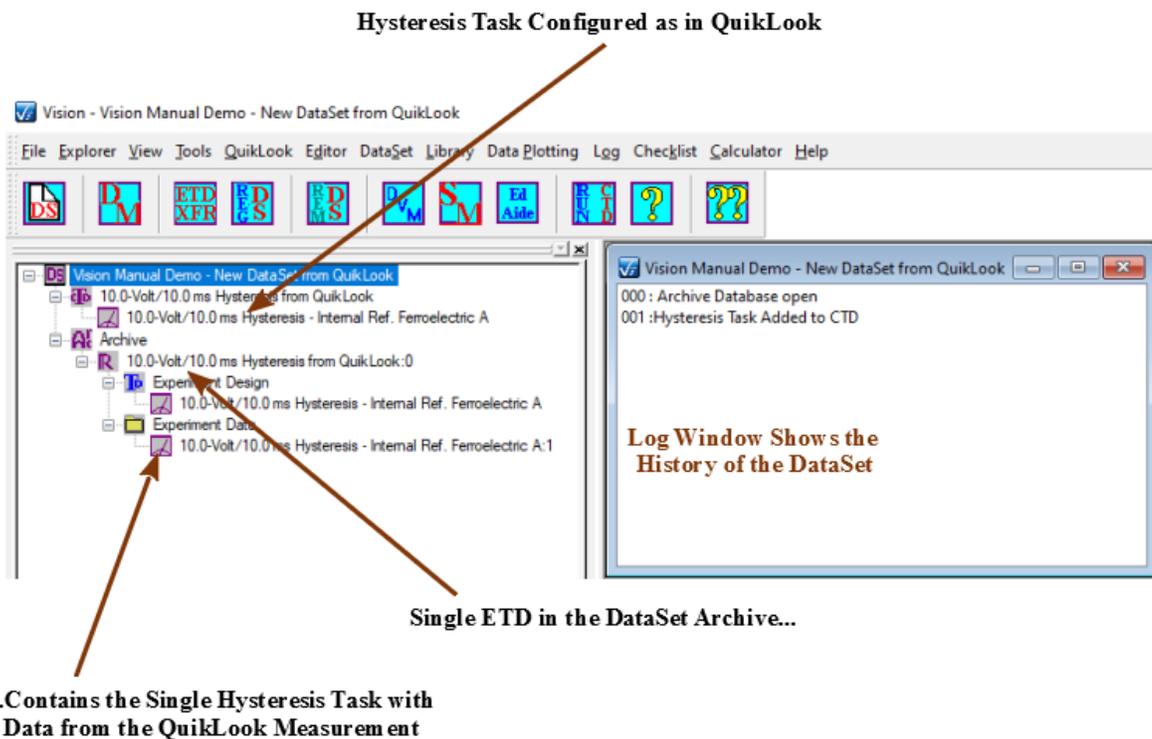
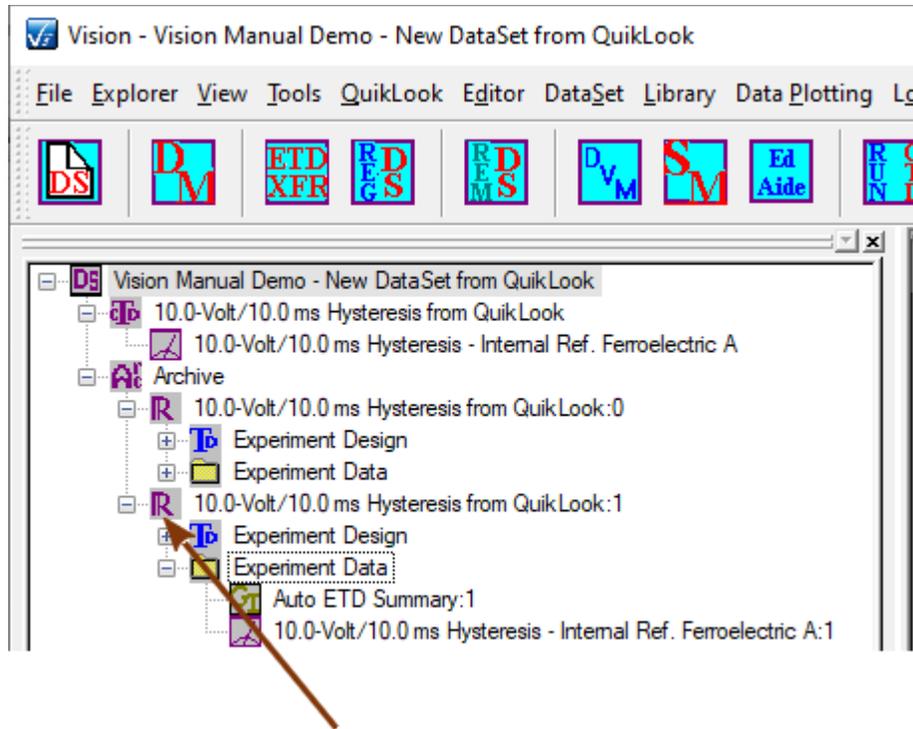


Figure 4 - DataSet Created from the QuikLook Hysteresis Execution.

Step 5: The Hysteresis Task is ready to execute again within the DataSet. Press <F1> to re-execute the Hysteresis.



Second ETD After Re-Execution

Figure 5 - Updated DataSet After CTD Re-execution.

Step 6: Repeat the QuikLook Hysteresis execution. Note that <Ctrl-R> recalls the most recently executed QuikLook Task.

Step 7: From the Data Presentation dialog select "Save to Open DataSet" and then click *OK*.

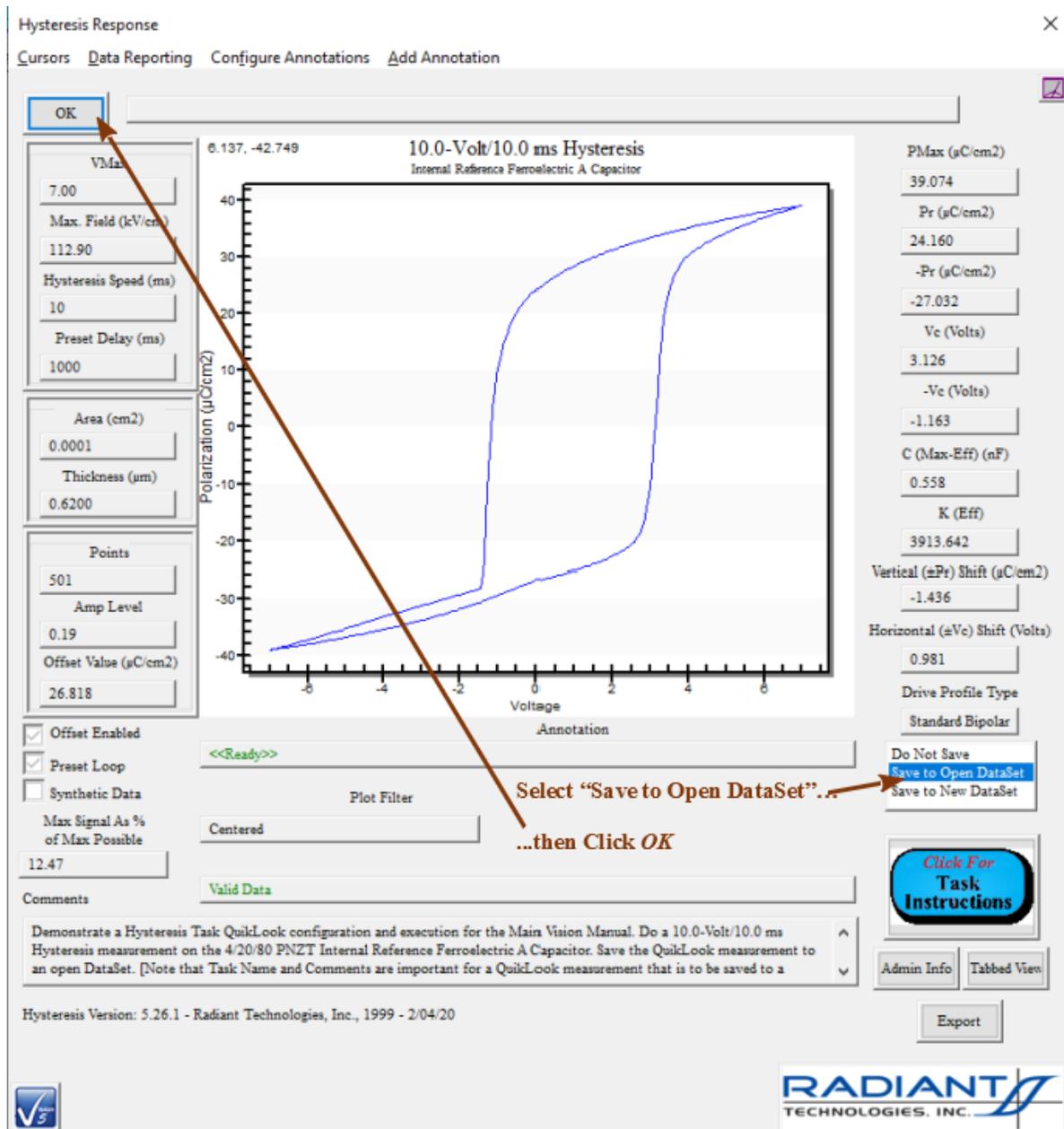


Figure 6 - Choose the Existing DataSet.

Step 8: The Task will again become the CTD of the DataSet. A new ETD will be appended to the DataSet Archive. The CTD and ETD Tasks will be configured as in the QuikLook execution and the data stored in the ETD will be those acquired by the QuikLook measurement. Note that if more than one DataSet is open, the DataSet whose tab is selected in the DataSet Explorer will be the one that is updated. A dialog will appear to rename the CTD. Apply an appropriate name.

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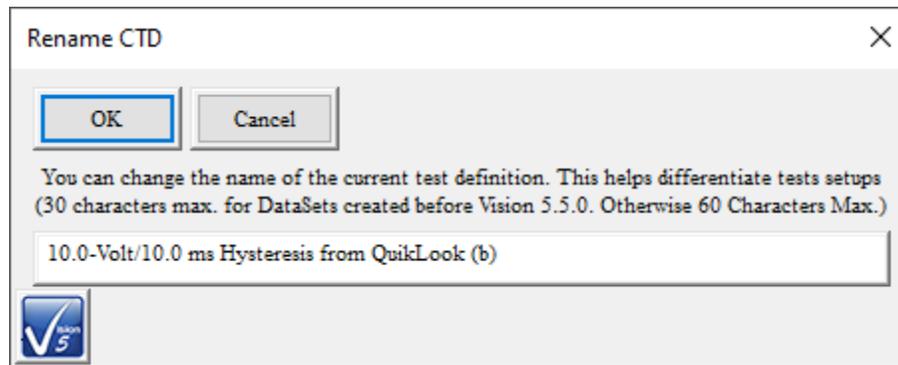


Figure 7 - Rename the CTD.

Step 9: To ascertain that the Hysteresis Task that is stored is configured as in QuikLook and contains the data measured in QuikLook, recall the Task from the DataSet Archive. Open the final ETD, Open the "Experiment Data" folder and double-click on the Hysteresis Task.

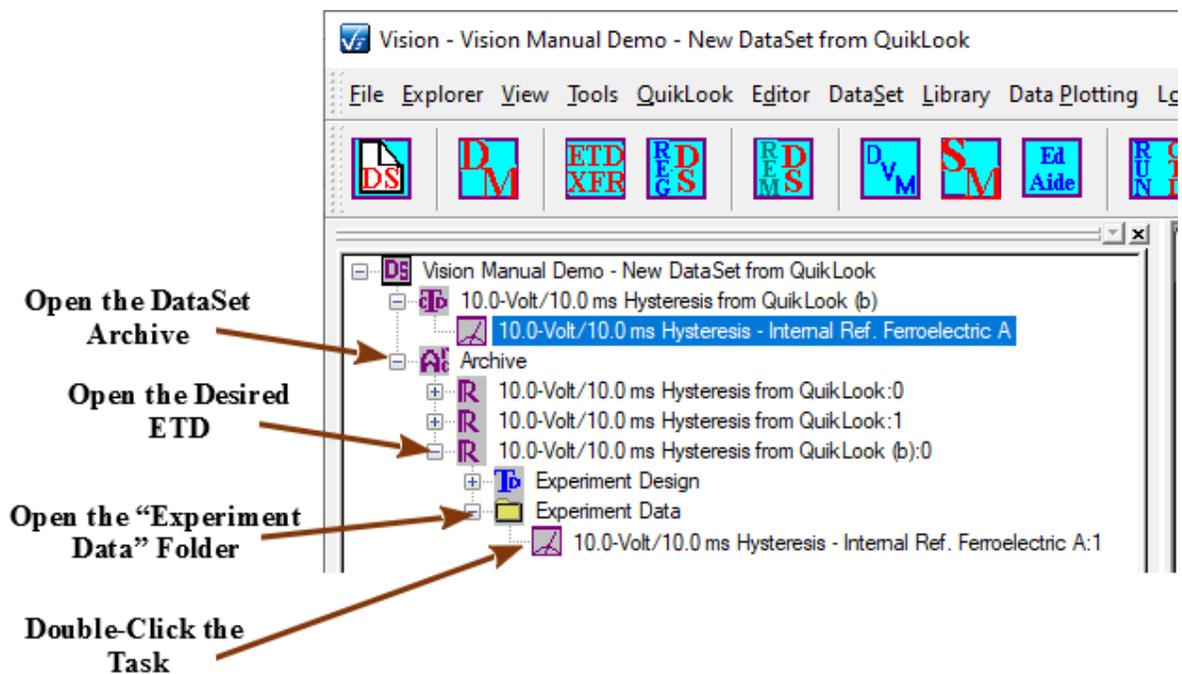


Figure 8 - Recall the Hysteresis Task from the DataSet Archive.

Step 10: The Hysteresis Configuration dialog will appear. Most controls are disabled, since the dialog is presented to review, and not change, the Task configuration. The *Click For Task Instructions* button is active to access the Hysteresis help page. *Set Sample Info, Adjust Params, Set SENSOR 1, Set SENSOR 2, Set Amplifier, Set Hysteresis VDF Im-*

port, *Set Runtime Export* and *Profile Preview* are controls that open sub-dialogs and are active. Controls in the subdialog will not be active.

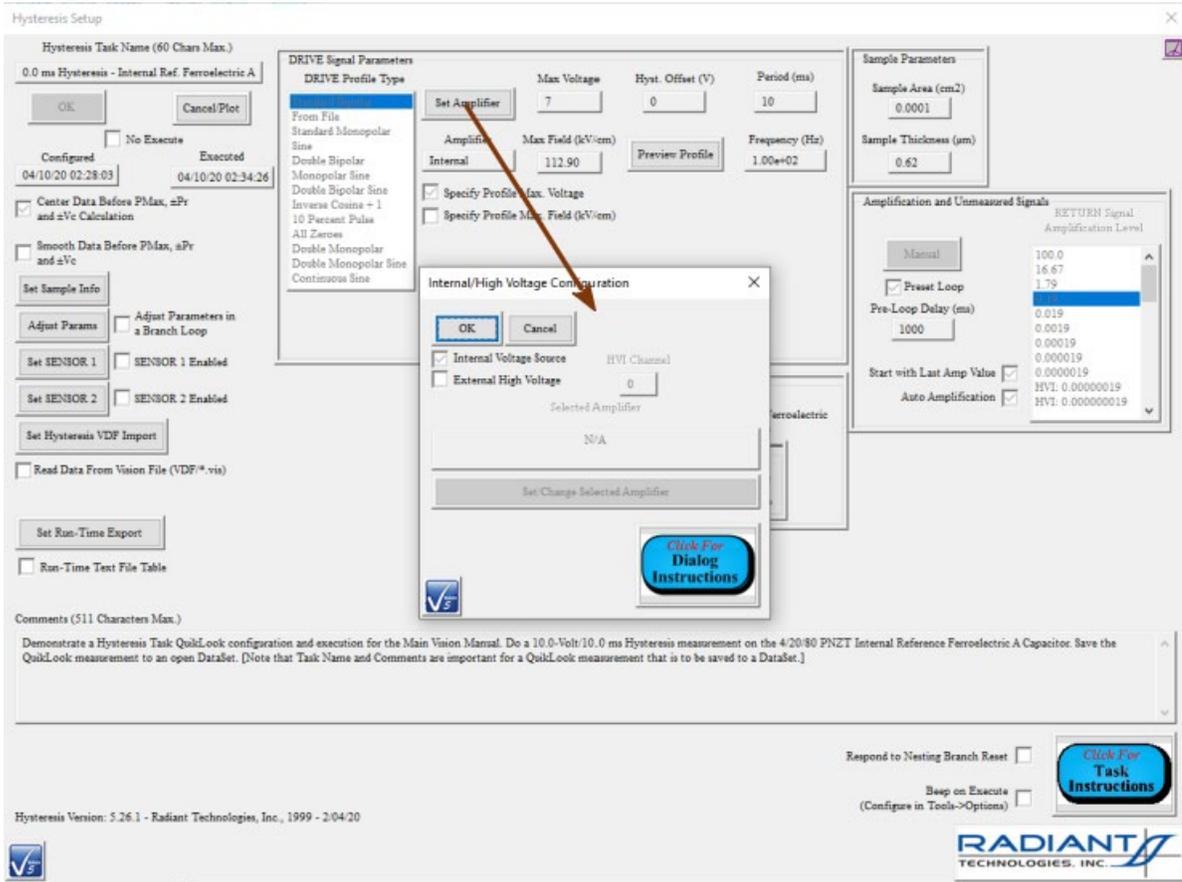


Figure 9 - The Hysteresis Configuration Dialog. Disabled for Configuration Review Only.

Step 11: The *Cancel/Plot* control is also active. Click it. The configuration dialog will close and a plot configuration dialog will appear so that the *display* of the recalled data can be configured. Configure this dialog appropriately.

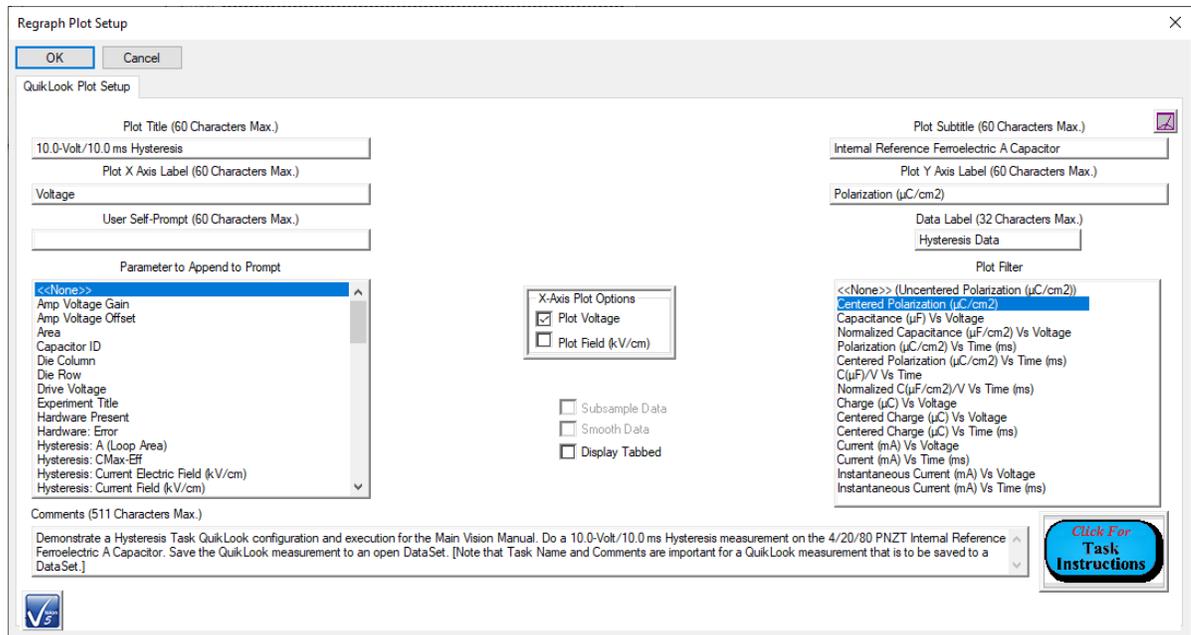


Figure 10 - Data Plot Configuration Dialog.

Step 12: Click either *OK* or *Cancel* and the dialog will be replaced by the QuikLook Results dialog showing both configuration parameters and the measured data. Note that the only difference between this dialog and the QuikLook execution is that the "Save to DataSet" list box is hidden.

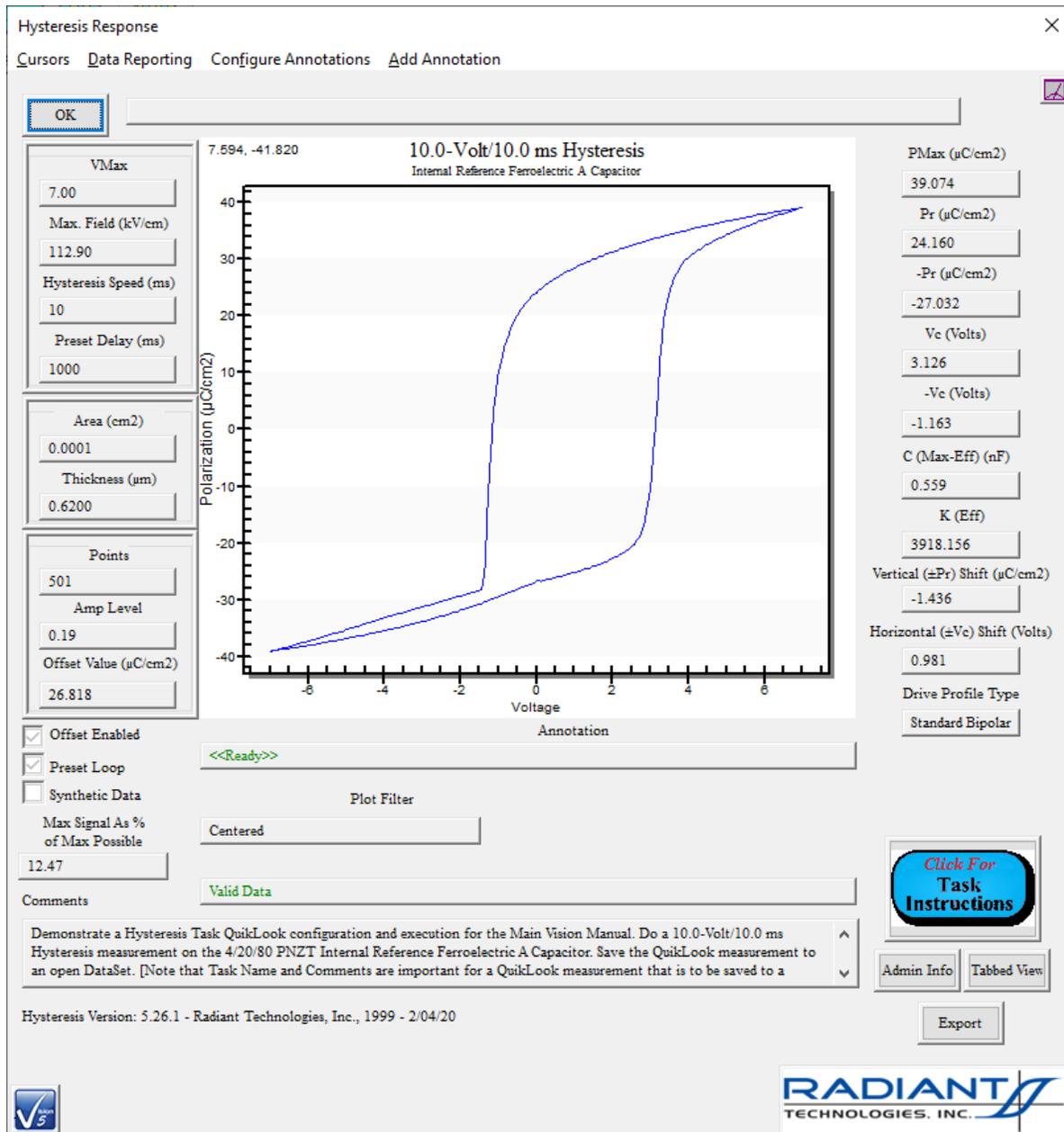


Figure 11 - Hysteresis Data Recalled from the DataSet Archive. Note that the Point Cursor is Enabled for Demonstration Purposes.

Measuring Internal Reference Elements

Step-by-Step: Measurement of Internal Reference Elements

Precision testers are shipped with an internal 1.0 nF linear capacitor, a 2.5 M Ω internal resistor and a pair of 4/20/80 PNZT ferroelectric capacitors, manufactured by Radiant Technologies, Inc., that may be switched into the measurement signal path. The Precision RT66I (RT66A interface) and Precision RT66B did not offer internal measurement elements. The original Precision LC tester did not offer the ferroelectric reference capacitors. The elements are provided to validate the tester and as a quick reference for tester troubleshooting. For testers older than 2014 the internal reference elements are switched into the measurement in parallel with each other and in parallel with any test sample attached to the external DRIVE and RETURN ports. For later testers, the external DRIVE and RETURN ports are switched out of the signal path any time an internal reference element is switched in. Normally, each element is tested independently with no sample connected to the external ports.

Every Measurement Task allows the internal reference elements to be switched in in both QuikLook and standard DataSet execution. The Waveform Hardware Task also allows the internal reference ferroelectric elements to have the signal applied. The reason is that these ferroelectric test elements are highly subject to fatigue and imprint. Applying a 9.0-Volt, 1 Hz square waveform for a period of 100 seconds will usually help the test element recover. If this fails, try applying the waveform for 300 seconds or longer.

The demonstrations in this document are all performed using the QuikLook Hysteresis Task.

Step 1: Measure the Internal Reference Capacitor

A 1.0 nF linear capacitor is included with most testers. In the QuikLook menu, select the Hysteresis Task. Configure the Task for 5.0-Volt and 10.0 ms. At 5.0 Volts, using the default sample area of 10^{-4} cm², the capacitor response will run 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 (± 40.0 $\mu\text{C}/\text{cm}^2$ at ± 4.0 Volts, ± 60.0 $\mu\text{C}/\text{cm}^2$ at ± 6.0 Volts, etc.). The magnitude of the response is scaled by the sample area and will change as the area is changed. Check the check box labeled *Enable Reference Cap*. Be sure that the *Enable Reference Resistor* and *Enable Reference Ferroelectric* boxes are unchecked. For older testers ensure that no sample is connected to the external DRIVE or RETURN ports.

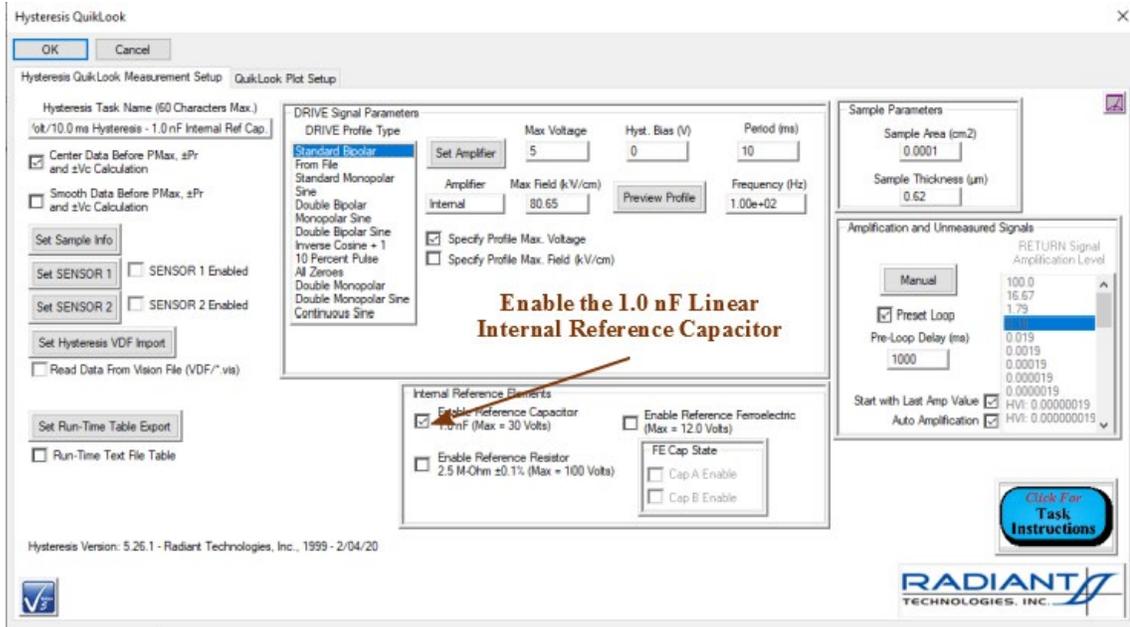


Figure 1 - QuikLook Hysteresis Configuration with Internal Reference Capacitor Enabled.

Note that no more than ± 30.0 Volts may be applied to the Internal Reference Capacitor. If *Max Voltage* is set to a magnitude greater than 30.0 Volts, the *Enable Reference Capacitor* control will be unchecked and disabled.

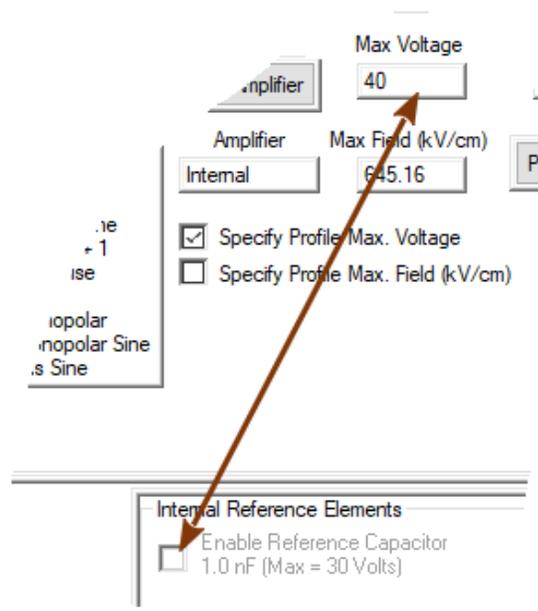


Figure 2 - Max Voltage > ± 30.0 Volts Unchecks and Disables the Enable Reference Capacitor Control.

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Click *OK* to make the measurement. The linear results are displayed in the Hysteresis Response dialog.

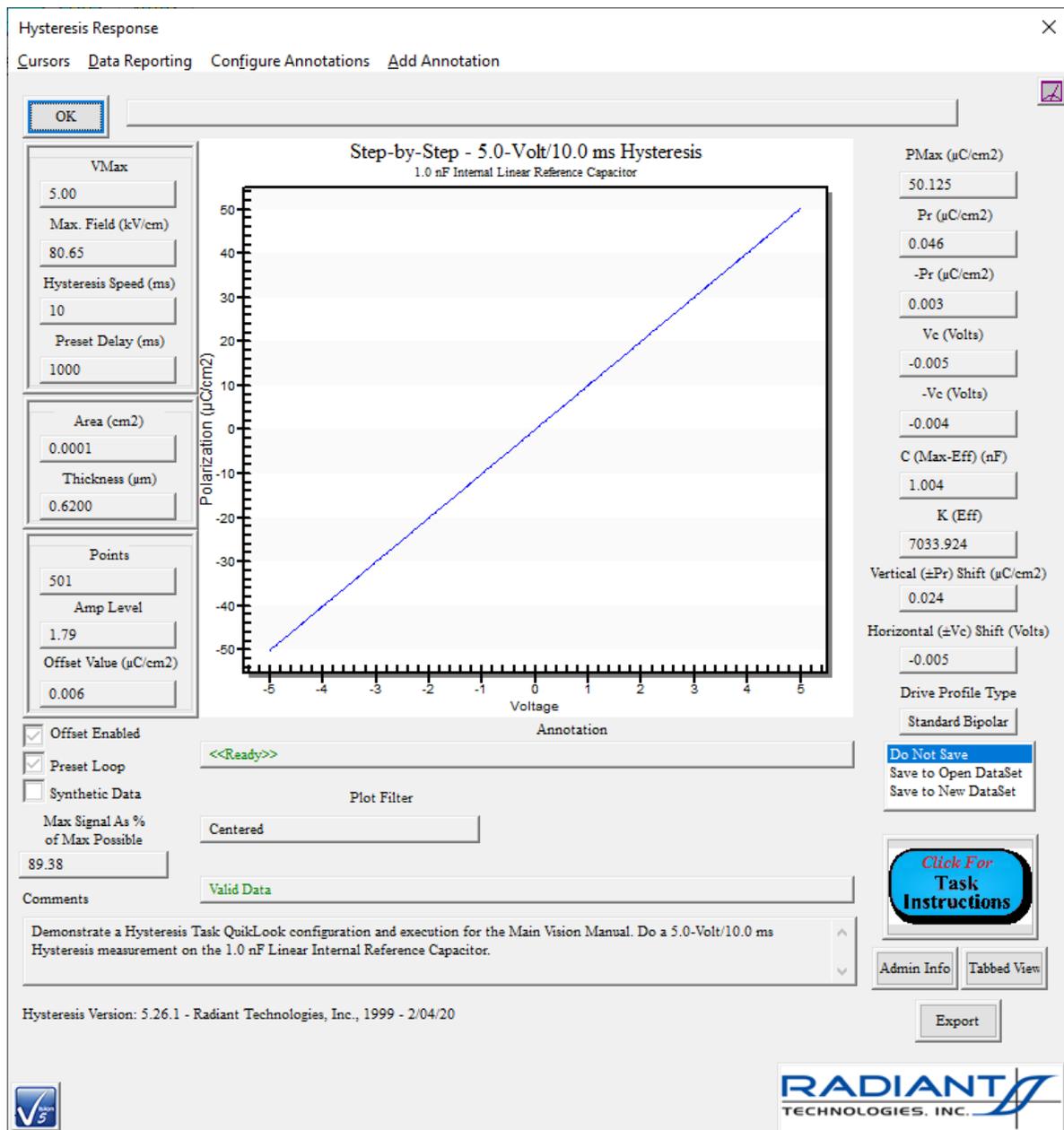


Figure 3 - Internal Reference Capacitor 5.0-Volt Hysteresis Response.

Step 2: Hysteresis Measurement on the Internal Reference Resistor.

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A 2.5 M Ω internal reference resistor is provided with most Precision testers. In the QuikLook menu, select the Hysteresis Task. Configure the Task for 5.0-Volt and 10.0 ms. Check the check box labeled *Enable Ref. Resistor*. Be sure that the *Enable Reference Capacitor* and *Enable Reference Ferroelectric* boxes are unchecked. For older testers, ensure that no sample is connected to the external DRIVE or RETURN ports. Note that the internal reference resistor can sustain a maximum voltage magnitude of ± 100.0 Volts. A *Max Voltage* value of greater than ± 100.0 Volts will uncheck and disable the *Enable Reference Resistor* control.

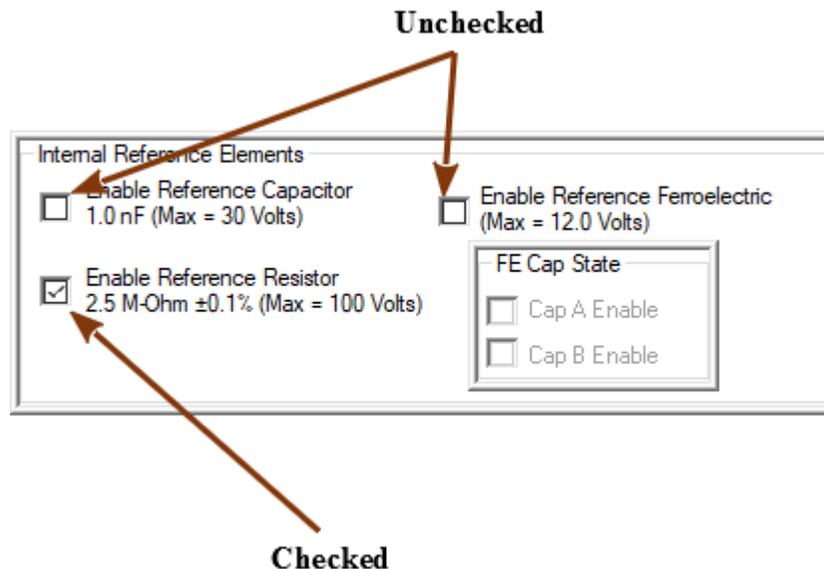


Figure 4 - QuikLook Hysteresis Configuration with Internal Reference Resistor Enabled.

Click *OK*. The measurement will produce an rugby-ball-shaped response. This is an appropriate response for a linear resistor.

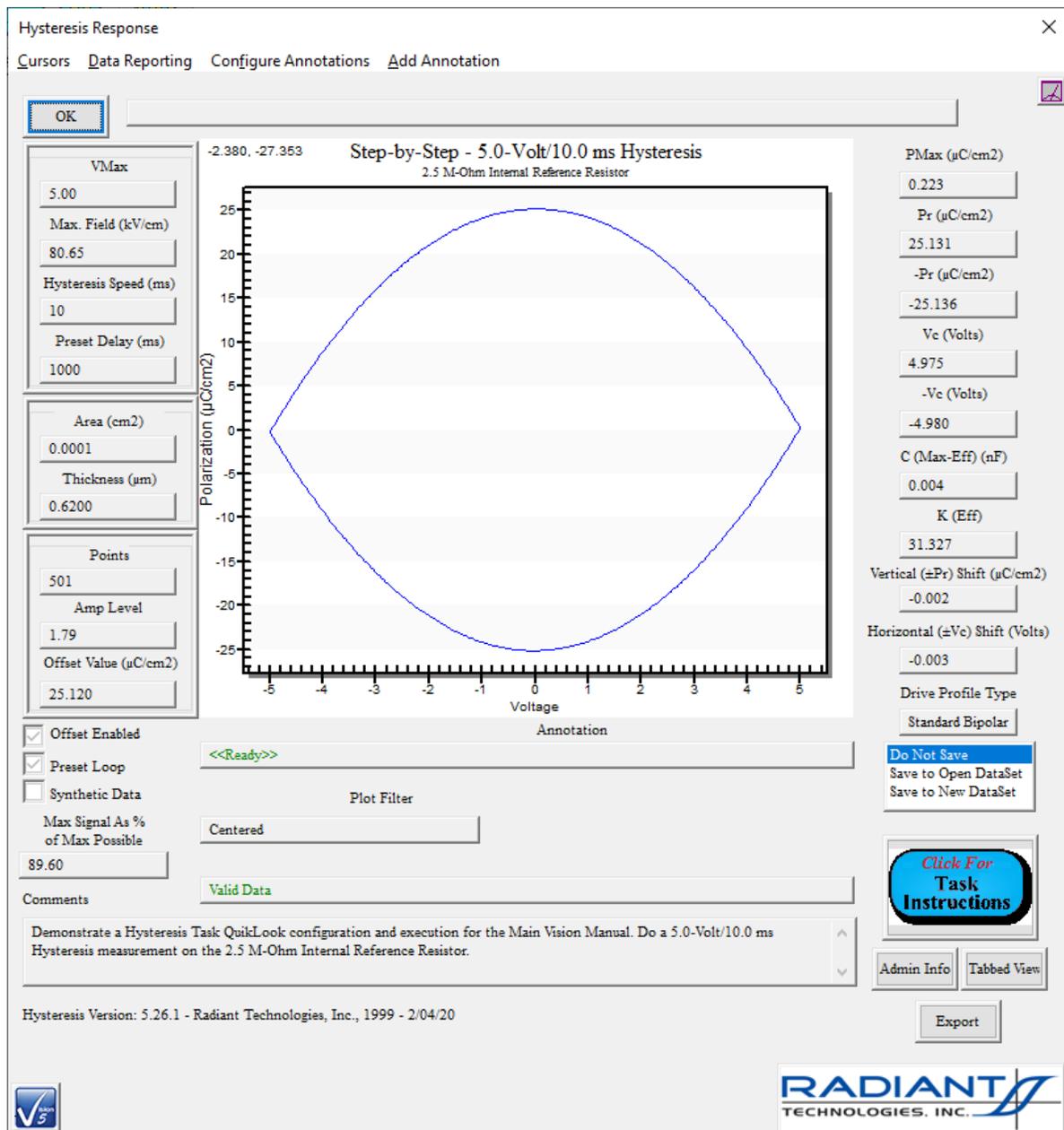
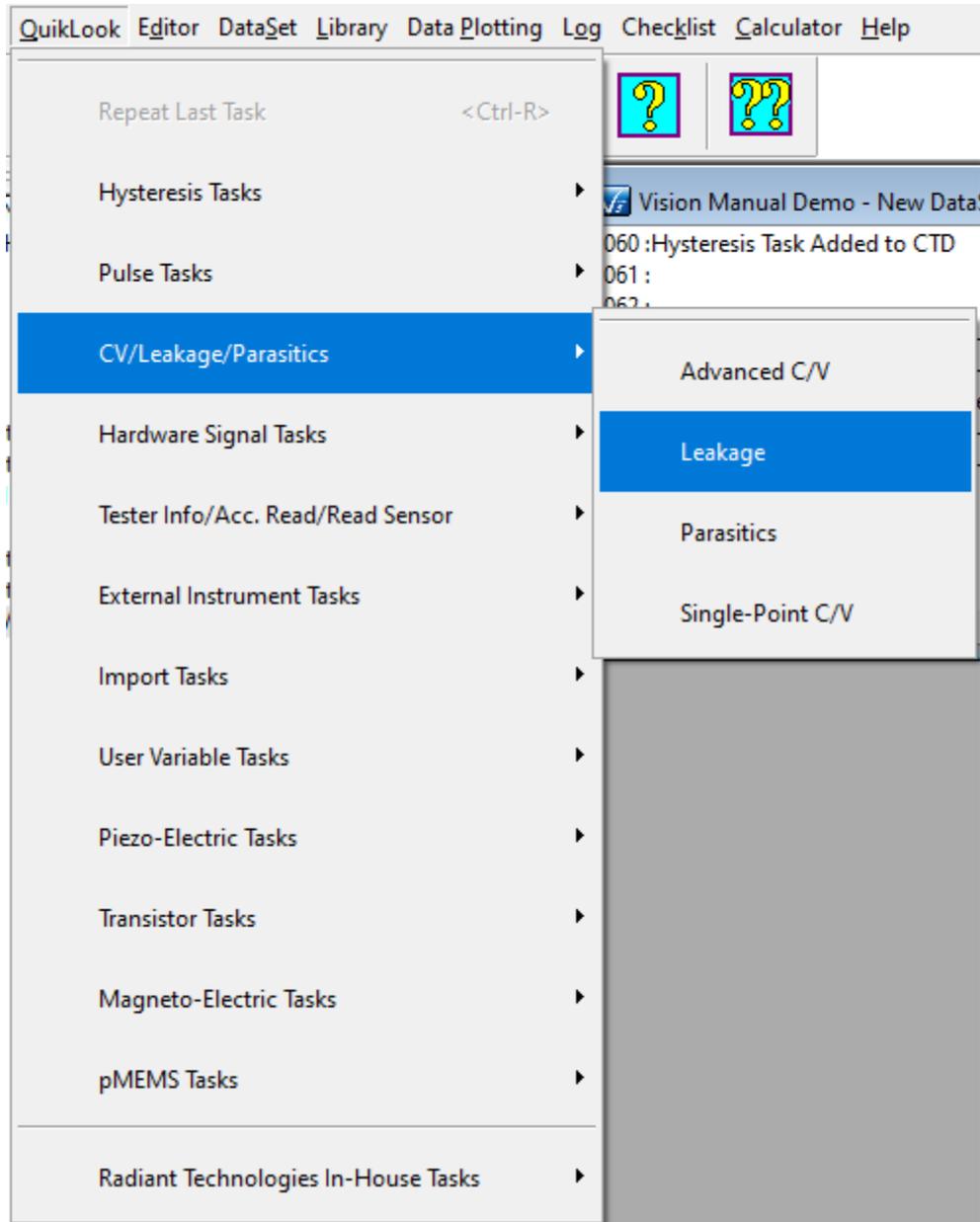


Figure 5 - Internal Reference Resistor 5.0-Volt Hysteresis Response.

Step 3: Leakage Measurement on the Internal Reference Resistor.

In the QuikLook Menu, select the CV/Leakage/Parasitics->Leakage Task. Assign a 5.0 Leakage Volts and Soak Time and Measure Time of 1000.0 ms. The Internal Reference Resistor will already be checked.

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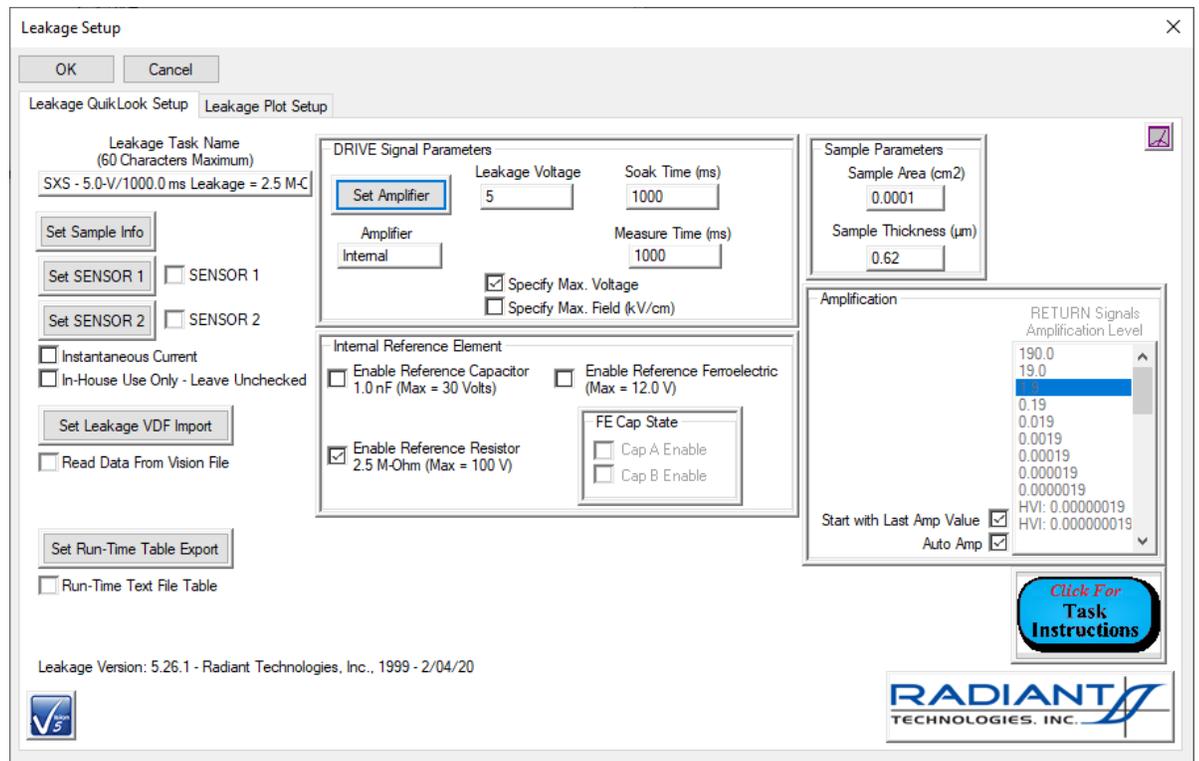


Figure 6 - Internal Reference Resistor 5.0-Volt Leakage Task QuikLook Access and Configuration.

Click *OK*. The current through the resistor as a function of the applied voltage will be displayed over the 1000.0 ms duration of the measurement. Some residual current induced by the spike in voltage when the measurement voltage is applied is apparent over the first 20.0 or so milliseconds. After that period, the measurement settles to a constant value of $\sim 1.6e^{-6}$ Amps. This is the value of 5.0 Volts divided over 2.5 M Ω . The prompt in **Figure 7** shows the computed resistance value of 2.5 $10^6 \Omega$.

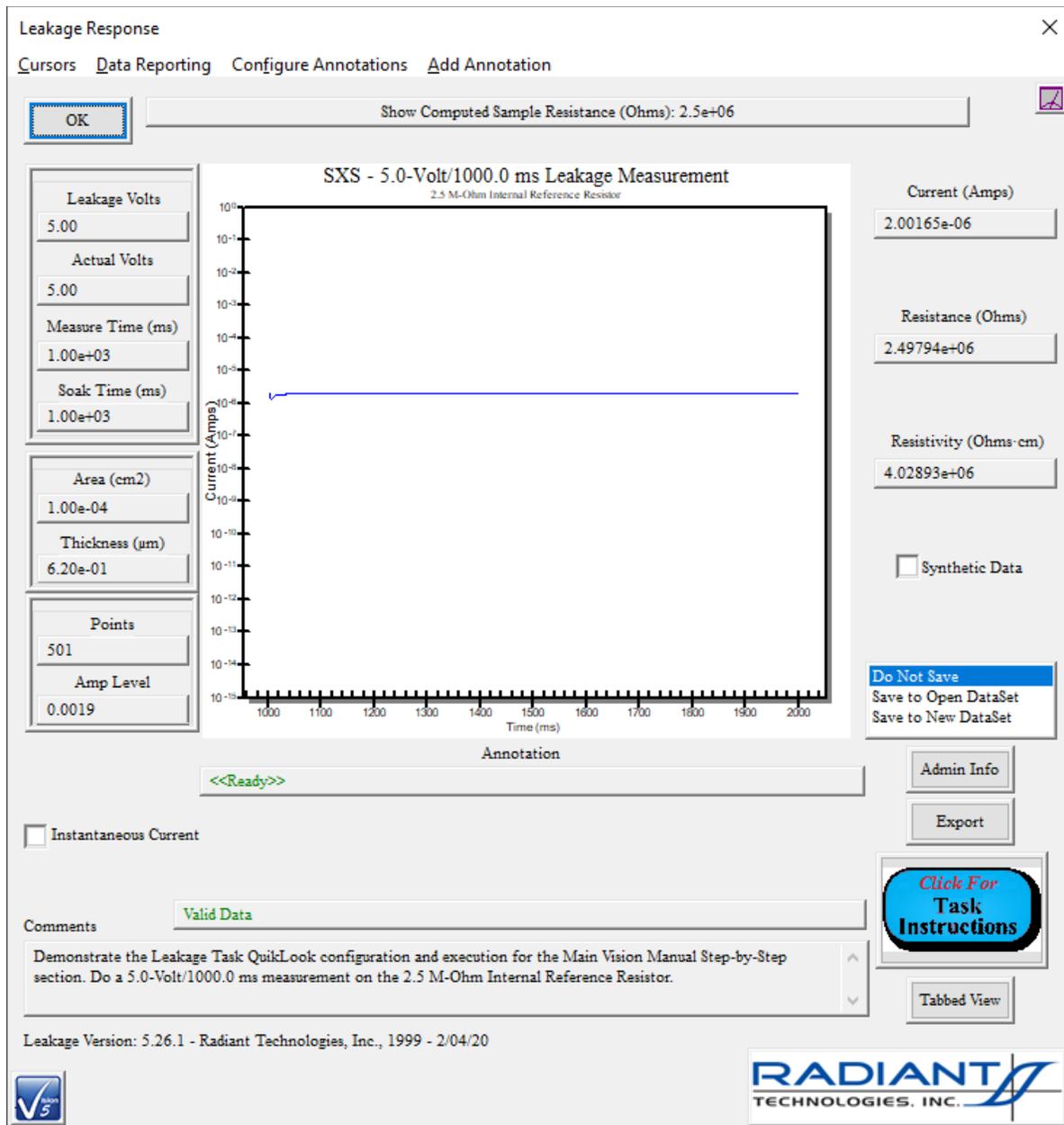


Figure 7 - Internal Reference Resistor 5.0-Volt Leakage Current Response.

Step 4: Hysteresis Measurement on the Internal Reference Resistor and Capacitor.

Return to the QuikLook Hysteresis Task. Maintain the configuration that appears, except that the *Enable Reference Capacitor* control should be checked as well as the *Enable Ref. Resistor* control. Click *OK*. The internal reference capacitor and internal reference resistor will be measured in parallel. The rugby ball shape of the resistor response will be tilted to be centered about an axis defined by the $45^\circ \pm 50.0 \mu\text{C}/\text{cm}^2$ line-

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ar response of the capacitor. This is the superpositive summation of the two responses. Note that at ± 5.0 -Volts, the response is $\pm 50.0 \mu\text{C}/\text{cm}^2 =$ the $\pm 50.0 \mu\text{C}/\text{cm}^2$ response of the capacitor plus the $\pm 0.0 \mu\text{C}/\text{cm}^2$ response of the resistor at those voltages. Likewise, at 0.0 Volts, the response is $25.0 \mu\text{C}/\text{cm}^2$, with the contribution entirely from the linear resistor. **Figure 8** shows a 10.0 ms response. **Figure 9** is a 100.0 ms response. The resistive contribution is increased, showing the time-dependence of the resistive contribution.

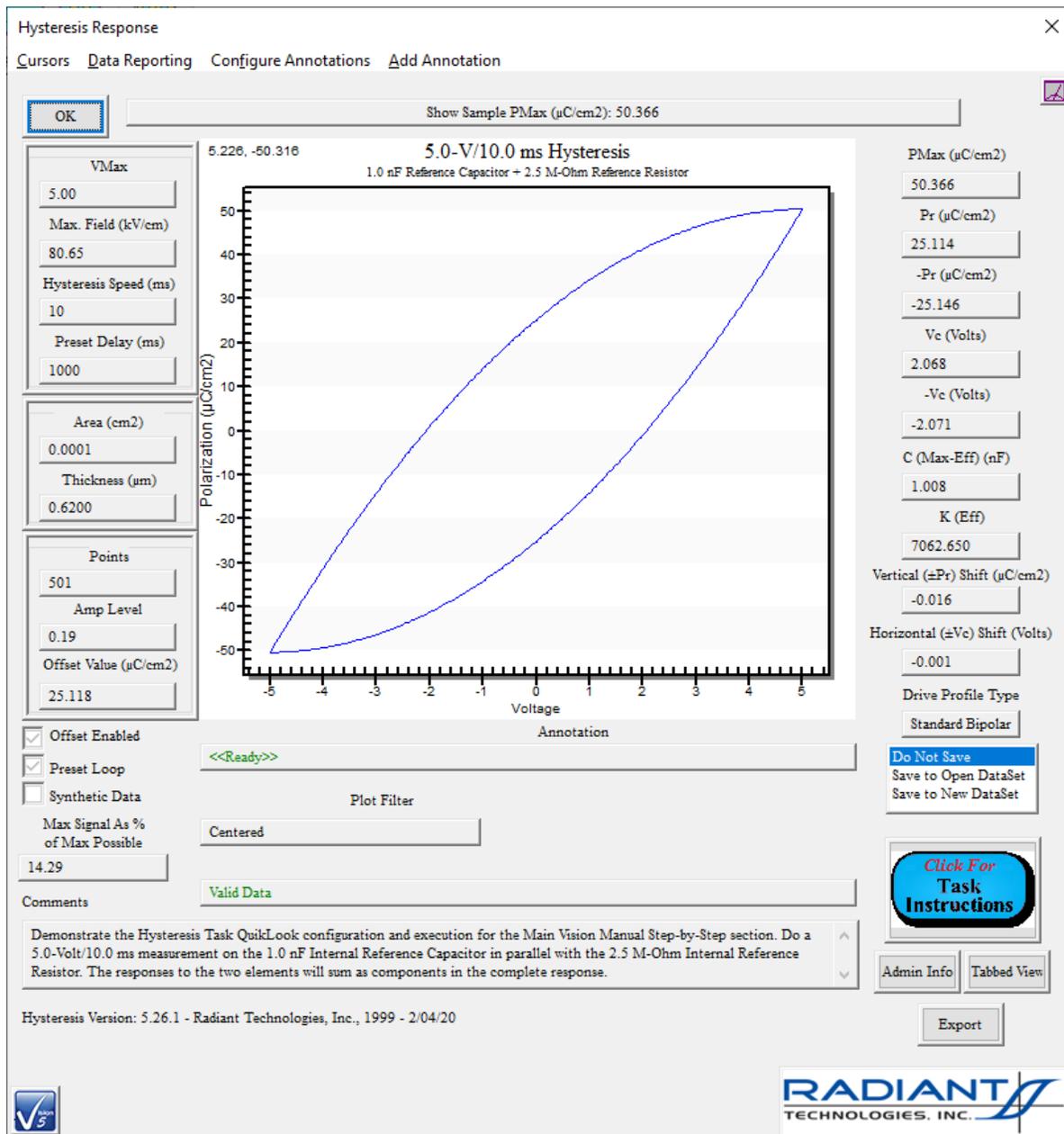


Figure 8 - Combined Reference Resistor and Capacitor 5.0-

Volt, 1.0 ms Hysteresis Response.

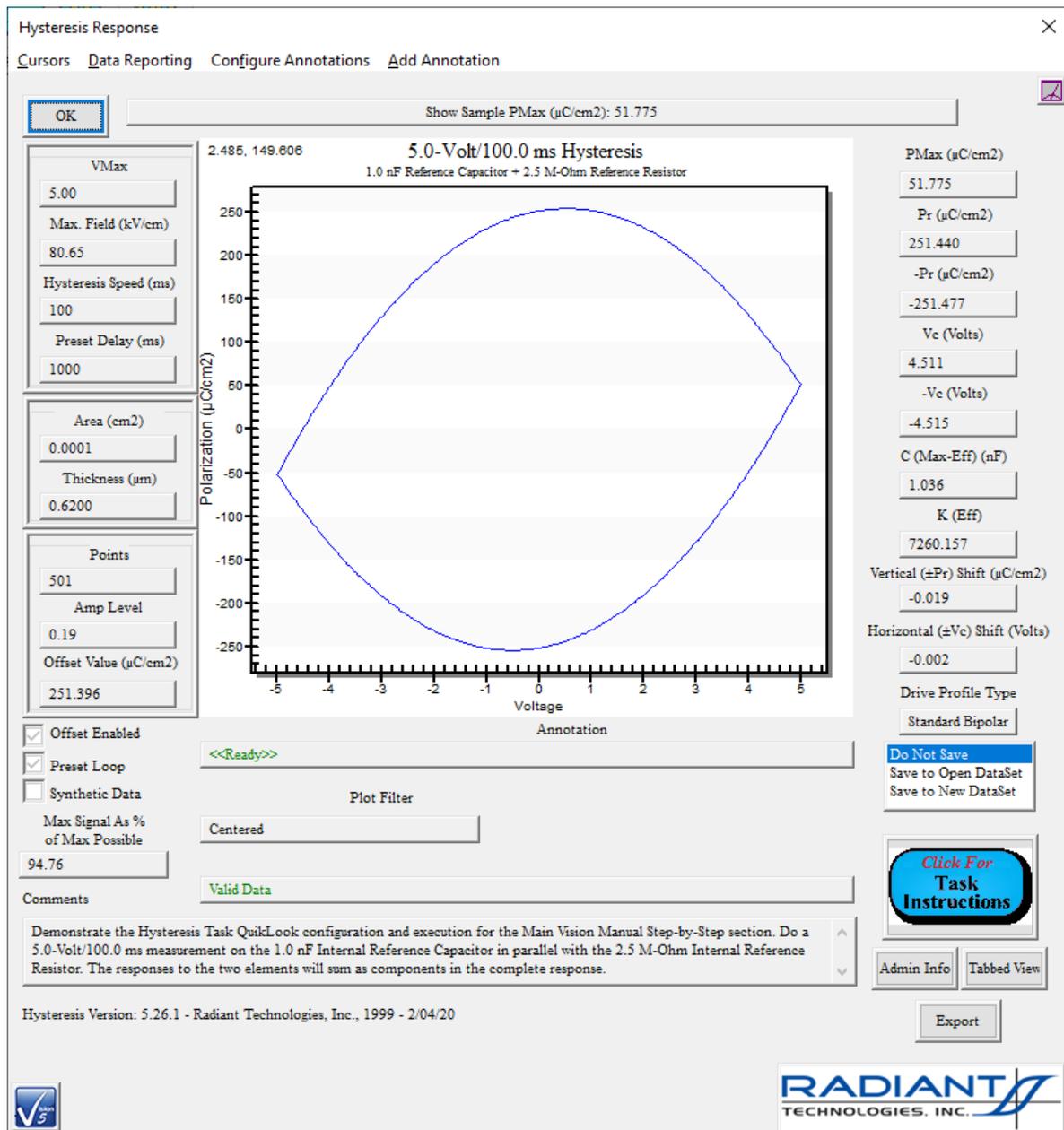


Figure 9 - Combined Reference Resistor and Capacitor 5.0-Volt, 10.0 ms Hysteresis Response.

Step 5: Hysteresis Response on One Internal Reference Ferroelectric Capacitor.

Most Precision testers offer a $100\ \mu\text{m} \times 100\ \mu\text{m}$ 20/80 PZT internal ferroelectric ca-

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capacitor pair. The device is switched into the measurement signal path by selecting *Enable Reference Ferroelectric*. When selected, the *Cap A Enable* and *Cap B Enable* check boxes are enabled. Cap A or Cap B (or both) must be selected to make the measurement. When both are selected, both capacitors will be measured in parallel. Open the Hysteresis QuikLook Dialog. Set *Max Voltage* to 9.0 Volts and *Period* to 10.0 ms. Uncheck the *Enable Reference Capacitor* and *Enable Reference Resistor* check boxes. Check *Enable Reference Ferroelectric* and *Cap A Enable*. Note that the maximum voltage magnitude that may be applied to the internal reference ferroelectric is ± 12.0 Volts. *Max Voltage* values greater than ± 12.0 Volts will uncheck *Enable Ref. Ferroelectric*, *Cap A Enable* and *Cap B Enable* and disable these controls.

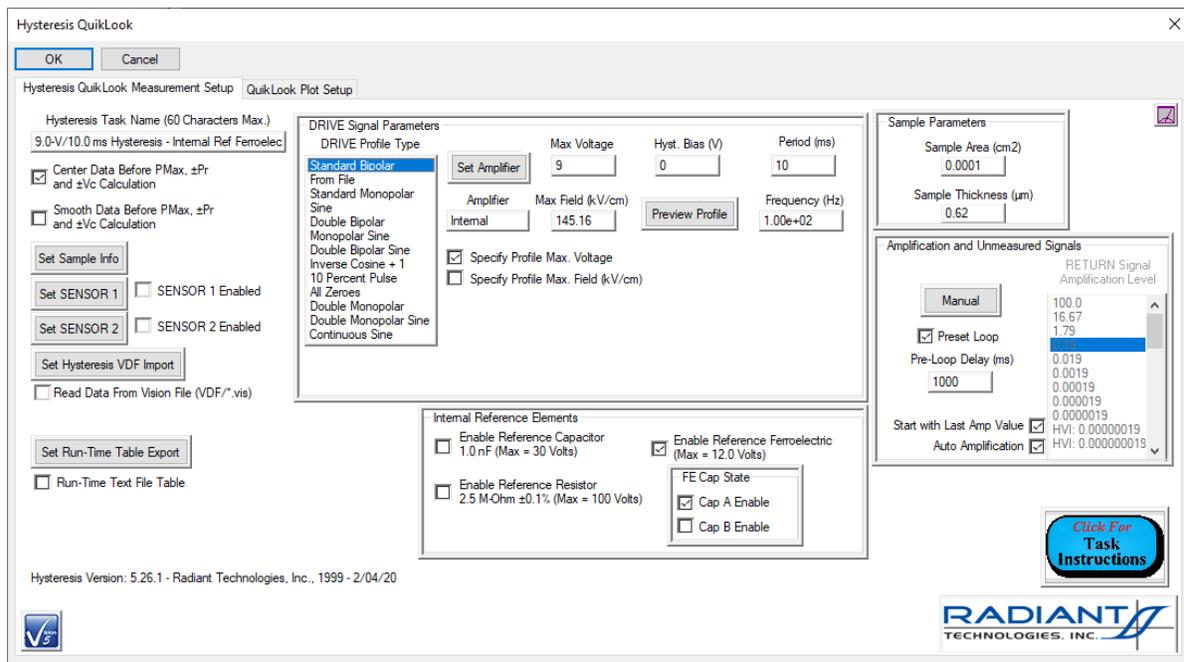


Figure 10 - Hysteresis Task with Internal Reference Ferroelectric Cap. A Selected.

Click *OK*. The sample will be measured and the response shown.

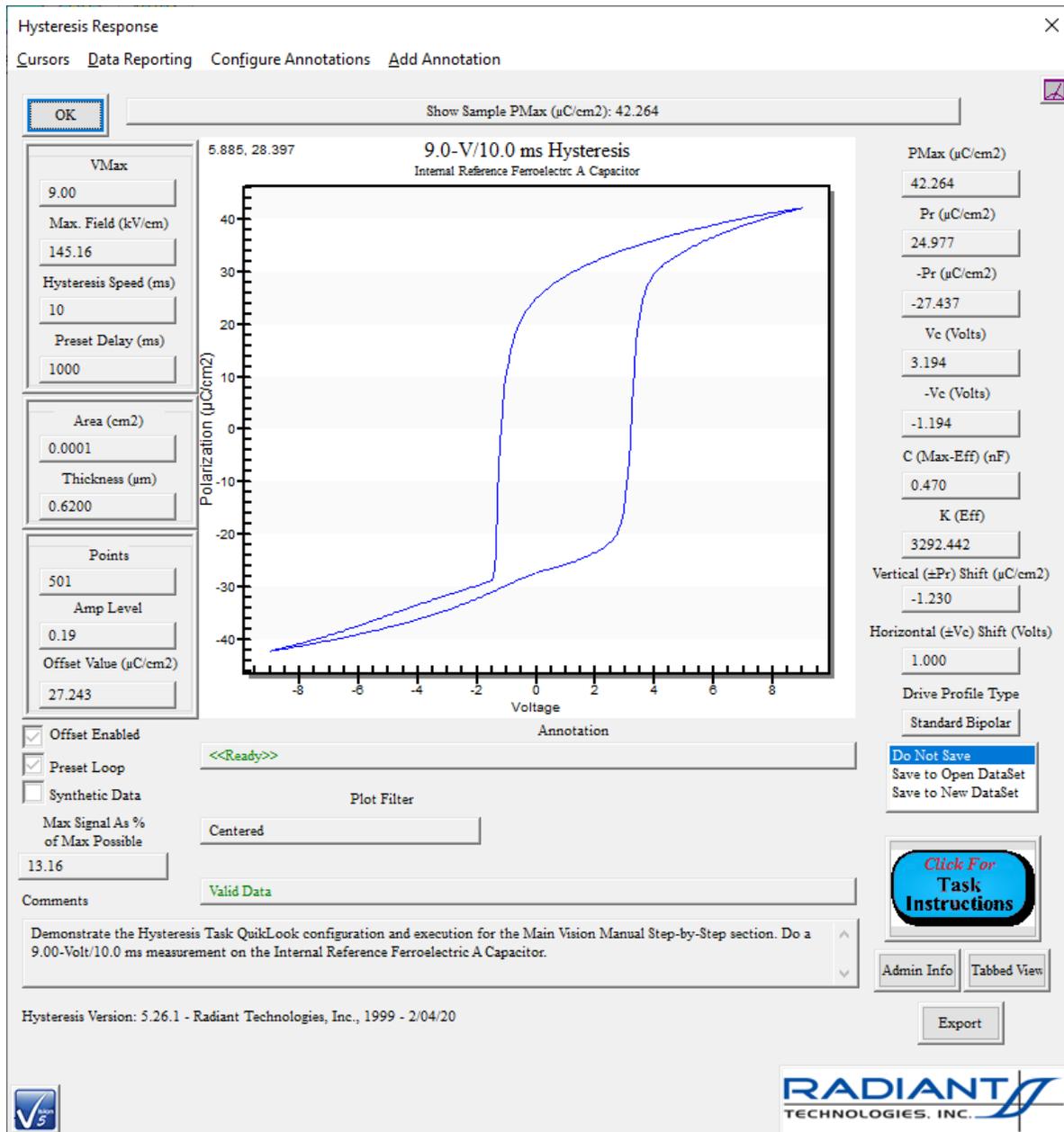


Figure 11 - Hysteresis Internal Reference Ferroelectric Cap. A Measurement.

Step 6: Hysteresis Response on the Second Internal Reference Ferroelectric Capacitor.

Press <Ctrl-R> to recall the QuikLook Hysteresis configuration dialog. Uncheck the *Cap. A Enable* control and check *Cap. B Enable*. Click *OK* to reproduce the measurement of **Step 5** on the second internal reference capacitor. Note that the responses are nearly indistinguishable.

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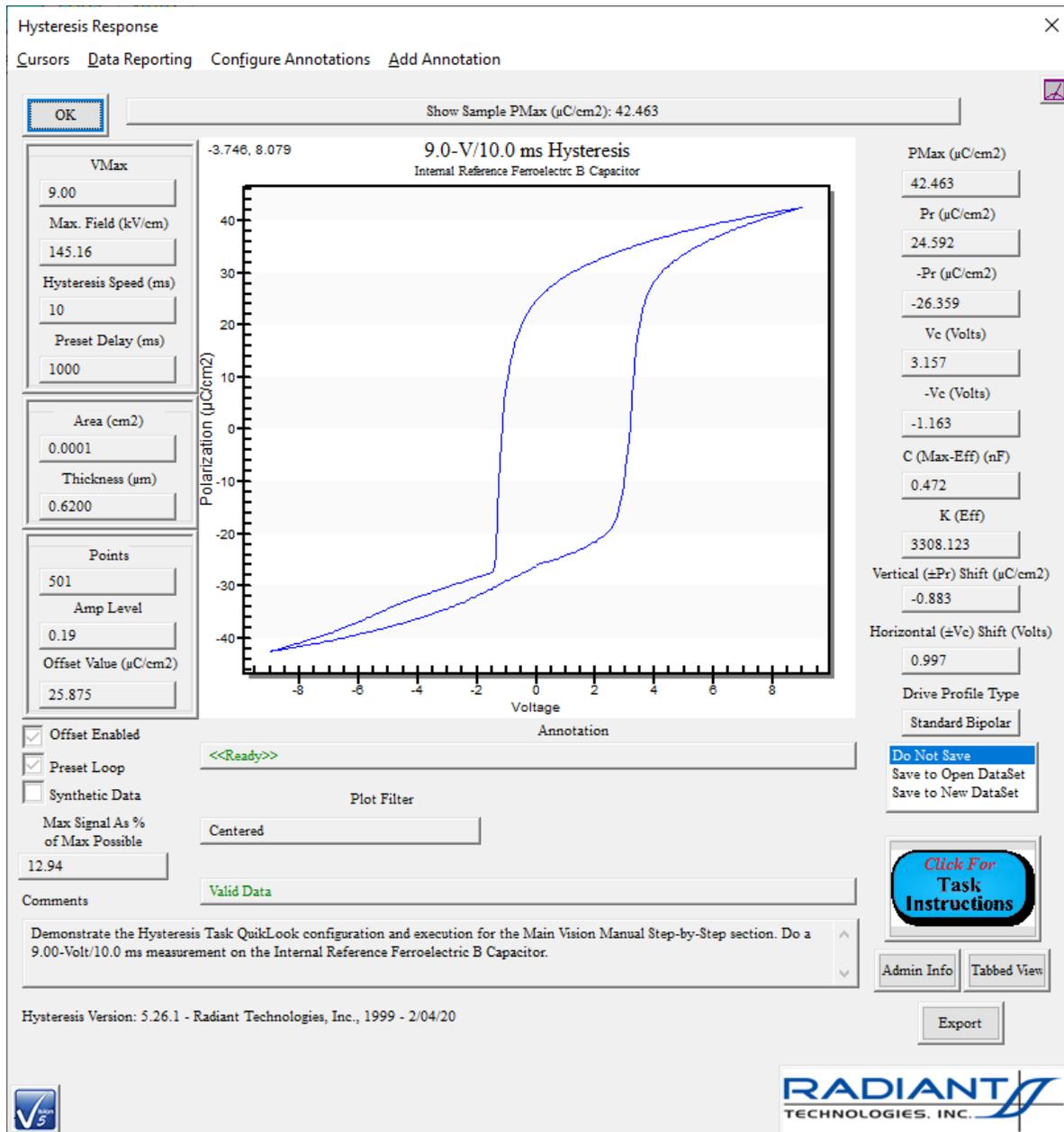


Figure 12 - Hysteresis Internal Reference Ferroelectric Cap. B Measurement.

Step 7: Hysteresis Response on the Both Internal Reference Ferroelectric Capacitors.

Press <Ctrl-R> to recall the QuikLook Hysteresis configuration dialog. Recheck the *Cap. A Enable* control. Click *OK* to measure the two internal reference ferroelectric capacitors in parallel. Note that the response shows twice the polarization of either of the two samples measured individually. As with the combined resistor and capacitor measurement these results are the superpositive combination of the individual response of

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each capacitor.

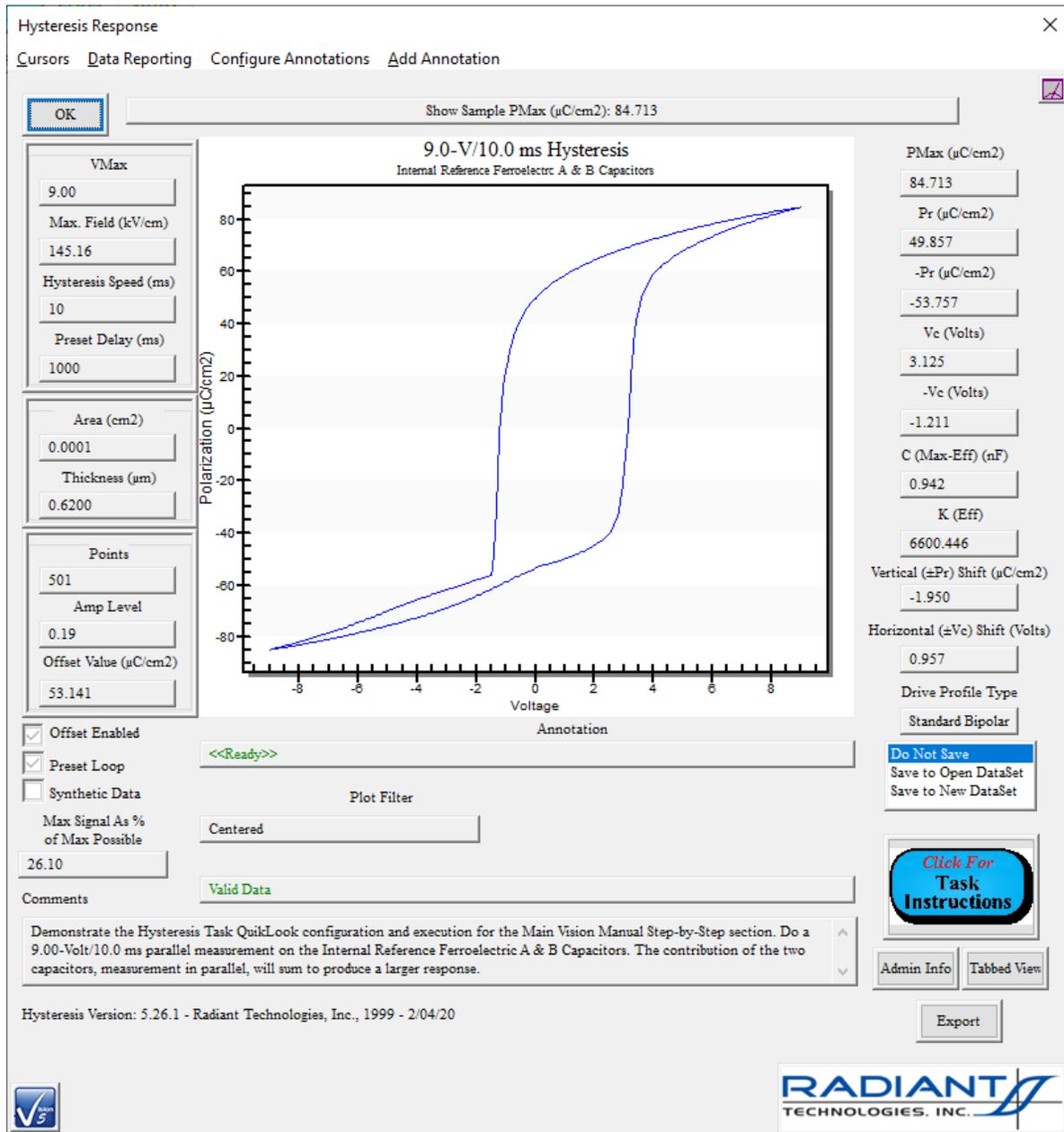


Figure 13 - Hysteresis Internal Reference Ferroelectric Caps. A and B Parallel Measurement.

Test Definition & Editor

Test Definition Creation

Step-by-Step: Test Definition Creation

- Step 1:** Plan the experiment carefully. Establish the order and configuration of the Tasks in the experiment.
- Step 2:** In the Library, open the folder (and subfolder and subsubfolder if appropriate) of the first Task in the experiment. (For the demonstration, the first Task will be the PUND, in the Hardware\ Measurement\Pulse path of the Library.)

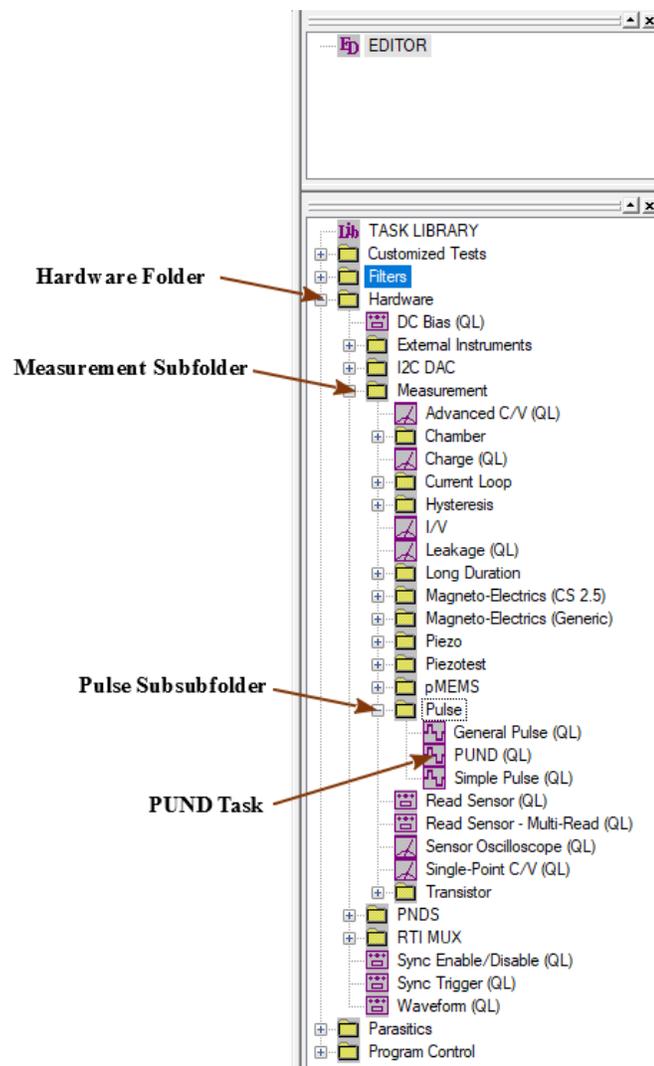


Figure 1 - Locating the PUND Task in the Library.

Step 3: Click and hold the left mouse button on the desired Task. With the mouse button held, move the mouse cursor into the [Editor](#) window and release the mouse button. This is known as “Drag and Drop”. **Note: Be sure that the Task that is being moved is the desired Task. It is easy for the program to select the wrong Task. The Task icon and name will appear with the mouse cursor as the mouse is moved. If the wrong Task is selected, release the mouse button with the cursor outside the Editor window. You may also *Cancel* the Task configuration as described in 4: if the wrong Task is dropped in the Editor. An alternative is to right-click the Task in the TASK LIBRARY and select "To Editor" from the popup menu.**

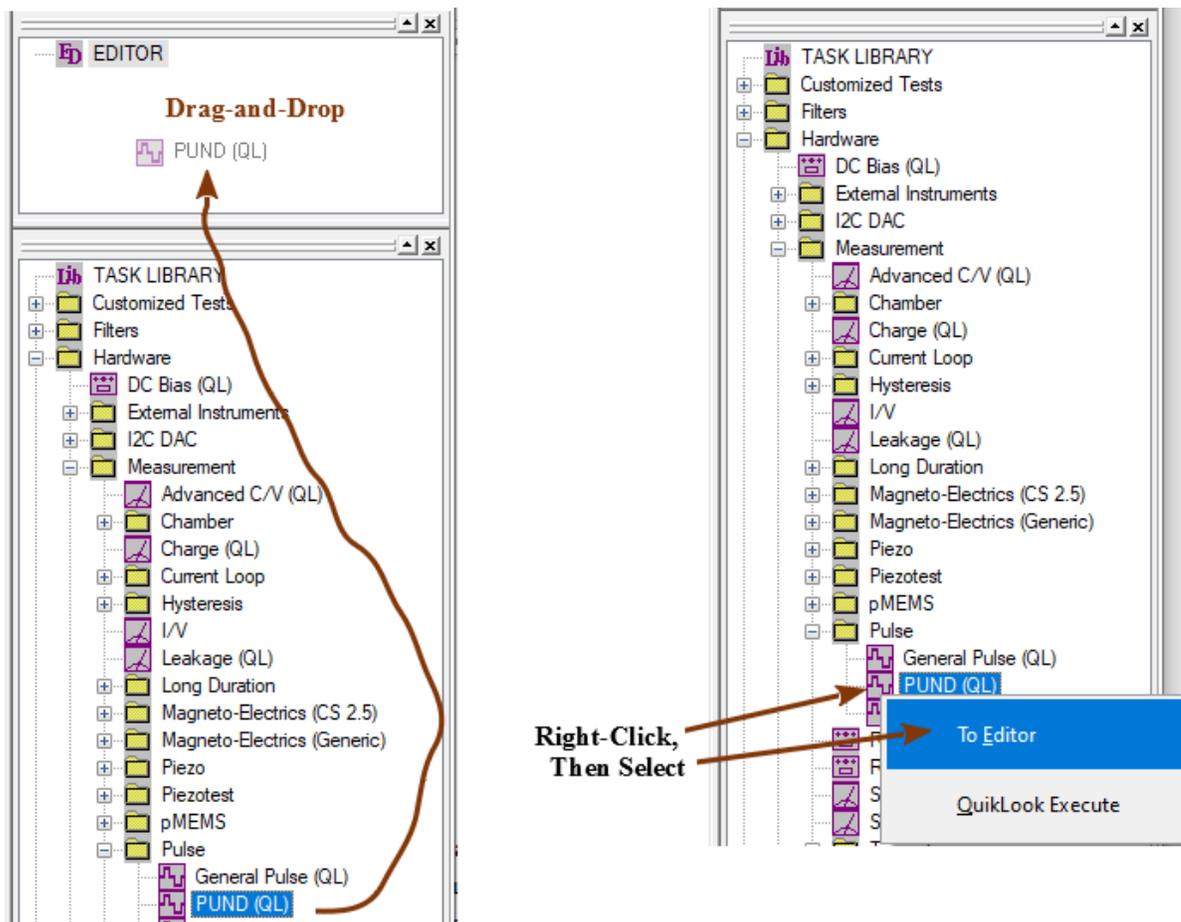


Figure 2 - Move the PUND Task from the TASK LIBRARY to the Editor.

Step 4: When the left mouse button is released in the Editor (the Task is “Dropped”) the Task configuration dialog will open. Configure the Task as appropriate. Click *OK* to add the Task to the Test Definition in the Editor. Click *Cancel* (in some cases *Cancel/Plot*) if

you do not want to add the Task to the Test Definition.

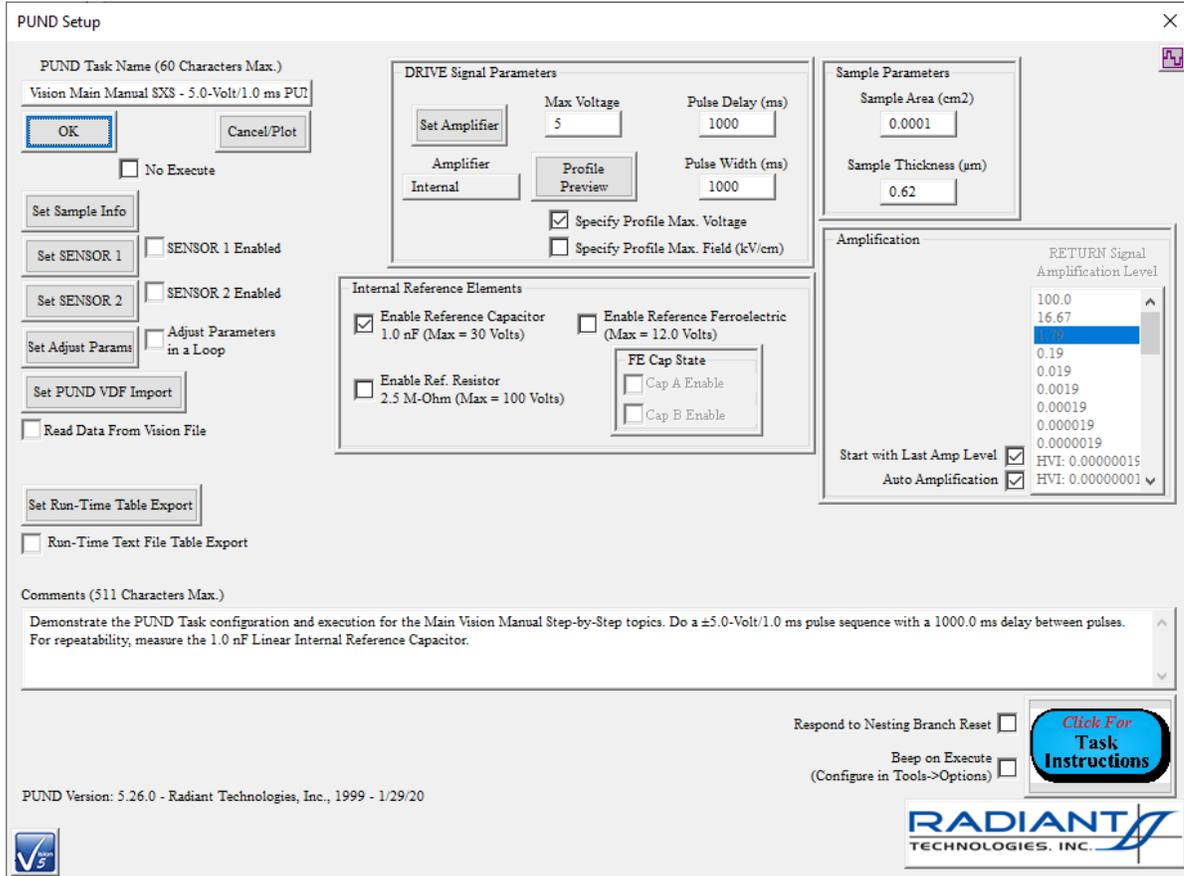


Figure 3 - PUND Task Configuration.

Step 5: When the dialog is closed, the Task will appear in the Editor window. It forms a complete Test Definition containing the single Task.

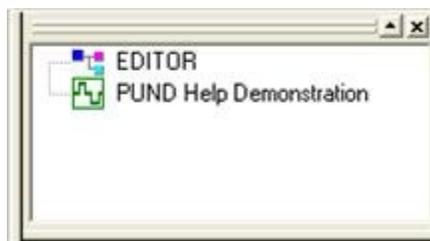


Figure 4 - PUND Task as Test Definition in the Editor.

Step 6: Repeat Steps 2 through 4 for each Task in the Experiment. (For the Demonstration, the experiment consists of: PUND, Collect/Plot Filter, Delay and Branch.)

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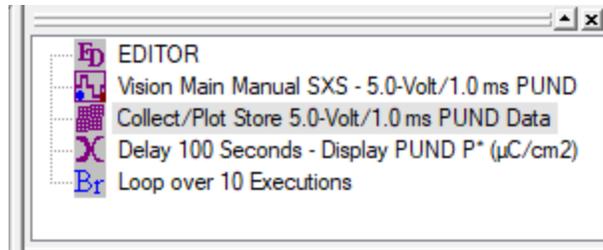


Figure 5 - Editor Test Definition Containing Multiple Tasks.

Step 7: A Task that has been placed into the Test Definition may be reconfigured by double-clicking the Task icon, in the Editor, with the left mouse button. This will reopen the Task configuration dialog. Once changes are made, click *OK* to register those changes in the Test Definition. Clicking *Cancel* (or *Cancel/Plot*) will close the configuration dialog without registering the changes. Double-Click the Branch Task to change its Task Name.

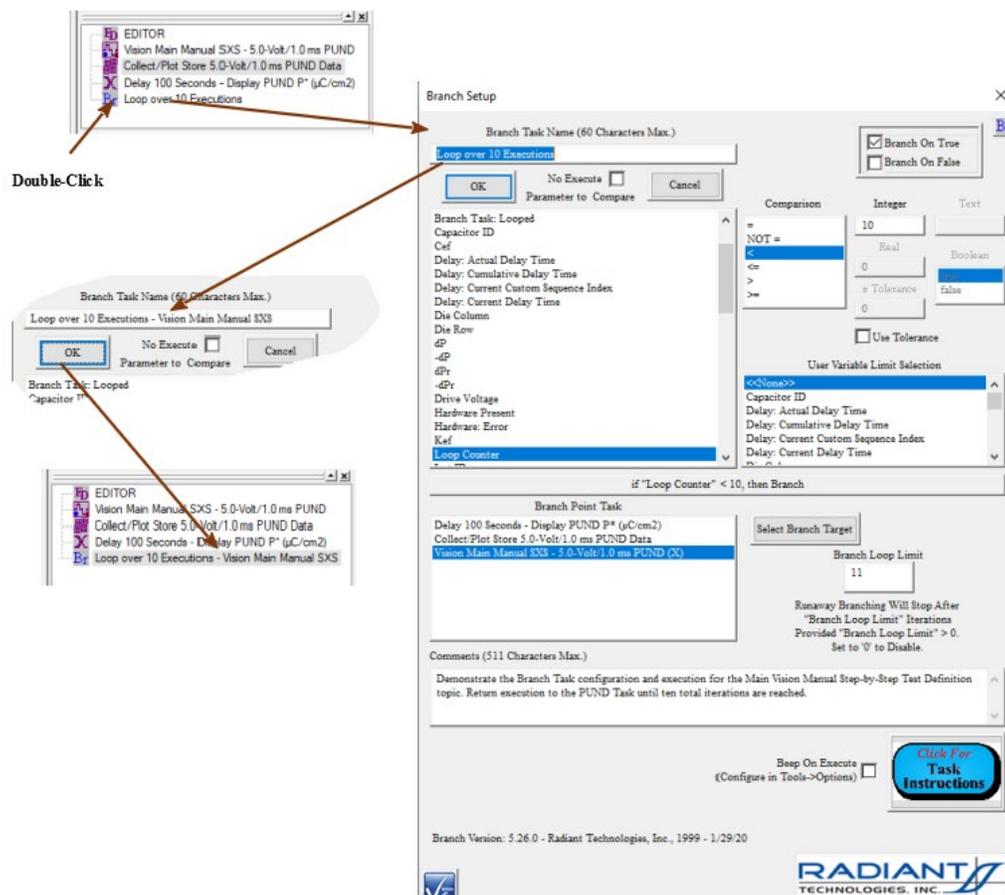


Figure 6 - Reconfigure the Branch Task and Change the Task Name.

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Clear All Editor Tasks

Step-by-Step: Clear All Editor Tasks

Once a Test Definition is defined in the Editor, newly added Tasks are appended to the existing list of Tasks shown. Restoring Test Definitions to the Editor from other locations such as the Customized Test folder in the Library or a Current Test Definition or Executed Test Definition in a DataSet may append several Tasks at once to the existing list. In order to start the creation of a new Test Definition, the old Test Definition must be cleared from the Editor. A tool exists to remove all of the Tasks from the Editor.

Step 1: Select "Editor->Clear All (Ctrl-A)", press <Ctrl-A> or right-click in the Editor window and select "Clear All (Ctrl-A)" from the popup menu.

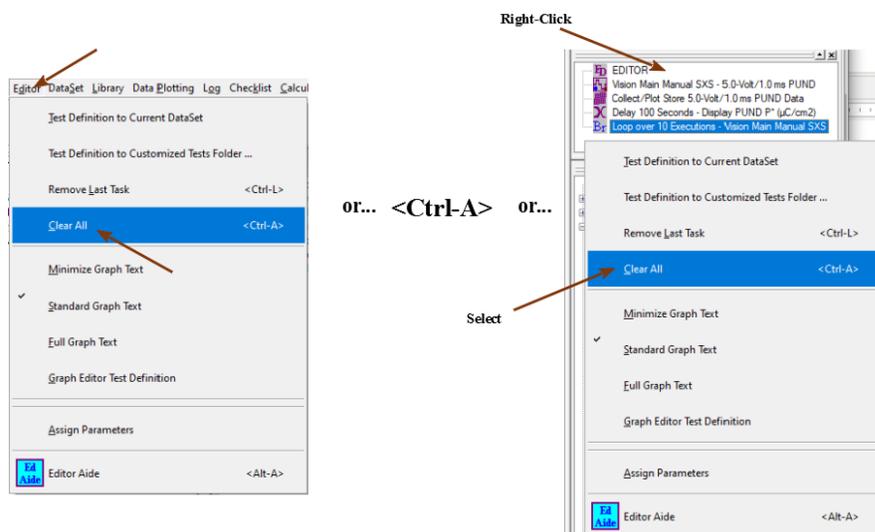


Figure 1 - Clearing the Editor of All Tasks.

Step 2: All Tasks will be removed from the Editor.

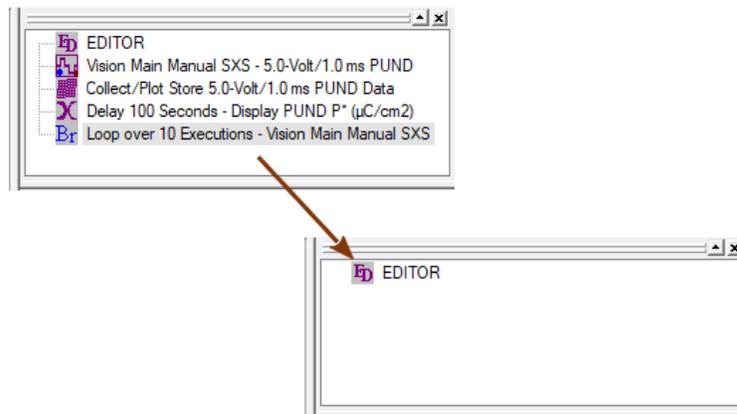


Figure 2 - Editor is Cleared of All Tasks.

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Remove Last Task From Test Definition

Step-by-Step: Remove Last Task From Test Definition

The most recently added Task - that is, the Task at the bottom of the sequence - can be deleted without clearing the entire Test Definition. This operation can be performed repeatedly until an interior target Task has been removed or an insertion point reached.

Step 1: With the example Test Definition in the Editor select "Editor->Remove Last Task (Ctrl-L)", press <Ctrl-L> or right-click in the Editor window and select "Remove Last Task (Ctrl-L)" from the popup menu.

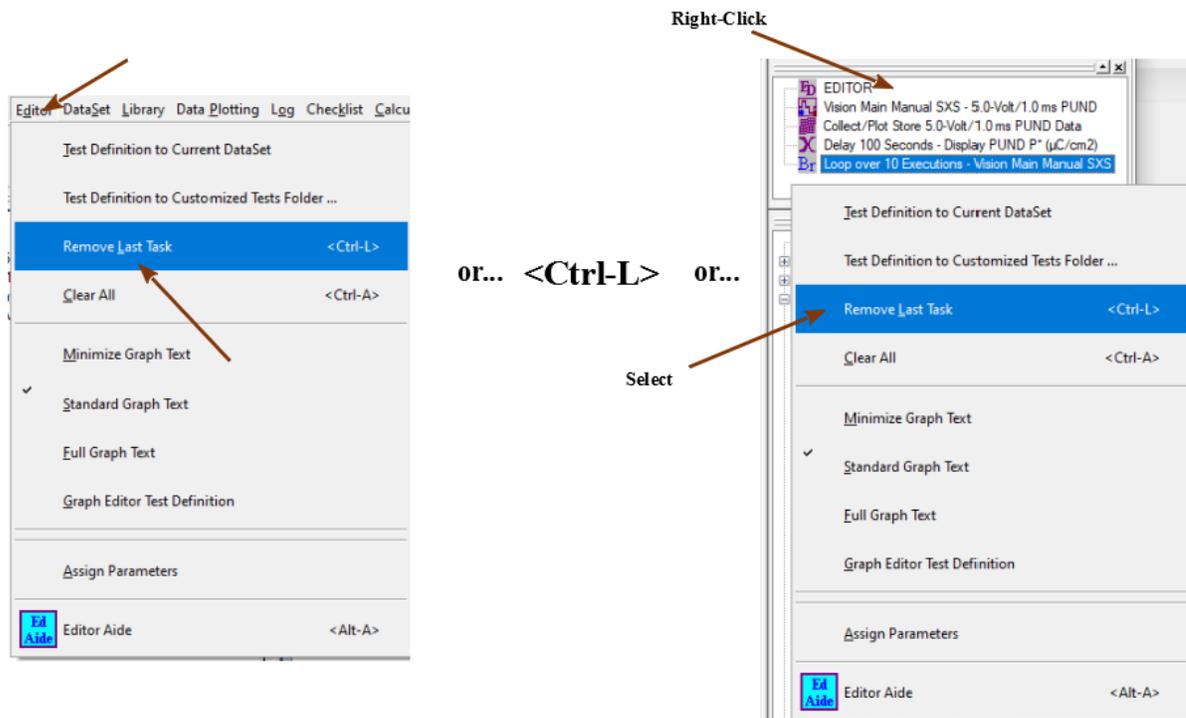


Figure 1 - Remove the Last Task from the Test Definition.

Step 2: The Branch Task will be eliminated. (Note that the PUND Task icon changes. It no longer shows the blue dot at the lower-left corner. The blue dot previously indicated that the Task was the Branch Target.)

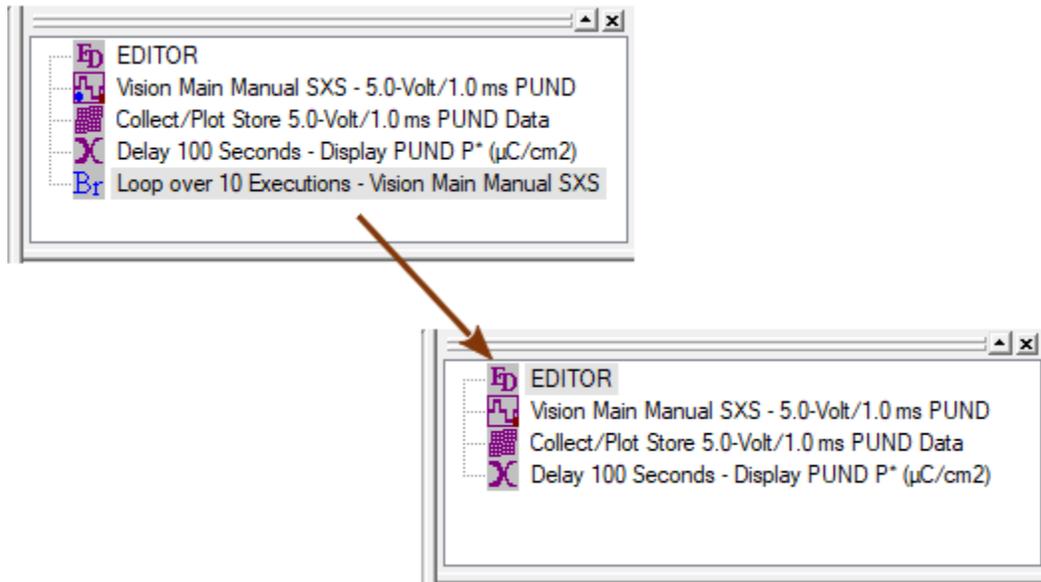


Figure 2 - The Test Definition is Updated Without the Branch Task.

Editor Aide

Step-by-Step: Editor Aide Operations

Discussion

To this point all the actions that can be taken to adjust the Test Definition directly within the Editor have been presented. These include:

- Append Tasks to the Editor Test Definition.
- Reconfigure Tasks in the Editor.
- Clear the Editor of all Tasks
- Remove the last (bottom-most) Task from the Editor Test Definition.

A fifth action - prepending a Task (adding a Task to the top of the Test Definition) - can be done by moving the Test Definition from the Editor to an alternative location, clearing the Editor, inserting the new Task and then restoring the original Tasks to the Editor. This action involves procedures that have not yet been discussed.

It is clear that operations in the Editor are limited. Actions that cannot be directly implemented include:

- Removing a Task from the interior of a Test Definition.
- Inserting a Task into the interior of a Test Definition.
- Changing the position of a Task in the Test Definition.

The reason for these limitations relates to the (possibly multiple) dependencies between Tasks such as the Branch Task or Filters and Tasks preceding them in the Test Definition. For example, removing a Branch Target Task from a Test Definition will leave the Branch Task improperly configured. The solution to this problem is the Editor Aide tool.

For this set of steps, the Test Definition of the preceding "Test Definition & Editor" Step-by-Step topics will be adjusted by removing the Delay Task and inserting a Single-Point Filter Task that collects $\pm P^*$ ($\mu\text{C}/\text{cm}^2$) and $\pm P^\wedge$ ($\mu\text{C}/\text{cm}^2$) as a function of Branch Loop iteration. This may be of limited practical value, but serves to fully explore the Editor Aide tool.

Step-by-Step

Step 1: Open the Editor Aide tool. Select "Editor->Editor Aide" or right-click in the Editor window and select "Editor Aide" from the popup menu or click "Ed Aide" on the tool bar or press <Alt-A>.

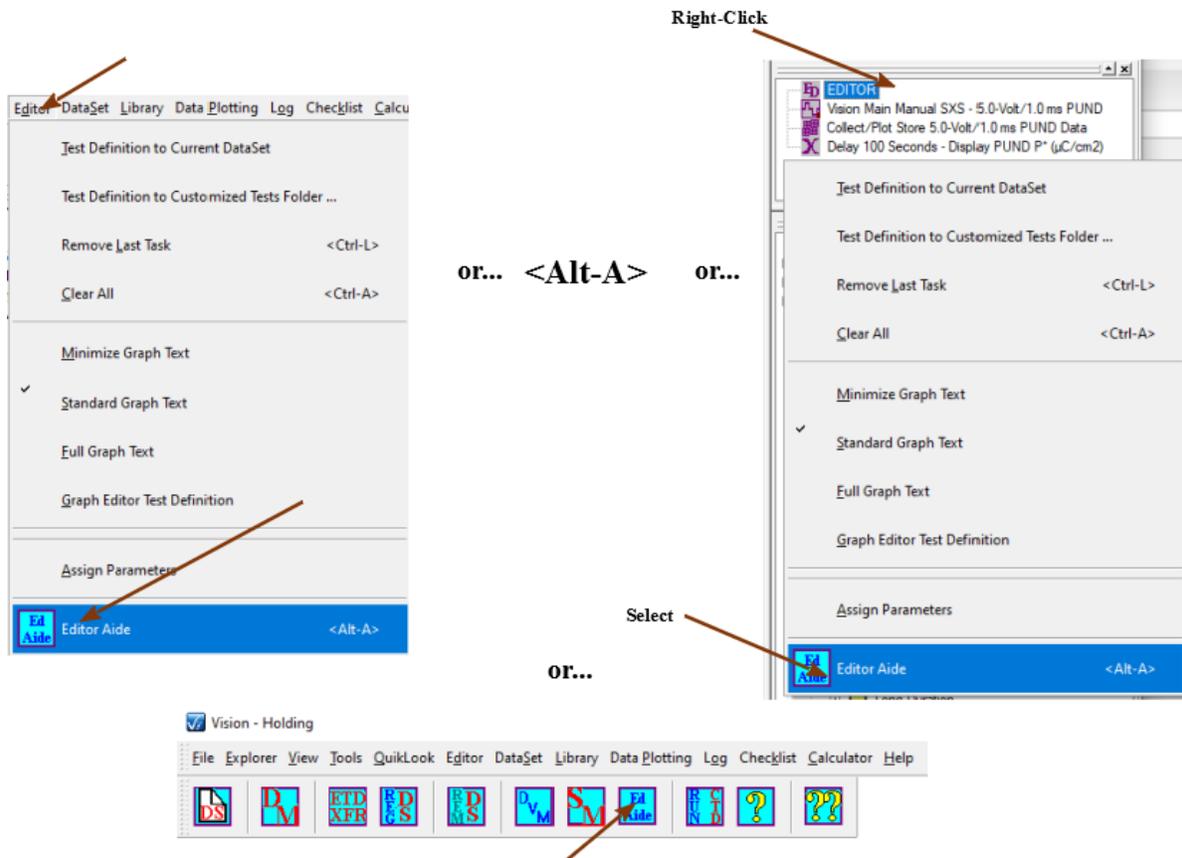


Figure 1 - Access the Editor Aide Tool.

Step 2: Load the Editor Test Definition into the Editor Aide *Editor List* control. When the Editor Aide tool opens, click *Load Editor Tasks To Editor List*. The Tasks in the Editor will be copied into the *Editor List*. The Tasks in the *Editor List* will retain their configurations. Selecting a Task will update *Task Name* and *Comments*, along with *Max. Voltage*, *Sample Area (cm²)* and *Sample Thickness (μm)*, if appropriate.

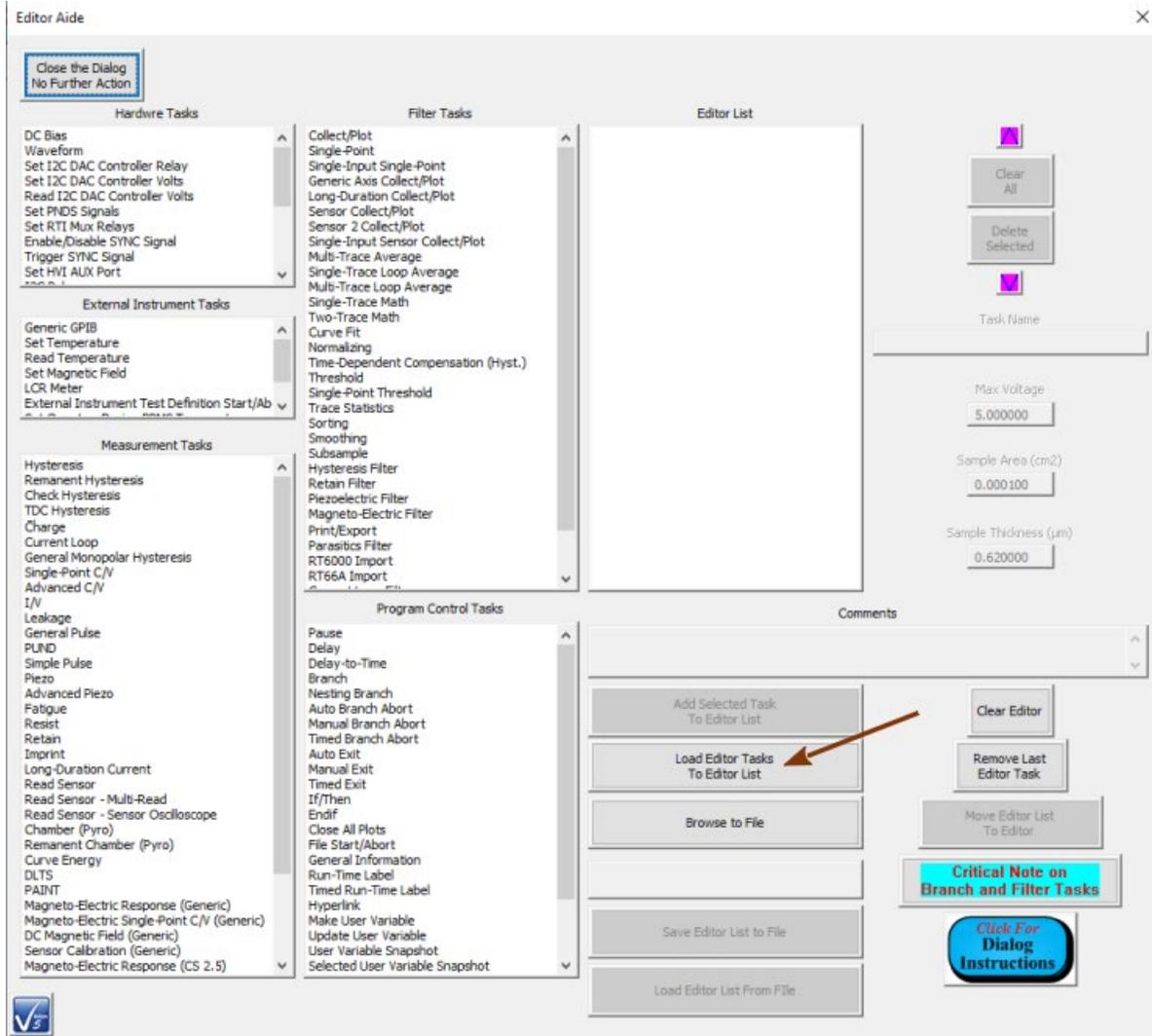


Figure 2a - Click *Load Editor Tasks To Editor List*.

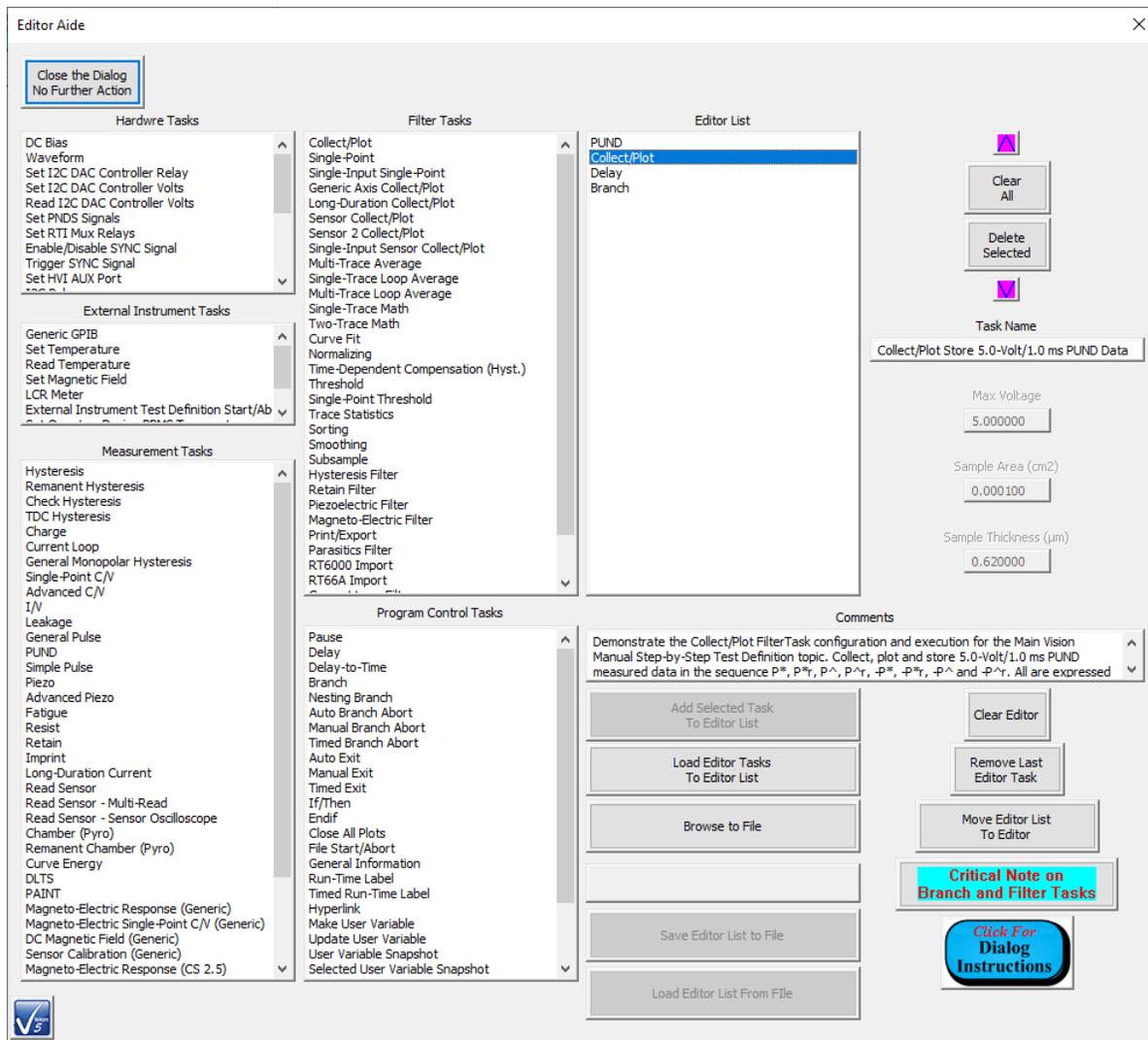


Figure 2b - Editor List is Update. Collect/Plot Filter Task is Selected. Task Name and Comments are as Configured.

Step 3: Delete the Delay Task. Select the Delay Task in the *Editor List* and click *Delete Selected*. (Note that the Branch Task is selected after the Delay Task is deleted. However, the *Task Name* and *Comments* are not yet updated. To update *Task Name* and *Comments*, along with *Max. Voltage*, *Sample Area (cm²)* and *Sample Thickness (µm)*, a Task must be deliberately selected with the mouse in *Editor List*.)

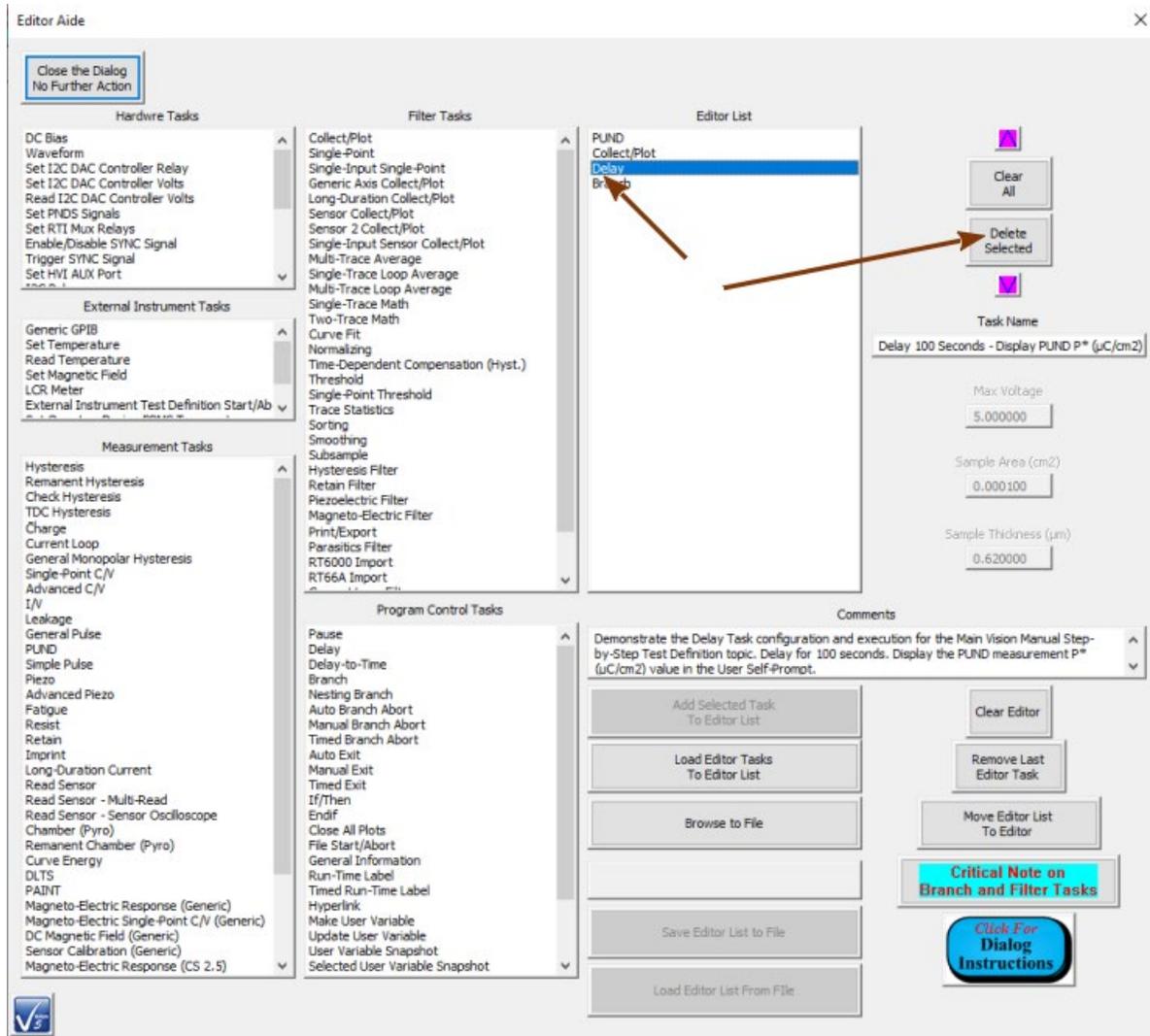


Figure 3a - Select the Delay Task and click *Delete Selected*.

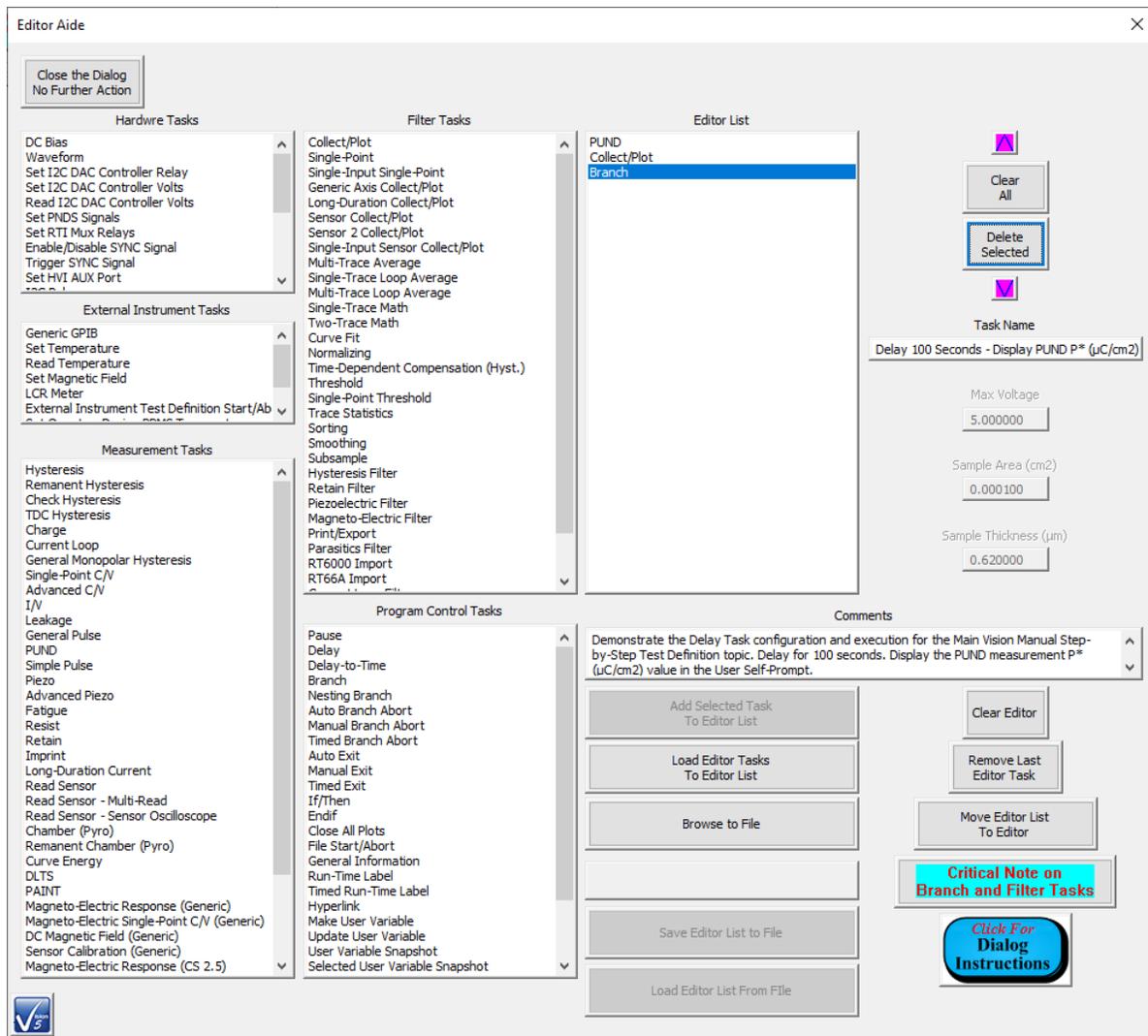


Figure 3b - Delay Task is Removed.

Step 4: Append the Single-Point Filter Task to the Test Definition in *Editor List*. In *Filter Tasks*, select "Single-Point". Click *Add Selected Task to Editor List*.

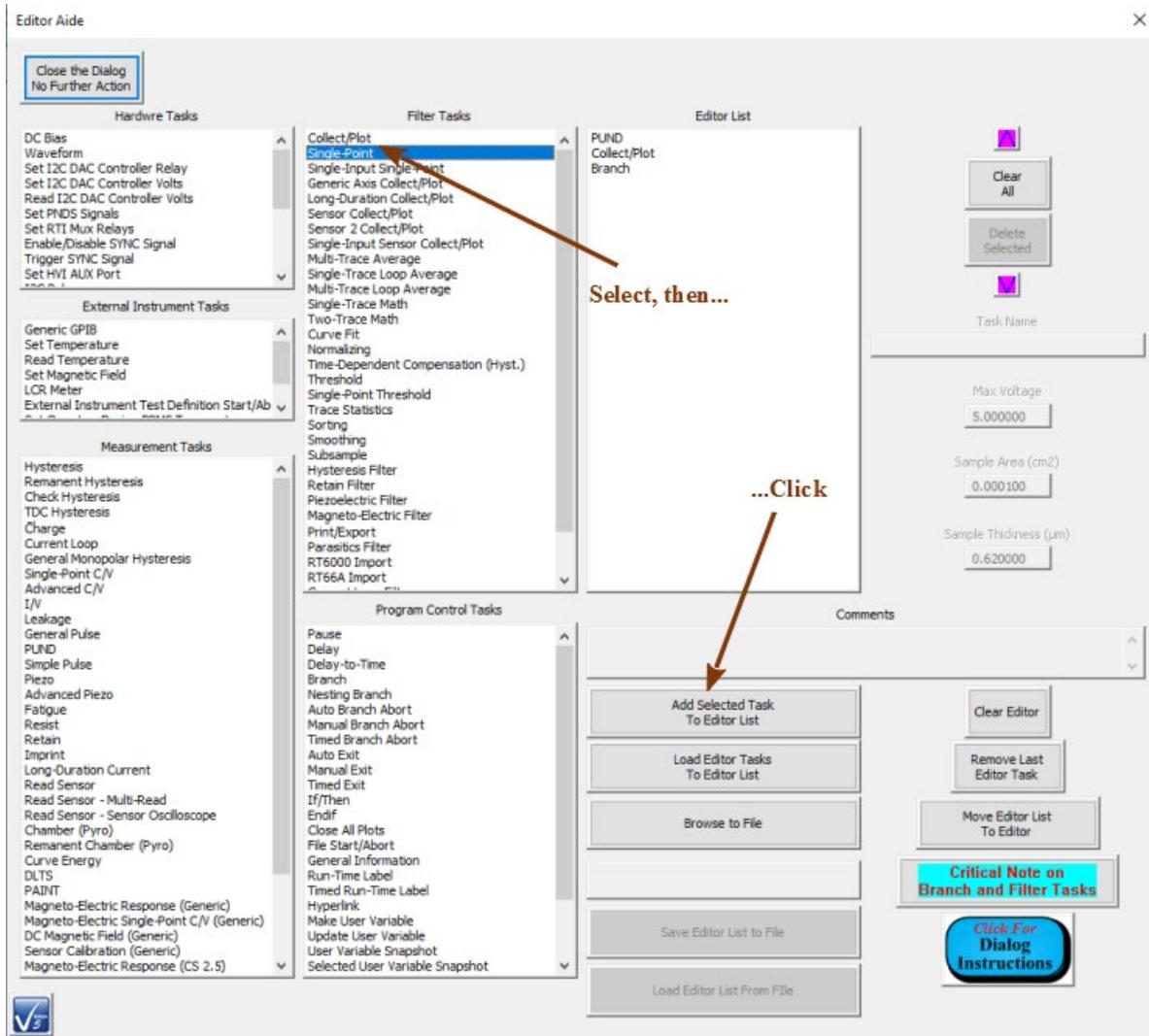


Figure 4a - Actions to Add the Single-Point Filter Task to the *Editor List*.

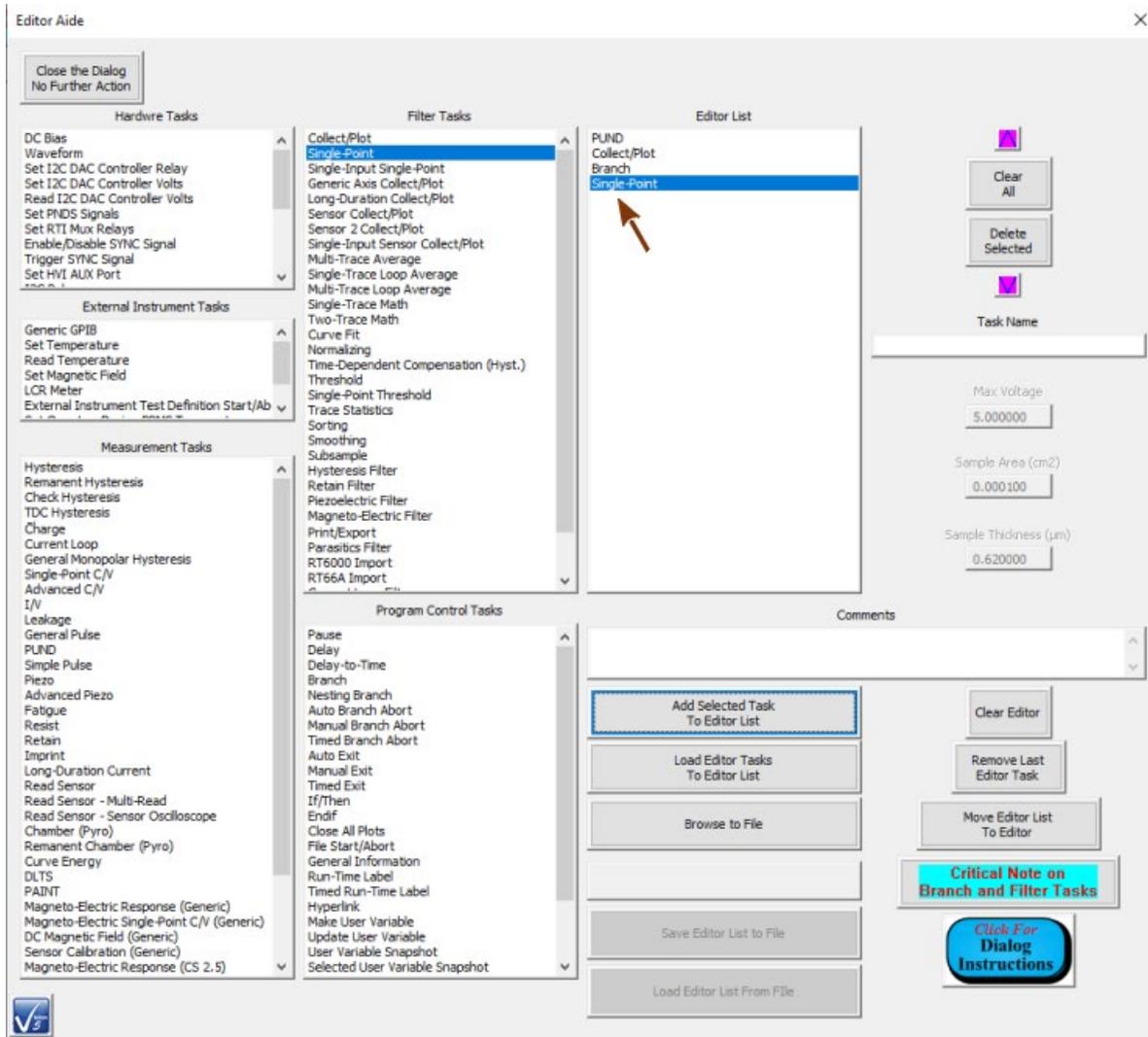


Figure 4b - Single-Point Filter Task is Appended to *Editor List* Test Definition.

Step 5: Move the Single Point Filter Task into Position. With the Single-Point Filter Task selected in the *Editor List*, click  once to move the Single-Point Filter Task up between the Collect/Plot Filter Task and the Branch Task. The Single-Point Filter Task could also be moved up again to before the Collect/Plot Filter Task. That is at the user's discretion. Note that *Task Name* and *Comments* could be assigned to the Single-Point Filter Task at this point. However, there will be a second opportunity, below.

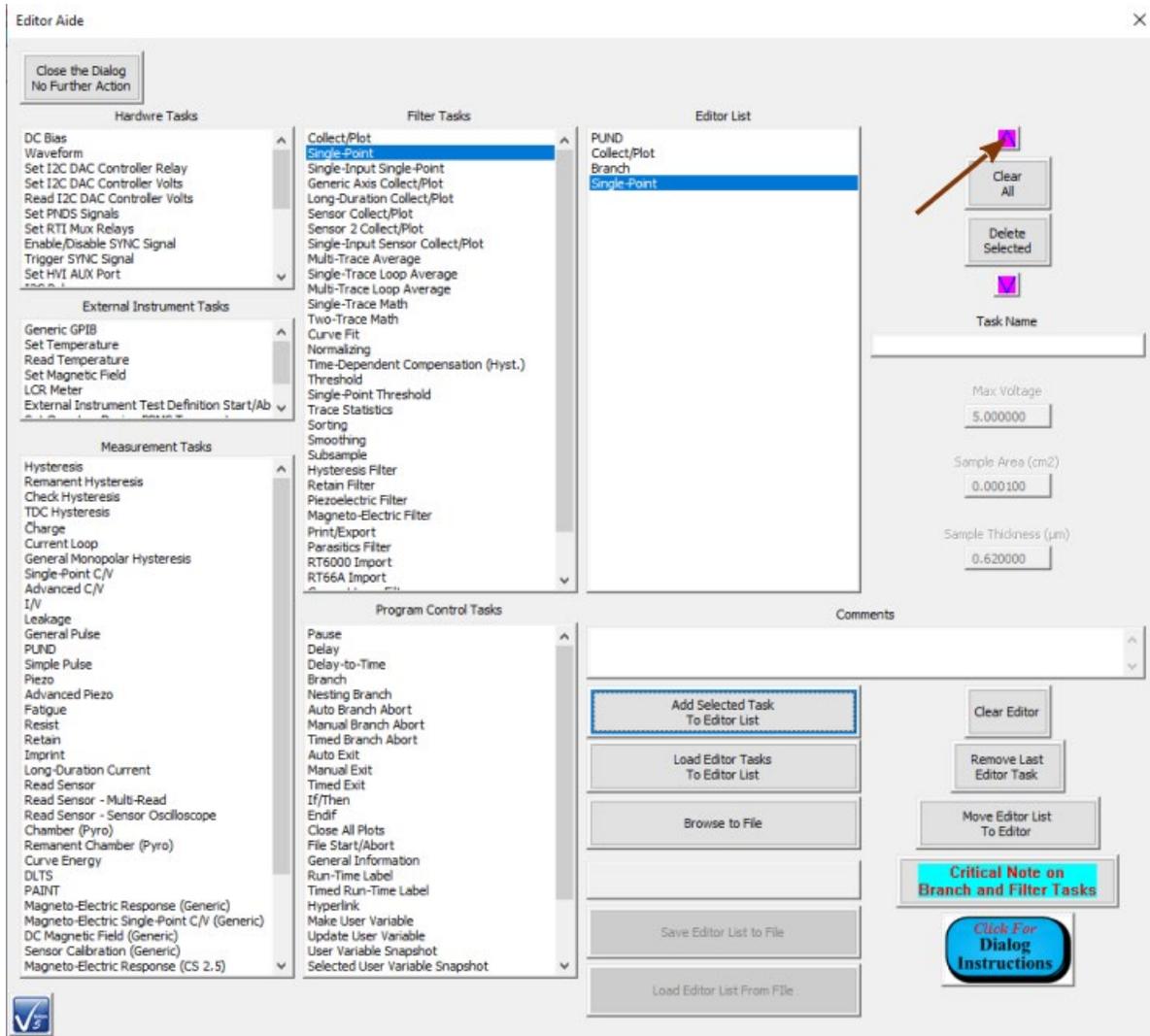


Figure 5a - Click  to Move the Single Point Filter Up in the *Editor List*.

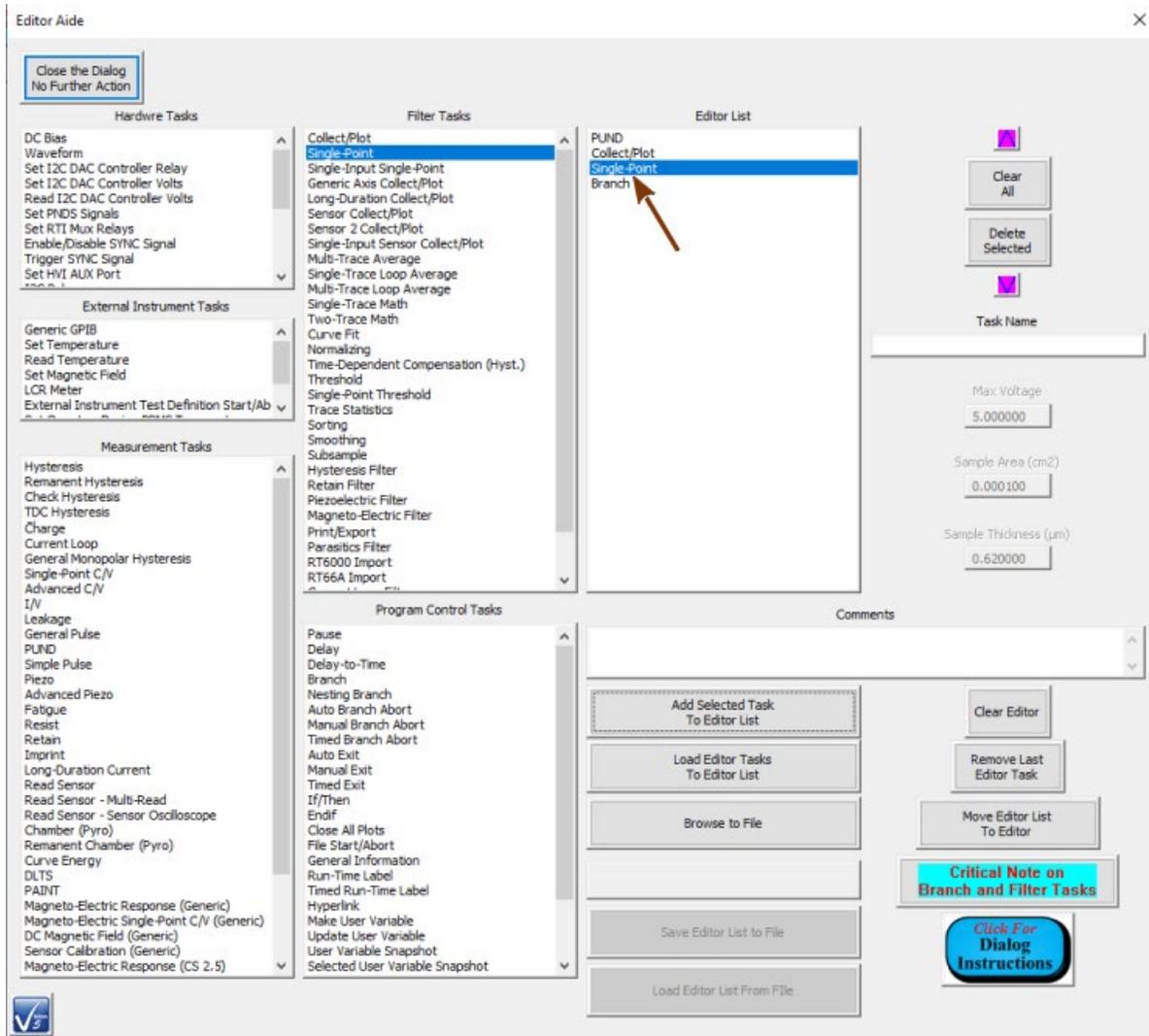


Figure 5b - Single-Point Filter Task Position is Adjusted in the *Editor List*.

Step 6: Clear the Test Definition from the Editor window. The Test Definition in the *Editor List* is now ready to return to the Editor window. The action could be initiated immediately. However, the Tasks in the *Editor List* control would be appended to the Tasks already in the Editor window (**Figure 6**). Before initiating the *Editor List* move to the Editor, clear the Editor by clicking *Clear Editor*.

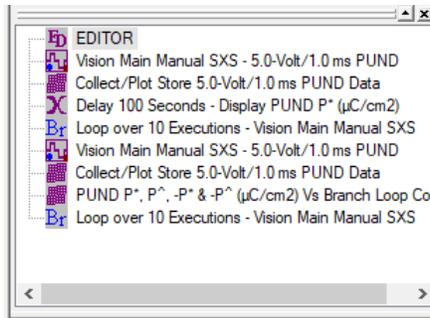


Figure 6 - Update Test Definition Moved to Editor Without Clearing the Editor.

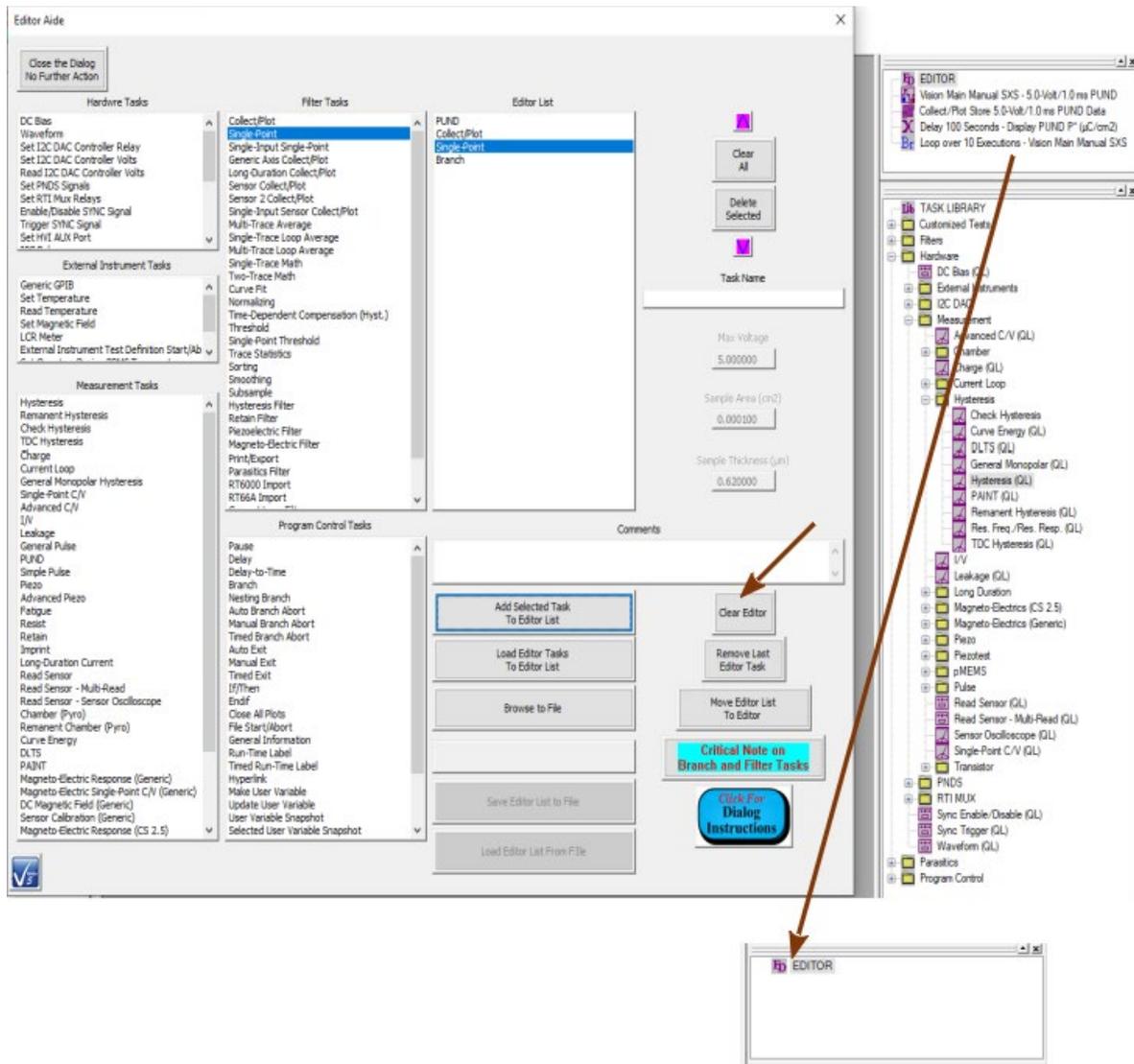


Figure 7 - Clear the Editor Window.

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Step 7: Move the *Editor List* Test Definition into the Editor window. As the *Editor List* Test Definition is moved, each Task is opened for configuration. As it is closed it is appended to the Test Definition in the Editor. Click *Move Editor List to Editor*.

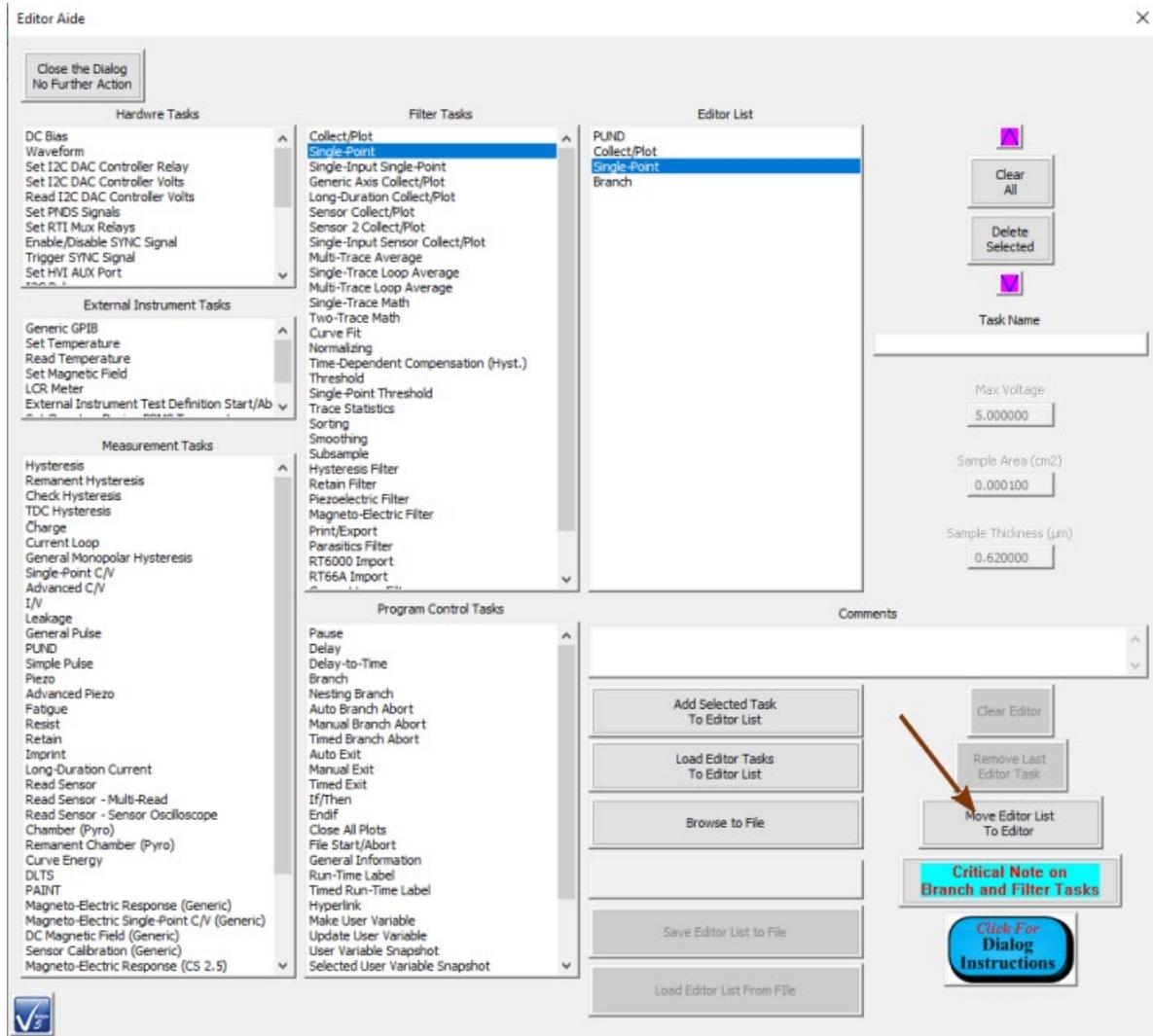


Figure 8 - Initial *Editor List* Test Definition Move to the Editor.

Configure the Tasks as follows:

- **PUND:** Review the Task configuration. Make any desired changes. No specific action is required.

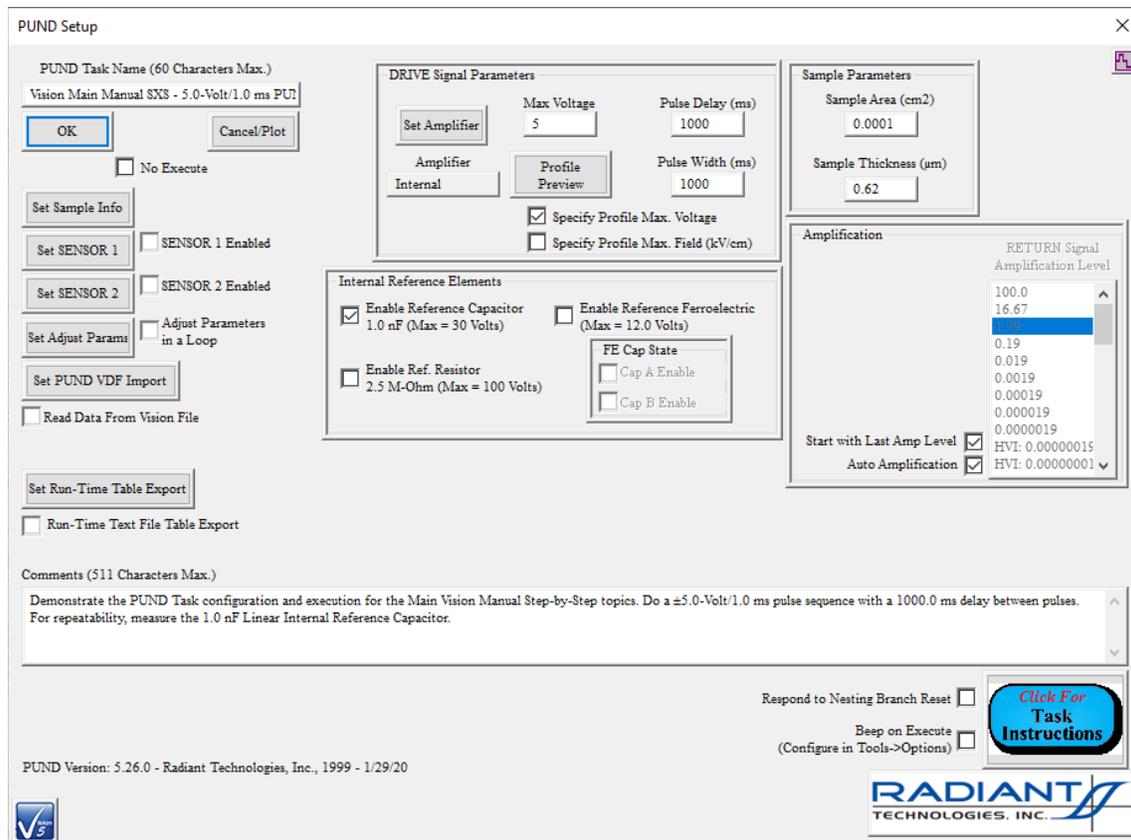


Figure 9 - Review and Adjust PUND Task Configuration.

- Collect/Plot Filter:** Review the Task configuration and plot configuration. Make any desired changes. For Filter Tasks, although they may appear properly configured, it is important to re-establish the dependency with the Filter Target Task(s) by validating the selection in *Task Selector* and clicking *Add Tasks*. This is noted specifically in the subdialog accessed by *Critical Note on Branch and Filter Tasks* (Figure 10).

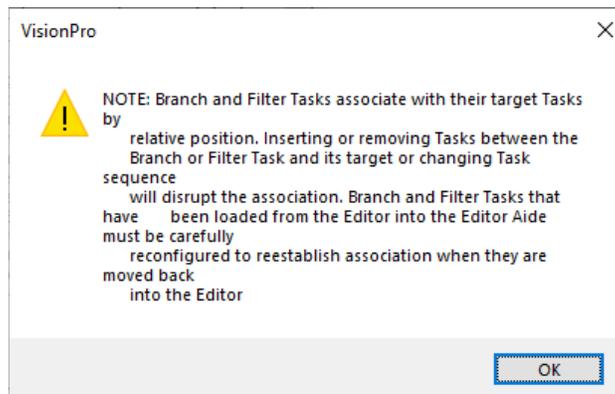


Figure 10 - Branch and Filter Task Reconfiguration Note.

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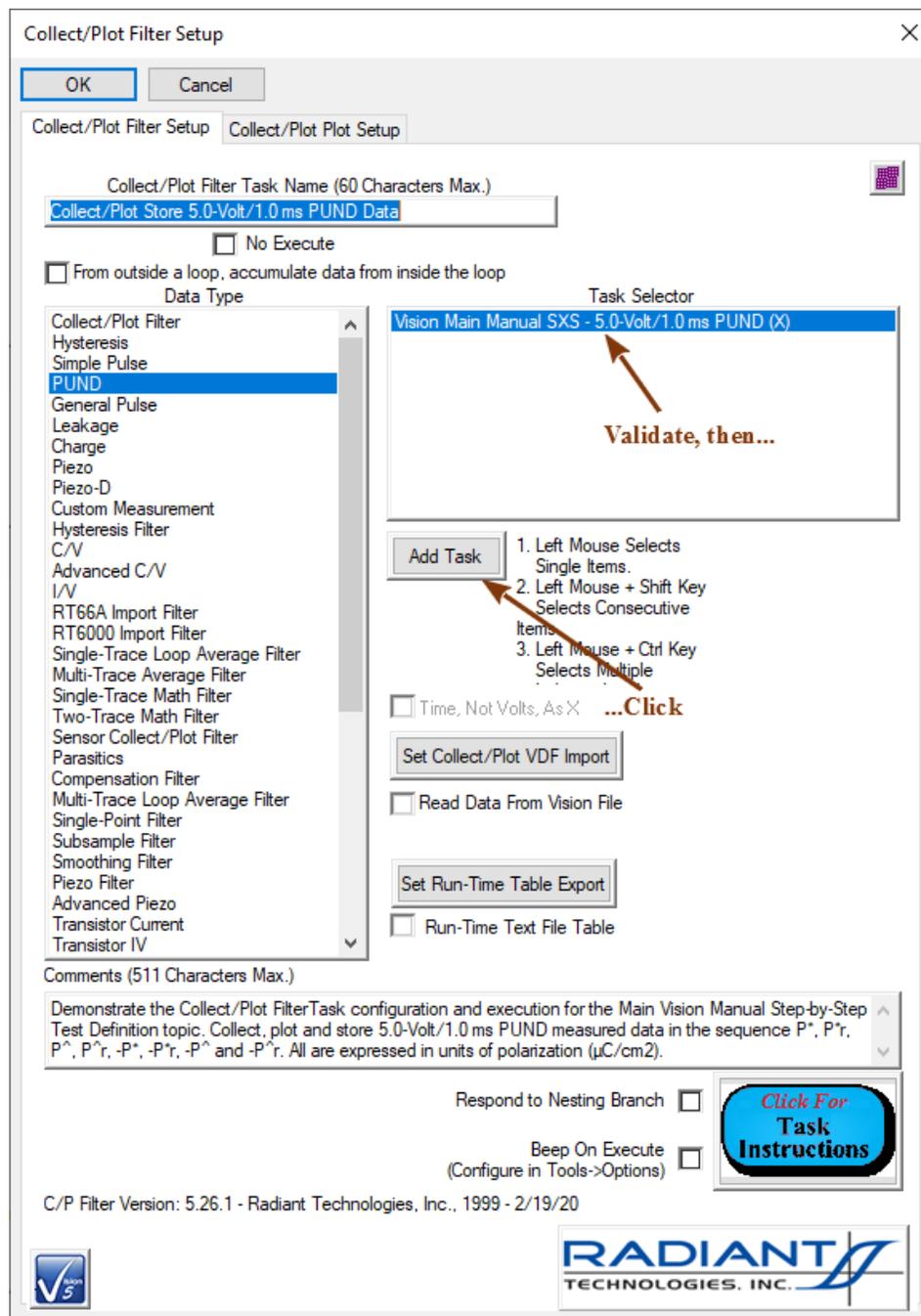


Figure 11 - Validate and Register Target Task(s) Selection.

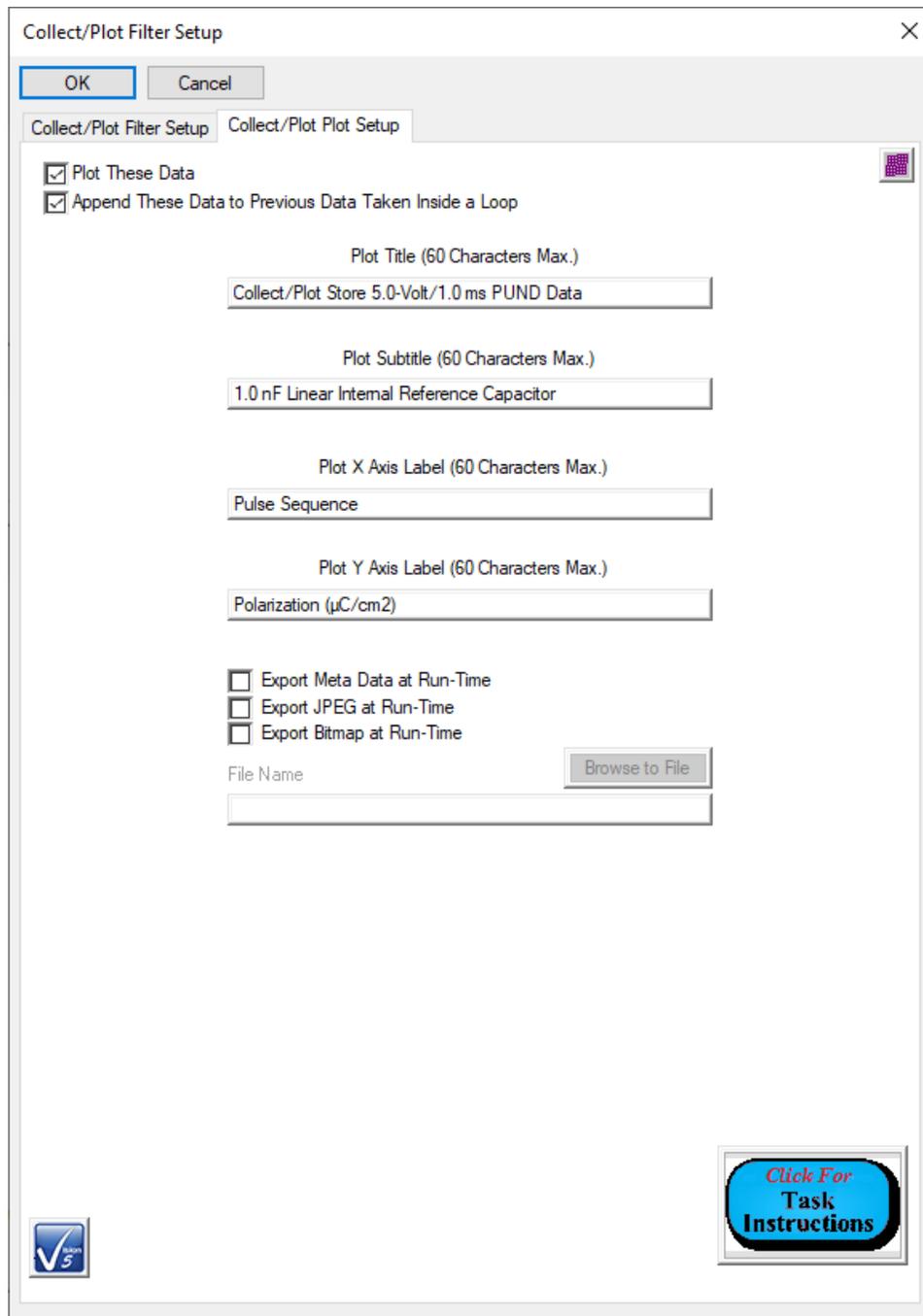


Figure 12 - Adjust Plot Labels and Configuration as Needed.

- **Single-Point Filter:** The entire Task must be configure from scratch. In particular:
 - *Task Name:* Give a unique and meaningful identifier. The Task will be permanently archived under this name.
 - *Data Type:* "PUND".

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- *Single-Point X Axis Type:* "Loop Count".
- *Single-Point Data:* "P* ($\mu\text{C}/\text{cm}^2$)", "P^ ($\mu\text{C}/\text{cm}^2$)", "-P* ($\mu\text{C}/\text{cm}^2$)" and "-P^ ($\mu\text{C}/\text{cm}^2$)".
- *Add Data Trace(s):* Click here after making the complete *Single-Point Data* selection. The selection will be indicated with an appended " (X)".
- *Task Selector:* Select one or more PUND Tasks. (For this set of steps there is only one.)
- *Add Task:* Click here after making the Complete Task Selector selection. The selection will be indicated with an appended " (X)".
- *Comments:* These are recommended, but not required. Extended text is available to allow detailed discussion of inclusion and configuration of the Task.

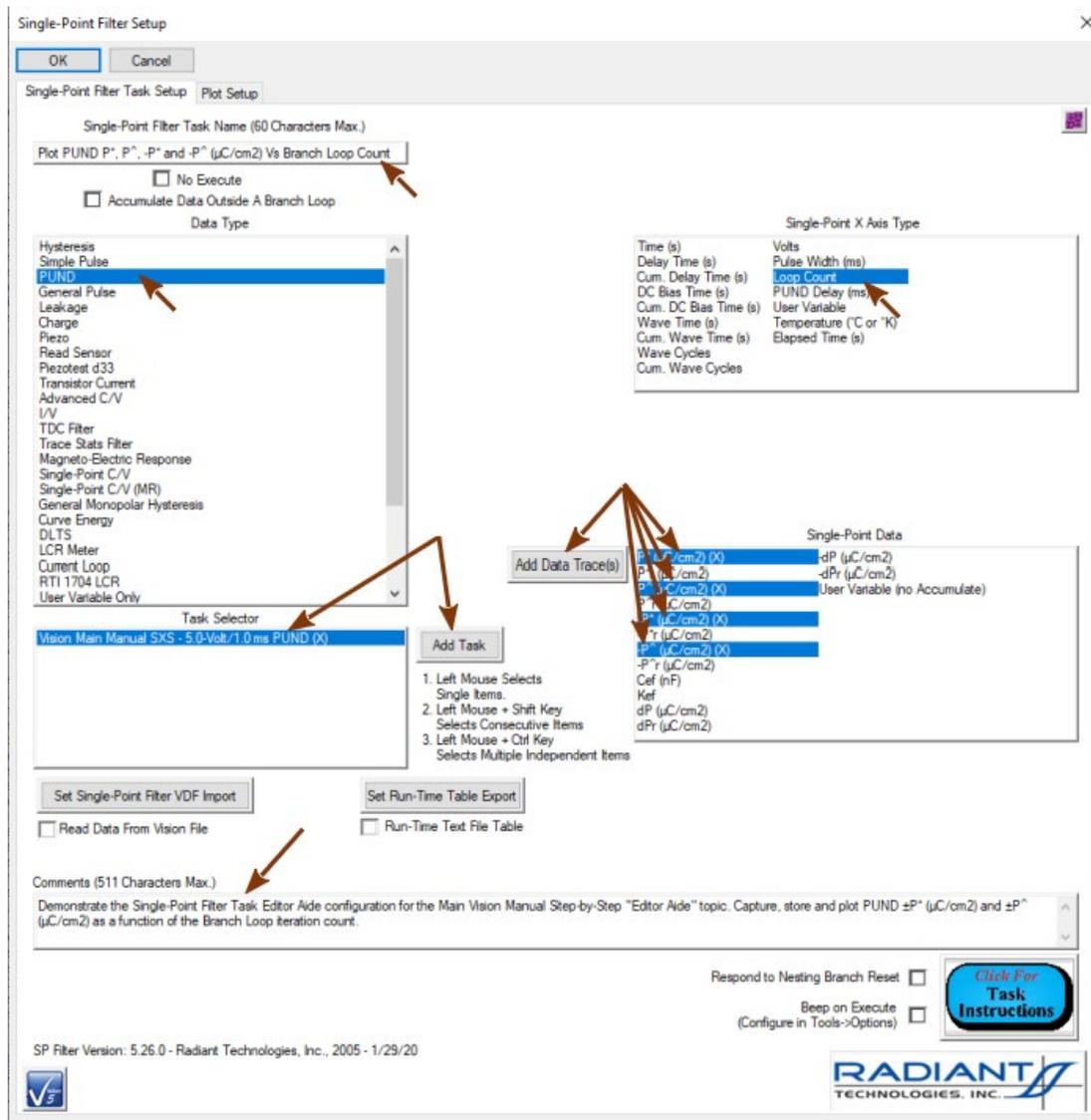


Figure 13 - Single-Point Filter Task Main Configuration.

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The Single-Point Filter Task plot labels should also be meaningfully configured.

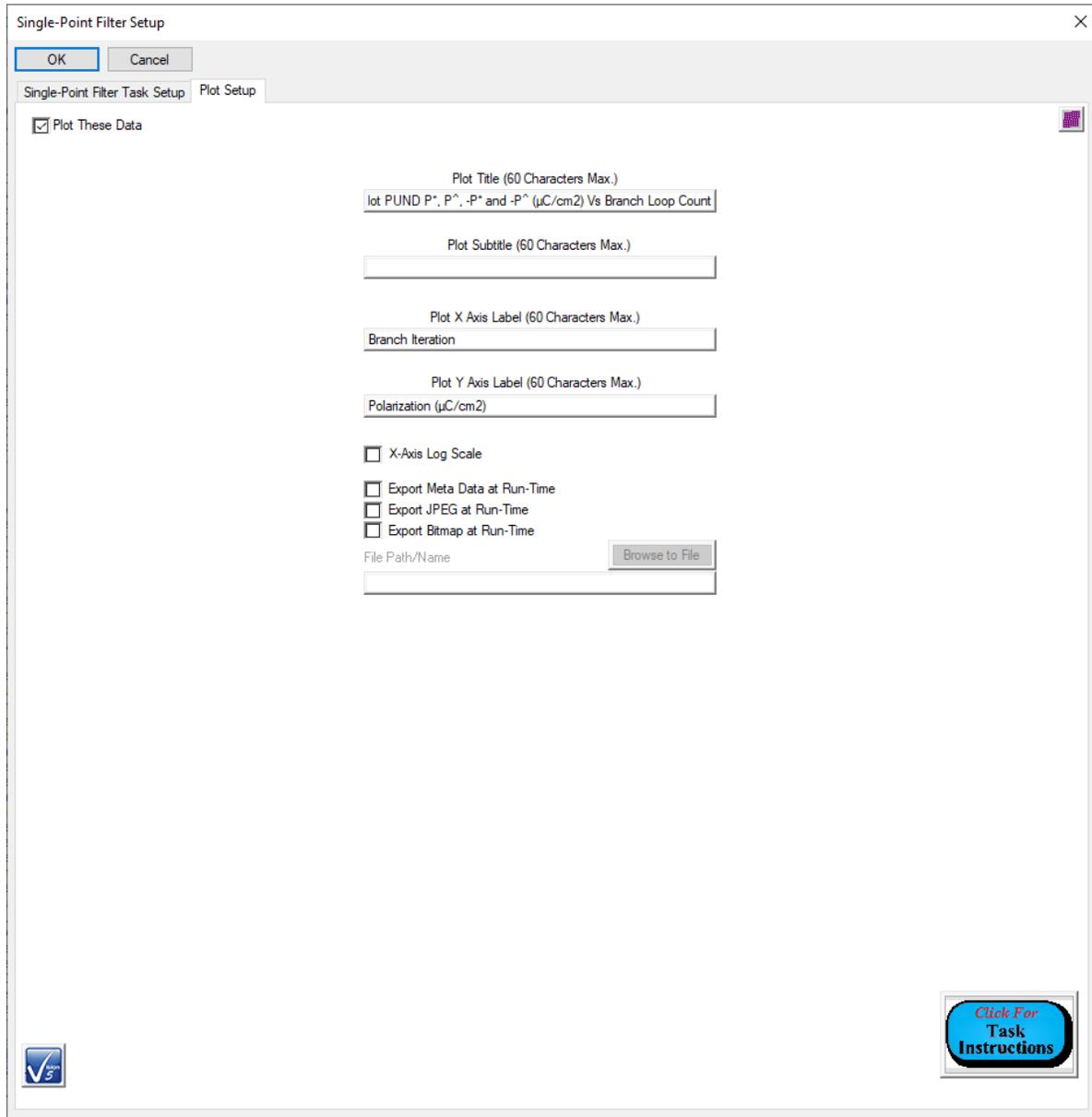


Figure 14 - Single-Point Filter Task Plot Configuration.

- **Branch Task:** Review the Task configuration and plot configuration. Make any desired changes. For the Branch Task, although they may appear properly configured, it is important to re-establish the dependency with the Branch Target Task by validating the selection in *Task Selector* and clicking *Add Tasks*. This is noted specifically in the subdialog accessed by *Critical Note on Branch and Filter Tasks* (**Figure 10**).

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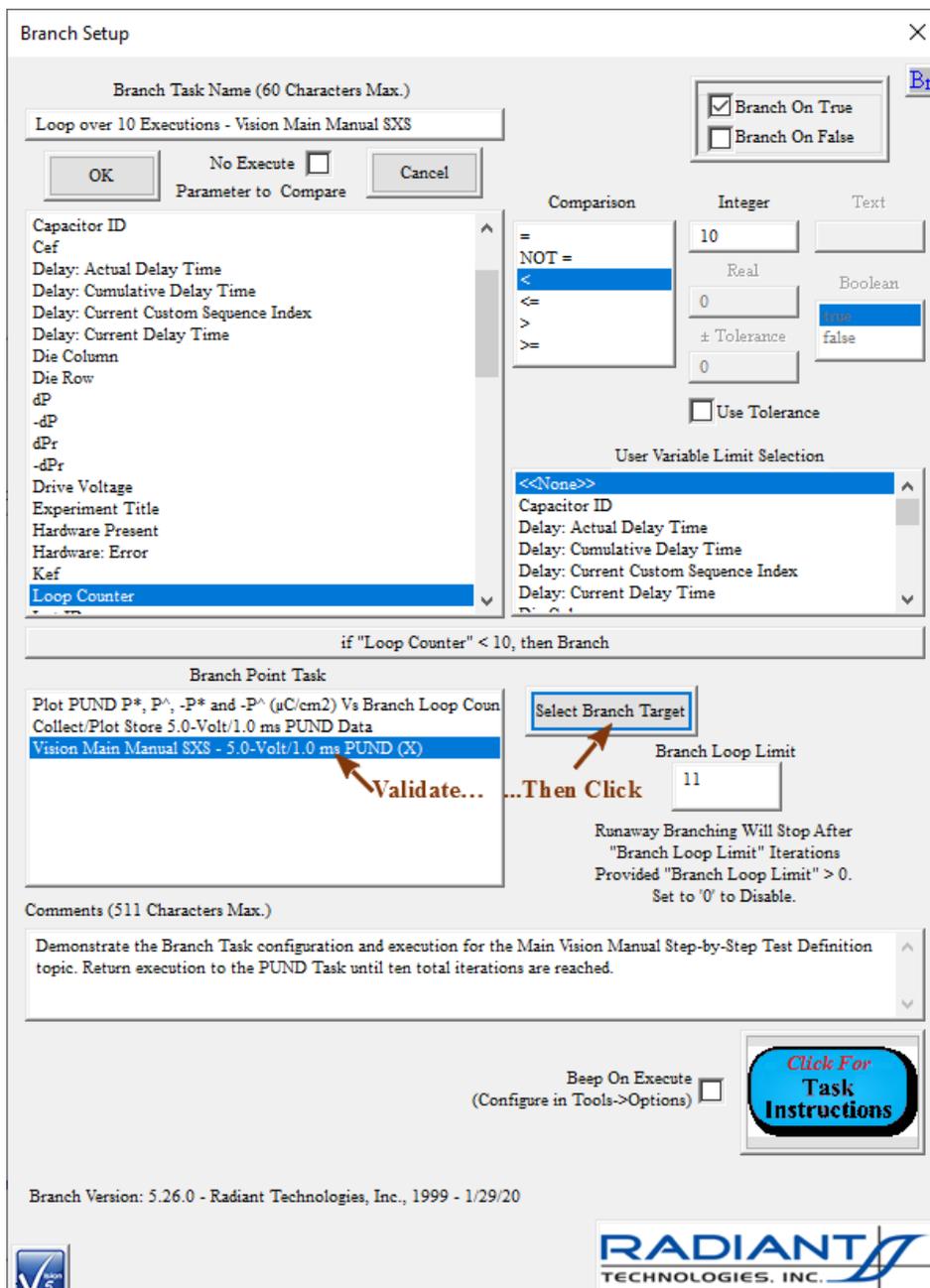


Figure 15 - Branch Task Reconfiguration.

Step 8: Save the Editor List Test Definition to a file.

- Click *Browse to File*

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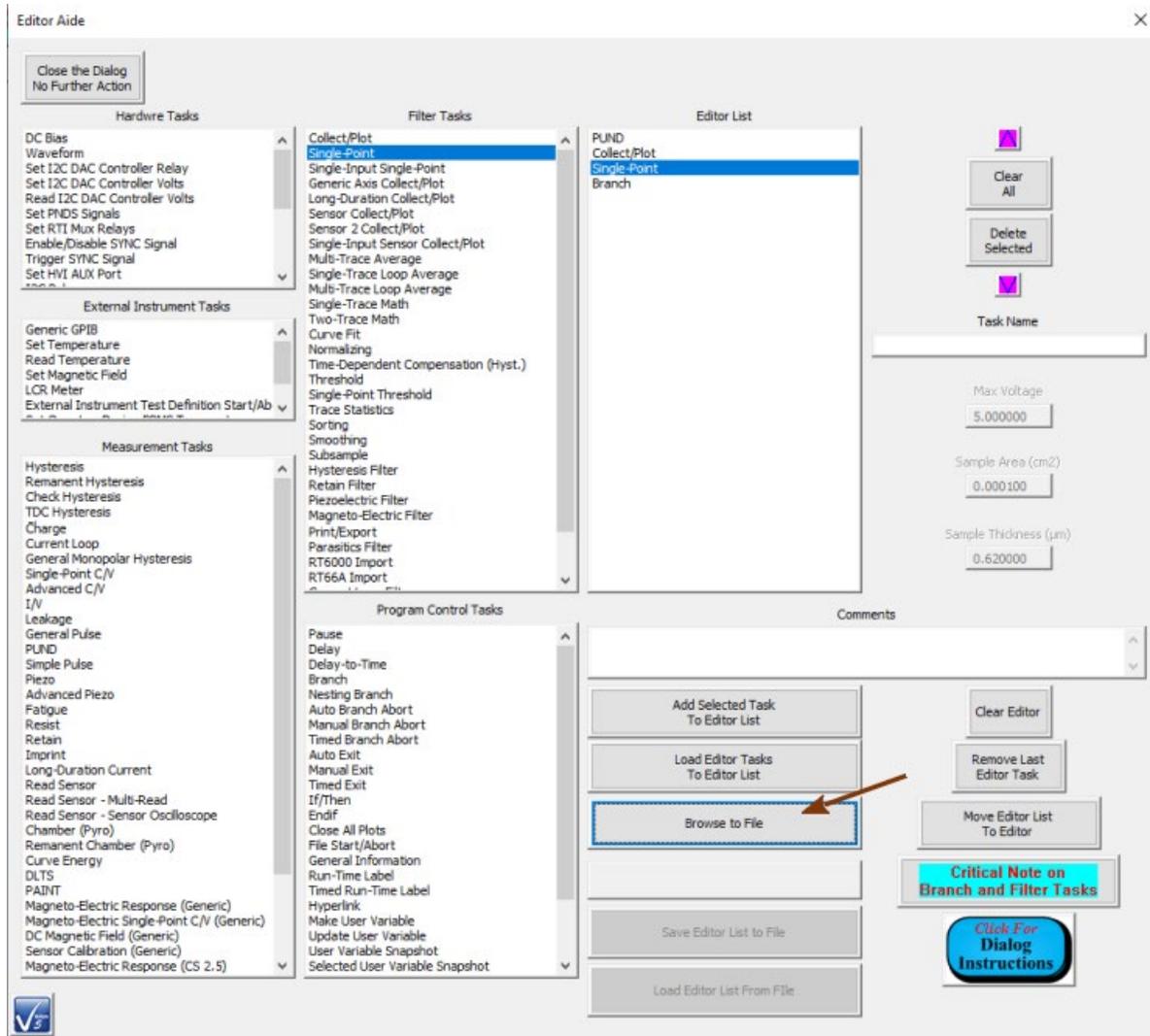


Figure 16 - Initial File Save - Click *Browse to File*.

- Navigate to an appropriate output file location and specify the non-existent file name. The file will have a *.elx file extension. Click *OK*.

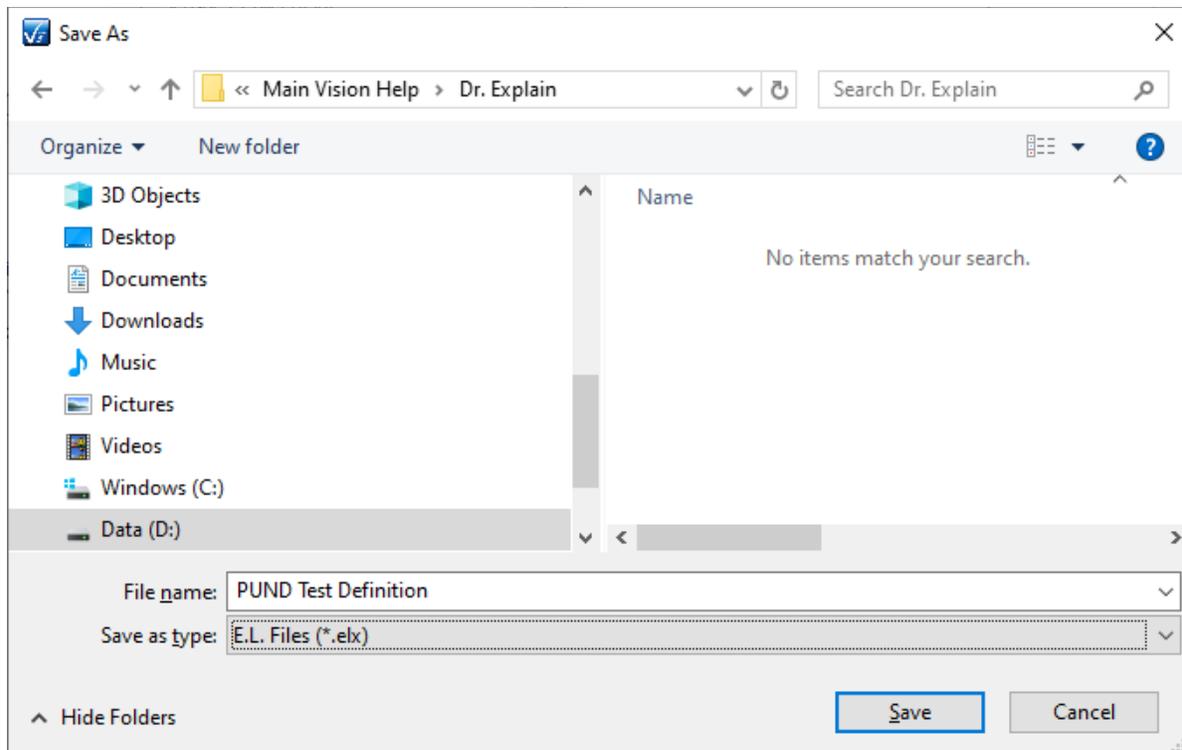


Figure 17 - Navigate to the File Location and Assign the File Name.

- The file path and name will appear in the unlabeled text box just below *Browse to File*. Since the file does not exist, *Save Editor List to File* is enabled and *Load Editor List From File* is disabled. Click *Save Editor List to File* to write the file. Then validate the file at the location. Since the file now exists, *Save Editor List to File* is disabled and *Load Editor List From File* is enabled.

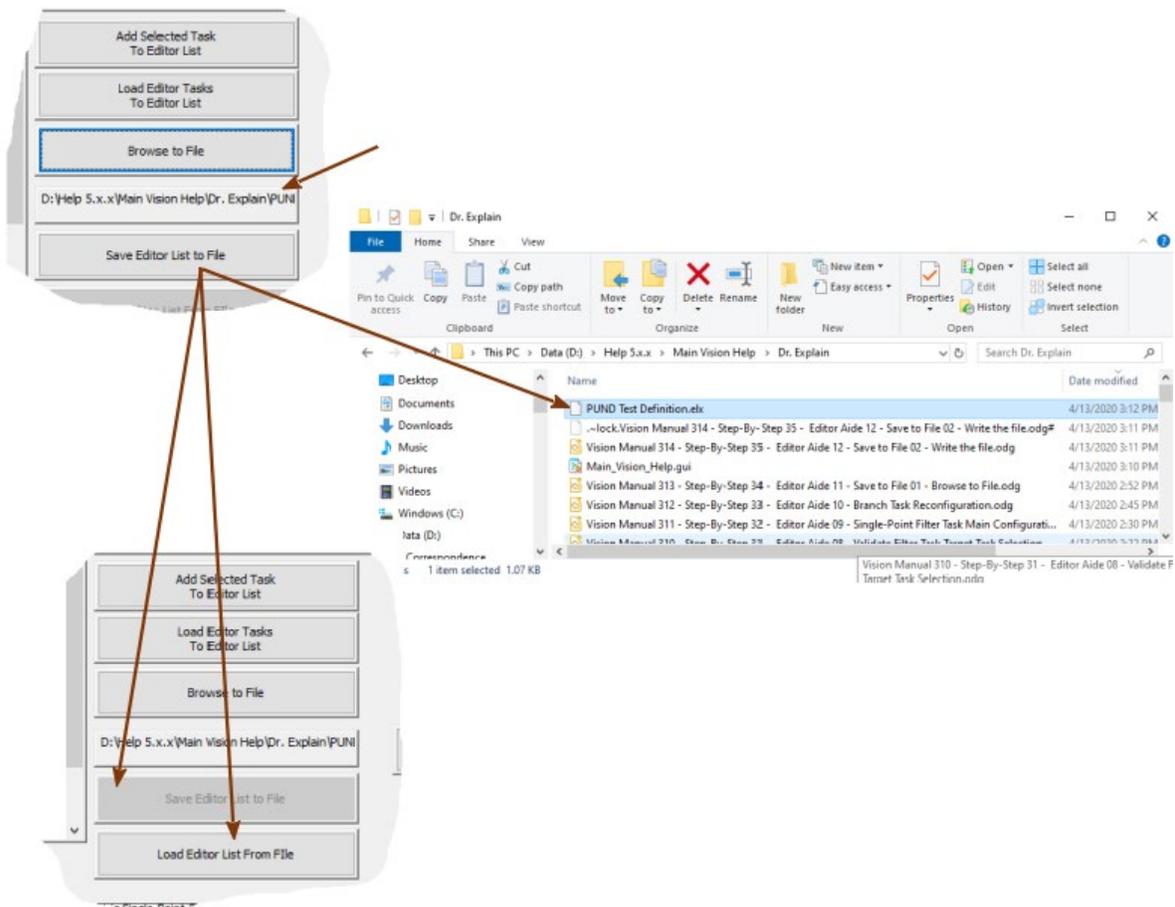


Figure 18 - Write the Editor Aide *Editor List* File.

Step 9: Recall the *Editor List* from an existing file.

- If required, click *Clear All to clear all Tasks* out of the *Editor List*. Otherwise, Tasks loaded from the file will be appended to existing Tasks in the *Editor List*.

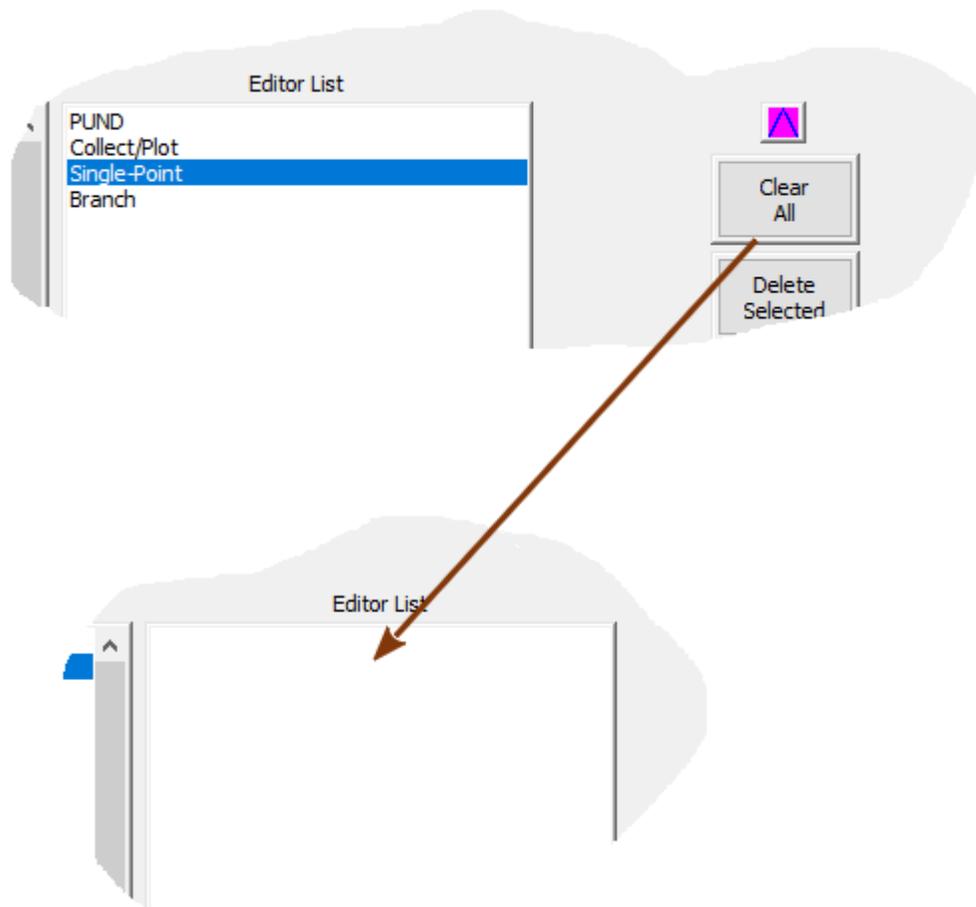


Figure 19 - Clear the *Editor List*.

- Click *Browse to File*. Use the standard Windows file browser dialog that appears to navigate to and select an existing *.elx file. Click *Save* to close the browser. The file path and name will appear in the unlabeled text box just beneath *Browse to File*. Since the file exists, *Save Editor List to File* will be disabled and *Load Editor List from File* will be enabled.

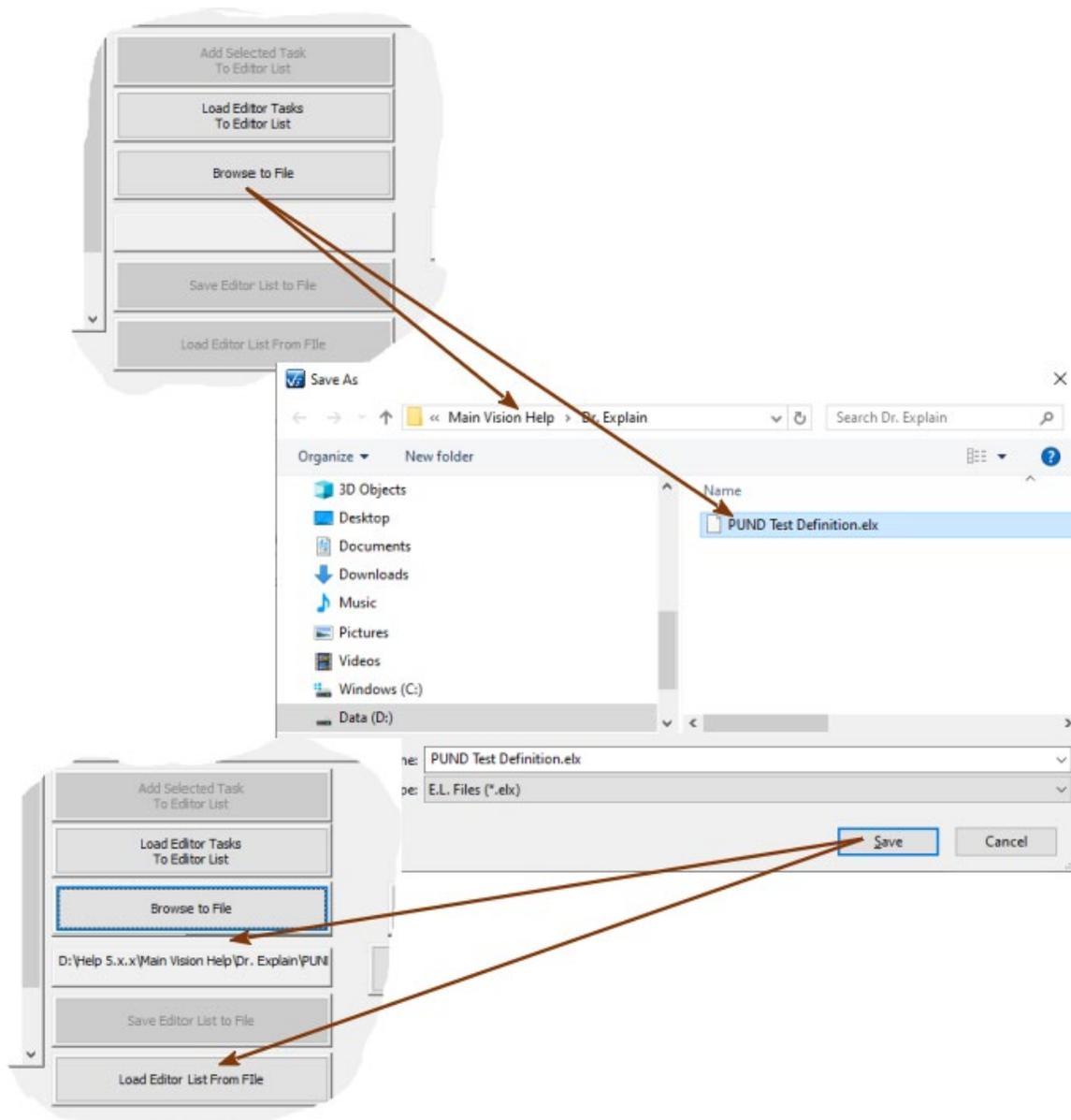


Figure 20 - Select the Existing Editor List File.

- Click *Load Editor List from File*. The Tasks stored in the selected *.elx file will be appended to any Tasks in the *Editor List*.

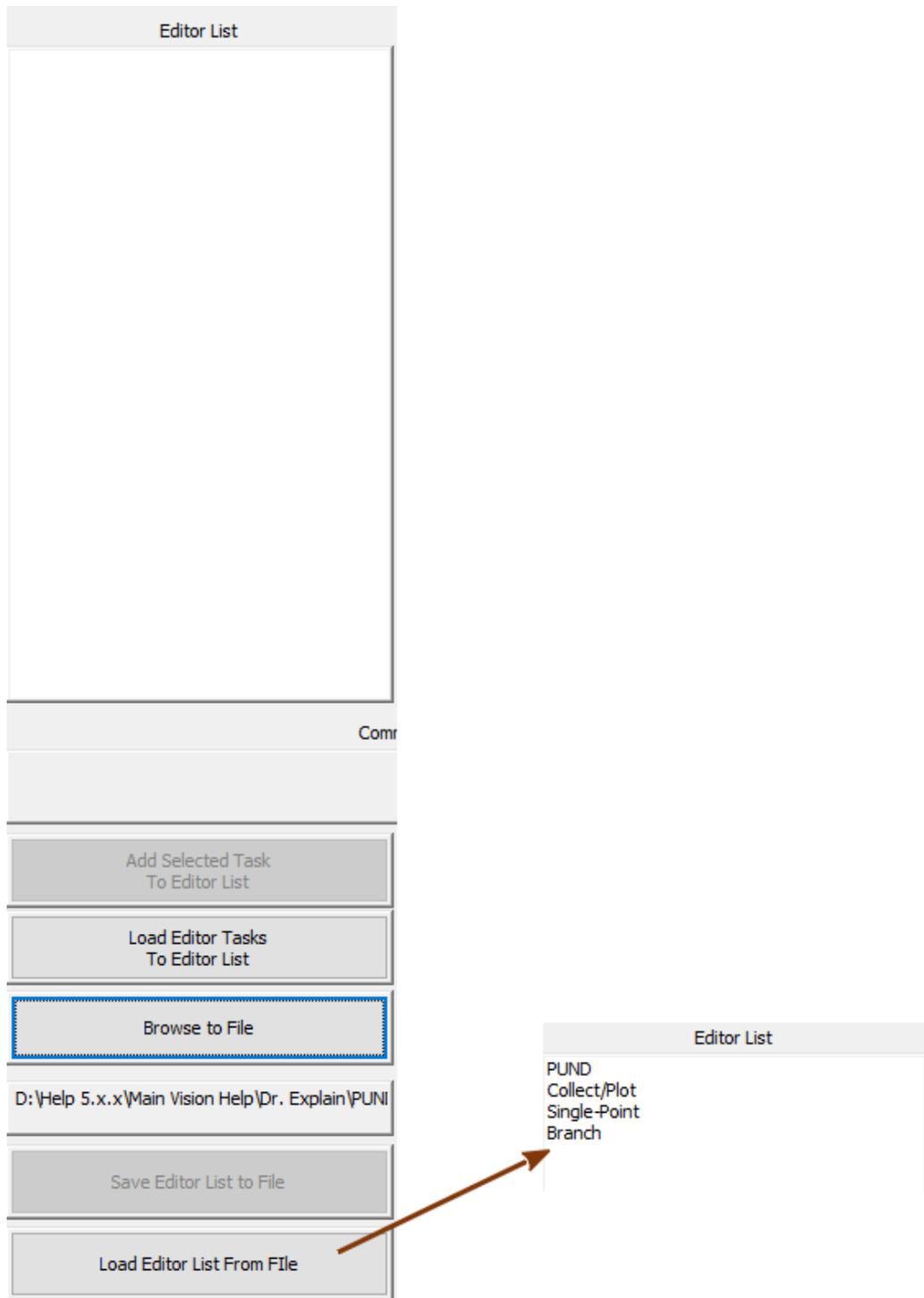


Figure 21 - Update the *Editor List* from the File.

Step 10: Click *Close the Dialog No Further Action* to close the Editor Aide.

Customized Tests

Customized Test Creation

Step-By-Step: Customized Test/Task Creation

Once a [Test Definition](#) has been created, it may be saved in the [Library](#) for reuse. Both the sequence of [Tasks](#) and the configuration of each Task will be saved. In the Library it will appear as a Task in a folder called “Customized Tests” That folder will be created when the first Test Definition is returned to the Library. When a Customized Test is dragged back to the [Editor](#) it will expand into the list of Tasks that comprise it. The Tasks will be configured as they were when the Customized Test was created. They may be reconfigured. The Task list will be appended to any Test Definition that is already in the Editor. New Tasks may then be appended to the Test Definition. **Note Customized Tests are also referred to by some Vision dialogs and controls as UDTs. This is short for User-Defined Test. While User-Defined Test is no longer used to refer to these objects, UDT is a convenient and persistent acronym that may still appear in dialogs and help pages.**

Test Definitions can also be moved from a DataSet CTD back to the Editor or directly into the Library as a Customized Test. Executed Test Definitions (ETDs) in a DataSet Archive can be moved directly into that DataSet's CTD or can be moved back to the Editor. Since Test Definitions can be recalled for reuse from a DataSet, Customized Tests are less used.

Note that Customized Tests are stored as files with a *.udt extension in the C:\DataSets folder. On startup, Vision will search that folder and load all *.udt files into the "Customized Test" folder of the TASK LIBRARY.

Step 1: Create a Test Definition as described in “[Test Definition Creation](#)” in the Step-by-Step instructions.

Step 2:

- a. Select the “TD to Customized Test..” option from the Editor menu or...
- b. ...click the right mouse button in the Editor window and select the “TD to Customized Test...” option from the Popup menu.

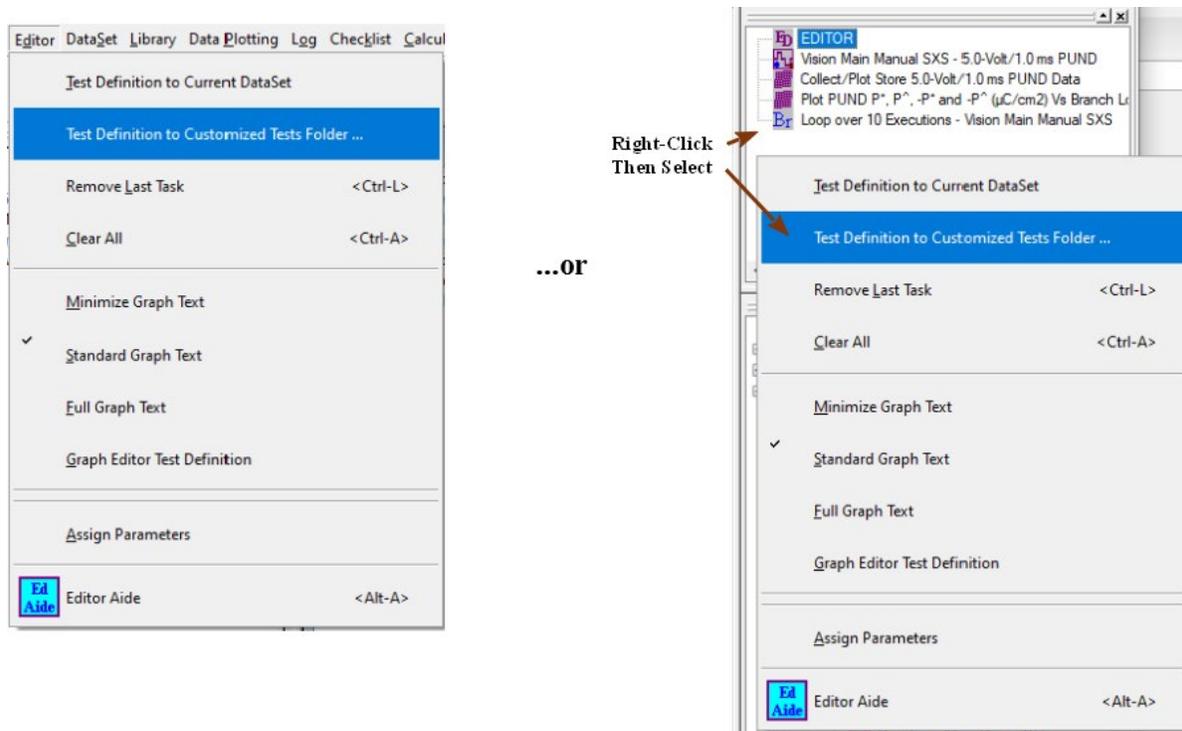


Figure 1 - Making a Customized Test from a Test Definition.

Step 3: A dialog will appear that allows you to name the Customized Test. Enter a descriptive name and click *OK*. Clicking *Cancel* will abort the operation without creating the Customized Test.

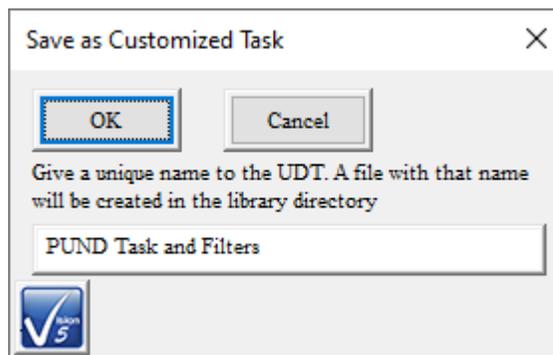


Figure 2 - Name the Customized Test.

Step 4: A folder name ‘Customized Tests’ will appear in the Library. The Customized Test that was just created will appear in the folder. Any number of Customized Tests can be added to the folder.

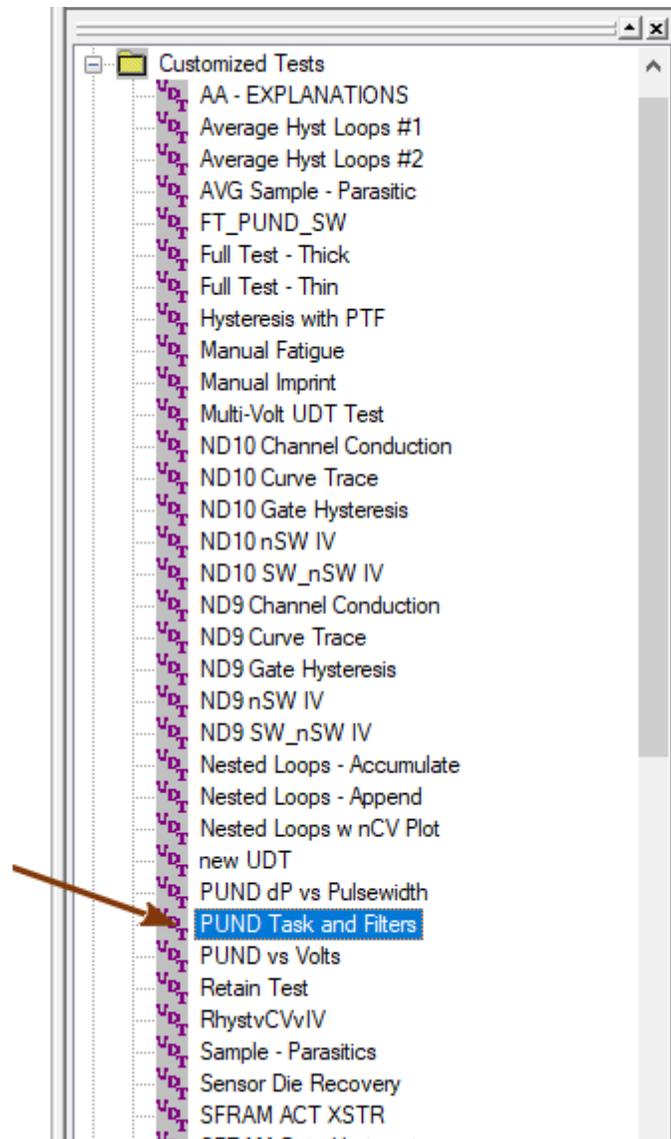


Figure 3 - Customized Test Folder Added to the Library. It Contains the Customized Test.

Step 5: To use the Customized Test, drag it to the Editor as with any other Task as described in the [Step-by-Step](#) instructions for creating a Test Definition. Alternatively, right-click on the Customized Test in the TASK LIBRARY and select "To Editor" from the popup menu.

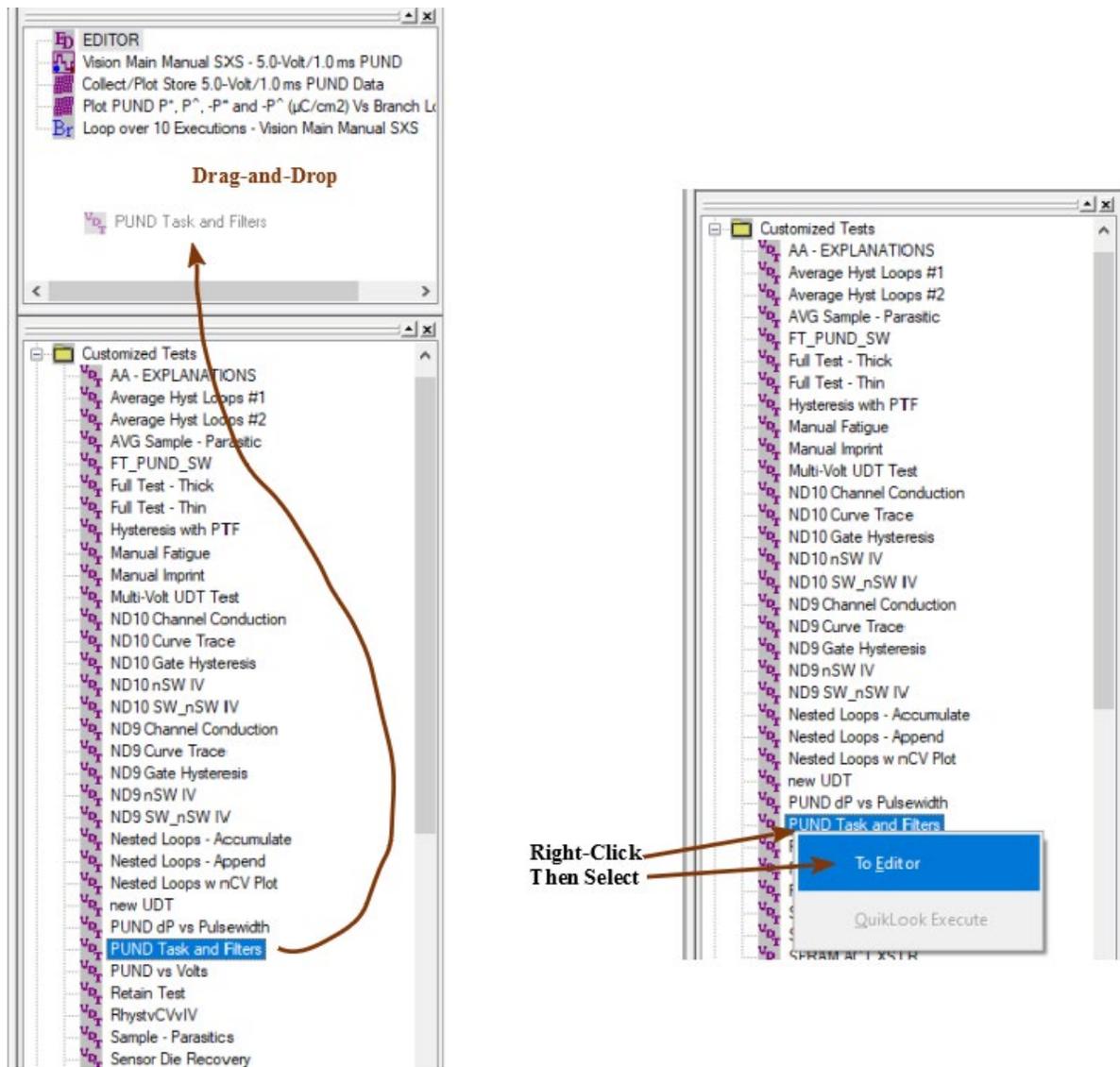
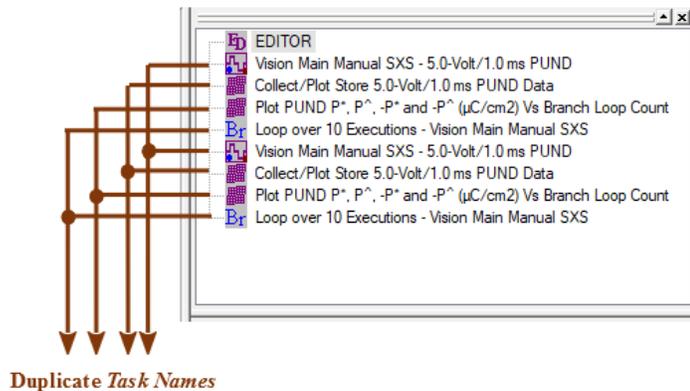


Figure 4 - Recalling the Customized Test to the Editor.

Step 6: The Customized Test will expand into the Tasks that form its Test Definition. These will be appended to any other Tasks in the Test Definition (Here, the list is simply duplicated.) **Note that there are now Tasks in the Test Definition with duplicate names. This is legal, but is bad programming practice. The newly added Tasks should be reconfigured and renamed.**



Duplicate Task Names

Figure 5 - Customized Test is Appended to the Test Definition in the Editor.

Step 7: Tasks installed by the Customized Test may be reconfigured by double-clicking on them with the left mouse button.

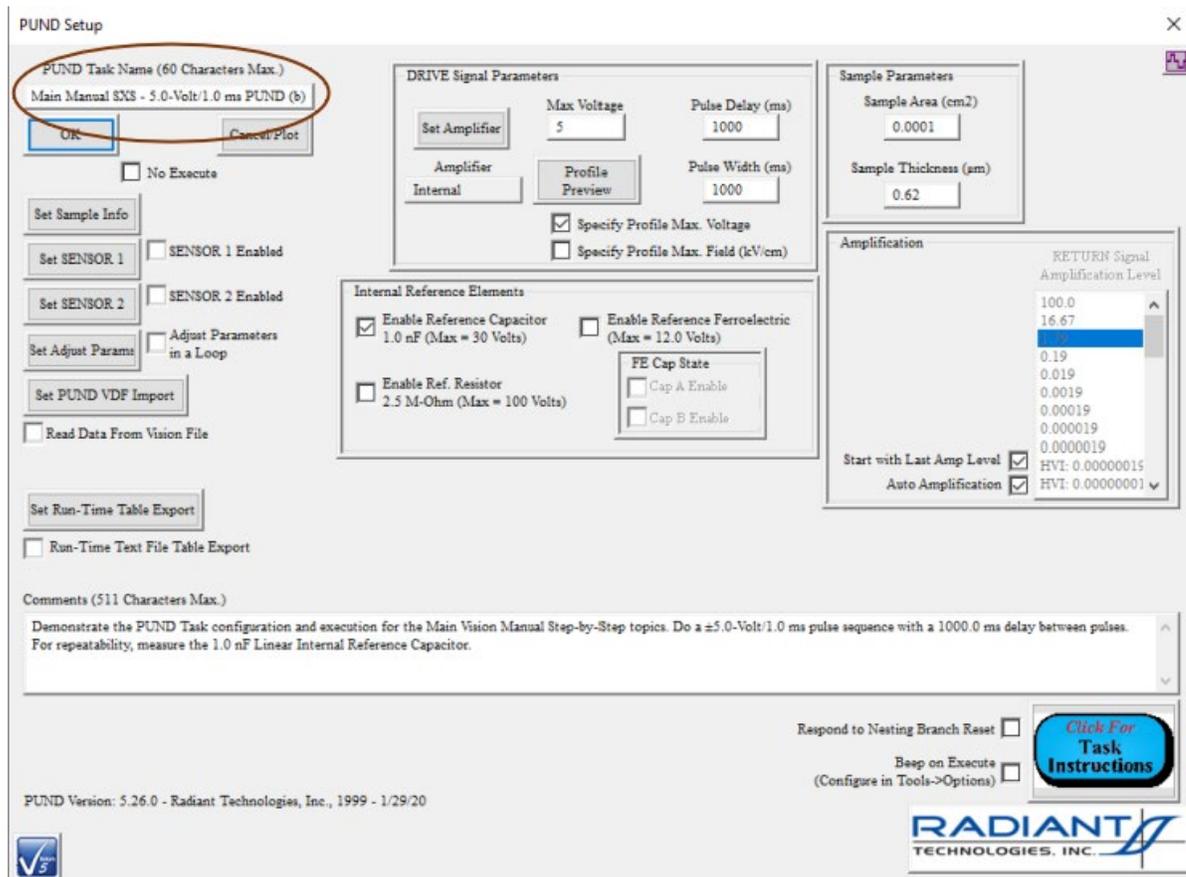


Figure 6 - Reconfigure and Rename the PUND Task.

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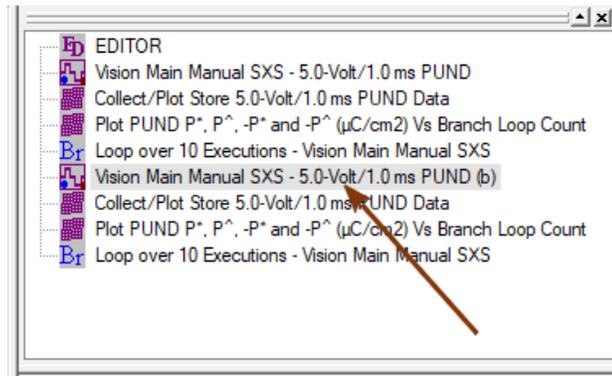


Figure 7 - Test Definition with Updated PUND Task Name.

Customized Test Deletion

Step-By-Step: Customized Test/Task Deletion

Step 1: To delete a Customized Test from the Customized Test folder in the Library, select “Delete Customized Test” from the Library menu.

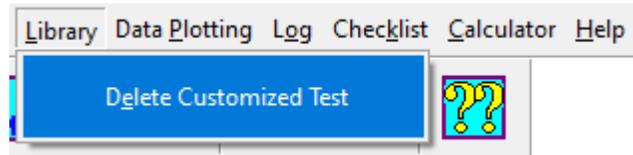


Figure 1 - Initiate the Deletion of One or More Customized Tests from the Library.

Step 2: A dialog box will appear listing all Customized Tests. Select the desired Customized Test(s) and click *OK*. Click *Cancel* to exit the procedure without deleting any Customized Tests.

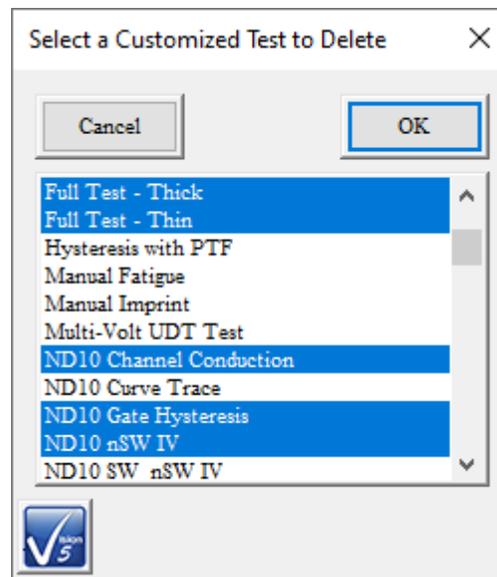


Figure 2 - A Dialog Appears in which the Test Definitions to be Deleted are Selected.

Step 3: The Customized Task will be removed from the “Customized Test” folder in the Library. If no Customized Tasks remain in the “Customized Test” folder, the folder will no longer appear in the Library.

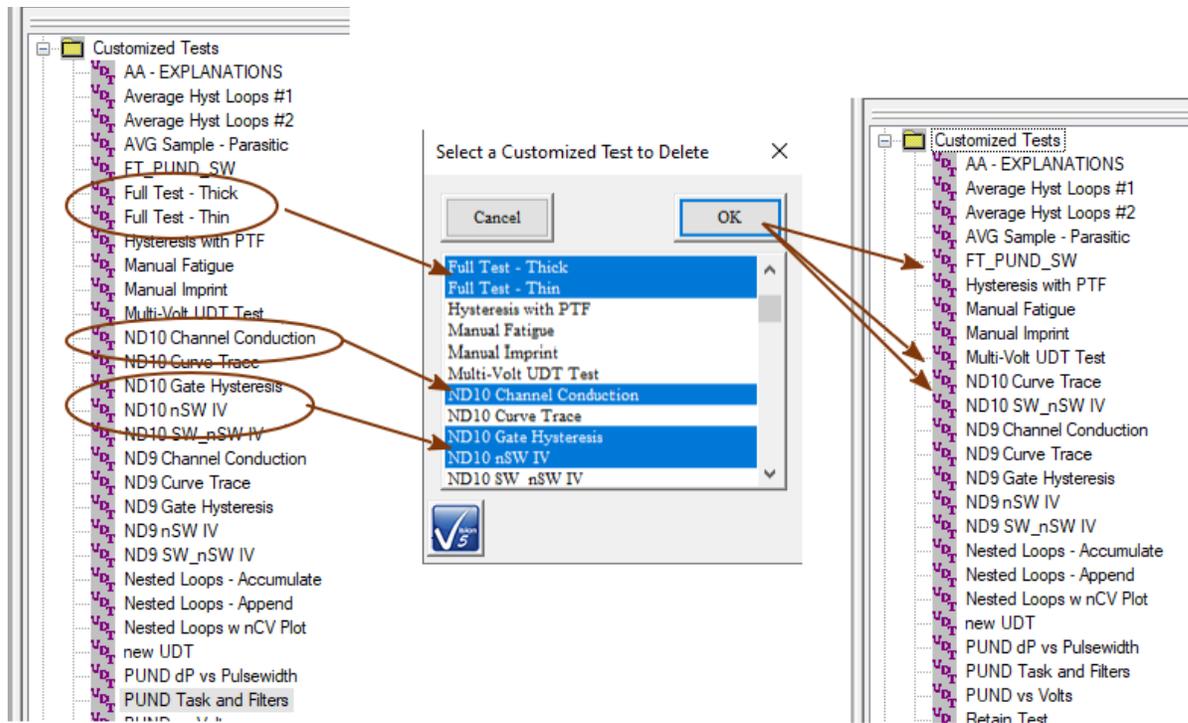


Figure 3 - The Library is Updated.

Note that once a Customized Test has been removed from the Library it cannot be recovered.

DataSets

DataSet Creation

Step-By-Step: DataSet Creation

A [DataSet](#) is a structure that contains an experiment (Test Definition) that is ready to execute and the complete history of previous experimentation performed by the DataSet. It consists of a Name, General Information, a [Current Test Definition \(CTD\)](#) (the experiment ready to be performed) and an [Archive](#) (the history of experimentation). The Archive is made up of [Executed Test Definitions \(ETDs\)](#). Each of these represents the complete execution of a single CTD. Each ETD contains an “[Experiment Design](#)” and an “[Experiment Data](#)” folder. The Experiment Design Folder holds a copy of the CTD that was executed to create the ETD. The Experiment Data Folder holds an instance of each [Task](#) that was performed in the experimental execution. The Tasks include both configuration and measured data where appropriate. The experiment may include [Branch Looping](#) that might result in many instances of a single Task. For this reason, the Experiment Data Folder may hold many more Tasks than the Experiment Design Folder. The Experiment Design Folder exists because, as a result of looping, an experiment cannot be directly recreated from the Experiment Data Folder.

Step 1: To create a new DataSet select “New DataSet” from the File Menu or..

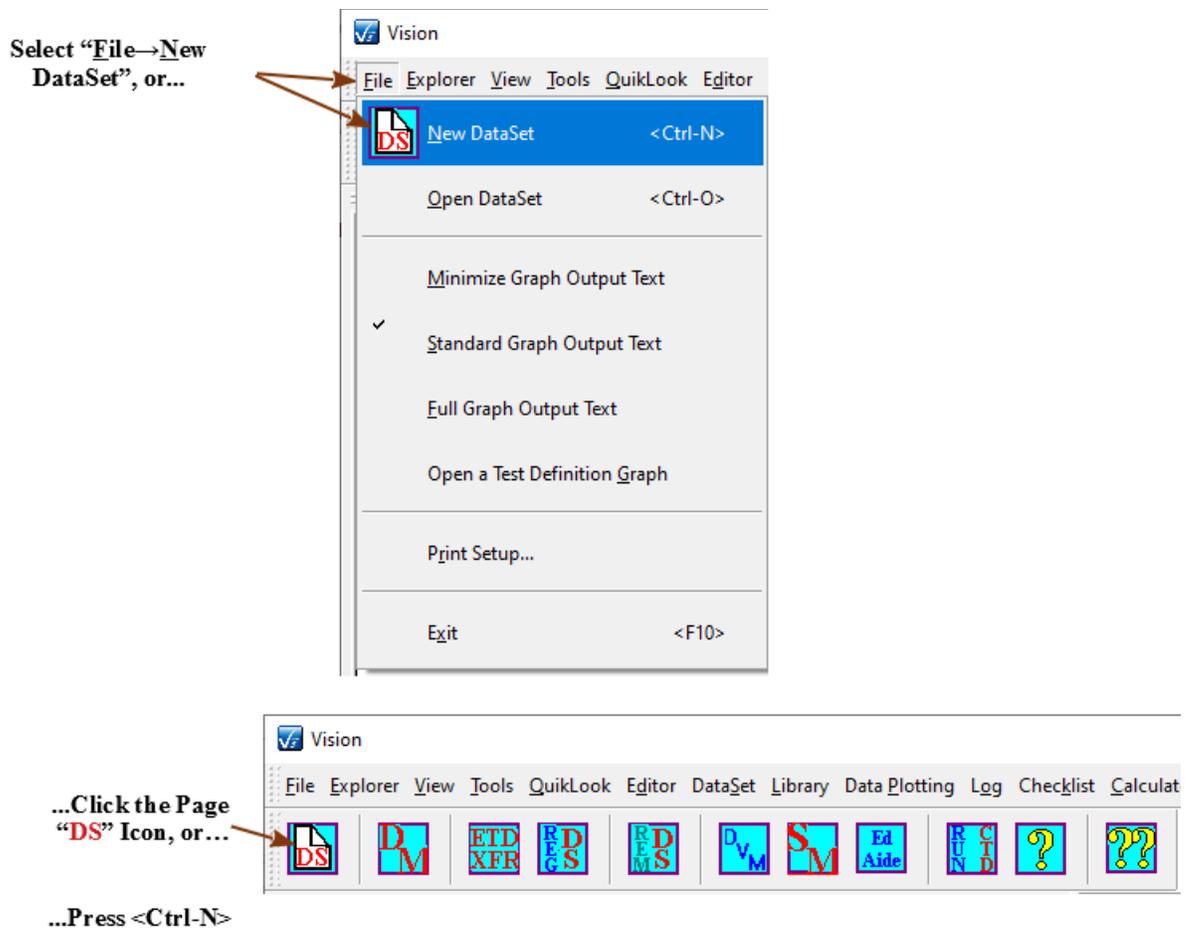


Figure 1 - Initiate the DataSet Creation.

Click on the Page icon at the left of the toolbar or press <Ctrl-N>.

Step 2: A Dialog box will appear into which the pertinent DataSet information must be placed. This information includes:

1. *DataSet Name* – Required - Must be at least 5 characters and should be unique. As the DataSet Name is typed, the DataSet File Name is updated to echo the typed name as "C:\DataSets\...\!". Characters are legal in the DataSet Name that are illegal in the DataSet File Name. These characters will be replaced by '.' in the DataSet File Name control. For Example:

DataSet Name: "ABCD?EFGH"

DataSet File Name: "C:\DataSets\ABCD.EFGH"

2. *DataSet File Path/Name (DataSet Path)* – Required - Must include a complete path

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and file name. The default file path is C:\DataSet, but the DataSet file may be stored anywhere on the Vision host hard disk. Once a path is established it is persistent for future DataSets until changed. The DataSet Name is appended to the file path as it is typed to the *DataSet Name* control. However, once the *DataSet Name* field is set, any DataSet File Path/Name may be typed. The browser may be used. Files will automatically have a *.dst extension appended to the name.

3. *Experimenter Initials* – Required – Three or four characters – Used to identify the person that initiated the DataSet. Once the initials are set they are persistent to future DataSets until expressly changed.
4. *Comments* – Optional – Up to 255 characters may be used to describe the intended use of the DataSet. In this case, Comments are of little value and are not recommended.

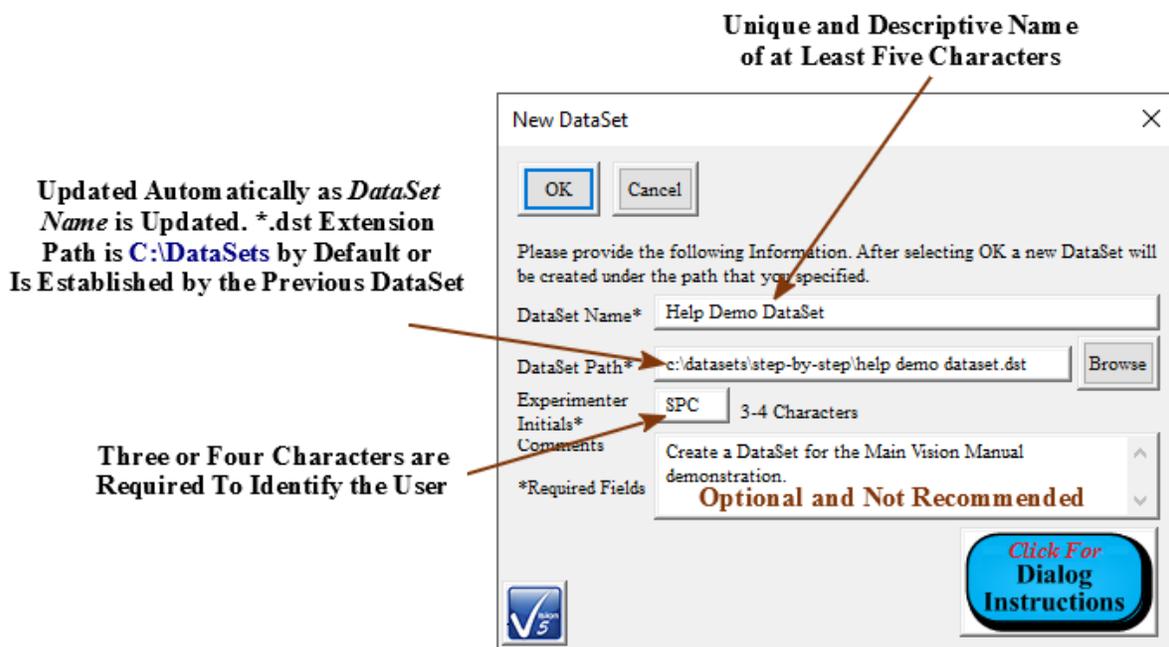


Figure 2 - Configure the DataSet.

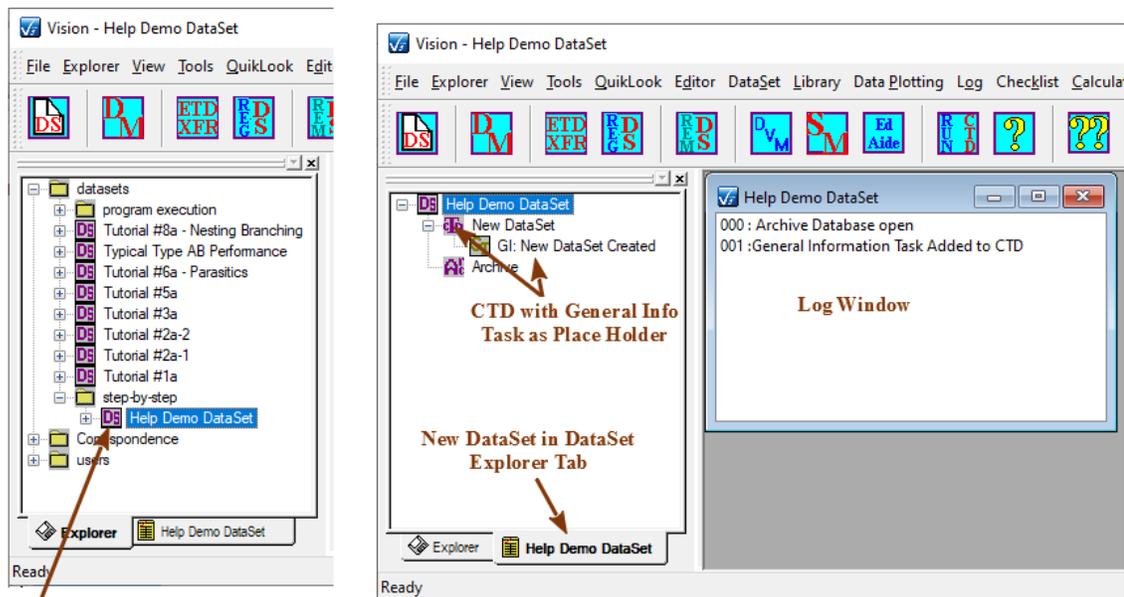
Step 3: Click OK to create the DataSet. Click Cancel to close the dialog without creating the DataSet.

Step 4: When the DataSet dialog is closed and the DataSet is created, four things occur:

1. The DataSet Explorer is updated with an entry of the same name as the DataSet. (The entry can be expanded to show the information entered into the dialog.) The entry will be placed in the DataSet Explorer tree at a location that represents its location on the Vision host disk. The initial appearance may be at the DataSet Explorer tree root, but the position will be adjusted as the tree is closed and reopened.
2. The DataSet is opened for use in its own tab in the DataSet Explorer and brought

into focus. It has the name of the DataSet. It contains the entire DataSet including a Current Test Definition (CTD) and the (empty) DataSet Archive. The presence of the tabbed page indicates that the DataSet is opened.

3. The [CTD](#) will have a General Information Task named "GI: New DataSet Created" as a place holder. The DataSet name will be "New DataSet"
4. A Log Window appears in the User Area of the program screen. The Log Window will initially have two entries including "000: Archive Database Open" and "001: General Information Task Added to CTD". This page will be updated as activity occurs within the DataSet. The open Log Window also indicates an open DataSet.



DataSet in the DataSet Explorer Tree

Figure 3 - DataSet Windows.

The DataSet is now ready for use. DataSets can also be created from [QuikLook](#) execution Data Presentation Dialogs or when using the [Data Mining](#) or [ETD Transfer](#) tool.

DataSet Opening

Step-By-Step: DataSet Opening

A [DataSet](#) may only be opened if it is closed and an entry for it is present in the [DataSet Explorer](#). A closed DataSet will have no Explorer Tab and no [Log Window](#). If the DataSet does not have an entry in the DataSet Explorer, it must either be created or reregistered if has been previously created. When a DataSet is created it is automatically opened. A DataSet must be opened before it can be used. Any number of DataSets may be opened, but only one has “focus” and can be used. This is indicated by its Explorer Tab page being open and its Log Window showing on top of all other Log windows.

Step 1: To open a DataSet select the DataSet entry in the DataSet Explorer Window, the select File/Open DataSet or Double-click on the DataSet entry in the DataSet Explorer Window with the left mouse button.

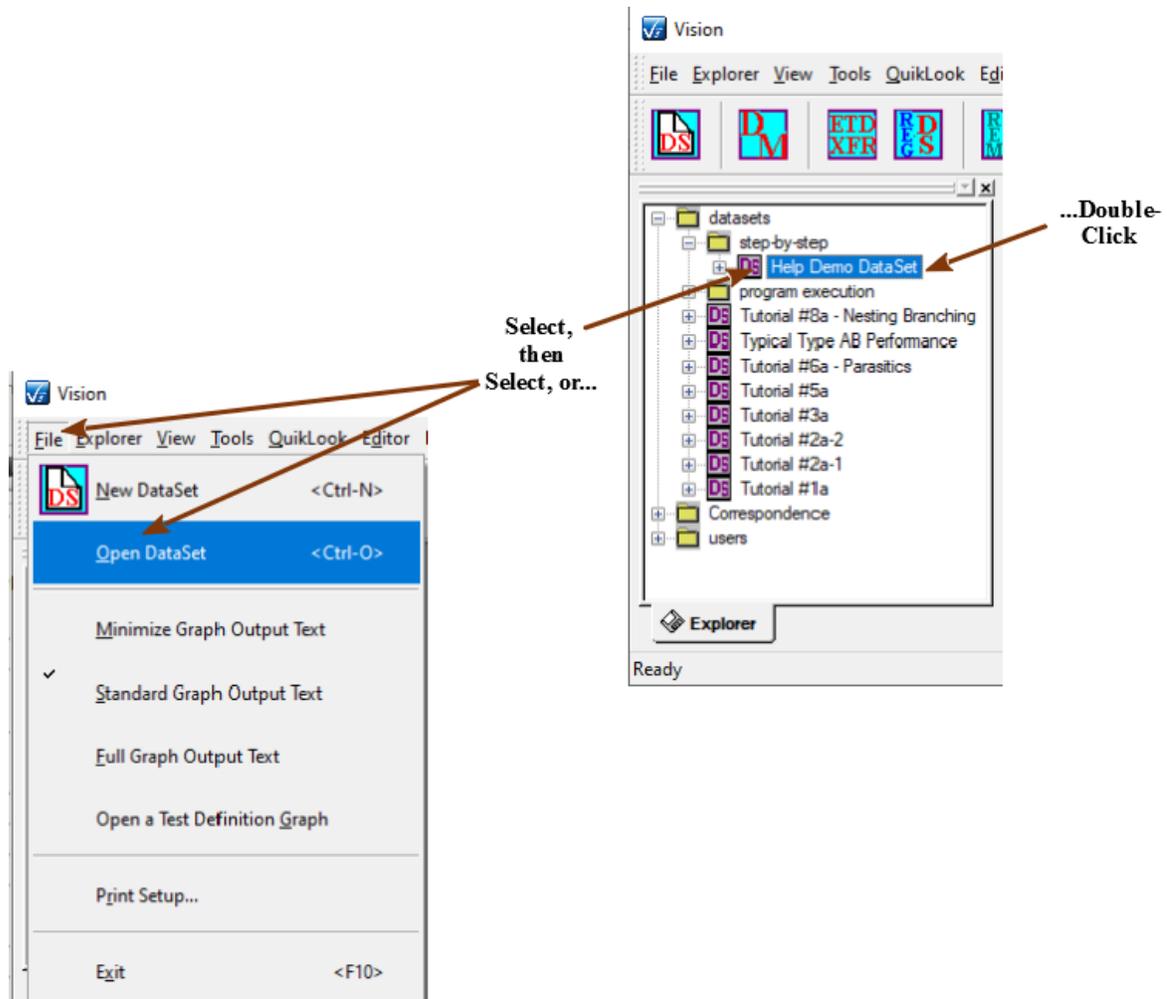


Figure 1 - Initiate the Opening of a DataSet.

Step 2: When the DataSet is opened, three things occur:

1. The DataSet is opened for use.
2. A tabbed page is added to the DataSet Explorer and brought into focus. It has the name of the DataSet. It contains the entire DataSet including a [Current Test Definition \(CTD\)](#) and the [DataSet Archive](#). The presence of the tabbed page indicates that the DataSet is opened.
3. A Log Window appears in the [User Area](#) of the program screen. The Log Window will initially have the single entry “000: Archive Database Open”. This page will be updated as activity occurs within the DataSet. The open Log Window also indicates an open DataSet.

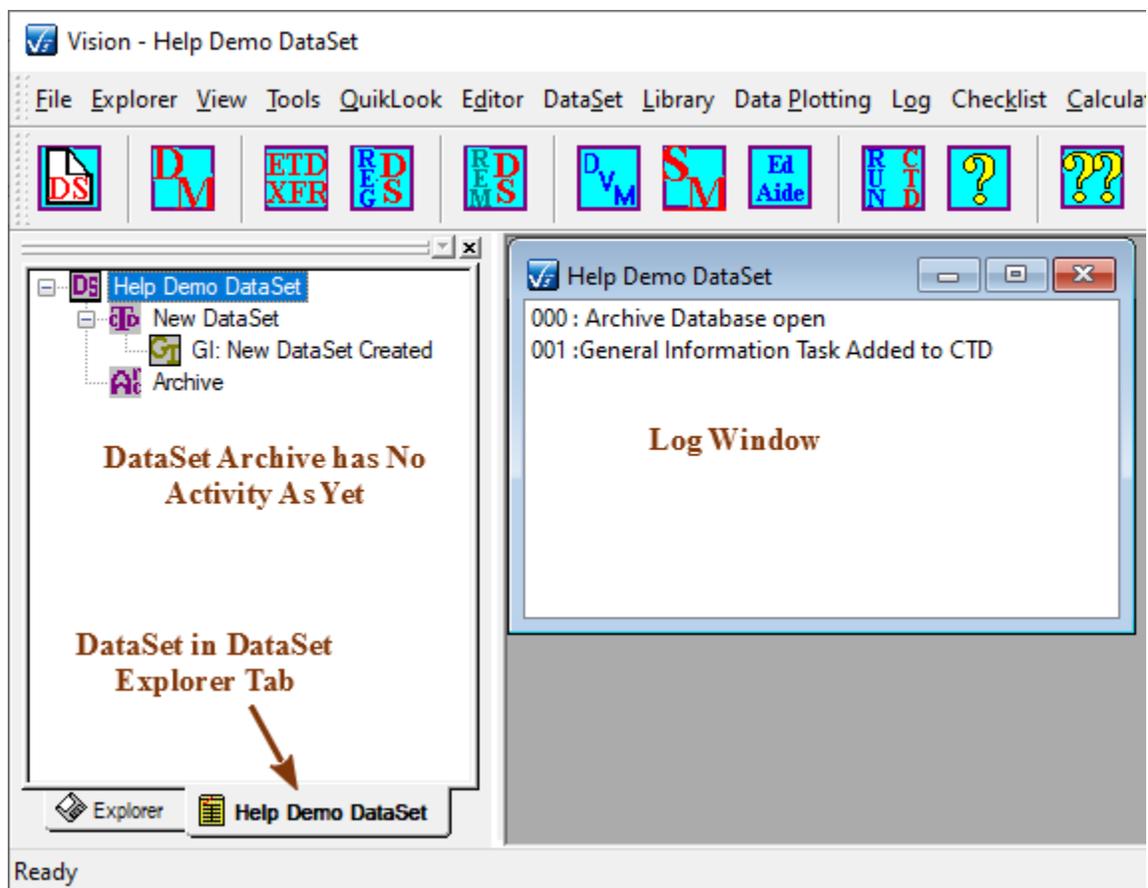


Figure 2 - DataSet Explorer Tab Window and Log Window.

Note: Deleting a DataSet’s file from its directory (or moving it) has no effect on the DataSet Explorer. The DataSet will still appear in the DataSet Explorer. Such a DataSet cannot be accessed and should be unregistered.

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Closing a DataSet

Step-By-Step: DataSet Closing

A [DataSet](#) may be closed to remove it from immediate use. The DataSet remains available as an entry in the [DataSet Explorer](#) and can easily be reopened for reuse.

Step 1: To close a DataSet bring it into focus by selecting either its DataSet Explore Tab or by selecting its [Log Window](#).

Step 2: Close the Log Window by clicking on the X icon in the upper right corner

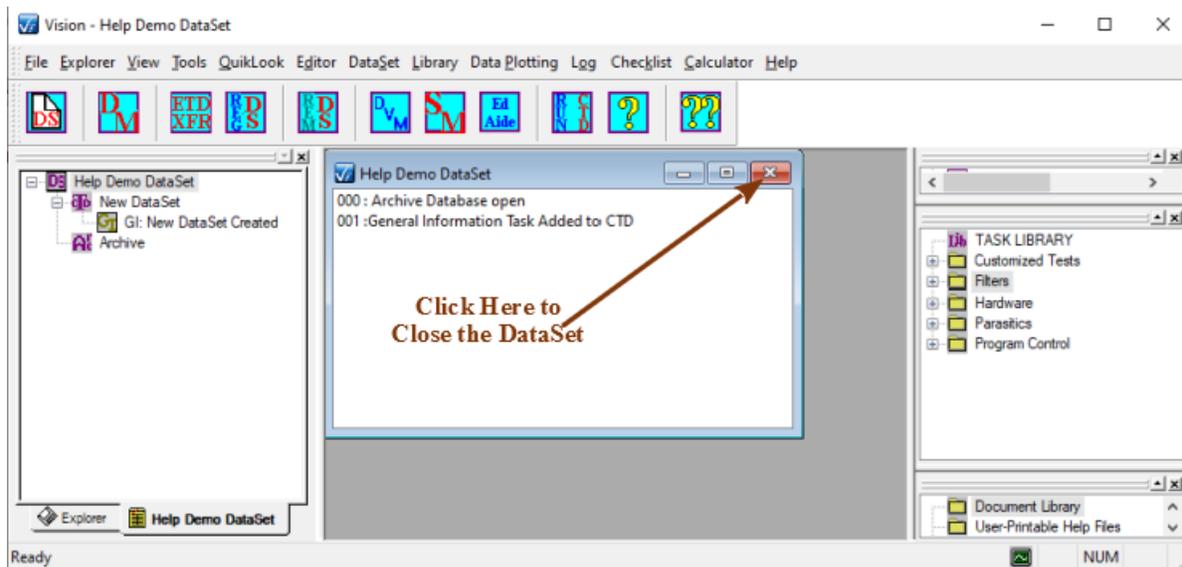


Figure 1 - Click to Close the DataSet.

Step 3: The dialog will appear to verify that you wish to close the DataSet. Click *Yes* to close the DataSet or *No* to close the Dialog without closing the DataSet. The future appearance of the dialog may be disabled by unchecking *Show This Dialog*, or by toggling "View->Show Prompt Dialogs" to unchecked. The dialog will appear every time Vision is shut down with a dialog open unless the dialog is disabled in this way.



Figure 2 - Software Checks to Ensure that You Want to Close the DataSet. This Dialog will also Appear Once for Each Open DataSet when the Vision Program is Closed, unless disabled.

Step 4: When the DataSet closes the Log Window and DataSet Explorer Tab Page are removed. The DataSet Explorer retains an entry for the DataSet.

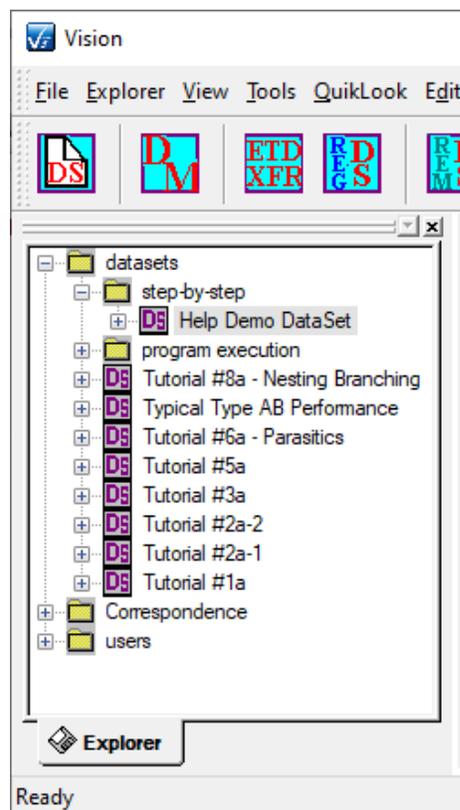


Figure 3 - DataSet Explorer After the DataSet is Closed.

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Note: When the Vision program is exited, all DataSets must first be closed. By selecting File\Exit, clicking on the X icon in the main program window or pressing <F10> the program begins the process of closing the DataSets before closing the program. A series of Dialog prompts will appear – one for each open DataSet - to verify closure. All prompts must be verified to exit the program. This will not happen if the DataSet prompt is disabled.

Registering a DataSet

Step-By-Step: DataSet Registering

All [DataSet](#) entries in the [DataSet Explorer](#) represent registered DataSets that are available for immediate use. DataSets may be unregistered to remove them from the DataSet Explorer, perhaps to reduce clutter. Such DataSets are not lost, but are retained as files in the folders in which they were stored. These can be returned to use by once again registering them.

Step 1: To register a DataSet select “[Explorer->Register DataSet...](#)” from the main menu items.

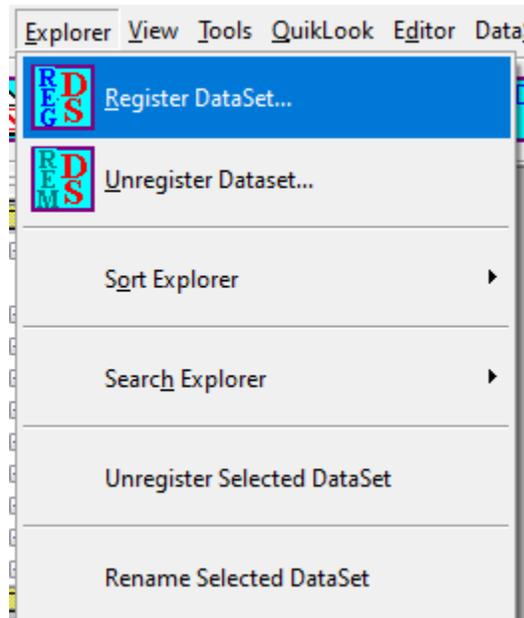


Figure 1 - Initiate DataSet Registration.

Step 2: A Dialog box will appear that can be used to search for the DataSet file in order to specify a complete DataSet path and file name. With the DataSet file selected, click *Open* to register the DataSet. Click *Cancel* to close the dialog without registering any DataSet. All DataSets have a *.dst extension. By default DataSets are stored in the c:\DataSets directory Vision installation.

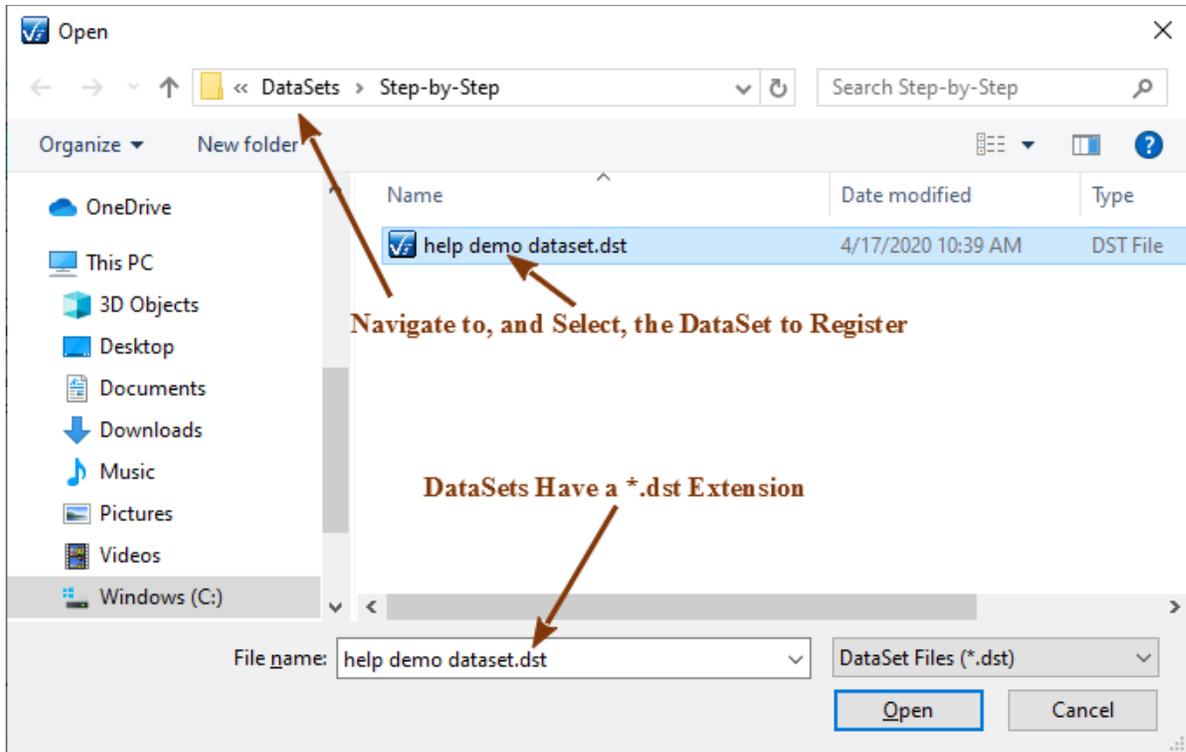


Figure 2 - DataSet Registration Browser Dialog.

Step 3: Once the DataSet is selected in the dialog, its entry will be returned to the DataSet Explorer and it will be available for immediate use.

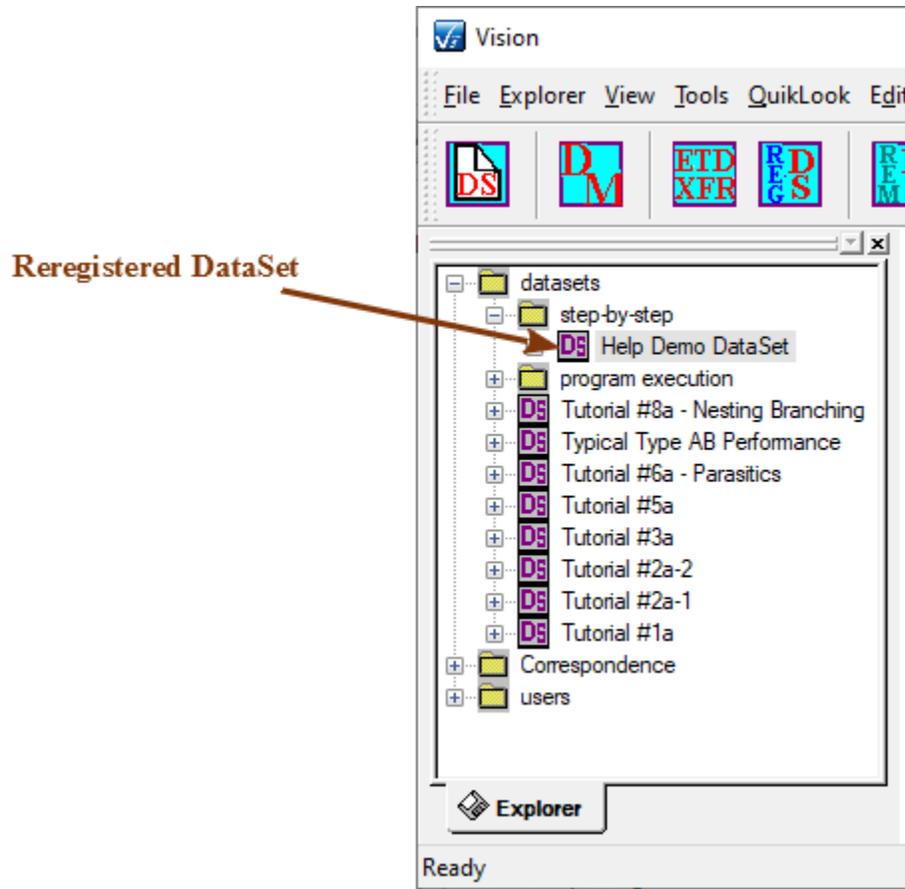


Figure 3 - DataSet Explorer Showing the Registered DataSet.

Unregistering a DataSet

Step-By-Step: DataSet Unregistering

All [DataSet](#) entries in the [DataSet Explorer](#) represent registered DataSets that are available for immediate use. DataSets may be unregistered to remove them from the DataSet Explorer, perhaps to reduce clutter. Such DataSets are not lost, but are retained as files in the folders in which they were stored. These can be returned to use by once again registering them.

Step 1: To unregister a DataSet select “[Explorer->Unregister DataSet&ldots;](#)” from the main menu items.

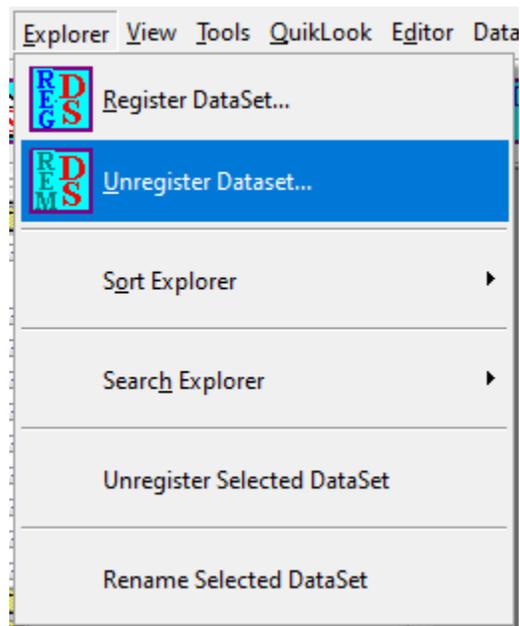


Figure 1 - Initiate DataSet Unregistration.

Step 2: A Dialog box will appear listing, by name, all registered DataSets. Select one or more DataSets. Click *OK* to unregister the DataSet. Click *Cancel* to close the dialog without unregistering a DataSet.

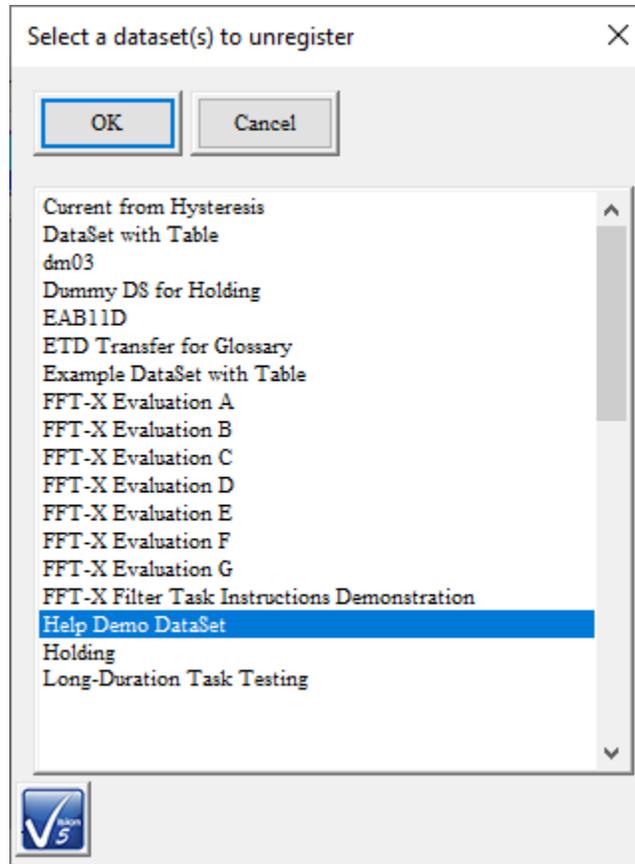


Figure 2 - Select DataSet to be Unregistered.

Step 3: A second dialog box will appear with the message that the “Changes will take effect next time”. This is an indication that the update to the DataSet and the DataSet Explorer will not take effect until the next time the program is run.

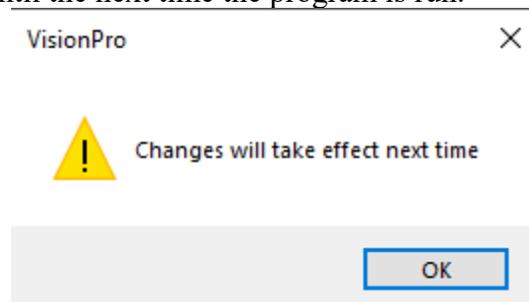


Figure 3 - Warning that the DataSets Will Not be Unregistered Until Vision is Stopped and Restarted.

Step 4: No apparent change will appear in the DataSet Explorer when the DataSet is unregistered. The program must be stopped and restarted before the DataSet Explorer will be updated.

Note: The need to stop and restart the program is a permanent condition for the program.

Note: A DataSet must be closed before it can be unregistered. If you attempt to unregister an open DataSet a warning dialog will appear.

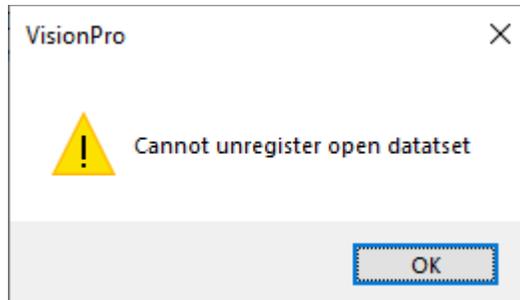


Figure 4 - Warning that Appears when an Open DataSet is Unregistered.

Step 5: When Vision is restarted the DataSet will be absent from the DataSet Explorer.

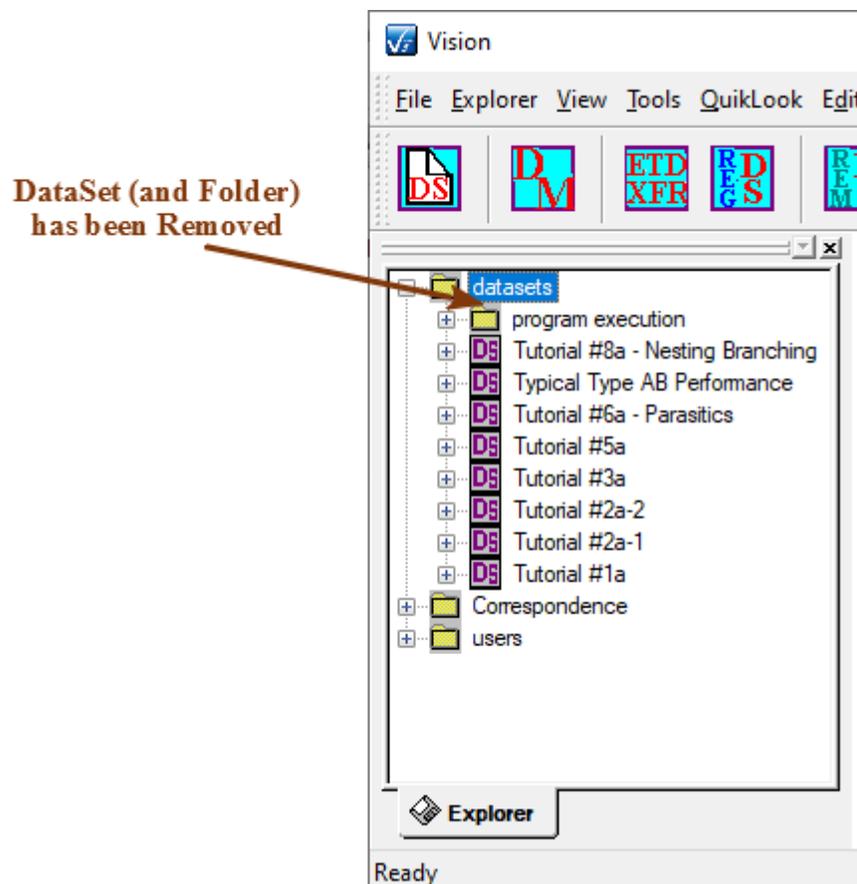


Figure 5 - Updated DataSet Explorer Tree.

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Current Test Definitions (CTDs)

- [Creation](#)
- [Task Configuration Review](#)
- [Execution](#)
- [Updating](#)
- [CTD-to-TASK LIBRARY](#)



CTD Creation

Step-By-Step: Current Test Definition (CTD) Creation

The [Current Test Definition \(CTD\)](#) is the experiment within a [DataSet](#) that is ready to be executed. A newly created DataSet will have no CTD. The CTD must be inserted into the DataSet by first creating a [Test Definition](#) in the [Editor](#), then moving that Test Definition into the DataSet as the CTD. Moving the Test Definition from the Editor to the DataSet will overwrite any existing Test Definition.

Step-by-Step

Step 1: Create a Test Definition in the EDITOR.

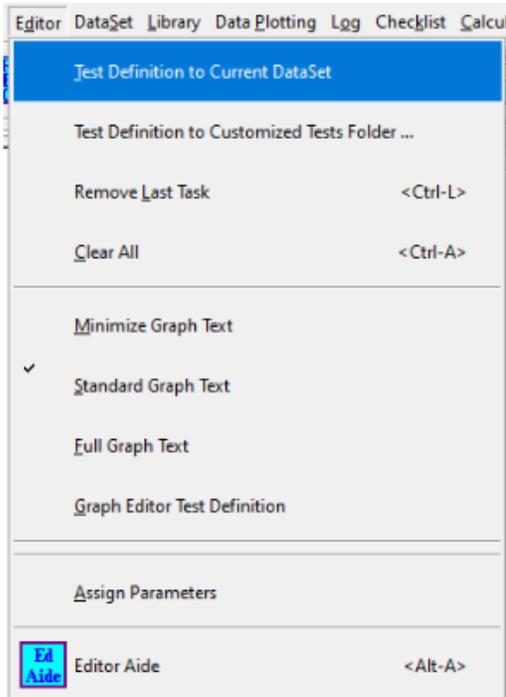
Step 2: Open or create a DataSet

Step 3: Move the Test Definition from the EDITOR to the open DataSet.

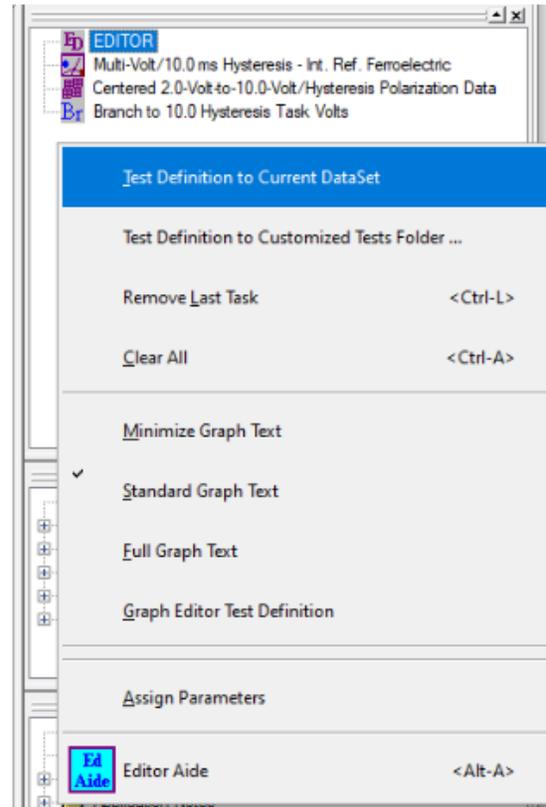
- A. Select “[Editor->Test Definition to Current DataSet](#)” or...
- B. In the Editor window click the right button and select “[Test Definition to Current DataSet](#)” from the Popup menu or...
- C. Click and hold the left mouse button on any item in the Editor window. With the left mouse button continuously held, move the mouse cursor into the DataSet Explorer Tab Window. Release the mouse button. This is known as “Drag and Drop”.



Select “E_ditor→T_est Definition to Current DataSet”,
or...



... Right-Click in the EDITOR Window and
Select “T_est Definition to Current DataSet”
or...



... Drag-and-Drop

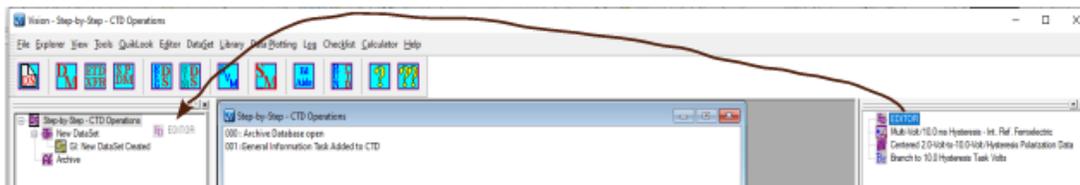


Figure 1 - Initiate the Transfer of the Test Definition from the Editor to the DataSet.

Step 4: When the Test Definition is moved into the DataSet, a dialog box will appear that will allow you to name the CTD. A unique name should be given to the CTD that will completely identify it to you in the future. Note that the naming of objects such as Tasks and CTDs is an important issue in Vision. When the Current Test Definition is executed the resulting Task execution sequence is stored in the DataSet Archive under the name that was given to the CTD. Tasks within the ETD retain their programmed name as well. Names must be unique and descriptive.

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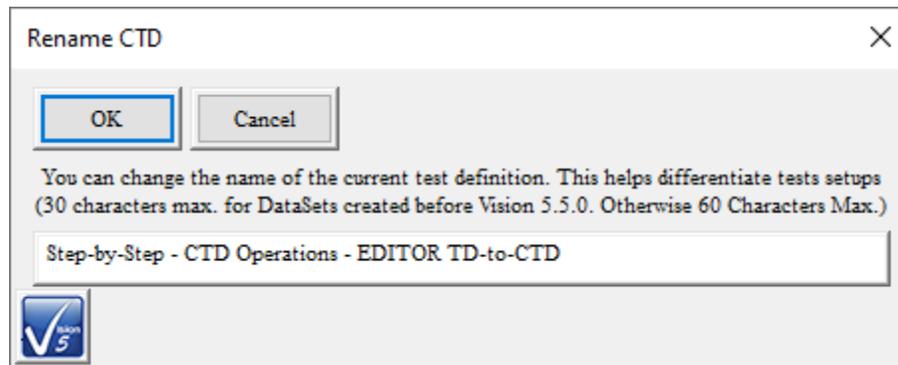


Figure 2 - CTD Naming Dialog.

Once the CTD is named, it will appear under the CTD icon in the DataSet Tab Page tree as the list of [Tasks](#), by name.

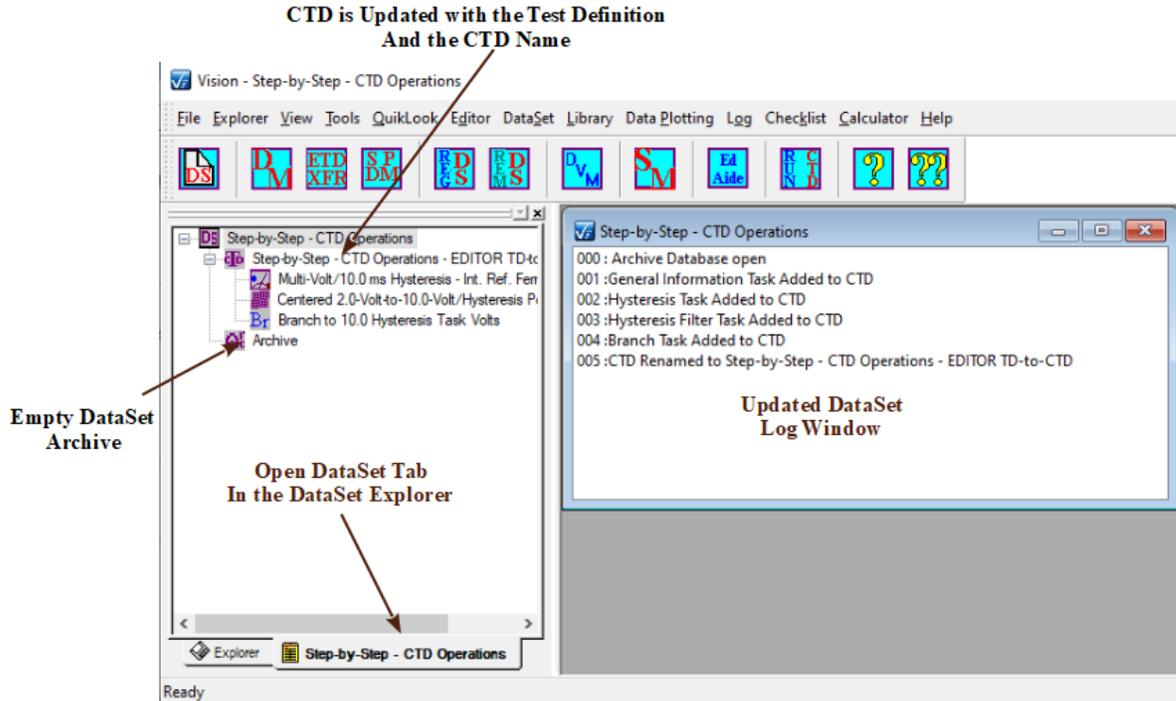


Figure 3 - DataSet Tab Page in DataSet Explorer Showing the New CTD.

The DataSet Log Window will also be updated to reflect the addition of the Tasks in the Test Definition.

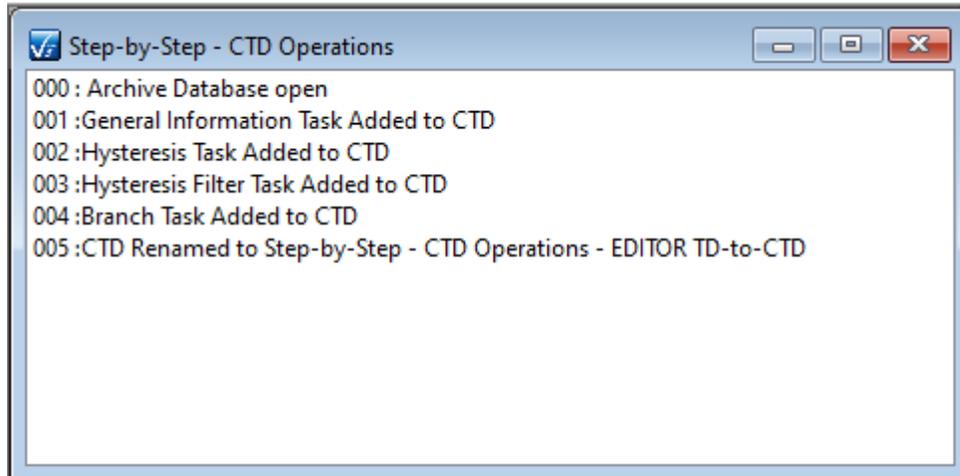


Figure 4 - DataSet Log Window Reflecting the Change in the DataSet.

The experiment is now ready to execute. The configuration of any Task can be reviewed by double-clicking on the Task, in the CTD, with the left mouse button. A configuration dialog will open showing all of the entered values. However, most of the dialog controls will be disabled. No adjustment may be made to the Task configuration in the CTD. In order to adjust a Task, it must be reconfigured in the Editor and moved again to the CTD. **Note: The dialog Task Instructions pages are available from the configuration review dialog.**

CTD Task Configuration Review

Step-by-Step CTD Task Review

Once a Current Test Definition is established in the DataSet, any Task in the Test Definition can be reviewed for configuration.

Step 1: In the open DataSet, double-click on the desired Task in the CTD.

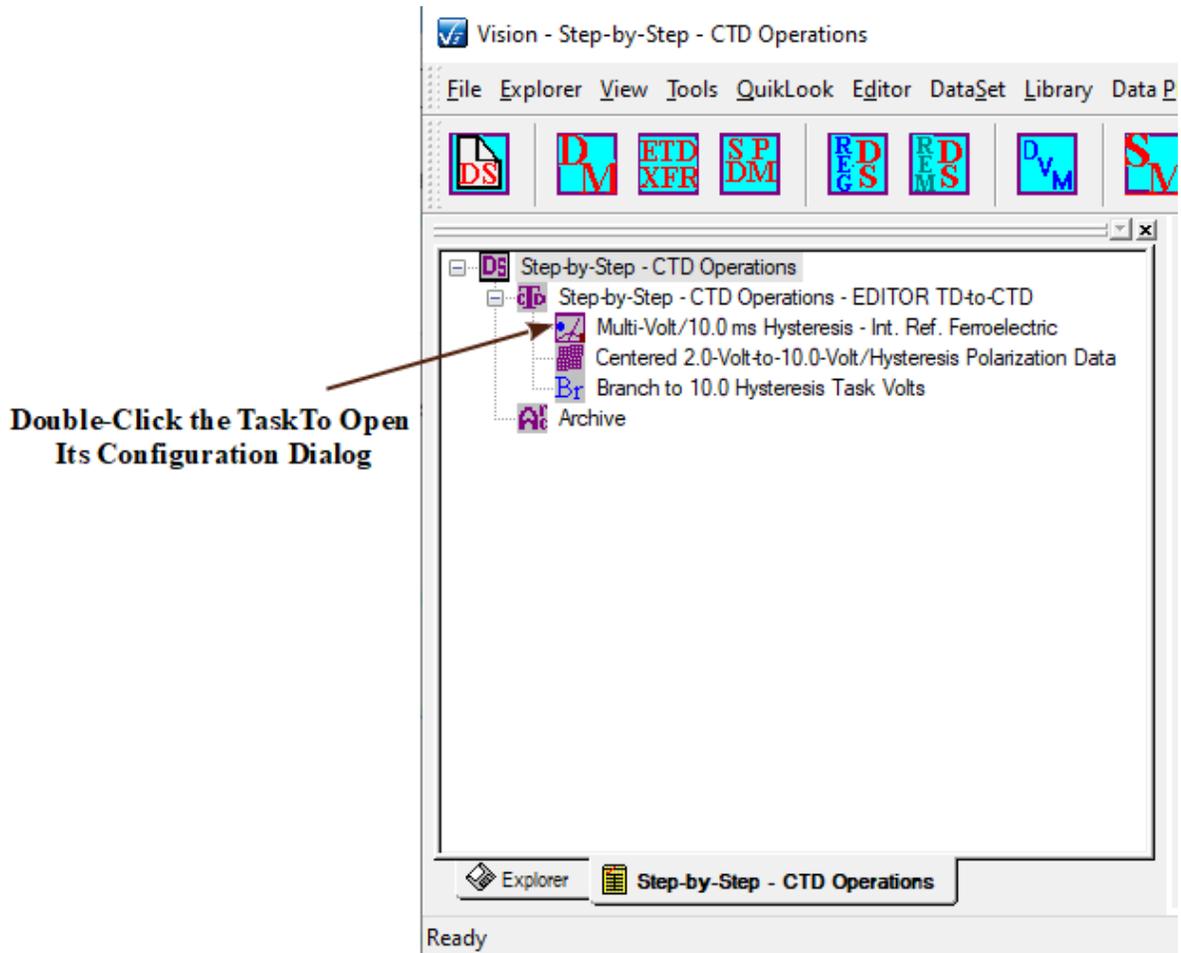


Figure 1 - Double-Click the Task in the CTD to Review its Configuration.

Step 2: The Task configuration dialog will open for review. Most controls will be disabled. *Task Instructions* are available. The *Cancel* or *Cancel/Plot* button will close the dialog.

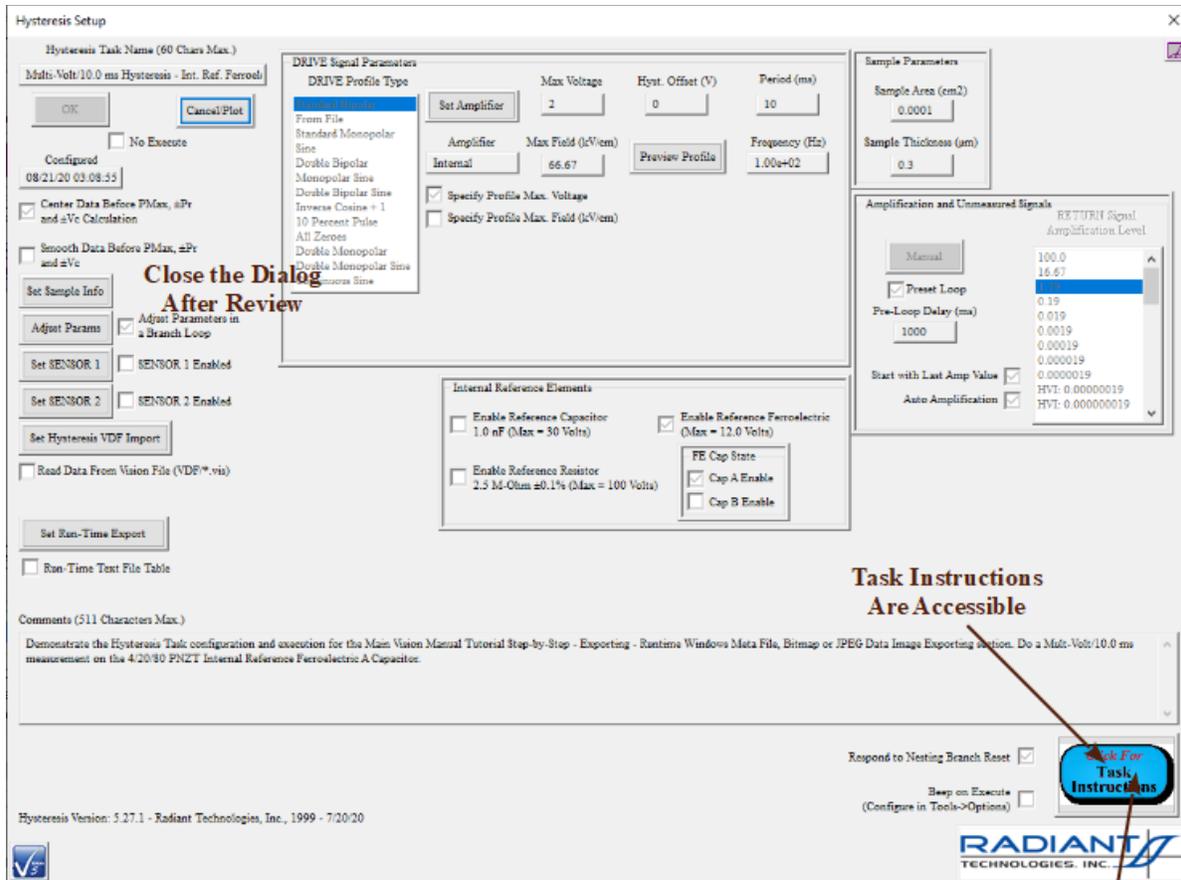
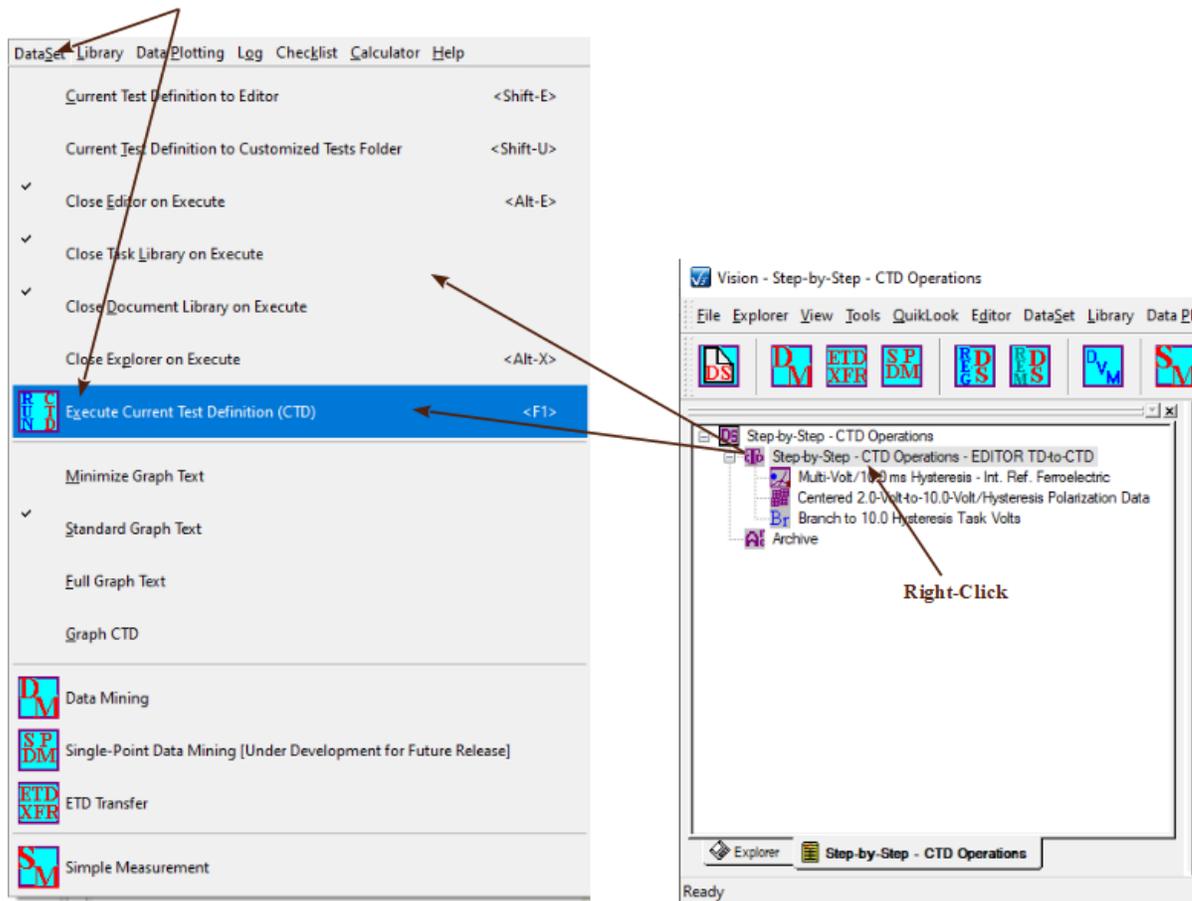


Figure 2 - Task Configuration Dialog is Opened for Review. Most Controls are Disabled.

CTD Execution

Step-By-Step Current Test Definition (CTD) Execution

- Step 1:** Ensure that the [DataSet Log Window](#) is the top window in the [User Area](#). This brings the DataSet into "focus", making it the primary active object in the Vision program.
- Step 2:** Select “[DataSet->Execute Current Test Definition \(CTD\) \(F1\)](#)” from the main menu or press <F1> or select the CTD name in the DataSet tab window and right-click, then select “[Execute Current Test Definition \(CTD\) \(F1\)](#)” from the popup menu.

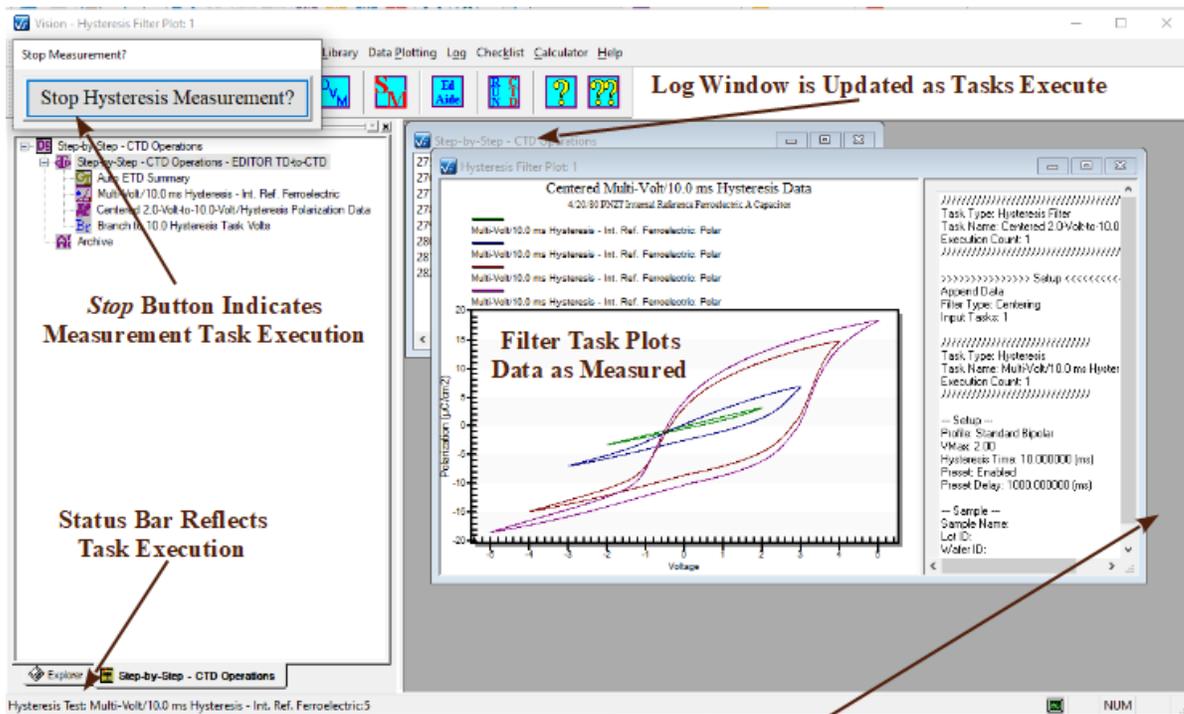


Press <F1>, or...
 ..Select “[DataSet->Execute Current Test Definition \(CTD\)](#)”, or...
 ...[Right-Click](#) the CTD Name and Select “[Execute Current Test Definition \(CTD\)](#)”

Figure 1 - Initiate the Execution of the CTD.

- Step 3:** Execution response will be highly variable, depending on the nature of the Current Test Definition (CTD). However, all Tasks are designed to write their execution to the Vision Status Bar.

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Vision is Configured to Close EDITOR,
TASK LIBRARY and Documents Windows
During Execution.
Windows Will Reappear After Execution

Figure 2 - Execution of the Demonstration CTD.

Note that, by default, the EDITOR, TASK LIBRARY and Document Library Windows are closed during execution and reopened when execution terminates. This is to allow a larger User Space to display the various execution windows such as those shown in **Figure 2**. To change the default setting, go to the Vision "DataSet" menu option and select the windows to close or leave open during CTD execution.

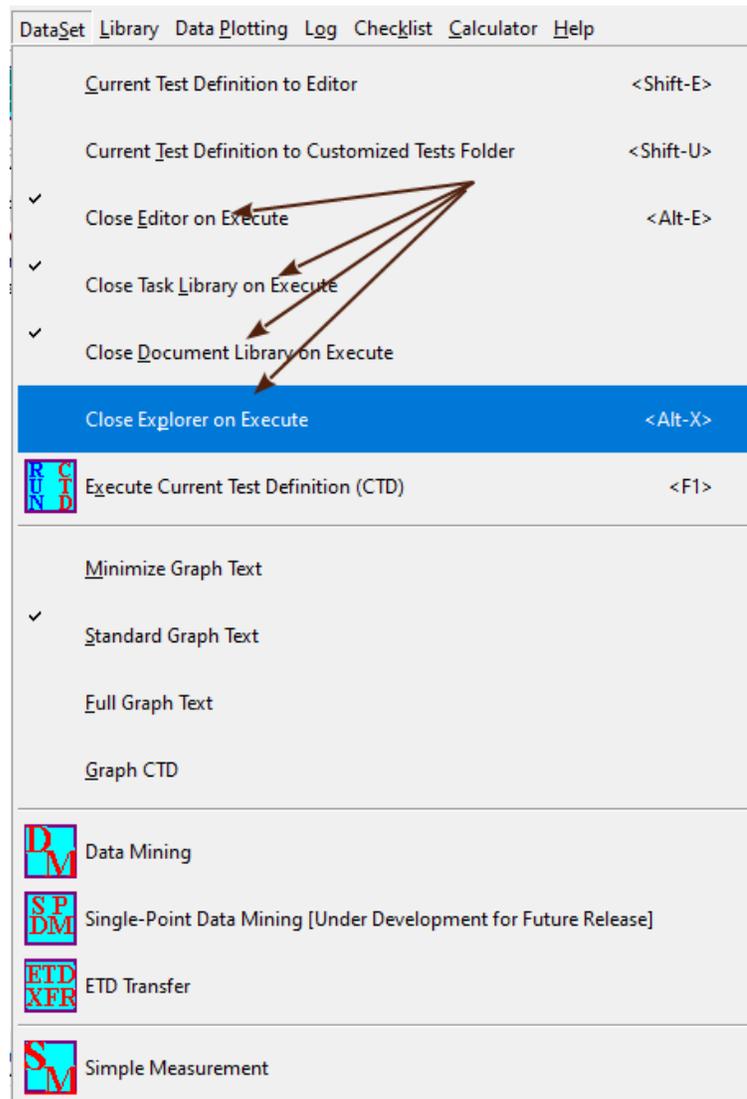


Figure 3 - Window Closing During Execution.

Step 4: Once the CTD has completed executing, the DataSet Archive is updated and the Executed Test Definition is appended. Note the difference between the "Experiment Data" record and the "Experiment Design" folder. The difference results from the fact that the experiment is executing a Branch Loop. Multiple copies of the Tasks are recorded in the "Experiment Data" folder. Serial values are appended to the Task names in the "Experiment Data" folder to distinguish Tasks by name. Note that these serial values depend on the Task names and that Vision will not distinguish between two identically named Tasks when applying the serial value. Having two Tasks of identical name is legal, but poor design.

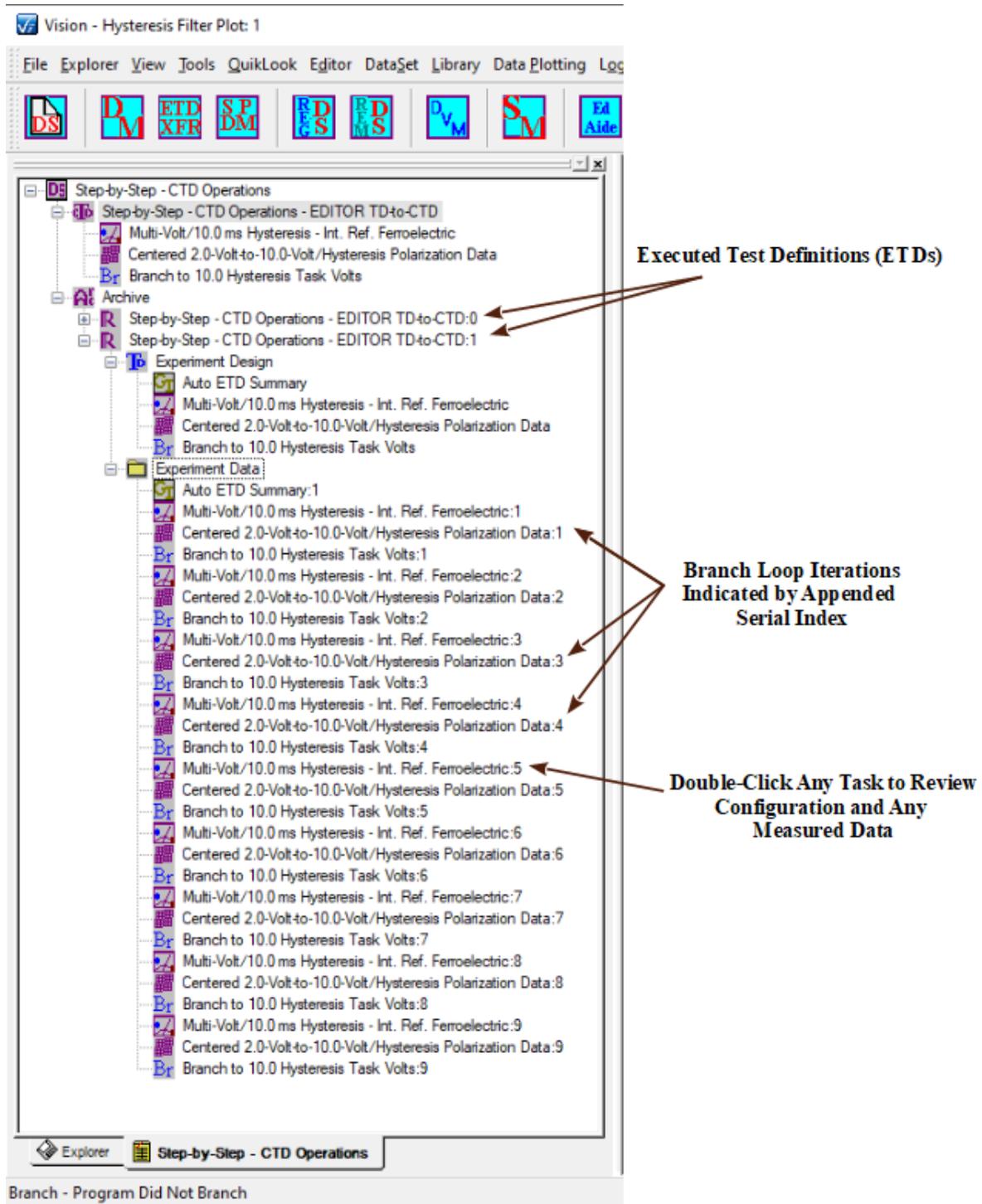


Figure 4 - DataSet Archive is Updated After the Execution of the CTD.

Updating a CTD

Step-by-Step Updating a Current Test Definition (CTD)

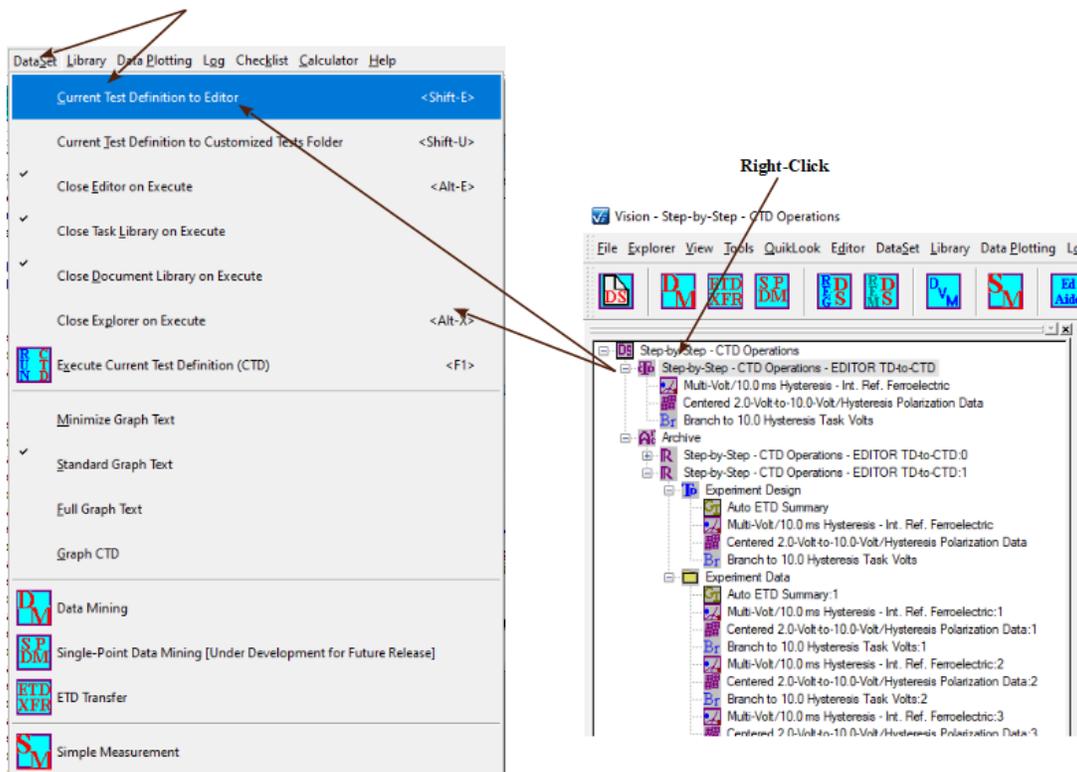
A Current Test Definition (CTD) cannot be updated "in place" in a DataSet. It must be moved back to the EDITOR for reconfiguration, then returned to the DataSet for execution and Archiving.

Step 1: Open the DataSet with the desired CTD.

Step 2: Press <Ctrl-A> to clear any existing Tasks from the EDITOR. When Tasks are moved from the CTD back to the EDITOR, they will be appended to any Tasks already in the EDITOR. For this example, a Pause Task is moved into the EDITOR after it is cleared, Prepending the Pause to the existing CTD Tasks.

Step 3: Ensure the DataSet has the focus. It's log window must be the top-most window in the User Area.

Step 4: Select "DataSet>Current Test Definition to Editor (Shift + E)", or select the CTD name and right-click to show a popup menu, then select "Current Test Definition to Editor (Shift + E)", or press <Shift-E>. **Note that a Drag-and-Drop option is not available for this operation.**



Press <Shift-E>, or...
 ...Select "DataSet→Current Test Definition To Editor", or...
 ...Right-Click the CTD Name and Select "Current Test Definition to Editor"

Figure 1 - Restore the DataSet Current Test Definition to the Editor.

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Step 5: The Test Definition that made up the CTD will appear in the Editor. It will be appended to any existing Tasks in the Editor's Test Definition. Once in the Editor, the Tasks of the Test Definition can be updated normally. New Tasks can be appended. The Test Definition can be returned to the original DataSet or sent to any other DataSet as the Current Test Definition.

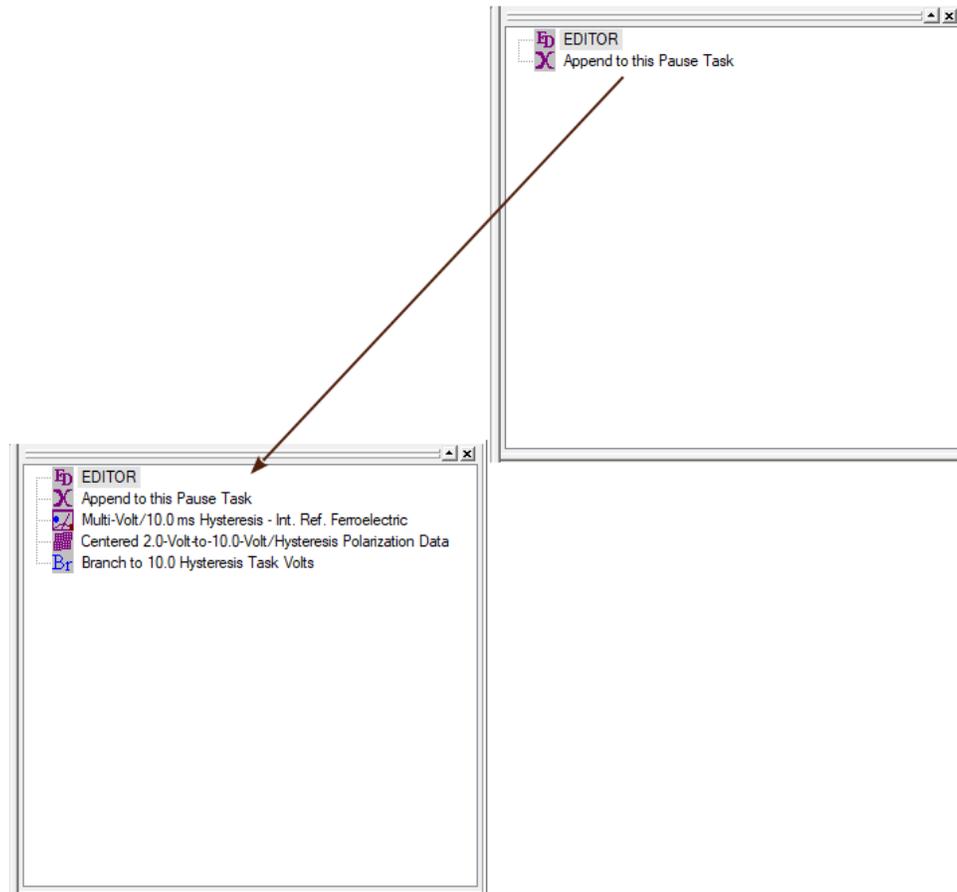


Figure 2 - The CTD Task are Appended to the Test Definition in the Editor.

Step 6: Perform any modifications to the Test Definition in the EDITOR as required. In the example above, a Pause Task is prepended. Tasks may be inserted and/or removed and/or reconfigured as necessary. See the [Editor Aide](#) tool for instructions in modifying the Task sequence including adding and/or moving and/or rearranging Tasks.

Step 7: Using [any technique](#), move the Test Definition from the EDITOR back into the CTD. Update the CTD name as appropriate. Note that the Test Definition that is moved into the CTD will overwrite all Tasks already in the CTD. The CTD is now ready to be [executed](#).

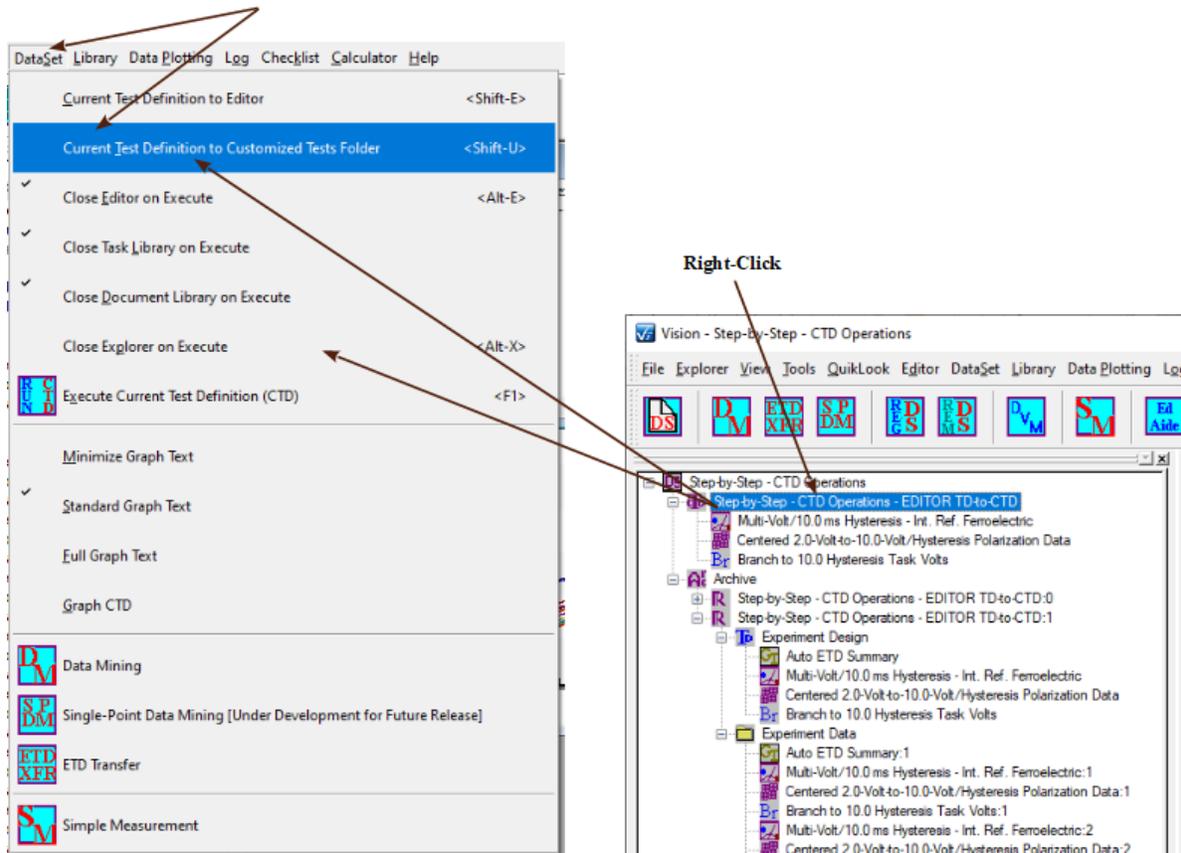
CTD-to-TASK LIBRARY

Step-By-Step CTD-To-Library

This topic shows how to move the Current Test Definition in a DataSet to the TASK LIBRARY as a Customized Test in the Customized Test folder. The term "Customized Test" replaces the term "User-Defined Test" used earlier in Vision development. Although the earlier term is no longer used, it's acronym UDT is pervasive and may continue to appear in documentation. The Customized Test file is terminated with a *.UDT extension in C:\DataSets.

A Current Test Definition may be moved to the TASK LIBRARY indirectly by first moving it back to the EDITOR, then [moving it into the TASK LIBRARY](#). The CTD may also be moved directly into the Customized Test folder.

- Step 1:** Open the DataSet with the desired CTD. Ensure the DataSet has the focus. Its Log Window must be the topmost window in the [User Area](#).
- Step 2:** Select "DataSet>Current Test Definition to Customized Tests Folder (Shift + U)" or select the CTD name in the DataSet, then right-click and select "Current Test Definition to Customized Tests Folder (Shift + U)" from the popup, or press <Shift-U>. **Note that Drag and Drop is not available for this operation.**



Press <Shift-U>, or...
 ...Select "DataSet→Current Test Definition to Customized Tests Folder", or...
 Right-Click the CTD Name and Select "Current Test Definition to Customized Tests Folder"

Figure 1 - Send the DataSet CTD to the Library as a Customized Test.

Step 3: A dialog will open to allow entry of a Customized Test name for the Test Definition. The default name will be the same as the CTD name. Enter an appropriate name, then click *OK*. **NOTE that the Customized Test name is limited to 25 characters.**

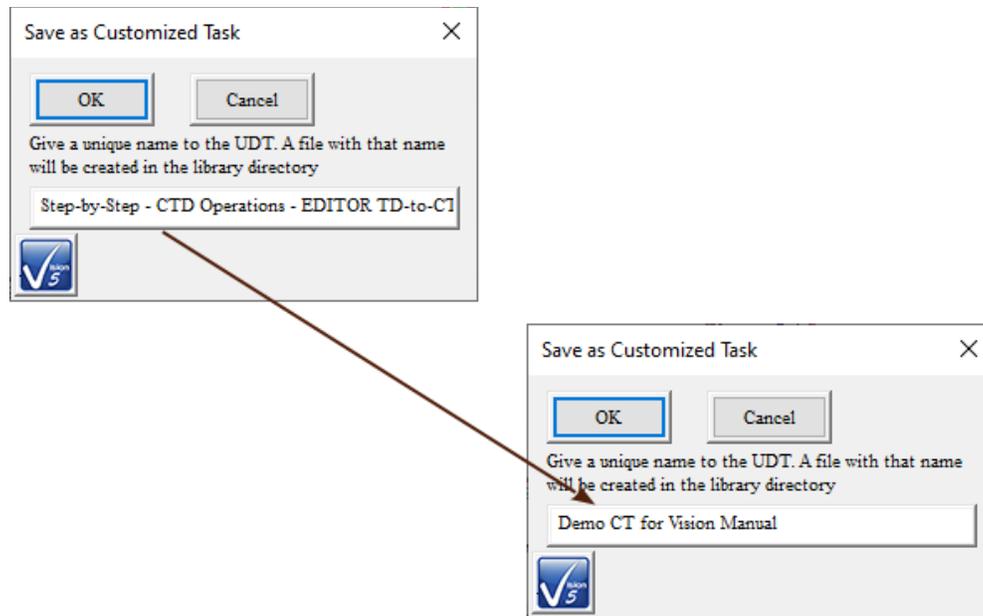


Figure 2 - Name the Customized Test.

Step 4: The Test Definition will appear in the Library under the Customized Tests folder as a single Task. If no previous Customized Tests existed, the Customized Tests folder will be created.

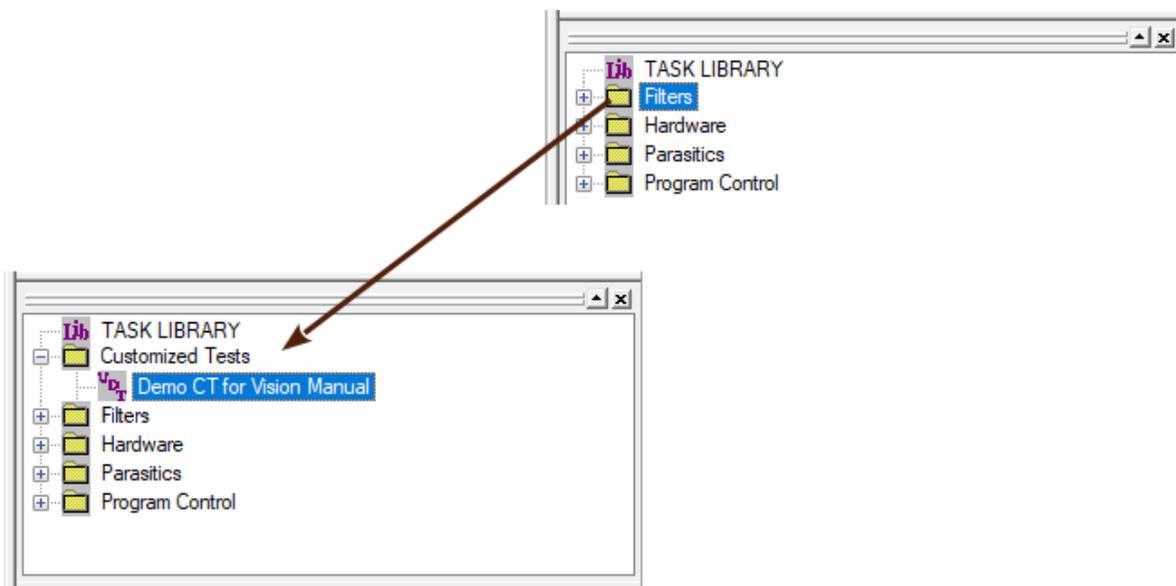


Figure 3 - Customized Test Folder in the Library is Updated with the New Customized Test.

Step 5: The Customized Task may now be recalled to the Editor for preconfigured Test Definition construction.

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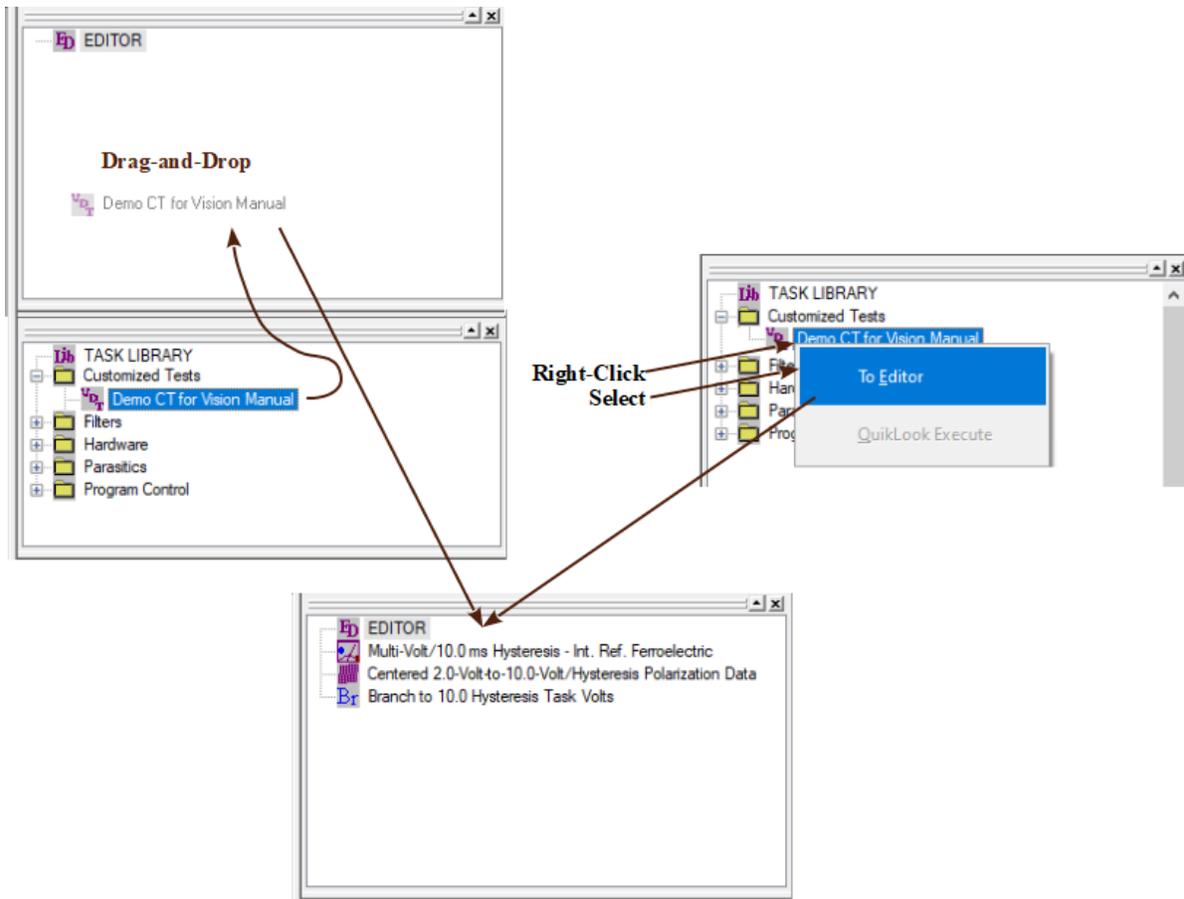


Figure 4 - Customized Test to EDITOR.

Executed Test Definitions (ETDs)

- [ETD Review](#)
- [ETD-to-CTD](#)
- [ETD-to-EDITOR](#)
- [ETD Notes](#)
- [ETD Markers](#)
- [Immediate General Information Task ETD](#)
- [Immediate Hyperlink Task ETD](#)

ETD Review

Step-By-Step Executed Test Definition (ETD) Review

Once a Current Test Definition is executed, each execution instance of each Task in the Current Test Definition (CTD) is stored in an Executed Test Definition (ETD), within the DataSet Archive, that is created for that particular Test Definition execution. The ETD will have the same name as the CTD, with an iteration count appended to it, to differentiate it from other executions of the CTD. Clearly, as a CTD's configuration is changed, its name must be updated to reflect the change and to uniquely identify the CTD when it appears as an ETD in the DataSet Archive. Detailed review of a particular Task in the ETD can be made as follows:

Step 1: Create and execute a Current Test Definition in a DataSet as described in the Step-by-Step instructions for a Current Test Definition.

[Step-By-Step CTD Creation](#)
[Step-By-Step CTD Execution](#)

Step 2: Open the DataSet Archive.

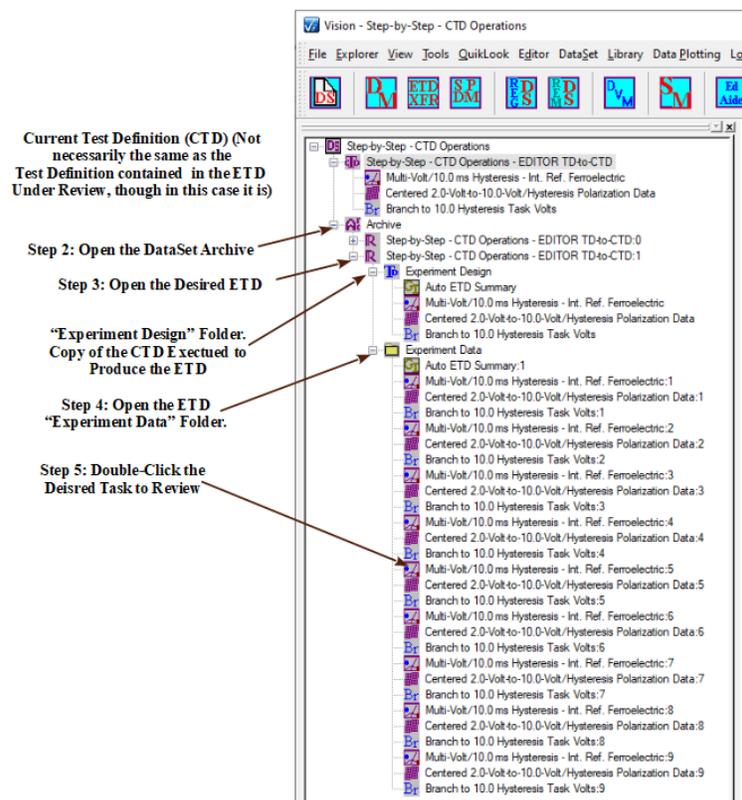


Figure 1 - Anatomy of the ETD - Accessing Tasks in the DataSet Archive.

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Step 3: Open the Desired ETD. Two Folders will appear. The "Experiment Design" folder contains a copy of the CTD that was executed to create the ETD. This folder allows the ETD's Test Definition to be moved to the EDITOR, back to the CTD or to the Customized Tests TASK LIBRARY folder. The "Experiment Data" folder contains an entry for each instance of every Task that was executed to create the ETD. **Note that the two folders may differ in length, as in Figure 1 , as the Branch Loop causes Tasks to be written to the "Experiment Data" folder multiple times. This necessitates the inclusion of the "Experiment Design" folder, since the original experiment cannot be recreated from the "Experiment Data" Task list.**

Step 4: Open the "Experiment Data" Folder.

Step 5: With the left mouse button, double-click on the desired Task. The original configuration dialog will open to show the setup of the Task that was executed. In general, only the *Export*, *Click For Task Instructions* and *Cancel* (or *Cancel/Plot*) buttons will be active. Tasks with subdialogs may have the controls that access them active. The Task may not be reconfigured from this dialog, since it represents the history of the Task and has been frozen on execution. Measurement Tasks that will plot the Archived data will either have plot tabs on the dialogs with active controls or will follow the configuration dialog with a second dialog so that the data plot may be configured as shown for the Hysteresis Task Task below.

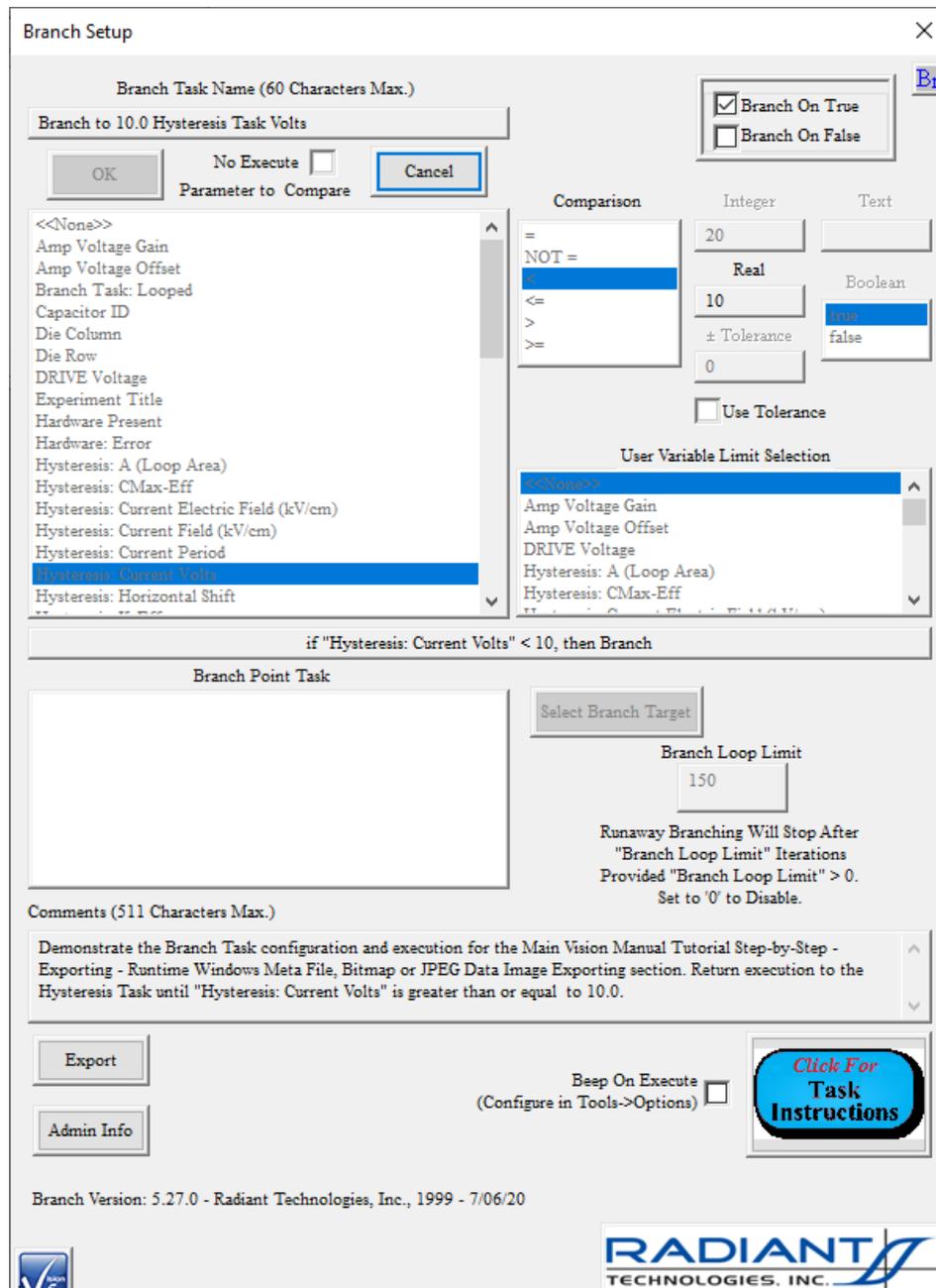


Figure 2 - The Selected Branch Task Configuration is Displayed for Review.

Note: Tasks in the Test Definition stored in the Archive are not linked together. For this reason, the Branch and Filter Tasks cannot rebuild, and will not show, the list of associated Tasks (as in the *Branch Point Task* control in Figure 2) in their Task list window.

In the case of the Branch Task, as in this example, the configuration dialog will be followed by a second simple dialog that indicates if the Task branched or not on the execution in question.

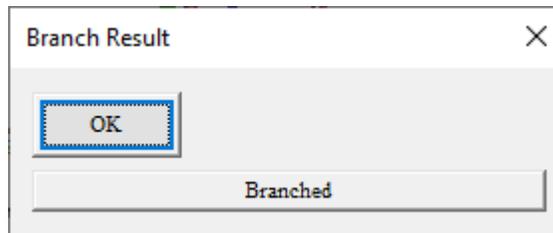


Figure 3 - Branch Condition Indicator for the Requested Branch Instance.

Step 6: In the case of most Measurement Tasks the *Cancel* button will be relabeled *Cancel/Plot*. For these Tasks, when the configuration dialog is canceled, the QuikLook response dialog will appear and display the measured data. Filter Tasks will redisplay the accumulated data in their own plot window. The plots represent data measured (or accumulated for Filters) and stored at that instance of the Task execution.

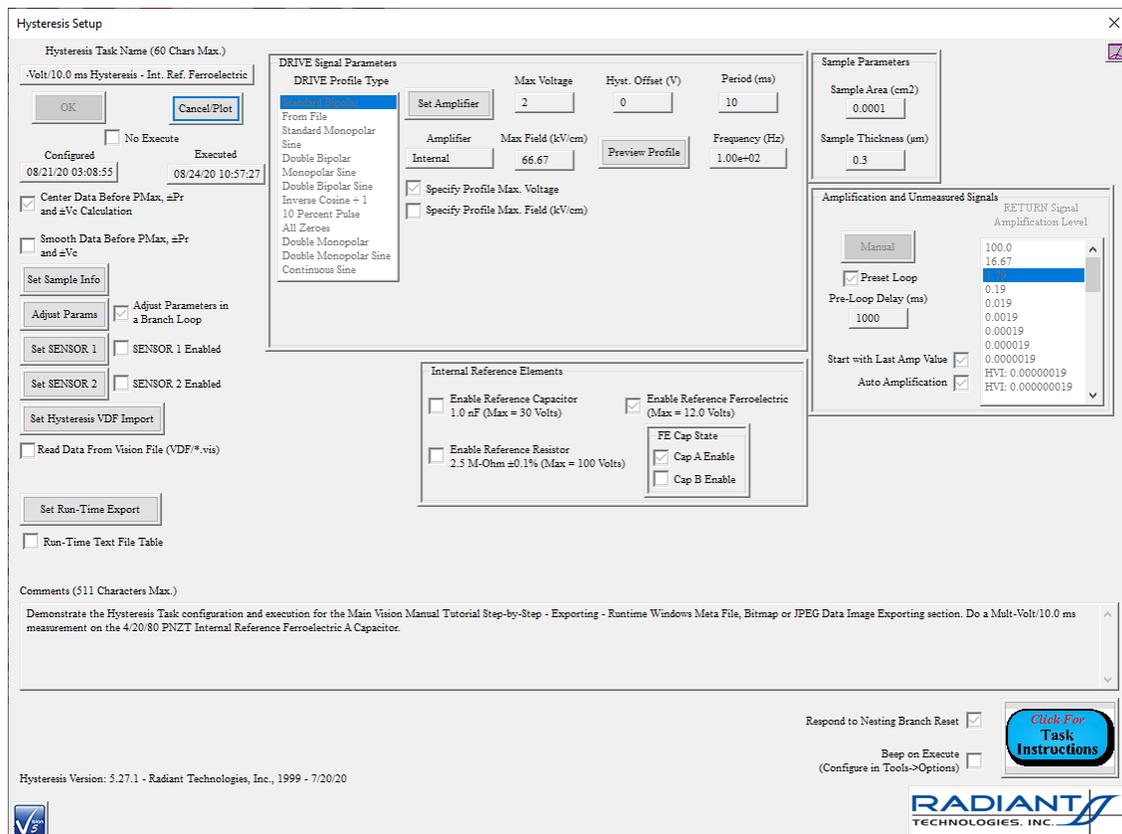


Figure 4 - Recalled Hysteresis Task Configuration for Review.

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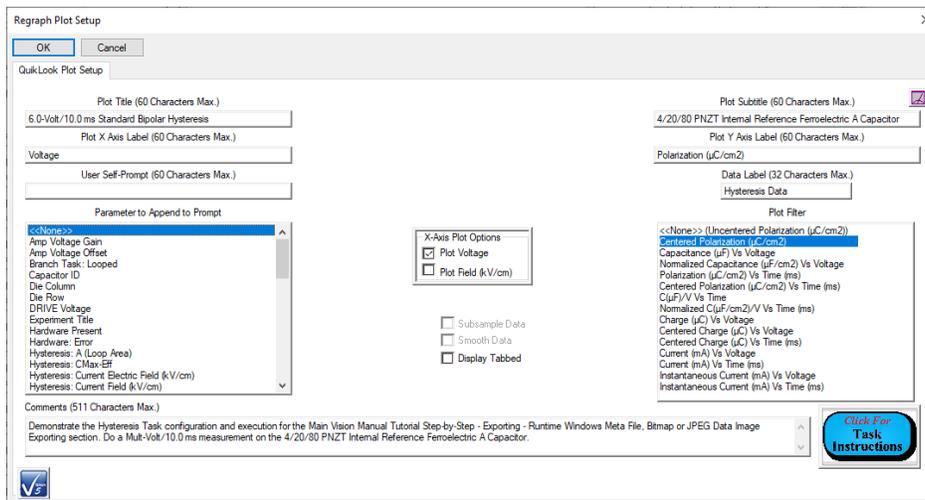


Figure 5 - Hysteresis Plot Setup Dialog to Format the Plot of Recalled Data.

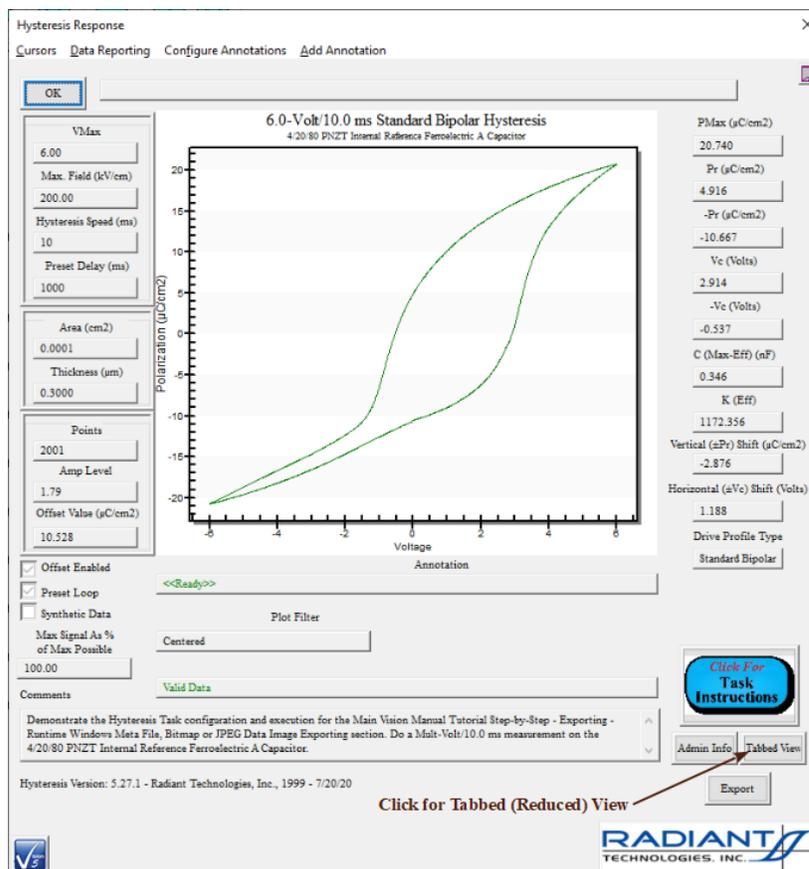


Figure 6 - 6.0-Volt/10.0 ms Hysteresis Data Recalled from the DataSet Archive.

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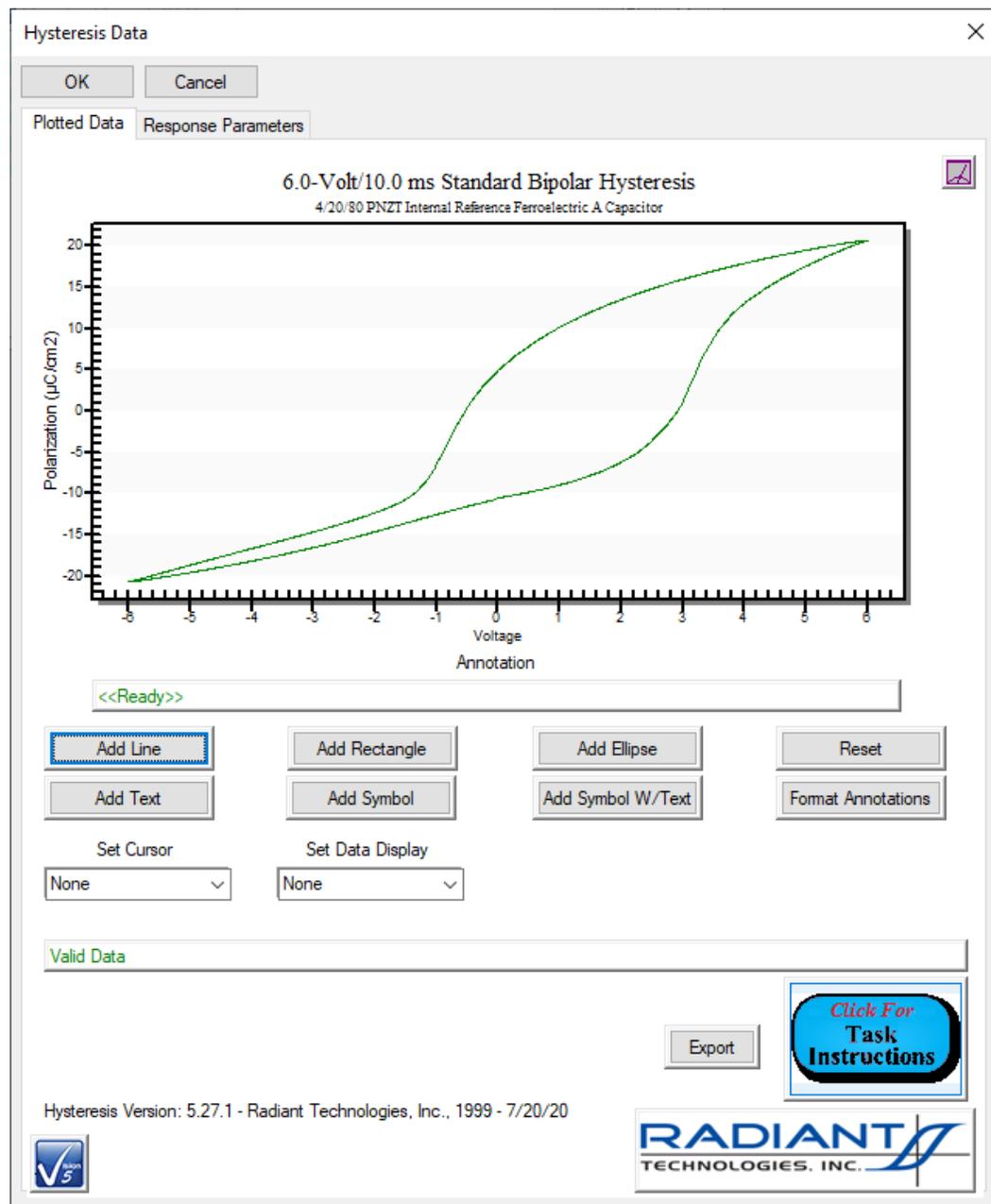


Figure 7 - 6.0-Volt/10.0 ms Hysteresis Data Recalled from the DataSet Archive - Tabbed (Reduced) View.

Hysteresis Data ✕

OK Cancel

Plotted Data **Response Parameters**

VMax 6.00 Max. Field (kV/cm) 200.00 Hysteresis Speed (ms) 10 Preset Delay (ms) 1000 Drive Profile Type Standard Bipolar Points 2001	Area (cm²) 0.0001 Thickness (μm) 0.3000 A (Loop Area - μC/cm ² ·Volts) 88.75 Max Signal As % of Max Possible 100.00 Amp Level 1.79 Offset Value (μC/cm ²) 10.528	PMax (μC/cm²) 20.740 Pr (μC/cm ²) 4.916 -Pr (μC/cm ²) -10.667 Vc (Volts) 2.914 -Vc (Volts) -0.537 C (Max-Eff) (nF) 0.346 K (Eff) 1172.356 Vertical (±Pr) Shift (μC/cm ²) -2.876 Horizontal (±Vc) Shift (Volts) 1.188
---	---	---

Offset Enabled
 Preset Loop
 Synthetic Data

Plot Filter: Centered

Comments

Demonstrate the Hysteresis Task configuration and execution for the Main Vision Manual Tutorial Step-by-Step - Exporting - Runtime Windows Meta File, Bitmap or JPEG Data Image Exporting section. Do a Mult-Volt/10.0 ms measurement on the 4/20/80 PNZT Internal Reference Ferroelectric A Capacitor.



Figure 8 - Hysteresis Data and Configuration Parameters - Tabbed (Reduced) View.

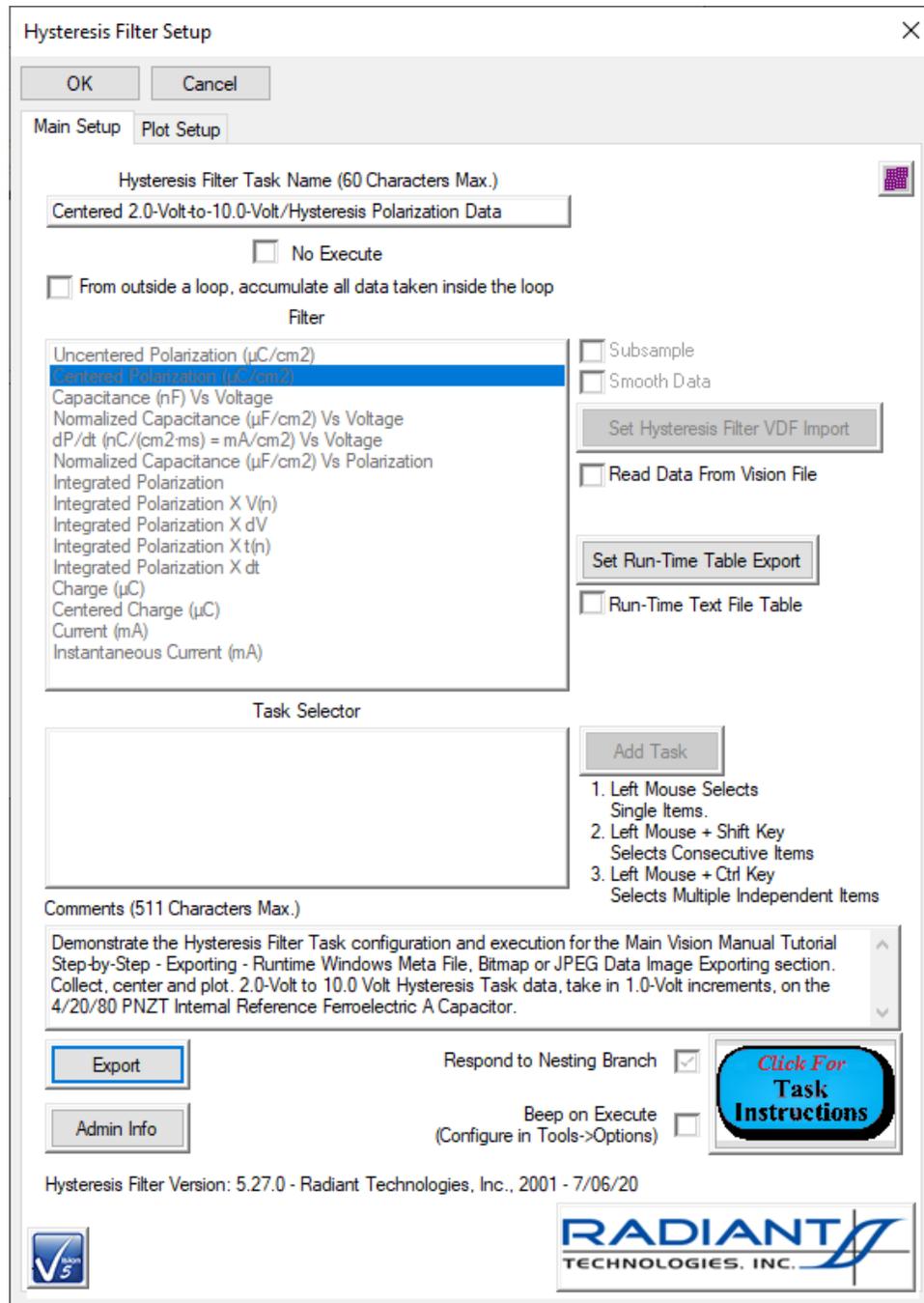


Figure 9 - Hysteresis Filter Configuration - Disabled for Review Only.

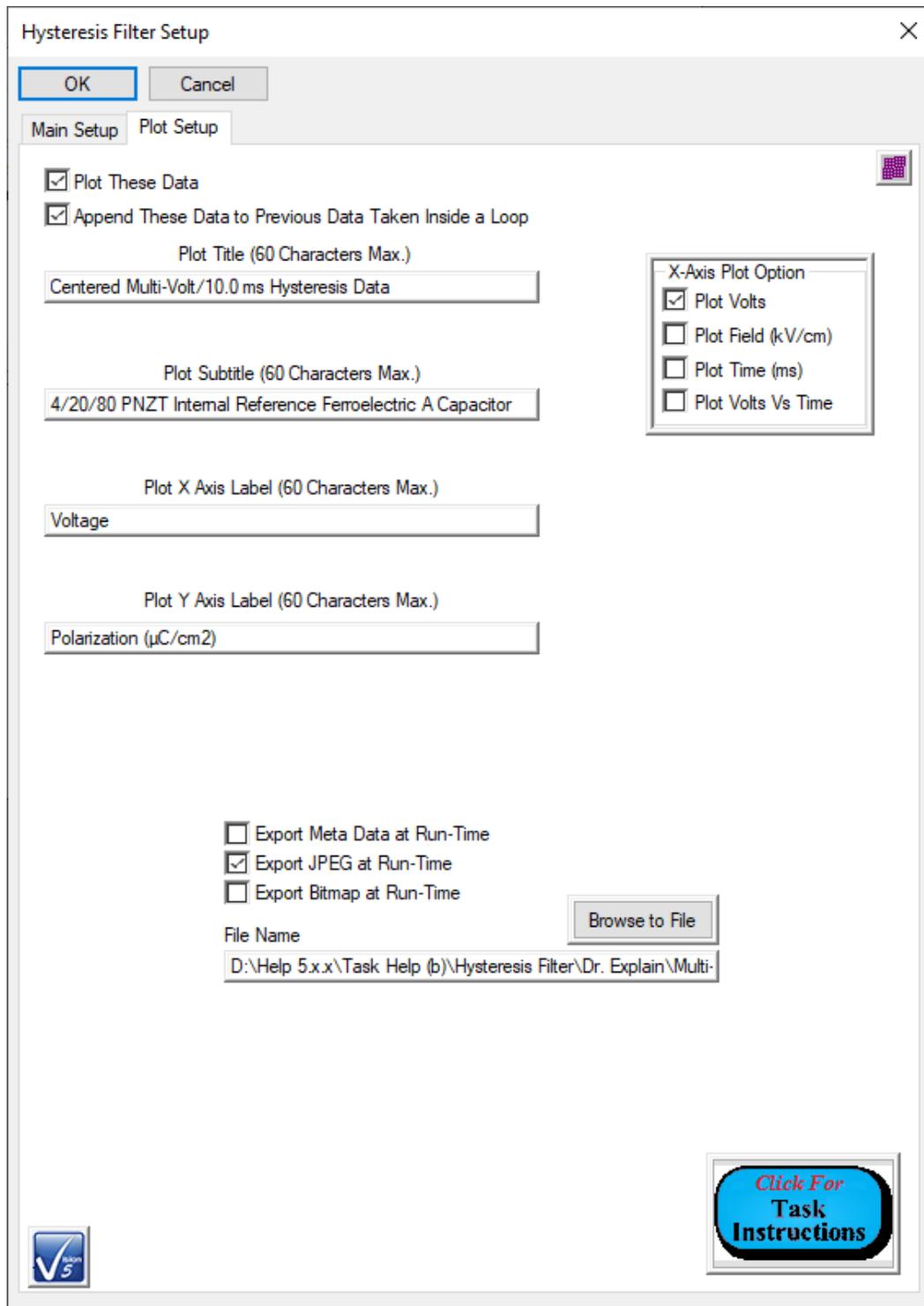


Figure 10 - Hysteresis Filter Plot Configuration. Controls are Enabled to Format the Data Plot.

ETD-to-CTD

Step-by-Step ETD-to-CTD

Once a Current Test Definition (CTD) is executed, it is written permanently into the DataSet Archive as an Executed Test Definition (ETD). The CTD may be repeatedly executed, in which case it is repeatedly stored. It can also be overwritten by new Test Definitions, created in the Editor, renamed and repeatedly executed. Although only one Test Definition is stored at any time in the CTD, the Archive may store many different Test Definitions as ETDs. Any of these ETDs can be recalled to service and reexecuted as a CTD at any time. The Test Definition stored in the ETD is simple made to overwrite whatever Test Definition may be in the CTD, at which time it may be reexecuted.

Note, as stated, moving the "Experiment Design" from an ETD back to a CTD will overwrite the existing Tasks in the CTD. This is different behavior from the action of moving the "Experiment Design" from an ETD to the EDITOR (next topic). In that case, the ETD Tasks are appended to any Tasks already in the EDITOR.

- Step 1:** Open the desired DataSet. Ensure the DataSet has the focus. Its Log Window must be the topmost window in the User Area.
- Step 2:** Open the DataSet Archive and select the desired ETD.
- Step 3:** Right-Click and Select "ETD to CTD" from the popup menu.

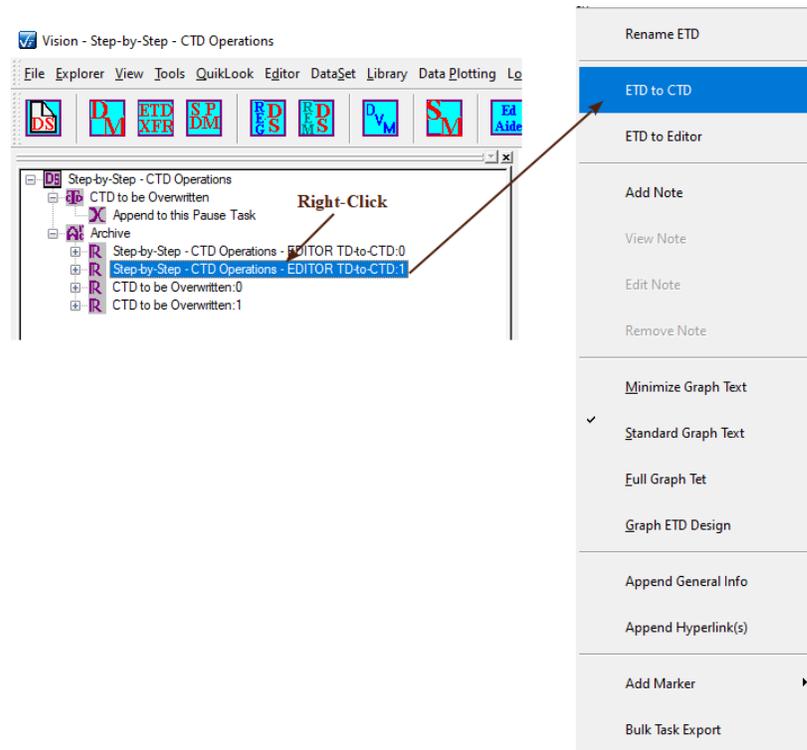


Figure 1 - Initiate the Movement of the ETD back to the CTD.

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Step 4: The CTD will be overwritten and a dialog will appear to allow it to be renamed. Assign an appropriate name.

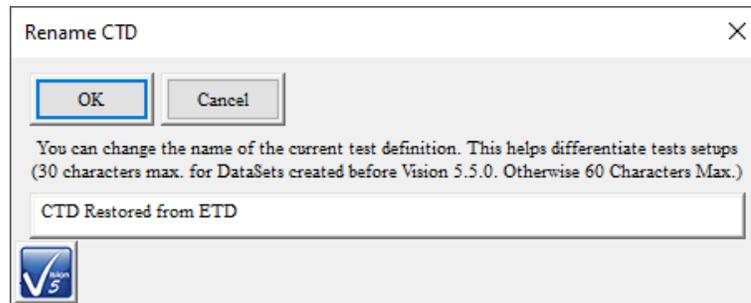


Figure 2 - Give the CTD a Unique and Meaningful Identifier.

Step 5: The CTD is restored and renamed and ready for reexecution.

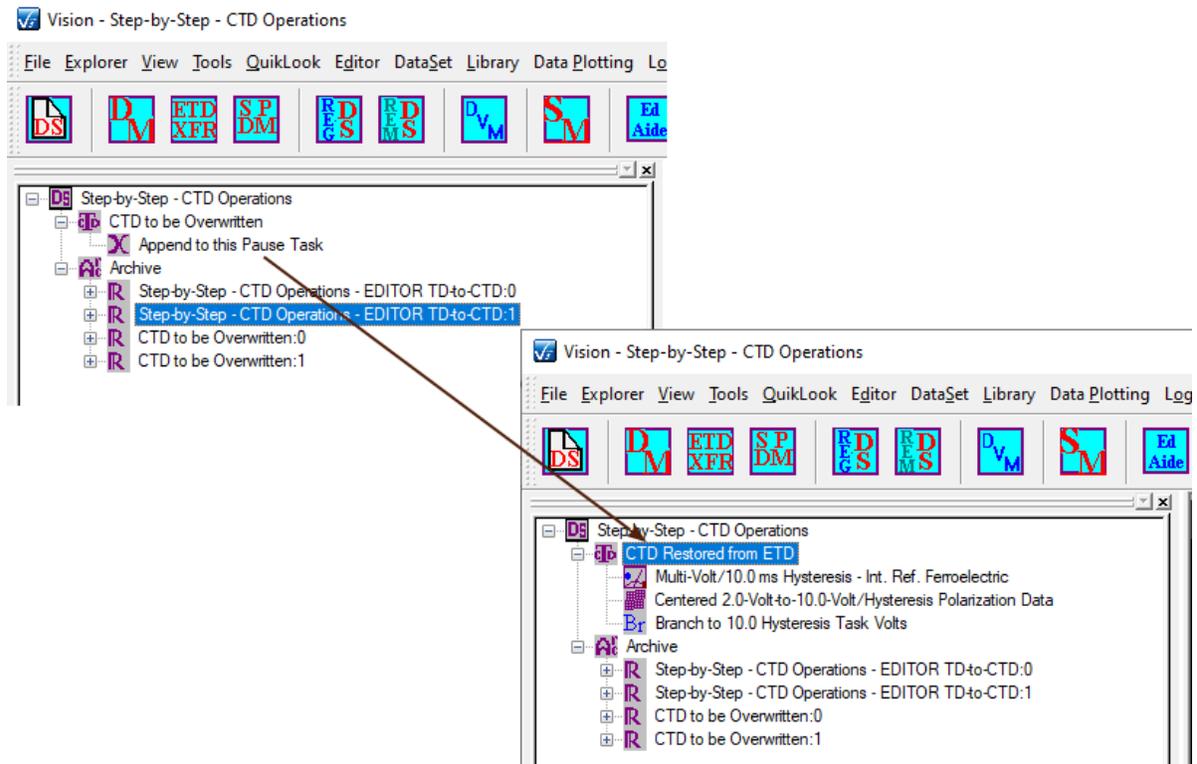


Figure 4 - Restored and Renamed CTD.

ETD-to-EDITOR

Step-by-Step ETD-to-EDITOR

When a Current Test Definition (CTD) is executed in a DataSet, the Test Definition is stored, along with the data, in an Executed Test Definition (ETD) in the DataSet Archive. Any number of ETDs may be stored in a single DataSet making the DataSet Archive an alternative to the Customized Tests folder in the Library as a storage locale for Test Definitions. As with Customized Tests in the Library, Test Definitions stored as ETDs may be recalled to the EDITOR for reconfiguration. From there they may be sent back to the DataSet to overwrite the CTD or transferred to new DataSets.

NOTE that moving the "Experiment Design from an ETD to the EDITOR will append the ETD Tasks to any Tasks already in the EDITOR window. This is a different behavior from moving the "Experiment Design" from the ETD back into the CTD (previous topic). In that case, Tasks in the CTD are overwritten by the Tasks in the "Experiment Design" folder.

Step 1: Open the desired DataSet. Ensure that the DataSet has the focus. The Log Window should be the topmost window in the User Area.

Step 2: Open the DataSet Archive and select the desired ETD.

Step 3: Right-Click and select "ETD to Editor" from the popup menu.

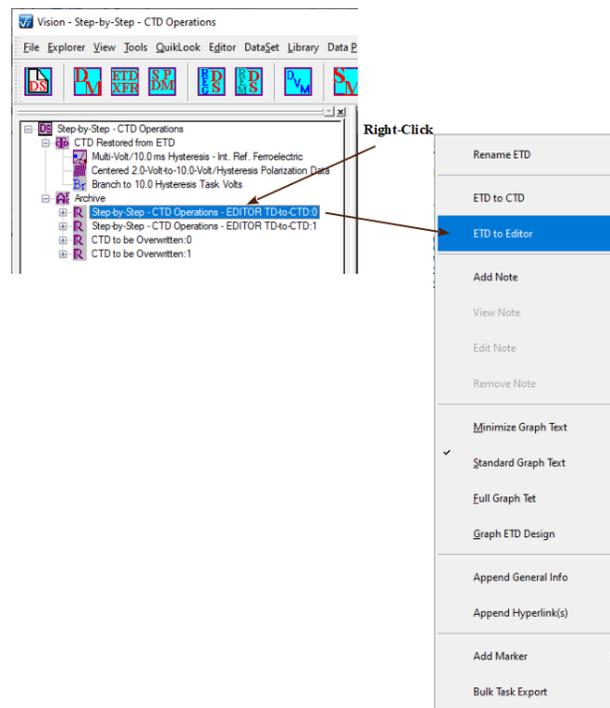


Figure 1 - Initiate the Restoration of the ETD Test Definition to the Editor.

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Step 4: The Tasks in the Test Definition stored in the ETD will be appended to any Tasks in the Editor.

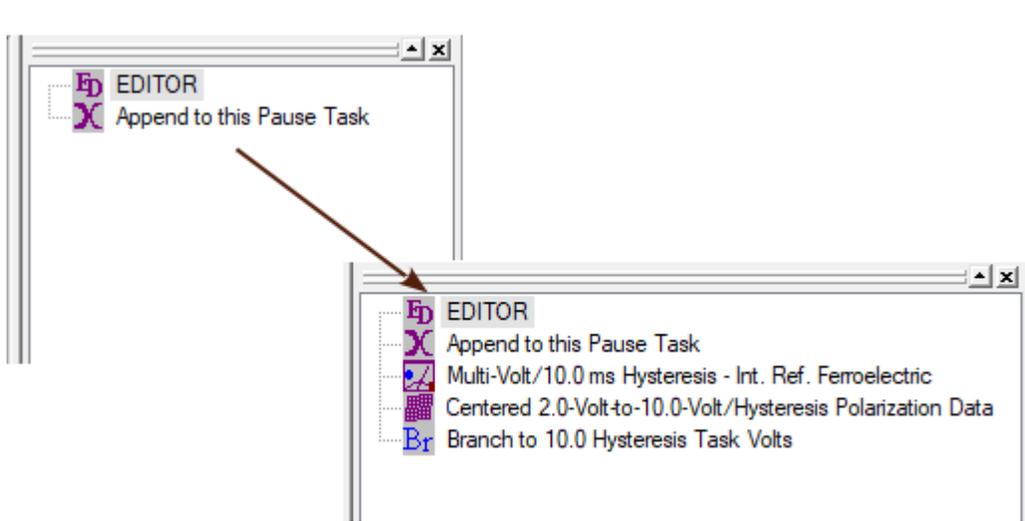


Figure 2 - Editor Updated with Appended Test Definition from the ETD.

ETD Notes

- [Adding an ETD Note](#)
- [Reviewing an ETD Note](#)
- [Printing an ETD Note](#)
- [Exporting an ETD Note](#)
- [Editing an ETD Note](#)
- [Deleting an ETD Note](#)

Adding an ETD Note

Step-by-Step ETD Notes - Adding an ETD Note

Vision offers the ability to annotate DataSets and their Executed Test Definitions (ETDs) after the ETD has been added to the DataSet, has been added. The ETD Note includes:

1. Date/Time of most-recent update.
2. Brief title/name
3. Rich Text edit field of up to 2000 characters. The field offers text formatting including bold, italic, underline, superscript, subscript, text color and text background color.

The Note is associated with a specific ETD to allow possible inconsistencies with the ETD or incomplete documentation associated with the ETD to be addressed.

To add the note:

- Step 1:** Open any DataSet in the DataSet Explorer.
- Step 2:** Open the DataSet Archive.
- Step 3:** Select (Highlight) the desired ETD.
- Step 4:** Right-click and select "Add Note" from the popup menu.

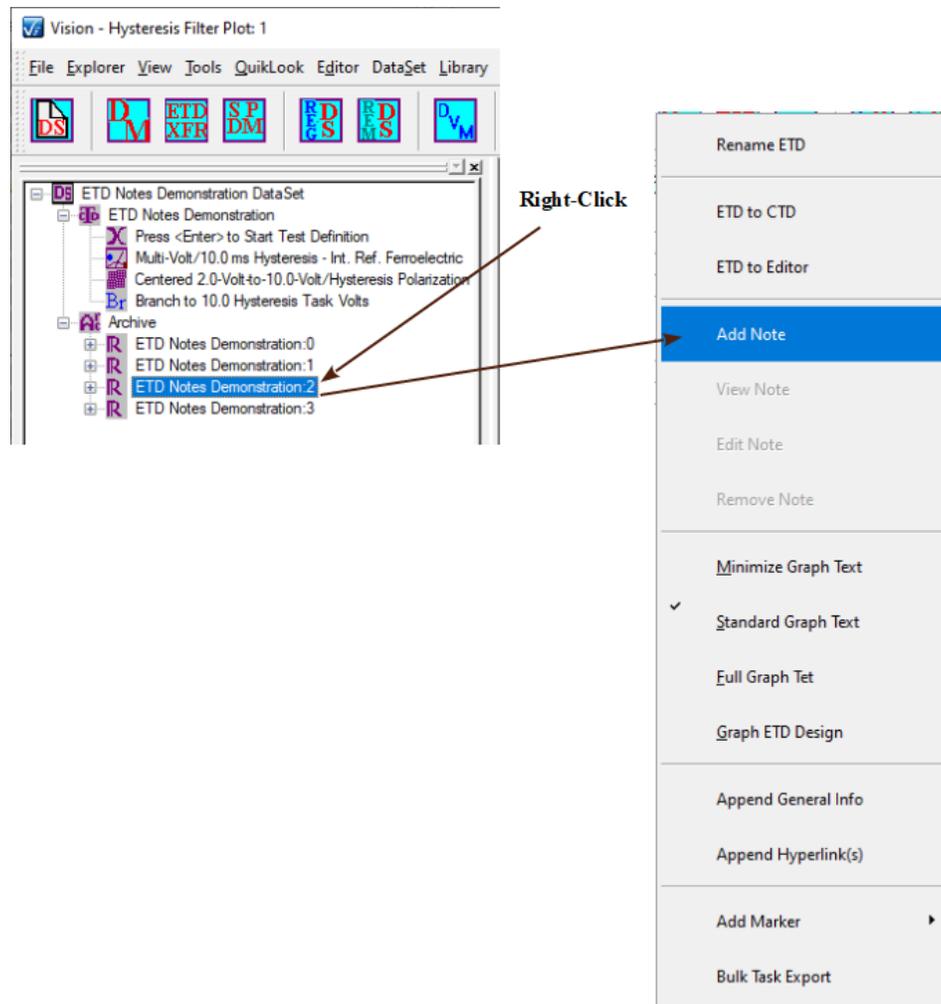


Figure 1 - Initiate an ETD Note.

Step 5: The note editing dialog will open. The unlabeled, read-only, time and date field will be updated automatically. Add a Brief Description/Title. Add up to 2000 characters of descriptive text. Format selected text using the Text menu (**Figure 3**).

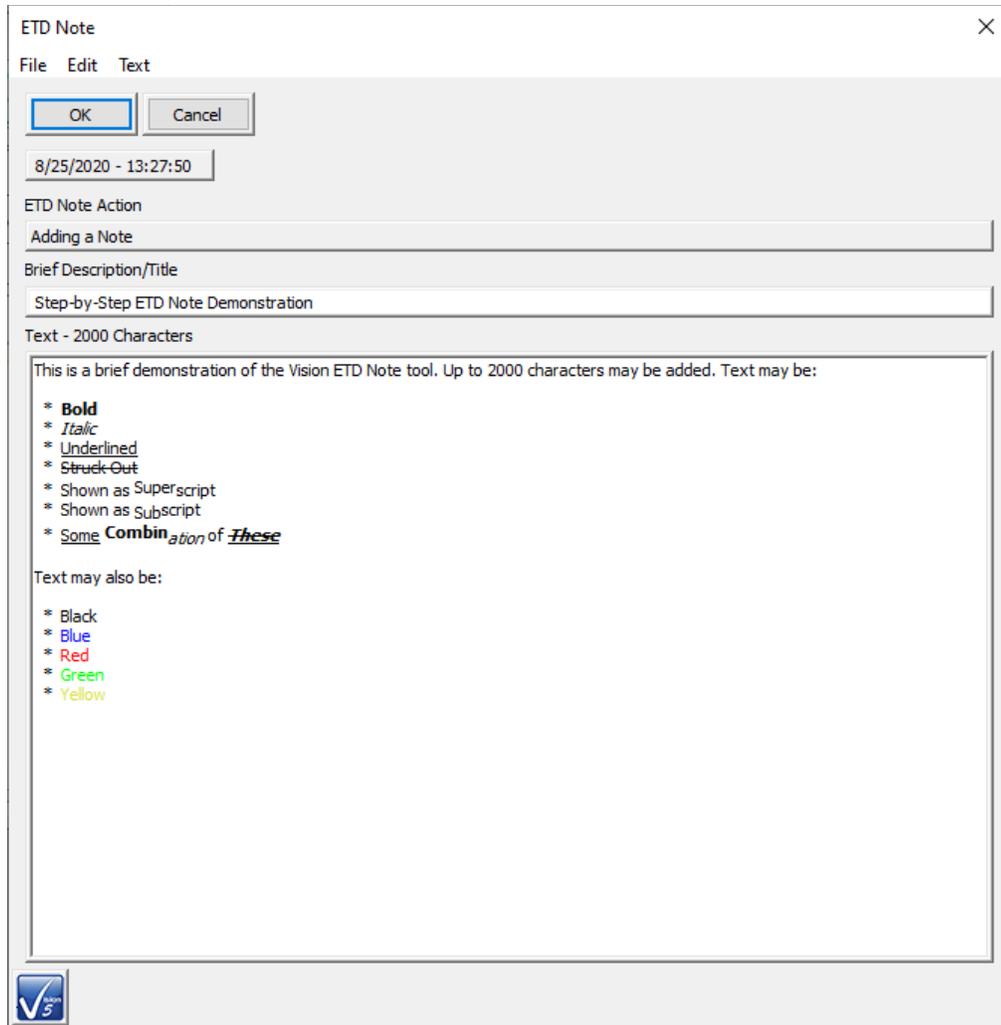


Figure 2 - Edit the ETD Note.

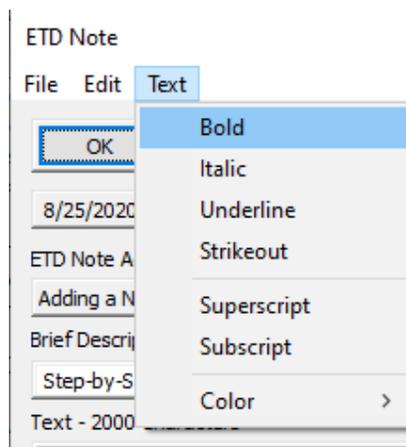


Figure 3 - Format the Text.

Step 6: Click *OK*. The edit dialog will close. The DataSet Archive will refresh. The standard ETD icon (R) will be replaced by a blue icon with an appended, upper-case "n" (Rⁿ) to indicate that a note is associated with the ETD.

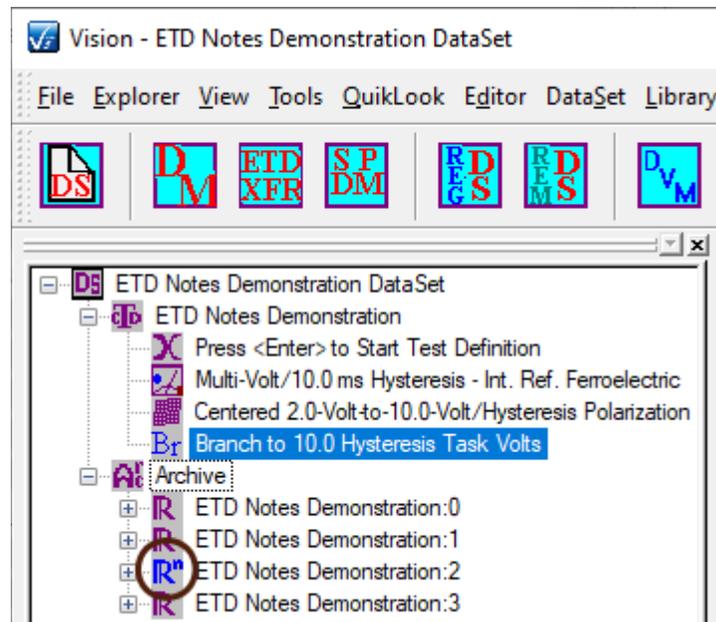


Figure 4 - Updated DataSet Archive. ETD Icon Change Shows that a Note is Associated.

Reviewing an ETD Note

Step-by-Step ETD Notes - Reviewing an ETD Note

Once an ETD note has been added to an ETD, the note is available for reviewing, editing, printing, exporting or deleting. To review the note:

- Step 1:** If the desired DataSet is not open, open it in the DataSet Explorer.
- Step 2:** Open the DataSet Archive.
- Step 3:** Select the desired ETD. (ETDs with associated notes will appear the )
- Step 4:** Right-click and select "View Note" from the popup menu.

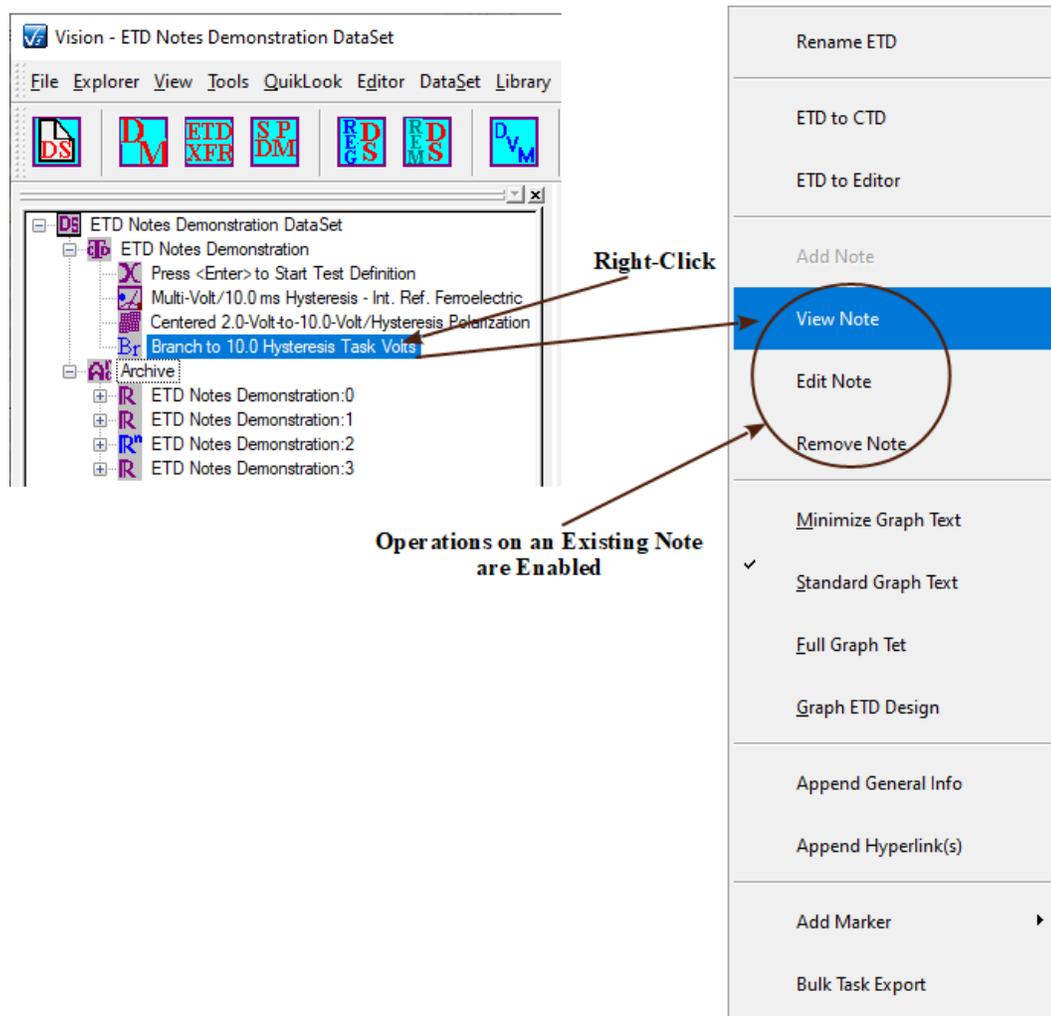


Figure 1 - Note Review Popup Selection.

Step 5: The Note dialog will reopen with controls disabled. The Text menu option appears enabled, as does the main text field, but editing has no effect. The File->Print and File->Export options are available.

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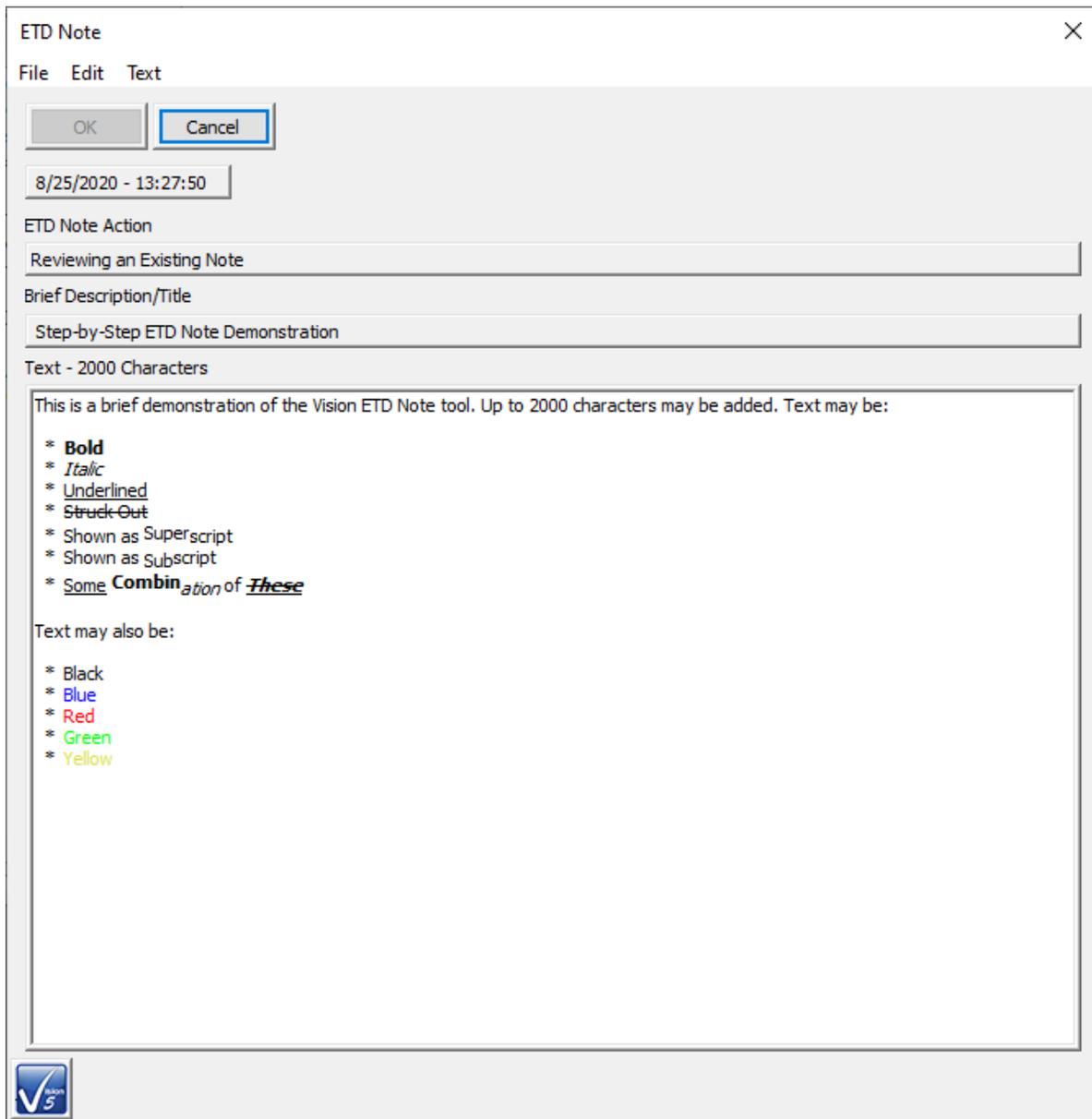


Figure 2 - Note Under Review.

Printing an ETD Note

Step-by-Step - ETD Notes - Printing an ETD Note

An ETD note can be sent as text to a printer. To print a note:

- Step 1:** If the desired DataSet is not open, open it in the DataSet Explorer.
- Step 2:** Open the DataSet Archive.
- Step 3:** Select the desired ETD. (ETDs with associated notes will appear with blue icons.)
- Step 4:** Right-click and select "View Note" from the popup menu as in the previous Step-by-Step topic. (The note can also be opened in Edit mode.)
- Step 5:** From the dialog menu select File->Print.

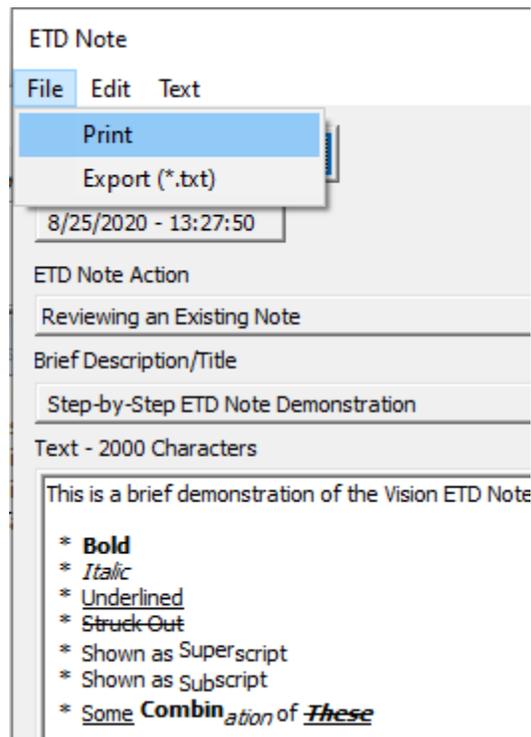


Figure 1 - Initiate Printing.

- Step 6:** The standard Printer configuration dialog will appear. (The dialog will vary by printer manufacturer and model and by Windows installation.) Click *OK* to print or *Cancel* to abort printing.

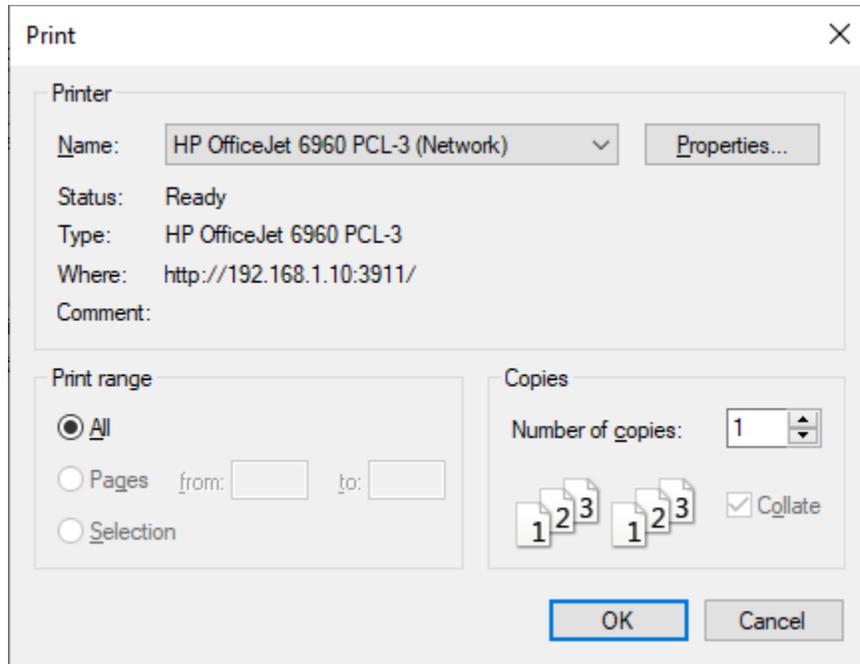


Figure 2 - Windows Printer Configuration Dialog.

Step 7: The text output will appear at the printer.

Exporting an ETD Note

Step-by-Step ETD Notes - Exporting an ETD Note

An ETD note can be exported to a text file. To export a note:

- Step 1:** If the desired DataSet is not open, open it in the DataSet Explorer.
- Step 2:** Open the DataSet Archive.
- Step 3:** Select the desired ETD. (ETDs with associated notes will appear with blue icons.)
- Step 4:** Right-click and select "View Note" from the popup menu as in the ETD Note Reviewing Step-by-Step topic. (The note can also be opened in Edit mode.)
- Step 5:** From the dialog menu select File->Export.

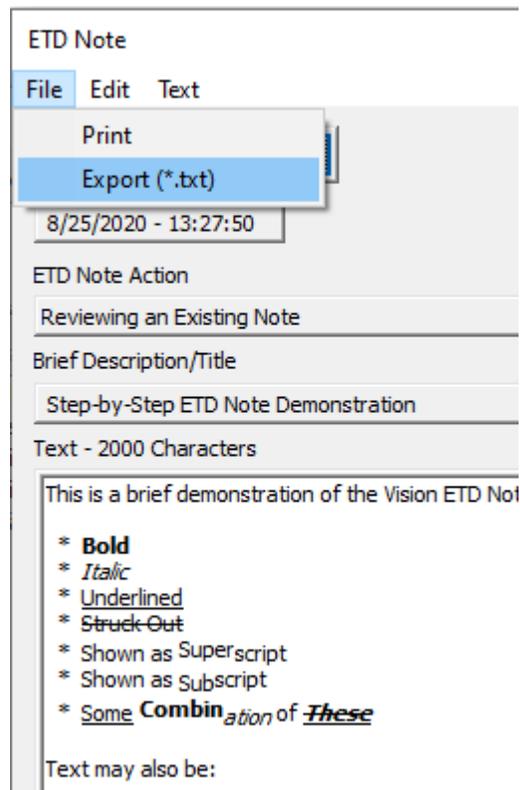


Figure 1 - Initiate Exporting.

- Step 6:** A standard Windows File browser will open. Navigate to an appropriate location, assign an appropriate file name and click Open to write the exported text file.

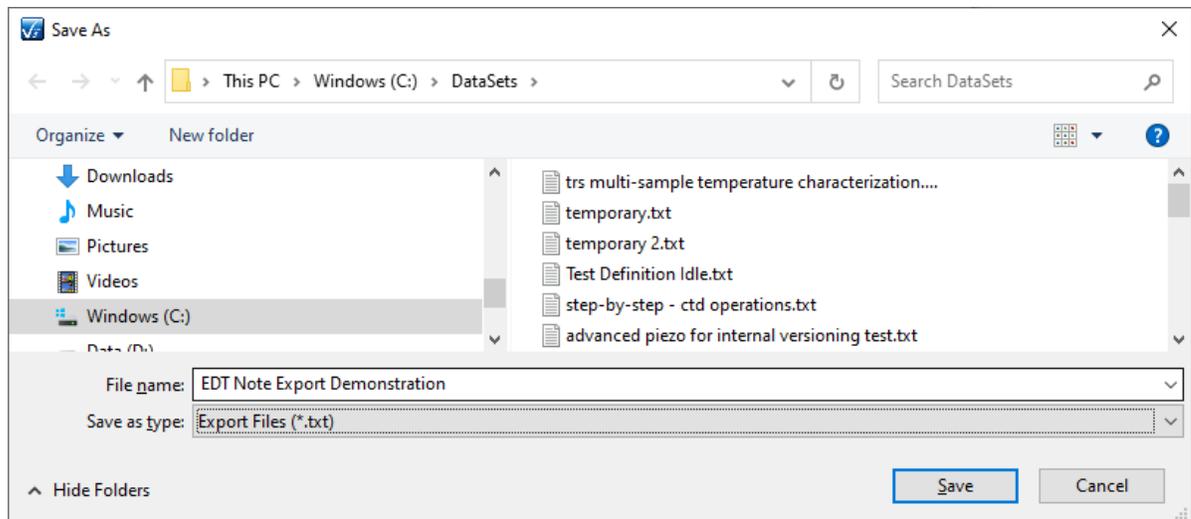


Figure 2 - Identify File Path and File Name.

Step 7: The file will be written and may be opened for review and/or editing in a text file editor such as Notepad. This is not a Rich Text document. Test formatting will not appear in the output file.

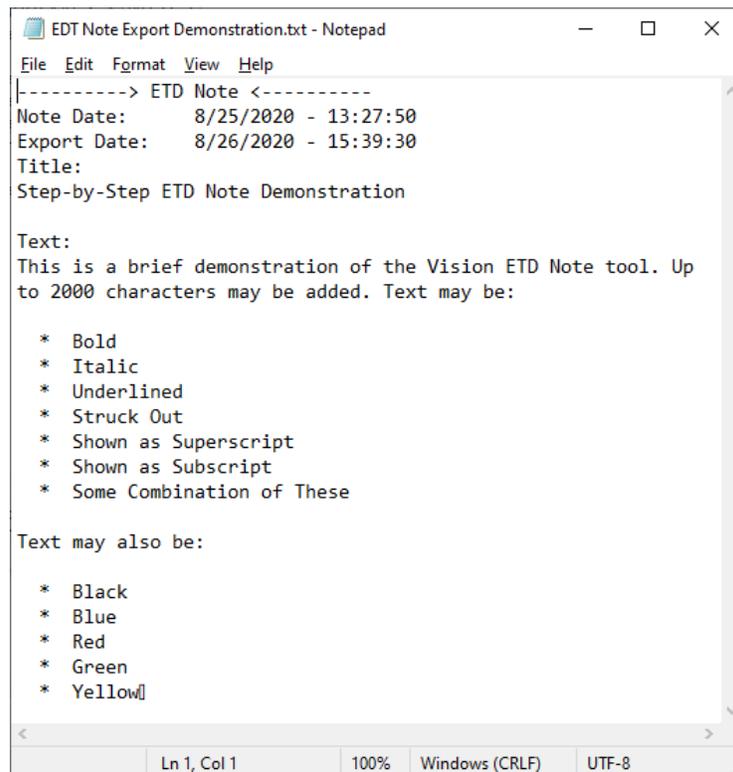


Figure 3 - Review the Exported Text File.

Editing an ETD Note

Step-by-Step ETD Notes - Editing an ETD Note

An existing ETD note may be modified in one of two modes: Append or Overwrite. In Append mode, the existing text is left intact except that the original Description/Title text and the original date/time values are prepended to the text in the main text field. All text in the field may be modified in any way. However, to keep a consistent record of updates, new text should actually be prepended to the top of the text field. The most-recent update will always be dated at the top of the document.

In Overwrite mode, the entire main text field is cleared of all text. In both modes, the *Brief Description/Title* field will be cleared. The *Brief Description/Title* field should be newly edited each time the note is edited. The user may toggle between Append and Overwrite modes until the proper action is chosen. When toggling between Append and Overwrite, the main text field will be cleared. When toggling between Overwrite and Append, the field will be rewritten. Note that any newly-added text in the main text field will not be maintained when toggling the edit mode.

To edit the note:

- Step 1:** If the desired DataSet is not open, open it in the DataSet Explorer.
- Step 2:** Open the DataSet Archive.
- Step 3:** Select the desired ETD. (ETDs with associated notes will appear with blue icons.)
- Step 4:** Right-click and select "Edit Note" from the popup menu.

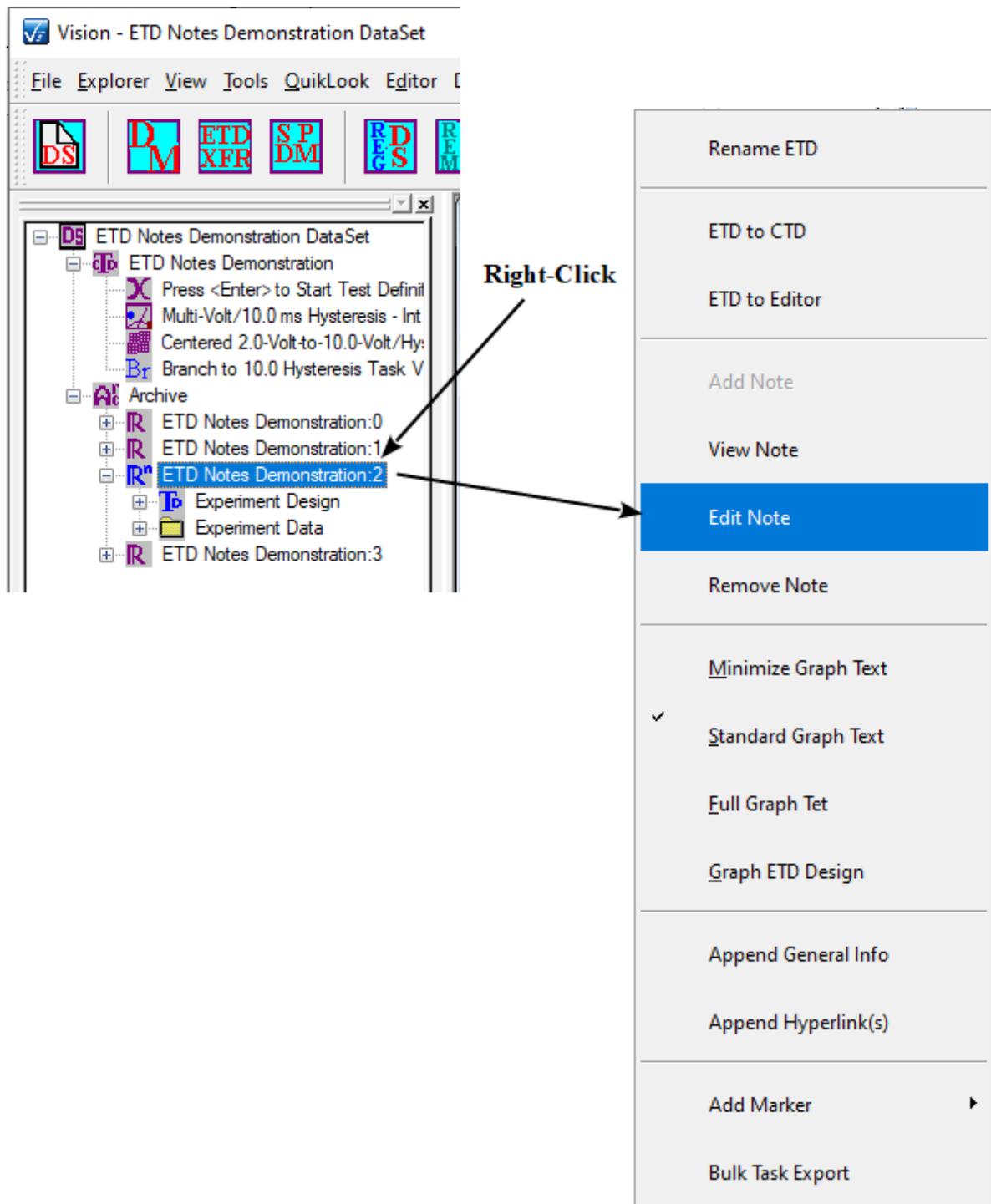


Figure 1 - Initiate Editing.

Step 5: In the dialog that opens, select *Append* or *Overwrite*.

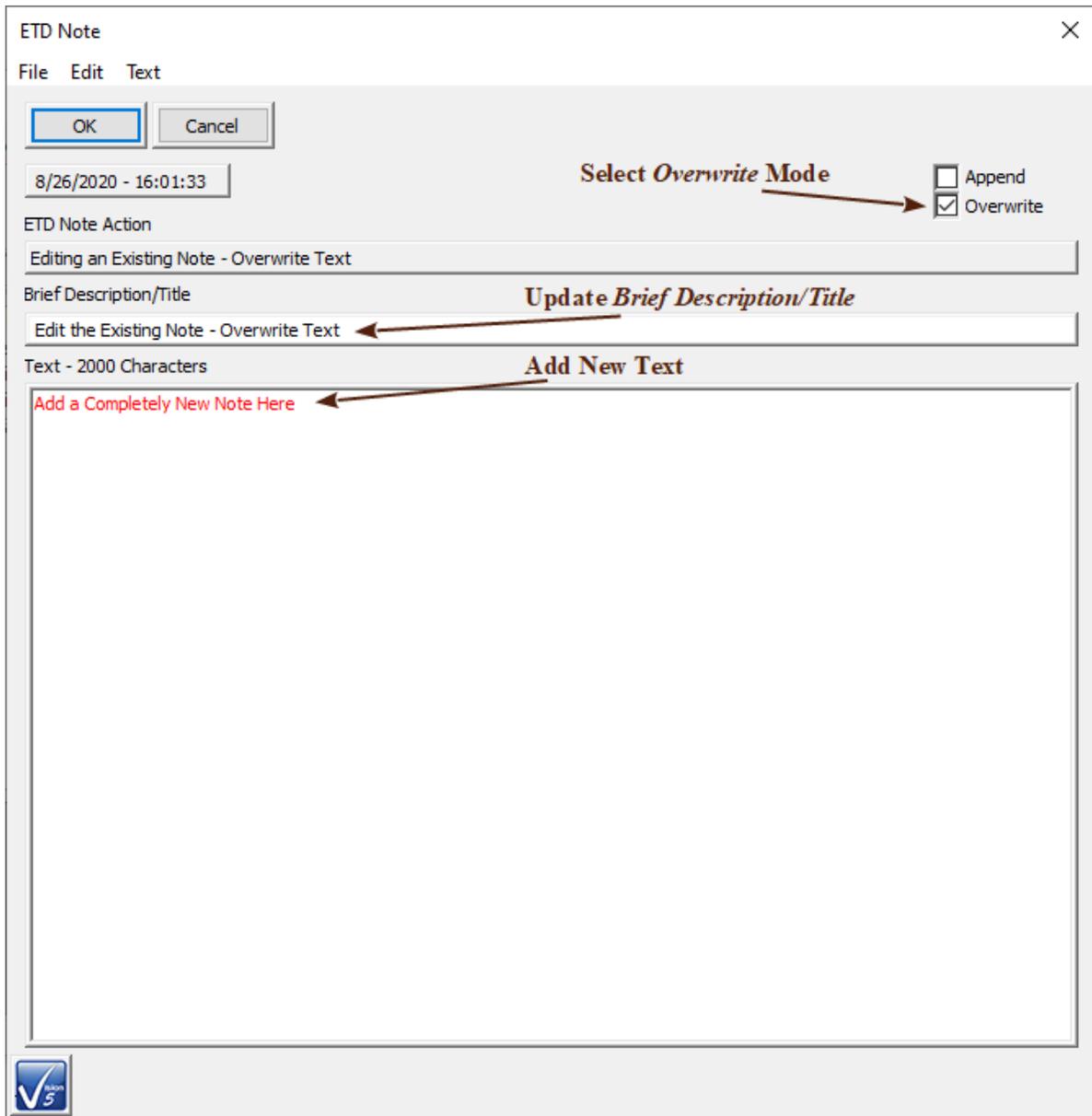


Figure 2 - Edit in *Overwrite* Mode.

Step 6: Update the *Brief Description/Title* field.

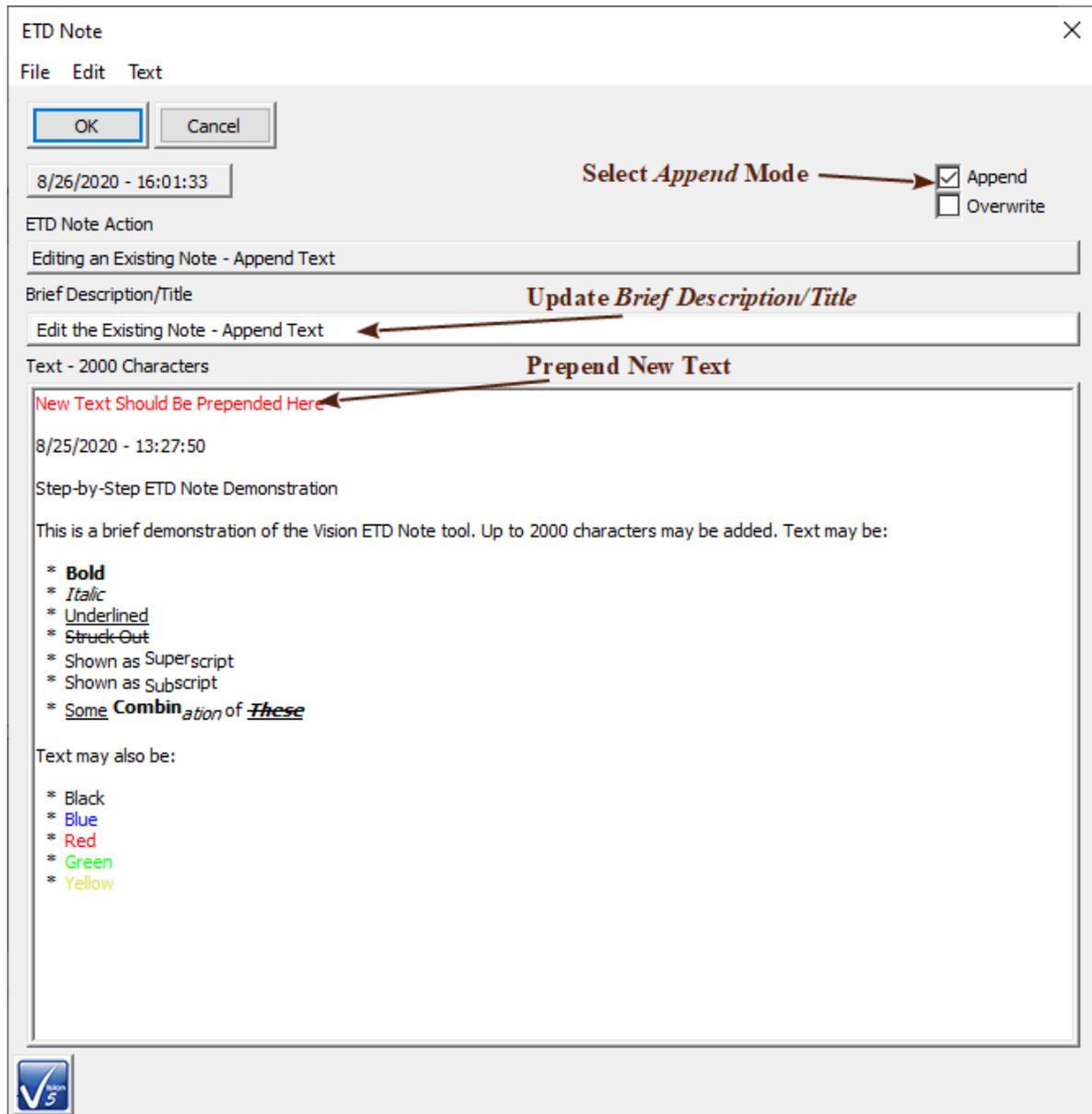


Figure 3 - Edit in *Append* Mode.

Step 7: Click *OK* to update the note in the ETD. *Cancel* leaves the note unedited.

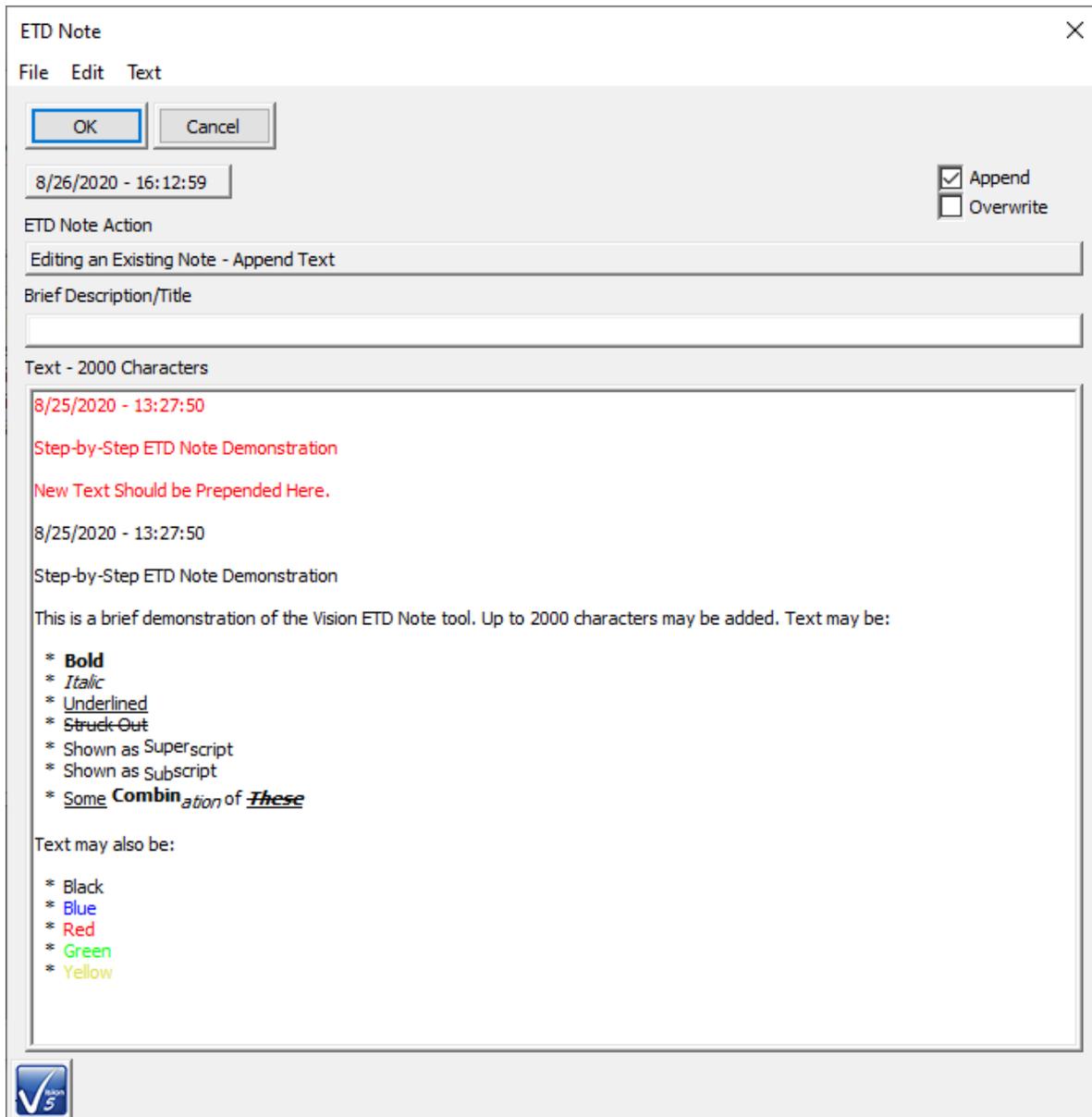


Figure 4 - Append Mode Note Reopened for Review.

Deleting an ETD Note

Step-by-Step - ETD Notes - Deleting an ETD Note

To delete the note:

- Step 1:** If the desired DataSet is not open, open it in the DataSet Explorer.
- Step 2:** Open the DataSet Archive.
- Step 3:** Select the desired ETD. (ETDs with associated notes will appear with blue icons.)
- Step 4:** Right-click and select "Remove Note" from the popup menu.

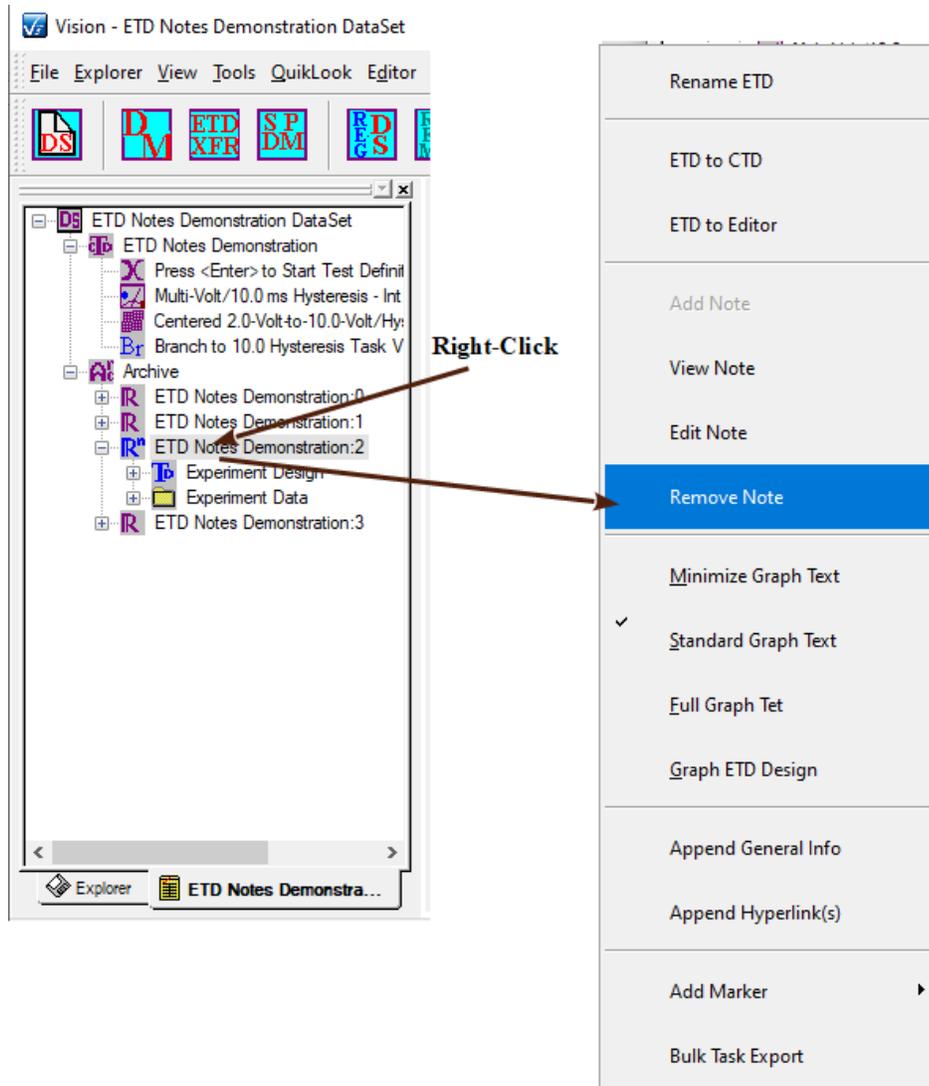


Figure 1 - Initiate Note Deletion.

- Step 5:** Acknowledge the User Prompt with *Yes*. The DataSet Archive will refresh and the ETD icon will return to the default green with no superscript "n" appended.

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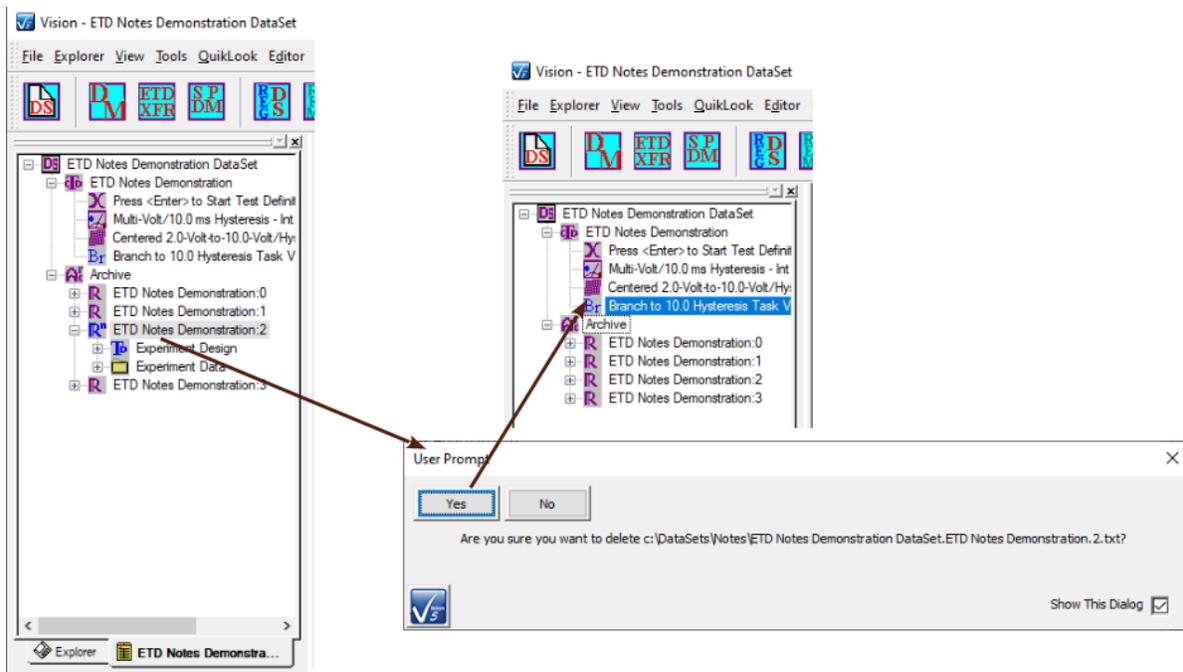


Figure 2 - Restored DataSet Archive.

ETD Markers

Discussion

Executed Test Definitions (ETDs) within a DataSet will normally have a common icon - . There are a number of exceptions to this rule including:

- [ETD Notes](#) - 
- [Immediate General Information](#) - 
- [Immediate Hyperlink](#) - 

These three special circumstances are discussed in the linked topics. These add unique, but fixed icons. These are beyond the user's control.

This topic present three user-selectable icons. These include:

- Error - 
- Important - 
- Special Attention - 

Here, the names are simple labels. The use of the icon can be taken to have any significance the user intends.

- Step 1:** Open the DataSet that requires attention.
- Step 2:** Open the DataSet Archive.
- Step 3:** Select the ETD whose icon is to be changed.
- Step 4:** Right-click and select "Add Marker-><Intended Marker>"

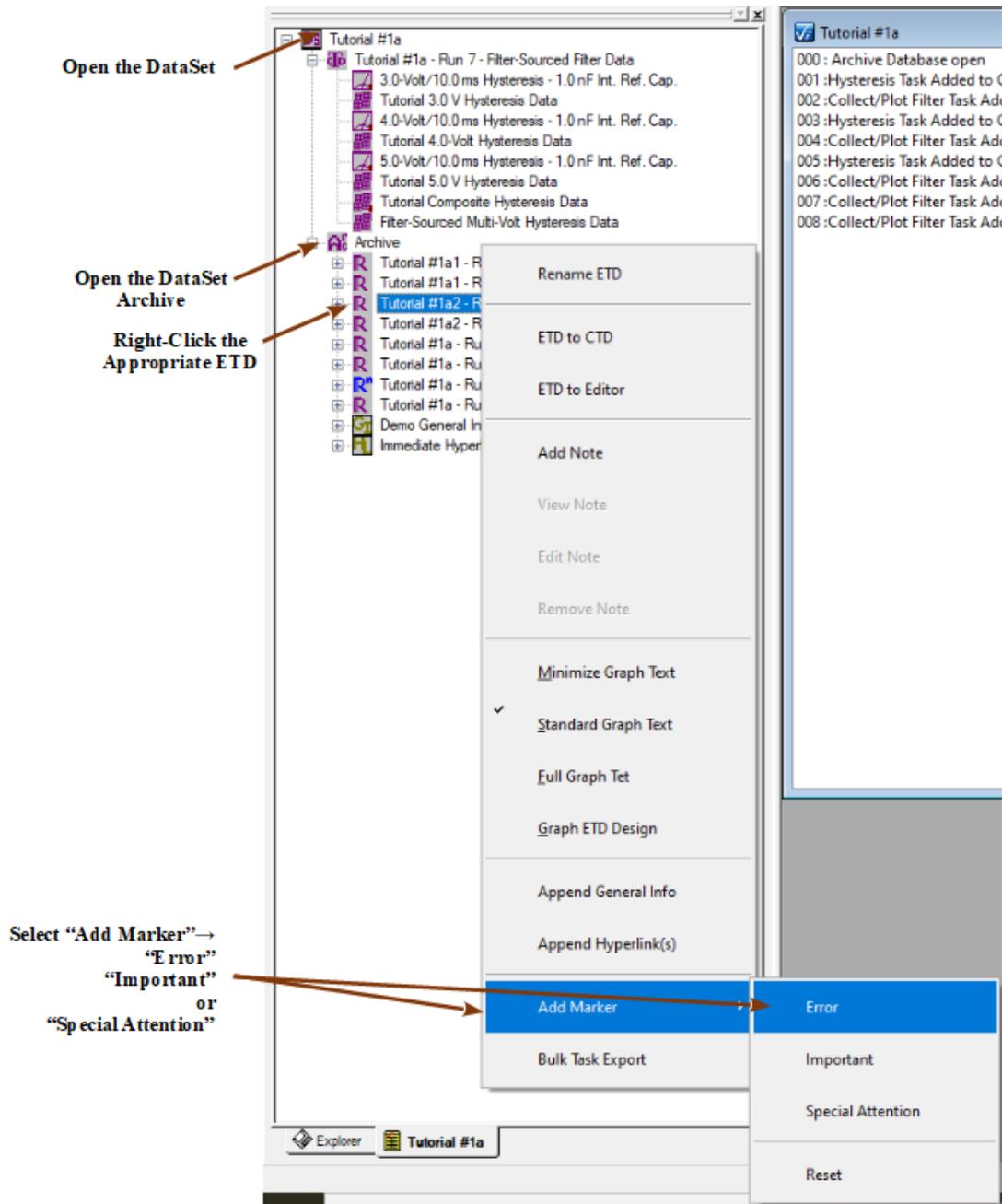


Figure 1 - Replace the Standard ETD Marker with the "Error" Marker.

Step 5: The DataSet Archive refreshes. Reopen the DataSet Archive to review the icon change.

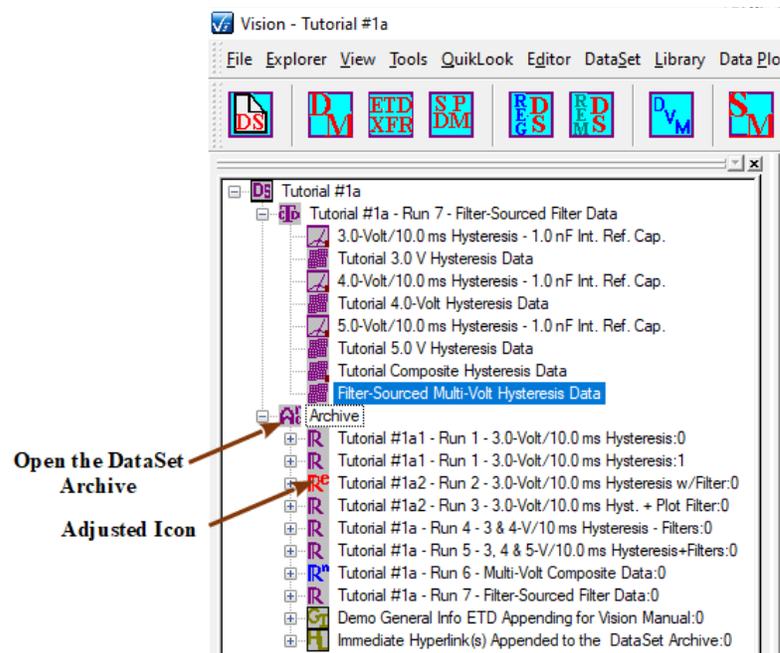


Figure 2 - DataSet Archive with Error ETD Icon.

Step 6: Right-click the same ETD. Select Add Marker-><Intended Marker> where "<Intended Marker>" differs from the marker of Steps 4 and 5. The first special marker is replaced by the second.

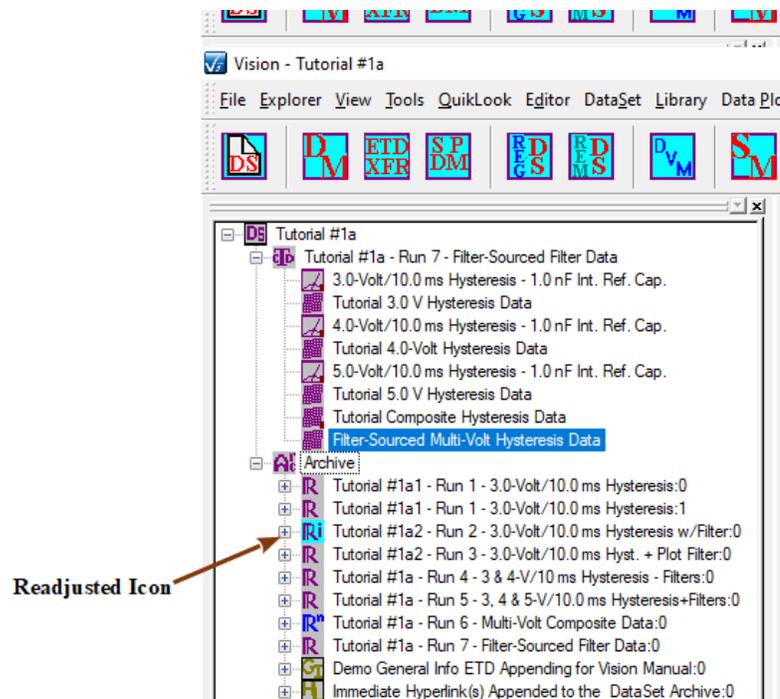


Figure 3 - Icon Readjusted to "Important".

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Step 7: Right-click the same ETD. Select Add Marker->Reset. The standard icon is restored.

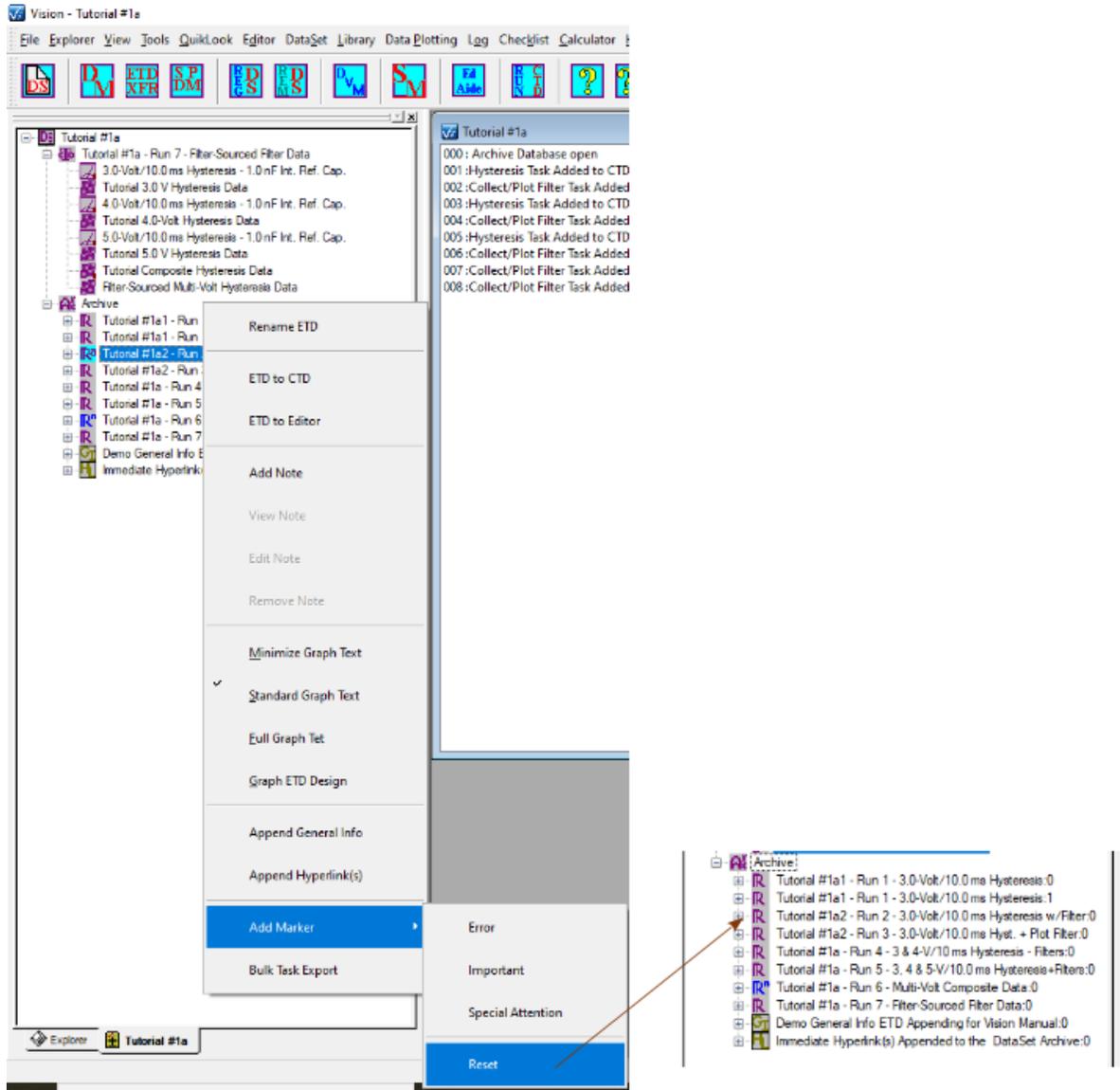


Figure 3 - Reset to Standard Icon.

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Immediate General Information Task ETD

Discussion

By policy, once data are taken in a DataSet and stored in the DataSet Archive, they become immutable. Stored data cannot be altered or removed. The user's primary option when dealing with data that are captured with misconfigured parameters, or that display errors on measurement, is to document the entry in the DataSet Archive after the incorrect or error execution has been performed. [ETD Notes](#) and [ETD Markers](#) are two techniques that have been covered in the Step-by-Step topics.

Another option would be to add a discussion of the situation into the DataSet Archive immediately after the Executed Test Definition (ETD) that stores the data in question. This could be accomplished by configuring a General Information Task with appropriate discussion in the Experiment Discussion control and then executing in the DataSet to be stored to its own ETD. This solution could be used to document the current state of a DataSet Archive for any reason, whether or not there are unwanted ETDs in the Archive.

Since this is often an immediate issue and since there is often a Test Definition in the EDITOR window that should not be disturbed with a General Information Task, Vision adds the capability of configuring and adding a General Information Task immediately to the DataSet Archive without the need to configure the Task in an EDITOR Test Definition, move it into the Current Test Definition (CTD) and then execute it.

- Step 1:** Open the DataSet that requires attention.
- Step 2:** Open the DataSet Archive.
- Step 3:** Right-click and ETD and select "Append General Info".

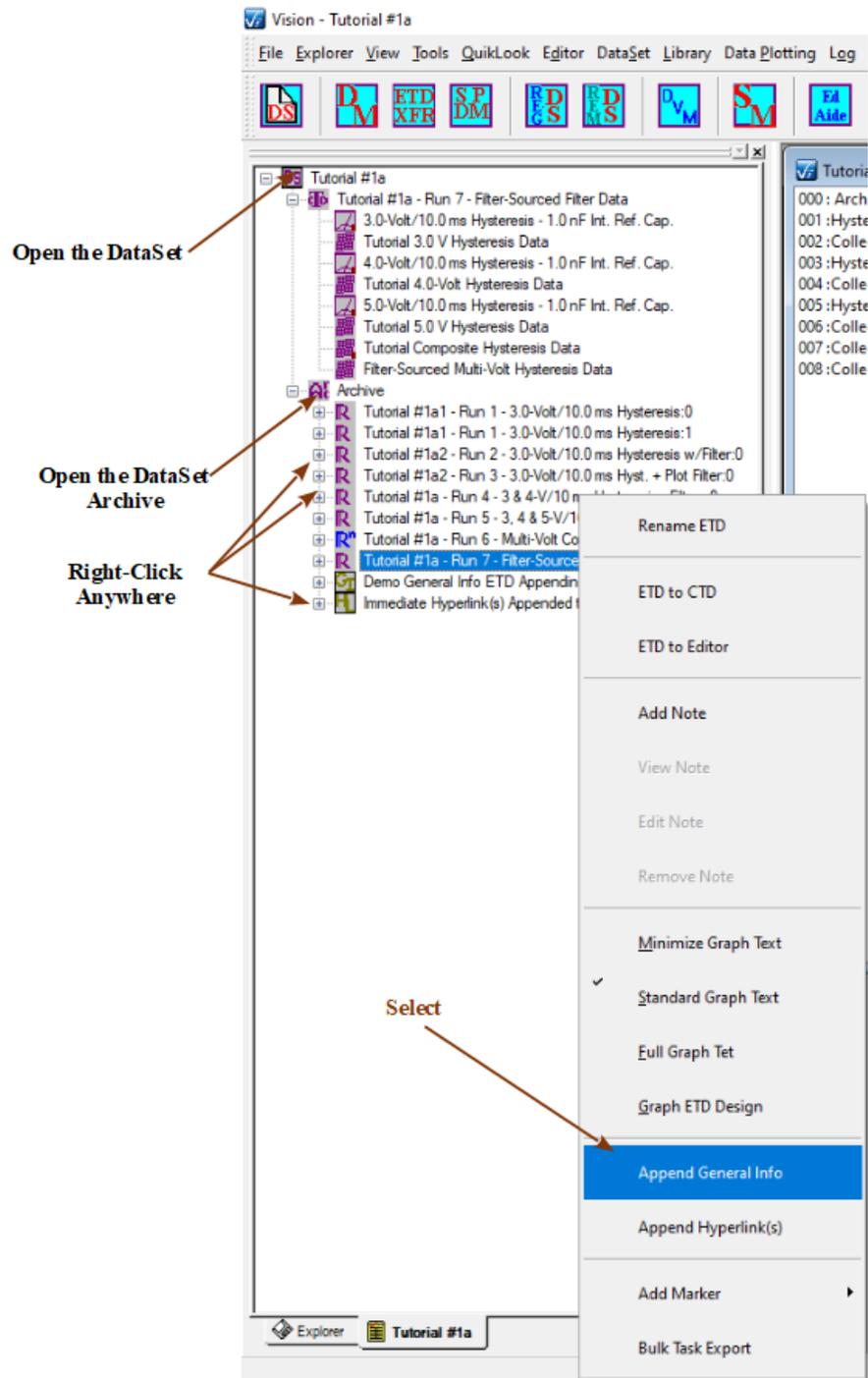


Figure 1 - Initiate Immediate General Information.

Step 4: The General Information Task configuration dialog opens. Provide an appropriate *Task Name*. Fill any of the appropriate controls. Provide a complete *Experiment Discussion* as needed. Note that the discussion has no character limit.

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General Information Task

General Information Task Name (60 Characters Max.)
Demo General Info ETD Appending for Step-by-Step

OK Cancel

Experiment Title: Tutorial #1a
Die Row: 0
Area (cm2): 0.0001

Sample Name: Int. Ref. Ferroelectric
Die Column: 0
Thickness (um): 0.3

Lot ID: N/A
Wafer ID: N/A
Capacitor Number: 0

Experiment Discussion

Demonstrate the immediate configuration and appending of the General Information Task to a DataSet Archive. This action bypasses EDITOR Task configuration, CTD update and CTD execution.

The General Information Task is remarkable for its unlimited Experiment Discussion (Comments) field. This is a good place to provide a complete discussion of the goal of the experiment (Test Definition), the details of experimental design (Task sequencing and configuration), reference citations, etc.

As an exception, the operation of the immediate appending of the General Information Task can be used to annotate the previous Executed Test Definition (ETD) when an error or unusual circumstance occurred, when some element of documentation was omitted or other item of interest needs to be noted.

The Experiment Discussion field can even be used to copy entire papers and references (text only), though the Task may slow as the number of recorded characters grows large. In that case, see the Hyperlink Task.

Beep On Execute (Configure in Tools->Options)

Click For Task Instructions

General Information Version: 5.27.0 - Radiant Technologies, Inc., 2001 - 7/06/20

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Figure 2 - Immediate General Information Configuration.

- Step 5:** Click *OK* to close the dialog and add the Task to the DataSet Archive in its own ETD. Note that *Cancel* will abort the process.
- Step 6:** The DataSet Archive is refreshed and closed. Reopen the DataSet Archive. The General Information Executed Test Definition will appear as the final entry in the Archive. The ETD will have a unique icon () indicating an immediate General Information Task.

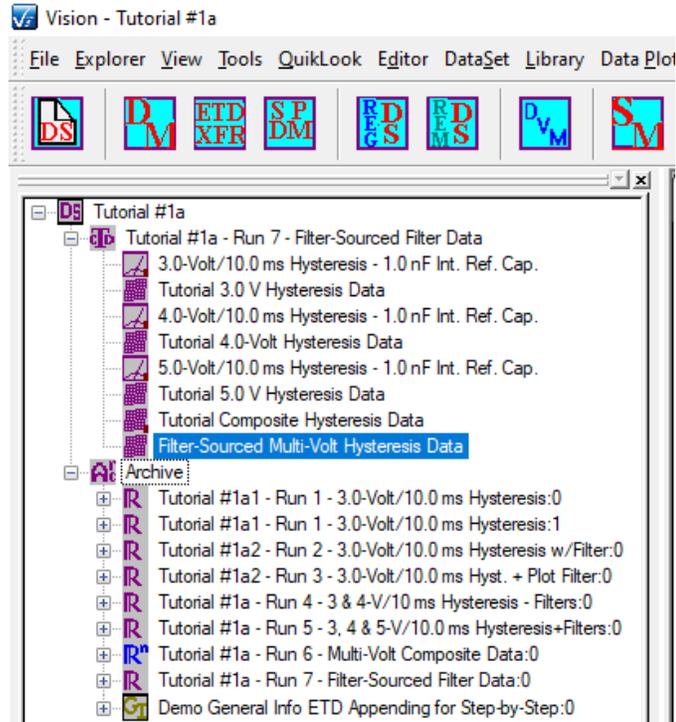


Figure 3 - Updated DataSet Archive with Immediate General Information as its Final ETD.

Step 7: Open the ETD and the "Experiment Data" folder. Double-click the General Information Task to review its contents.

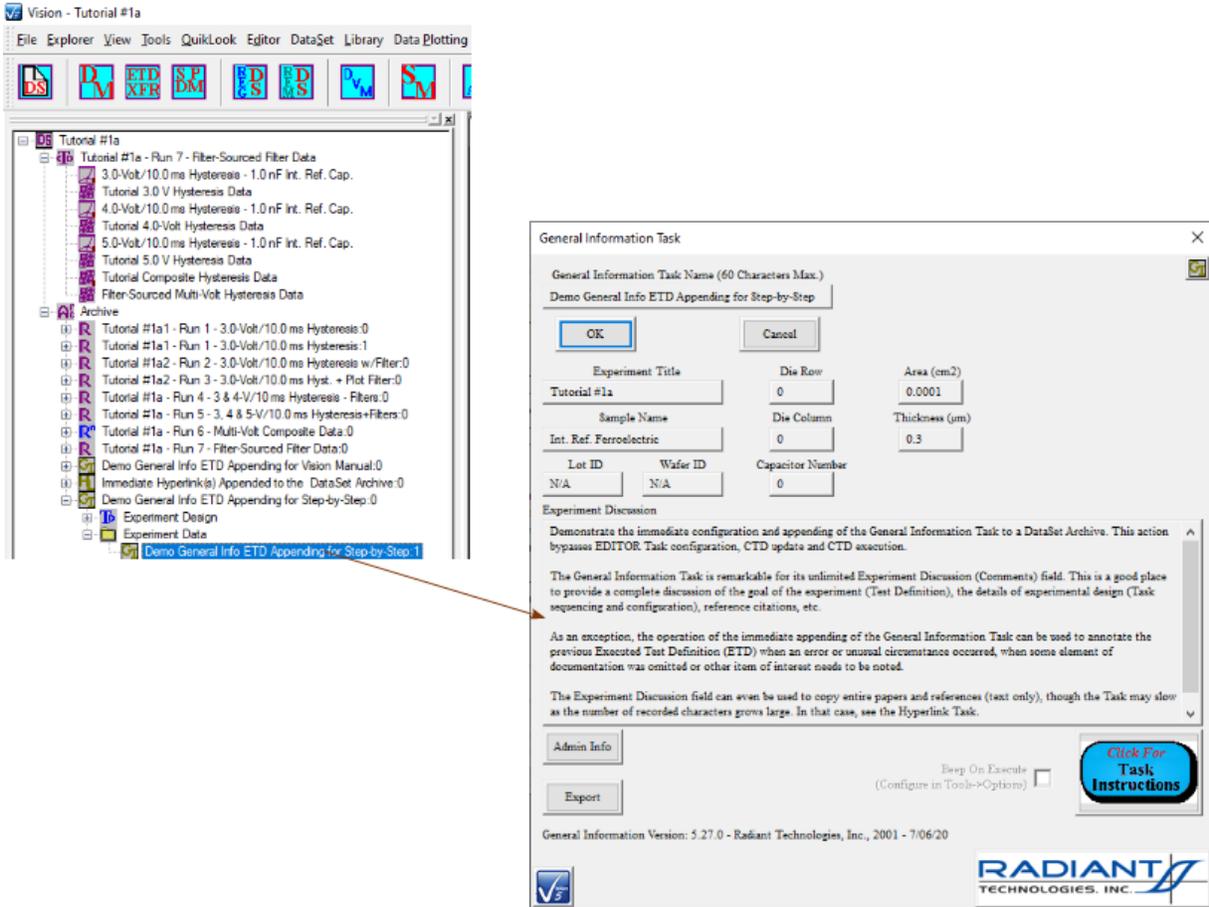


Figure 4 - Archived Immediate General Information Task.

Immediate Hyperlink Task ETD

Discussion

The [previous topic](#) discussed the documentation of a DataSet Archive through the immediate insertion of a General Information Task without the need to configure the Task in the Vision EDITOR, move the Task into the DataSet Current Test Definition (CTD) and then execute as a Test Definition. Another important form of documentation is the inclusion of references to external experiment and/or theory-supporting literature. This is done in Vision using the Hyperlink Task. As with the General Information Task, the Hyperlink Task may be immediately configured, executed and added to the Test Definition, bypassing the EDITOR Window.

- Step 1:** Open the DataSet that requires attention.
- Step 2:** Open the DataSet Archive.
- Step 3:** Right-click and ETD and select "Append Hyperlink(s)".

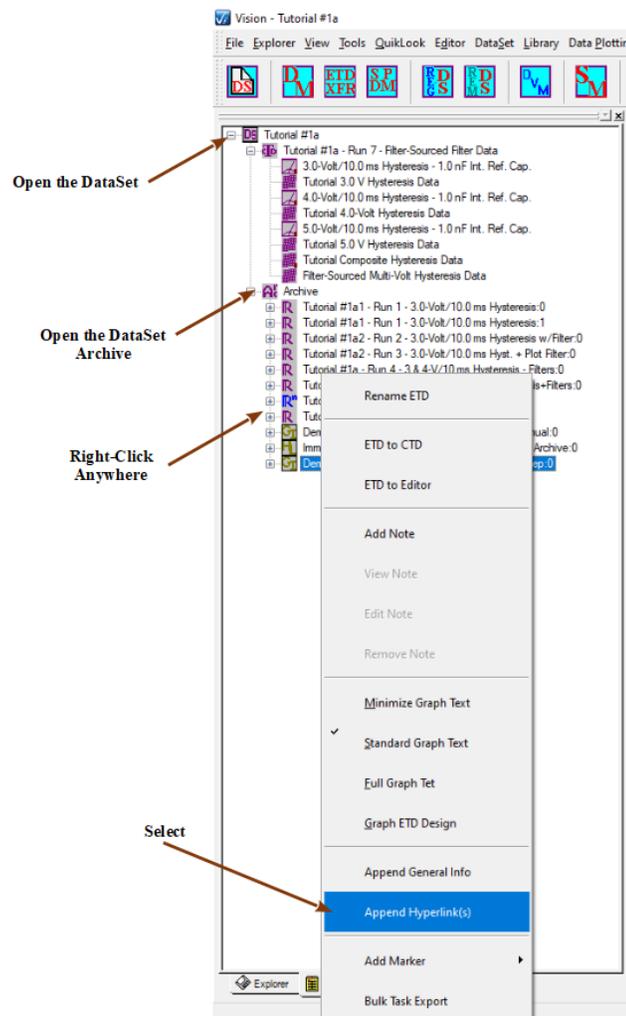


Figure 1 - Initiate Immediate Hyperlink Addition to the ETD.

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Step 4: The Hyperlink Task configuration dialog appears. Assign a unique and meaningful *Hyperlink Task Name* and any *Comments* that are appropriate.

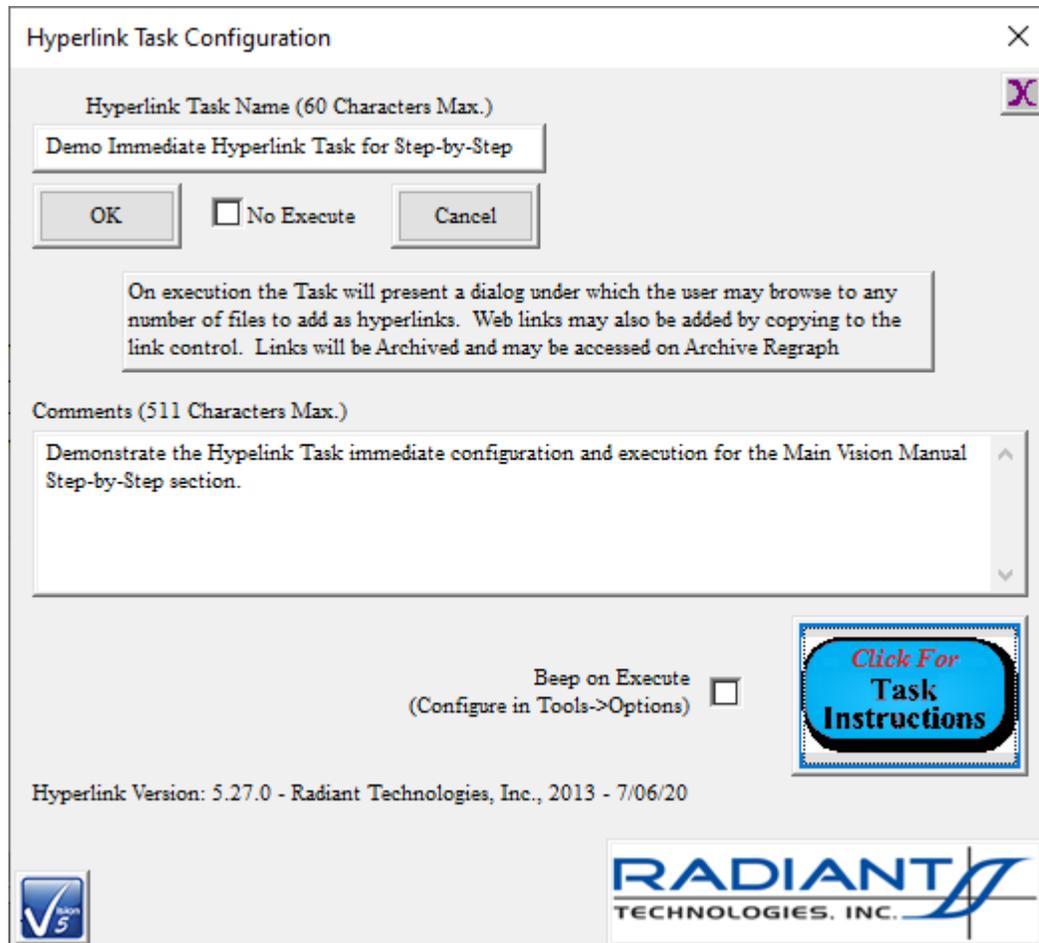


Figure 2 - Configure the Hyperlink Task.

Step 5: Click *OK* to close the configuration dialog.

Step 6: The Hyperlink Task execution dialog opens. Add one or more hyperlinks by copying URLs to the *Link to Add* control and clicking *Add Link*. The *Browse...* button can be used to locate documentation that is on the Vision host hard disk.

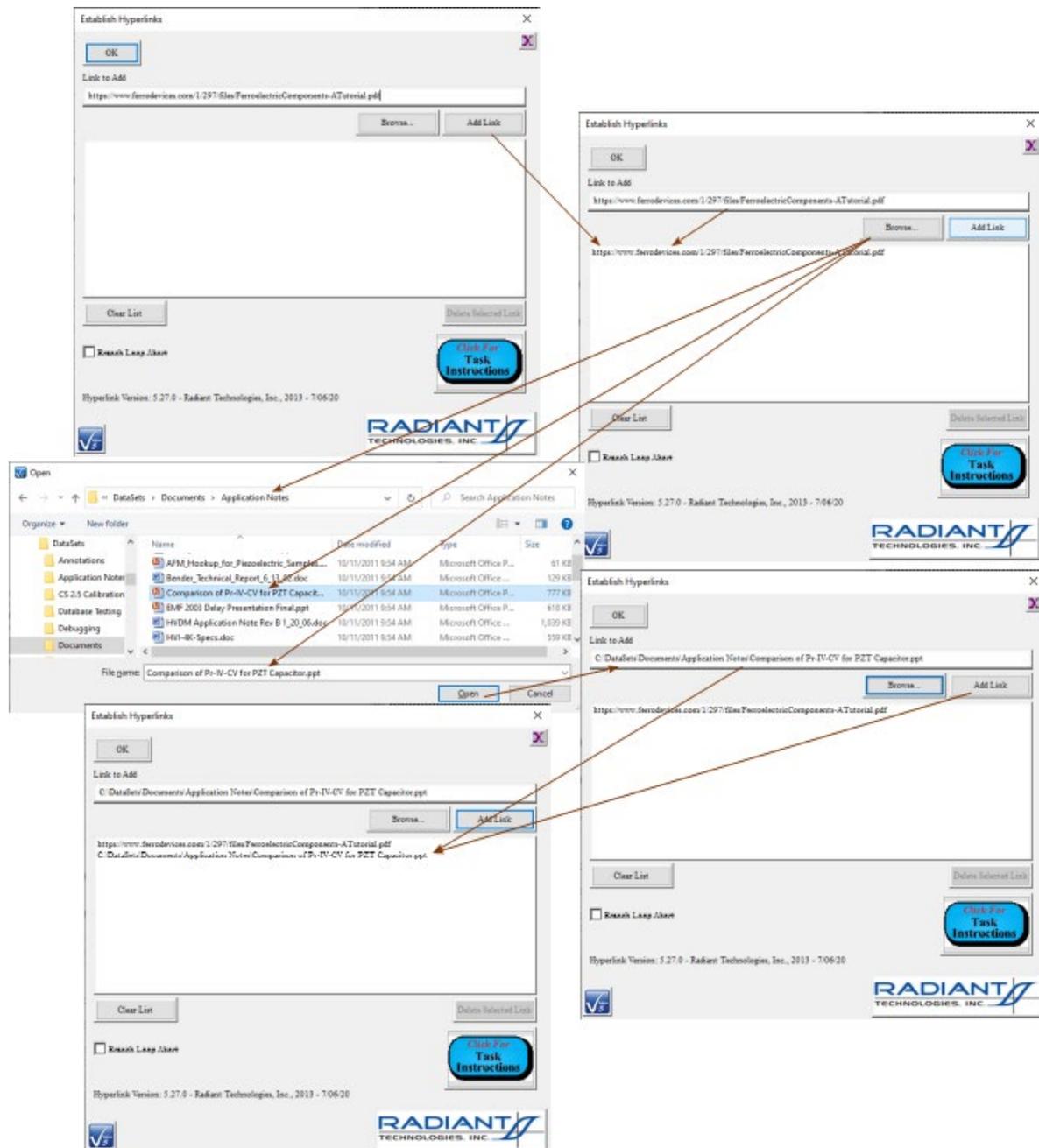


Figure 3 - Establish Hyperlinks.

Step 7: Click *OK* to close the execution dialog. The DataSet Archive is refreshed and closed. Open the DataSet Archive. The Hyperlink Task appears as the final ETD with a custom (📄) icon.

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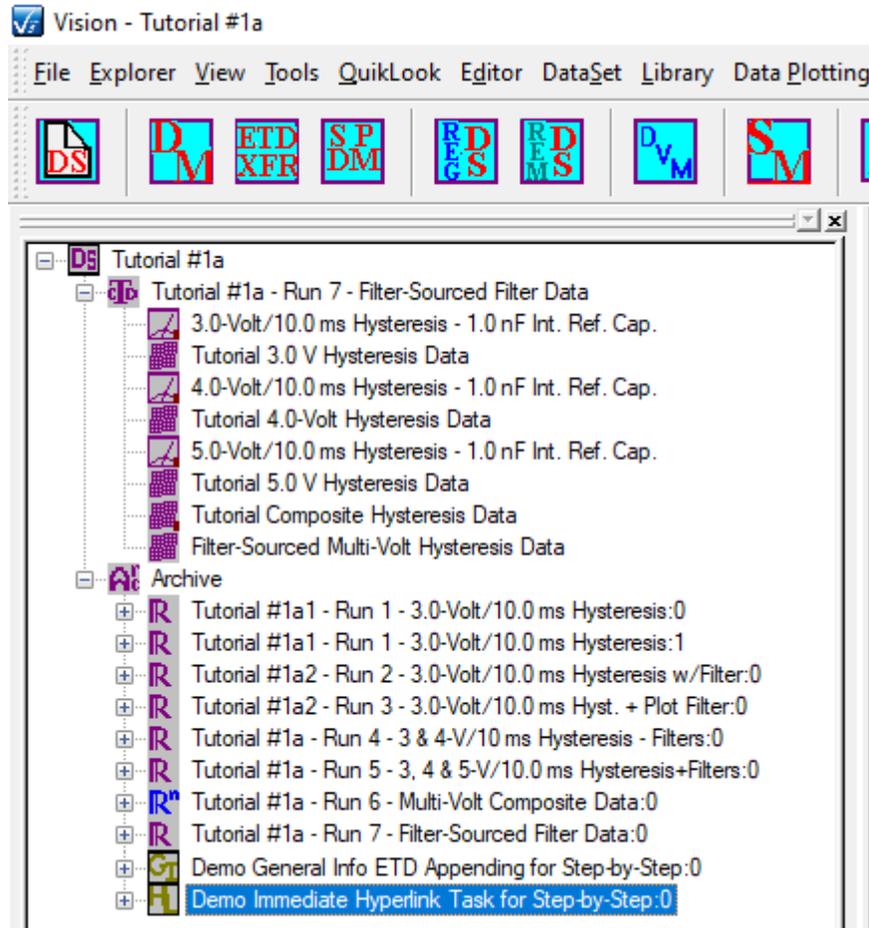


Figure 4 - Hyperlink Task Appended to the DataSet Archive.

Step 8: Open the Hyperlink Executed Test Definition (ETD) and the "Experiment Data Folder". Double-click the Task to review the configuration dialog.

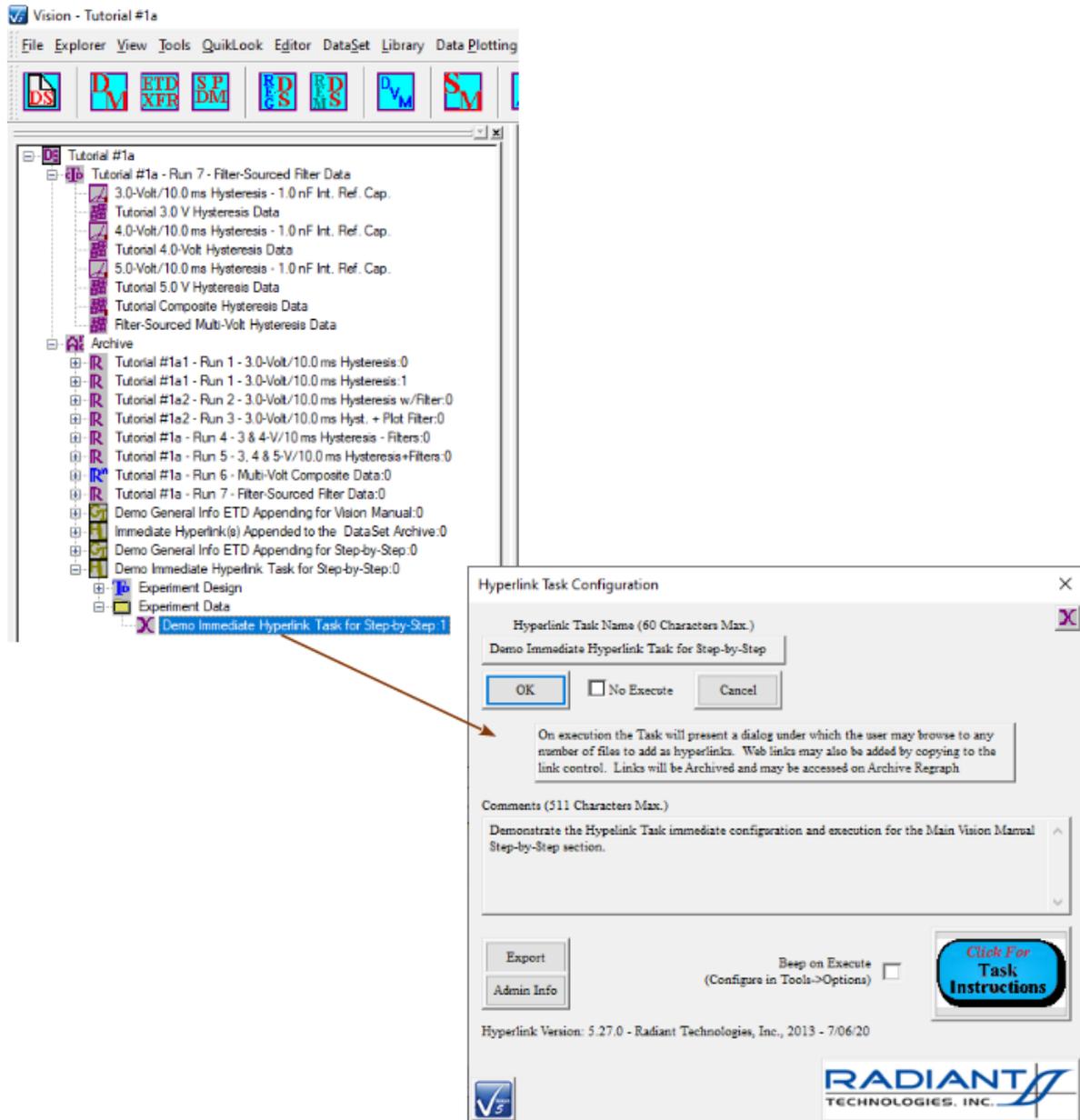


Figure 5 - Review Hyperlink Task Configuration.

Step 9: Click *OK*. The configuration dialog closes and the execution dialog opens. Select a Hyperlink in the list of Hyperlinks and then click *Go To/Open Selected Link* to exercise the Hyperlink.

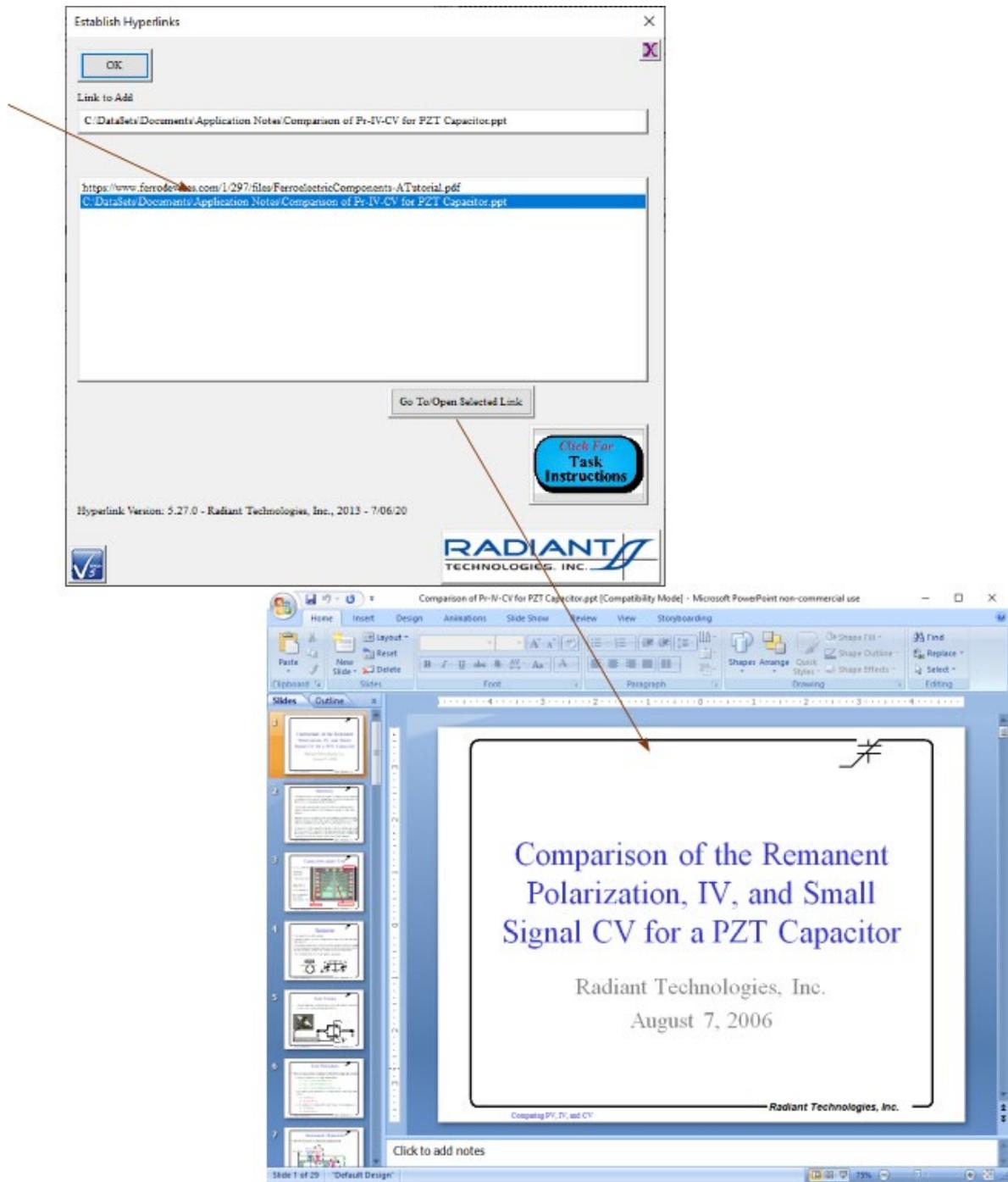


Figure 6 - Exercise the Hyperlinks.

Plots and Data

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Acquired Data Review

In the Vision program for the Precision family of testers, data are acquired either by performing a single [Task](#) under [QuikLook](#), or by creating a [Test Definition](#), creating a [DataSet](#), moving the Test Definition to the DataSet as a [Current Test Definition \(CTD\)](#) and executing the CTD. Data are plotted in three ways:

1. Immediately, as a result of a QuikLook measurement.
2. During execution by associating a [Filter](#) with the data measuring Tasks and enabling the Filter's plotting option. (Some Tasks will plot themselves during execution. These will be Tasks that perform repeated measurements over an extended period during a single Task instance. Fatigue, Retention and TDDDB (Resist) Tasks are a few examples.)
3. From a DataSet's [Executed Test Definition \(ETD\)](#). These represent historical data reviewed from a DataSet after the complete execution of Test Definition.

To understand the meaning of both plotted data and values listed in a response dialog box, refer to the details for the Task in question. To review historical data captured in the [Archive](#) of a DataSet

Step 1: Open the DataSet that contains the data to be reviewed. Locate and double-click the DataSet in the DataSet Explorer window to open.

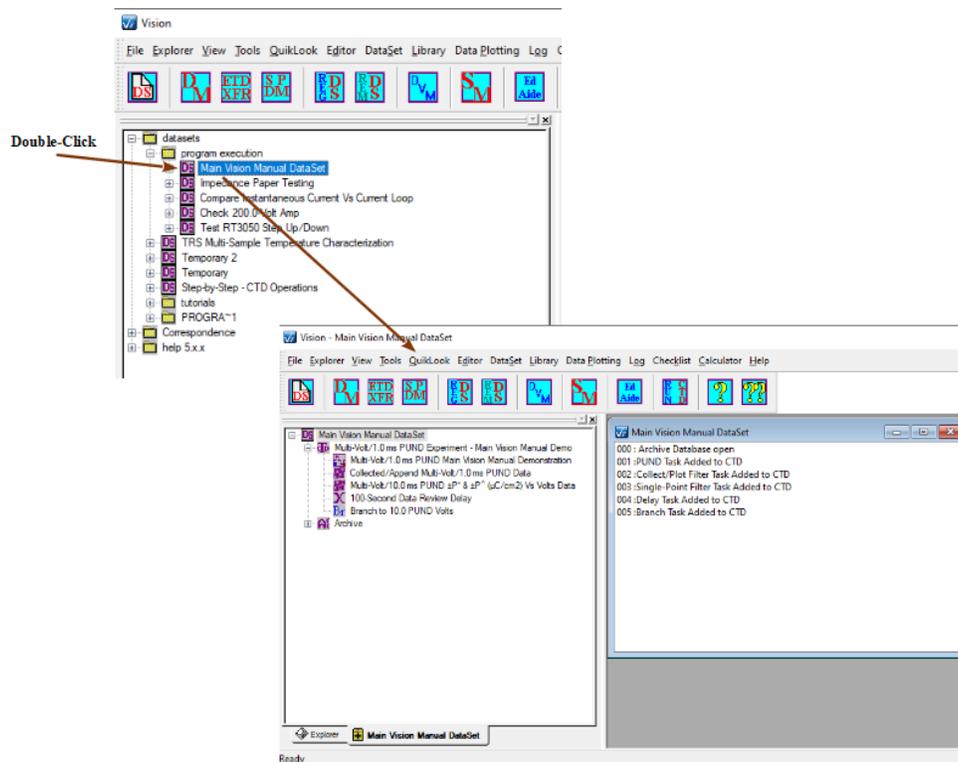


Figure 1 - Open the Intended DataSet.

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Step 2: Open the DataSet Archive.

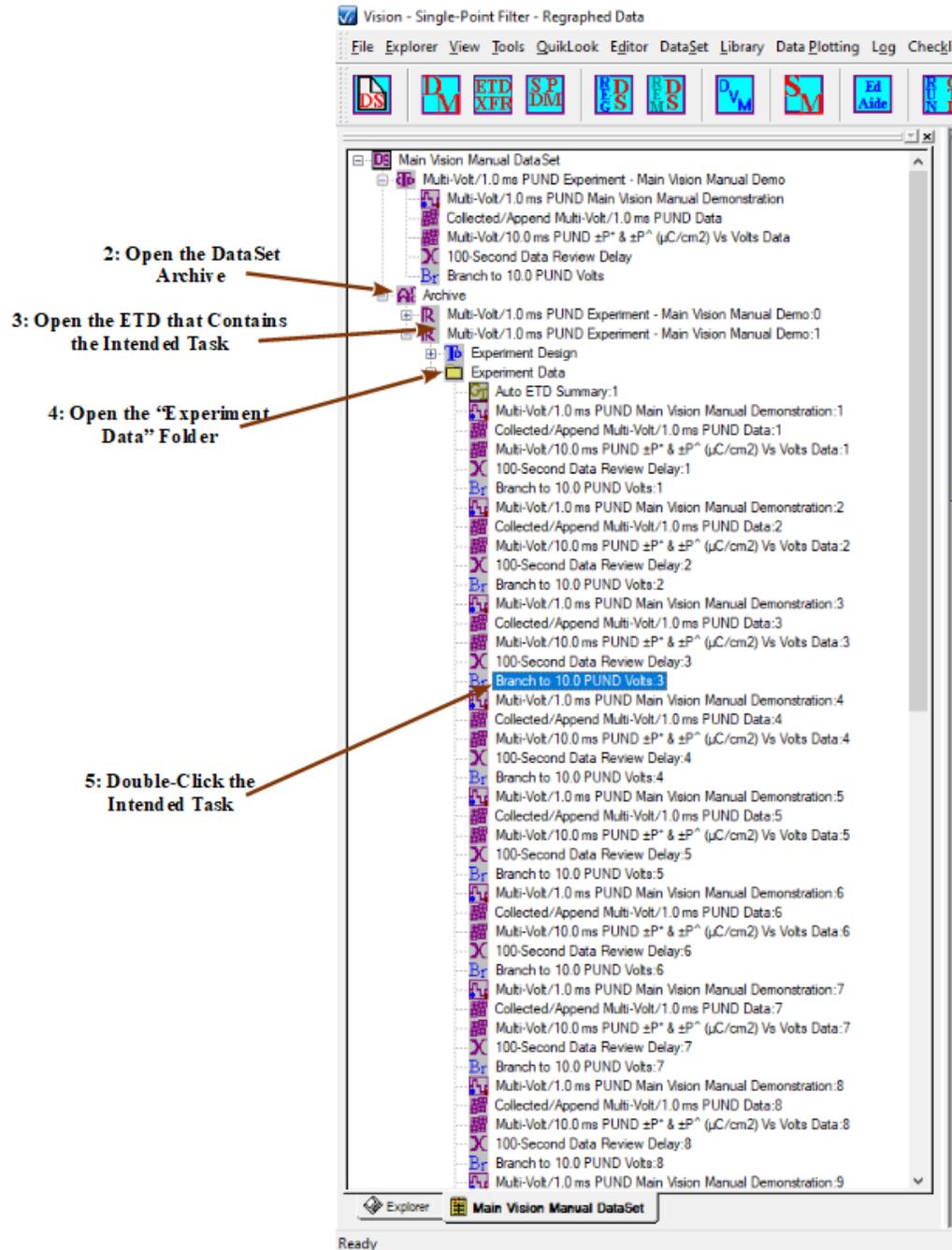


Figure 2 - Locate the Task in the Archive to Recall its Data.

Step 3: Open the Desired ETD. Two Folders will appear. The [Experiment Design Folder](#) contains a copy of the CTD that was executed to create the ETD. The [Experiment Data](#)

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[Folder](#) contains an entry for each instance of every Task that was executed to create the ETD.

Step 4: Open the "Experiment Data" Folder.

Step 5: With the left mouse button, double-click on the desired measurement Task or Filter. The original configuration dialog will open to show the setup of the Task that was executed. Normally only the *Export*, *Admin Info*, *Click For Task Instructions*, *OK* and *Cancel* (or *Cancel/Plot*) buttons will be active. The Task may not be reconfigured from this dialog, since it represents the history of the Task and has been frozen on execution.

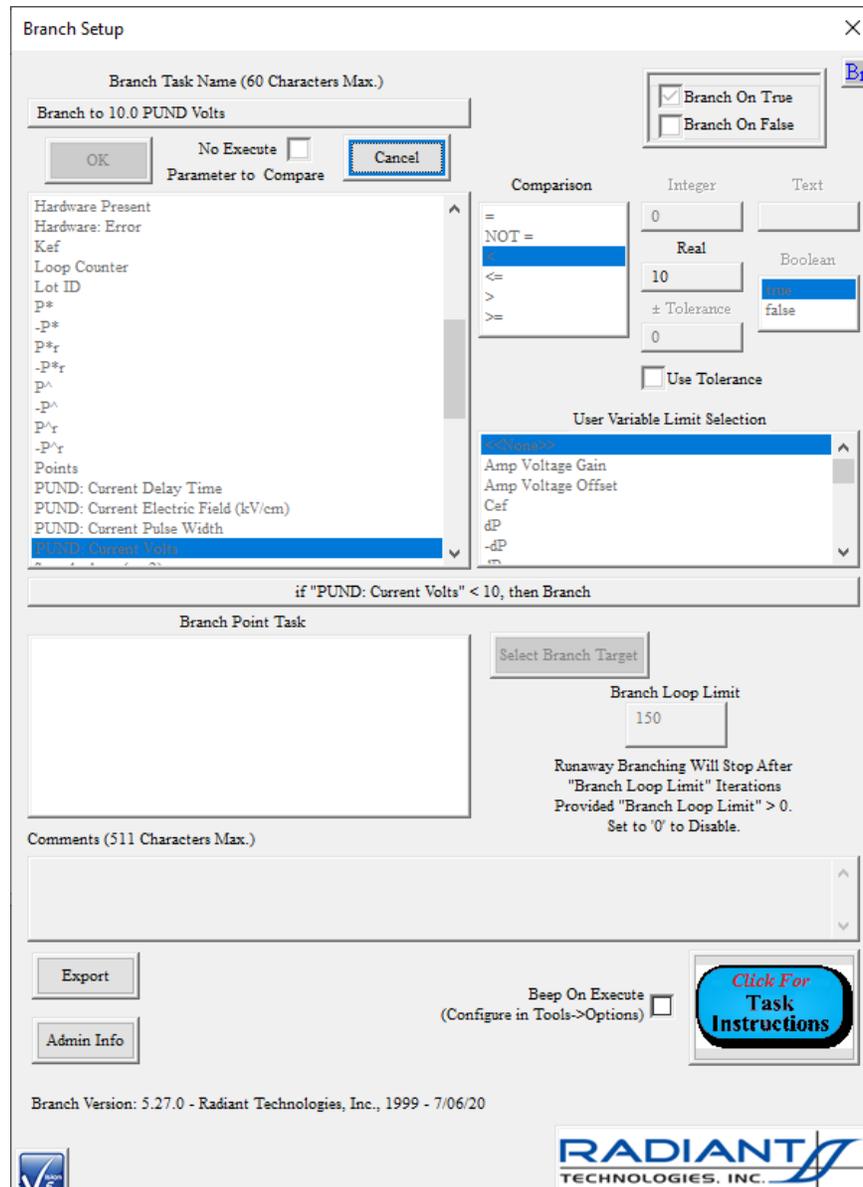


Figure 3 - Branch Task Configuration Dialog. Controls are Disabled and for Review Only.

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In the case of the Branch Task, as in this example, the configuration dialog will be followed by a second simple dialog that indicates if the Task branched or not on the execution in question.

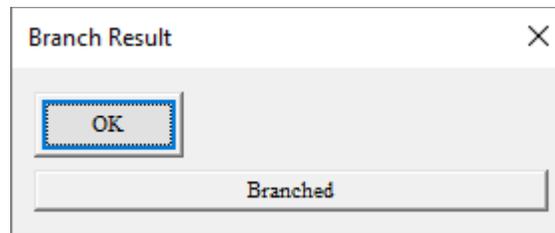


Figure 4 - Branch Condition Indicator for the Requested Branch Instance.

Step 6: Recall PUND Data. In the case of [Measurement Tasks](#) the *Cancel* button will be re-labeled *Cancel/Plot*. For these Tasks, when the configuration dialog is canceled a second dialog appears allowing the plot of the data to be recalled to be configured. Then, the Data Presentation dialog will appear and display the measured data.

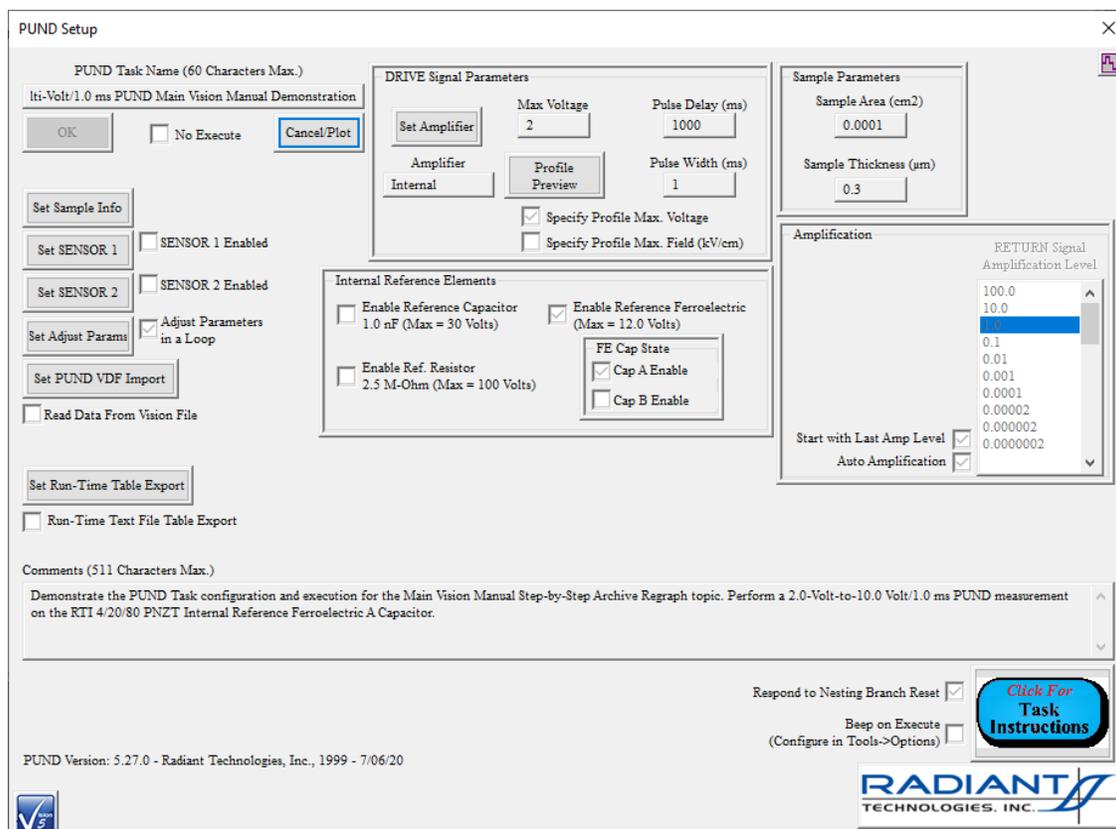


Figure 5 - Recalled PUND Task Configuration for Review.

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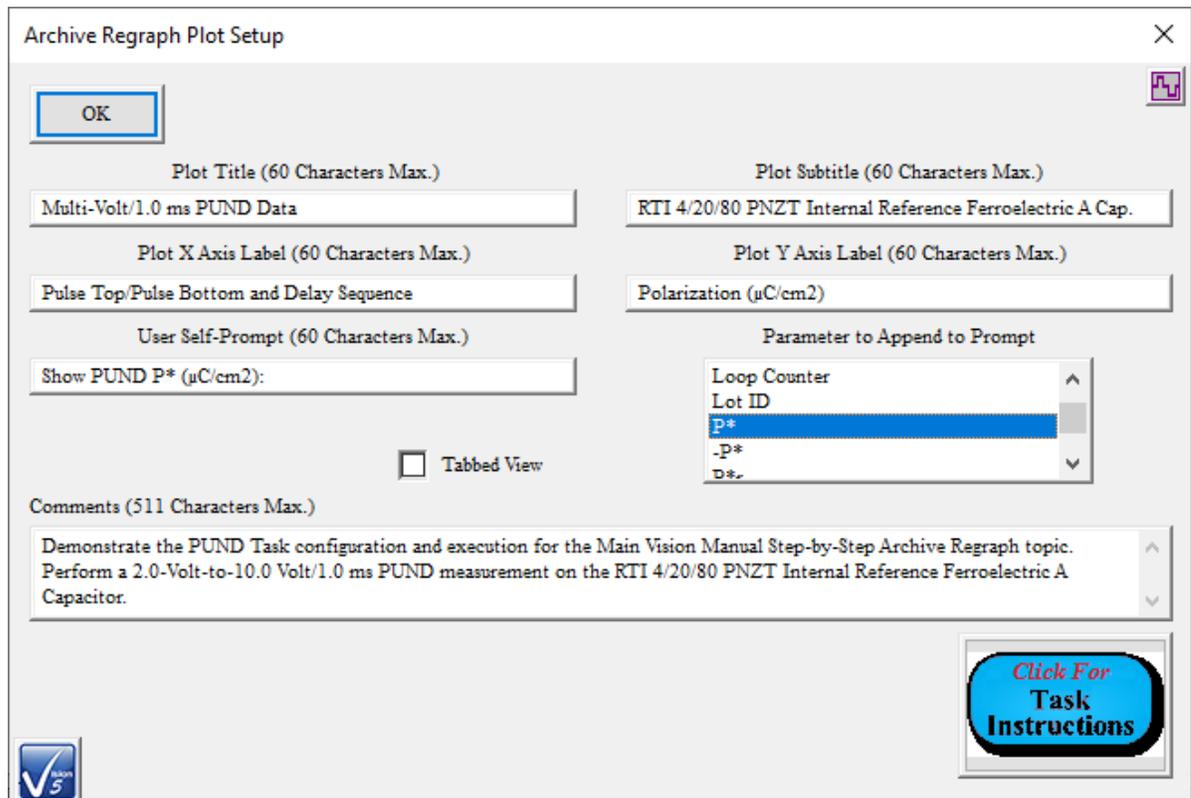


Figure 6 - PUND Plot Setup Dialog to Format the Plot of Recalled Data.

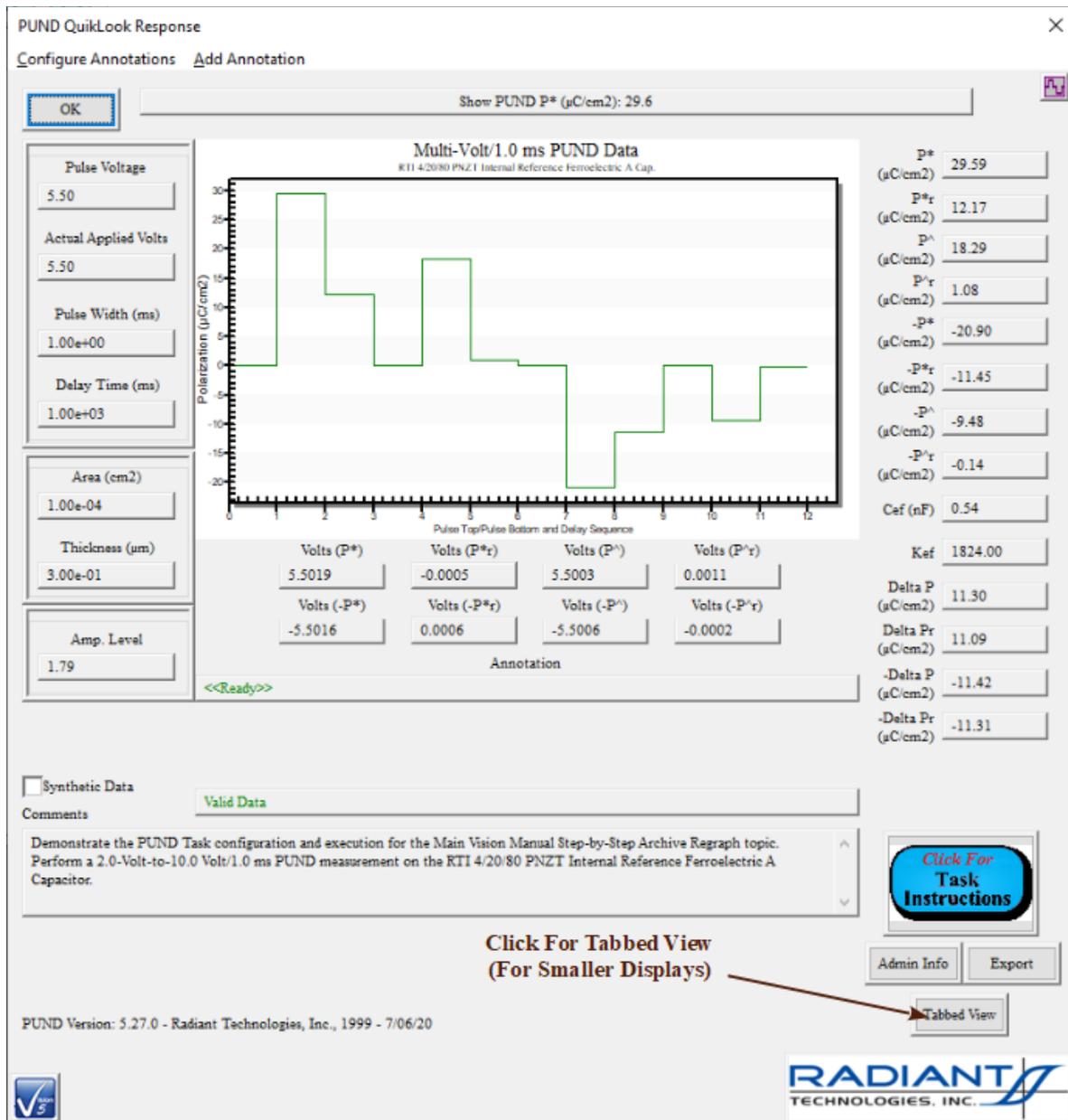


Figure 7 - PUND Data Recalled from the DataSet Archive.

Step 7: Recall Collect/Plot Filter and Single-Point Filter Task data. [Note that the entire Test Definition is not reconstructed, only the recalled Filter Task. For this reason the *Task Selector* control is empty when the Task is recalled from the DataSet Archive as in **Figure 8.**] Most Filter Tasks maintain enabled controls in their plot configuration dialog. After reviewing main configuration, clicking the plot dialog tab will allow the data presentation to be configured. Then, closing the configuration dialog presents the data in a Filter plot window.

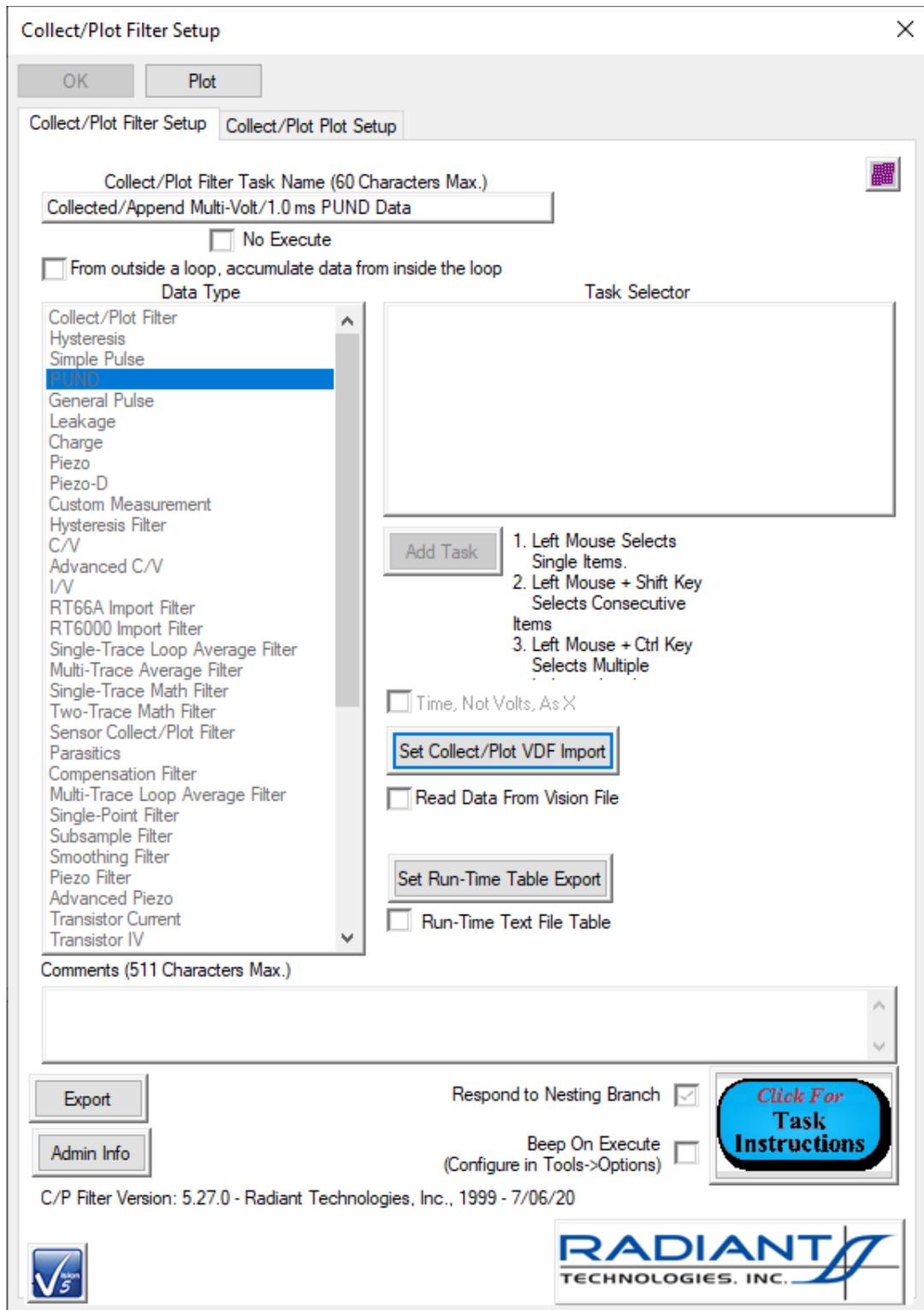


Figure 8 - Collect/Plot Filter Configuration - Disabled for Review Only.

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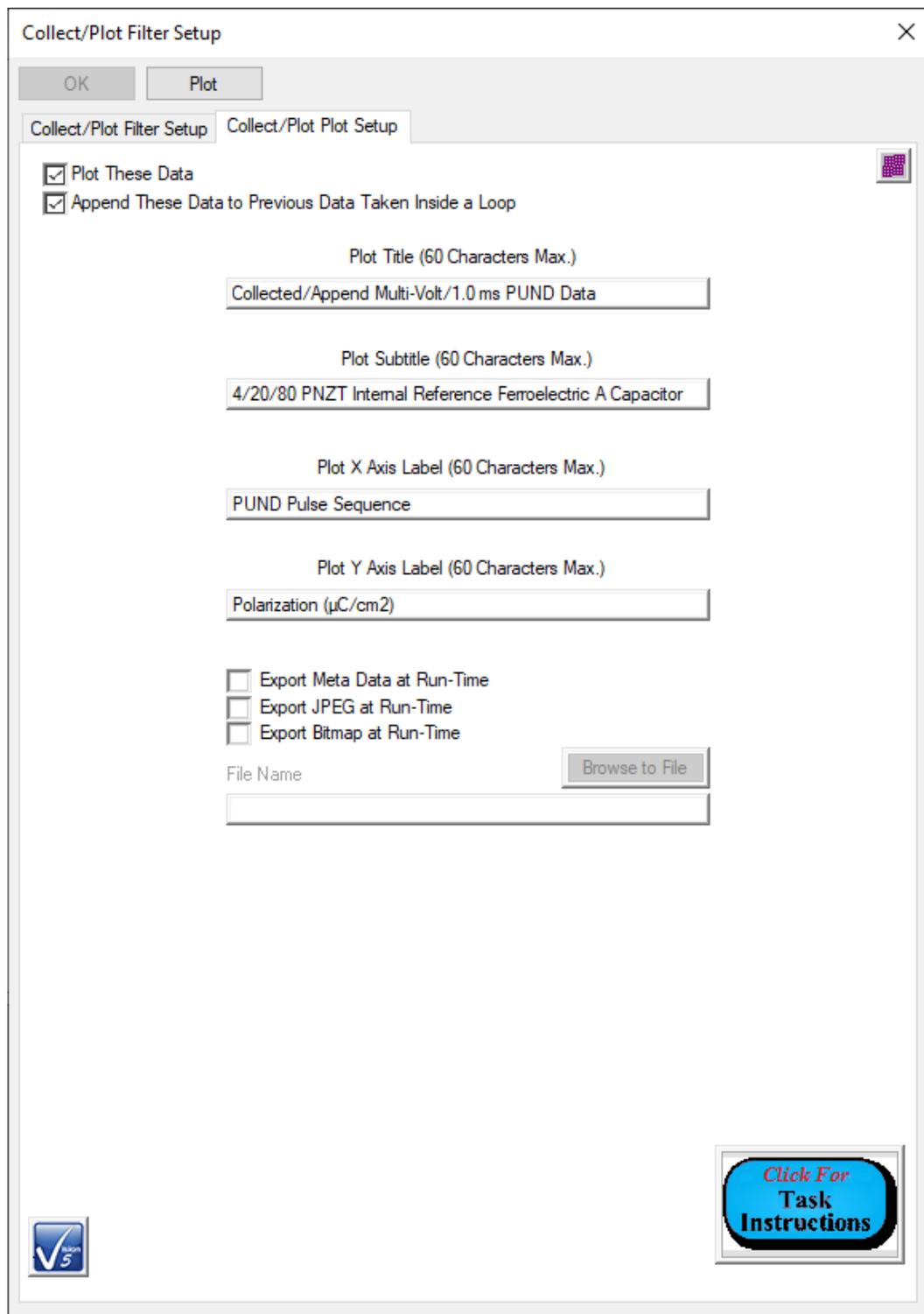


Figure 9 - Collect/Plot Filter Plot Configuration. Controls are Enabled to Format the Data Plot.

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Working with Data Plots

Discussion

Data are plotted in three ways:

1. Immediately, as a result of a QuikLook measurement.
2. During execution by associating a Filter with the data measuring Tasks and enabling the Filter's plotting option. (Some Tasks will plot themselves during execution. These will be Tasks that perform repeated measurements over an extended period during a single Task instance. Fatigue, Retention and TDDDB Tasks are a few examples.)
3. From a DataSet's Executed Test Definition (ETD). These represent historical data review from a DataSet after the complete execution of the Current Test Definition (CTD).

Once data are plotted, the plot may be manipulated in many ways. These include:

1. Changing font sizes
2. Independently adjusting fonts and font characteristics (bold, underline, italics) for main title, subtitle and other labels.
3. Changing numeric precision
4. Changing line/point types
5. Adding Data Shadows
6. Adding/removing/adjusting grid lines.
7. Labeling data points with X/Y values
8. Resetting the main title and subtitle
9. Adjusting X and Y axis limits (manual or automatic fit to data)
10. Adjusting X and Y axis log/normal presentation
11. Adjusting graph colors (foreground, background, etc.).
12. Adjusting point type, line type and trace color for any specific data trace
13. The plot may also be maximized to fill the screen for closer review. Note that only the plot and not the entire dialog will be maximized.

Step 1: In order to adjust any one of the following:

- Changing font sizes
- Changing numeric precision
- Changing line/point types
- Adding Data Shadows
- Adding/removing/adjusting grid lines.
- Labeling data points with X/Y values

A: Create a plot by one of the three methods listed at the beginning of this section.

B: Place the mouse cursor in the plot window and click the right mouse button. A popup menu will appear.

Right-Click Anywhere in the Plot Window

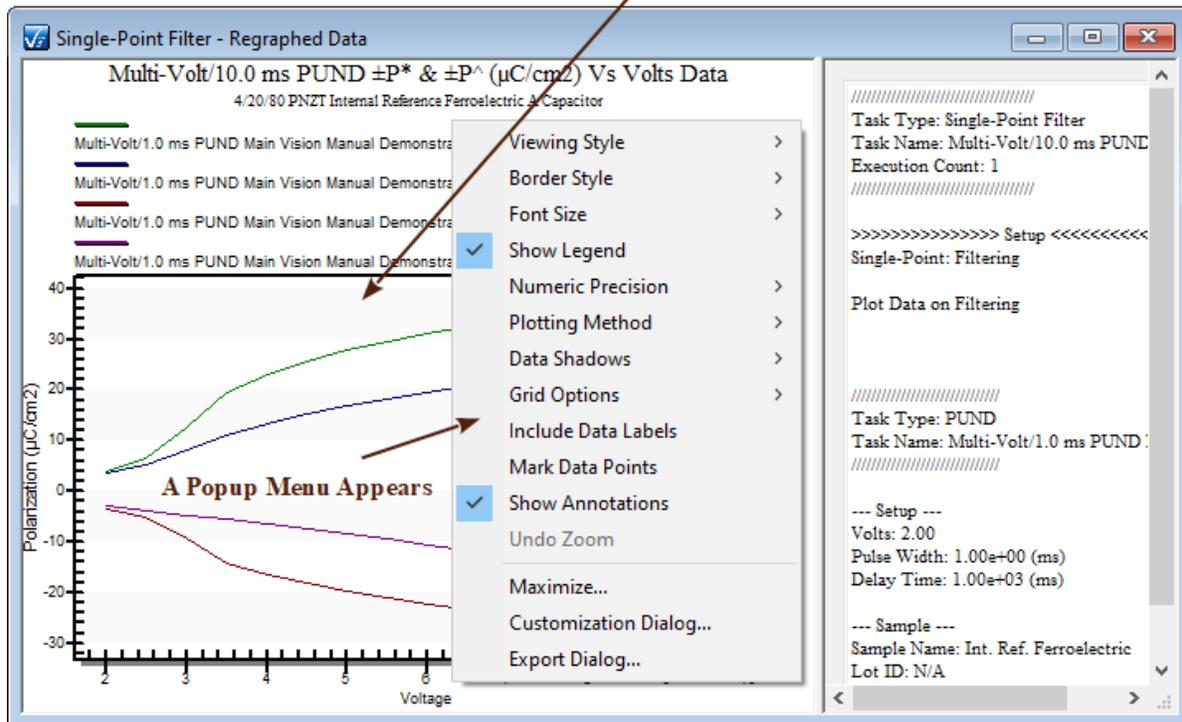


Figure 1 - Right-Click in the Plot Window to Create a Popup Menu.

C: Move the cursor to the desired change (above the line) in the popup menu. In some cases a secondary menu will appear.

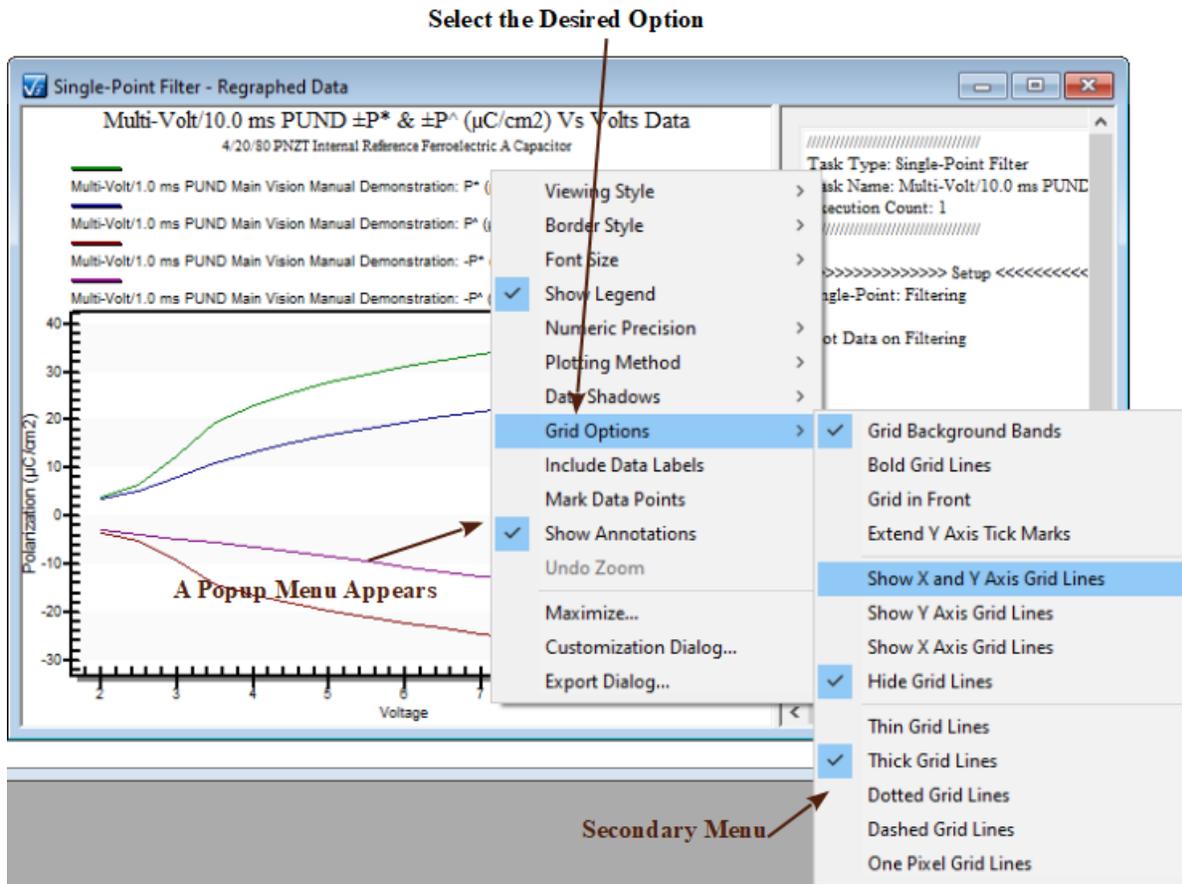


Figure 2 - Plot Menu Option with a Secondary Popup Menu.

D: Click the desired operation with the left mouse button. The popup menu will close and the plot will show the selected change.

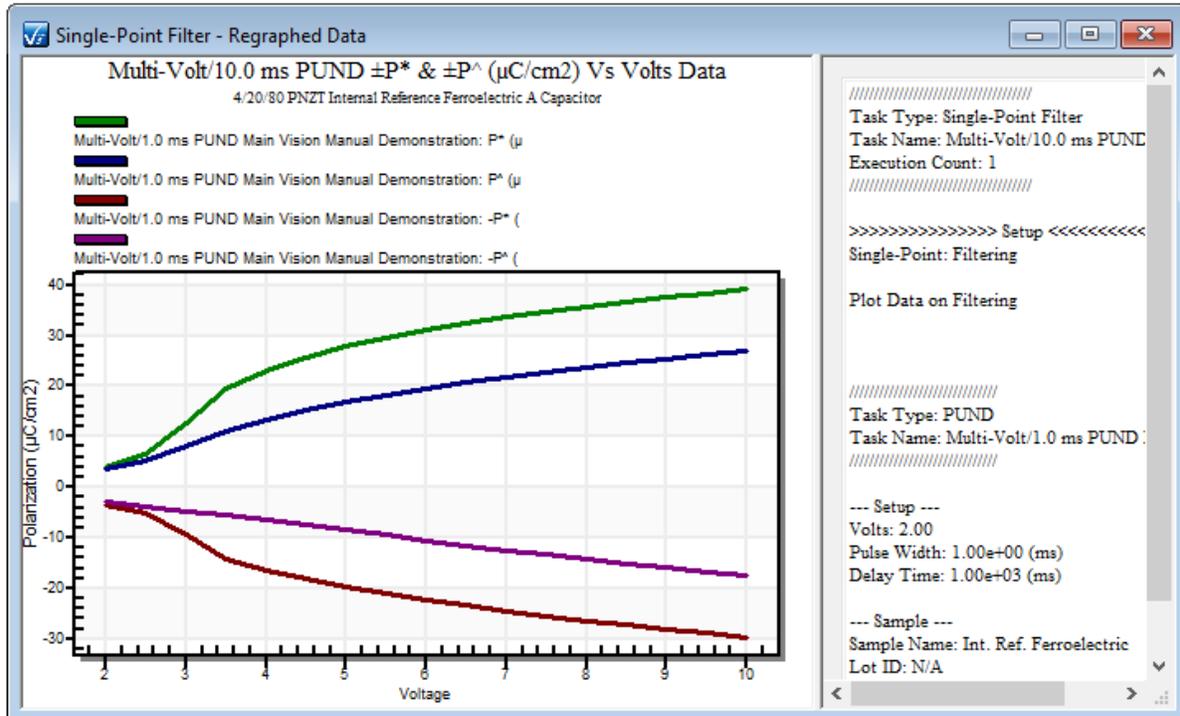


Figure 3 - Plot With Added Grid Lines. Data Lines Were Also Made Bold to Make them Visible Against the Grid. This Option is Also Available.

Step 2: To change one or more of any of the following:

1. Changing font sizes
2. Independently adjusting fonts and font characteristics (bold, underline, italics) for main title, subtitle and other labels.
3. Changing numeric precision
4. Changing line/point types
5. Adding Data Shadows
6. Adding/removing/adjusting grid lines.
7. Labeling data points with X/Y values
8. Resetting the main title and subtitle
9. Adjusting X and Y axis limits (manual or automatic fit to data)
10. Adjusting X and Y axis log/normal presentation
11. Adjusting graph colors (foreground, background, etc.).
12. Adjusting point type, line type and trace color for any specific data trace

A: Create a plot by one of the three methods listed at the beginning of this topic.

B: Place the mouse cursor in the plot window and click and hold the right mouse button. A popup menu will appear.

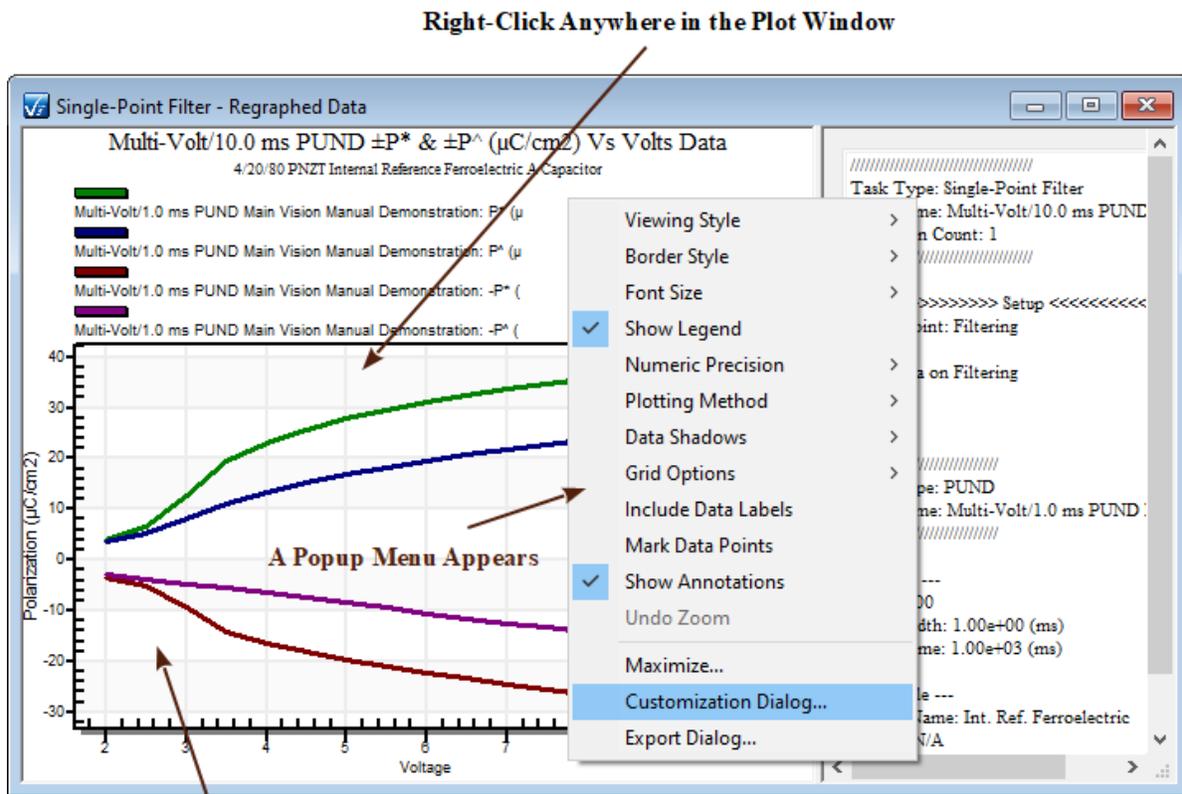


Figure 4 - Right-Click to the Popup Menu.

- C: Move the cursor to the "Customization Dialog..." option and click with the left mouse button. (The dialog may also be opened by double-clicking on the plot surface.)

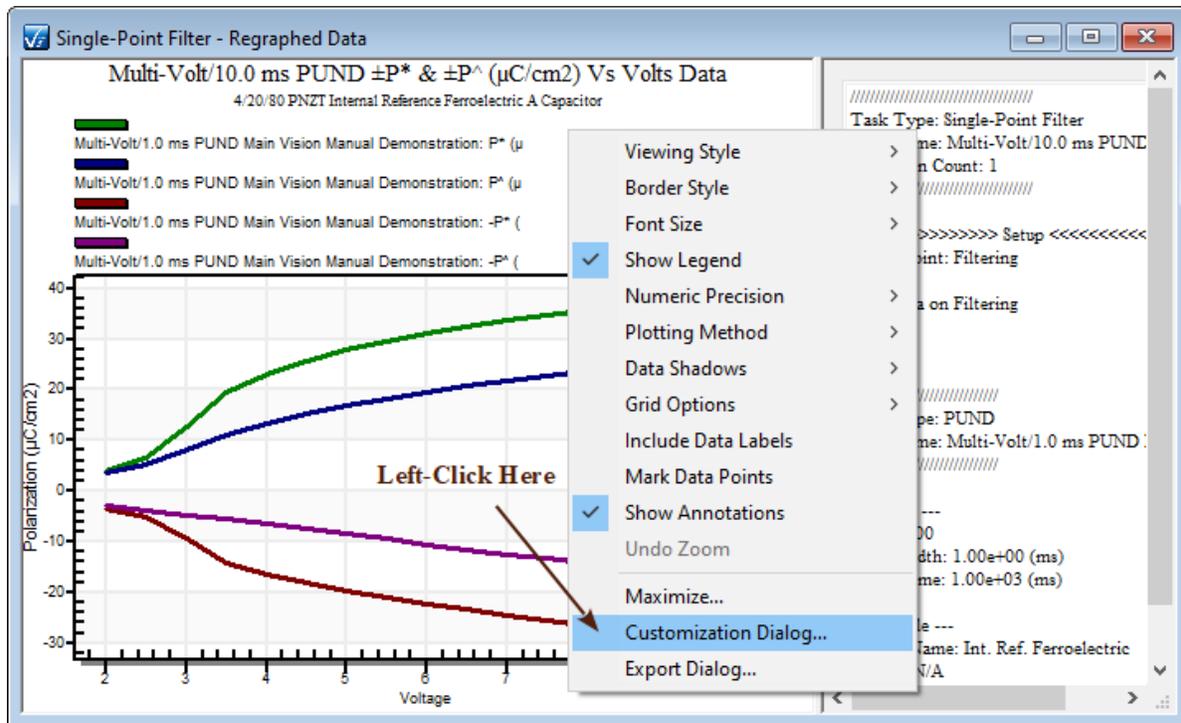


Figure 5 - Select the Customization Dialog.

- D: A dialog will appear with tabbed pages. Any number of changes can be made before closing the dialog box. The plot can be updated to reflect all changes made so far by clicking the *Apply* button. When the dialog is closed by clicking *OK* all changes will be applied to the plot. If *Cancel* is clicked, the dialog will close without making changes. However, changes made by clicking *Apply* will be retained even if the dialog is canceled. Clicking *Original* will close the dialog and undo all changes made to the plot at any time.

Tabbed Pages Containing Various Plot Change Options.

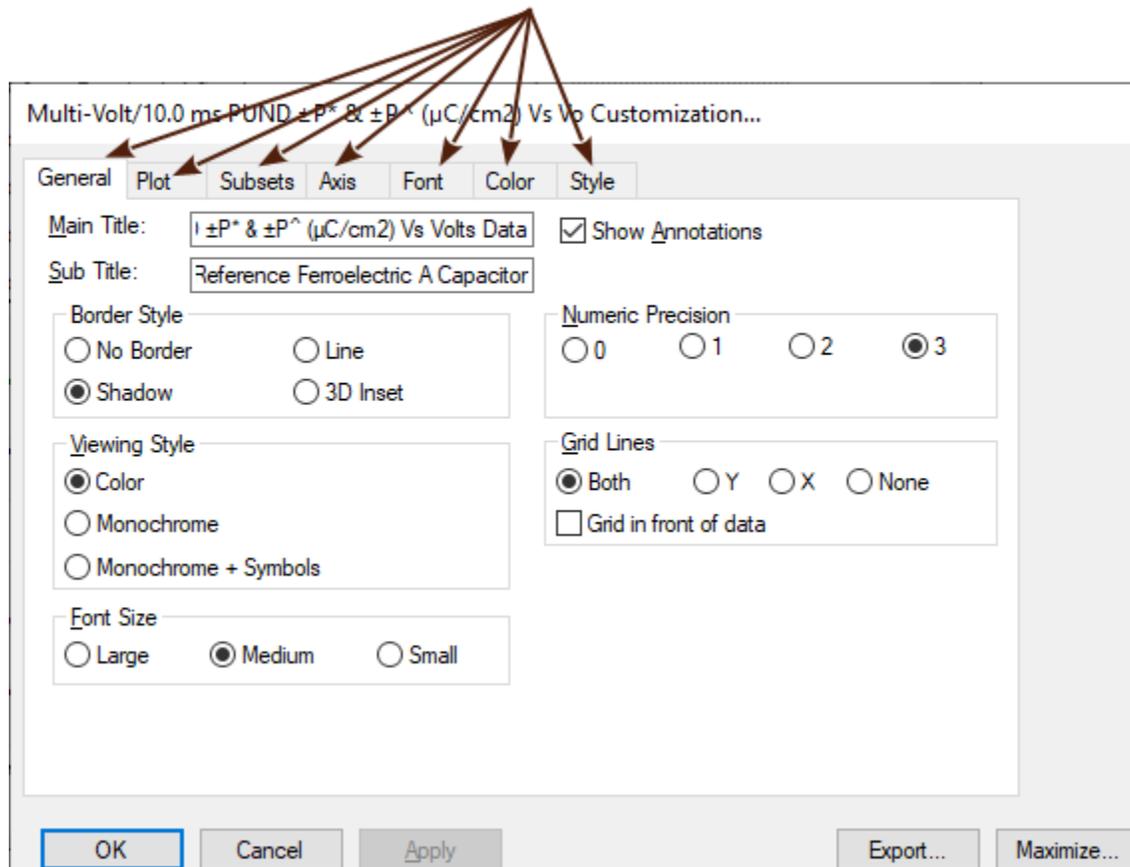


Figure 6 - Plot Customization Options.

E: Experiment with all tabbed pages and visit the dialog “Help” pages to determine where to make all changes.

Step 3: In order to maximize the plot display to fill the screen:

A: Create a plot by one of the three methods listed at the beginning of this section.

B: Right-click in the plot window. A popup menu will appear.

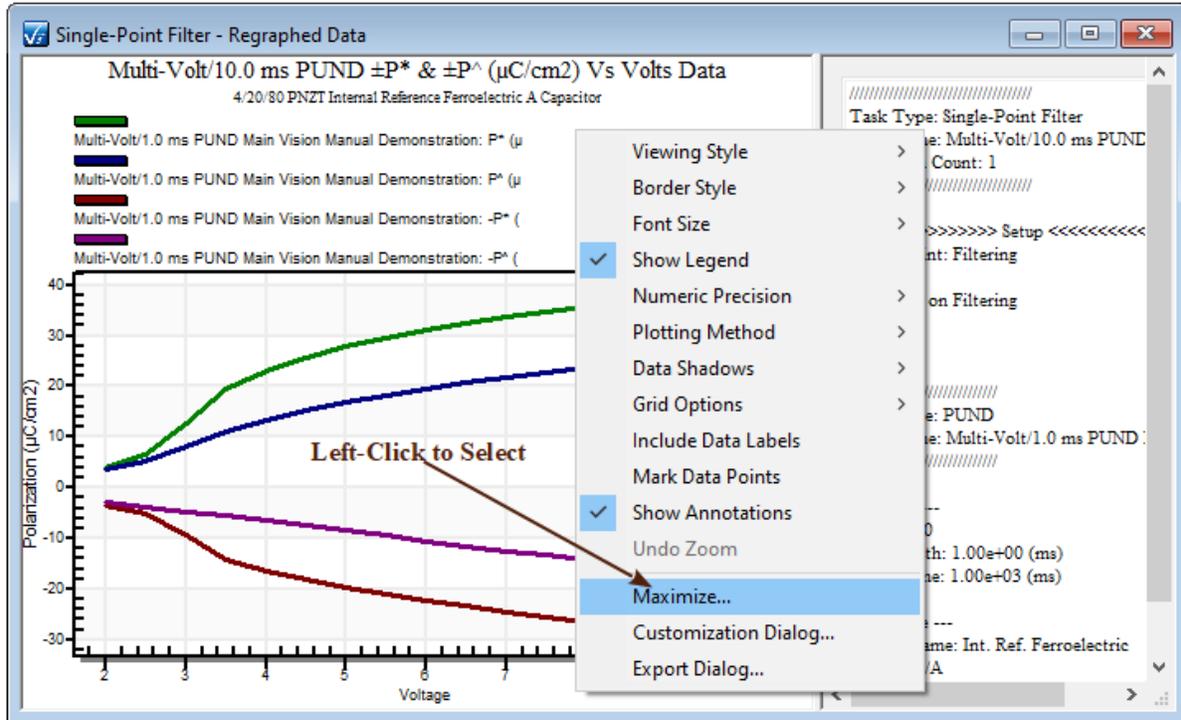


Figure 7 - Select the " Maximize..." Option.

C: Left-click the *Maximize...* option.

D: The popup menu will close and the plot will fill the screen. The popup menu is available from the filled screen.

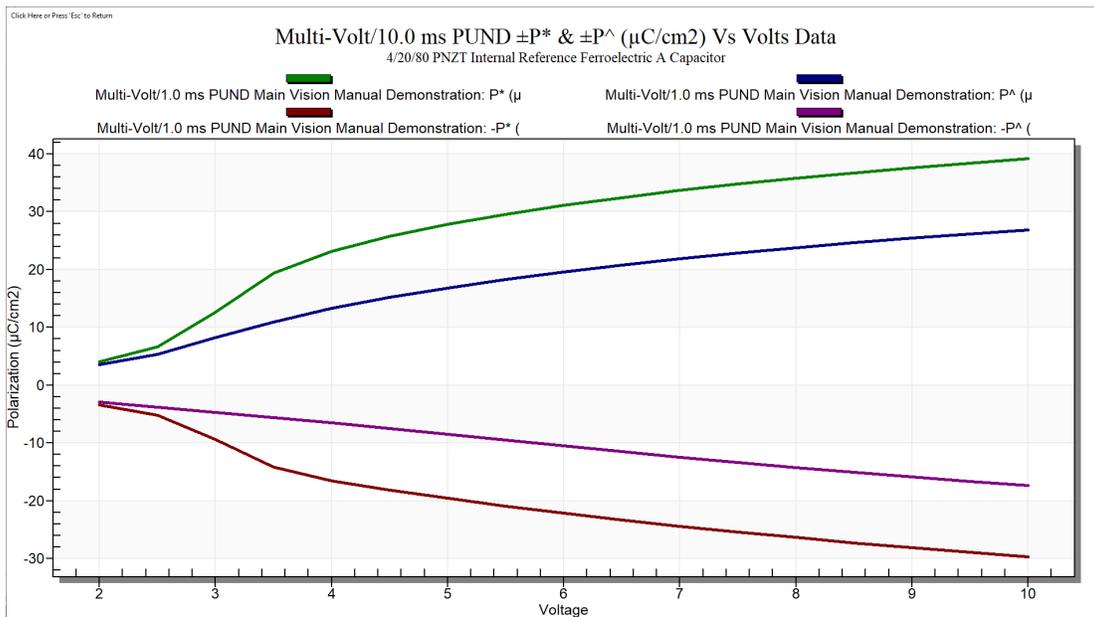


Figure 8 - Maximized Plot Example.

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E: To reduce the plot to normal size press *Esc* or click with the left mouse button in the blue bar at the top of the plot.

Step 4: To zoom the plot, create a rectangular window around the desired data by...

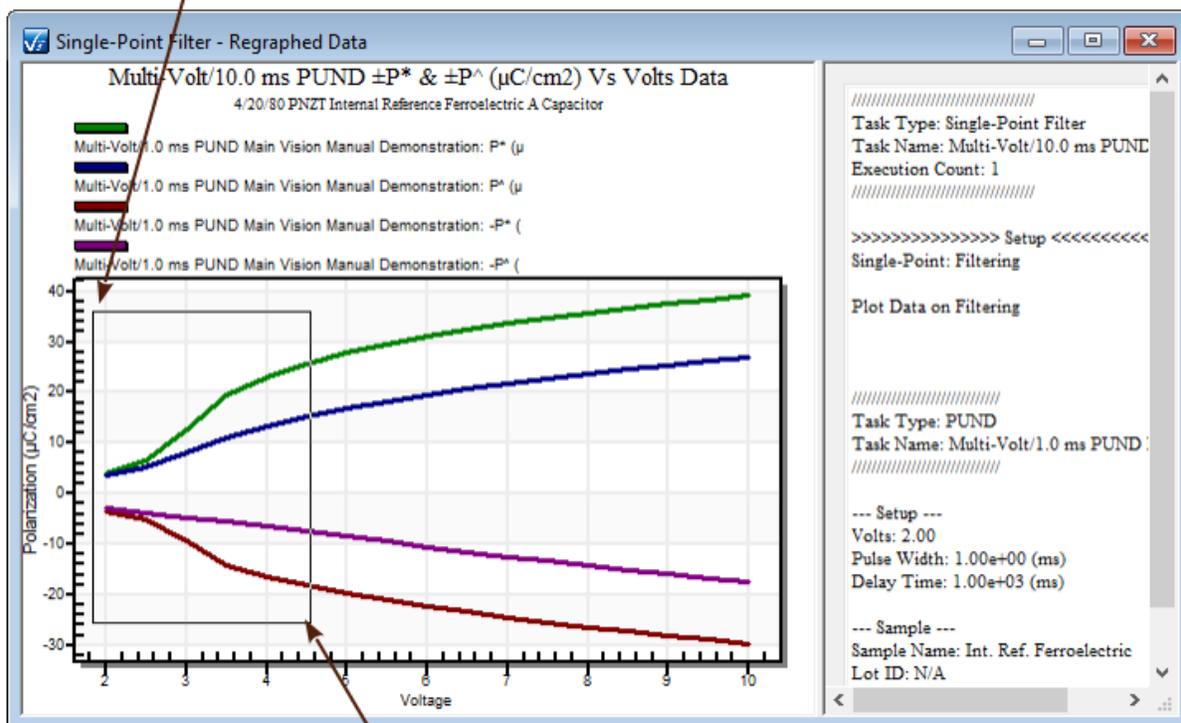
A: Click and hold the left mouse button with the cursor at the upper left corner of the imagined window.

B: With the left mouse button held, drag the cursor to the lower right corner of the window and release. A rectangle will appear while the cursor is being moved. Once the left mouse button is released, the rectangular area will expand to fill the view. This is known as "rubberbanding".

C: Zooms may be repeated for closer and closer looks.

D: To undo the Zoom, right-click in the plot surface and select *Undo Zoom* from the popup menu.

Left-Click Here, then...



**Drag and Release the
Button Here**

Figure 9 - Select (Rubberband) the Area over which to Zoom.

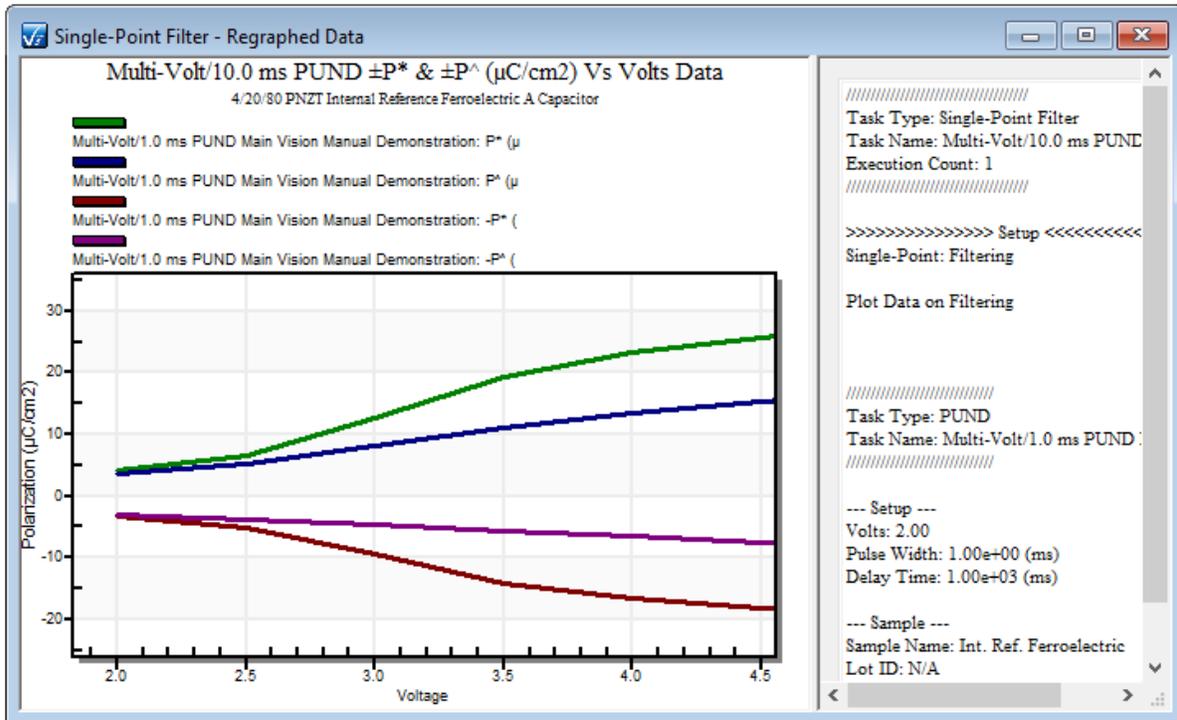


Figure 10 - Zoomed Data.

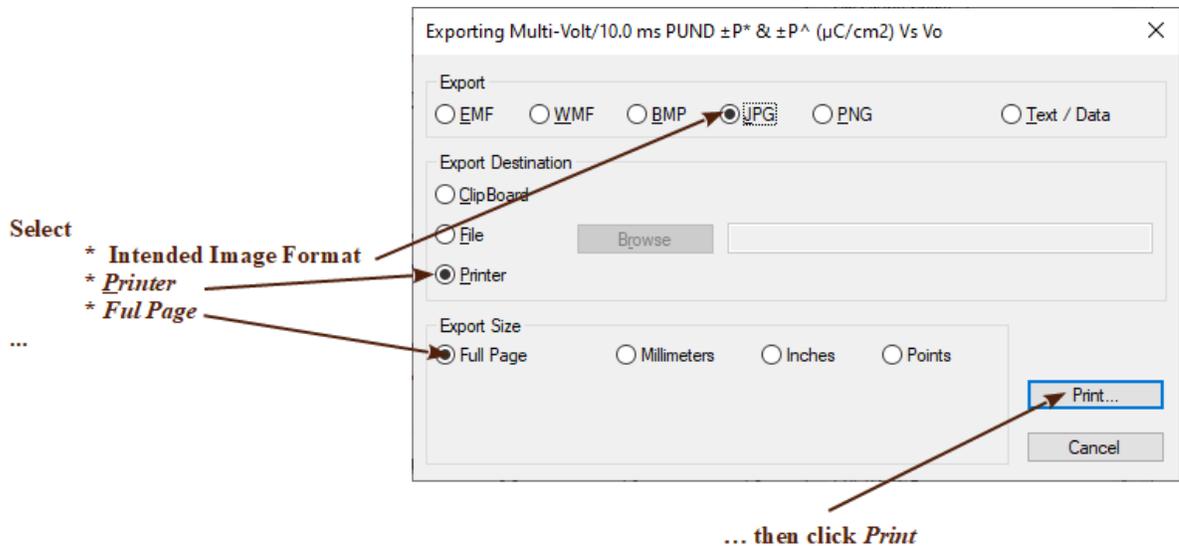


Figure 2 - The Plot Export Dialog - Used to Print the Plotted Data.

Step 4: Select the desired image format, *Printer* and *Full Page*, then click *Print...*;

Step 5: A second dialog box will appear that is customized to the default printer. Click *Setup* to open another dialog if you want to adjust the printing options. Click *OK* to send the plot to the printer. (*Cancel* closes the dialog without printing.)

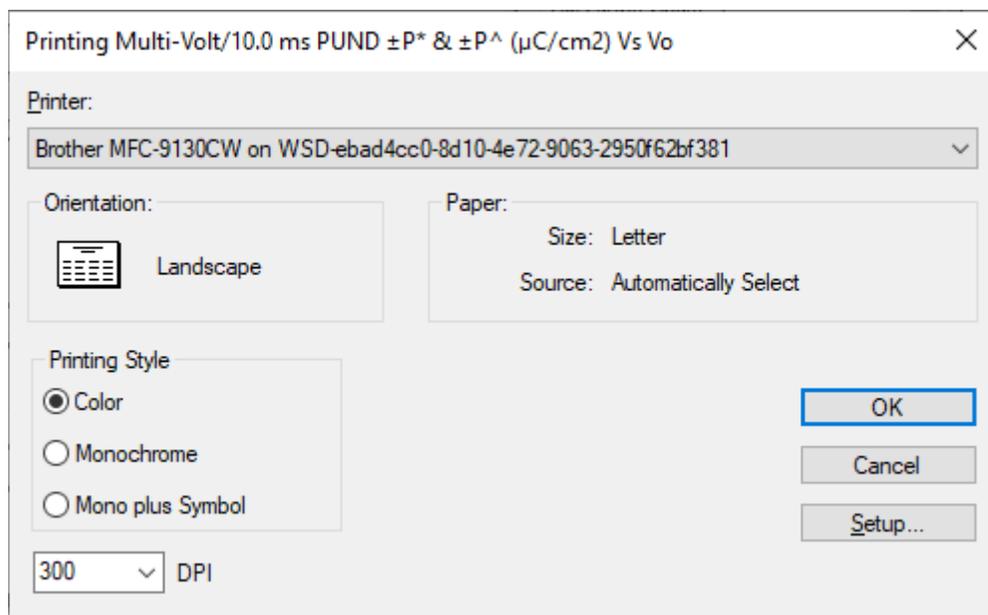


Figure 3 - Print Setup Dialog.

Exporting Data

This topic deals with the exporting of Measurement Task or Filter Task data directly from the data plot. This is an option that has been provided by the plotting tool and is actually external to Vision. Vision also provides exporting tools that produce Vision-formatted output. These are not the subject of the present discussion and are presented elsewhere.

The data used to create the plot can be exported to the Clipboard so that they can be imported in to other programs such as Word or Excel. They can also be written to a file. For plots with multiple data traces any subset of the traces can be saved. Data for each trace are saved in columns. The columns, from left to right, are: Serial index starting at 1, X-Axis value and Y-Axis value. If labels are saved with the data, the label will be prepended to the left of the data point. However, data labels will not be unique enough to identify particular traces.

Step 1: Create a plot using any method described in the topics above.

Step 2: Right-click in the plot window. A popup menu will appear.

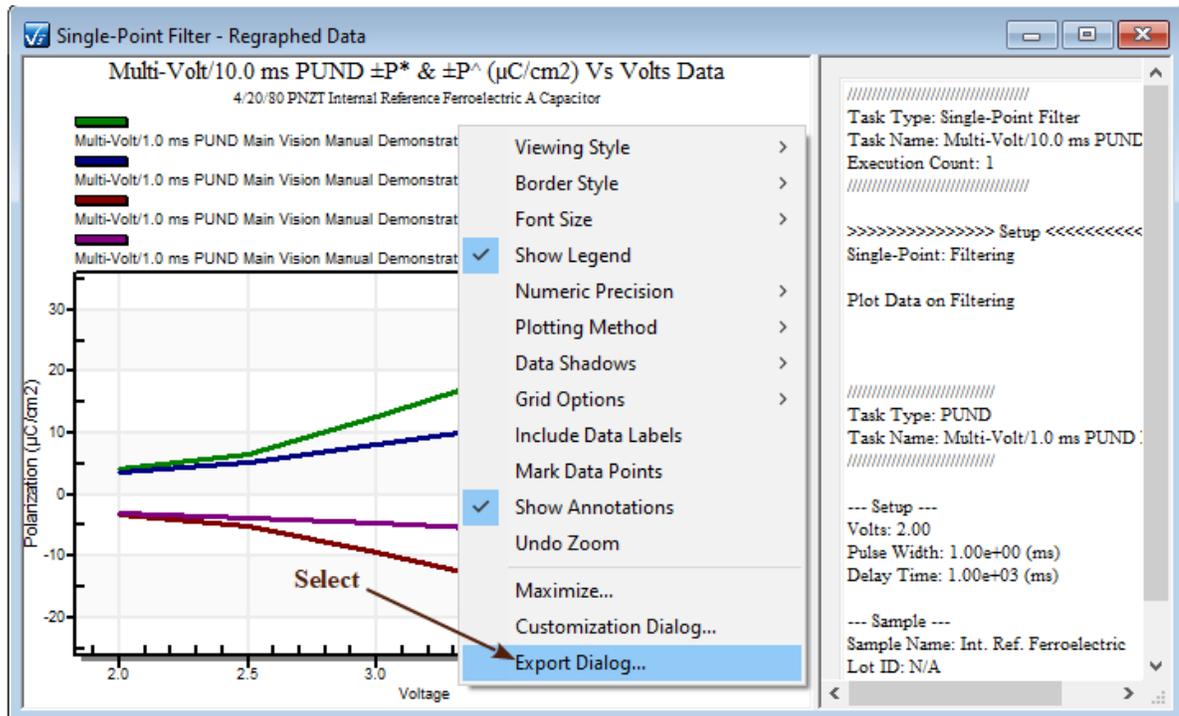


Figure 1 - The Plot Popup Menu.

Step 3: Select "Export Dialog...". The popup menu will disappear and a dialog will appear.

Step 4: Select Text/Data Only and File and then click Browse.

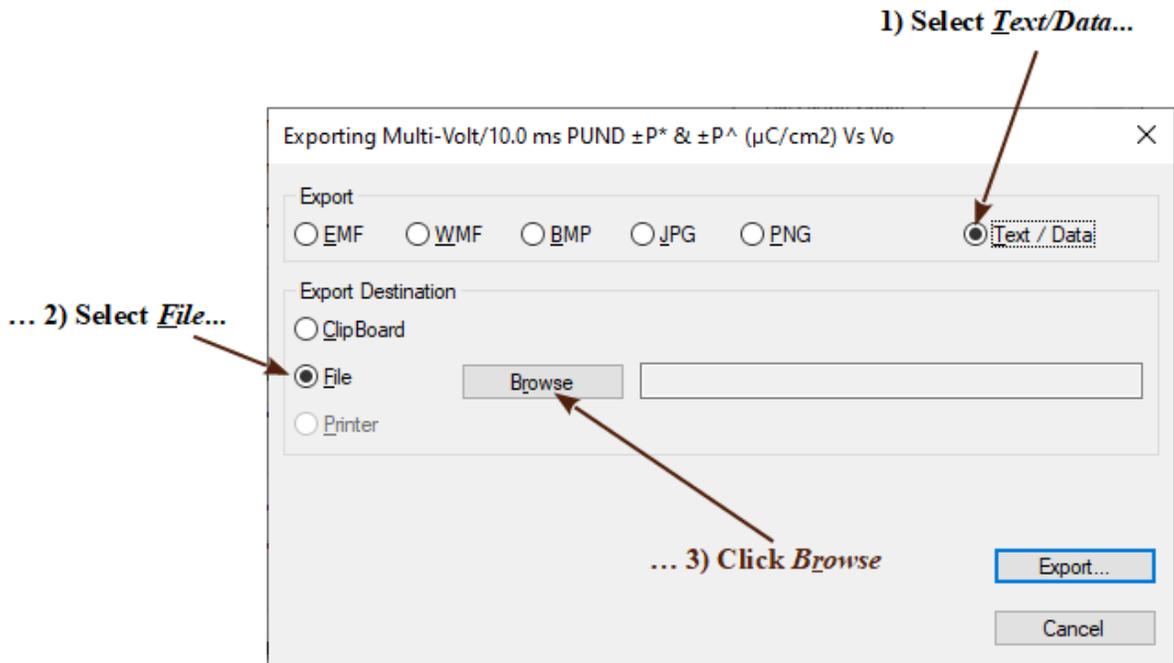


Figure 2 - Configure the Export.

Step 5: A standard Windows file browser dialog will appear. Navigate to an appropriate location and assign an appropriate file name. Then click *Save*.

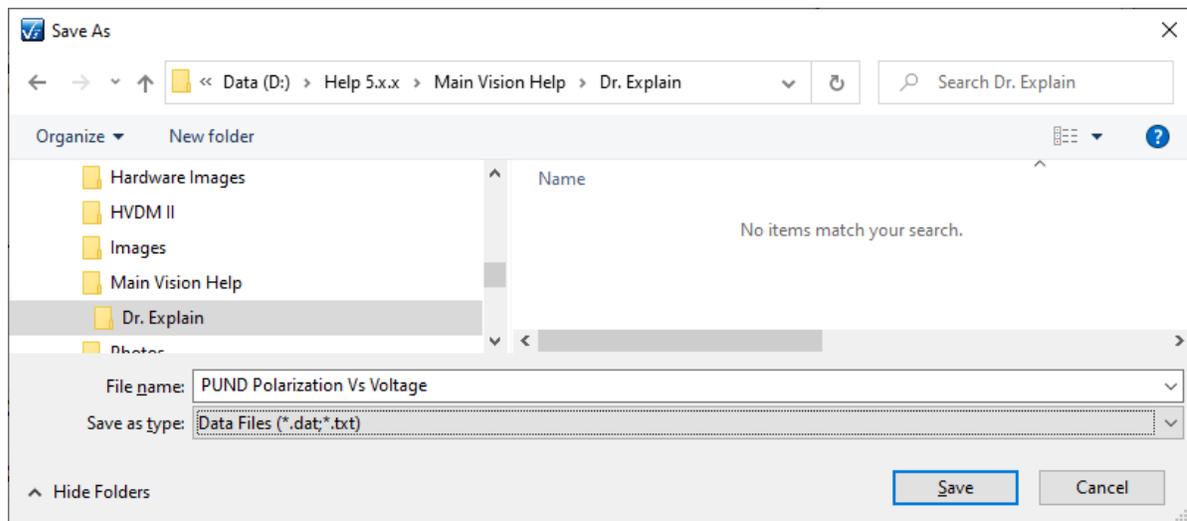


Figure 3 - Browse to Locate and Name the Output File.

Step 6: A partial file path and name will appear in the text field. Click *Export...* to close the dialog and open the second configuration dialog.

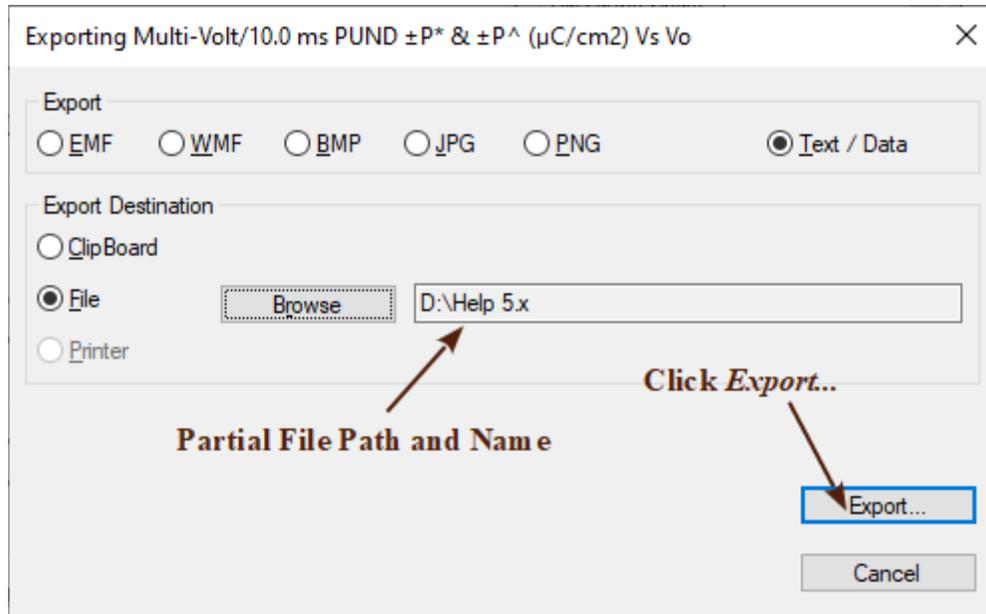


Figure 4 - Updated Configuration Dialog.

Step 7: A second dialog will appear. To export all data, select *All Data*. To export selected subset, check *Selected Data* and highlight the desired subsets in *Subsets to Export*:. You may also select a subset of the points in *Points to Export*:. Reduced points will rarely be selected. Make all other selections as intended.

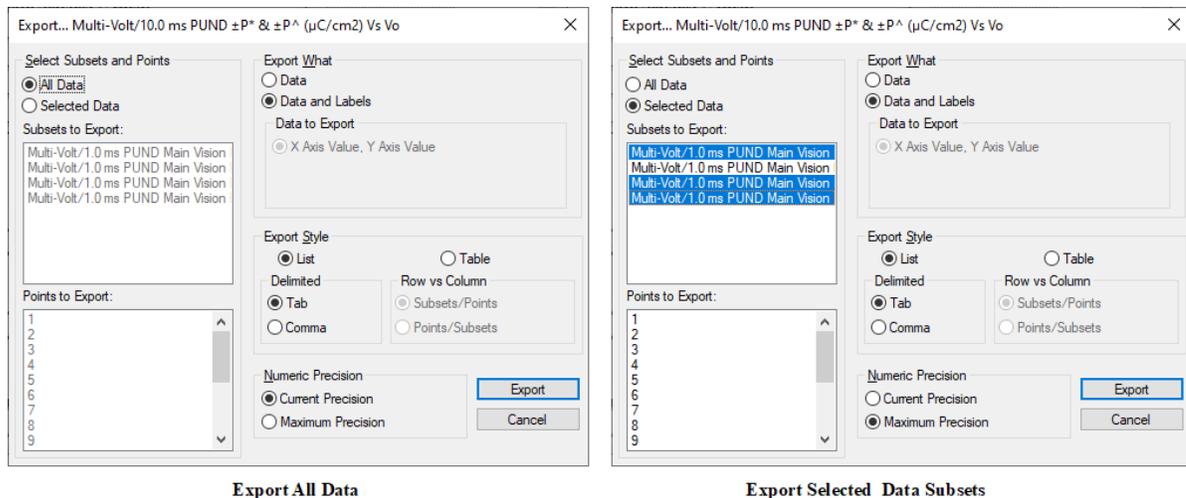


Figure 5 - The Second Export Dialog.

Step 8: Click *Export* to create the file.

Step 9: Repeat **Steps 1** through **3**, above.

Step 10: Select *Text/Data Only* and *Clipboard*.

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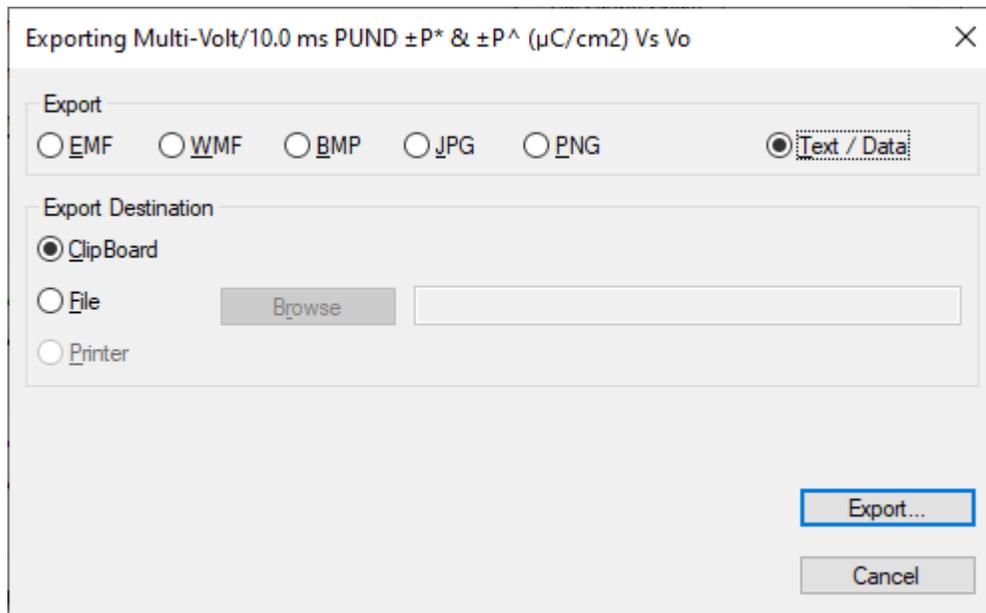


Figure 6 - The Clipboard Export Dialog Configuration.

Step 11: Click *Export...* The dialog will close and a second dialog will appear.

Step 12: Setup the data export as desired. Click *Export* to buffer the data.

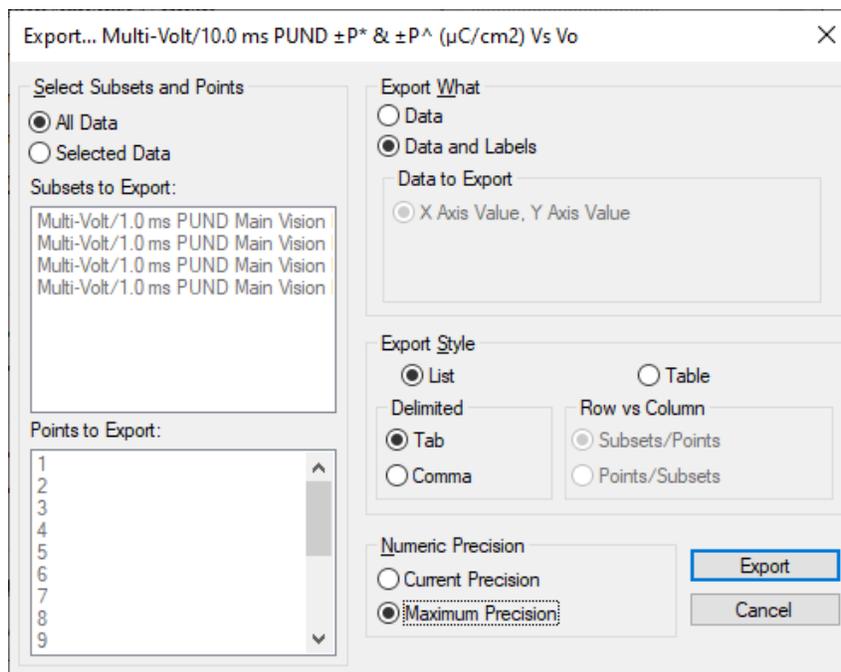


Figure 7 - Clipboard the Data.

Step 13: Open the desired program and select *Paste* to insert the data.

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```
*Untitled - Notepad
File Edit Format View Help
Multi-Volt/1.0 ms PUND Main Vision Manual Demonstration: P* (μ 3 3 12.670524937439
Multi-Volt/1.0 ms PUND Main Vision Manual Demonstration: P* (μ 4 3.5 19.3971277099609
Multi-Volt/1.0 ms PUND Main Vision Manual Demonstration: P* (μ 5 4 23.1958460006714
Multi-Volt/1.0 ms PUND Main Vision Manual Demonstration: P* (μ 6 4.5 25.7685501083374
Multi-Volt/1.0 ms PUND Main Vision Manual Demonstration: P* (μ 7 5 27.8354431289673
Multi-Volt/1.0 ms PUND Main Vision Manual Demonstration: P* (μ 8 5.5 29.5890927352905
Multi-Volt/1.0 ms PUND Main Vision Manual Demonstration: P* (μ 9 6 31.1232151947021
Multi-Volt/1.0 ms PUND Main Vision Manual Demonstration: P* (μ 10 6.5 32.4857384613037
Multi-Volt/1.0 ms PUND Main Vision Manual Demonstration: P* (μ 11 7 33.704049937439
Multi-Volt/1.0 ms PUND Main Vision Manual Demonstration: P* (μ 12 7.5 34.8162352294922
Multi-Volt/1.0 ms PUND Main Vision Manual Demonstration: P* (μ 13 8 35.8304249725342
Multi-Volt/1.0 ms PUND Main Vision Manual Demonstration: P* (μ 14 8.5 36.7517543045044
Multi-Volt/1.0 ms PUND Main Vision Manual Demonstration: P* (μ 15 9 37.619592616272
Multi-Volt/1.0 ms PUND Main Vision Manual Demonstration: P* (μ 16 9.5 38.4335119796753
Multi-Volt/1.0 ms PUND Main Vision Manual Demonstration: P* (μ 17 10 39.2012151016235
Multi-Volt/1.0 ms PUND Main Vision Manual Demonstration: P^ (μ 1 2 3.56356056976318
Multi-Volt/1.0 ms PUND Main Vision Manual Demonstration: P^ (μ 2 2.5 5.3234263305664
Multi-Volt/1.0 ms PUND Main Vision Manual Demonstration: P^ (μ 3 3 8.20980178070068
Multi-Volt/1.0 ms PUND Main Vision Manual Demonstration: P^ (μ 4 3.5 10.9665149978638
Multi-Volt/1.0 ms PUND Main Vision Manual Demonstration: P^ (μ 5 4 13.3329577316284
Multi-Volt/1.0 ms PUND Main Vision Manual Demonstration: P^ (μ 6 4.5 15.2312470565796
Multi-Volt/1.0 ms PUND Main Vision Manual Demonstration: P^ (μ 7 5 16.8530947891235
Multi-Volt/1.0 ms PUND Main Vision Manual Demonstration: P^ (μ 8 5.5 18.2930730529785
Multi-Volt/1.0 ms PUND Main Vision Manual Demonstration: P^ (μ 9 6 19.590123310852
Multi-Volt/1.0 ms PUND Main Vision Manual Demonstration: P^ (μ 10 6.5 20.7763401748657
Multi-Volt/1.0 ms PUND Main Vision Manual Demonstration: P^ (μ 11 7 21.8581425674438
Multi-Volt/1.0 ms PUND Main Vision Manual Demonstration: P^ (μ 12 7.5 22.8560710403442
Multi-Volt/1.0 ms PUND Main Vision Manual Demonstration: P^ (μ 13 8 23.7868147918701
Multi-Volt/1.0 ms PUND Main Vision Manual Demonstration: P^ (μ 14 8.5 24.6353963363647
Multi-Volt/1.0 ms PUND Main Vision Manual Demonstration: P^ (μ 15 9 25.4309147888184
Multi-Volt/1.0 ms PUND Main Vision Manual Demonstration: P^ (μ 16 9.5 26.1785052871704
Multi-Volt/1.0 ms PUND Main Vision Manual Demonstration: P^ (μ 17 10 26.9046993774414
Multi-Volt/1.0 ms PUND Main Vision Manual Demonstration: -P* ( 1 2 -3.40871510467529
Multi-Volt/1.0 ms PUND Main Vision Manual Demonstration: -P* ( 2 2.5 -5.18434967803955
Multi-Volt/1.0 ms PUND Main Vision Manual Demonstration: -P* ( 3 3 -9.38061333089599
Ln 69, Col 1 100% Windows (CRLF) UTF-8
```

Figure 8 - Data Pasted into Notepad.



Exporting Data Plots

Once a plot has been created in a dialog or Filter plot window, it can be buffered in the clipboard for copying to other programs such as Microsoft Word or Microsoft Excel as a Meta file. Note that only the plot will be buffered. The rest of the dialog or Filter window will not appear.

To buffer a plot:

Step 1: Create a plot using any method described in the topics above.

Step 2: Right-click in the plot window. A popup menu will appear.

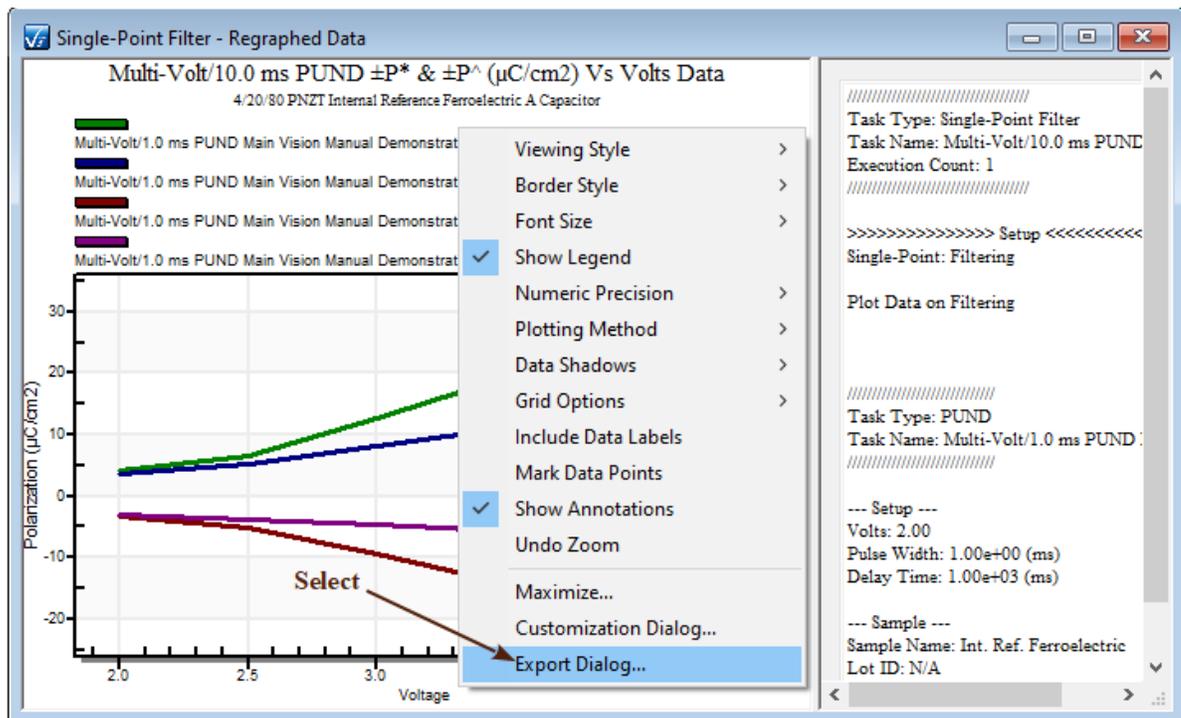


Figure 1 - The Plot Popup Menu.

Step 3: Select "Export Dialog...". The popup menu will disappear and a dialog will appear.

Step 4: Select the desired image format and *Clipboard*. Adjust the remaining parameters as intended and based on the selected image format.

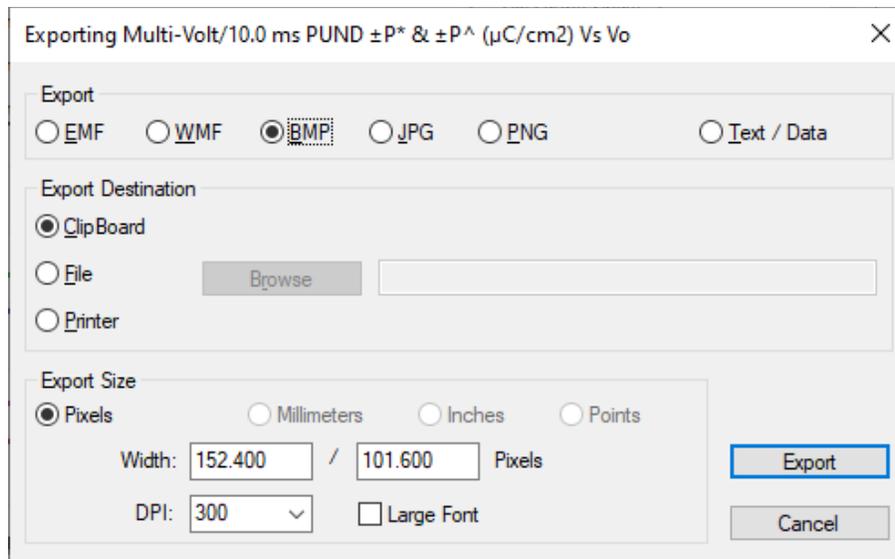


Figure 2 - Plot Export Menu.

Step 5: Click *Export....* The dialog will close. The image will be saved to the clipboard.

Step 6: Start the desired target program and paste the image from the clipboard.

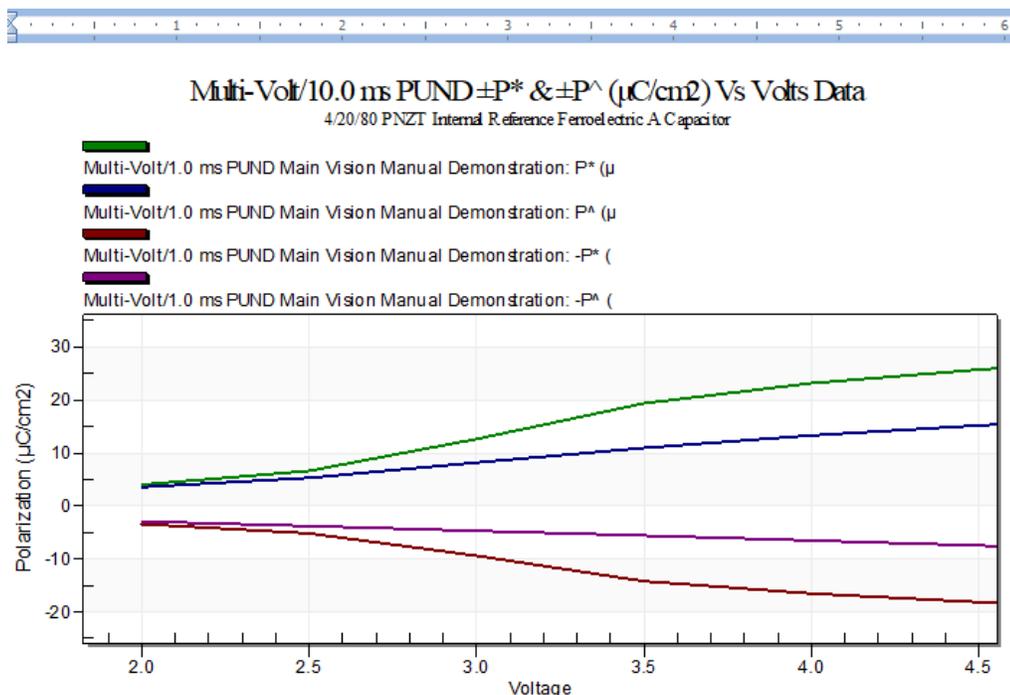


Figure 3 - The Original Plot, Pasted into Word.

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Annotations

Discussion

Annotations may be added to the plotted data for any Task that produces a data display dialog that can include a menu. Tasks that allow annotations are:

1. Hysteresis
2. Check Hysteresis
3. Remanent Hysteresis
4. General Monopolar Hysteresis
5. Current Loop
6. Curve Energy
7. DLTS
8. PAINT
9. TDC Hysteresis
10. Advanced C/V
11. Leakage
12. Piezo
13. Advanced Piezo
14. Simple Pulse
15. General Pulse
16. PUND

Several Tasks produce plotted data in which the data is shown in a plot window generated by Vision. These plots do not allow menus and cannot show annotations. The Tasks in this category are:

1. All Filter Tasks
2. Long-Duration Tasks (Chamber Suite, Fatigue, Imprint, Resist, Retain)
3. I/V

Annotations may be placed in either QuikLook plot dialogs or on data plots that have been recalled from a DataSet Archive. QuikLook annotations are transient and are lost when the dialog is closed. Annotations added to a Task recalled from a DataSet Archive are persistent. These are stored in the C:\DataSets\Annotations folder and are uniquely named to match the Task that they are associated with.

Step 1: Configure Line Type

The current line type configuration applies to lines, ellipses and rectangles that are added after the line type selection. Line types are Thin Solid, Medium Solid, Thick Solid, Dotted and Dashed. The default is Thin Solid.

A: Generate the plotted data.

B: Go to Configure Annotations->Configure Lines->Line Type. Select the desired line

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type.

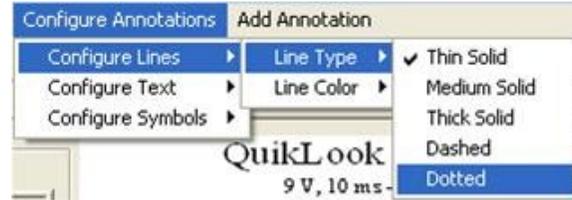


Figure 1 - Configure Line Type.

C: The *Annotation* indicator will change from "<<Ready>>" to "Line Type Set to X", where X is the selected line type.

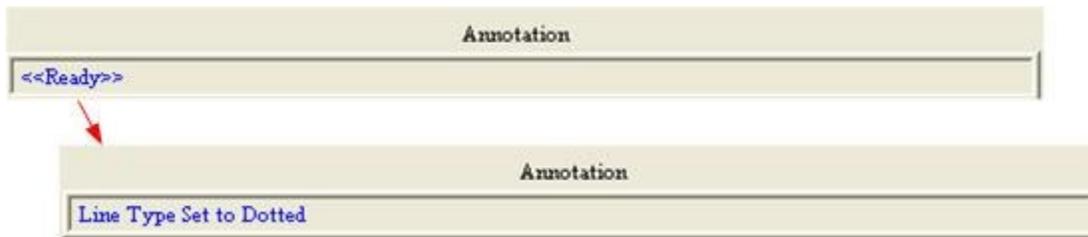


Figure 2 - Line Type Indicator.

Step 2: Configure the line color.

The current line color can be immediately set to Black, Blue, Red, Green or Yellow. Any custom color can also be set through the "Custom" line color option.

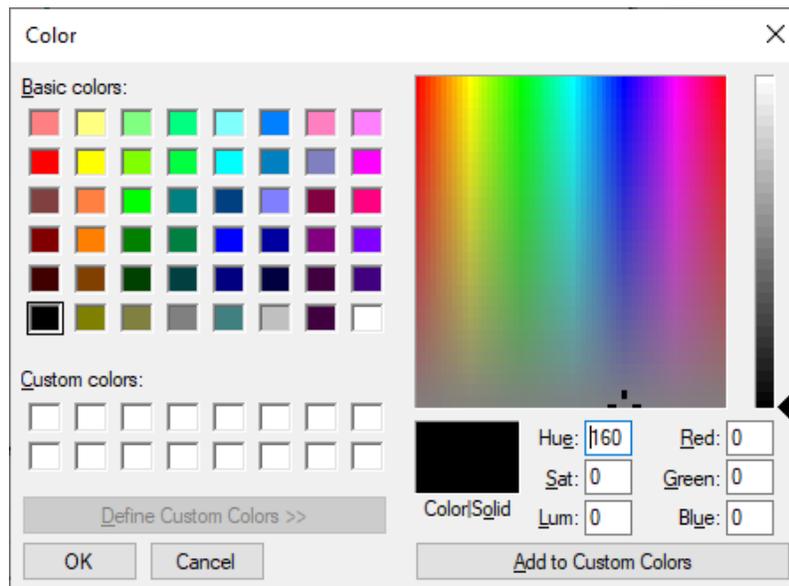


Figure 3 - Custom Color Selection Dialog.

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- A: Generate the plotted data.
- B: Go to Configure Annotations->Configure Lines->Line Color. Select the desired line color. If using the custom dialog, adjust to the desired color. The *Annotation* control will indicate the RGB values for the line color selected for custom colors, or the name of the color for simple selections.

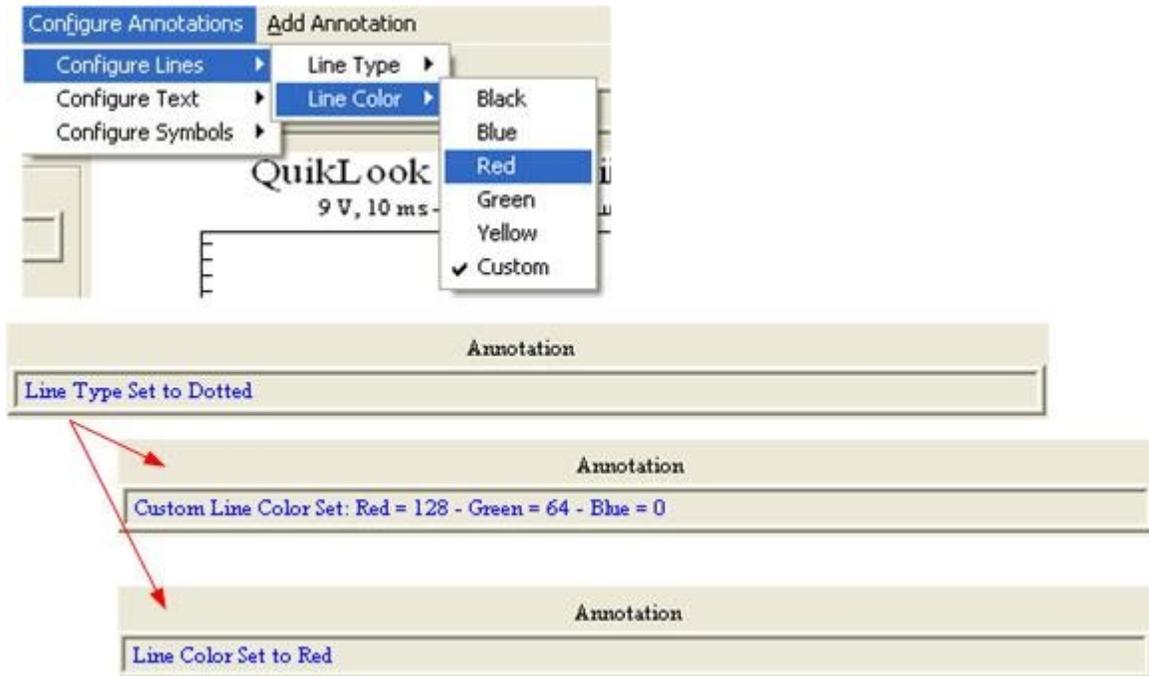


Figure 4 - Line Color Selection.

Selections for text color and symbol color are made in the same way.

Step 3: Configure symbol type

Symbols may be inserted of the following types:

1. Open or Solid Dot
2. Open or Solid Square
3. Open or Solid Diamond
4. Open or Solid Triangle, Up or Down
5. Plus (+)
6. Cross (X)

Symbols may have text accompanying them or may be placed without text.

- A. Generate the plotted data.

- B. Go to Configure Annotations->Configure Symbols->Symbol Type. Select the desired symbol type. *Annotation* indicates the change.

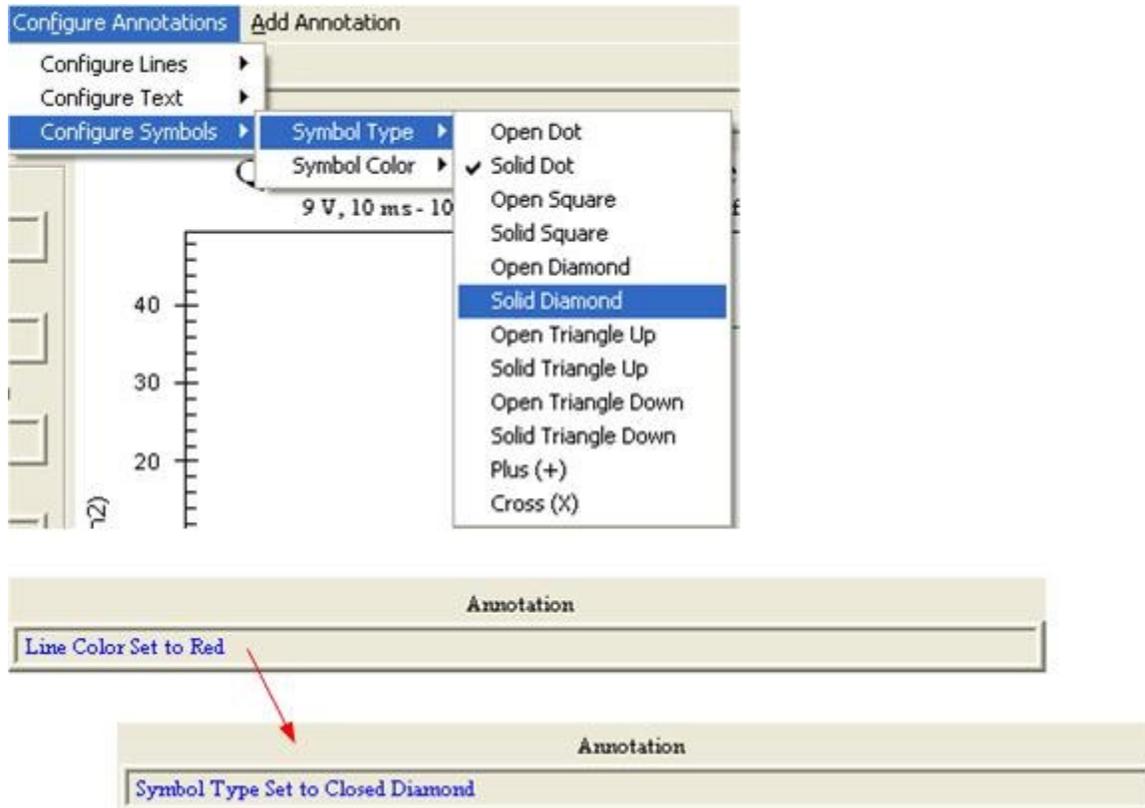


Figure 5 - Symbol Type Selection.

Step 4: Select the Text Size

The text size may be set to Tiny, Small, Medium, Large or Very Large. The default is Very Large and this is the only text size selection that produces text that appear in a reasonable way. This is the only annotation option that can be applied to change existing annotations. The text size selection is universal. It applies to all existing text.

- A: Generate the plotted data.
 B: Go to Configure Annotation->Configure Text->Text Size. Select the desired size. Annotation will indicate the change in text size selection. Any existing text will have its size adjusted to match the selection.

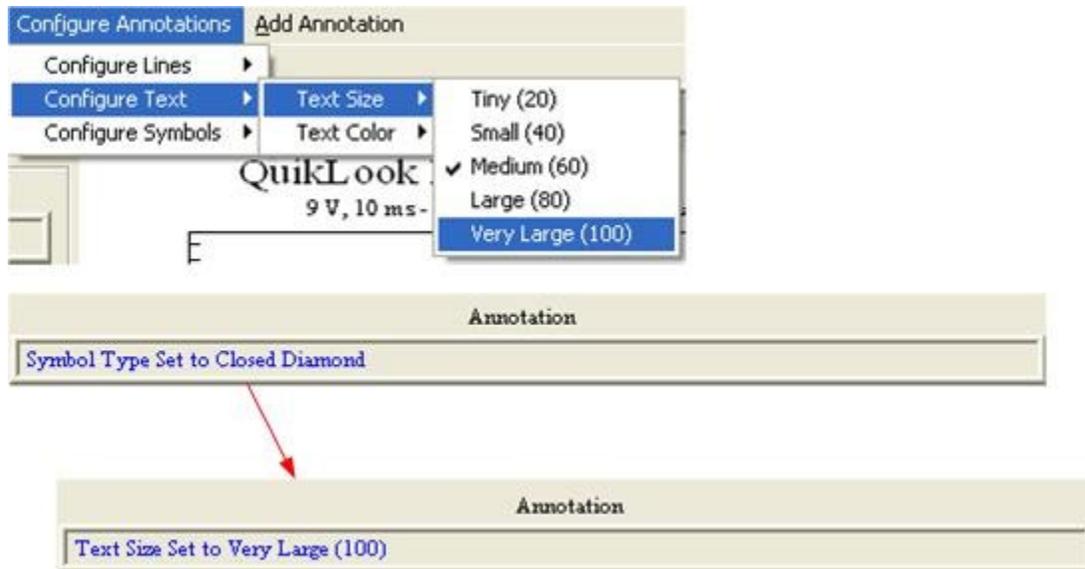


Figure 6 - Text Size Selection.

Step 5: Add a Line.

- A. Go to Add Annotation->Add Line. The *Annotation* control will instruct you to left click at the first endpoint of the line.

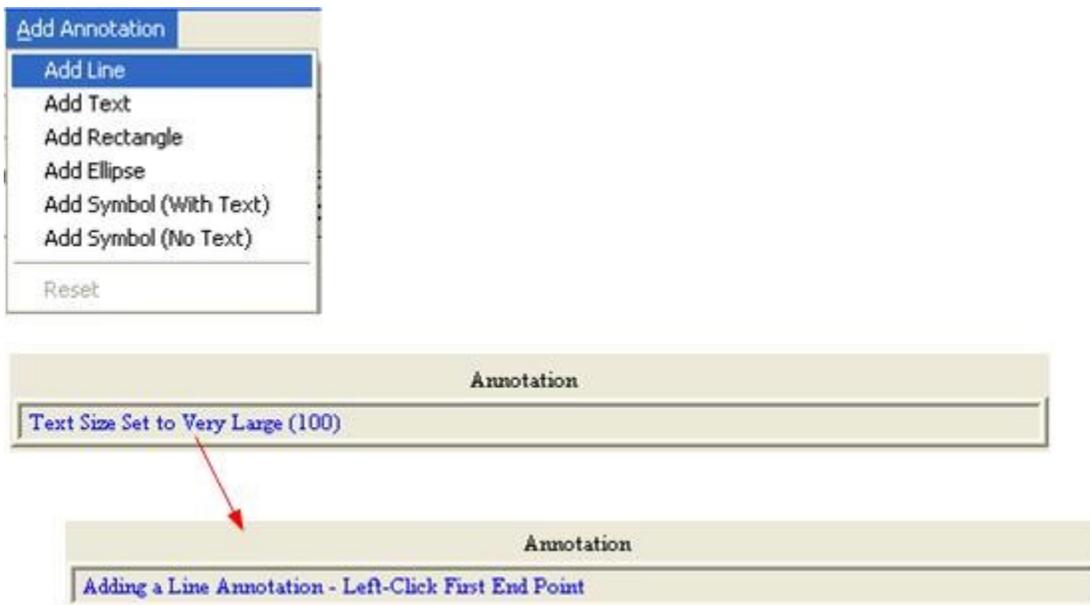


Figure 7 - Initiate a Line.

- B. If this is the first annotation added to the plot, left-click anywhere on the plot surface to change focus to the plot.

- C. Left-click at one desired endpoint of the line. The point will be recorded and *Annotation* will provide instructions to left-click the second end point.

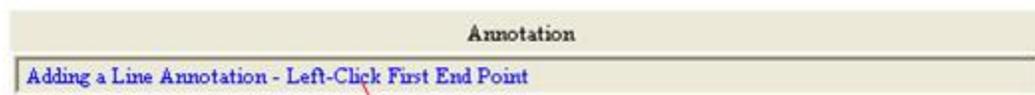
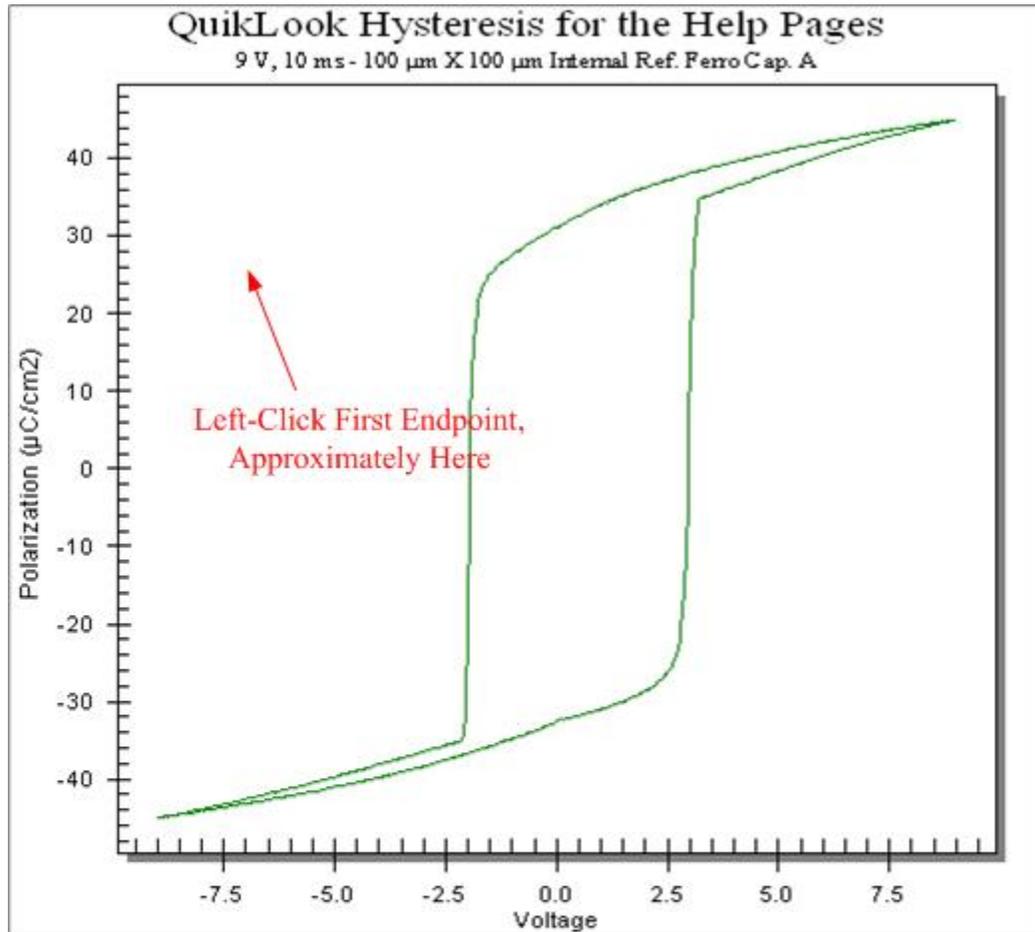


Figure 8 - Start the Line.

- D. Left click the opposite endpoint. The line will appear. The configuration will be the default (thin solid, black) or as adjusted in the steps outlined above. Annotation will return to the idle <<Ready>> indicator.

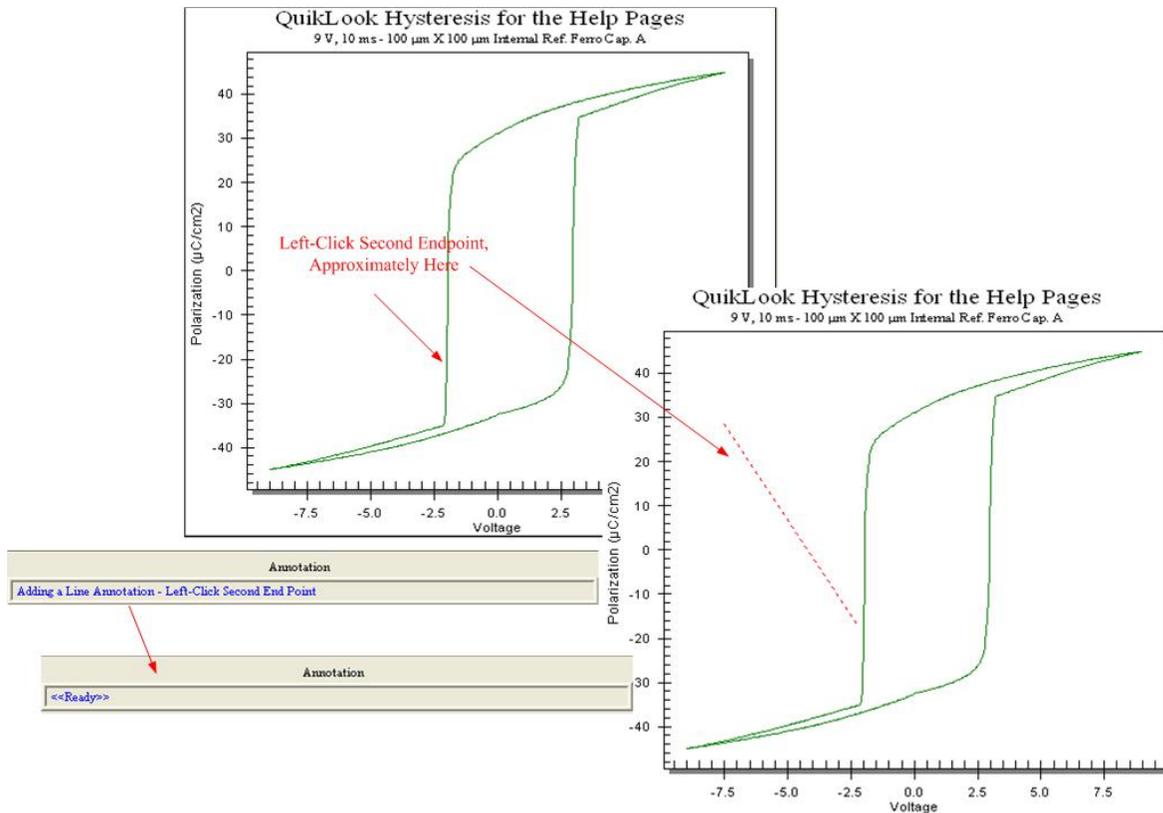


Figure 9 - Complete the Line.

Step 6: Add a Rectangle

A rectangle is added in very similar fashion to a line. The two mouse clicks indicate opposite corners of the rectangle.

A. Go to Add Annotation->Add Rectangle. The *Annotation* control will instruct you to left click at one corner of the rectangle.

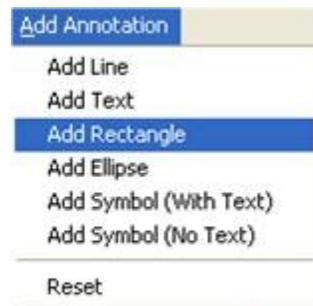


Figure 10 - Initiate a Rectangle.

B. If this is the first annotation added to the plot, left-click anywhere on the plot sur-

face to change focus to the plot.

C. Left-click at one desired corner of the rectangle.

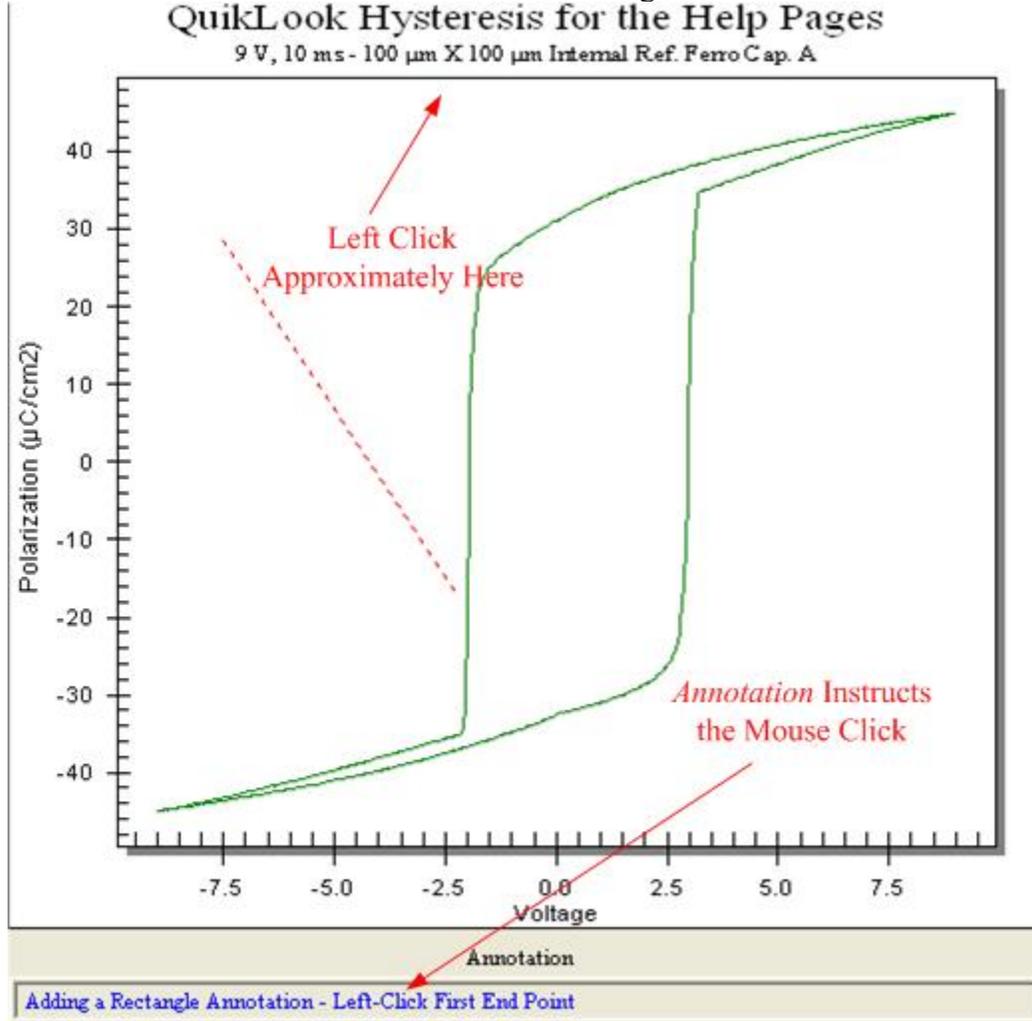


Figure 11 - Start to Delimit the Rectangle.

D. The point will be recorded and *Annotation* will provide instructions to left-click the opposite. Left click at the desired corner. The rectangle appears and *Annotation* returns to the idle state of "<<Ready>>".

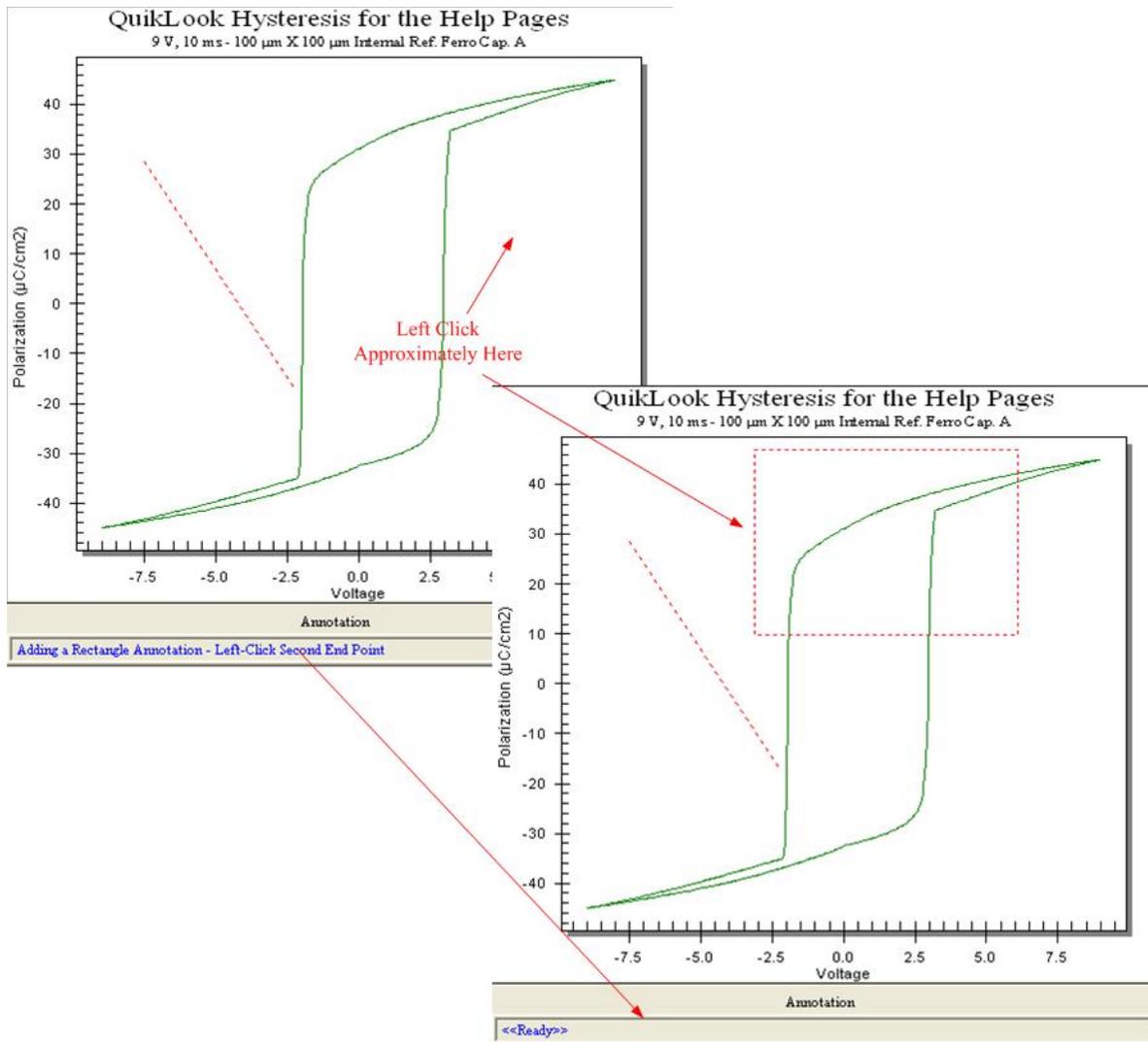


Figure 12 - Finish Adding the Rectangle.

Step 7: Add an Ellipse

An ellipse is added in a nearly identical fashion to a rectangle. Here, though, the two mouse clicks indicate opposite corners a rectangle that defines the ellipse's upper and lower, right and left limits.

- A. Go to Add Annotation->Add Ellipse. The *Annotation* control will instruct you to left click at one corner of the ellipse's limit box.

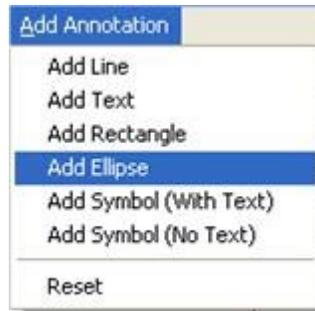


Figure 13 - Initiate an Ellipse.

- B. If this is the first annotation added to the plot, left-click anywhere on the plot surface to change focus to the plot.
- C. Left-click at one desired corner of the limits of the ellipse.

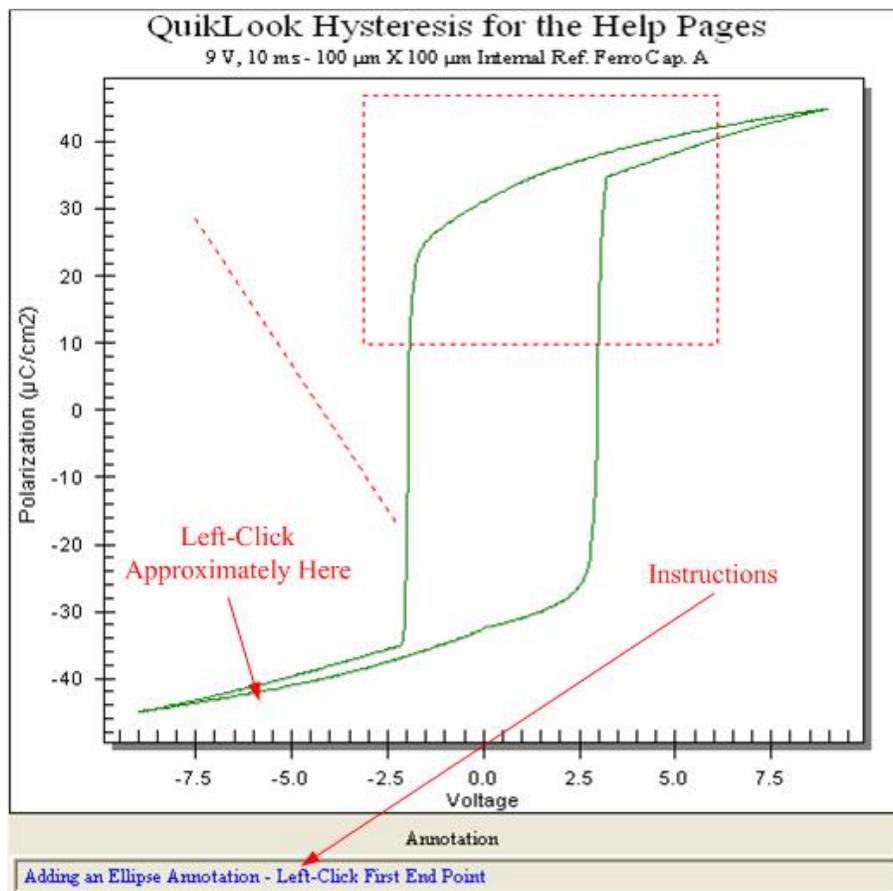


Figure 14 - Start to Delimit the Ellipse.

- D. The point will be recorded and *Annotation* will provide instructions to left-click the opposite. Left click at the desired corner. The rectangle appears and *Annotation* returns to the idle state of "<<Ready>>".

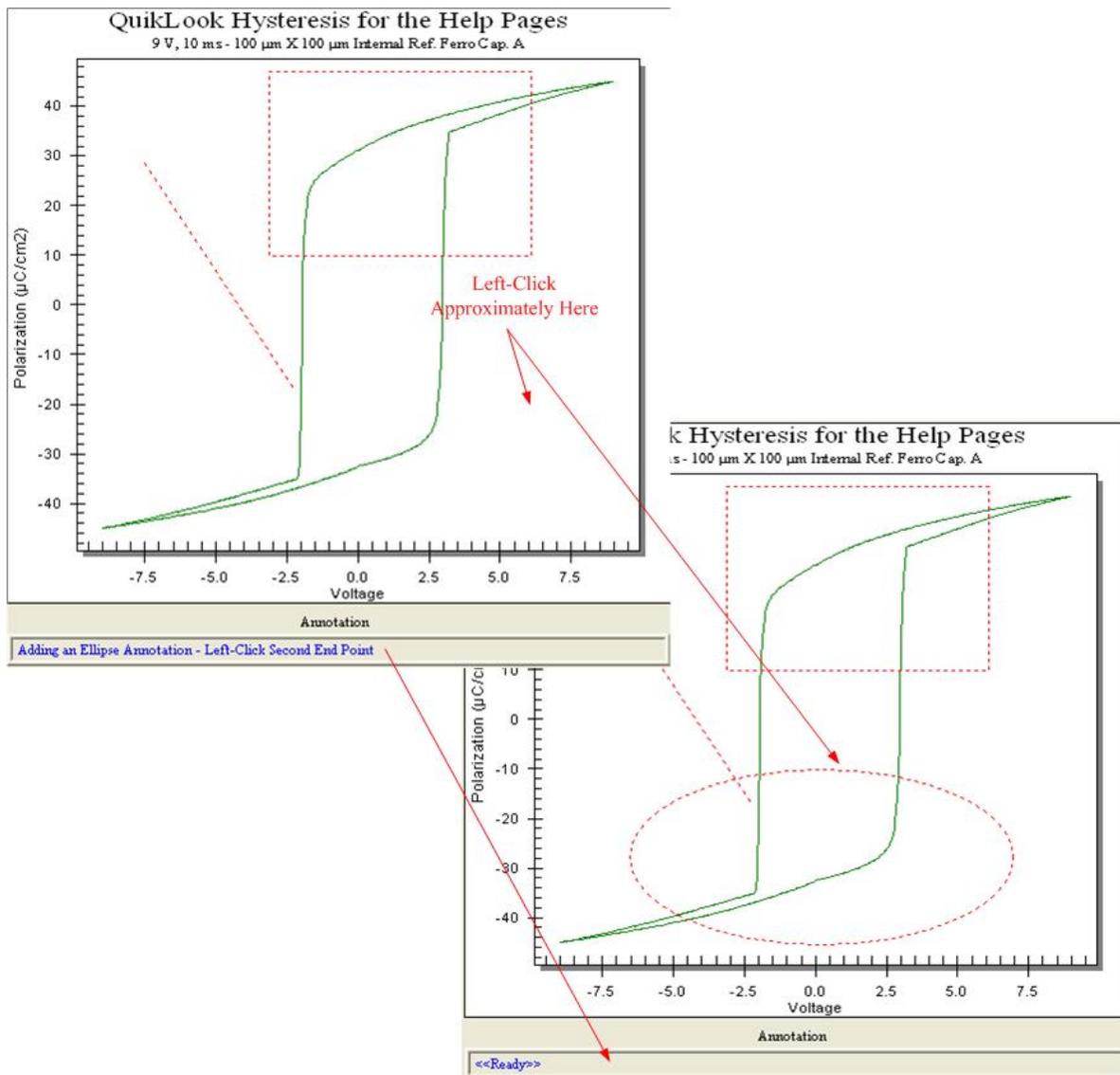


Figure 15 - Finish Adding the Ellipse.

Step 8: Add Text

Text is added with a single mouse click.

- A. Go to Add Annotation->Add Text. The *Annotation* control will instruct you to left click at the left-most position of the text.

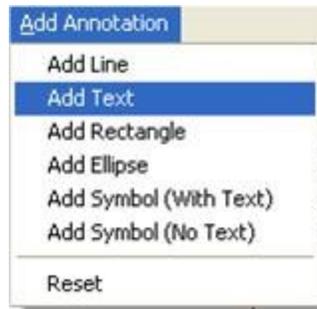


Figure 16 - Initiate Text.

- B. If this is the first annotation added to the plot, left-click anywhere on the plot surface to change focus to the plot.
- C. Left-click at the left-most position of the text.

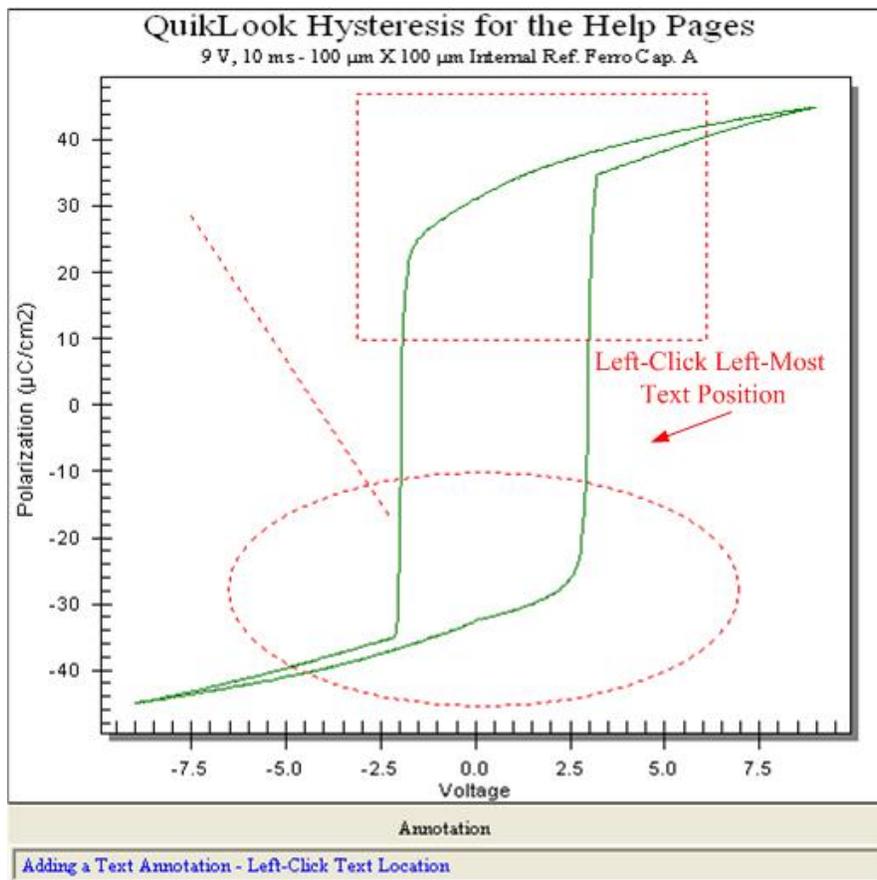


Figure 17 - Indicate Text Position

- D. A text entry dialog will appear. Type the text - up to 48 characters - then click *OK*. *Cancel* aborts the text entry. *Annotation* instructs the text entry.

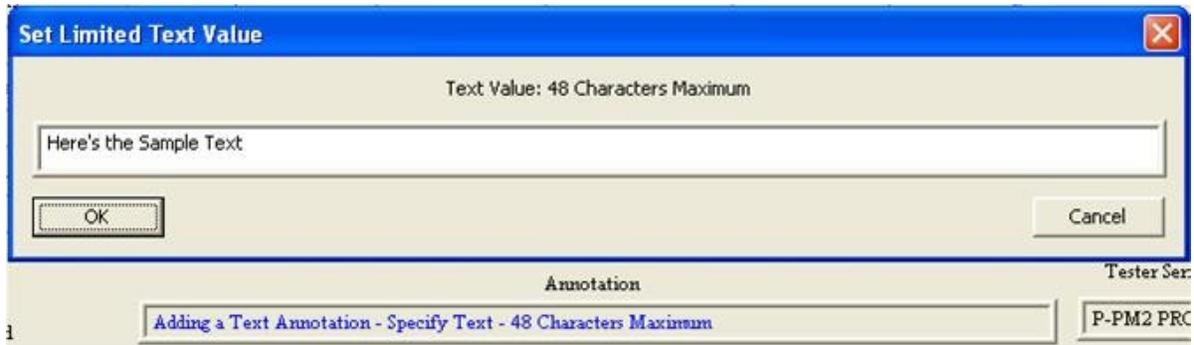


Figure 18 - Enter the Text.

E. The text appears to the right of the mouse click and *Annotation* resets.

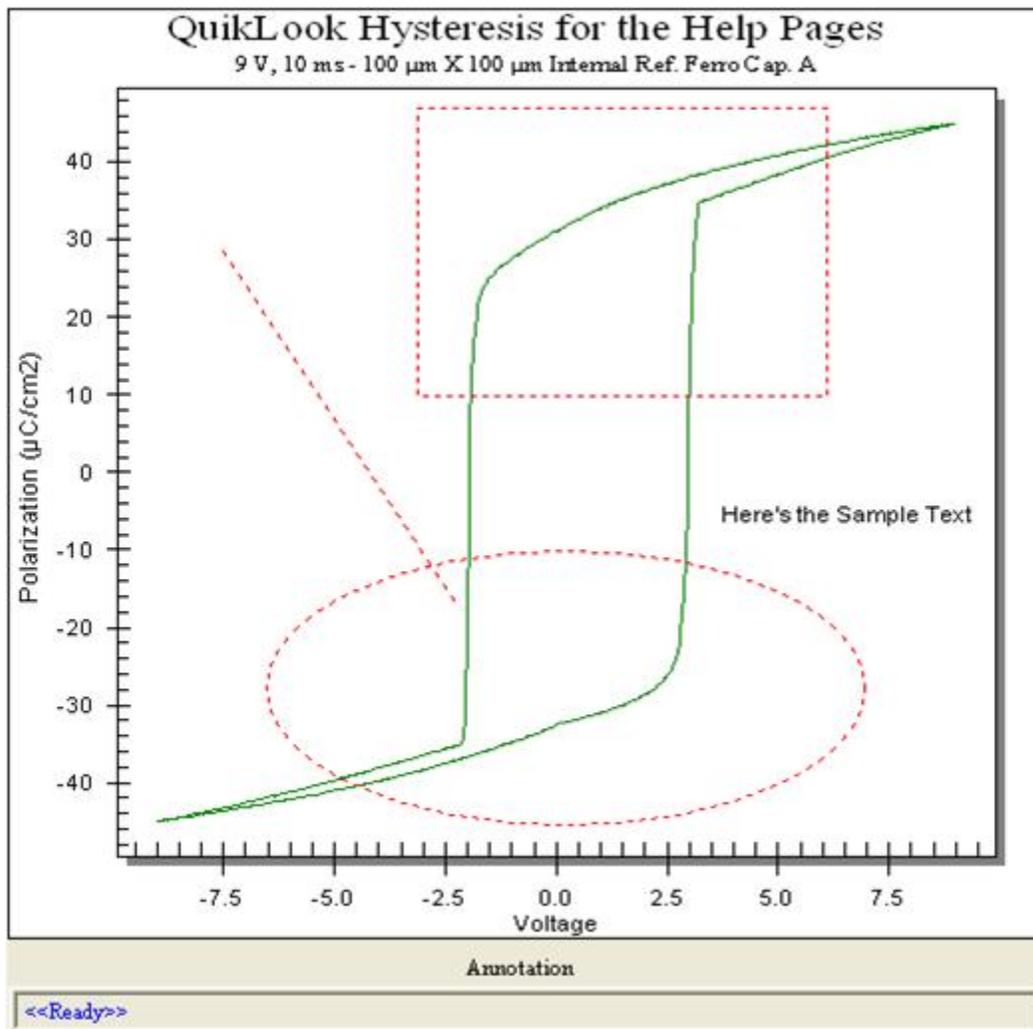


Figure 19 - Text Appears on the Plot Surface.

Step 9: Add a symbol

A symbol is also placed with a single mouse click. This section adds only a symbol. A symbol with text is added using an identical procedure to text insertion in step 8. In that case, the text will appear with the configured symbol to the left of the text. The text will take on the symbol color, but will be subject to changes in text size.

- A. Go to Add Annotation->Add Symbol (No Text). The *Annotation* control will instruct you to left click at one corner of the ellipse's limit box.



Figure 20 - Initiate Symbol (No Text).

- B. If this is the first annotation added to the plot, left-click anywhere on the plot surface to change focus to the plot.
- C. Left-click at the left-most position of the symbol.

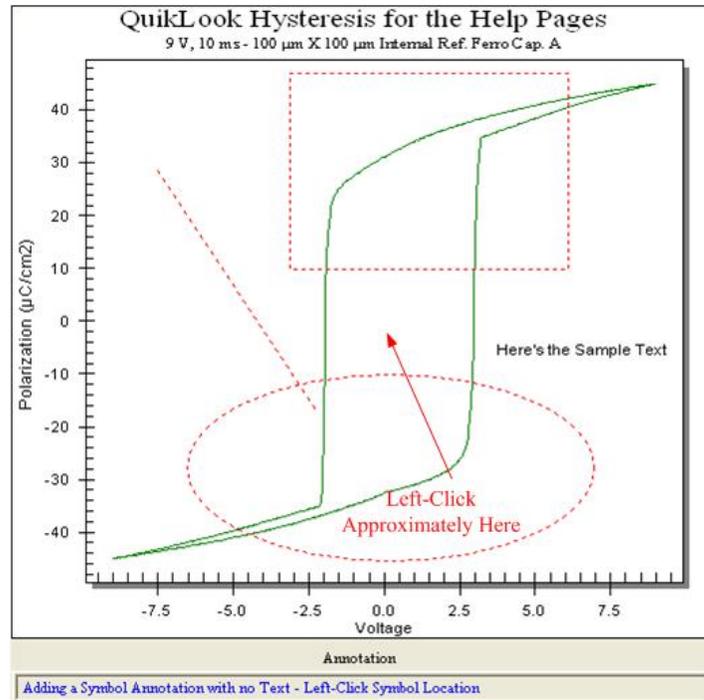


Figure 21 - Indicate the Symbol Insertion Point.

D. The symbol appears and *Annotation* resets.

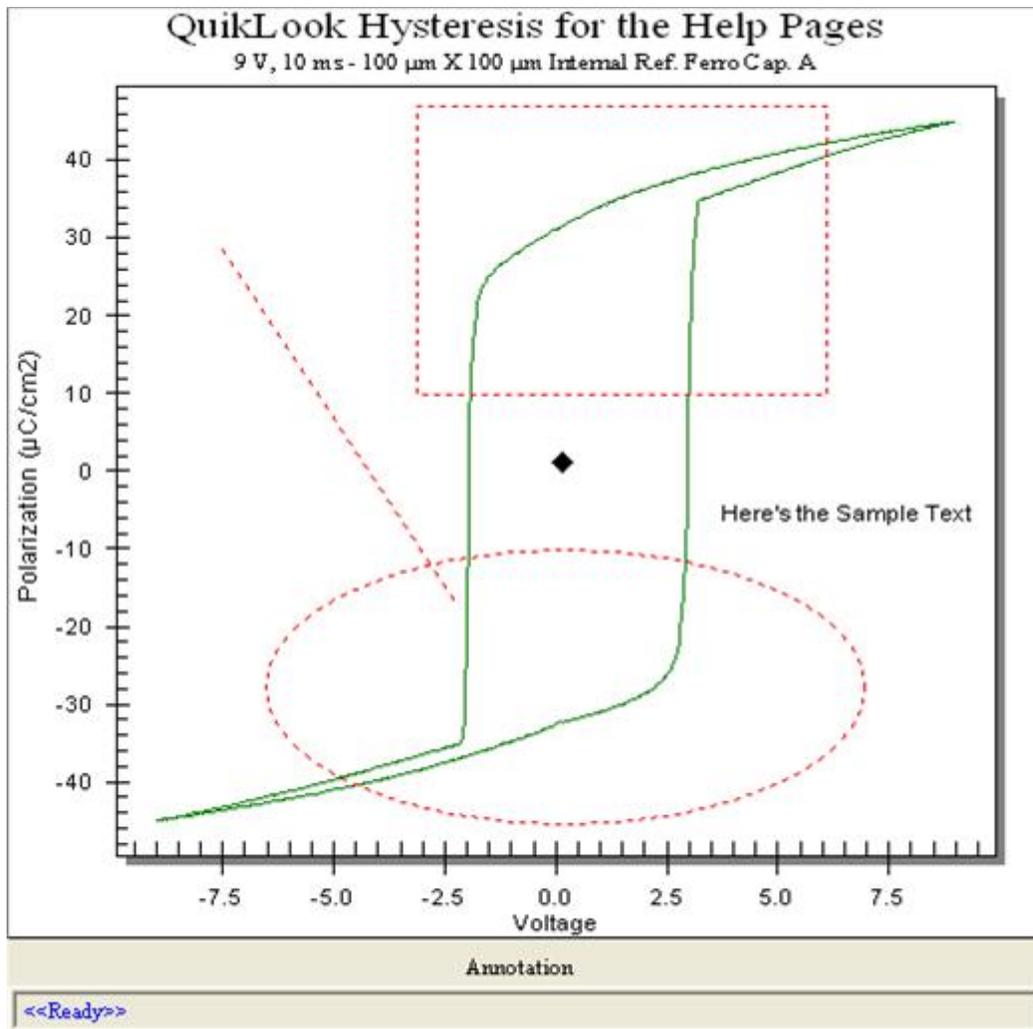


Figure 22 - Plot with Inserted Symbol.

Step 10: Clear All Annotations

Once annotations have been inserted they may be modified only by appending new annotations, changing text size or removing all annotations. Annotations cannot be moved, individually removed or have their properties changed (except for text size).

A. Go to Add Annotation->Reset



Figure 23 - Initiate Reset of All Annotations.

B. All annotations will be removed.

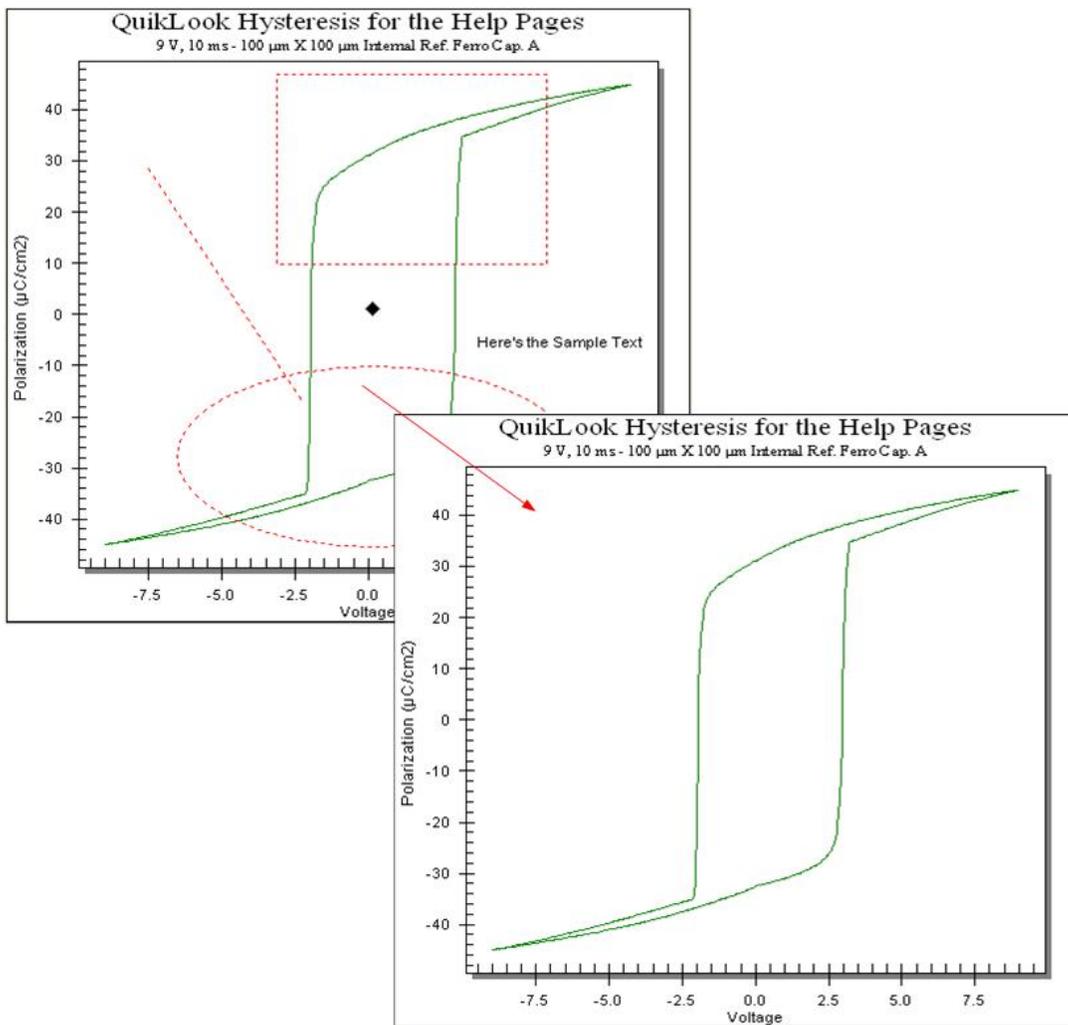


Figure 24 - All Annotations are Cleared.

Exporting

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[sa/2.5/](http://creativecommons.org/licenses/by-nc-sa/2.5/)



QuikLook Export

[Measurement Tasks](#) can have their data or plot exported using plot features available by right-clicking on the plot surface. The exported data include only the measured values. The step-by-step procedures are presented in the previous chapter. All [Tasks](#) have available to them a separate export feature that allows both configuration and measured data values to be stored in a pre-formatted way. Measurement Tasks executed from the QuikLook menu have the export feature available from their "Results" dialog immediately upon collecting and displaying their measured data.

[Exporting Data](#)

[Exporting Data Plots](#)

Exporting can output data to one of five targets:

1. **Printer** - A standard printer setup dialog will appear. Once closed, a formatted data output will be sent to the printer. Note that the printer dialog will not appear until the "Results" dialog is closed. With the release of Version 4.1.x, printing adds the option to print a header only. This provides all configuration information but eliminates the output of data vectors, significantly shortening the printout.
2. **Text File** - Selecting this option enables the *Browse for File Name* button. Clicking this button will open a standard browser dialog in which a file name and path must be selected. If the file already exists, the output will be appended to existing text. Export will occur when the "Results" dialog is closed. Text export is an effective way to move data into data manipulation programs and spreadsheets if Microsoft Excel is not installed on the test system. The output can be imported as text into any such program. It is tab-delimited for simple parsing.
3. **Excel** - Selecting this option enables the *Browse for File Name* button. Clicking the *Browse for File Name* button will open a standard browser dialog in which a file name and path may be selected. The file name need not be specified. When the "Results" dialog is closed, Excel will start and a pre-formatted worksheet will be created. If no file name was specified, the user will be prompted to provide one when Excel is closed. Regardless of where it was specified, if the file name exists, the user will be prompted to overwrite. Data are not appended to existing data in an Excel file. Microsoft Office/Excel 2000 or later must be installed on the Precision tester or USB host computer for this option. Microsoft Office is not provided with the tester or Vision software. Exporting has been updated to include all Office/Excel products version 2000 or later as of Vision 4.1.x. Export will occur when the "Results" dialog is closed.
4. **Word** - Selecting this option enables the *Browse for File Name* button. Clicking the *Browse for File Name* button will open a standard browser dialog in which a file name and path may be selected. The file name need not be specified. When the "Results" dialog is closed, Word will start and a pre-formatted document will be created. If no file name was specified, the user will be prompted to provide one when Word is closed. Regardless of where it was specified, if the file name exists, the user will be prompted to overwrite.

Data are not appended to existing data in a Word file. Microsoft Office/Word 2000 or later must be installed on the Precision tester or USB host computer for this option. Microsoft Office/Word is not provided with the tester or Vision software. Exporting has been updated to include all Office/Word products version 2000 or later as of Vision 4.1.x. Export will occur when the "Results" dialog is closed. With the release of Version 4.1.x, Word export adds the option to output a header only. This provides all configuration information but eliminates the output of data vectors, significantly shortening the document.

5. **Vision Data File** - Measurement Tasks and most Filter Tasks have this option available to them. When this option is selected, the *Browse for File Name* button is enabled. The button must be used to open the windows browser to specify a file path and file name. Both configuration and measured data will be written to a formatted binary file. Subsequent executions of the Task can then be configured to read the data from the file rather than making a measurement. In this way data can be moved from the QuikLook execution into any DataSet through the output file. The utility of Vision Data File Exporting is shown in **Figure**.

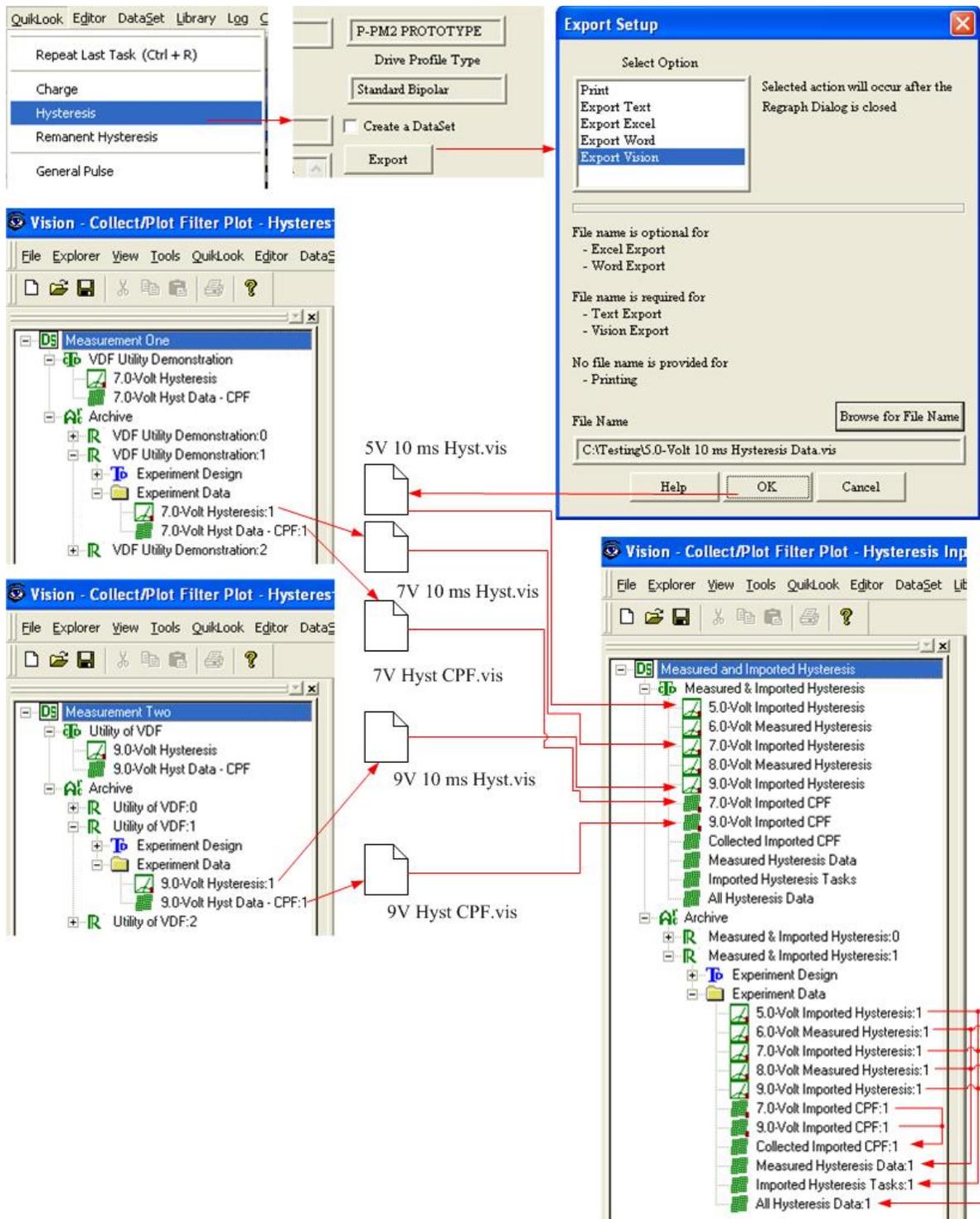


Figure 1 - The Utility of Vision Data File Exporting.

Step 1: To send data to the printer:

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- Make a QuikLook measurement, producing a "Results" dialog.
- Click the *Export* Button.

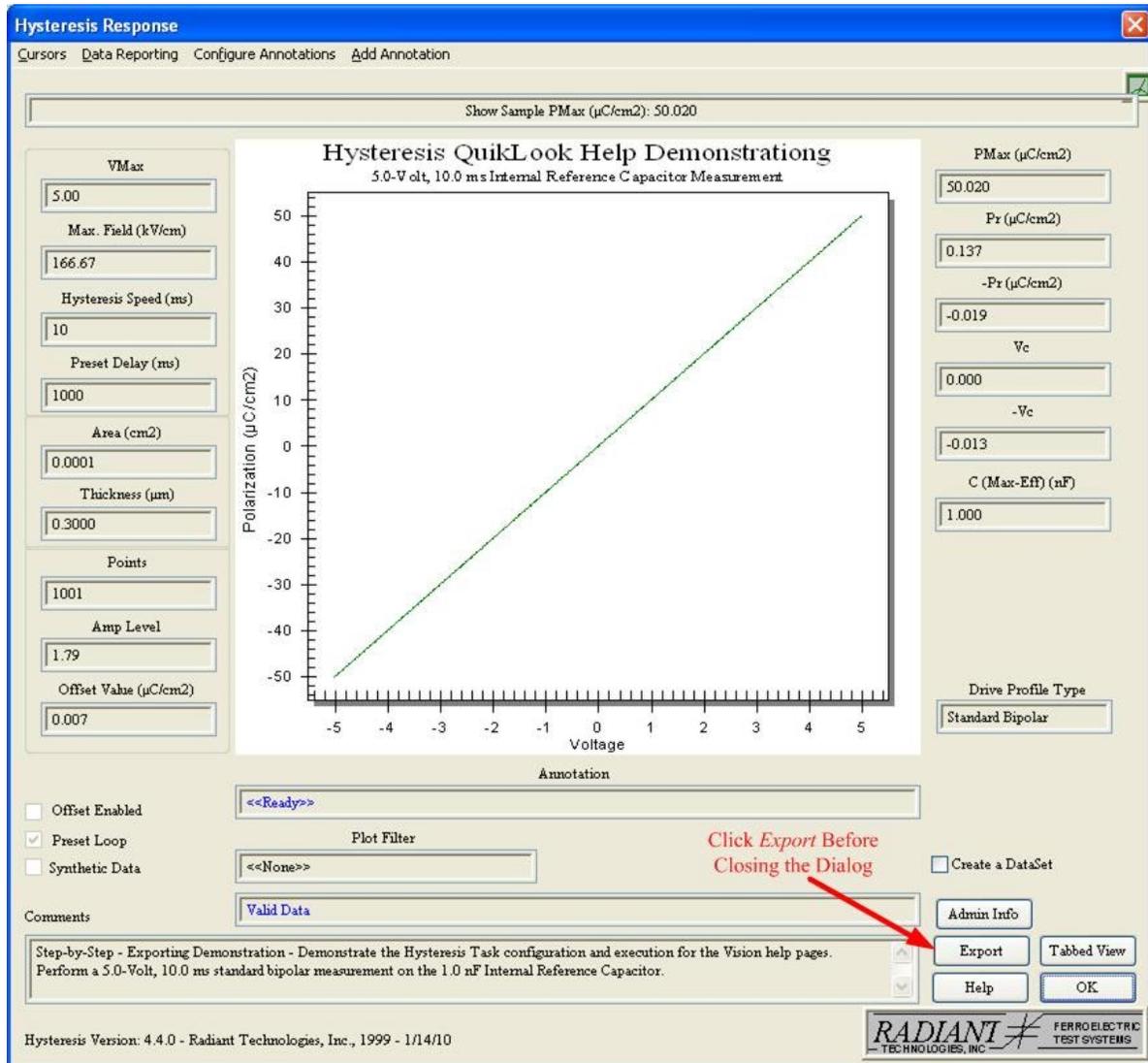


Figure 2 - The Hysteresis QuikLook Results Dialog.

- From the dialog that appears, select "Print" in *Select Option*.



Figure 3 - The Export Dialog. Printing is Configured.

NOTE: Clicking *Cancel* on the Export dialog will abort the Export setup and return to the "Results" dialog. If the *Export* button is clicked again, whether the export was configured or cancelled, reopens the Export dialog. In that case, the export must be reconfigured.

- D. Set *Line Spacing*, *Left Margin* and *Tab Spacing* as appropriate for your printer. (Note, this will involve trial-and-error. However, once set, the values will be persistent.)
- E. Enable or disable *Header Only* as preferred. Note that enabling this control may produce many pages of printed output.
- F. Click OK to close the Export dialog.
- G. Click OK to close the "Results" dialog.
- H. Adjust printer settings in the dialog that appears. Click *OK* to print the document.

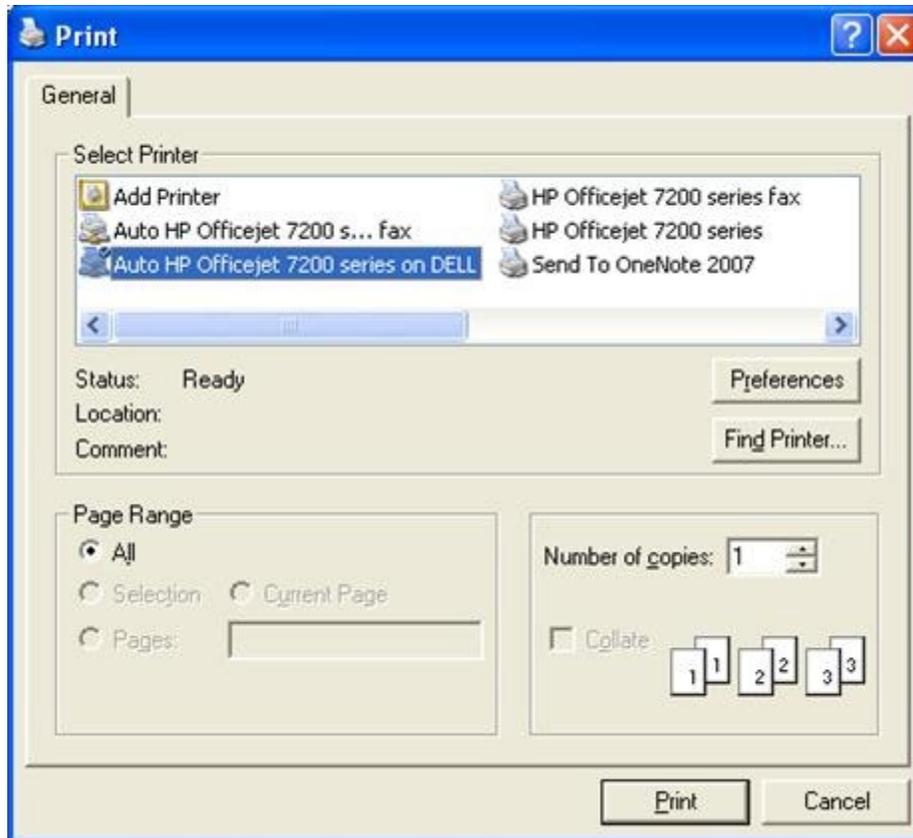


Figure 4 - Standard Windows Printer Dialog. User's Dialog may Vary.

- I. Check your printer for the formatted output.

Step 2: To save to a Text File:

- A. Repeat steps A and B above.



Figure 5 - Export Dialog with Text Selected. Browser is Enabled.

- B. Select "Export Text" in Select Option.
- C. Press *Browse for File Name*.

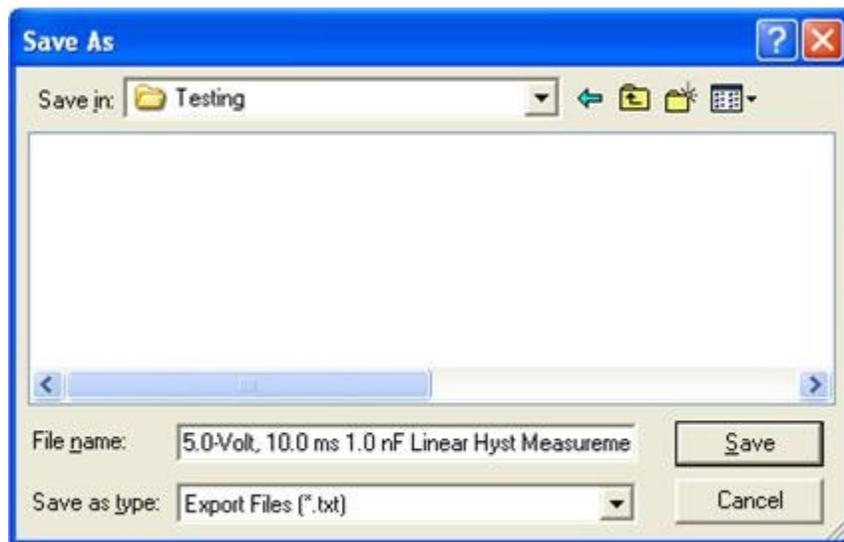


Figure 6 - Standard Windows File Browser.

- D. Browse to the desired directory and enter an appropriate file name. Then click *Save*.

Note that the file name and path must be specified by the browser. The *File Name* control on the export dialog is read-only and is only used to reflect the selected path and file name.

Note that if the text file name exists at the specified path, the formatted output will be appended to the existing text.



Figure 7 - Text Export Dialog with File Name/Path.

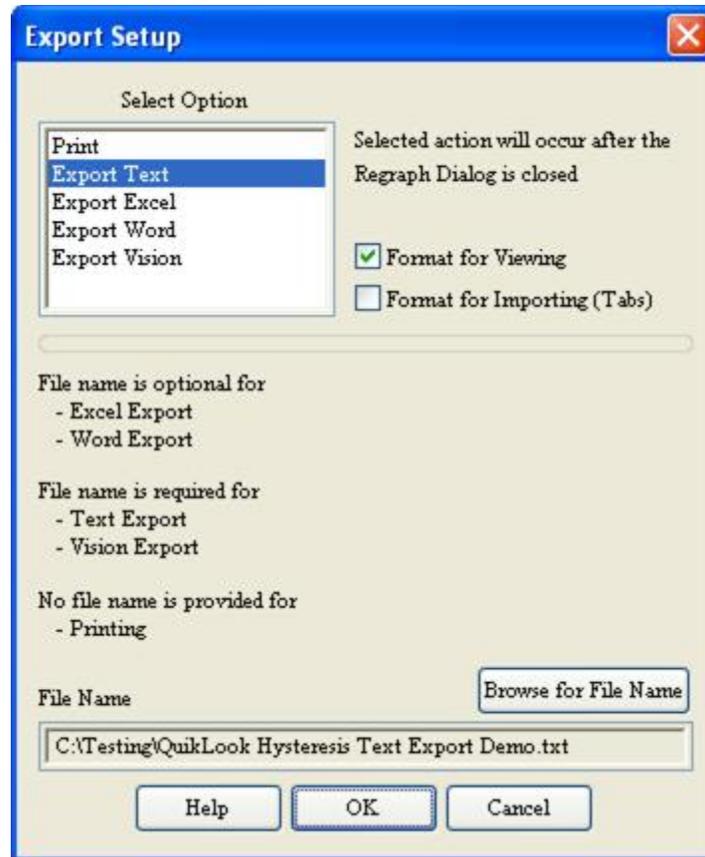


Figure 7b - Measurement and Filter Tasks Add Formatting Selections.

NOTE: Text output is tab-delimited. As of Vision 4.4.0, two text controls - *Format for Viewing* and *Format for Importing (Tabs)* - have been added. These act as radio buttons and are mutually exclusive. The buttons are only shown for Measurement Tasks and Filters that export data. If *Format for Viewing* is checked, the data are written in columns that are nicely presented on the page. Several tabs may be inserted between values written to the page in order to format the data. If *Format for Importing (Tabs)* is selected, only a single tab is permitted between any header or data value. Furthermore, numerical data are not formatted, but presented in full resolution. This presents a less readable page, but is more conducive to importing into Excel or another data analysis program.

- E. Click *OK* on the "Results" dialog to write the file. A partial view of the file is shown in **Figure 8**.

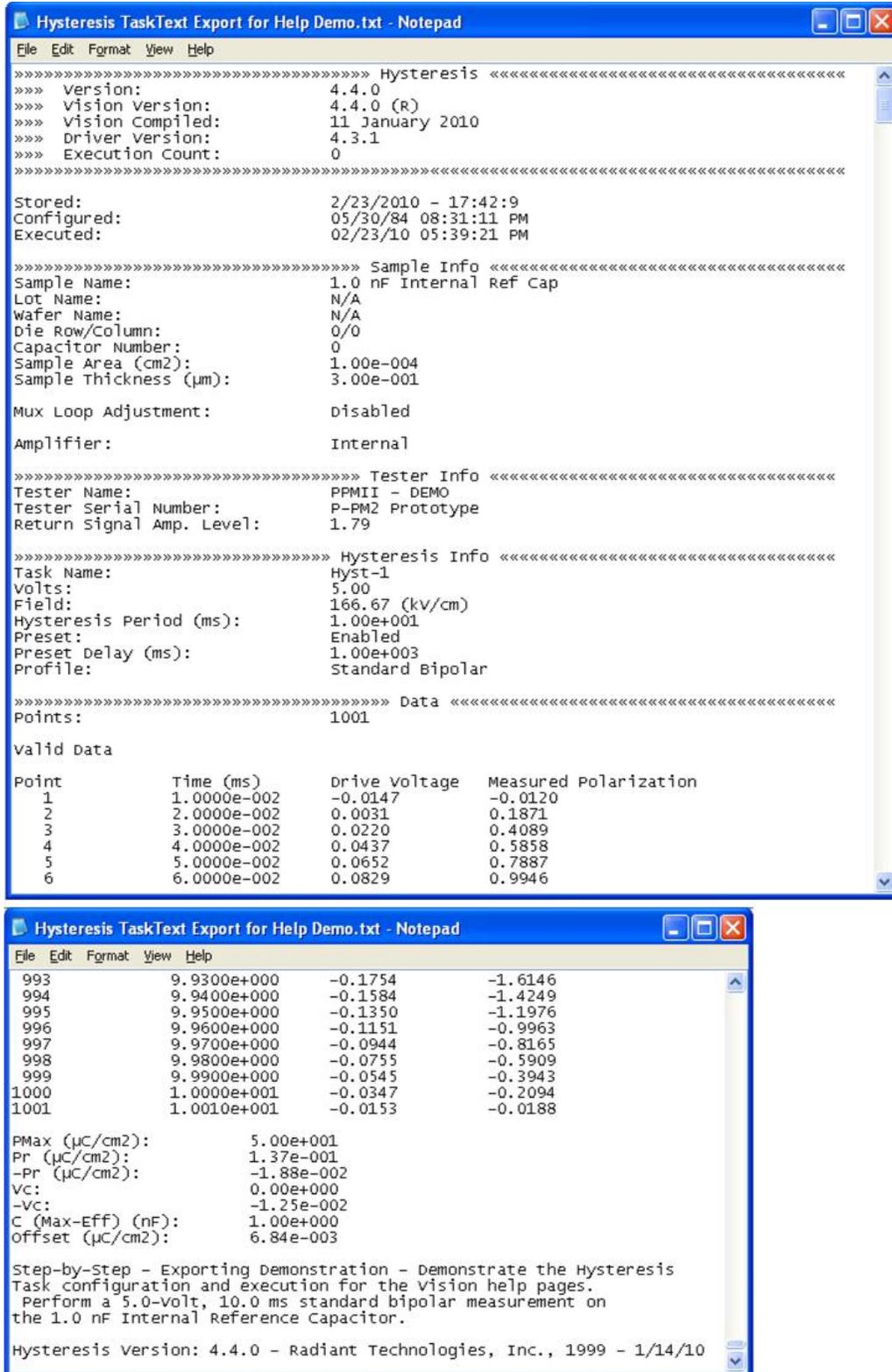


Figure 8 - Partial Sample Text File Export.

Step 3: Save to Excel

To save to an Excel File: **Note that Microsoft Office/Excel 2000 must be installed on the Precision Tester to use this utility. Microsoft Office is not provided with the Precision Tester.**

A. Repeat steps A and B in Print Export instructions above.

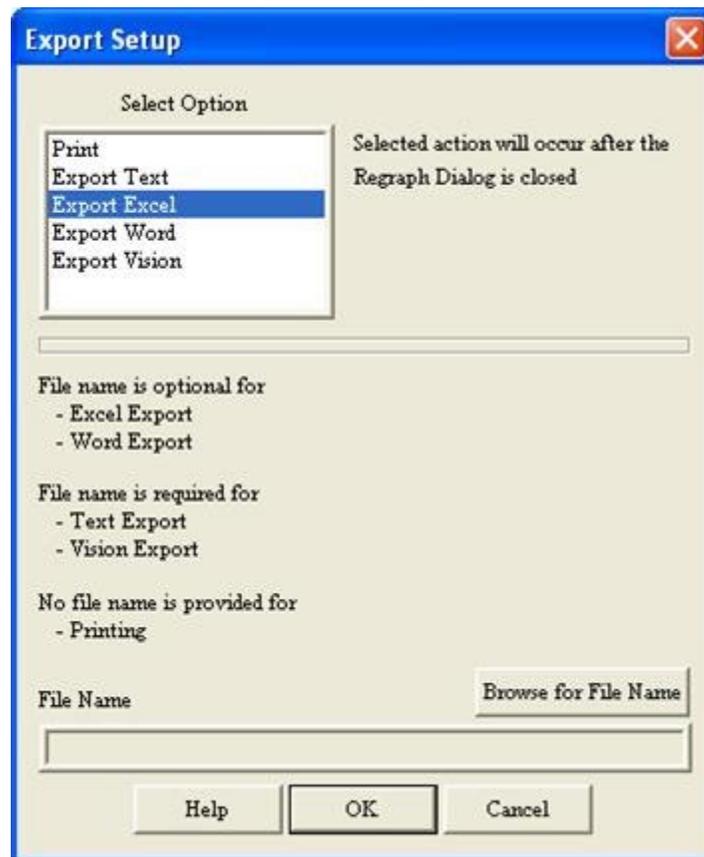


Figure 9 - Export Dialog with Excel Selected. Browser is Enabled.

- B. Select "Export Excel" in Select Option.
C. Press Browse for *File Name*.

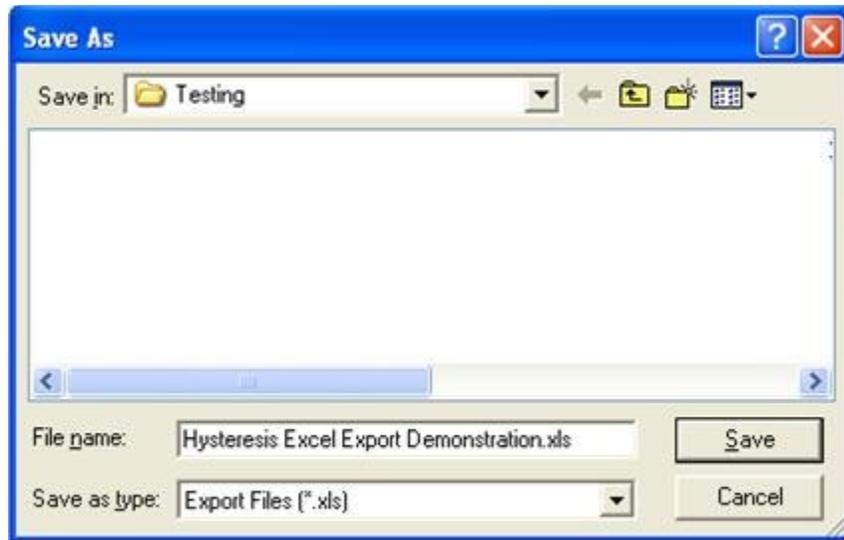


Figure 10 - Standard Windows File Browser. Specify Excel File Name.

D. Browse *to* the desired directory and enter an appropriate file name. Then click *Save*.

Note that the file name and path must be specified by the browser. The *File Name* control on the export dialog is read-only and is only used to reflect the selected path and file name.

Note that specifying a file name (steps C and D) is optional since the Excel program will be started and the data written to the spreadsheet. However, if no file name is selected Excel will prompt for one when the spreadsheet is closed.

Note that if the Excel file name already exists at the specified path Excel will prompt to overwrite when the spreadsheet is closed.

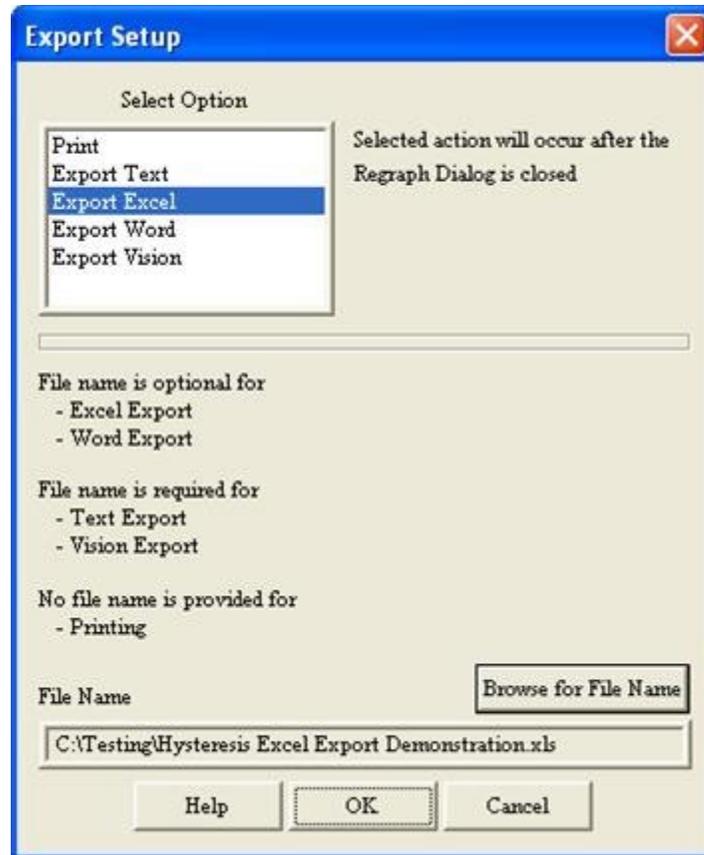


Figure 11 - Export Dialog with Complete Excel Export Configured.

- E. Click *OK* on the "Results" dialog. The Excel program is started and the formatted output is written to the spreadsheet. A partial sample of the spreadsheet is shown in the Figure below.

Note that once Excel is open, writing the output to the spreadsheet may takes several second, depending on the amount of data to be written. The final step in configuring the spreadsheet is to adjust the size of the columns to fit the data. When the columns are resized the process is done.

Note that after the point-by-point data are written the extracted values P_{Max} , $\pm P_r$, $\pm V_c$ and Offset are written at the bottom of the spreadsheet, along with the Comments. See the lower portion of the Figure below.

	A	B	C	D
1	Hysteresis			
2	Version	4.4.0		
3	Vision Version	4.4.0 (R)		
4	Vision Compiled	11-Jan-10		
5	Driver Version	4.3.1		
6	Execution Count	0		
7	Excel Date	2/23/2010 - 17:46:49		
8	Configuration Date	6/3/1984 20:34		
9	Execution Date	2/23/2010 17:45		
10				
11	Sample Info.			
12	Sample Name	1.0 nF Internal Ref Cap		
13	Lot Name	N/A		
14	Wafer Name	N/A		
15	Die Row/Column	0/0		
16	Capacitor ID	0		
17	Area (cm ²)	0.0001		
18	Thickness (µm)	0.3		
19				
20	Mux Adjust	Disabled		
21				
22	Amplifier	Internal		
23				
24	Tester Info			
25	Tester Name	PPMII - DEMO		
26	Tester Serial Number	P-PM2 Prototype		
27	Return Signal Amp. Level	1.79		
28				
29	Hysteresis Info			
30	Task Name	Hyst-1		
31	Volts	5		
32	Field (kV/cm)	166.6666667		
33	Hysteresis Period (ms)	10		
34	Preset Enabled			
35	Preset Delay (ms)	1000		
36	Profile	Standard Bipolar		
37				
38	Data	Valid Data		
39	<i>Point</i>	<i>Time (ms)</i>	<i>Drive Voltage</i>	<i>Measured Polarization (µC/cm²)</i>
40	1	0.01	-0.016860962	-0.001708984
41	2	0.02	0.003433228	0.194824219
42	3	0.03	0.023422241	0.403747559
1036	997	9.97	-0.095672607	-0.792541504
1037	998	9.98	-0.077514648	-0.600708008
1038	999	9.99	-0.056304932	-0.394348145
1039	1000	10	-0.037765503	-0.177734375
1040	1001	10.01	-0.01739502	0.00982666
1041				
1042	P _{Max} (µC/cm ²)	50.01257324		
1043	P _r (µC/cm ²)	0.170227503		
1044	-P _r (µC/cm ²)	0.00982666		
1045	V _c	-0.018462266		
1046	-V _c	-0.017351792		
1047	C _{Max-eff} (nF)	1.000251465		
1048	Offset (µC/cm ²)	-0.005126953		
1049				
1050	Step-by-Step - Exporting Demonstration - Demonstrate the Hysteresis			
1051	Task configuration and execution for the Vision help pages.			
1052	Perform a 5.0-Volt, 10.0 ms standard bipolar measurement on			
1053	the 1.0 nF Internal Reference Capacitor.			
1054				
1055	Hysteresis Version: 4.4.0 - Radiant Technologies, Inc., 1999 - 1/14/10			
1056				

Figure 12 - Sample Exported Excel File.

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Step 4: Save to Word

To save to a Microsoft Word File: **Note that Microsoft Office/Word 2000 must be installed on the Precision Tester to use this utility. Microsoft Office is not provided with the Precision Tester.**

A. Repeat steps A and B in Print Export instructions above.



Figure 13 - Export Dialog with Word Selected. Browser is Enabled.

- B. Select "Export Word" in Select Option.
- C. Enable or disable Header Only. Note that if enabled the Word document will be much larger for Tasks such as Hysteresis and Piezo that acquire large vectors of data. Note that only Tasks that exported measured data show this control.
- D. Press Browse for *File Name*



Figure 14 - Standard Windows File Browser. Specify Word File Name.

- E. Browse to the desired directory and enter an appropriate file name. Then click *Save*.

Note that the file name and path must be specified by the browser. The *File Name* control on the export dialog is read-only and is only used to reflect the selected path and file name.

Note that specifying a file name (steps C and D) is optional since the Word program will be started and the data written to the spreadsheet. However, if no file name is selected Word will prompt for one when the spreadsheet is closed.

Note that if the Word file name already exists at the specified path Word will prompt to overwrite when the spreadsheet is closed.

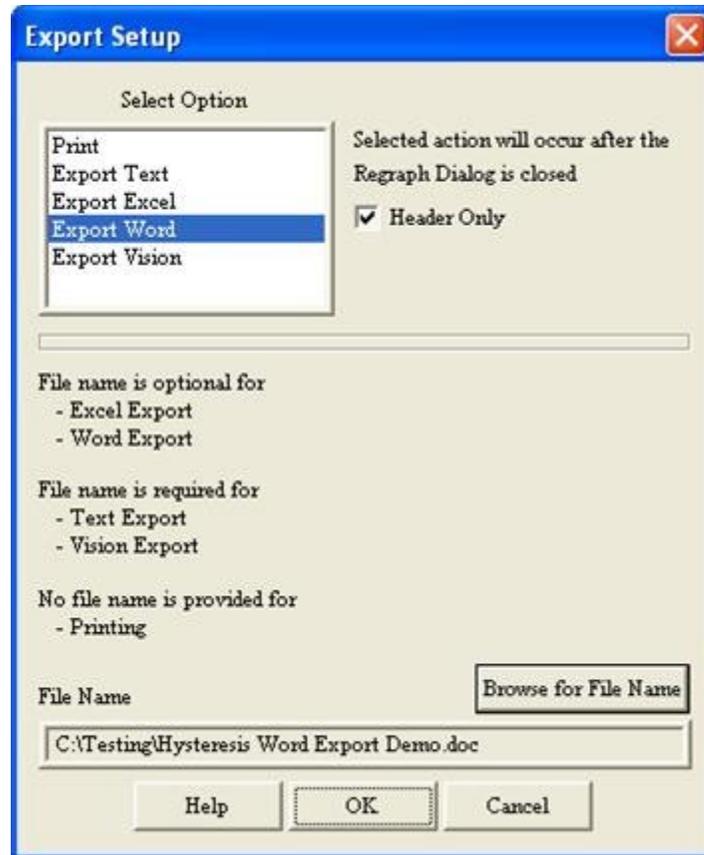


Figure 15 - Export Dialog with Complete Word Export Configured.

- F. Click *OK* on the "Results" dialog. The Word program is started and the formatted output is written to the spreadsheet. A header-only sample of the Word document is shown in **Figure 16**.

Step 5: Save to a Vision data file:

- A. Repeat steps A and B in Print Export instructions above.
- B. Select "Export Vision" in *Select Option*.



Figure 17 - Vision Data File Export Configuration.

- C. Click *Browse For File Name*. Browse to an appropriate folder and assign a file name. This step is required.

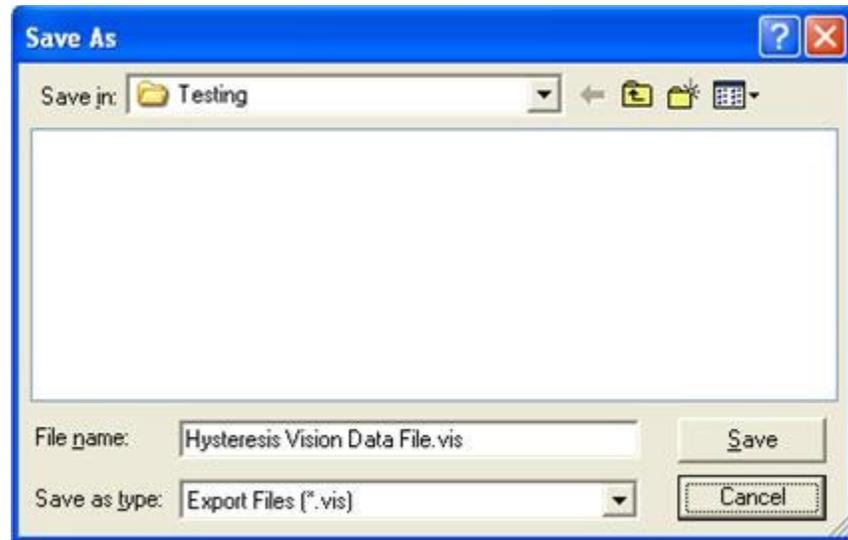


Figure 18 - Browse to Vision Data File.

- D. The Export dialog will be updated by displaying the file path and file name in *File Name*.

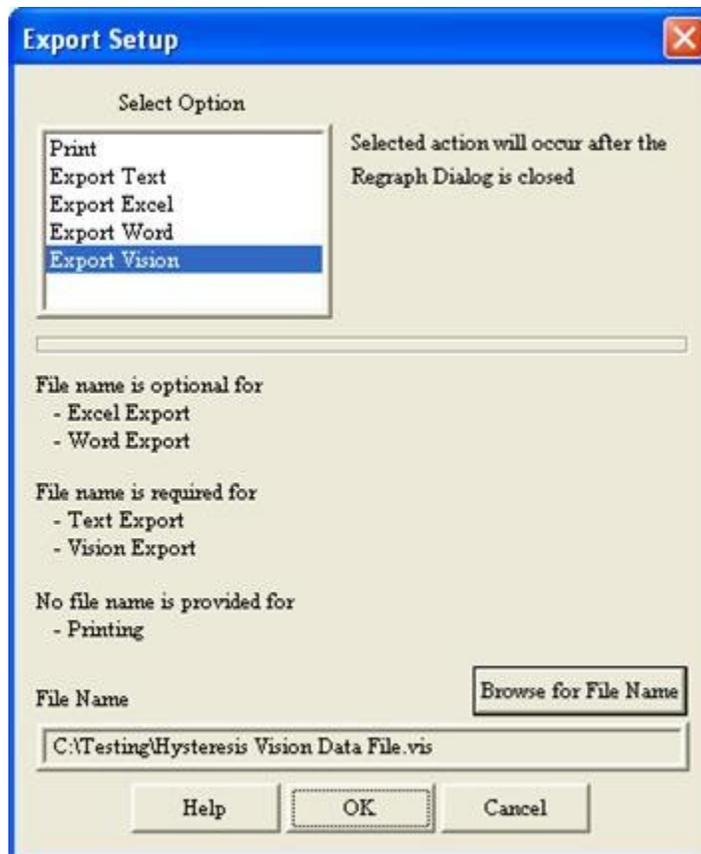


Figure 19 - Export Configuration with File Path and Name.

- E. Click *OK* to close the dialog
- F. Click *OK* to output the file.
- G. To demonstrate the utility of the file, recall the Hysteresis Task in the QuikLook menu. **Note that although this example is run from QuikLook and that functionality is available, this form of exporting is most useful when it is used to pass measured data into a DataSet by programming the Task to import the data within a DataSet.**
- H. Check *Read Data from Vision File* .

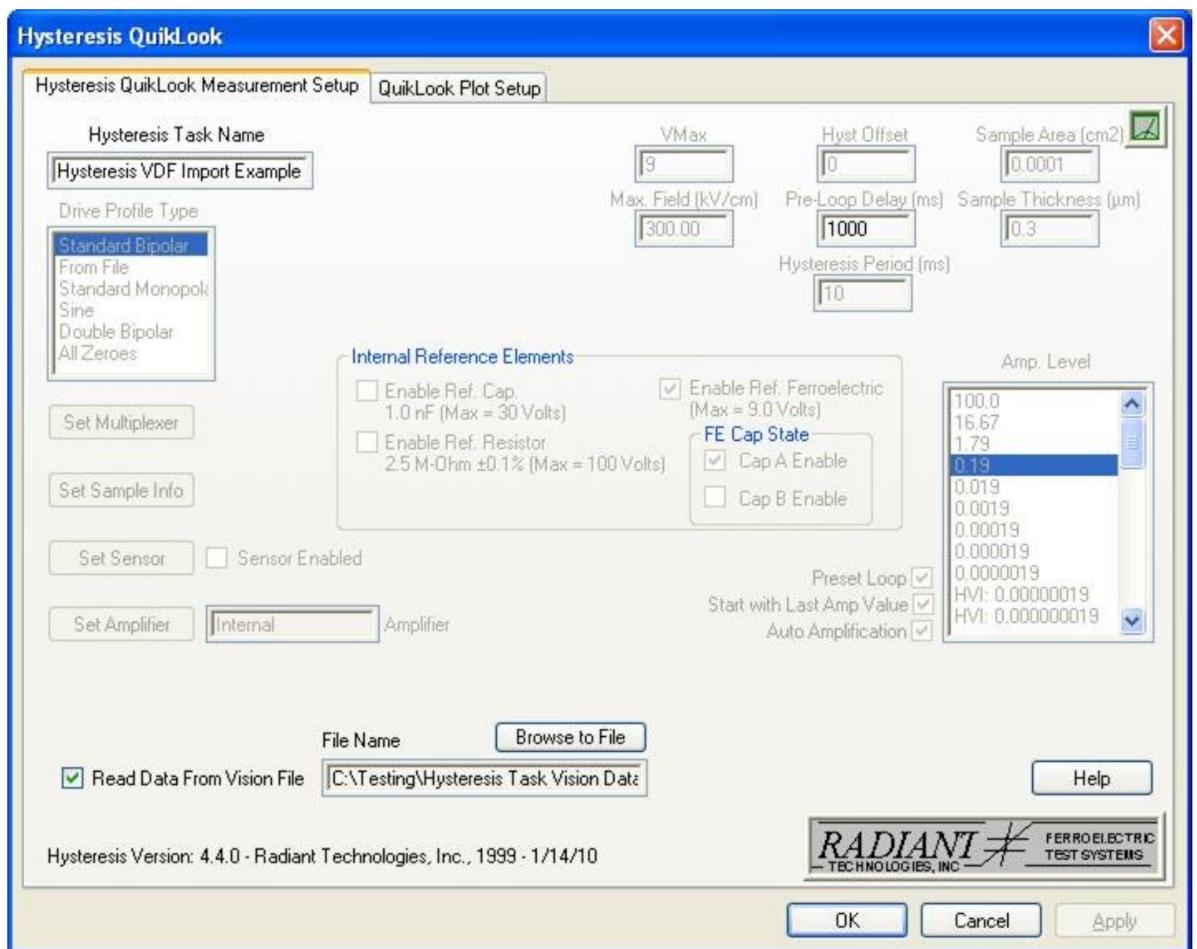


Figure 20 - Configure Hysteresis to Recall the Vision Data File Data.

- I. Most controls will be disabled. *File Name* and *Browse to File* will be enabled. Click

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Browse to File to open the standard Windows browser. Browse to the file written above. ("Testing\Hysteresis Vision Data Export for Help" in this example).

- J. Click *OK* in the main configuration dialog. The Hysteresis data will appear as read from the file. Configuration information will be as set for the execution that produced the file.

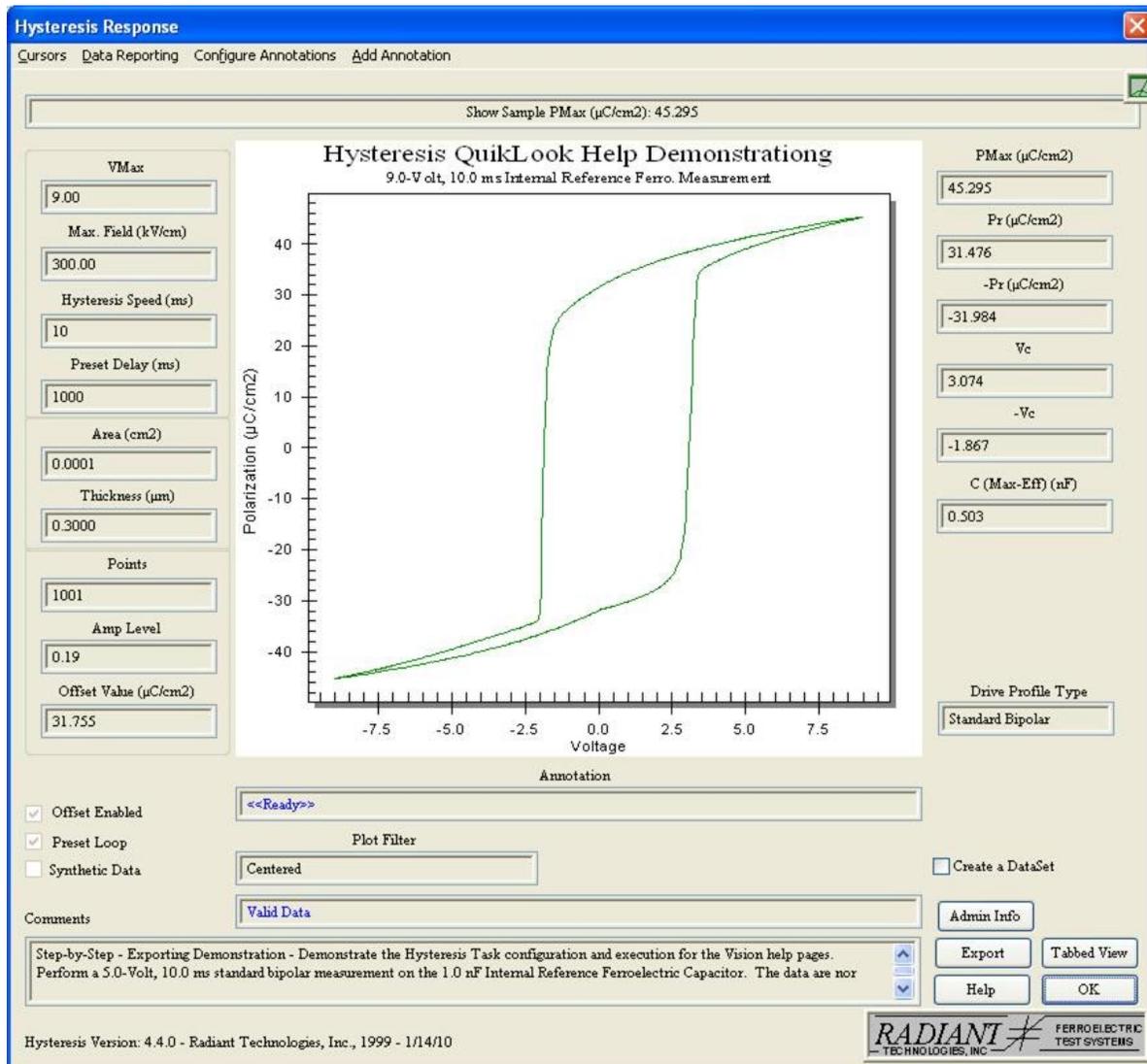


Figure 21 - Hysteresis Data Recalled from a Vision Data File.

Archive Regraph Export

[Measurement Tasks](#) can have their data or plot exported using plot features available by right-clicking on the plot surface. The exported data include only the measured values as explained in [Exporting Data](#). All [Tasks](#) have available to them a separate export feature that allows both configuration and measured data values to be stored in a pre-formatted way. All Tasks that are recalled from the [DataSet Archive \(Archive Regraph\)](#) have the export function immediately available to them. The process is very similar to [QuikLook](#) exporting. During an Archive Regraph operation, the configuration dialog first appears. For Measurement Tasks that appear in the QuikLook menu, this dialog is followed by the "Results" dialog. That dialog contains the *Export* button from which the export operation is configured. For other Tasks, the *Export* button is located on the configuration dialog and the button is enabled. In any case, the export operation will not occur until all Regraph/Configuration dialogs are closed. Note that the examples below use the Hysteresis Task. Minor alterations and experimentation will enable the export function for any Task.

Exporting can output data to one of eight targets:

1. **Printer** - A standard printer setup dialog will appear. Once closed, a formatted data output will be sent to the printer. Note that the printer dialog will not appear until the "Results" dialog is closed. The user has the option to print a header only, eliminating paper output of columns of numeric data. This provides all configuration information but eliminates the output of data vectors, significantly shortening the printout. Header-Only is default. The user also sets vertical line spacing, horizontal left-margin spacing and horizontal tab spacing. Trial-and-error will establish the proper values for each of these parameters.

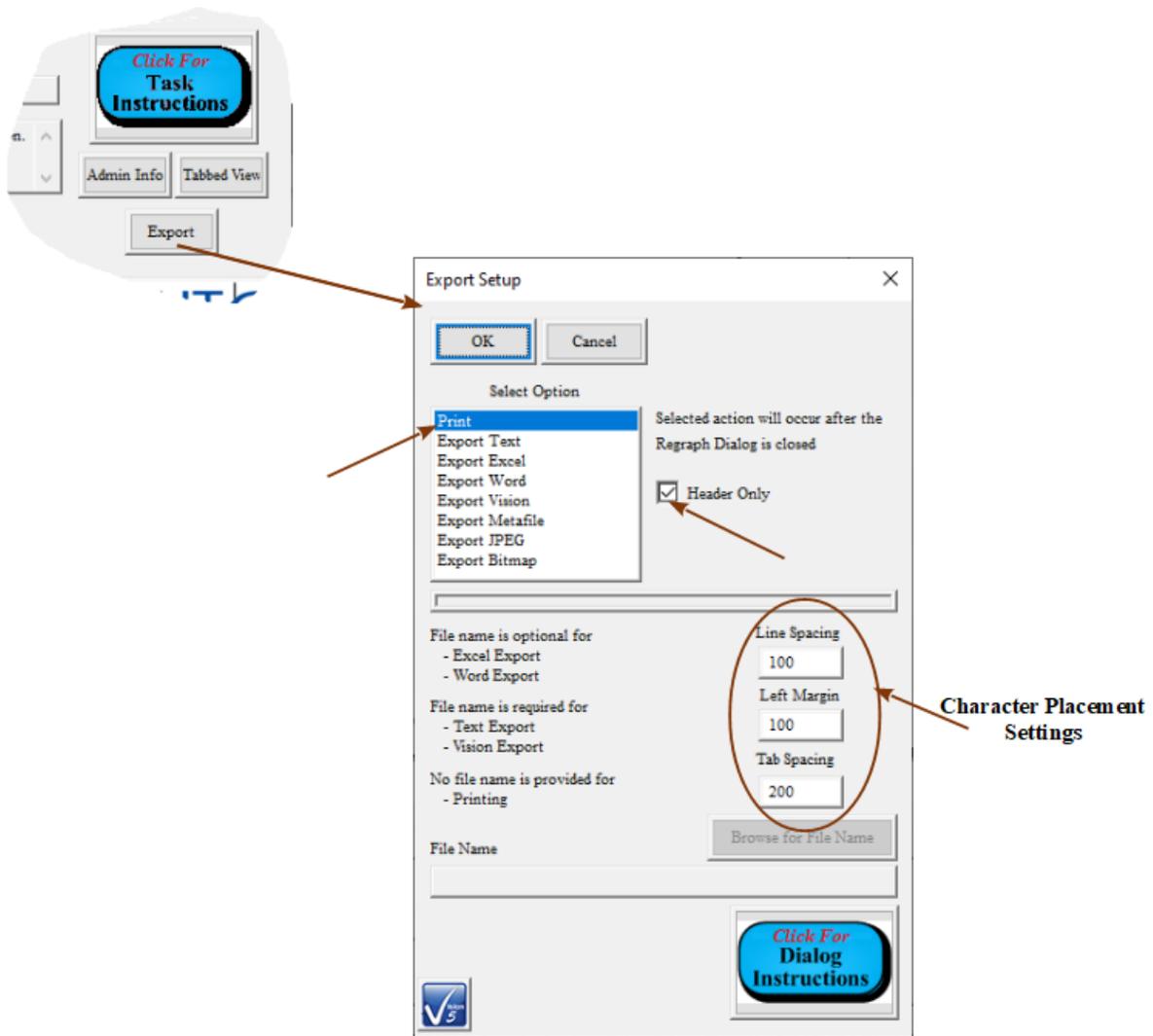


Figure 1 - Printer Export Configuration.

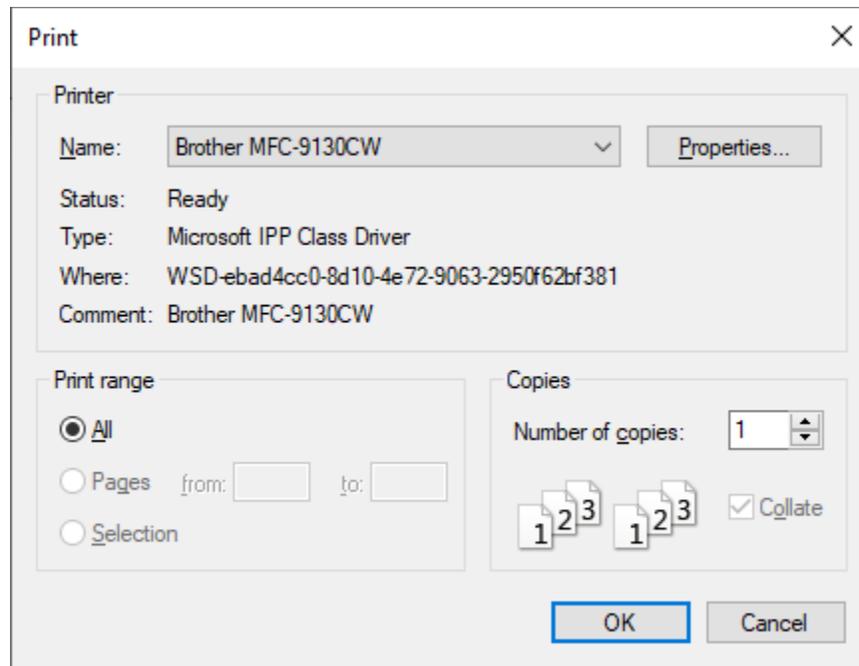


Figure 2 - Target Printer Dialog.

2. **Text File** - Selecting this option enables the *Browse for File Name* button. Clicking this button will open a standard browser dialog in which a file name and path must be selected. If the file already exists, the output will be appended to existing text. Export will occur when the "Results" dialog is closed. Text export is an effective way to move data into data manipulation programs and spreadsheets if Microsoft Excel is not installed on the test system. The output can be imported as text into any such program. The user may select the text delimiter to separate data - tab, double-tab, comma, etc.

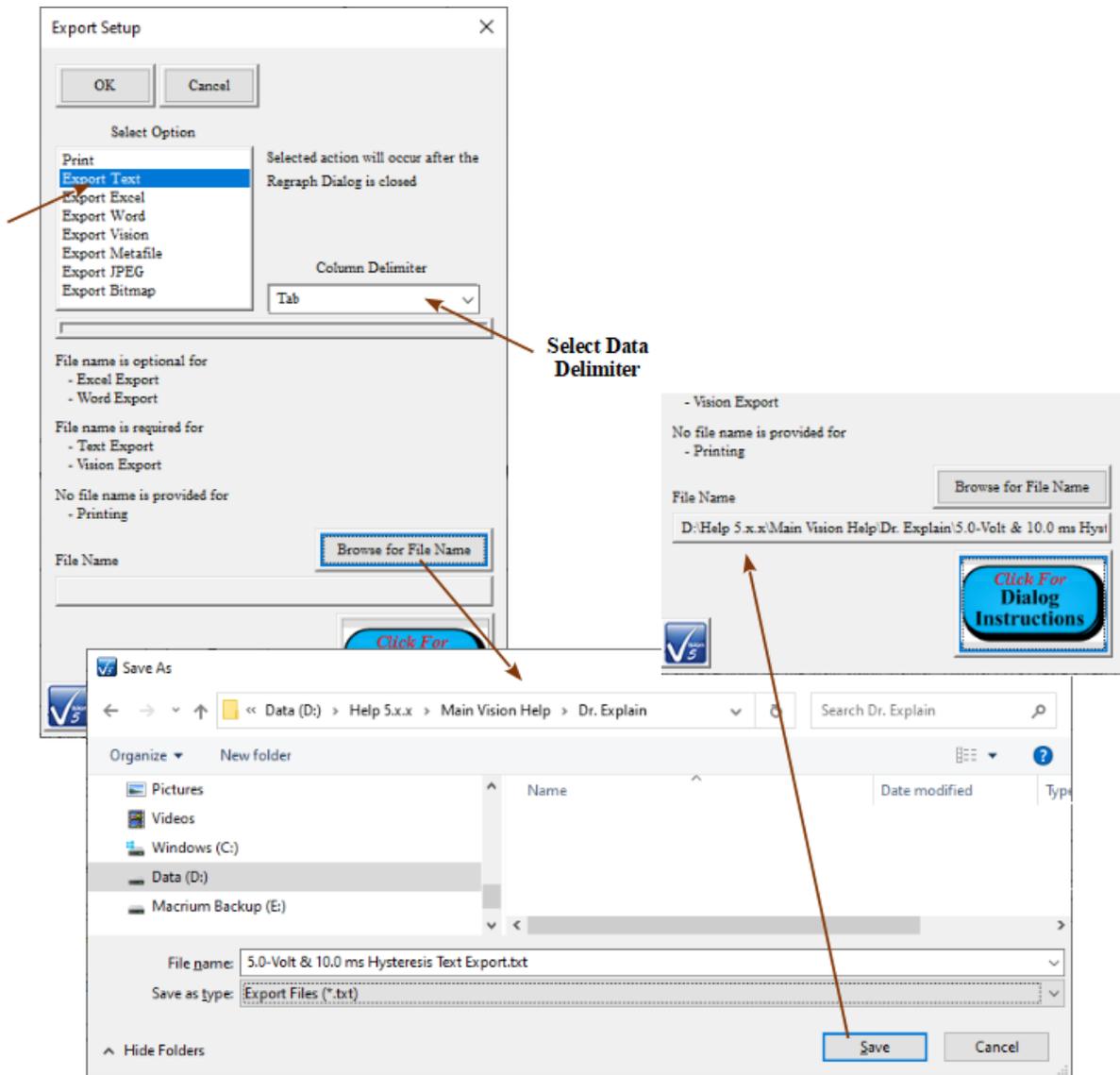


Figure 3 - Configure Text Export.

3. **Excel** - Selecting this option enables the *Browse for File Name* button. Clicking the *Browse for File Name* button will open a standard browser dialog in which a file name and path may be selected. Specifying the file name is optional. When the "Results" dialog is closed, Excel will start and a pre-formatted worksheet will be created. If no file name was specified, the user will be prompted to provide one when Excel is closed. If the specified file name exists, the user will be prompted to overwrite. Data are not appended to existing data in an Excel file. Microsoft Office/Excel 2000 or later must be installed on the Vision host computer to operate this option. Microsoft Office/Excel is not provided with the tester or Vision software. Export will occur when the "Results" (Measurement Tasks) or Configuration (non-Measurement Tasks) dialog is closed.

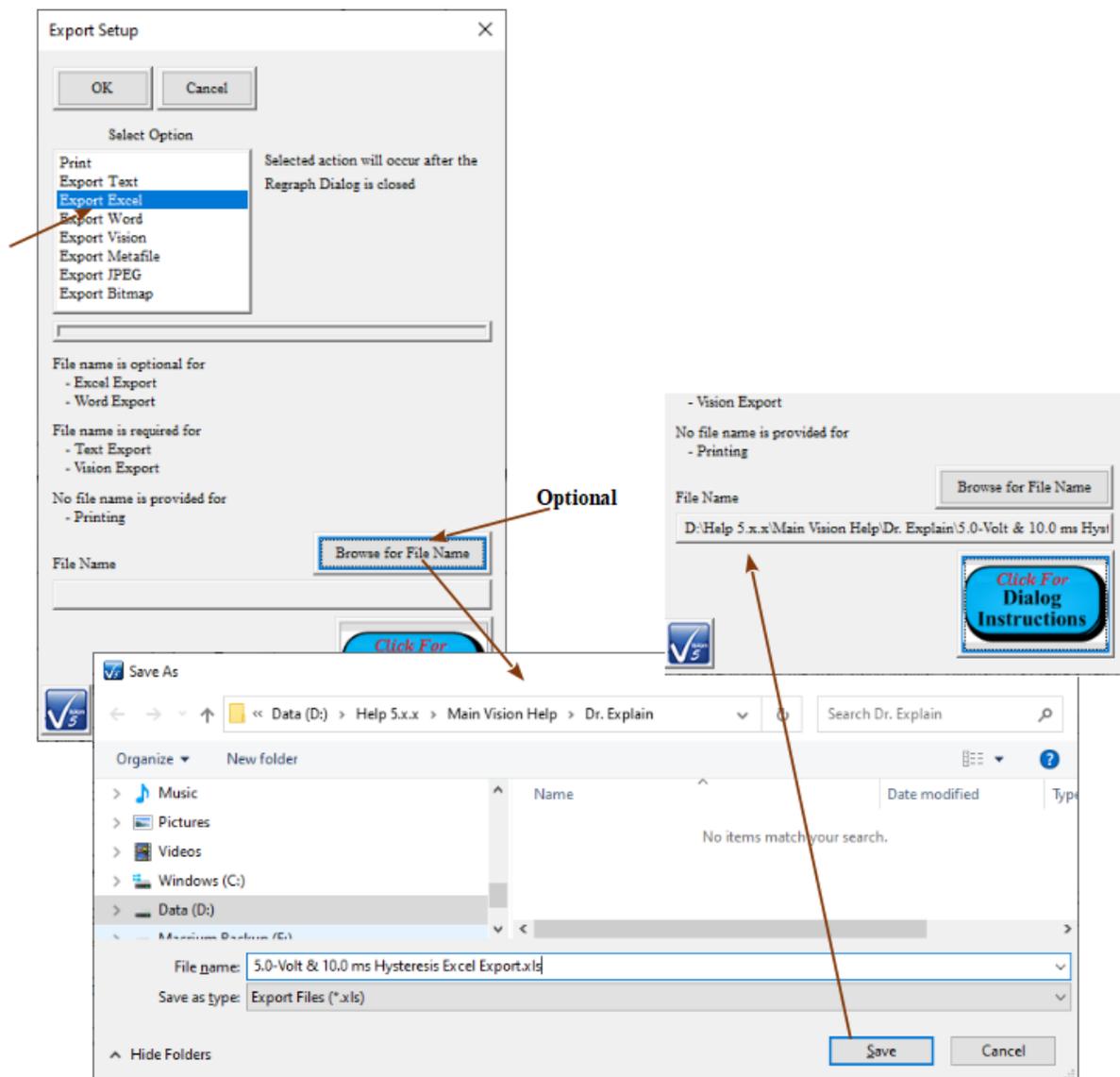


Figure 5 - Setup Hysteresis Excel Export.

A	B	C	D	E	F	G
Hysteresis						
Executed Version	5.27.1					
Vision Version	5.27.2 (D)					
Vision Compiled	7/20/2020					
Driver Version	No Driver Present					
Windows Version	Windows 8, 8.1 or 10					
Processor Information	x86 (AMD or Intel) - 8 Processors					
Tester Name	No Tester Present					
Tester S/N	No Tester Present					
Internal Amp Type	200V RevH 100K					
Internal Amp Serial	iAB2-431/H					
Execution Count	1					
Excel Date	8/14/2020 - 11:24:14					
Configuration Date	7/28/2020 11:31					
Execution Date	7/28/2020 11:49					
Sample Info.						
Sample Name	Int. Ref. Ferroelectric					
Lot Name	N/A					
Wafer Name	N/A					
Die Row/Column	0/0					
Capacitor ID	0					
Area (cm ²)	0.0001					
Thickness (µm)	0.3					
Amplifier	Internal					
Tester Info						
Tester Name	No Tester Present					
Tester Serial Number	No Tester Present					
Return Signal Amp. Level [Index]	0.19 [3]					
Hysteresis Info						
Task Name	5.0-Volt/10.0 ms Hysteresis - 1.0 nF Int. Ref. Cap.					
Max. Volts	5					
Max. Field (kV/cm)	166.666667					
Hysteresis Period (ms)	10					
Preset Enabled						
Preset Delay (ms)	1000					
Profile	Standard Bipolar					
Data						
Point	Time (ms)	Drive Voltage	Measured Polarization (µC/cm ²)	Capacitance (µF)	Normalized Capacitance (µF/cm ²)	Dielectric Constant
1	0.005	-0.002746582	-26.97637794	7.986641932	7.986641932	2.708738432
2	0.01	0.006484985	-26.89656027	7.986641932	7.986641932	2.708738432
3	0.015	0.017166138	-26.90055115	-0.399332097	-0.399332097	-0.135436922
4	0.02	0.027084351	-26.90853292	-0.798664193	-0.798664193	-0.270873843
5	0.025	0.037231445	-26.90853292	0	0	0
6	0.03	0.046768188	-26.9125238	-0.399332097	-0.399332097	-0.135436922
● ● ●						
1999	9.995	-0.023040771	-27.07215915	-3.59398887	-3.59398887	-1.218932294
2000	10	-0.011901855	-27.02825943	4.392653063	4.392653063	1.489806138
2001	10.005	-0.002746582	-27.02825943	4.392653063	4.392653063	1.489806138
Center data before PMax, ±Pr and ±Vc Calc.						
P _{Max} (µC/cm ²)	35.19759823					
P _r (µC/cm ²)	23.19235511					
-P _r (µC/cm ²)	-27.02825943					
V _c	2.900848979					
-V _c	-1.247685052					
C _{Max} (nF)	0.70536269					
K _{FB}	2392.298344					
Offset (µC/cm ²)	26.94844176					
Vert. (±P _r) Shift (µC/cm ²)	-1.917952161					
Horiz. Shift (±V _c)	0.826581964					
A (Loop Area - µC/cm ² -Volts)	219.2627637					
2061 Demonstrate the Hysteresis Task configuration and execution						
2062 for the Main Vision Manual::Tutorial I.H - Create a Test Definition.						
2063 Do a 5.0-Volt/10.0 ms standard bipolar measurement on the 4/20/80						
2064 PNZT Internal Reference Ferroelectric A Capacitor.						
2065						
2066 Hysteresis Version: 5.27.1 - Radiant Technologies, Inc., 1999 - 7/20/20						

Figure 6 - Hysteresis Excel Output.

4. **Word** - Selecting this option enables the *Browse for File Name* button. Clicking the *Browse for File Name* button will open a standard browser dialog in which a file name and path may be selected. The file name need not be specified. When the "Results" or configuration dialog is closed, Word will start and a pre-formatted document will be created. If no file name was specified, the user will be prompted to provide one when Word



is closed. If the file name exists for the specified file, the user will be prompted to overwrite. Data are not appended to existing data in a Word file. A *Header Only* option is provided and checked by default for Tasks that collect data in lengthy vectors. This causes the Task to output only configuration and single-point derived parameters. With Header Only checked, pages of numeric columns are not output. Microsoft Office/Word 2000 or later must be installed on the Vision host computer for this option. Microsoft Office/Word is not provided with the tester or Vision software.

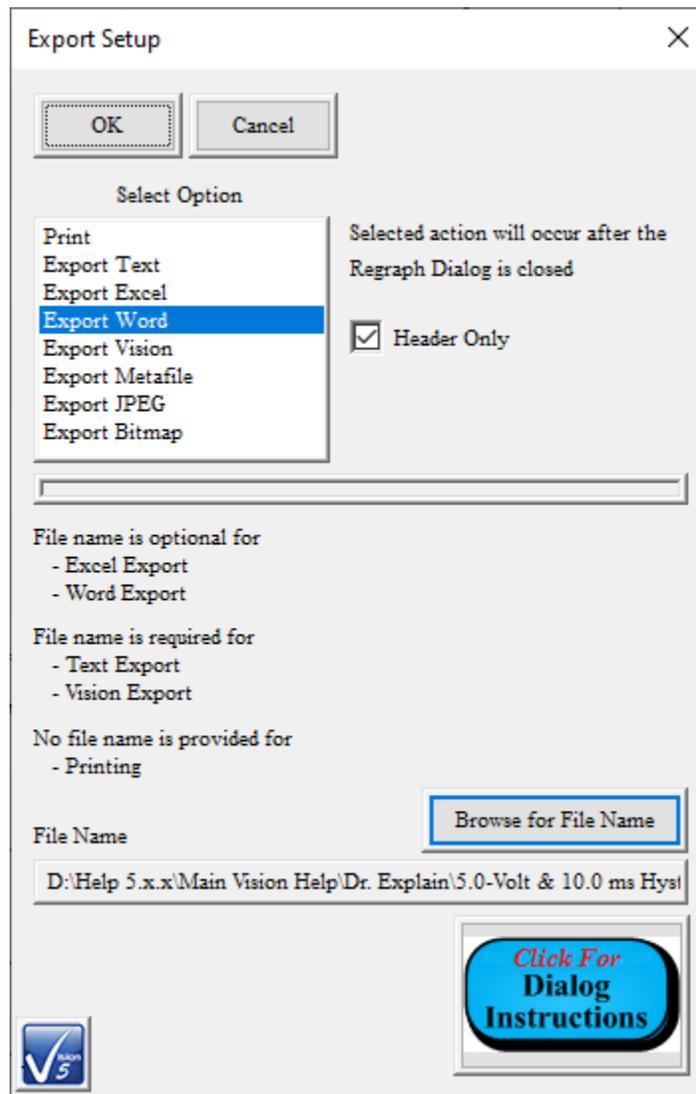


Figure 7 - Hysteresis Word Export Configuration.

```

===== Hysteresis =====
>>> Executed Version: 5.27.1
>>> Vision Version: 5.27.2 (D)
>>> Vision Compiled: 7/20/20
>>> Driver Version: No Driver Present
>>> Windows Version: Windows 8, 8.1 or 10
>>> Processor Information: x86 (AMD or Intel) - 8 Processors
>>> Tester Name: No Tester Present
>>> Tester S/N: No Tester Present
>>> Internal Amp Type: 200V RevH100K
>>> Internal Amp Serial: iA82-431/H
>>> Execution Count: 1
=====
Exported: 8/14/2020 - 11:52:38
Configured: 07/28/20 11:31:52 AM
Executed: 07/28/20 11:49:43 AM

===== Sample Info =====
Sample Name: Int. Ref. Ferroelectric
Lot Name: N/A
Wafer Name: N/A
Die Row/Column: 0/0
Capacitor Number: 0
Sample Area (cm²): 1.00e-04
Sample Thickness (µm): 3.00e-01

Amplifier: Internal

===== Tester Info =====
Tester Name: No Tester Present
Tester Serial Number: No Tester Present
Return Signal Amp. Level: 0.19 [Index: 3]

===== Hysteresis Info =====
Task Name: 5.0-Volt/10.0 ms Hysteresis - 1.0 nF Int. Ref. Cap.
Volts: 5.00
Field: 166.67 (kV/cm)
Hysteresis Period (ms): 1.00e+01
Preset: Enabled
Preset Delay (ms): 1.00e+03
Profile: Standard Bipolar

===== Data =====
Points: 2001

Valid Data
|
Header Info Only - No Point-by-Point Data Written

Center data before PMax, ±Pr and ±Vc Calc.

PMax (µC/cm²): 35.20
P (µC/cm²): 23.19
-P (µC/cm²): -27.03
Vc: 2.90
-Vc: -1.25
CMax (nF): 0.71
Kint: 2392.30
Offset (µC/cm²): 26.95
Vertical (±Pr) Shift (µC/cm²): -1.92
Horizontal Shift (±Vc): 0.83

A (Loop Area - µC/cm²): 219.26-Volts

Demonstrate the HysteresisTask configuration and execution for the Main Vision Manual:Tutorial I.H -
Create a Test Definition. Do a 5.0-Volt/10.0 ms standard bipolar measurement on the 4/20/80 PNZT
Internal Reference Ferroelectric Capacitor.

Hysteresis Version: 5.27.1 - Radiant Technologies, Inc., 1999 - 7/20/20

```

Figure 8 - Hysteresis Word Export - Header Only.

- Vision Data File** - Measurement Tasks and Most Filter Tasks have this option available to them. When this option is selected, the *Browse for File Name* button is enabled. The button must be used to open the windows browser to specify an file path and file name. Both configuration and measured data will be written to a formatted binary file. Subsequent executions of the Task can then be configured to read the data from the file rather than making a measurement. In this way data can be moved from the QuikLook execution into any DataSet through the output file. The Utility of Vision Data File Exporting is shown in **Figure 1**.

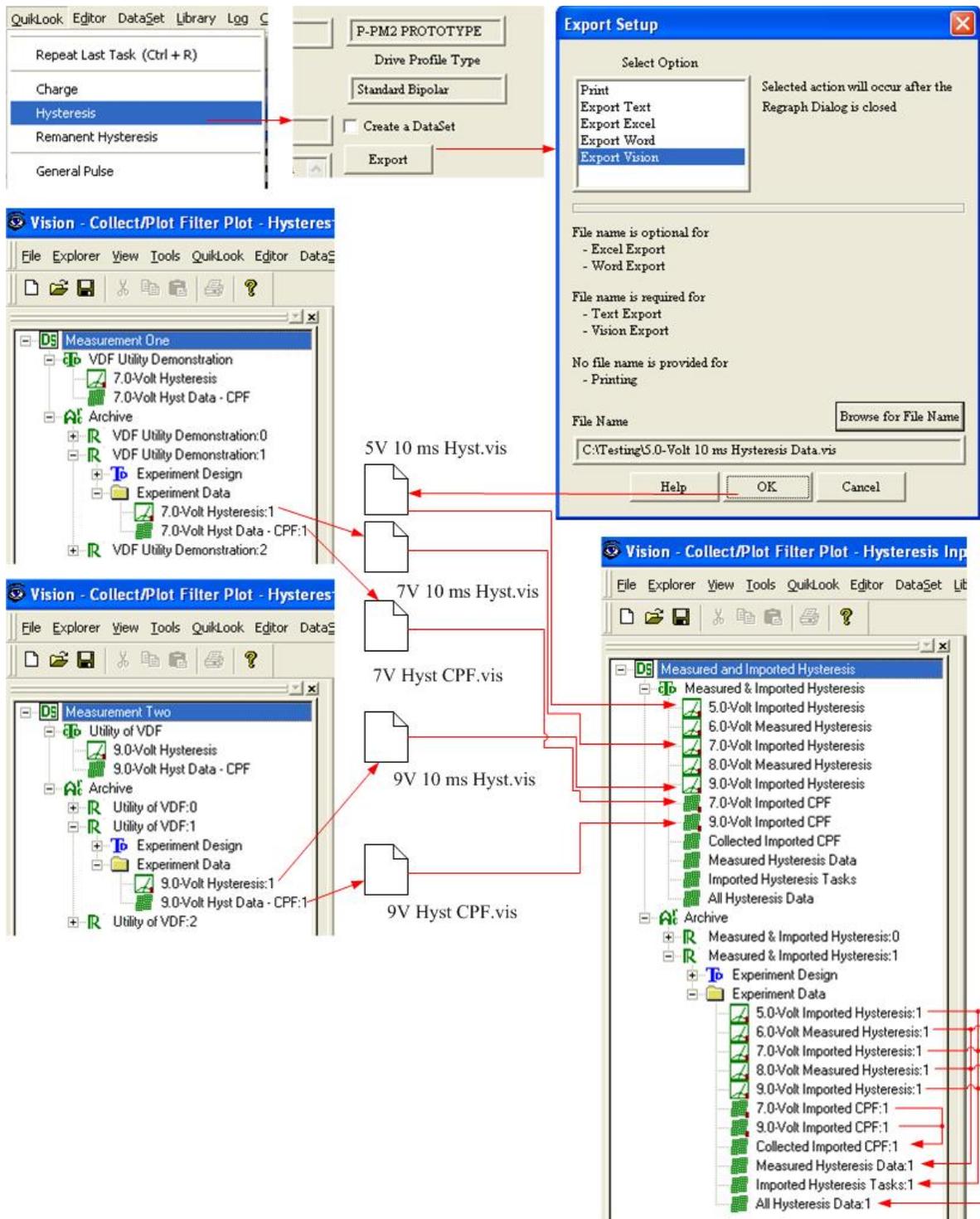


Figure 9 - Utility of the Vision Data File.

- 6. Windows Meta File -
- 7. Bitmap Image -

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8. **JPEG Image** - Export options 6, 7 and 8 output the plotted data image to an image file in one of these three formats. A file name is required. These export options are unique in that the export occurs before the Data Presentation dialog is closed. This is because the export is performed by the library that is producing the plotted image. It is the image that exports itself.

NOTE: Export options 1 through 8 apply to Measurement Tasks and most Filter Tasks. These are Tasks that capture and plot data. All Tasks offer exporting. Tasks that do not collect data are limited to Printer, Text, Excel and Word exporting. These Tasks also do not offer a *Header Only* option for printing or Word export.

NOTE: Measurement and Filter Tasks offer a ninth export option: Runtime Tabular Text Exporting. This option is described in detail in the [next section](#). A tenth options is runtime export of the Windows Meta File, Bitmap or JPEG images discussed in the [final Step-by-Step - Exporting](#) topic.

Step 1: Send data to the printer:

- A. Configure and execute a Test Definition in a DataSet. Or, open a Tutorial DataSet and choose a Task from its DataSet Archive.
- B. Open the DataSet Archive.
- C. Open the desired Executed Test Definition (ETD).
- D. Double-click the desired Task. The configuration dialog will appear with most controls disabled.

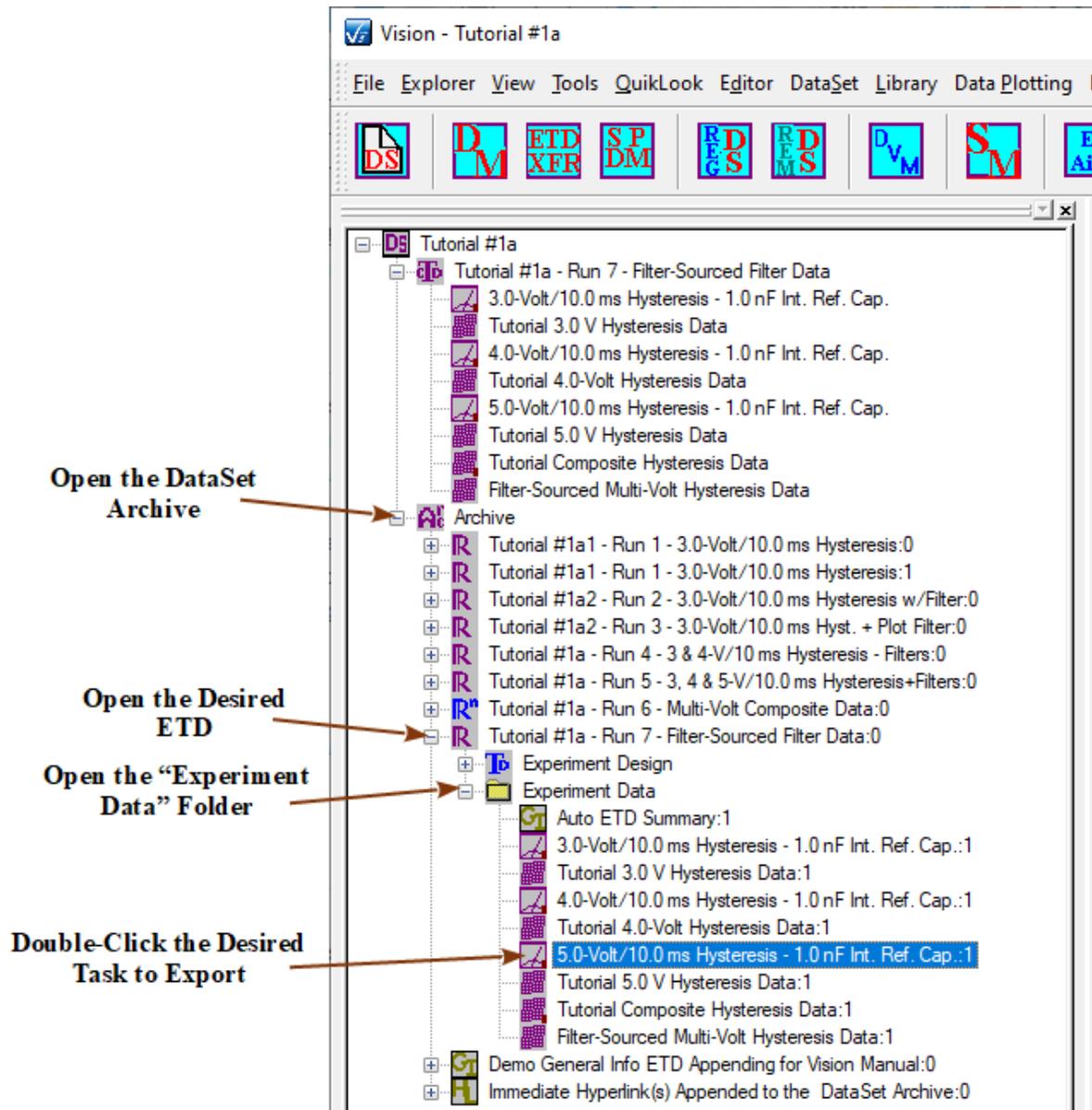


Figure 10 - Recall the Hysteresis Task from the DataSet Archive.

- E. If the desired Task is a Measurement Task (as in this example), click *Cancel/Plot*. The configuration dialog will close and, after an intermediate plot setup dialog, the "Results" dialog will open. That dialog will have the enabled *Export* button on it. For all of other Tasks the *Export* button is located and enabled on the configuration dialog. Click the *Export* Button.

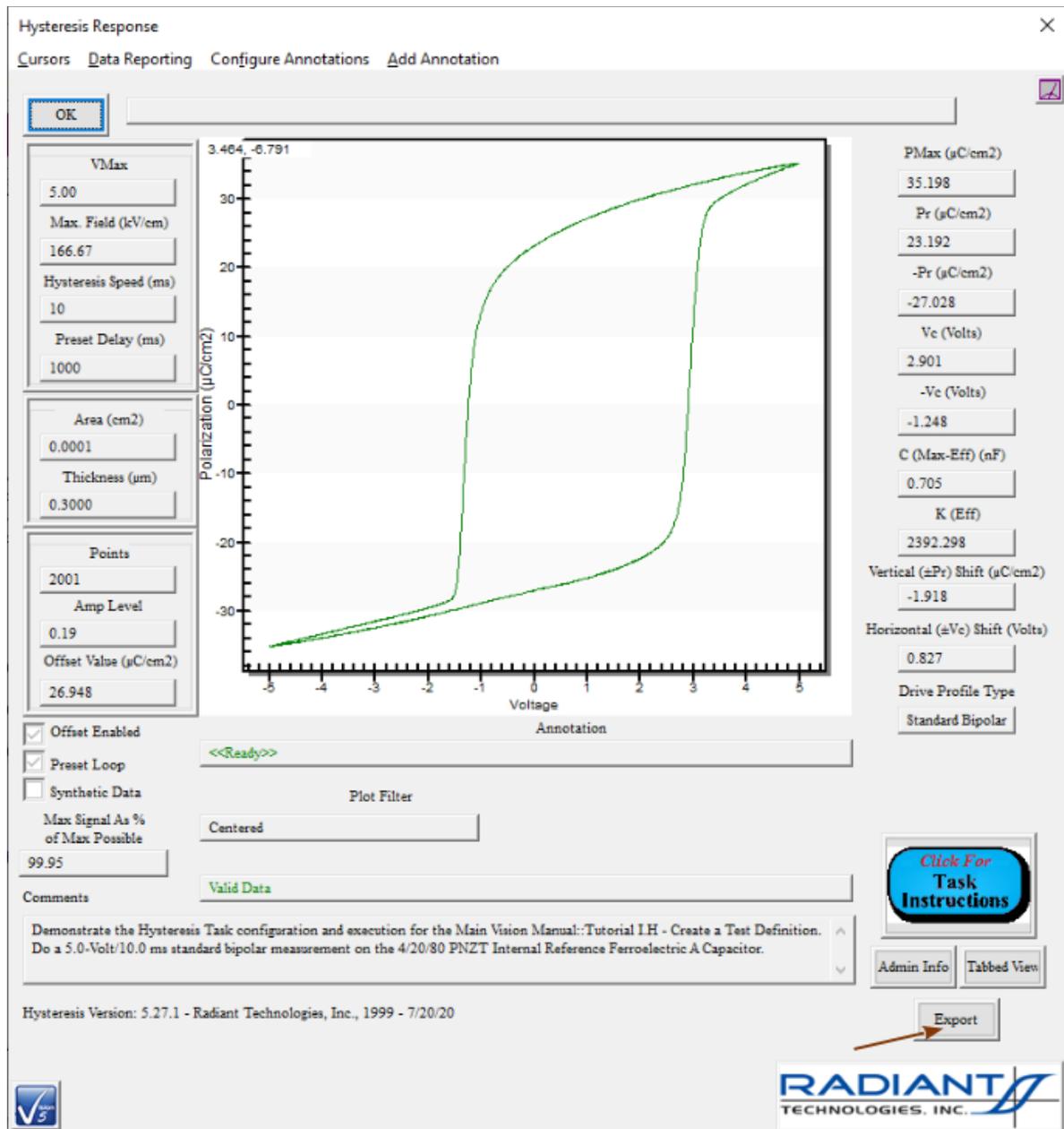


Figure 11 - Initiate Data Export.

- F. From the dialog that appears, select *Print*. Check *Header Only* if the control is visible. Adjust text positioning as required.

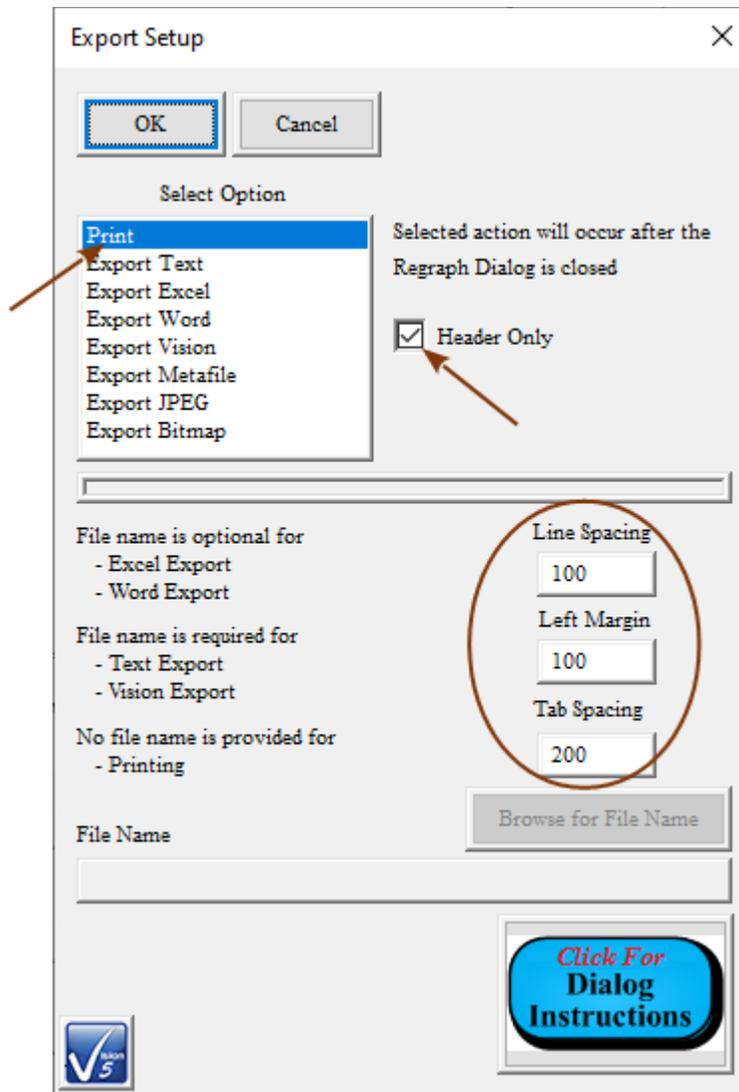


Figure 12 - Export Setup Dialog with Printing Configured.

NOTE: Clicking *Cancel* on the Export dialog will abort the Export setup and return to the "Results" dialog. If the *Export* button is clicked again, whether the export was configured or cancelled, reopens the Export dialog. In that case, the export must be reconfigured.

- G. Click *OK* to close the export dialog.
- H. Click *OK* to close the "Results" or configuration dialog.
- I. Adjust printer settings in the dialog that appears. Click *OK* to print the document.

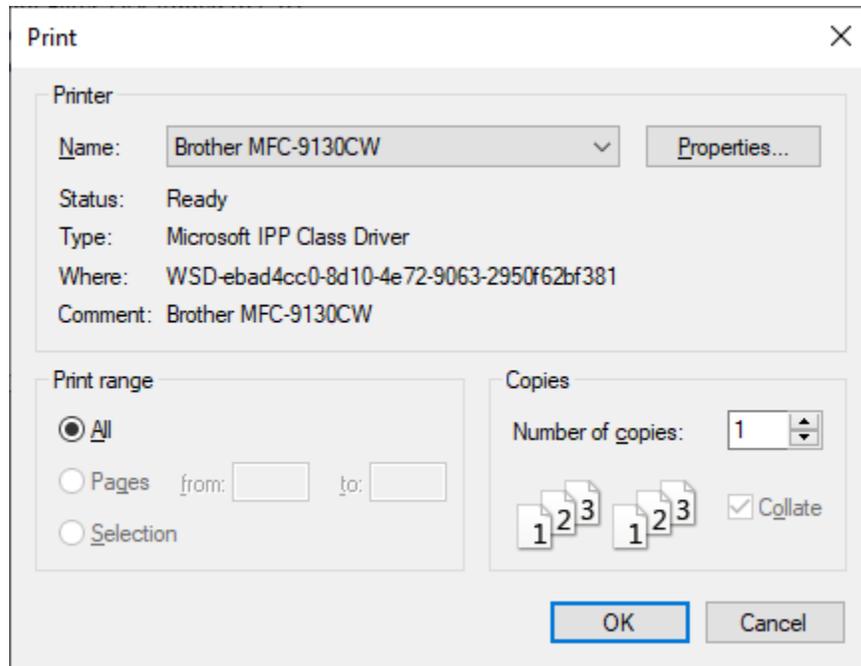


Figure 13 - Standard Windows Printer Dialog.

J. Check your printer for the formatted output.

Step 2: Save to a Text File:

- A. Repeat steps A through E above.
- B. Select "Export Text" in *Select Option*.
- C. Select the appropriate *Column Delimiter*.

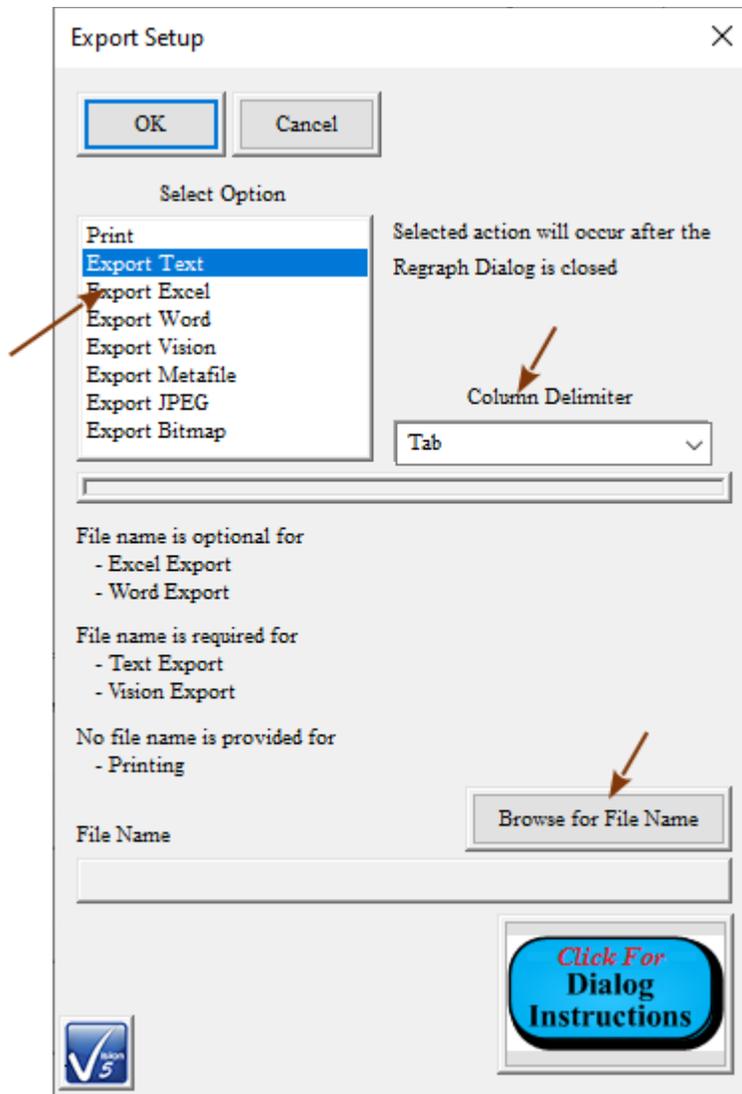


Figure 14 - Text Export Dialog.

- D. Press *Browse for File Name*.
- E. Navigate to an appropriate file path and assign an appropriate file name. The file should not exist.

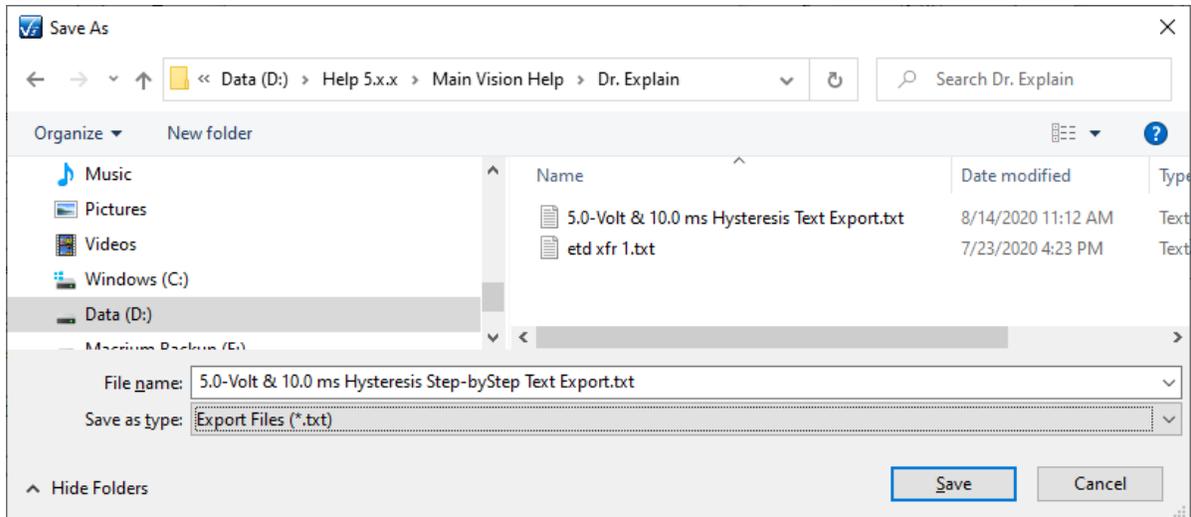


Figure 15 - Standard Windows Browser Dialog.

- F. Click *Save* to close the browser and update the *File Name* text control in the Export dialog. Click OK in the Export Setup dialog to return to the Data Presentation or Task Configuration dialog.

Note that the file name and path must be specified by the browser. The *File Name* control on the export dialog is read-only and is only used to reflect the selected path and file name.

Note that if the text file name exists at the specified path, the formatted output will be appended to the existing text.

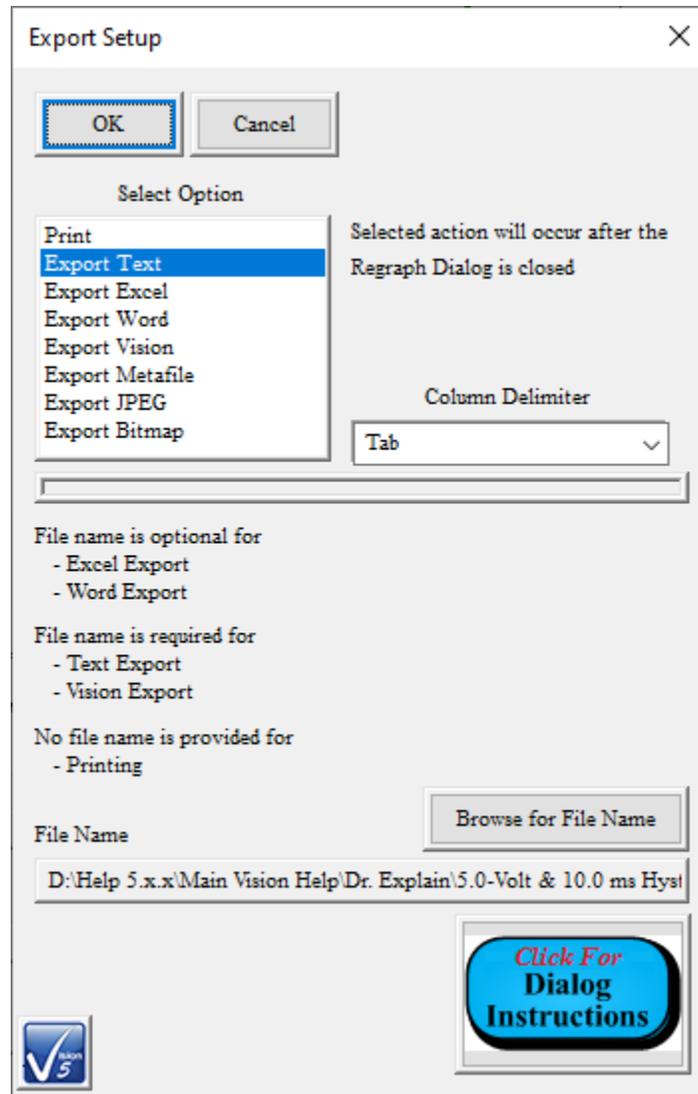


Figure 16 - Export Dialog Completely Configured for Text Output.

- G. Click *OK* on the Data Presentation or Task Configuration dialog to write the file. A view of the file is shown in the **Figure** below.


```

File Edit Format View Help
1997 9.9850e+00 -0.0422 -27.116059
1998 9.9900e+00 -0.0336 -27.036241
1999 9.9950e+00 -0.0230 -27.072159
2000 1.0000e+01 -0.0119 -27.028259
2001 1.0005e+01 -0.0027 -27.028259

Center data before PMax,±Pr and ±Vc Calc.

PMax (µC/cm2): 3.52e+01
Pr (µC/cm2): 2.32e+01
-Pr (µC/cm2): -2.70e+01
Vc: 2.90e+00
-Vc: -1.25e+00
C (Max-Eff) (nF): 7.05e-01
K (Eff): 2.39e+03
Vert. (±Pr) Shift (µC/cm2): -1.92e+00
Horiz. Shift (±Vc): 8.27e-01
Offset (µC/cm2): 2.69e+01

A (Loop Area - µC/cm2·Volts): 2.19e+02

Demonstrate the Hysteresis Task configuration and execution
for the Main Vision Manual::Tutorial I.H - Create a Test Definition.
Do a 5.0-Volt/10.0 ms standard bipolar measurement on the 4/20/80
PNZT Internal Reference Ferroelectric A Capacitor.

Hysteresis Version: 5.27.1 - Radiant Technologies, Inc., 1999 - 7/20/20

```

Figure 17 - Sample Text Export File.

Step 3: Save to an Excel File:

Note that Microsoft Office 2000 or later must be installed on the Precision Tester to use this utility. Office is not provided with the Precision Tester.

- A. Repeat steps A through E in the Print Export (**Step 1**) instructions above.
- B. Select "Export Excel" from *Select Option*.
- C. Press *Browse for File Name*.

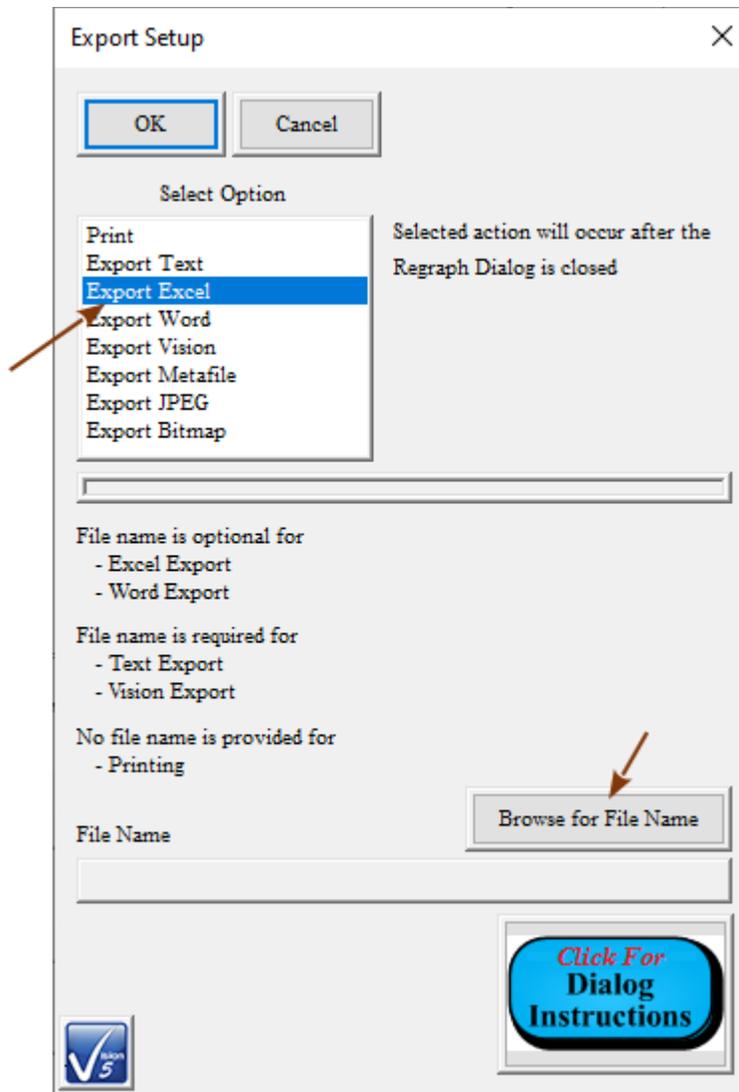


Figure 18 - Export Dialog with Excel Selected.

- D. Browse to the desired directory and enter an appropriate file name. Then click *Save*.

Note that the file name and path must be specified by the browser. The *File Name* control on the export dialog is read-only and is only used to reflect the selected path and file name.

Note that specifying a file name (step D) is optional since the Excel program will be started and the data written to the spreadsheet. However, if no file name is selected Excel will prompt for one when the spreadsheet is closed.

Note that if the Excel file name already exists at the specified path Excel will

prompt to overwrite when the spreadsheet is closed.

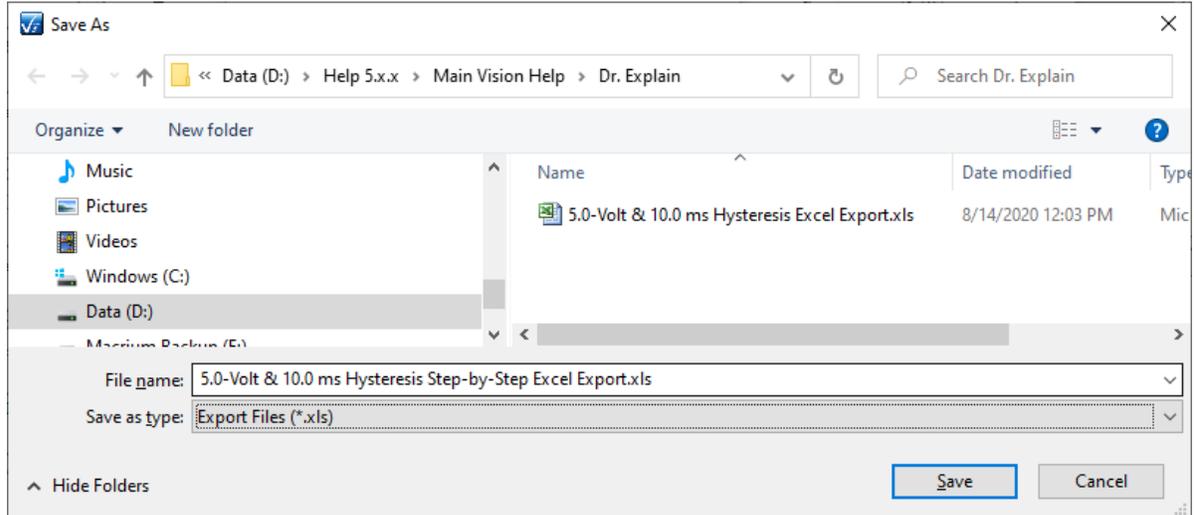


Figure 19 - Use the Standard Windows Browser Dialog to Select The Excel Output File.

- E. Click *OK* to close the browser and update the *File Name* control on the Export Set-up dialog.

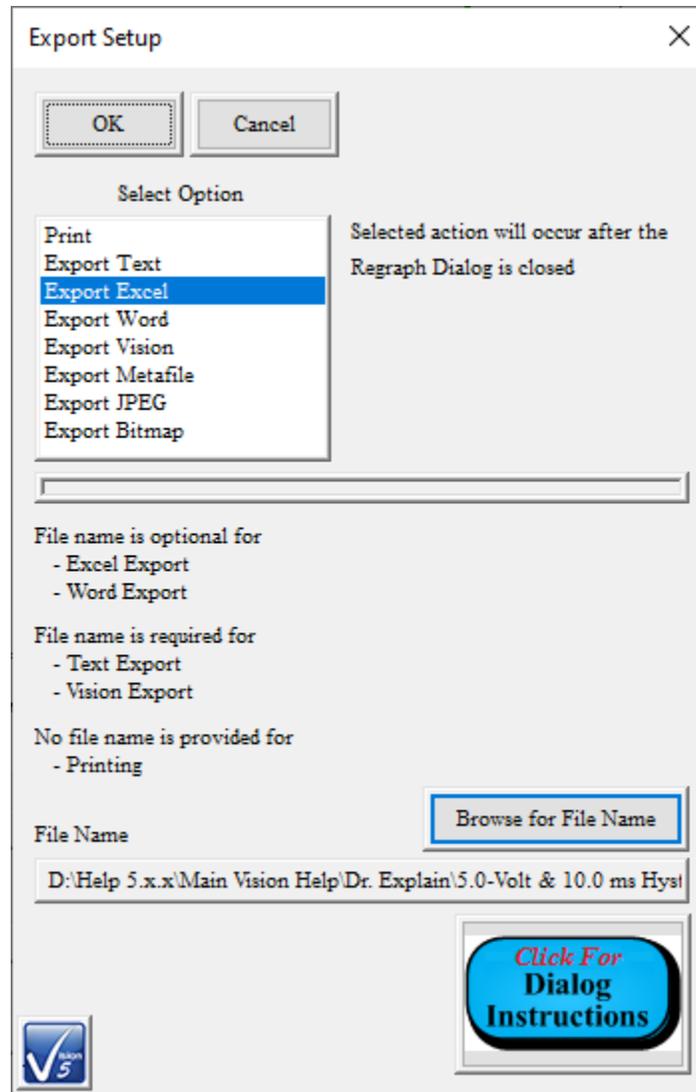


Figure 20 - Export Dialog Completely Configured for Excel Output.

- F. Click *OK* to close the Export Setup dialog. Then click *OK* in the Data Presentation or Task Configuration dialog to close the dialog and initiate the Excel export.

	A	B	C	D	E	F	G
1	Hysteresis						
2	Executed Version	5.27.1					
3	Vision Version	5.27.2 (D)					
4	Vision Compiled	7/20/2020					
5	Driver Version	No Driver Present					
6	Windows Version	Windows 8, 8.1 or 10					
7	Processor Information	x86 (AMD or Intel) - 8 Processors					
8	Tester Name	No Tester Present					
9	Tester S/N	No Tester Present					
10	Internal Amp Type	200V RevH 100K					
11	Internal Amp Serial	IAB2-431/H					
12	Execution Count	1					
13	Excel Date	8/17/2020 - 10:6:19					
14	Configuration Date	7/28/2020 11:31					
15	Execution Date	7/28/2020 11:49					
16							
17	Sample Info.						
18	Sample Name	Int. Ref. Ferroelectric					
19	Lot Name	N/A					
20	Wafer Name	N/A					
21	Die Row/Column	0/0					
22	Capacitor ID	0					
23	Area (cm ²)	0.0001					
24	Thickness (μm)	0.3					
25							
26	Amplifier	Internal					
27							
28	Tester Info						
29	Tester Name	No Tester Present					
30	Tester Serial Number	No Tester Present					
31	Return Signal Amp. Level [Index]	0.19 [3]					
32							
33	Hysteresis Info						
34	Task Name	5.0-Volt/10.0 ms Hysteresis - 1.0 nF Int. Ref. Cap.					
35	Max. Volts	5					
36	Max. Field (kV/cm)	166.6666667					
37	Hysteresis Period (ms)	10					
38	Preset Enabled						
39	Preset Delay (ms)	1000					
40	Profile	Standard Bipolar					
41							
42	Data	Valid Data					
43	<i>Point</i>	<i>Time (ms)</i>	<i>Drive Voltage</i>	<i>Measured Polarization (μC/cm²)</i>	<i>Capacitance (μF)</i>	<i>Normalized Capacitance (μF/cm²)</i>	<i>Dielectric Constant</i>
44	1	0.005	-0.002746582	-26.97637794	7.986641932	7.986641932	2.708738432
45	2	0.01	0.006484985	-26.89656027	7.986641932	7.986641932	2.708738432
46	3	0.015	0.017166138	-26.90055115	-0.399332097	-0.399332097	-0.135436922
47	4	0.02	0.027084351	-26.90853292	-0.798664193	-0.798664193	-0.270873843
48	5	0.025	0.037231445	-26.90853292	0	0	0
49	6	0.03	0.046768188	-26.9125238	-0.399332097	-0.399332097	-0.135436922
2042	1999	9.995	-0.023040771	-27.07215915	-3.59398887	-3.59398887	-1.218932294
2043	2000	10	-0.011901855	-27.02825943	4.392653063	4.392653063	1.489806138
2044	2001	10.005	-0.002746582	-27.02825943	4.392653063	4.392653063	1.489806138
2045							
2046	Center data before PMax, ±Pr and ±Vc Calc.						
2047							
2048	P _{Max} (μC/cm ²)	35.19759823					
2049	P _r (μC/cm ²)	23.19235511					
2050	-P _r (μC/cm ²)	-27.02825943					
2051	V _c	2.900848979					
2052	-V _c	-1.247685052					
2053	C _{MEAS} (nF)	0.70536269					
2054	K _{ME}	2392.298344					
2055	Offset (μC/cm ²)	26.94844176					
2056	Vert. (±P _r) Shift (μC/cm ²)	-1.917952161					
2057	Horiz. Shift (±V _c)	0.826581964					
2058							
2059	A (Loop Area - μC/cm ² -Volts)	219.2627637					
2060							
2061	Demonstrate the Hysteresis Task configuration and execution						
2062	for the Main Vision Manual::Tutorial I.H - Create a Test Definition.						
2063	Do a 5.0-Volt/10.0 ms standard bipolar measurement on the 4/20/80						
2064	PNZT Internal Reference Ferroelectric A Capacitor.						
2065							
2066	Hysteresis Version: 5.27.1 - Radiant Technologies, Inc., 1999 - 7/20/20						

Figure 21 - Partial Sample Excel Output.

Step 4: Save to a Microsoft Word File:

Note that Microsoft Office 2000 or later must be installed on the Precision Tester to use this utility. Office is not provided with the Precision Tester.

A. Repeat steps A through E in the Print Export (Step 1) instructions above.

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- B. Select "Export Word" from *Select Option*.
- C. Check *Header Only*. **NOTE: You may uncheck Header Only as an option., This will cause many tens, or even hundreds, of pages of number columns to appear in the document.**

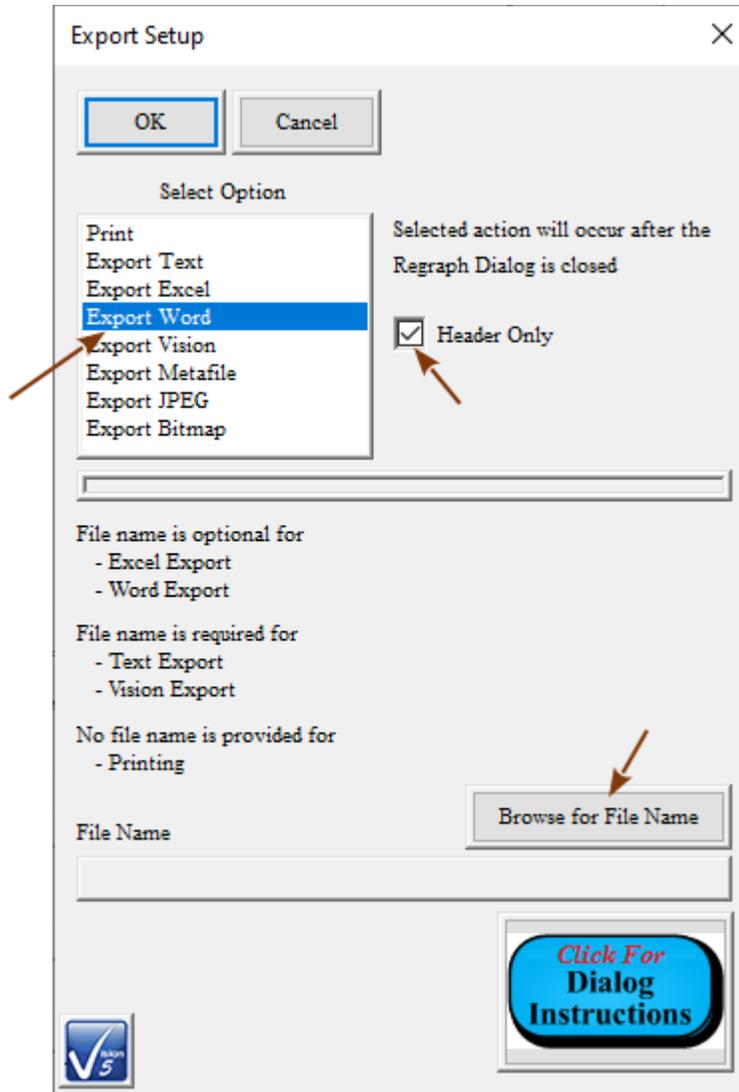


Figure 22 - Export Dialog with Word Selected. Browser is Enabled.

- D. Press *Browse for File Name*

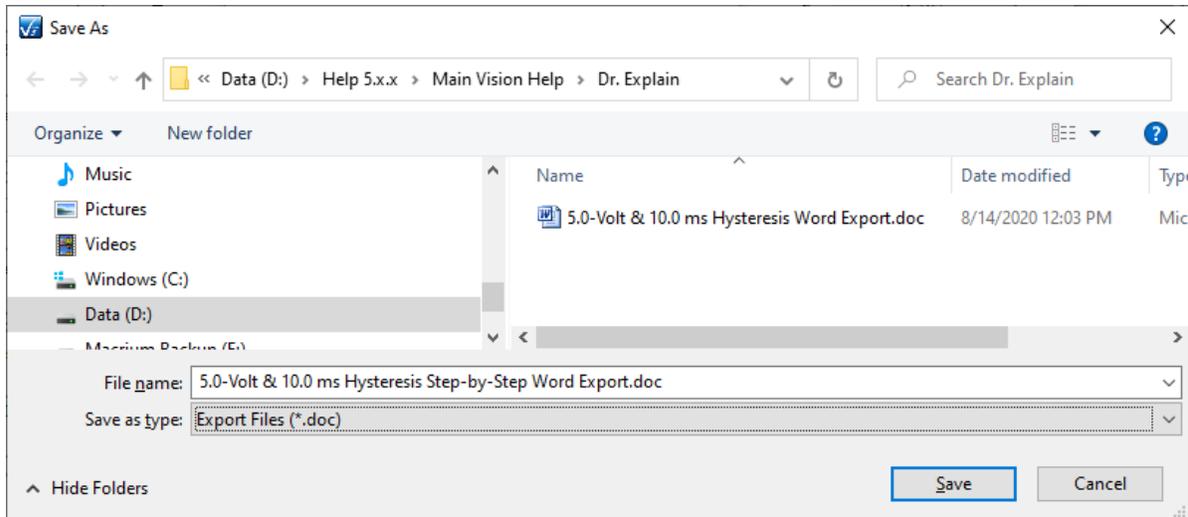


Figure 23 - Standard Windows File Browser. Specify Word File Name.

- E. Browse to the desired directory and enter an appropriate file name. Then click *Save* to close the browser and update the Export Setup dialog.

Note that the file name and path must be specified by the browser. The *File Name* control on the export dialog is read-only and is only used to reflect the selected path and file name.

Note that specifying a file name (steps C and D) is optional since the Word program will be started and the data written to the spreadsheet. However, if no file name is selected Word will prompt for one when the spreadsheet is closed.

Note that if the Word file name already exists at the specified path Word will prompt to overwrite when the spreadsheet is closed.

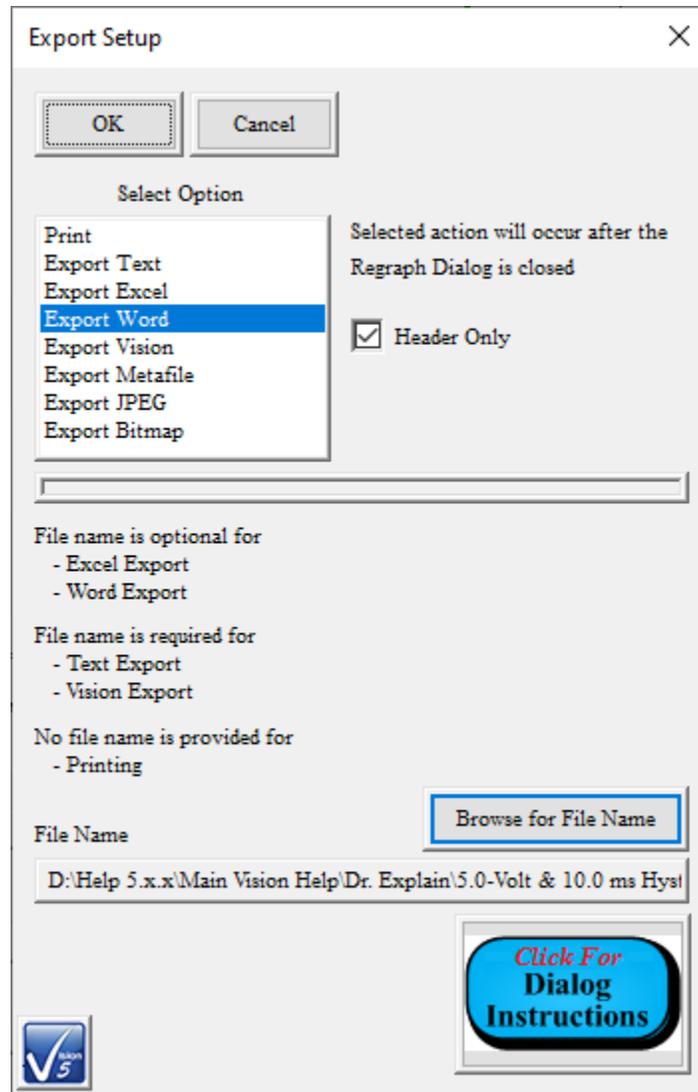


Figure 24 - Export Dialog with Complete Word Export Configured.

- F. Click *OK* to close the Export Setup dialog. Click *OK* in the Data Presentation or Task Configuration dialog to close the dialog and initiate Word export.

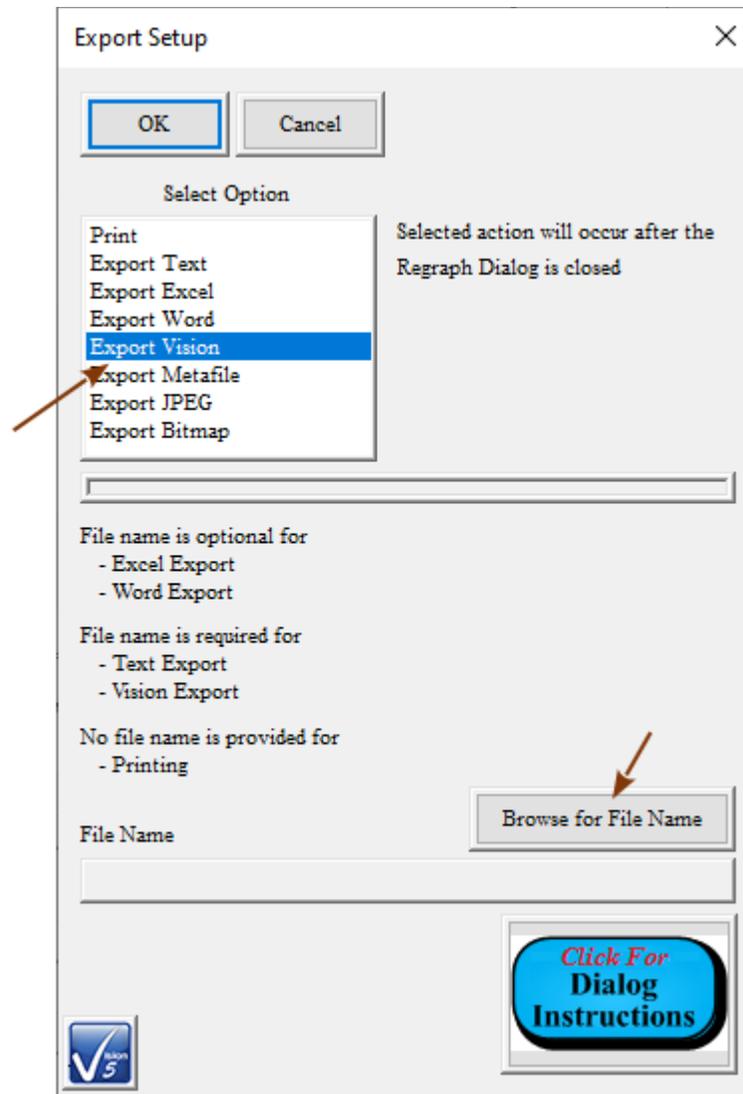


Figure 26 - Vision Data File Export Configuration.

- C. Click *Browse For File Name*. Browse to an appropriate folder and assign a file name. This step is required.

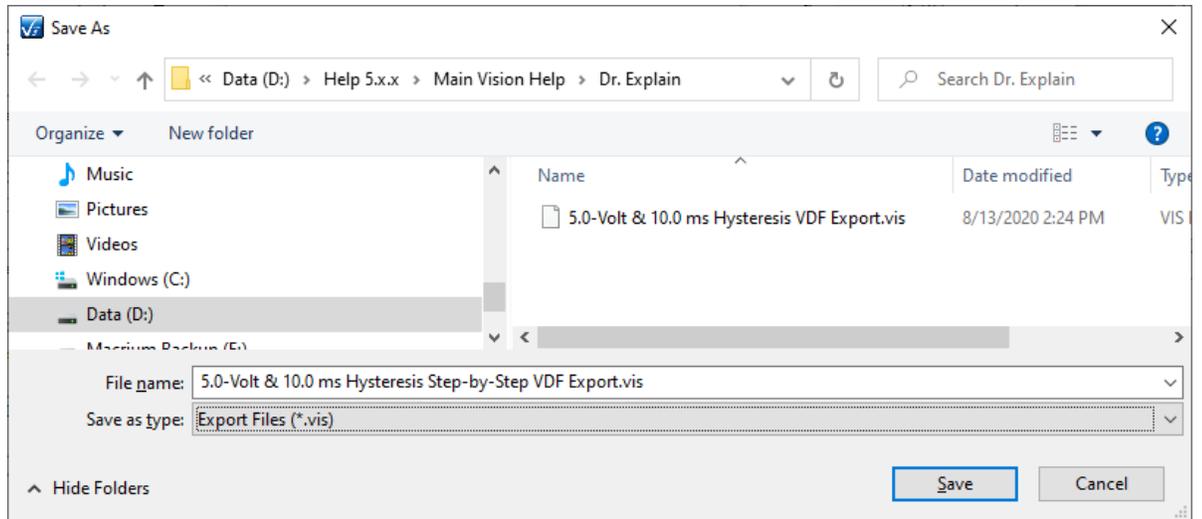


Figure 27 - Browse to Vision Data File.

- D. Click Save to close the Browser dialog. The Export dialog will be updated by displaying the file path and file name in *File Name*.

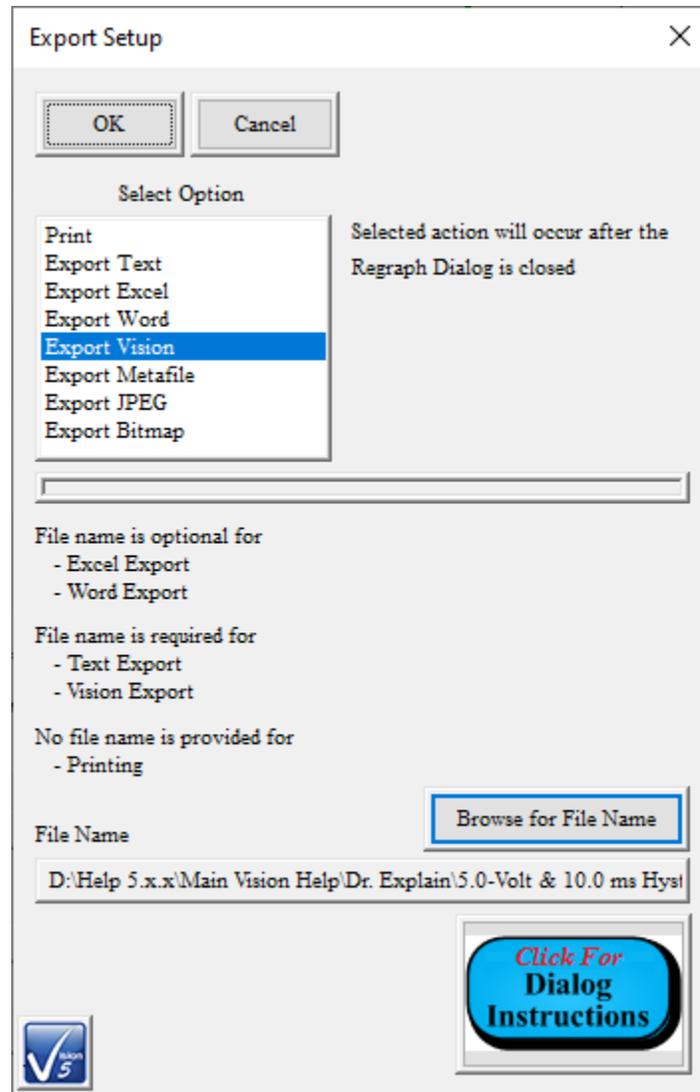


Figure 28 - Export Configuration with File Path and Name.

- E. Click *OK* to close the Export Setup dialog.
- F. Click *OK* to close the Data Presentation dialog and output the file.
- G. To demonstrate the utility of the file, clear the EDITOR and move a new instance of the appropriate Task from the TASK LIBRARY to the EDITOR.
- H. In the configuration dialog assign a *Task Name* and *Comments* as appropriate. Most other controls will be disabled as configuration proceeds.
- I. Click *Set xxx VDF Import* to open a subdialog to configure the Vision Data File import.

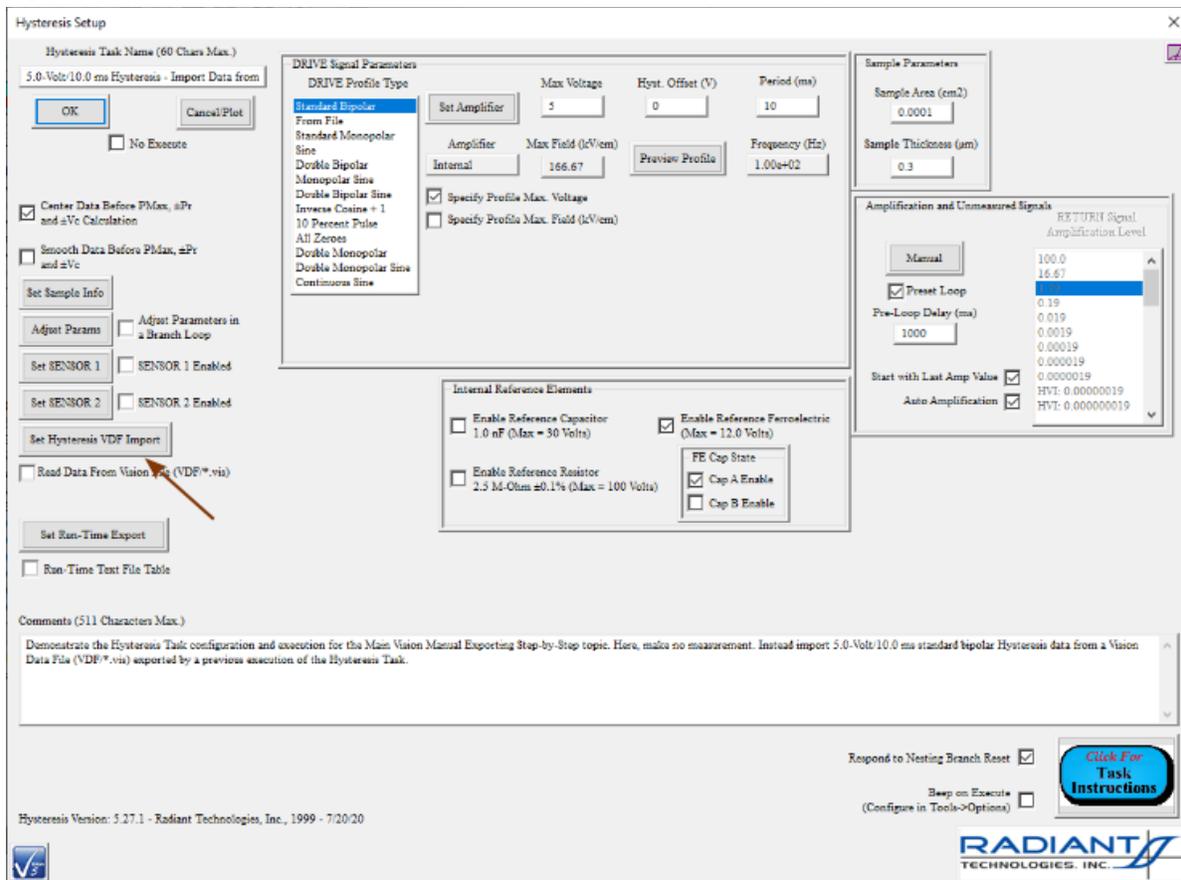


Figure 29 - Begin Hysteresis Task Vision Data File Import Configuration.

- J. In the subdialog, check *Import xxx Vision Data File*.
- K. *Click Browse to File* to open a standard Windows Browser dialog.
- L. Navigate to and select the VDF file exported in **Step 5.F**, above.
- M. Click *Open* to close the browser and record the file path and name to *File Name*.

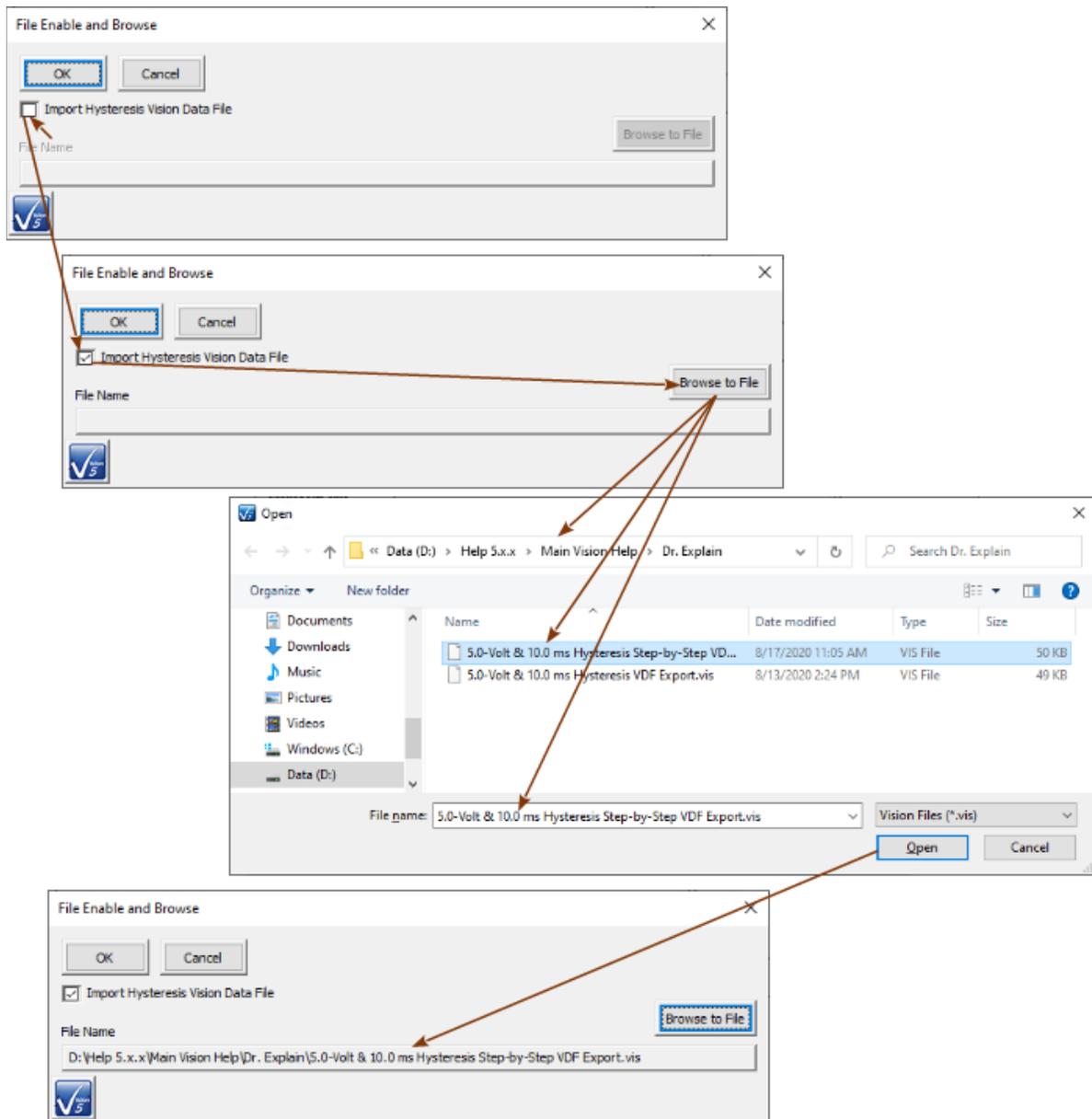


Figure 30 - VDF Import Configuration Subdialog Sequence.

- N. Click *OK* to close the VDF configuration subdialog. Most controls in the main Task Configuration dialog will be disabled. *Read Data From Vision File (VDF/*.vis)* will be checked. The VDF import file path and file name will be written below *Read Data From Vision File (VDF/*.vis)*.

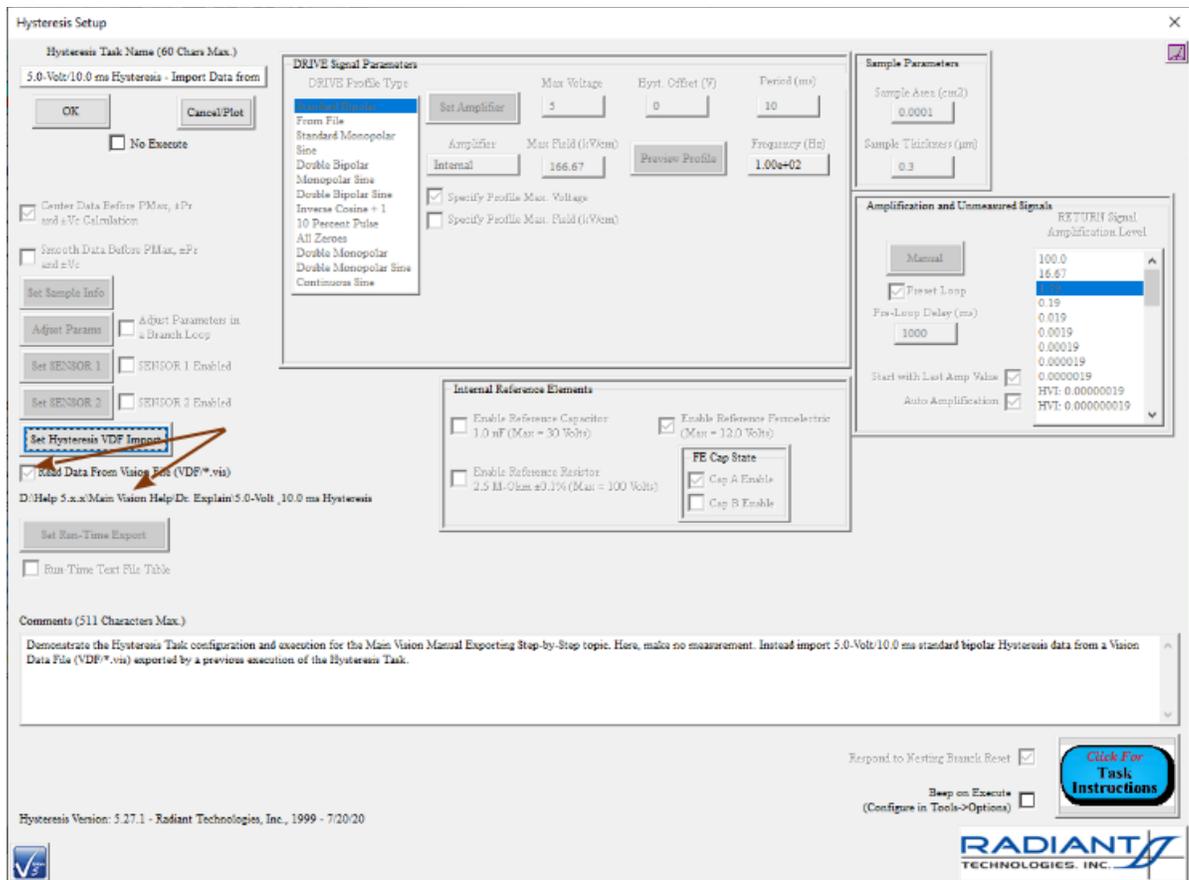


Figure 31 - Final VDF Import Task Configuration.

- O. Add a second Measurement Task of the same type. Do not configure to import a VDF. Instead configure for direct measurement from the Precision tester. Adjust the configuration to differ from the configuration of the VDF file.

Note that the VDF import configuration will be set by persistence from the previous configuration. To disable, click *Set XXX VDF Import* to open the subdialog. Then uncheck *Import xxx Vision Data File* and click *OK* to return to the main configuration dialog.

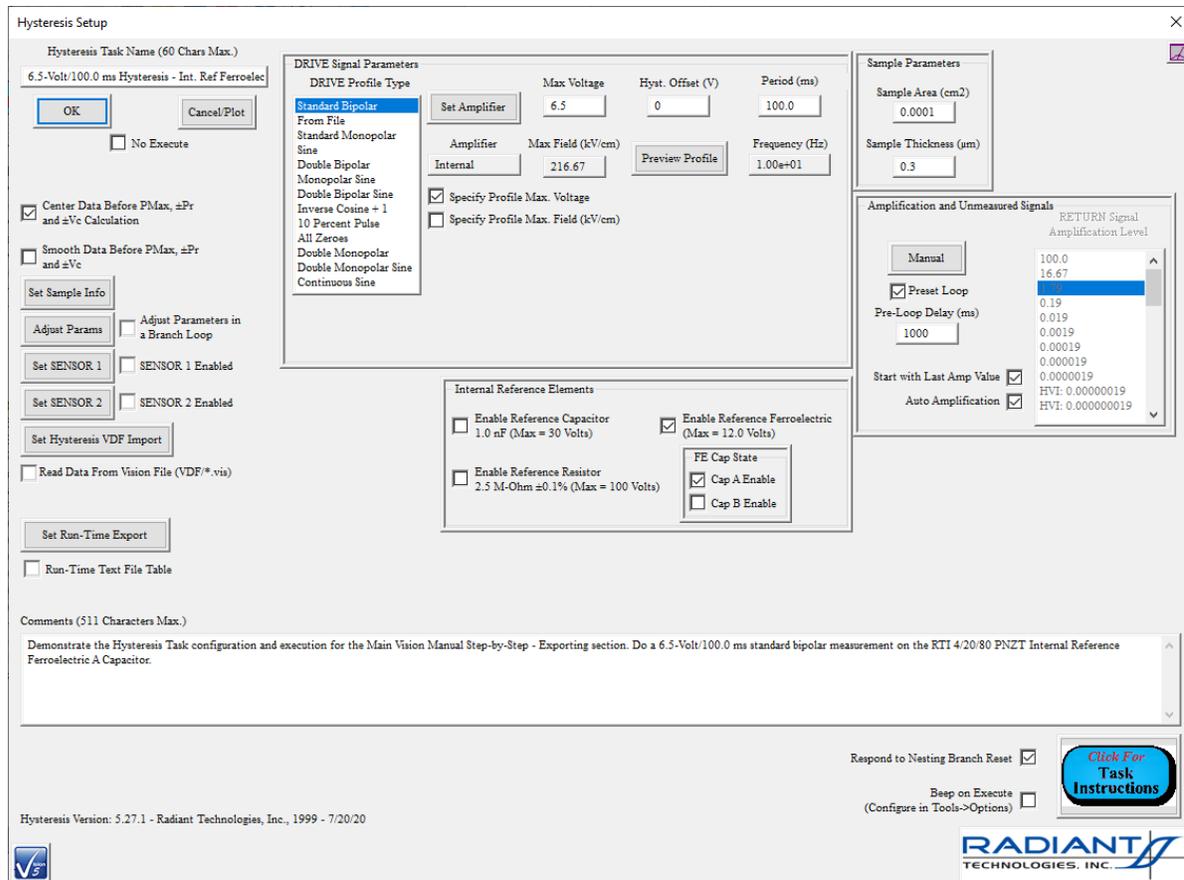


Figure 32 - Configure the Second Measurement Task.

- P. From the Filters folder in the TASK LIBRARY, move a Collect/Plot Filter Task into the EDITOR. Configure the Task appropriately. The Table, below, represents the Hysteresis Task in this example.

Task Name:	"Multi-Volt/Multi-Speed Hysteresis Data - Int. Ref. Ferro."
Data Type:	"Hysteresis"
Task Selector:	"6.5-Volt/100.0 ms Hysteresis - Int. Ref. Ferroelectric" "5.0-Volt/10.0 ms Hysteresis - Import Data from a VDF"
Add Task:	Click this button after selecting the Tasks in Task Selector to register the input Tasks with the Filter.
Comments:	As appropriate.

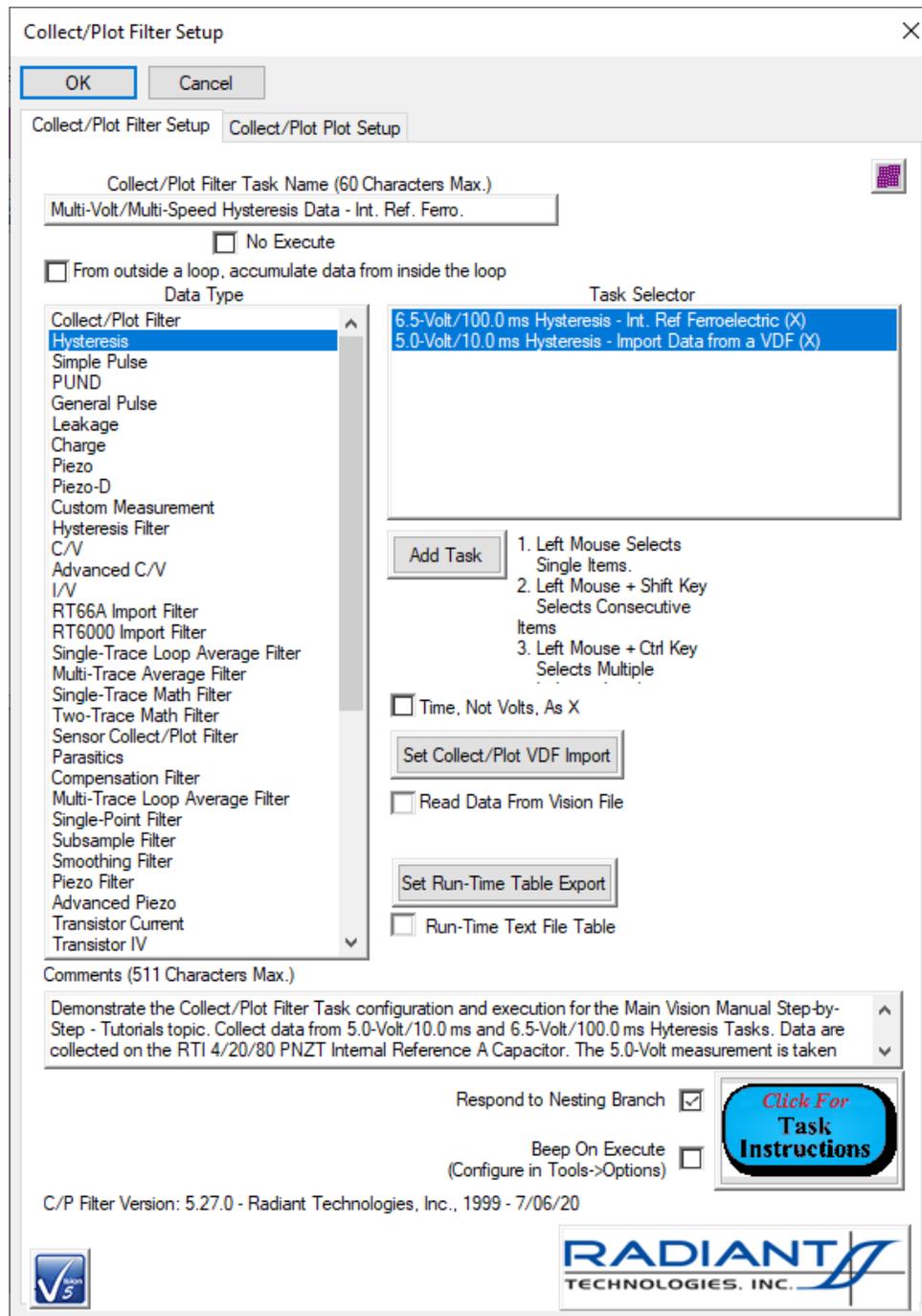


Figure 33 - Collect/Plot Filter Task Configuration.

Q. Configure the Collect/Plot Filter Task plot with appropriate labels.

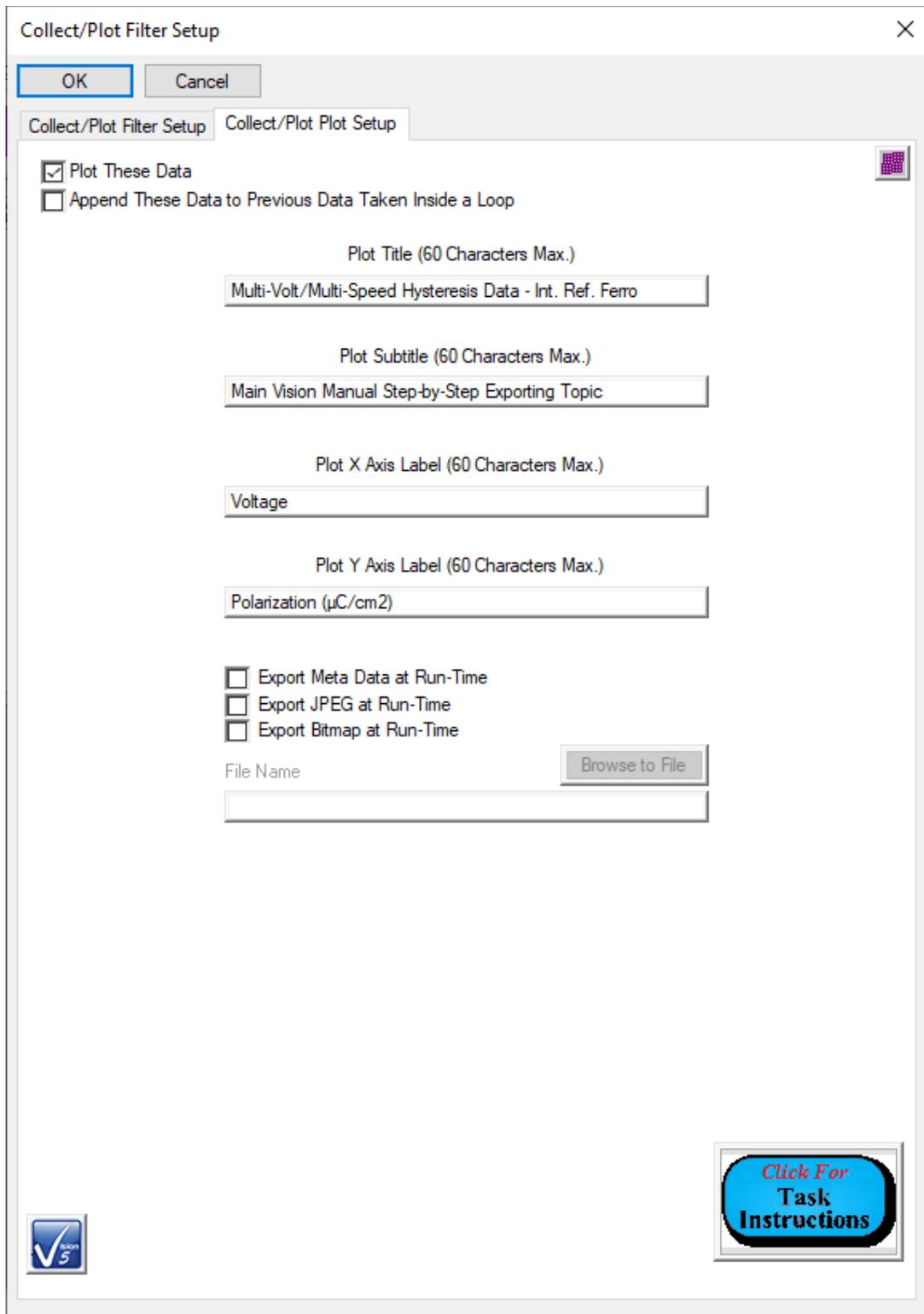
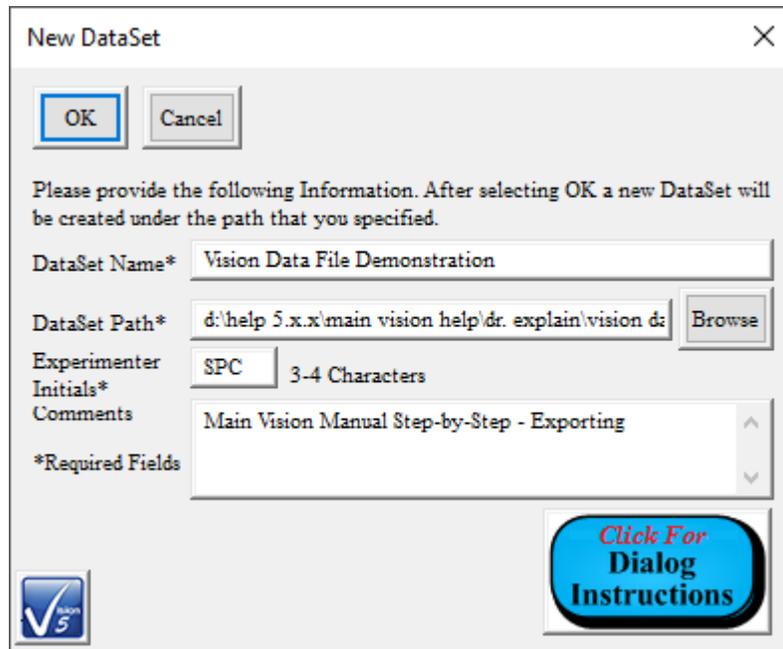


Figure 34 - Collect/Plot Filter Task Plot Configuration.

- R. Using any means discussed earlier in the Main Vision Manual, create a DataSet named "Vision Data File Demonstration". Locate the DataSet anywhere that is appropriate to your Step-by-Step learning.



The screenshot shows a 'New DataSet' dialog box with the following fields and values:

- DataSet Name***: Vision Data File Demonstration
- DataSet Path***: d:\help 5.x.x\main vision help\dr. explain\vision d: (with a 'Browse' button)
- Experimenter Initials***: SPC (with a '3-4 Characters' label)
- Comments**: Main Vision Manual Step-by-Step - Exporting

Buttons: OK, Cancel, Click For Dialog Instructions. A 'Vision 5' logo is visible in the bottom left corner.

Figure 35 - VDF Import Demonstration DataSet.

- S. Move the Test Definition into the DataSet, name the CTD appropriately and execute the experiment. 5.0-Volt data will be read from the Vision data file, 6.5-Volt data will be measured and the two will be plotted together by the Collect/Plot Filter.

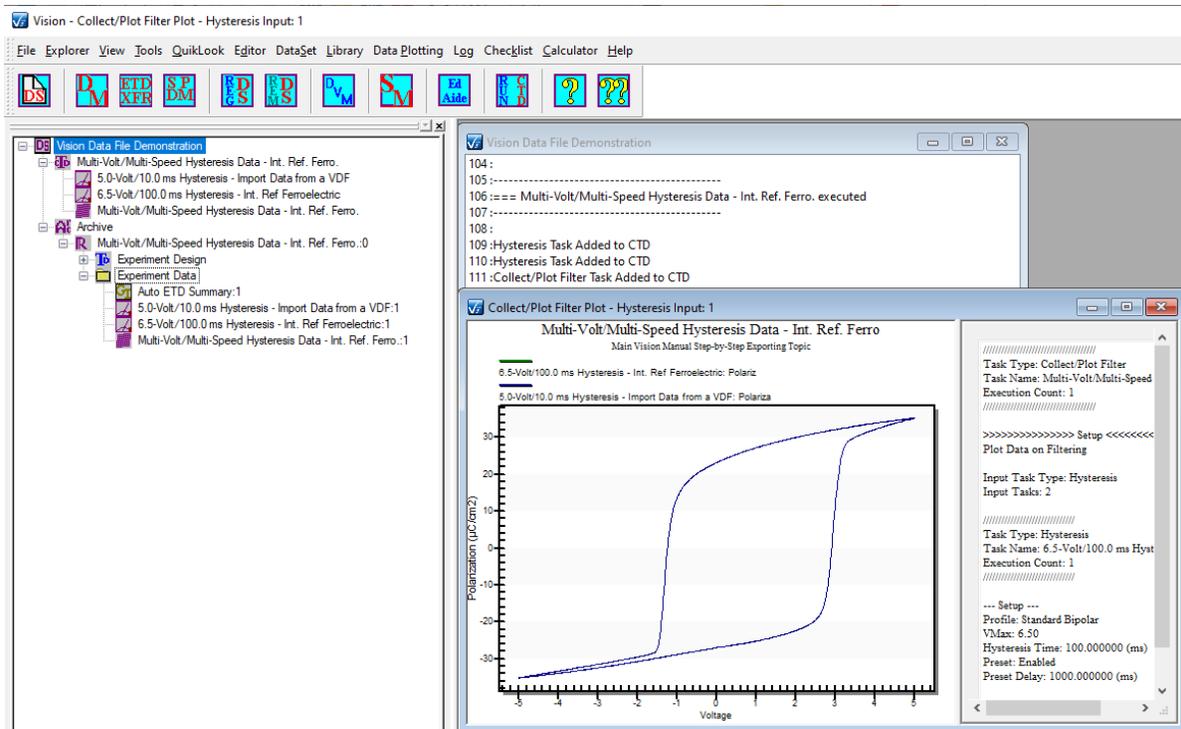


Figure 36 - Measured and VDF-Imported Hysteresis Data.

Step 6: Export the data image to a Windows Meta File (*.wmf), JPEG file (*.jpg) or Bitmap file (*.bmp):

Note that the data image exporting is available only to Tasks that collect data. These include Measurement Tasks and most Filters.

Note that, for Measurement Tasks, the export will occur before the Data Presentation dialog is closed. This differs from all other Archive Regraph export options. It also means that, after the image is exported, additional exporting may be configured and effected when the dialog is closed.

- A. Repeat steps A through E in Print Export (**Step 1**) instructions above.
- B. Select "Export Metafile", "Export JPEG" or "Export Bitmap" in *Select Option*.
- C. Click *Browse for File Name* to open the standard Window file browser dialog.

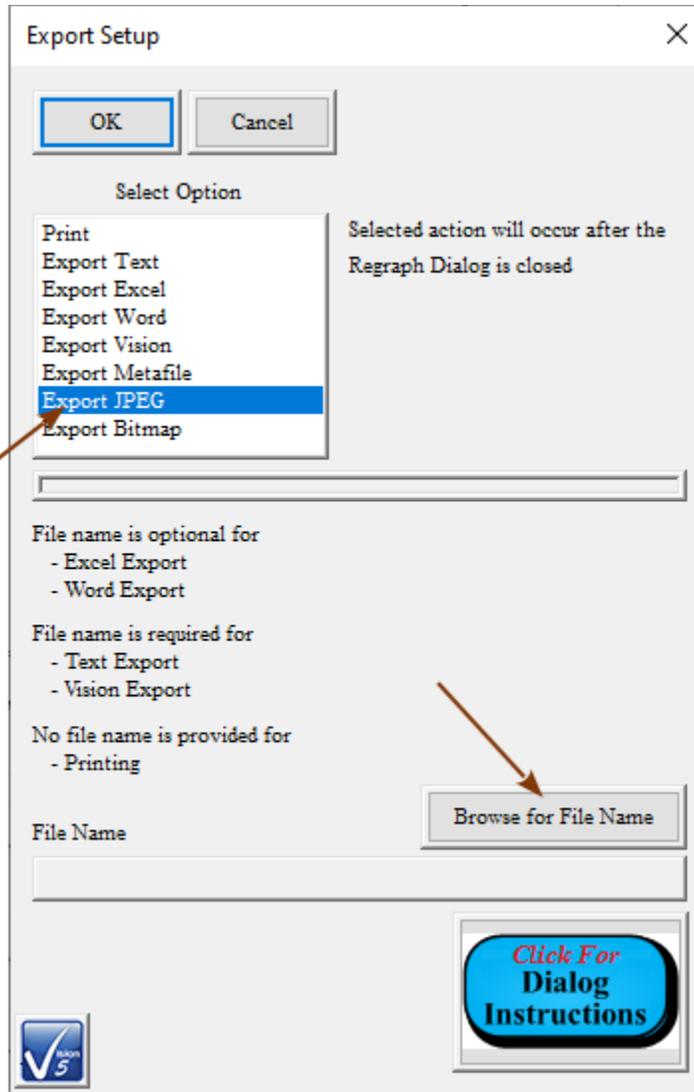


Figure 37 - Initial JPEG Export Configuration.

- D. In the browser dialog, navigate to an appropriate location and assign an appropriate file name.

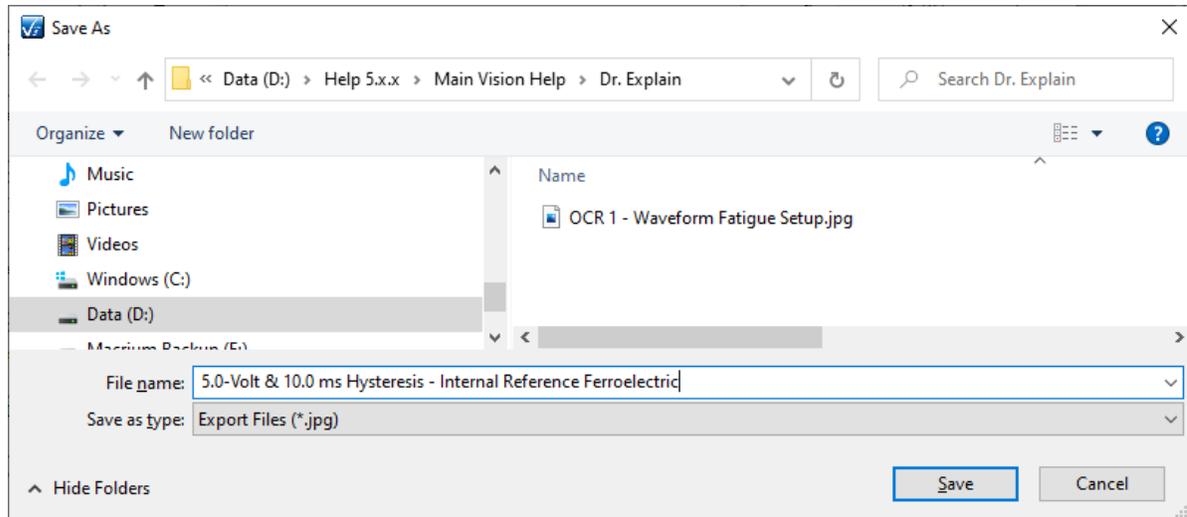


Figure 38 - Assign a File Path and File Name to the JPEG Export.

- E. Click Save to close the browser and display the file path and file name in the Export Setup dialog *File Name* control.

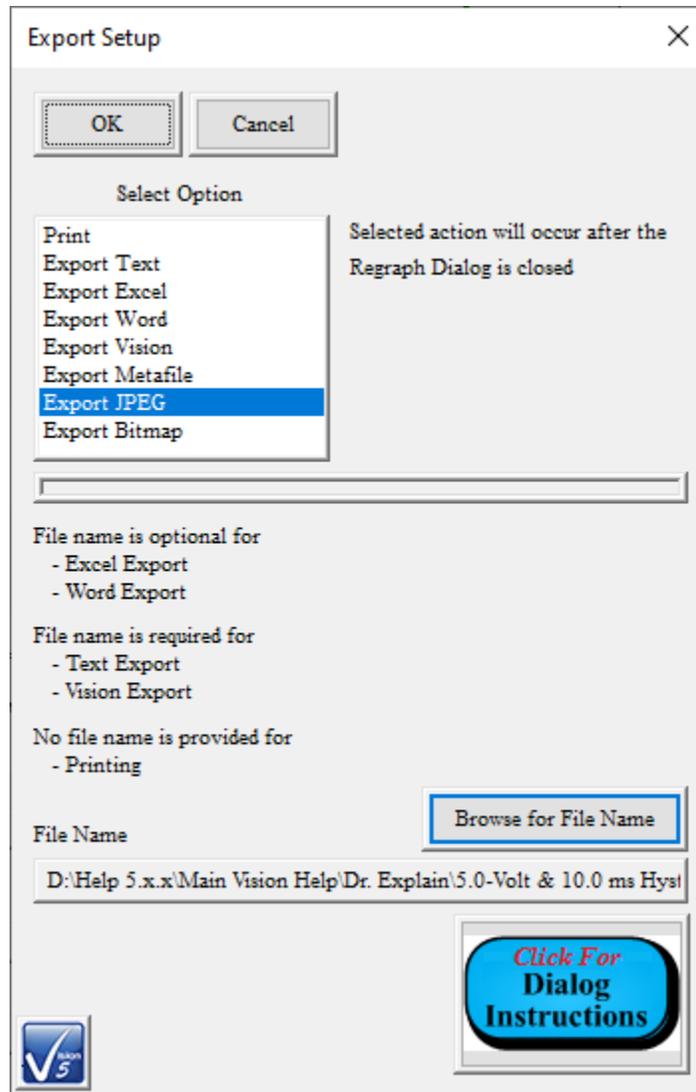


Figure 39 - Export Setup Dialog Configured for JPEG Export.

F. Click *OK* to close the Export Setup dialog and to do the exporting.

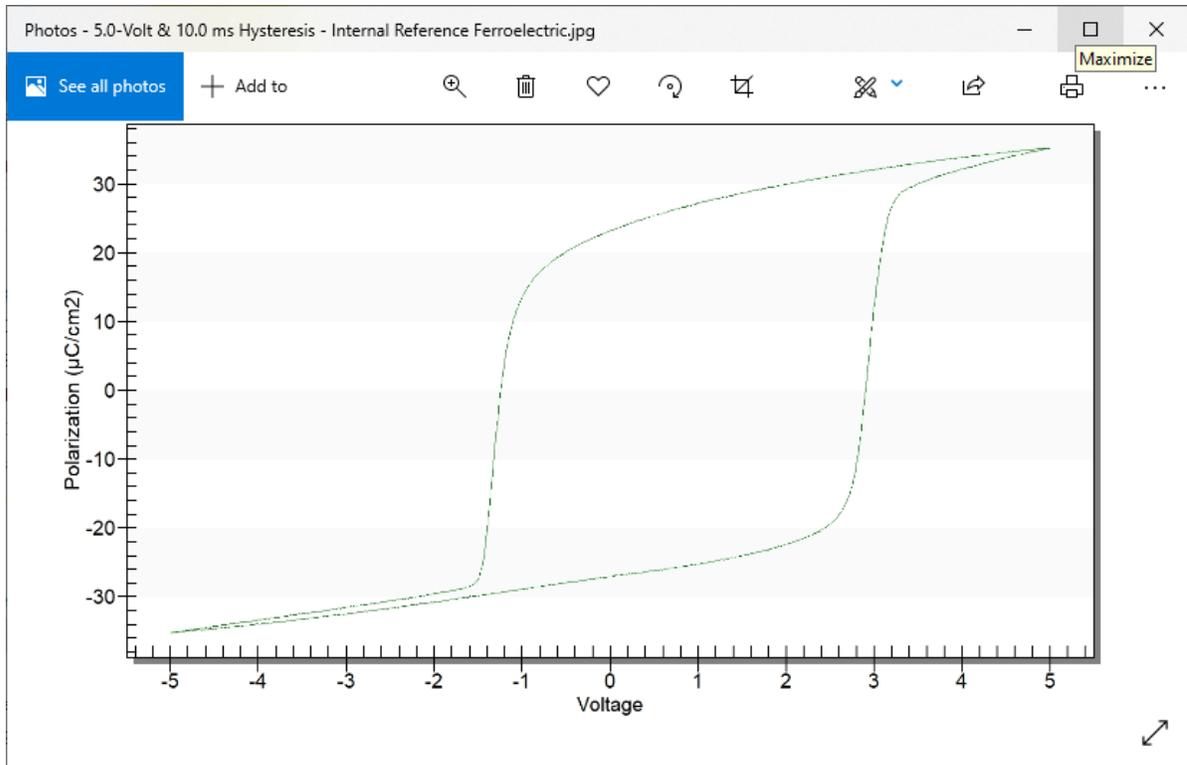


Figure 40 - Measured Data Plot Exported to a JPEG File.

Runtime Tabular Text Export

Discussion

Historically, Tasks are able to export their data to a number of targets outside Vision only after execution - either when the Task is recalled from a DataSet Archive (all Tasks) or executed in QuikLook (Measurement Tasks). Tasks are also able to export to a variety of targets at runtime by associating the Task with the Print/Export Filter Task. Long-duration Tasks, such as Fatigue or Resist, also offer runtime exporting directly from the Task.

More recently, data-collecting Tasks, including Measurement and Filter Tasks, have been fitted with a Runtime Tabular Text Export option. In this option the Task will export all data collected at a single execution to a single text file at execution time. Only measured data are exported in tabular format, with column headings. Header information, common to standard Task exporting, is not available. Hysteresis-based Tasks, and Filters, that generate or collect columns of data output data from each measured point, line-by-line in the data columns. Other Tasks that collect only single-point data, such as pulse-based Tasks, will output data in a single line under the column headings. In either case, the first line of data will include any derived single-point data and a date/time stamp.

Each line that is appended to a runtime text file will be appended to any previous line exported. That means that a single file may be assigned to multiple Task executions - as in a Branch Loop and/or in repeated Test Definition executions. Multiple Tasks may even be configured with the same file name so that data from multiple sources may be gathered into one common file.

As a final note, the columns output to the text file are single-tab-delimited. That means that the data may appear offset from the column headers when viewed in Notepad or other text editor. However, the data will import correctly into Excel, Origin or other data manipulation program.

Step-by-Step

For this sequence, a Hysteresis Task, programmed to vary voltage at 10.0 ms in a Branch Loop and configured to measure the Radiant Technologies, Inc. 4/20/80 PNZT Internal Reference Ferroelectric A Capacitor will be used. Instructions will refer to this specification. However, you may use any data-collecting Task, configured in an way, to experiment with these procedures.

Step 1: Clear the EDITOR.

Step 2: Move a Hysteresis Task into the EDITOR.

Step 3: Configure the Task as follows:

<i>Hysteresis Task Name:</i>	"Multi-Volt/10.0 ms Hysteresis - Runtime Tabular Text Export"
<i>Max Voltage:</i>	3.0
<i>Period (ms):</i>	10.0
<i>Enable Reference Ferroelectric:</i>	Checked
<i>Cap A Enable:</i>	Checked
<i>Comments:</i>	As Appropriate

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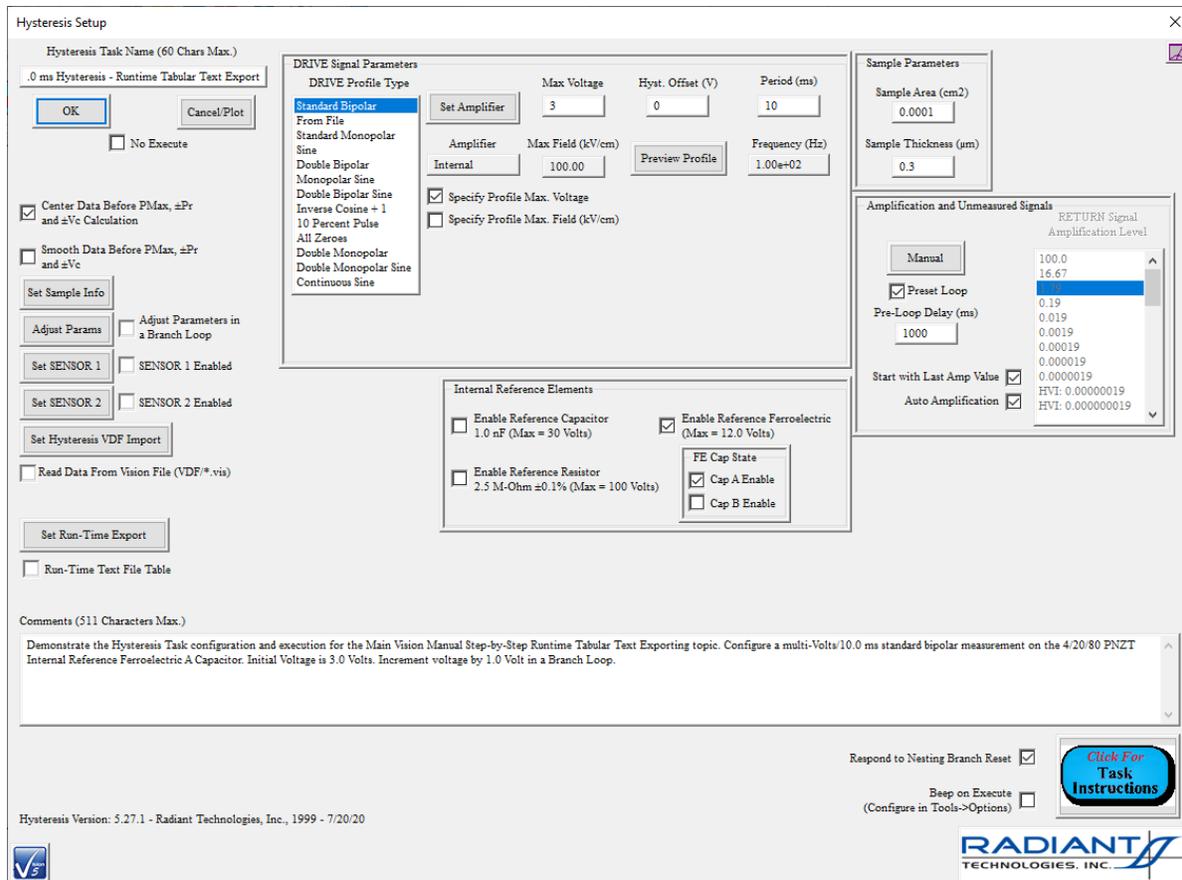


Figure 1 - Configure Multi-Volt/10.0 ms Hysteresis.

Step 4: Click *Set Runtime Export* to open the Runtime Tabular Text Export configuration sub-dialog. Perform the sequence as in the **Figure**. When the sequence is complete *Runtime Text File Table* will be checked and the output file path and file name will be written beneath the checkbox.

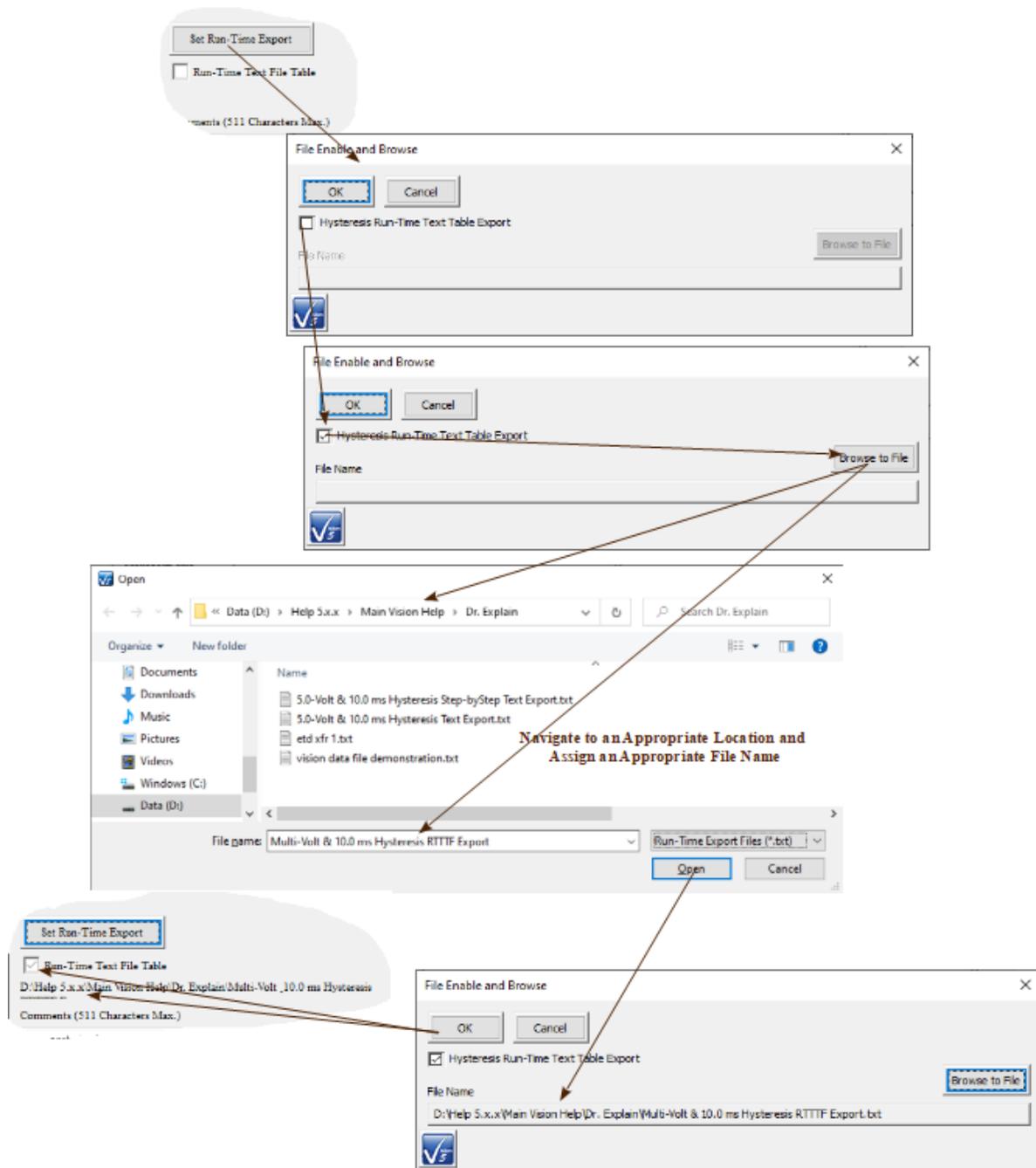


Figure 2 - Setup Runtime Tabular Text File Exporting.

Step 5: Click *Adjust Params* to open the Hysteresis parameter adjustment subdialog. Check *Adjust Hysteresis Volts in a Loop* and *Adjust by Incrementing*. Set *Voltage Increment* to 1.0. Click *OK* to close the dialog. *Adjust Parameters in a Branch Loop* will be checked on the main configuration dialog.

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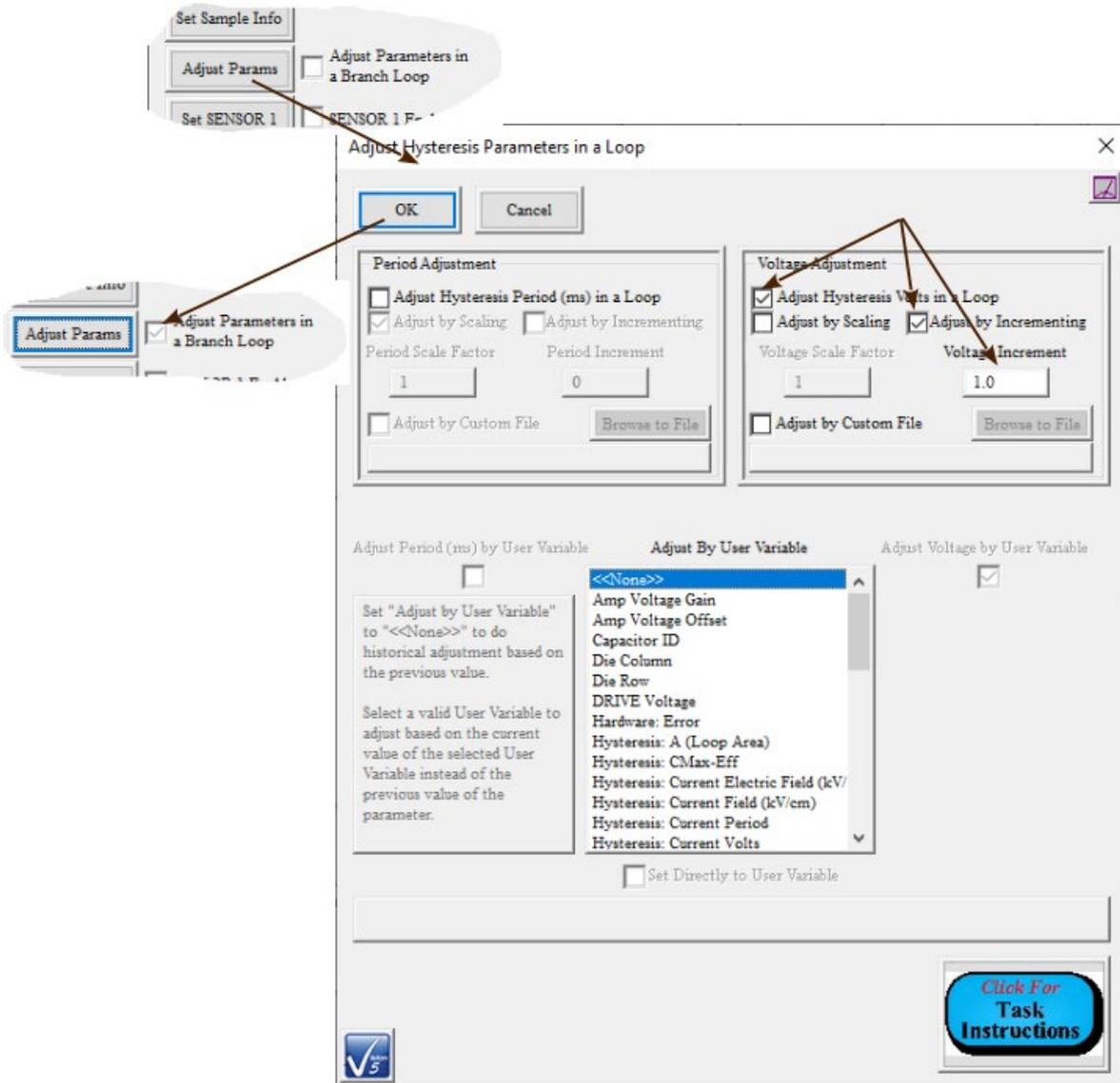


Figure 3 - Configure Hysteresis Branch Loop Adjustment.

Step 6: Click *OK* to close the main Hysteresis configuration dialog and to add the Task to the EDITOR.

Step 7: From TASK EDITOR->Program Control->Branching move a Branch Task into the EDITOR. (Note that at this point a Filter Task would normally be added to collect multi-Volt Hysteresis data. It is omitted here for simplicity. But you are welcome to modify these steps as you see fit.) Configure the Task as follows:

Branch Task Name:	"Loop to 10.0 Hysteresis Volts"
Parameter to Compare:	"Hysteresis: Current Volts"
Comparison:	"<"
Real:	10.0

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Use Tolerance:	Unchecked
User Variable Limit Selection:	"<<None>>"
Branch Point Task:	"Multi-Volt/10.0 ms Hysteresis - Runtime Tabular Text Export"
Select Branch Target:	Click after selecting <i>Branch Point Task</i> .
Comments:	As Appropriate

Branch Setup

Branch Task Name (60 Characters Max.)
Loop to 10.0 Hysteresis Volts

OK No Execute Cancel
Parameter to Compare

Branch Task: Looped
Capacitor ID
Die Column
Die Row
DRIVE Voltage
Experiment Title
Hardware Present
Hardware: Error
Hysteresis: A (Loop Area)
Hysteresis: CMax-Eff
Hysteresis: Current Electric Field (kV/cm)
Hysteresis: Current Field (kV/cm)
Hysteresis: Current Period
Hysteresis: Current Volts
Hysteresis: Horizontal Shift
Hysteresis: K-Eff
Hysteresis: Max As % Of Possible Max
Hysteresis: Offset

Comparison Integer Text
= 0
NOT = Real
< 10.0 Boolean
<= ± Tolerance true
> 0 false
>= Use Tolerance

User Variable Limit Selection
<<None>>
Amp Voltage Gain
Amp Voltage Offset
DRIVE Voltage
Hysteresis: A (Loop Area)
Hysteresis: CMax-Eff

if "Hysteresis: Current Volts" < 10.0, then Branch

Branch Point Task
Multi-Volt/10.0 ms Hysteresis - Runtime Tabular Text Export

Select Branch Target

Branch Loop Limit
150

Runaway Branching Will Stop After
"Branch Loop Limit" Iterations
Provided "Branch Loop Limit" > 0.
Set to '0' to Disable.

Comments (511 Characters Max.)
Demonstrate the Branch Task configuration and execution for the Main Vision Manual Step-by-Step Runtime Tabular Text Export topic. Return the Test Definition execution to the Hysteresis Task until "Hysteresis: Current Volts" is greater than or equal to 10.0.

Beep On Execute
(Configure in Tools->Options)

Click For Task Instructions

Branch Version: 5.27.0 - Radiant Technologies, Inc., 1999 - 7/06/20

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Figure 4 - Configure the Branch Task.

Step 7: Click *OK* to add the Branch Task to the Test Definition in the EDITOR.

Step 8: Create a new DataSet. Name the "DataSet Runtime Tabular Hysteresis Export".

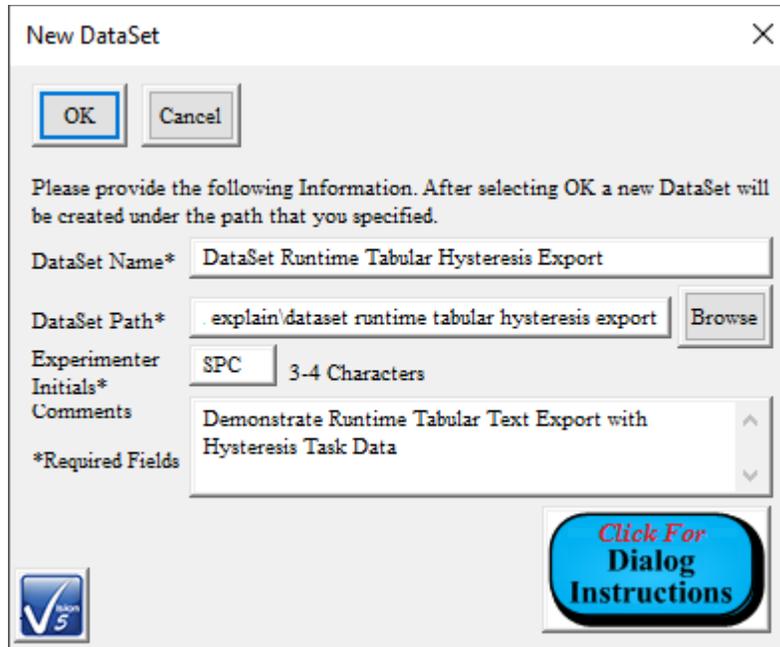


Figure 5 - Create the Step-by-Step DataSet.

Step 9: Move the EDITOR Test Definition into the new DataSet Current Test Definition (CTD). Name the CTD "Multi-Volt Runtime Tabular Hysteresis Export".

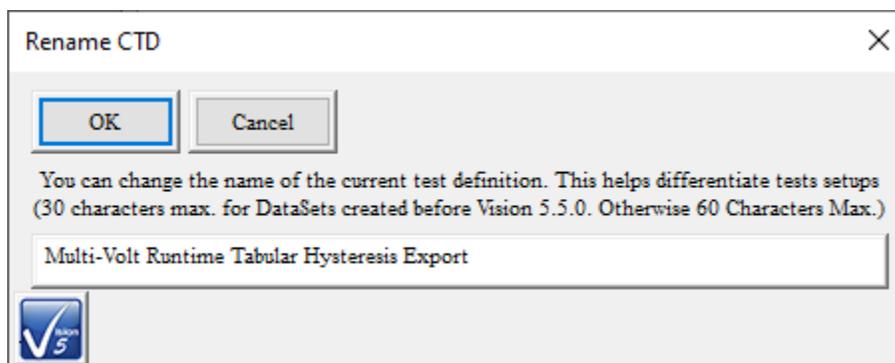


Figure 6 - Name the CTD.

Step 10: Run the CTD.

Step 11: Review the Runtime Tabular Text file.

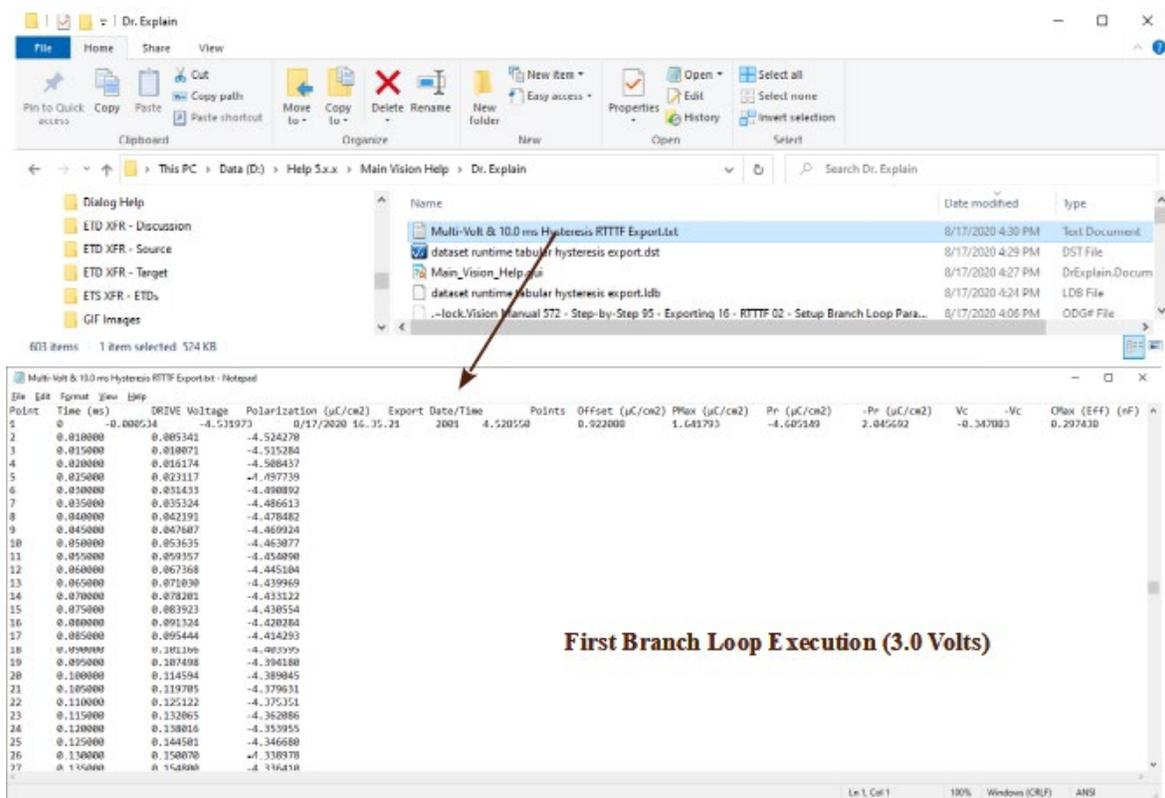


Figure 6 - Runtime Tabular Text File Content.



Runtime Windows Meta File, Bitmap or JPEG Data Image Exporting

Data-collecting Tasks that generate plots at runtime, especially Filter Tasks, can be configured to export the plot images to Windows Meta File, JPEG or Bitmap files during execution as the plots are generated. The user simply specifies the file format to use and opens a standard Windows file browser dialog to specify the output file path and baseline name. The actual output file will be built on the baseline file name, but will include a serialized index and a date/time stamp to render each file name unique. In this way a single Tasks configuration can be repeatedly executed, in a Branch Loop and/or through repeated Test Definition executions, without having an overwrite issue as the file is generated.

Step 1: Clear the EDITOR Window if there are Tasks present.

Step 2: Add a Measurement Task to the EDITOR to provide input data into the Filter. To exercise the multiple-instance property of this tool, configure the Task to operate in a Branch Loop. (Here a 10.0 ms Hysteresis Task is configured to measure the 4/20/80 PNZT Internal Reference Ferroelectric A Capacitor over a 2.0-Volt to 10.0Volt range.)

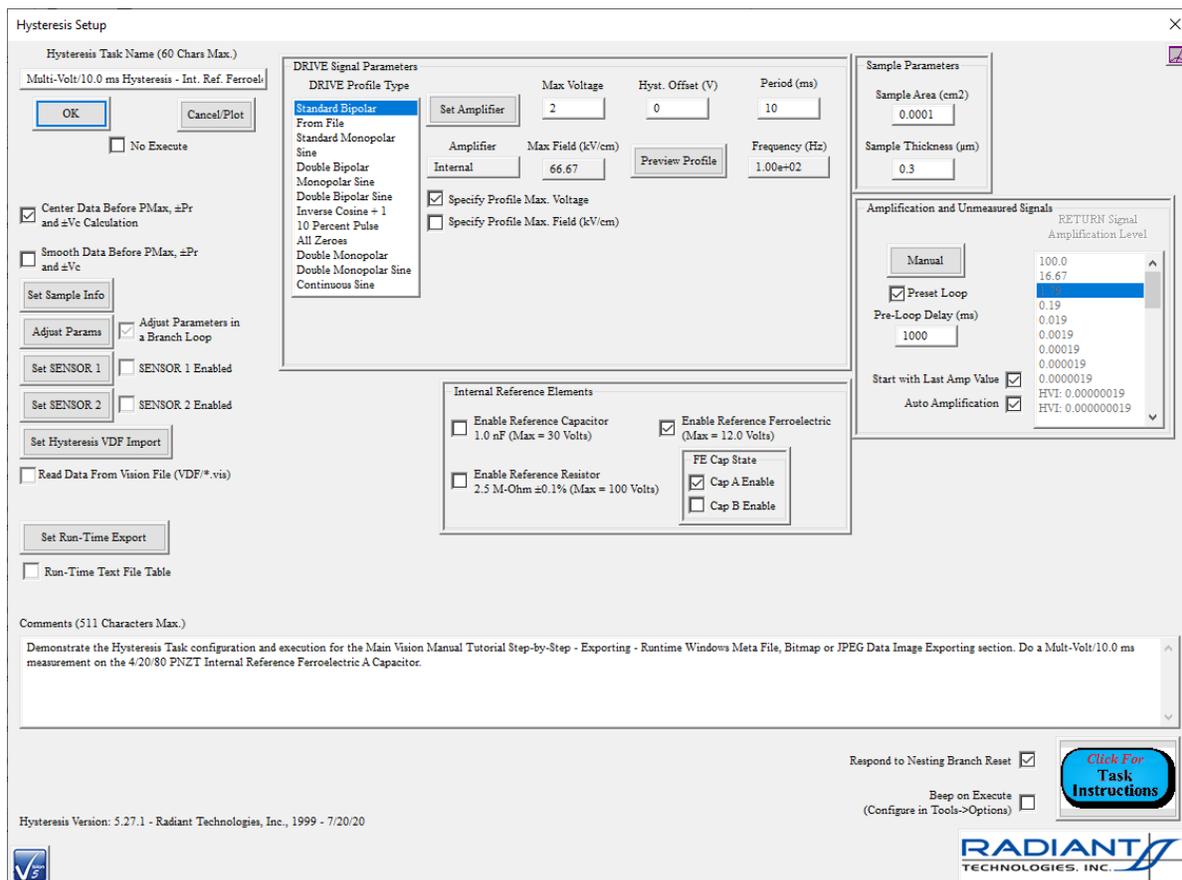


Figure 1 - Configure a Measurement Task to Operate in a Branch Loop.

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Step 3: Add an appropriate Filter Task that will collect and plot the measured data at runtime. Set the main Filter Task configuration appropriately. (Here a Hysteresis Filter Task is configured to collect and center the measured Hysteresis polarization ($\mu\text{C}/\text{cm}^2$) as a function of voltage.)

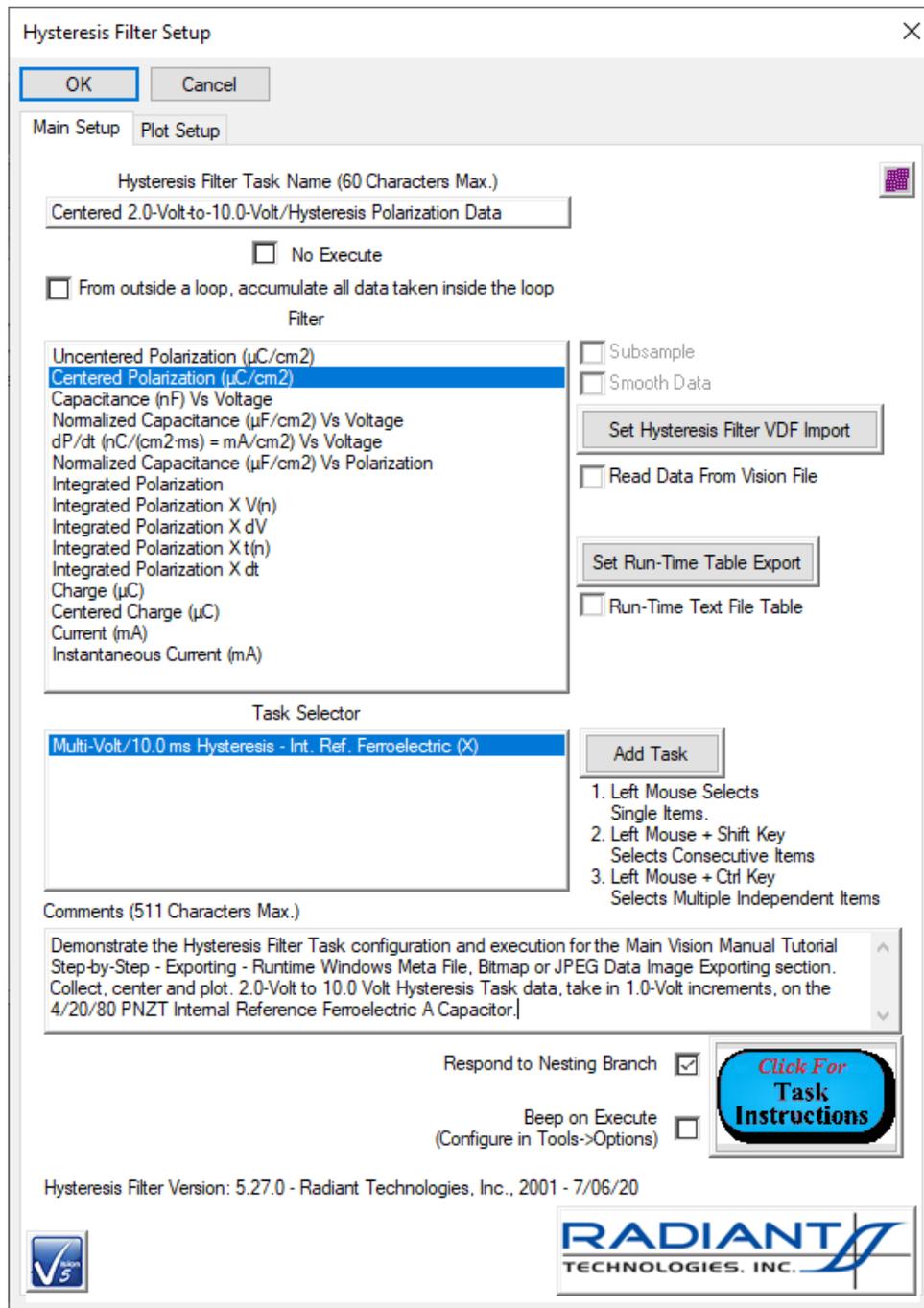


Figure 2 - Filter Task Main Configuration.

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Step 4: Configure the Filter Task Data Plot

- A. Select the Filter Task configuration dialog "Plot Setup Tab".
- B. Add labels as appropriate.
- C. Select the Plot X-Axis Type if appropriate.
- D. Check *Export Meta Data at Runtime* or *Export JPEG at Runtime* or *Export Bitmap at Runtime*.
- E. Click *Browse to File*. Navigate to an appropriate location and specify an appropriate base file name.
- F. Click *OK* to close the browse and update the displayed *File Name*.

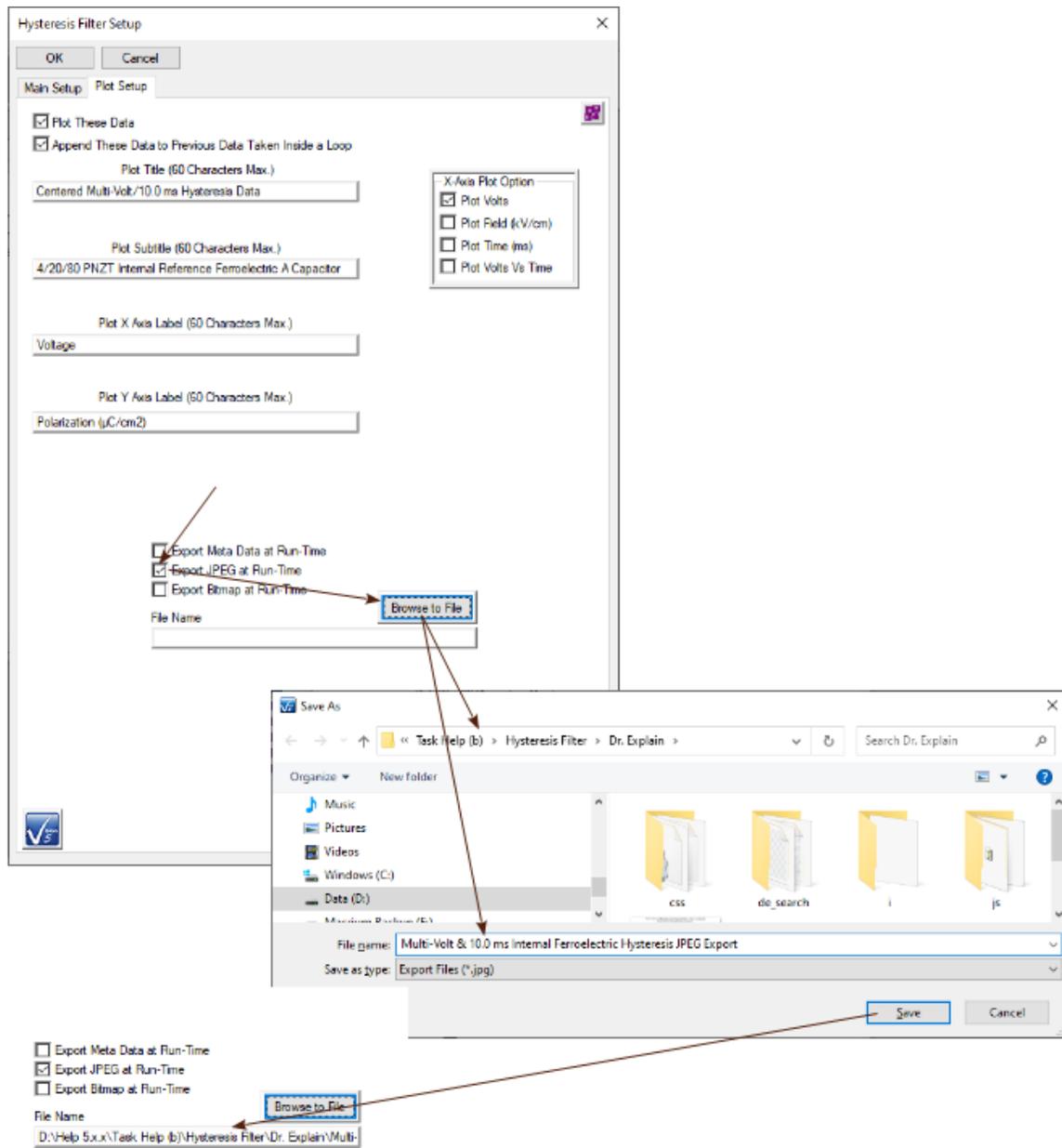


Figure 3 - Configure Filter Plot with Runtime Image Export.

G. Click *OK* to close the Filter Task configuration dialog and add the Task to the EDITOR Test Definition.

Step 5: Add a Branch Task to the EDITOR Test Definition. Configure the Task to return execution to the Measurement Task. Assign an appropriate [Branch Logic Condition](#). (In this example, the Branch Task returns execution to the initial Hysteresis Task until "Hysteresis: Current Volts" is greater than or equal to 10.0.

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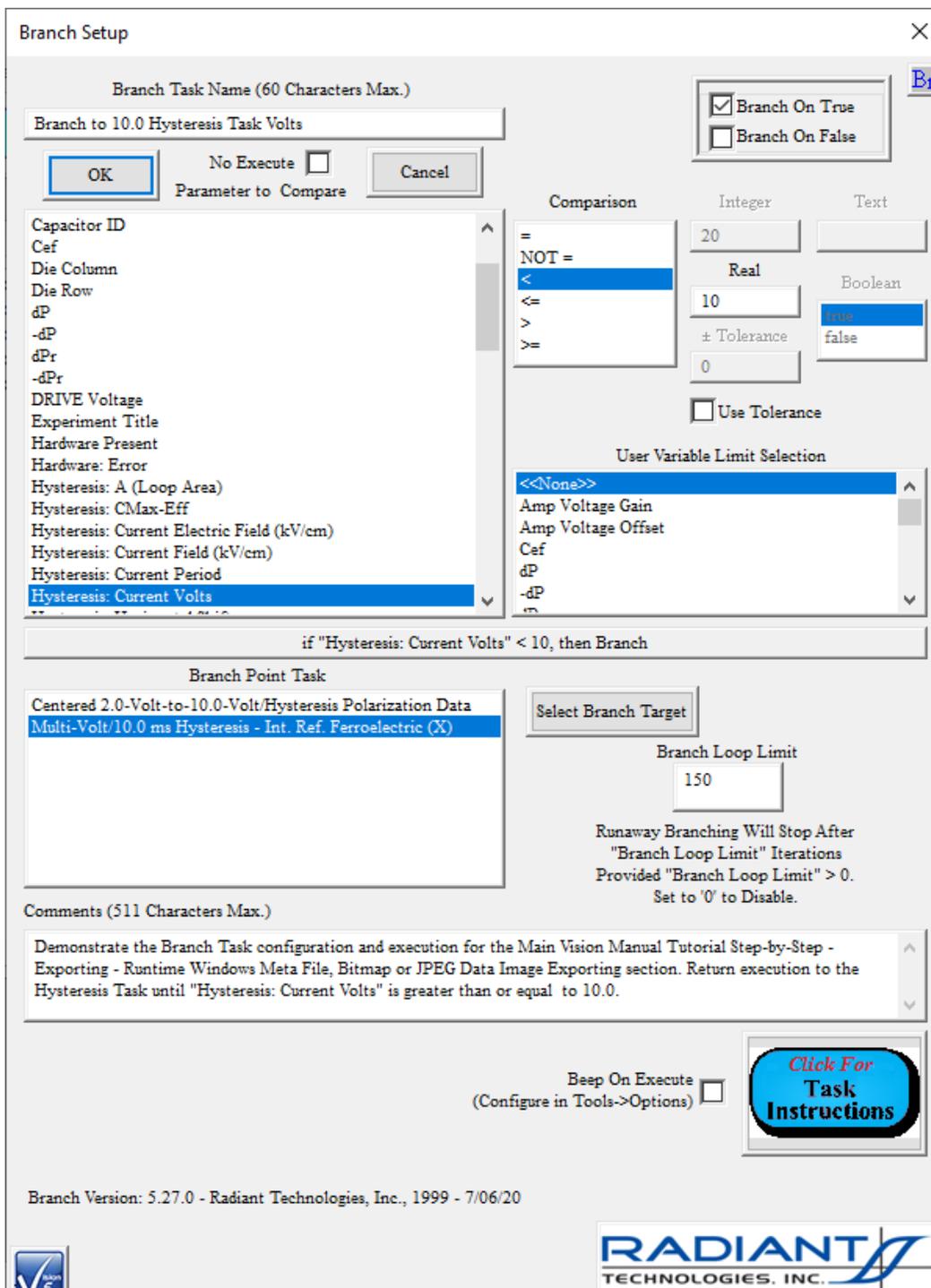


Figure 4 - Configure the Branch Task.

Step 6: Exercise the Test Definition.

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- A. Create a DataSet of appropriate name in an appropriate location, or open an existing DataSet.

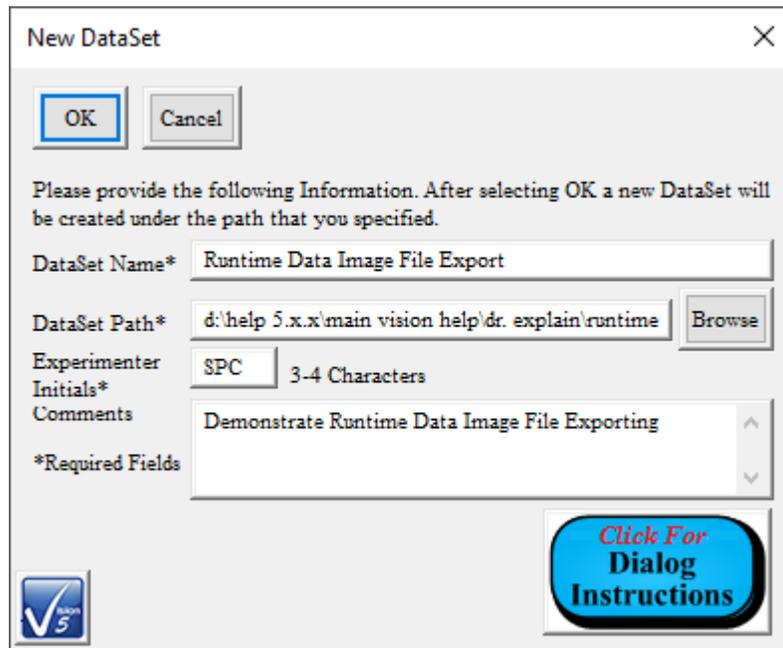


Figure 5 - Create an Appropriate DataSet.

- B. Move the Test Definition from the EDITOR to the DataSet. Assign an appropriate CTD Name.

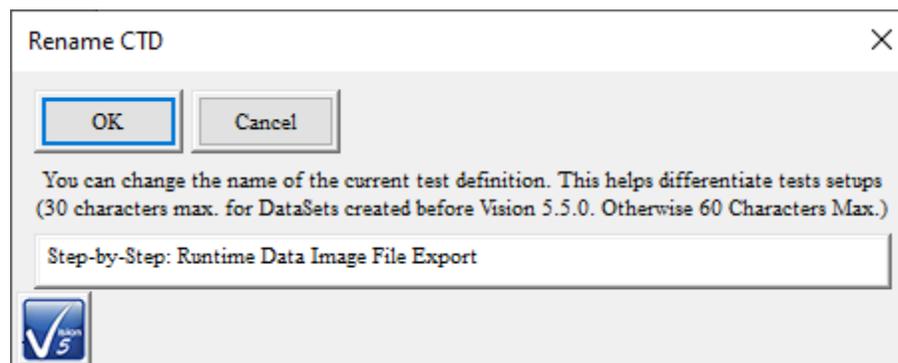


Figure 6 - Name the CTD.

- C. Using any means, run the CTD.

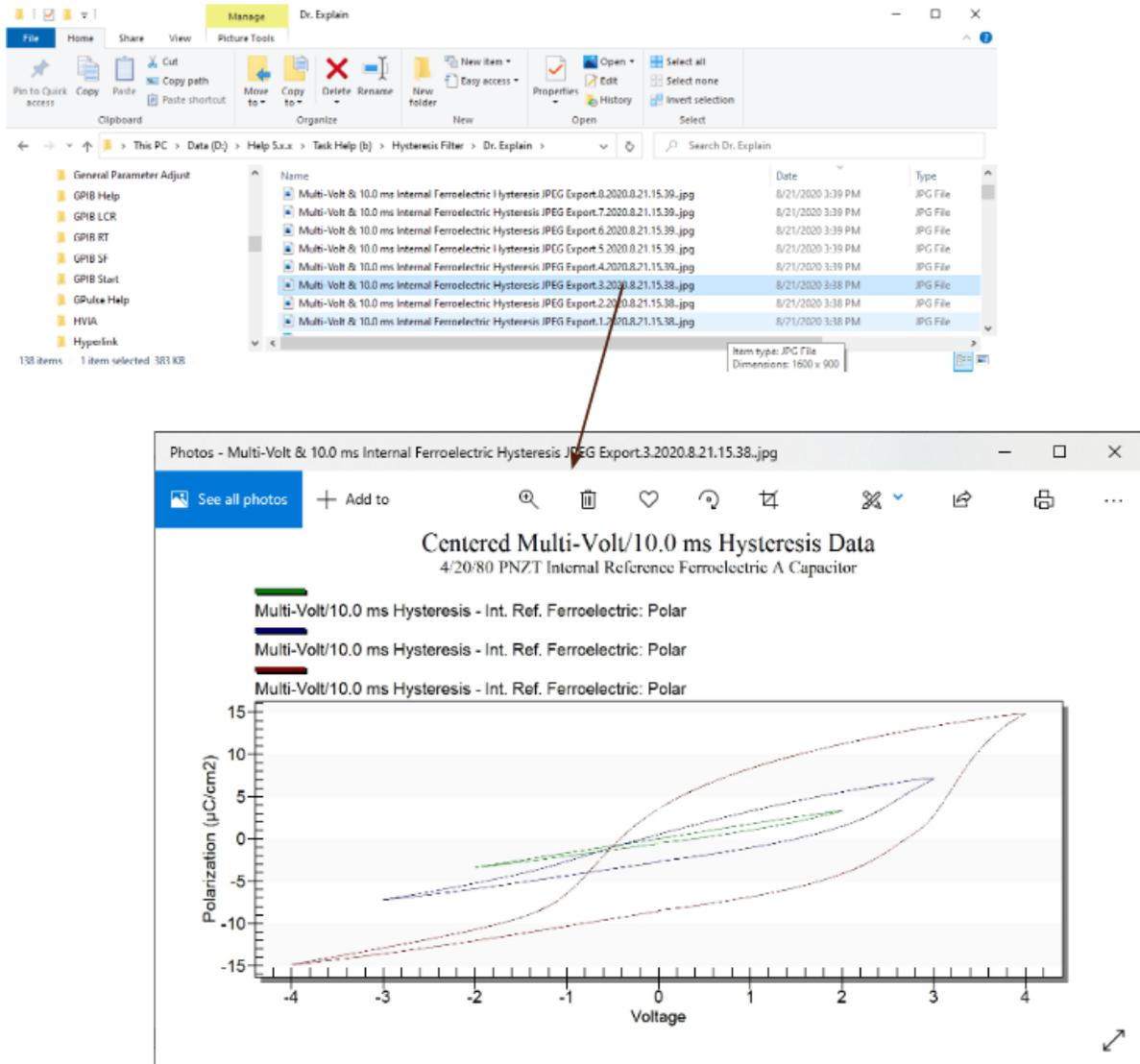


Figure 8 - Runtime Exported Image - Third Branch Loop Iteration (4.0 Volts).

Print/Export Task

<TODO>: Insert description text here... And don't forget to add keyword for this topic

ETD Bulk Exporting

<TODO>: Insert description text here... And don't forget to add keyword for this topic



Hardware Refresh & Tester Selection Dialog

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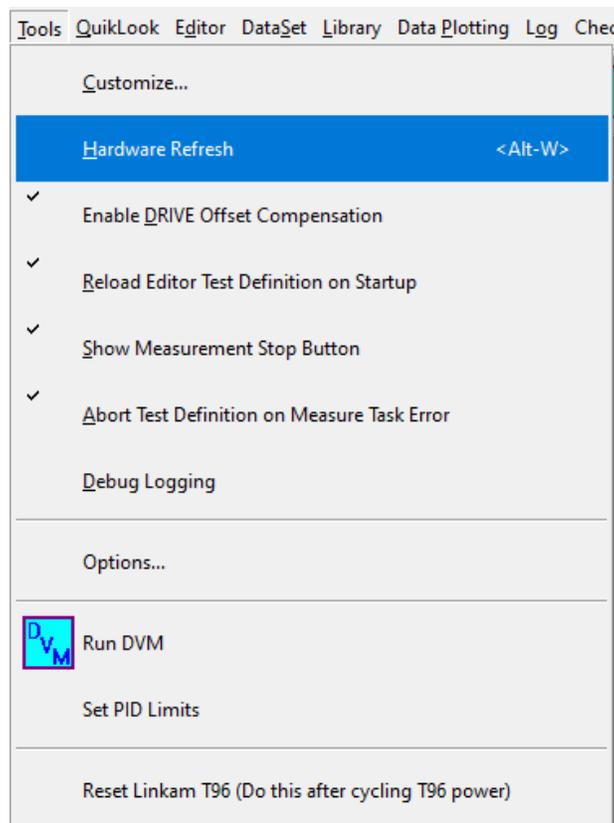


Hardware Refresh

When Vision starts up it detects the Precision NGS tester connected to the host computer through a USB cable. Once started, it presents a Tester Selection dialog that lists the tester by name. (If no testers are connected or powered, the dialog indicates "No Tester Attached" in the *Attached Tester* list box.) The target tester must be selected and the dialog closed before Vision may proceed.

If there is a change in the hardware configuration (testers are added and/or removed, a High-Voltage Interface [HVI] is connected or powered, etc.) or to perform any of the actions in the following three topics, Vision must be made to redetect the tester and accessories and reopen the Tester Selection dialog. This is known as refreshing the hardware.

Step 1: Go to Tools->Hardware Refresh (Alt-W) in the main Vision menu, or press <Alt-W>.



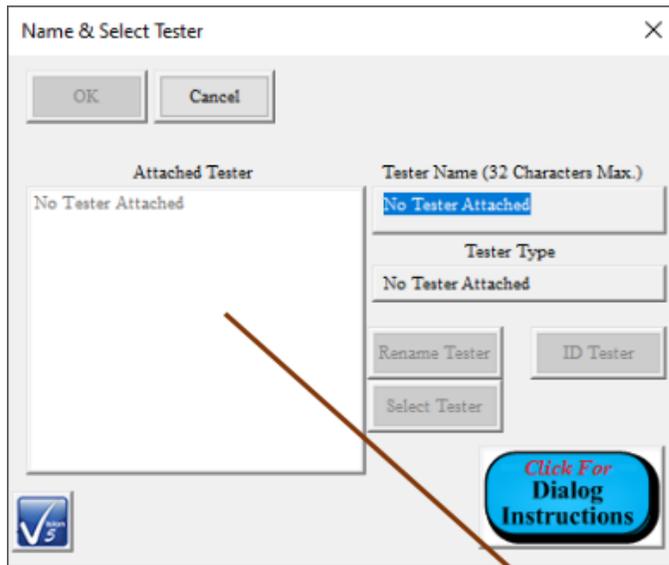
Go to Tools→Hardware Refresh
or Press <Alt-W>

Figure 1 - Initiate Hardware Refresh.

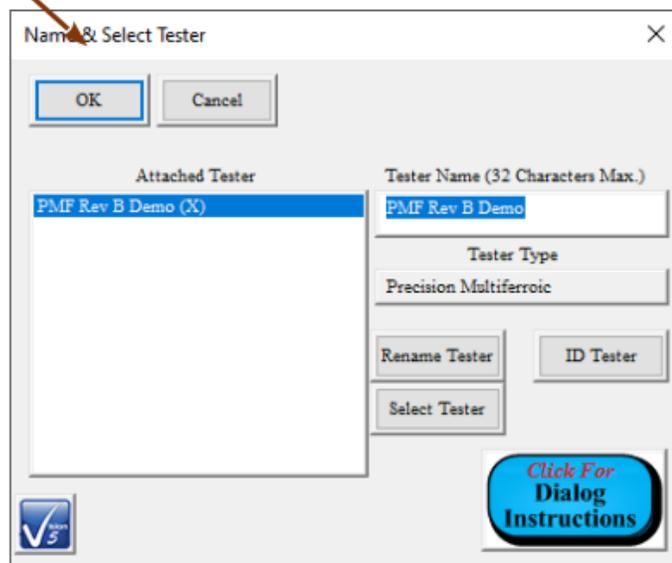
Step 2: The Tester Selection dialog will appear with the current available tester listed by name.

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Click *OK* to close the dialog.



Tester Selection Dialog on Vision Startup with No Tester Detected



Tester Selection Dialog after Tester Power-Up and Hardware Refresh

Figure 2 - Hardware Configuration Change Reflected in Hardware Refresh.

Step 3: Complete tester calibration. When the dialog is closed Vision will enter a tester calibration period. Allow the calibration to proceed and to finish. Vision is then in its idle state.

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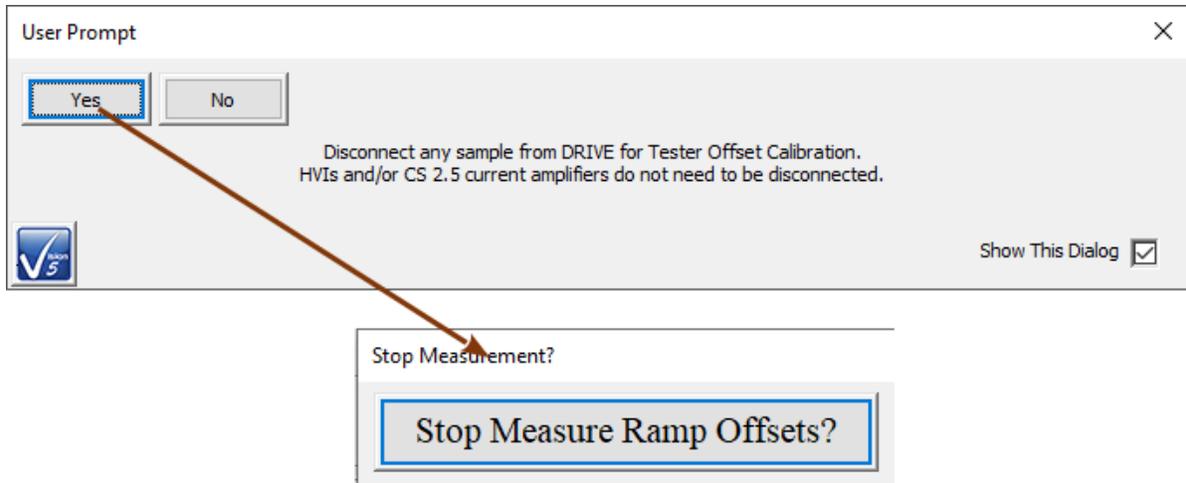


Figure 3 - Tester Calibration After Hardware Refresh.

Identify Tester

The tester selection dialog was initially intended to allow multiple connected Precision testers to be displayed. The dialog would allow a single tester to be selected for use from the *Attached Tester* list of testers. Vision no longer accommodates more than a single Precision tester. However, the tools originally built into the dialog remain active. Among these is the *ID Tester* button. By highlighting the intended tester in the *Attached Tester* list and clicking *ID Tester*, a signal is sent to the selected tester to cause the front-panel Active lamp to blink more rapidly for five seconds.

- Step 1:** Ensure that the hardware is properly configured with desired testers connected to the Vision host and powered.
- Step 2:** Do a Hardware Refresh.
- Step 3:** In the Tester Selection dialog select the tester to be identified in the *Attached Tester* list. Click *ID Tester*.
- Step 4:** Observe that the green "Active" light on the front of the selected tester blinks more rapidly than normal for a period of five seconds.

Rename Tester

Each tester of any type has a small EEPROM that is used to store tester information. One field in the EEPROM contains a unique name, of up to 32 characters, for the tester. This name may be changed by the user. Identifying the tester by name was particularly useful when Vision allowed more than one tester of the same type to be connected to the host computer. Whenever the tester appears in the Tester Selection dialog it will appear using that name. The name may be changed by using the tester selection dialog.

Step 1: Ensure the tester is connected to the Vision host and powered.

Step 2: Perform a Hardware Refresh. The Tester Selection dialog appears with the connected and powered tester listed.

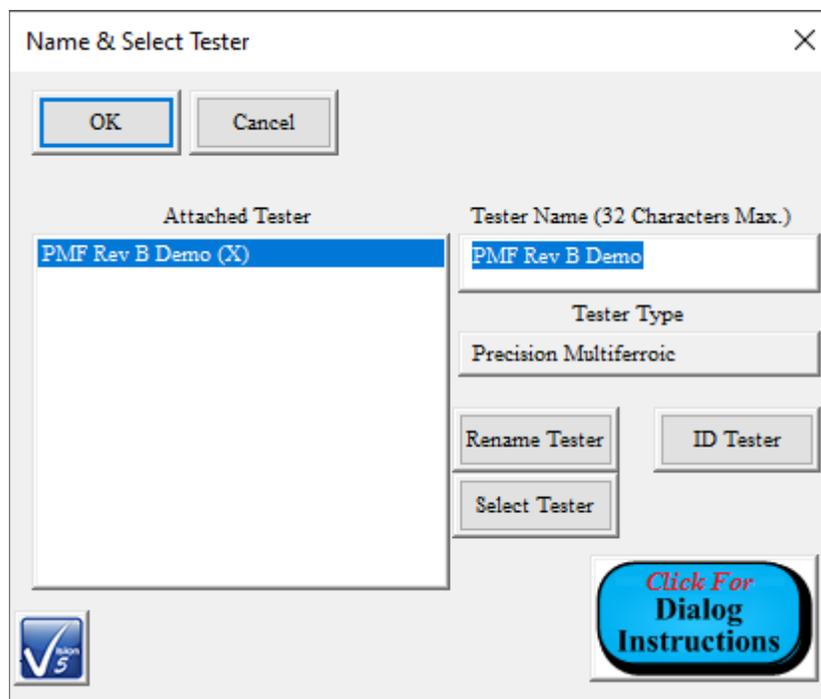


Figure 1 - Tester Selection Dialog with Connected Testers Listed.

Step 3: The detected tester will be highlighting it in *Attached Tester*. The current name appears in *Tester Name (32 Characters Max.)*. The Tester Type indicator will also be updated. (Note that the example in **Figure 2** uses a Precision Multiferroic tester.)

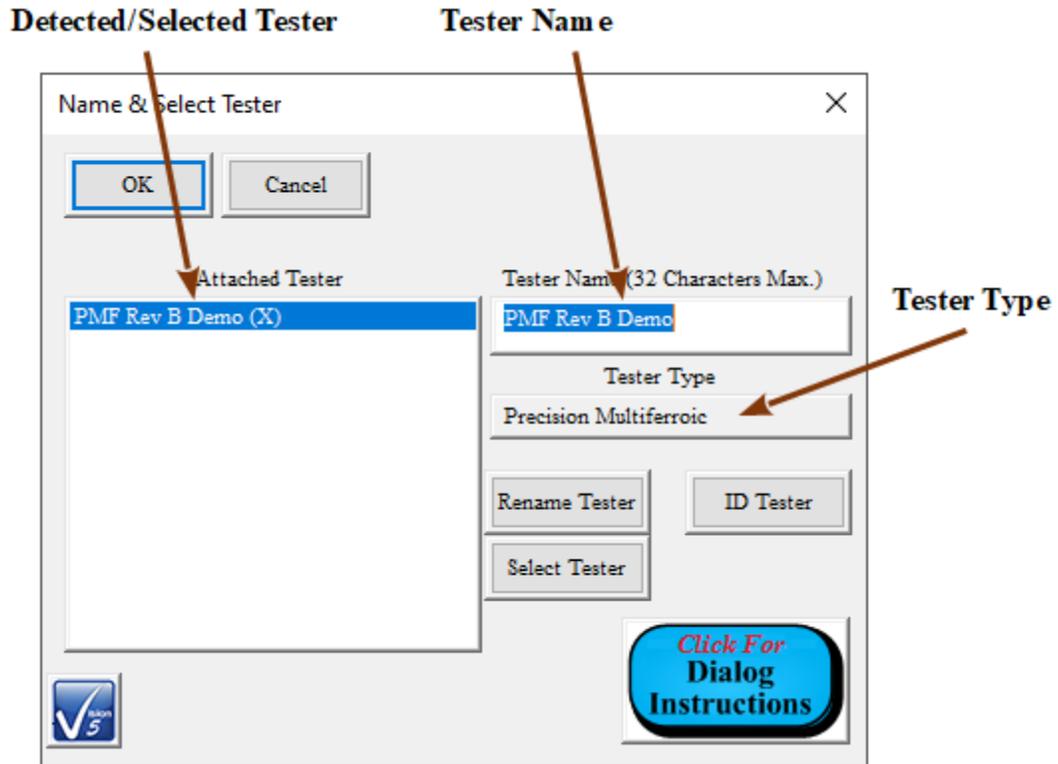


Figure 2 - Tester Selection Dialog with Appropriate Tester Selected.

Step 4: Type the new name in *Tester Name (32 Characters Max.)*, then click *Rename Tester*. The updated name will appear in *Attached Tester*.

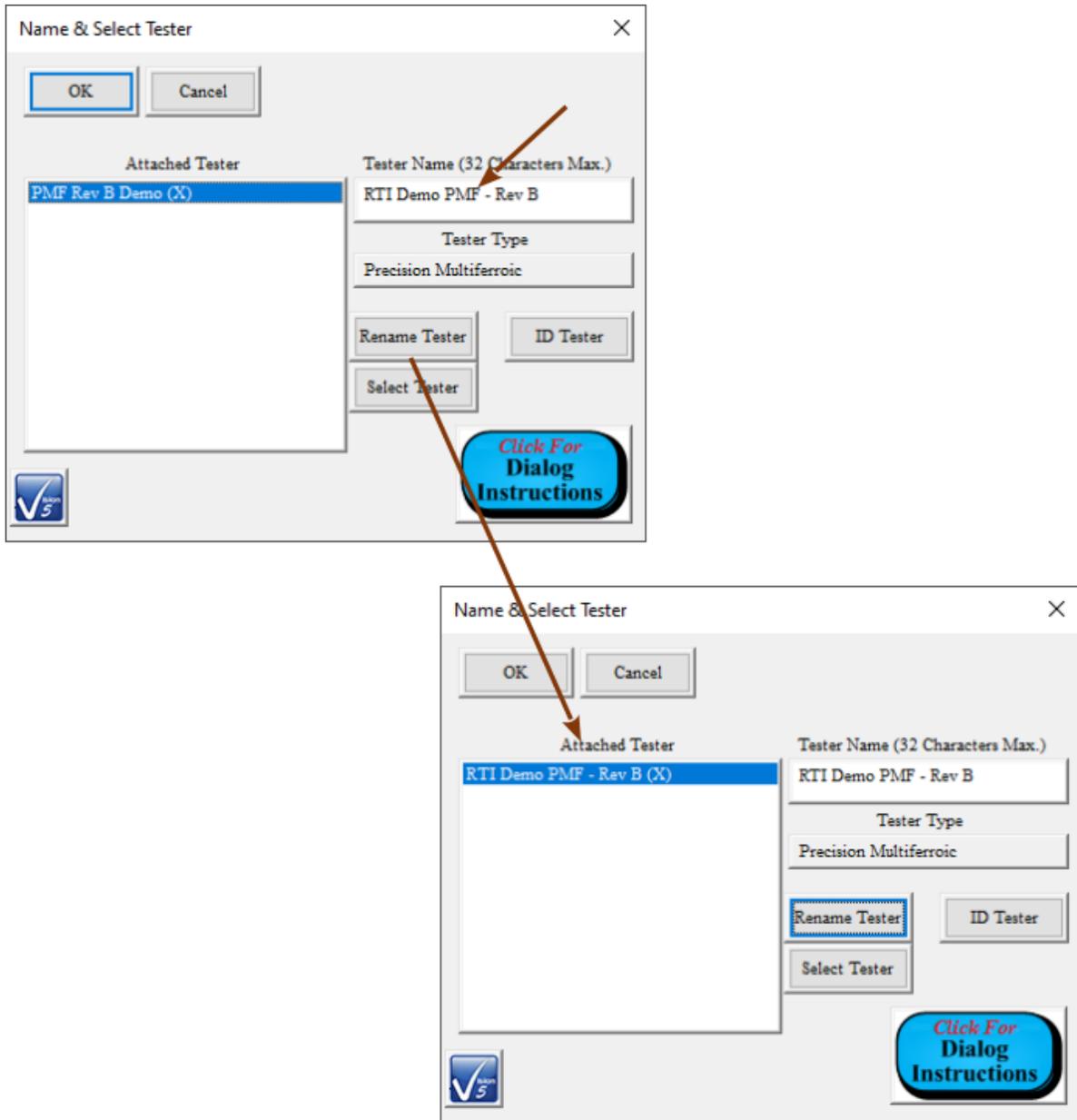


Figure 3 - Renaming Action Sequence.

Step 5: Close the Tester Selection dialog and do a Hardware Refresh. The dialog will reappear with the updated tester name in Attached Tester. This is a positive indication that the tester name has been written to the tester EEPROM.

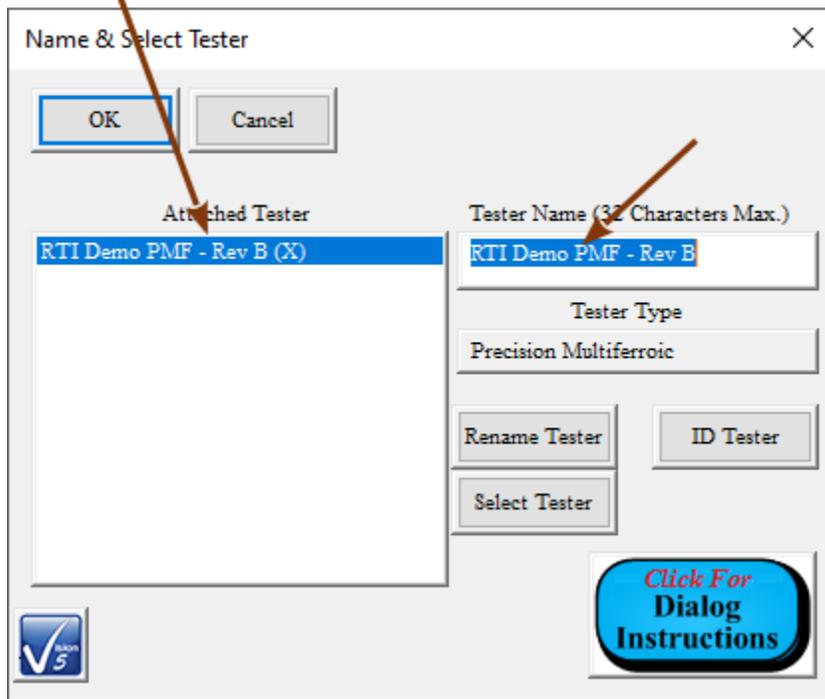


Figure 4 - Tester Name has been Updated in the Tester EEPROM.

Using the Ferroelectric Calculator

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Using the Ferroelectric Calculator

The calculator is a Vision menu option intended to determine any one of five ferroelectric sample parameters by deriving the value from a combination of user-specified values entered into the remaining parameters. Parameters calculated include Capacitance (nF), Charge (μC), Polarization ($\mu\text{C}/\text{cm}^2$), Voltage applied to the sample and Sample Area (cm^2). Polarization ($\mu\text{C}/\text{cm}^2$) is simply the Charge (μC) value divided by the Area (cm^2) value and Charge (μC) and Polarization ($\mu\text{C}/\text{cm}^2$) are derived simultaneously. Capacitance (nF) and Drive Voltage can be calculated using either the Charge (μC) or Polarization ($\mu\text{C}/\text{cm}^2$) value and the user is offered an opportunity to select between them. **Table 1** shows the derivation of each value considering the Charge (μC)/Polarization ($\mu\text{C}/\text{cm}^2$) option.

Value	Derivation from Charge (μC)	Derivation from Polarization ($\mu\text{C}/\text{cm}^2$)
Capacitance (nF) (C)	$1000 \text{ (nF}/\mu\text{F}) \times Q / V$	$1000 \text{ (nF}/\mu\text{F}) \times P \times A / V$
Charge (μC) (Q)	$C \times V / 1000 \text{ (nF}/\mu\text{F})$ (Independent of Charge and Polarization.)	$C \times V / 1000 \text{ (nF}/\mu\text{F})$ (Independent of Charge and Polarization.)
Polarization ($\mu\text{C}/\text{cm}^2$) (P)	$C \times V / (1000 \text{ (nF}/\mu\text{F}) \times A) = Q/A$ (Independent of Charge and Polarization.)	$C \times V / (1000 \text{ (nF}/\mu\text{F}) \times A) = Q/A$ (Independent of Charge and Polarization.)
Voltage (V)	$1000 \text{ (nF}/\mu\text{F}) \times Q / C$	$1000 \text{ (nF}/\mu\text{F}) \times P \times A / C$
Area (cm^2) (A)	N/A	$C \times V / (1000 \text{ (nF}/\mu\text{F}) \times P)$

Table 1 - Ferroelectric Parameter Derivations.

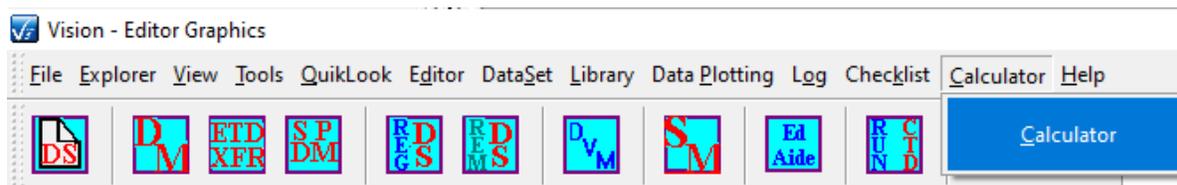


Figure 1 - Accessing the Calculator from Vision.

The calculator is accessed through the "Calculator->Calculator" option in the main Vision menu as in **Figure 1**. The dialog of **Figure 2** appears. By default, the value to be calculated is the Polarization/Charge pair. The polarization derivation is enabled and the charge derivation disabled, but these controls are hidden since the default values to be derived are independent of this option. **Figure 3** shows the option appearing in the dialog when "Voltage" is selected to be derived.

The screenshot shows the 'Ferroelectric Calculator' dialog box with the following fields and values:

- Done** button (top left)
- Voltage**: 5.0
- Capacitance (nF)**: 1.0
- Charge (μC)**: 0.005
- Polarization (μC/cm²)**: 50.0
- Area (cm²)**: 0.0001
- Value to Calculate** dropdown menu:
 - Capacitance (nF)
 - Charge (μC) & Polarization (μC/cm²)
 - Voltage
 - Area (cm²)
- Calculate** button (bottom right)
- Logo: Vision 5

Figure 2 - Default Calculator Dialog.

The screenshot shows the 'Ferroelectric Calculator' dialog box with the following fields and values:

- Done** button (top left)
- Voltage**: 5.0
- Capacitance (nF)**: 1.0
- Charge (μC)**: 0.005
- Polarization (μC/cm²)**: 50.0
- Area (cm²)**: 0.0001
- Value to Calculate** dropdown menu:
 - Capacitance (nF)
 - Charge (μC) & Polarization (μC/cm²)
 - Voltage
 - Area (cm²)
- Calculation Method** section:
 - Calculate by Charge
 - Calculate by Polarization
- Calculate** button (bottom right)
- Logo: Vision 5

Figure 3 - Calculate Voltage from Polarization.

Default values for each of the ferroelectric parameters are shown in **Figures 2** and **3** and given in **Table 2**. When a combination of *Value to Calculate* and (where appropriate) *Calculation Method*

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is selected, the value to be calculated is set to read-only. Any parameters that do not figure in the calculation are disabled. The remaining active parameters are free to be adjusted before the derivation is performed. **Figure 4** Represents the calculation of Capacitance (nF) from Charge (μC), given by $1000 \times Q / V$. Charge and Voltage figure in the calculation. Polarization and Area do not and are disabled.

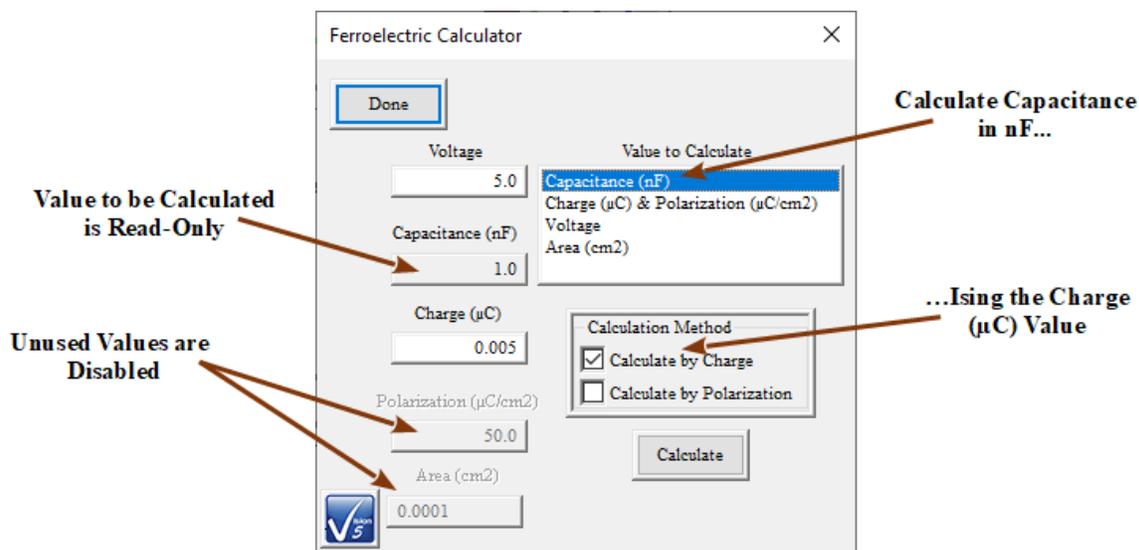


Figure 4 - Control States when Deriving Capacitance (nF) from Charge (μC).

Controls

Name	Type	Default	Description
<i>Voltage</i>	Real	5.0	Derived or User-Set. Voltage applied to the sample to agree with the current state of all other parameters. This control is read-only when <i>Value to Calculate</i> is set to "Voltage". Otherwise it is enabled.
<i>Capacitance (nF)</i>	Real	1.0	Derived or User-Set. Capacitance of the sample in nF to agree with the current state of all other parameters. This control is read-only when <i>Value to Calculate</i> is set to "Capacitance (nF)". Otherwise it is enabled.
<i>Charge (μC)</i>	Real	0.005	Derived or User-Set. Electrical charge in μC stored on the sample to agree with the current state of all other parameters. This control is read-only when <i>Value to Calculate</i> is set to "Charge (μC)" and Polarization ($\mu\text{C}/\text{cm}^2$). It is disabled when <i>Value to Calculate</i> is set to "Area" or when <i>Value to Calculate</i> is set to "Voltage" or "Capacitance" and <i>Calculate by Charge</i> is unchecked. It is enabled when <i>Value to Calculate</i> is set to "Voltage" or "Capacitance" and <i>Calculate by Charge</i> is checked.
<i>Polarization ($\mu\text{C}/\text{cm}^2$)</i>	Real	50.0	Derived or User-Set. Polarization state in $\mu\text{C}/\text{cm}^2$ of the sample to agree with the current state of all other parameters. This control is read-only when <i>Value to Calculate</i> is set to "Charge (μC)" and Polarization ($\mu\text{C}/\text{cm}^2$). It is disabled when <i>Value to Calculate</i> is set to "Voltage" or "Capacitance" and <i>Calculate by Polarization</i> is unchecked. It is enabled when <i>Value to Calculate</i> is set to "Area (cm^2)" or when set to "Voltage" or "Capacitance (nF)" and <i>Calculate by Polarization</i> is checked.
<i>Area (cm^2)</i>	Real	0.0001 (1e-	Derived or User-Set. Area in cm^2 of the sample to agree with the current

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		4)	state of all other parameters. This control is read-only when <i>Value to Calculate</i> is set to "Area". It is disabled when <i>Value to Calculate</i> is set to "Voltage" or "Capacitance" and <i>Calculate by Charge</i> is checked. It is enabled when <i>Value to Calculate</i> is set to "Charge (μC) and Polarization ($\mu\text{C}/\text{cm}^2$)" or when set to "Voltage" or "Capacitance (nF)" and <i>Calculate by Polarization</i> is checked.
<i>Value to Calculate</i>	List Box	"Charge (μC) & Polarization ($\mu\text{C}/\text{cm}^2$)"	Select the ferroelectric parameter to be derived. This control, together with <i>Calculate by Charge</i> and <i>Calculate by Polarization</i> , affects the control state of <i>Voltage</i> , <i>Capacitance (nF)</i> , <i>Charge (μC)</i> , <i>Polarization ($\mu\text{C}/\text{cm}^2$)</i> and <i>Area (cm²)</i> as shown in Table 3 . The selection in this control will cause <i>Calculate by Charge</i> and <i>Calculate by Polarization</i> to be hidden or revealed.
<i>Calculate</i>	Button	Unpressed	Derive the value selected in <i>Value to Calculate</i> based on the values found in the controls representing the other ferroelectric parameters. Display the derived value in the value's control.
<i>Calculate by Charge</i>	Check Box	Unchecked	If checked, perform the Capacitance (nF) or Voltage derivation based on the value in Charge (μC). This control, together with <i>Value to Calculate</i> , affects the control state of <i>Voltage</i> , <i>Capacitance (nF)</i> , <i>Charge (μC)</i> , <i>Polarization ($\mu\text{C}/\text{cm}^2$)</i> and <i>Area (cm²)</i> as shown in Table 3 . Changing the state of this control will change the state of <i>Calculate by Polarization</i> . This control is hidden when <i>Value to Calculate</i> is set to "Area (cm ²)" or "Charge (μC) & Polarization ($\mu\text{C}/\text{cm}^2$)". Otherwise it is visible on the dialog.
<i>Calculate by Polarization</i>	Check Box	Checked	If checked, perform the Capacitance (nF) or Voltage derivation based on the value in Charge (μC). This control, together with <i>Value to Calculate</i> , affects the control state of <i>Voltage</i> , <i>Capacitance (nF)</i> , <i>Charge (μC)</i> , <i>Polarization ($\mu\text{C}/\text{cm}^2$)</i> and <i>Area (cm²)</i> as shown in Table 3 . Changing the state of this control will change the state of <i>Calculate by Charge</i> . This control is hidden when <i>Value to Calculate</i> is set to "Area (cm ²)" or "Charge (μC) & Polarization ($\mu\text{C}/\text{cm}^2$)". Otherwise it is visible on the dialog.
<i>Done</i>	Button	Unpressed	Quit the Calculator operation.

Table 2 - Calculator Dialog Controls.

	<i>Capacitance (nF)</i>	<i>Charge (μC)</i>	<i>Polarization ($\mu\text{C}/\text{cm}^2$)</i>	<i>Voltage</i>	<i>Area (cm²)</i>
"Capacitance (nF)" Charge Calculation	Read-Only	Enabled	Disabled	Enabled	Disabled
"Capacitance (nF)" Polarization Calculation	Read-Only	Disabled	Enabled	Enabled	Enabled
"Charge (μC) & polarization ($\mu\text{C}/\text{cm}^2$)"	Enabled	Read-Only	Read-Only	Enabled	Enabled
"Voltage" Charge Calculation	Enabled	Enabled	Disabled	Read-Only	Disabled
"Voltage" Polarization Calculation	Enabled	Disabled	Enabled	Read-Only	Enabled
"Area (cm ²)"	Enabled	Disabled	Enabled	Enabled	Read-Only

Table 3 - Calculator Dialog Value Controls States.

Table 3 shows the state of *Capacitance (nF)* , *Charge (μC)* , *Polarization ($\mu\text{C}/\text{cm}^2$)* , *Voltage* and *Area (cm²)* controls on the calculator dialog depending on the control selected for derivation and, where appropriate, the selection of Charge or Polarization derivation. The columns labeled horizontally along the top represent the ferroelectric value whose control's state is being tabled. The rows labeled vertically along the left represent the various states of the *Value to Calculate* , *Calculate by Charge* and *Calculate by Polarization* controls.

Test Definition Graphs

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Introduction

A Test Definition defines an experiment as a linear sequence of Tasks. Test Definitions are constructed in the Vision Editor. They are moved into DataSets as an experiment that is ready to execute, known as the Current Test Definition (CTD). Once executed, they are stored in the DataSet as a series of Executed Test Definitions (ETDs). Test Definition Graphs may be created from any of these locations. A Test Definition Graph may also be opened by recalling it from a file, normally with the extension *.GRPH.

As shown in **Figure 1**, the Test Definition Graph appears in a two-paned window, similar to a Filter Task data presentation. To the right is a box labeled Mini-Graph that shows the sequence of Tasks by Task family type icon. It also shows the dependence between Filter (brown lines) and Branch (blue Line) Tasks and their Target Tasks. The same relationships are presented in the left pane. However, in that case, the Tasks are presented with more detail. Each Task is shown in a colored box. The color refers to the Task Family Type. (Task Family types, their colors and icons are presented in **Table 1**.) The Task writes Task-specific configuration data into the Task box so that the Test Definition may be reconstructed from the Test Definition Graph.

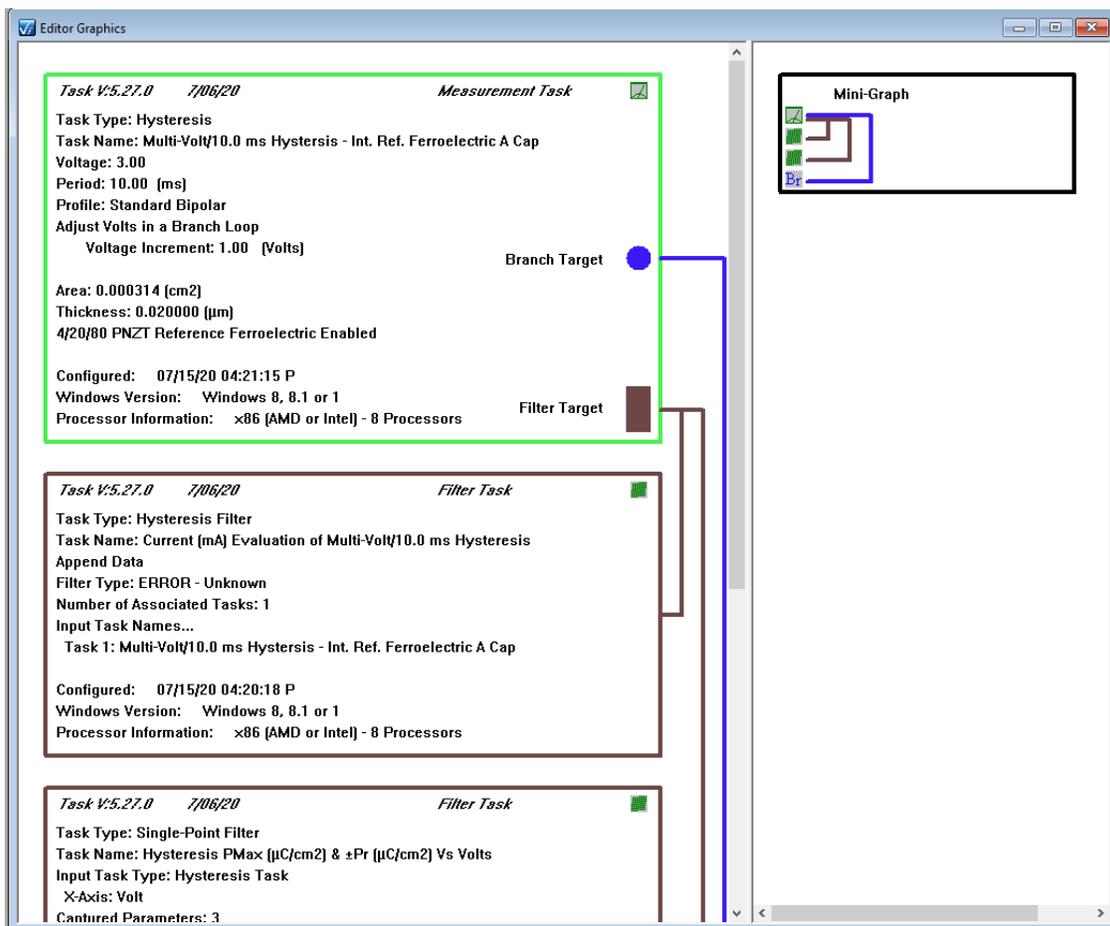


Figure 1 - A Typical Test Definition Graph.

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Task Family Type	Box Color	Icon
Program Control	Blue	
Hardware	Dark Green	
Measurement	Light Green	
GPIB	Orange	
Filter	Dark Brown	
Long-Duration	Light Brown	
Branch	Blue	
Nesting Branch	Blue	

Table 1 - Icons and Box Colors by Task Family Type.

Tasks may present their data in either minimized, standard or full data presentation.

Minimize Text.

In the minimized text representation, all Tasks provide the same information. This includes the italicized Task Version, compilation date and family and the Task Type and Task name entries. Since the size of the boxes is minimized, links and symbols indication associations between Filter and Branch Tasks and their Targets are eliminated. This information is still provided in the Mini-Graph of the right pane.

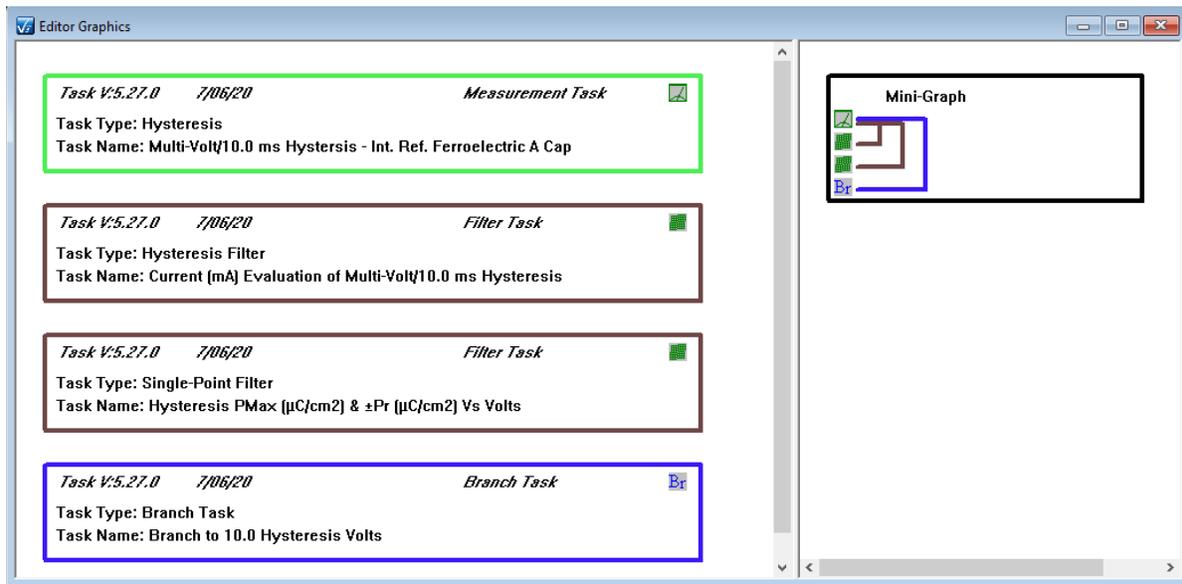


Figure 2 - Minimized Text.

Standard Text

This is the normal Task presentation. Tasks provide complete configuration information. Full links are provided between Branch and Filter Tasks and their Targets.

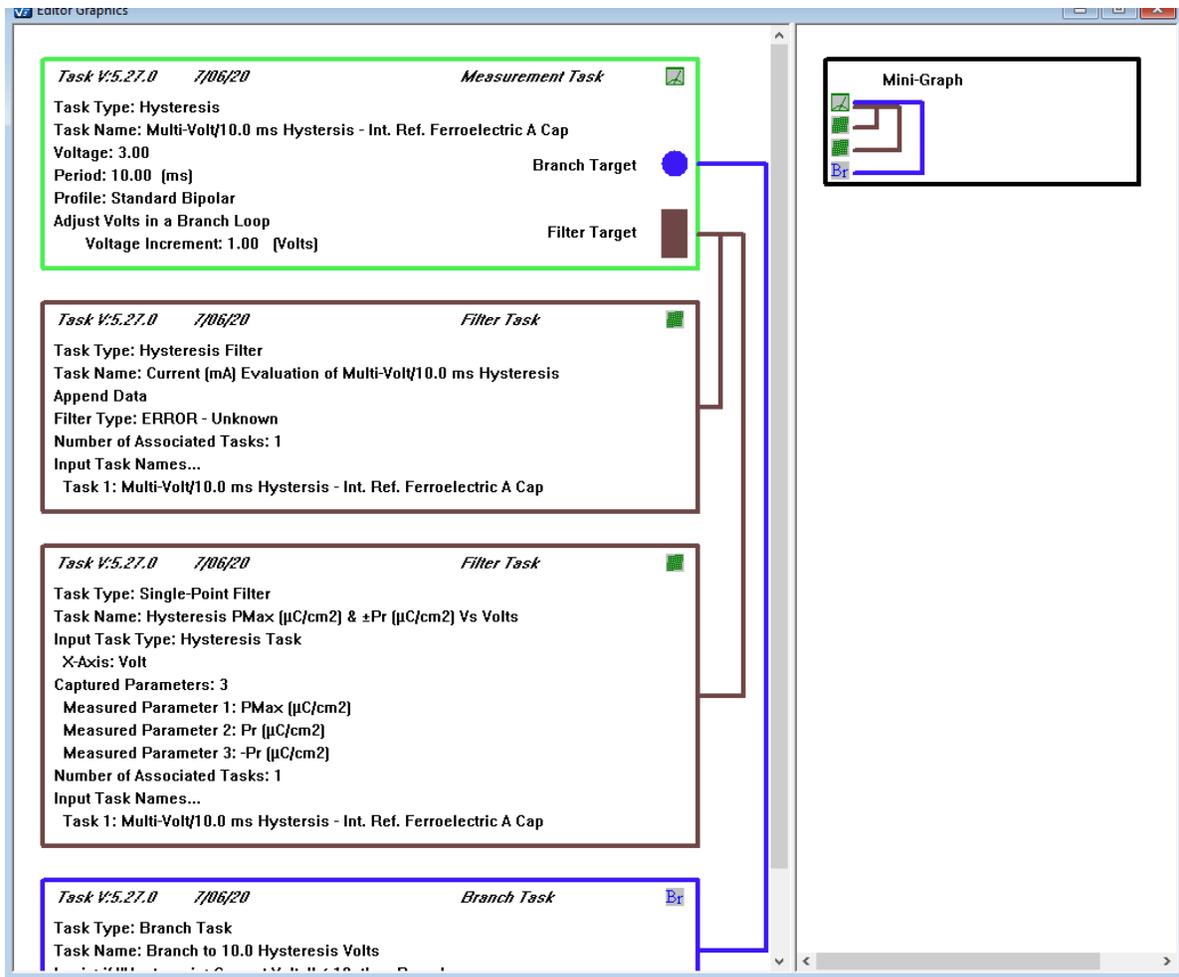


Figure 3 - Standard Text.

Full Text.

In the Full Text presentation Tasks add just a little bit more information. All Tasks add the Task configuration date to the bottom of the displayed Text. Hardware Tasks also add the sample Area (cm²) and Thickness (μm) information. Finally, Measurement Tasks present the configuration of the return signal amplification level.

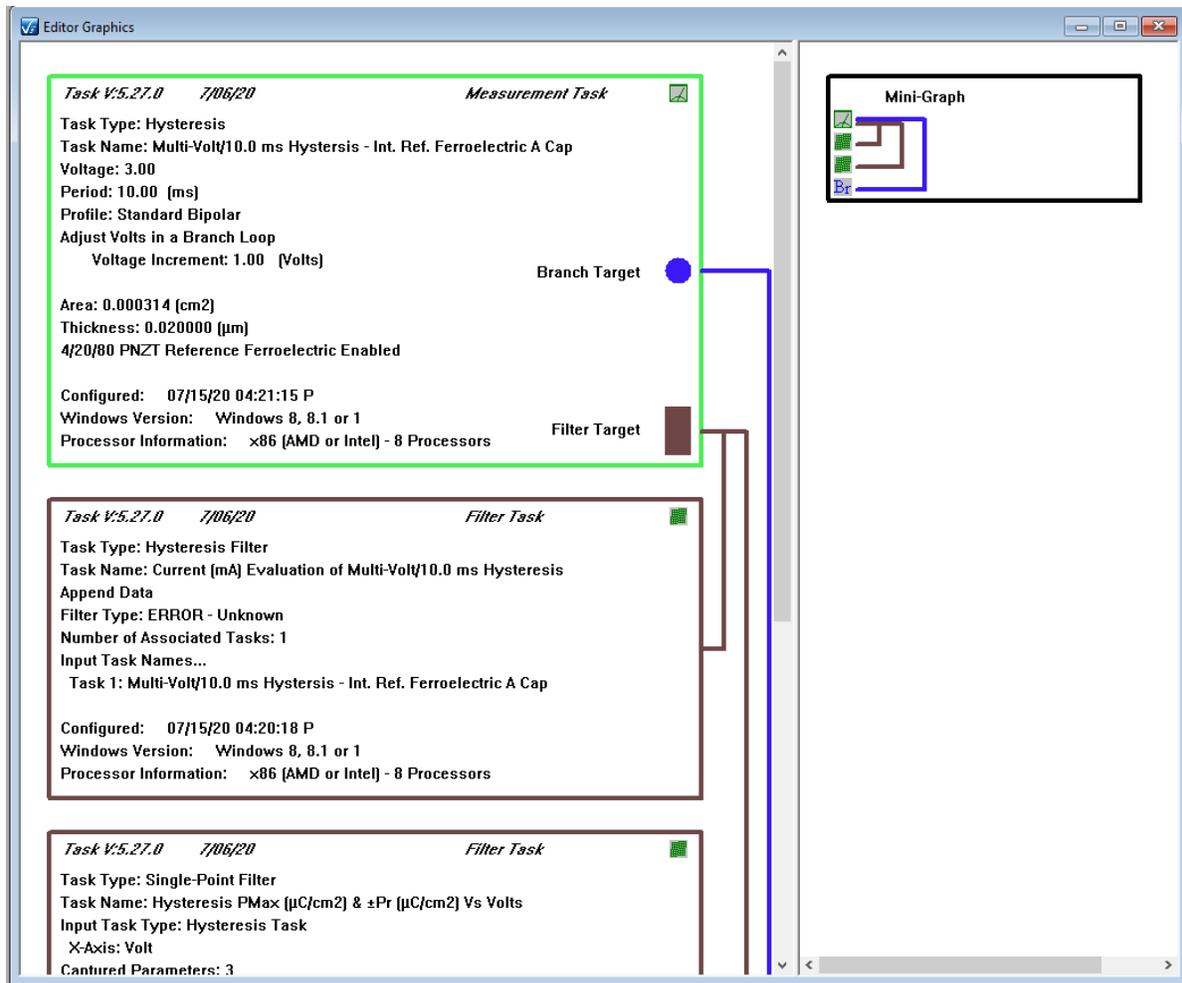


Figure 4 - Full Text.

Once created, the Task text cannot have its resolution adjusted. However, a user can append text comments to any Task's text presentation.

As presented in the following step-by-step documents, once a Test Definition Graph is created, it may have the following actions taken:

1. Add general user Comments.
2. Add user comments to any Task.
3. Change the Task box color.
4. Reset the Task text and/or box color
5. Save the Graph to a file
6. Recall theGraph from a file.
7. Print Preview and Print the Test Definition Graph.
8. Copy the Graph to the Windows clipboard for importing into another program such as Microsoft Word, Microsoft Excel, etc.

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Create A Test Definition Graph

Step 1: Select the Text Resolution

1. Right-click in the Editor window and select the desired resolution from the popup menu, or...
2. ... Select the CTD name in an open DataSet, right-click and select the desired resolution from the popup menu, or...
3. ... Select an ETD name in an open DataSet, right-click and select the desired resolution from the popup menu, or...
4. ... Go to File->XXX Graph Output Text.

Note that changing the text resolution in any of these locations will affect the resolution of all future Test Definition Graphs, until the resolution is changed again, regardless of how the graph is created.

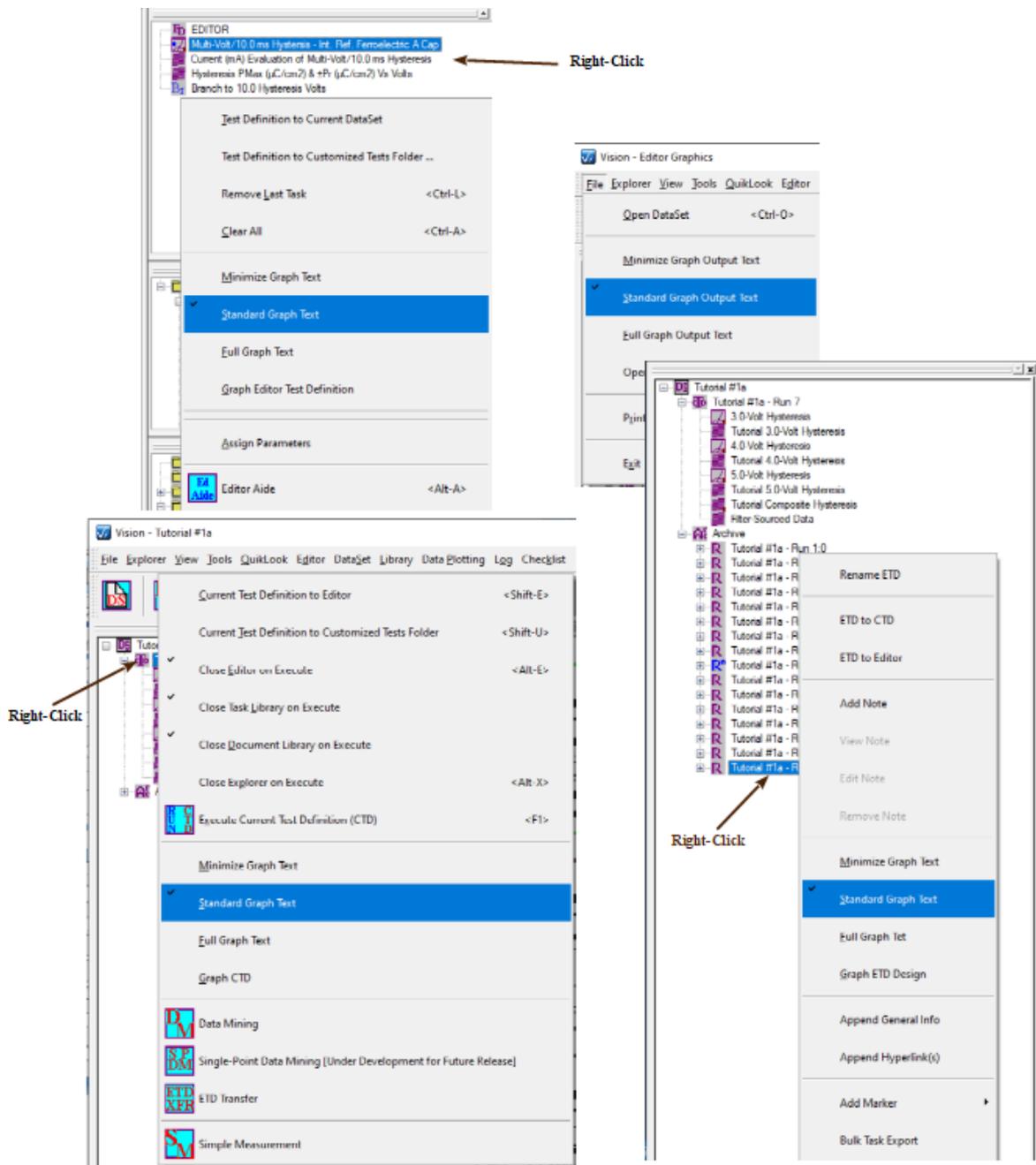


Figure 1 - Adjust the Graph Text Resolution.

Step 2: Graph the Test Definition.

1. Right-click in the EDITOR window and select "Graph Editor Test Definition" from the popup menu, or...
2. ... Select the CTD name in an open DataSet, right-click and select "Graph CTD" from the popup menu, or...

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- ... Select an ETD name in an open DataSet, right-click and select "Graph ETD Design" from the popup menu.

These options are shown, though not highlighted, in **Figure 1**.

Step 3: The Graph appears in a new Test Definition Graph Window as in **Figure 2**. Note that **Figure 2** shows *standard* text output.

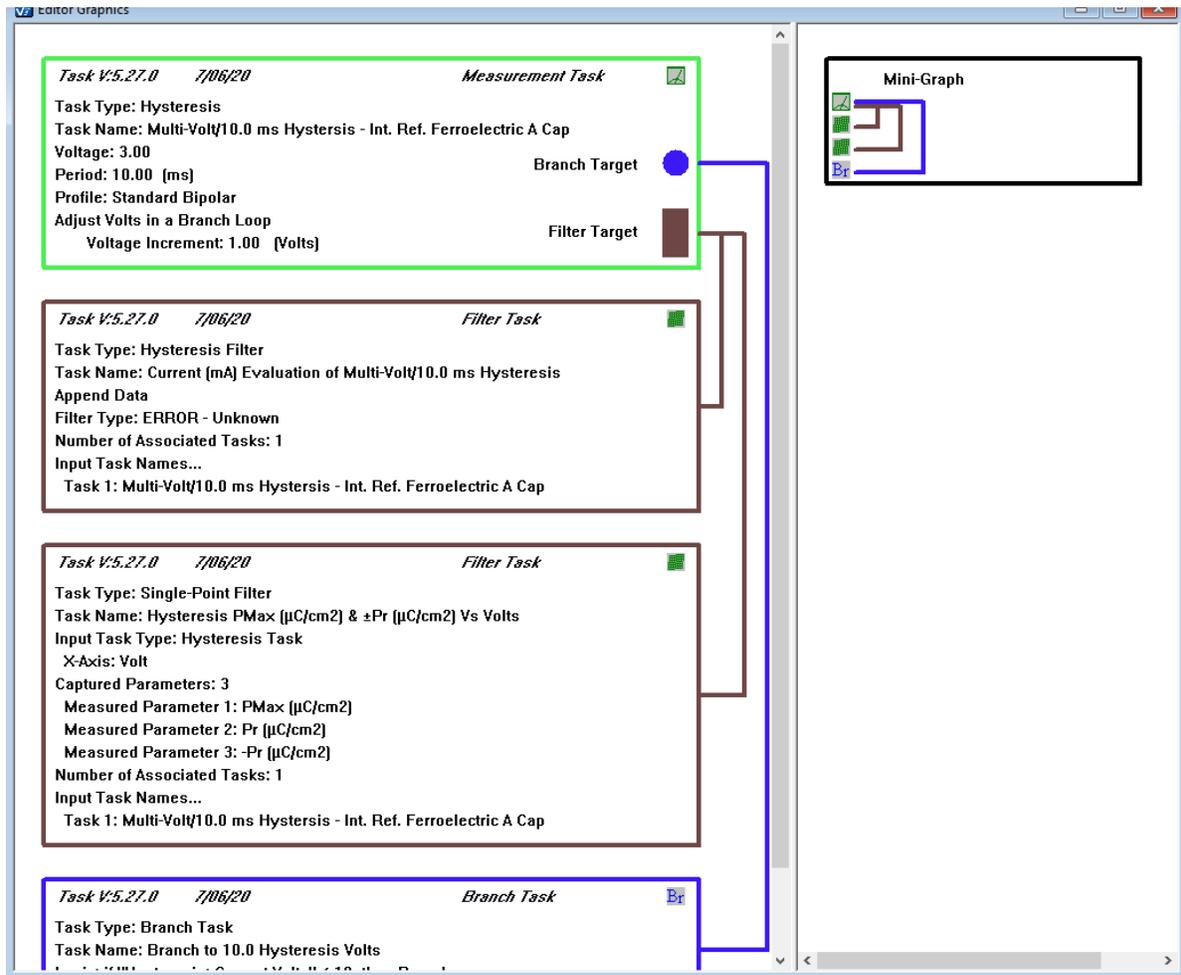


Figure 2 - A Simple Test Definition Graph.

Add A General Comment

Step 1: In an open Test Definition Graph, right-click on any portion of the Graph window. Select "Graph Comments" from the popup menu.

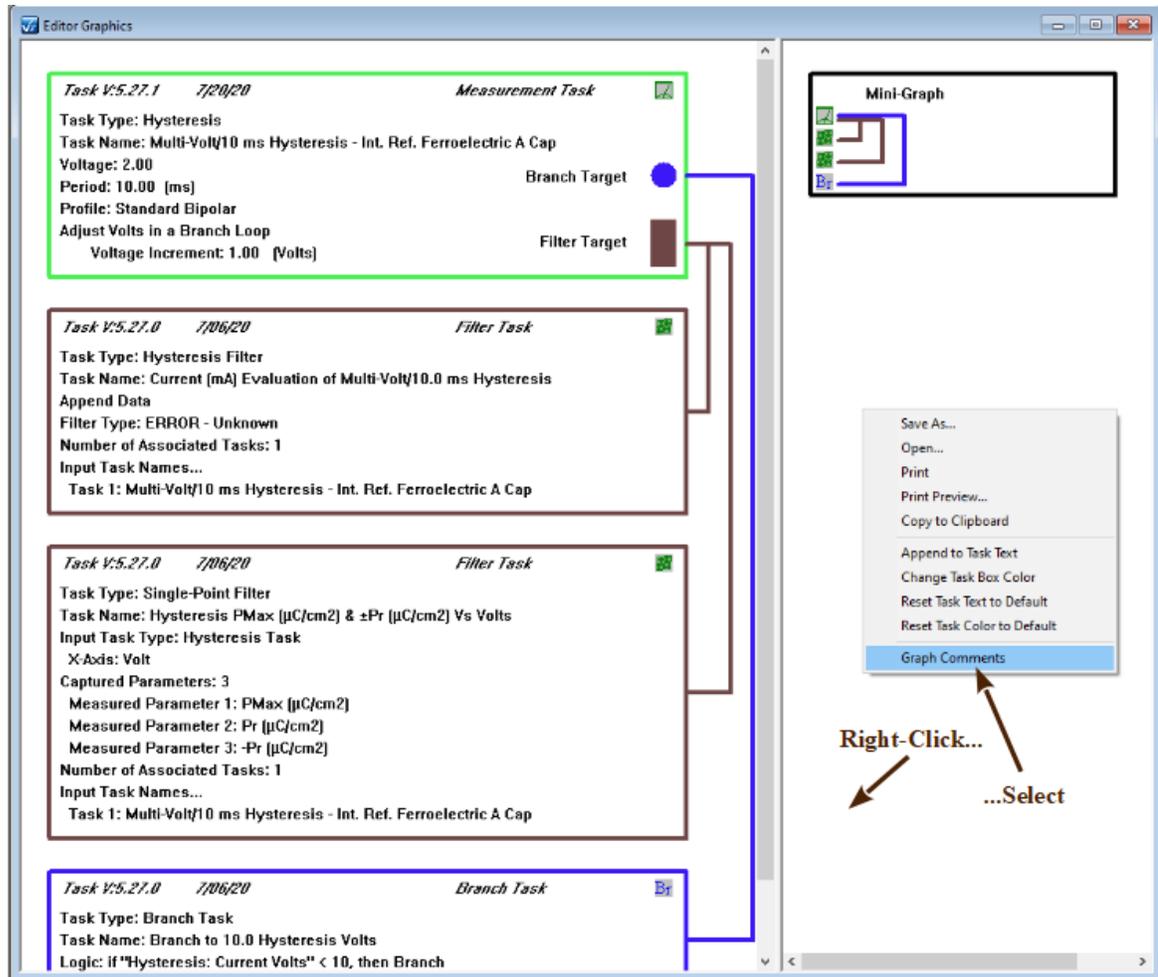


Figure 1- Initiate Graph Comments.

Step 2: In the dialog that appears type the appropriate text to add to the Graph. Carriage returns are acceptable to the text.

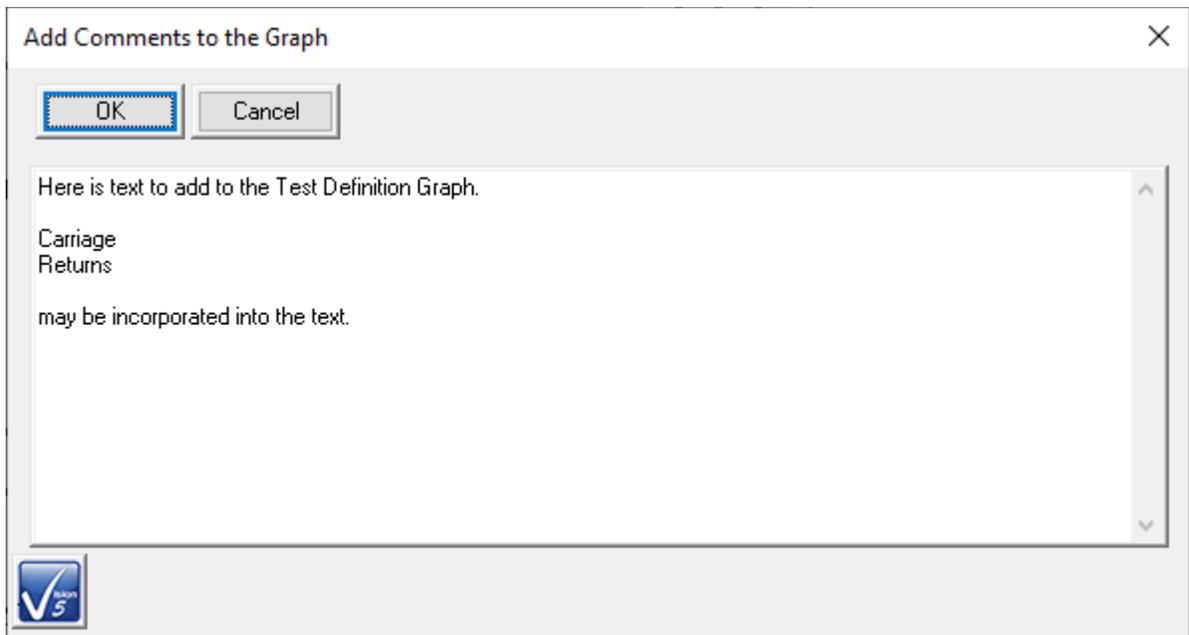


Figure 2- Edit the Comments.

Step 3: Click *OK*. The added text will appear in a box in the right Graph pane, below the Mini-Graph.

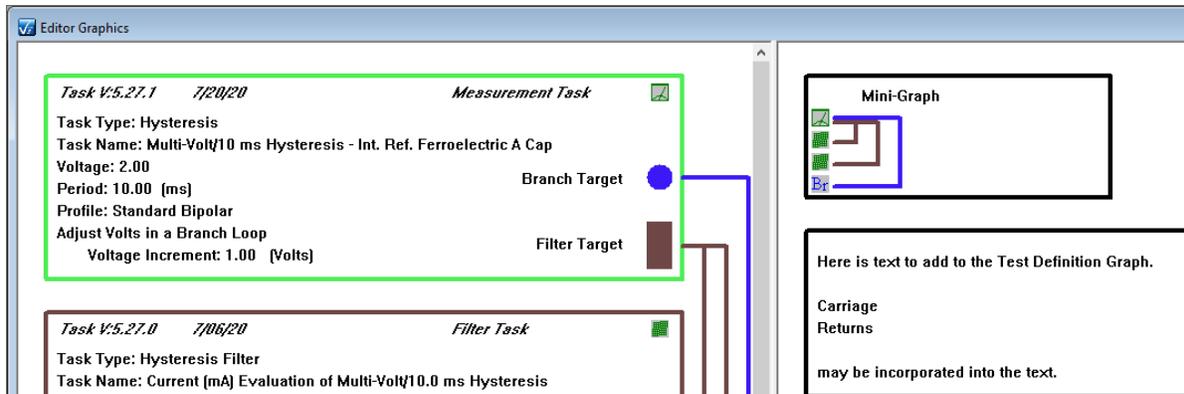


Figure 3 - User Comments in the Graph.

Step 4: Right-Click and select "Graph Comments" from the popup menu. The Comments edit dialog will appear with the original comments inserted and highlighted. Edit the comments.

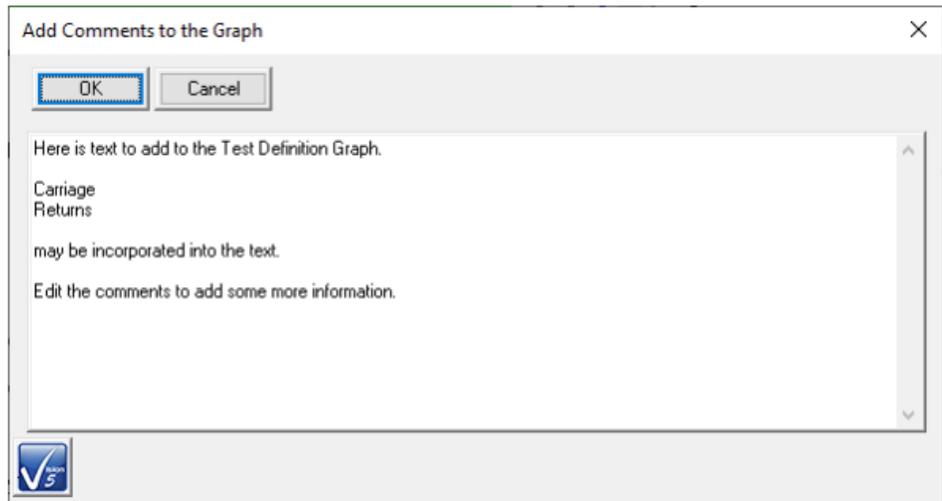
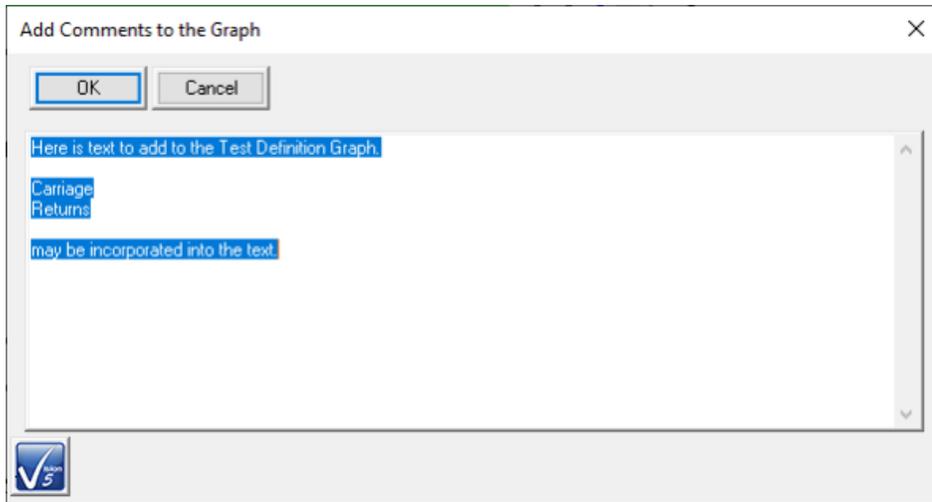


Figure 4 - Edit the Comments.

Step 5: Click *OK*. The adjusted comments will appear in the right pane Comments box.

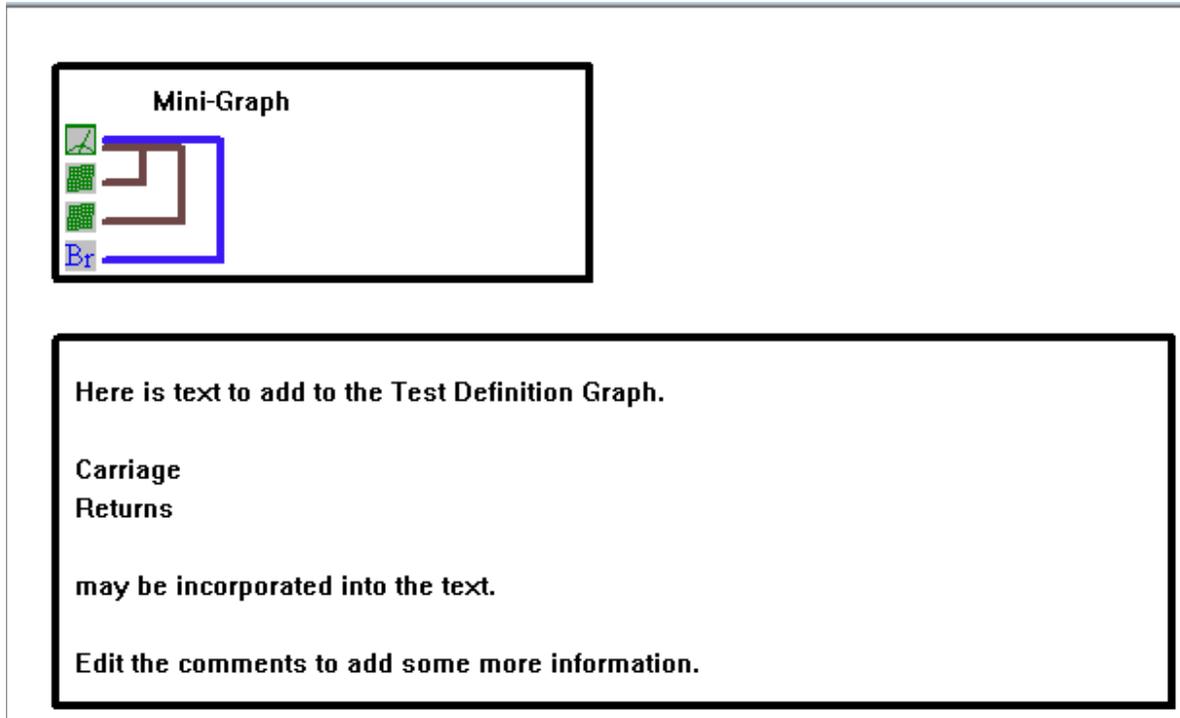


Figure 5 - Edited Comments.

Step 6: Right-Click and select "Graph Comments" from the popup menu. The Comments edit dialog will appear with the adjusted comments inserted and highlighted. Delete the comments. Click *OK*. The Comments box will be removed from the Graph right pane.

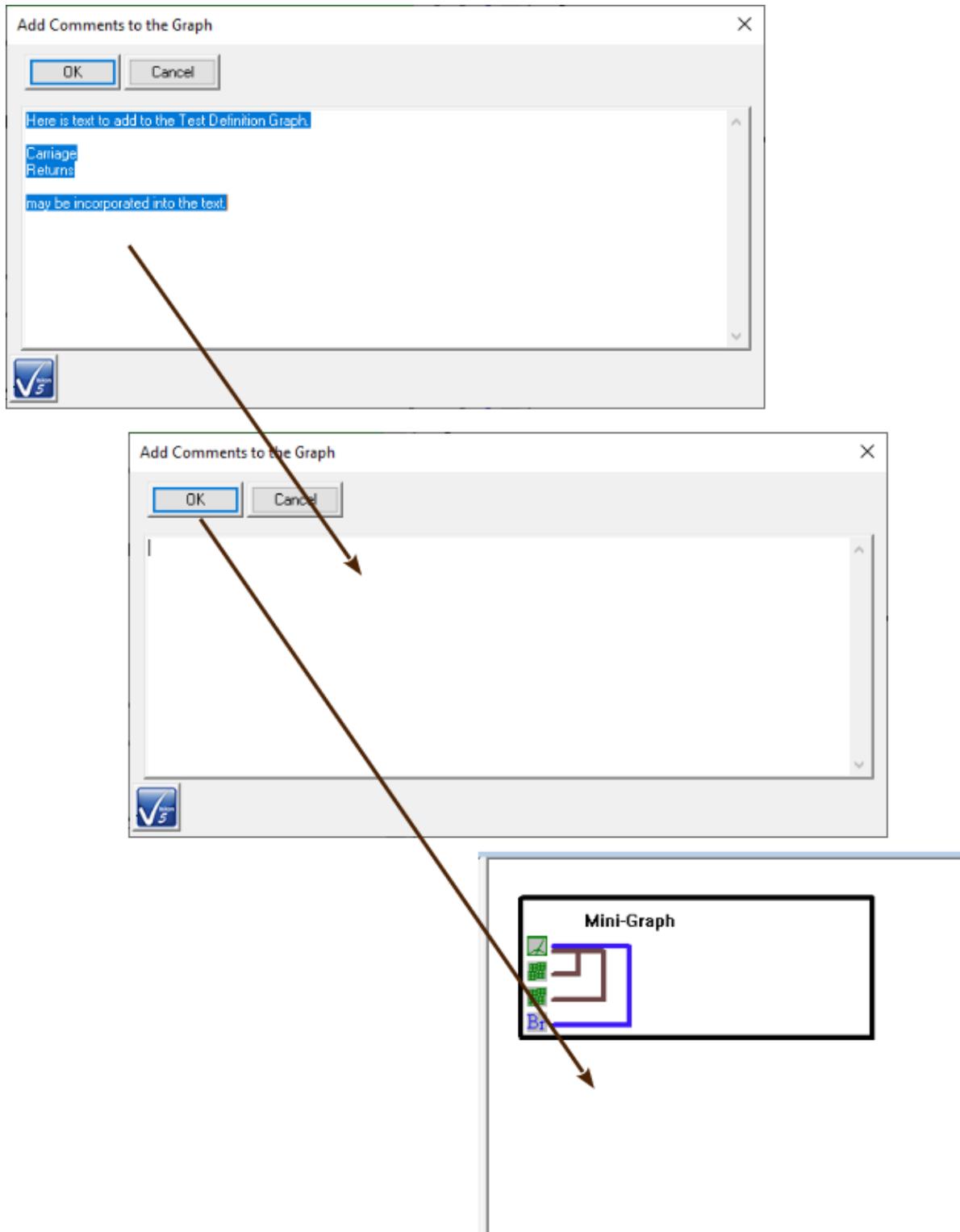


Figure 6 - Delete the Comments.

Change a Task Box Color

Step 1: In an open Test Definition Graph select a Task by left-clicking within the Task box limits. The Task will appear as selected by changing color to a pink highlight.

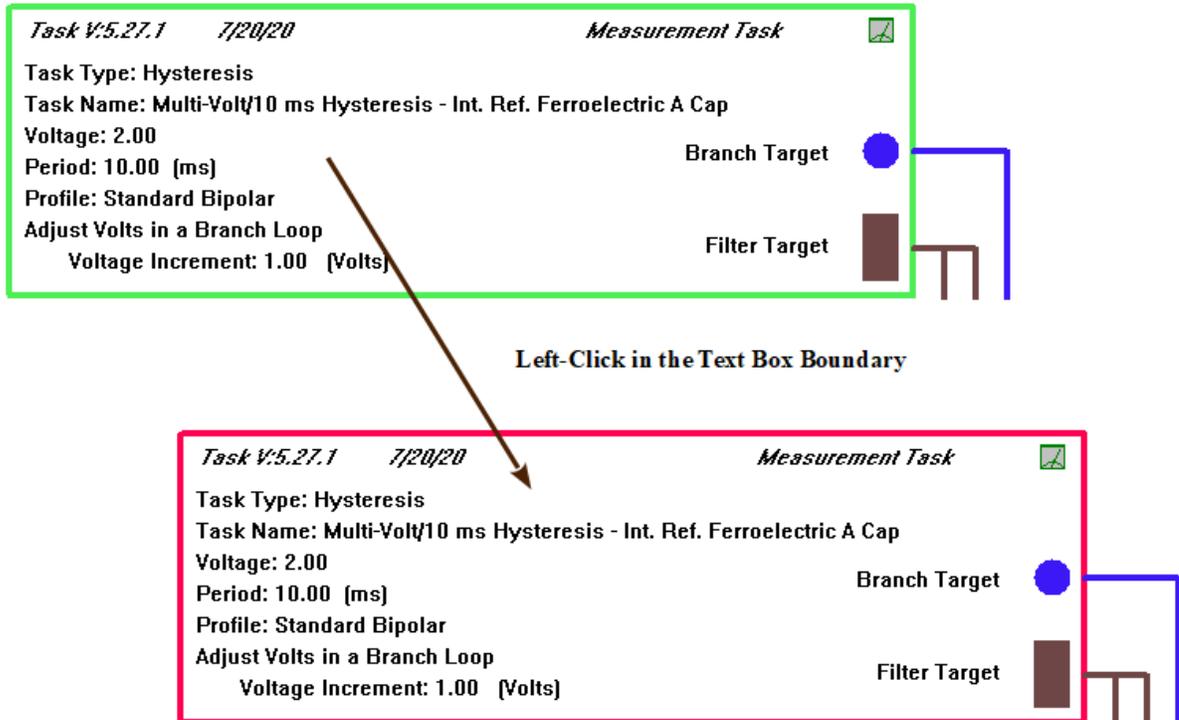


Figure 1 - Select a Task in the Graph.

Step 2: Right-Click and select "Change Task Box Color" from the popup menu.

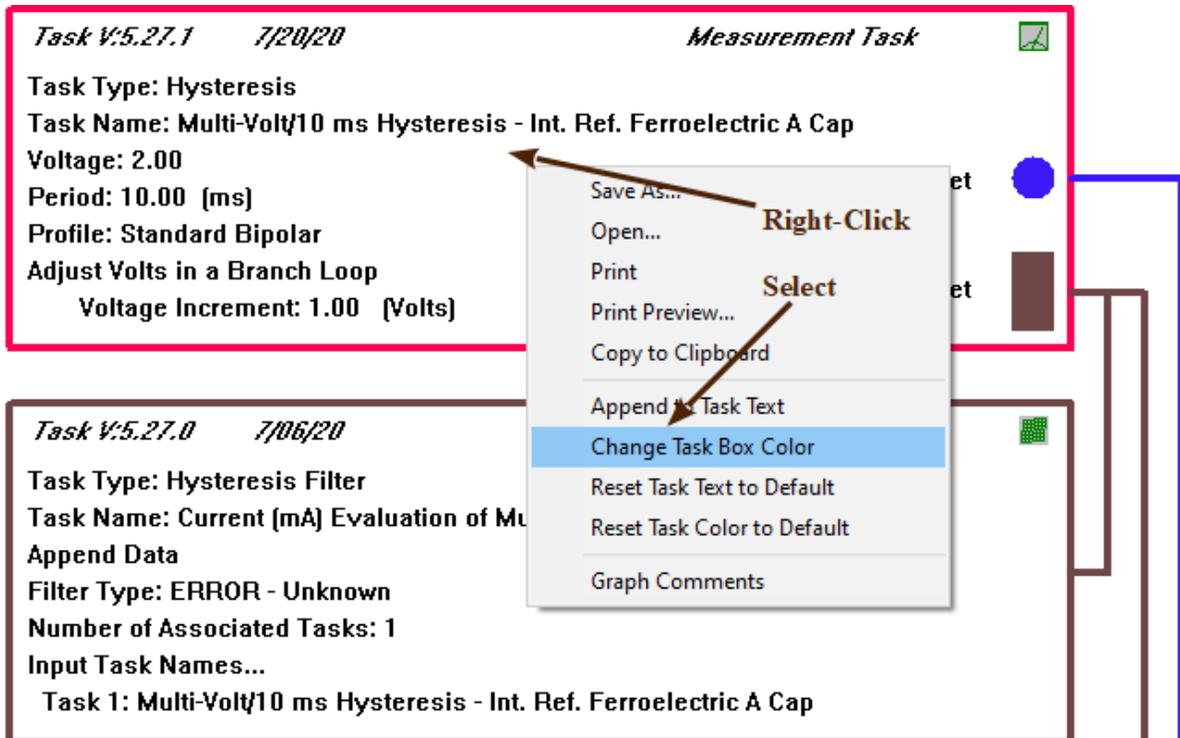


Figure 2 - Initiate the Color Change.

Step 3: A standard Windows Color Picker dialog will appear. Click *Define Custom Colors >>* to expand the dialog if desired.

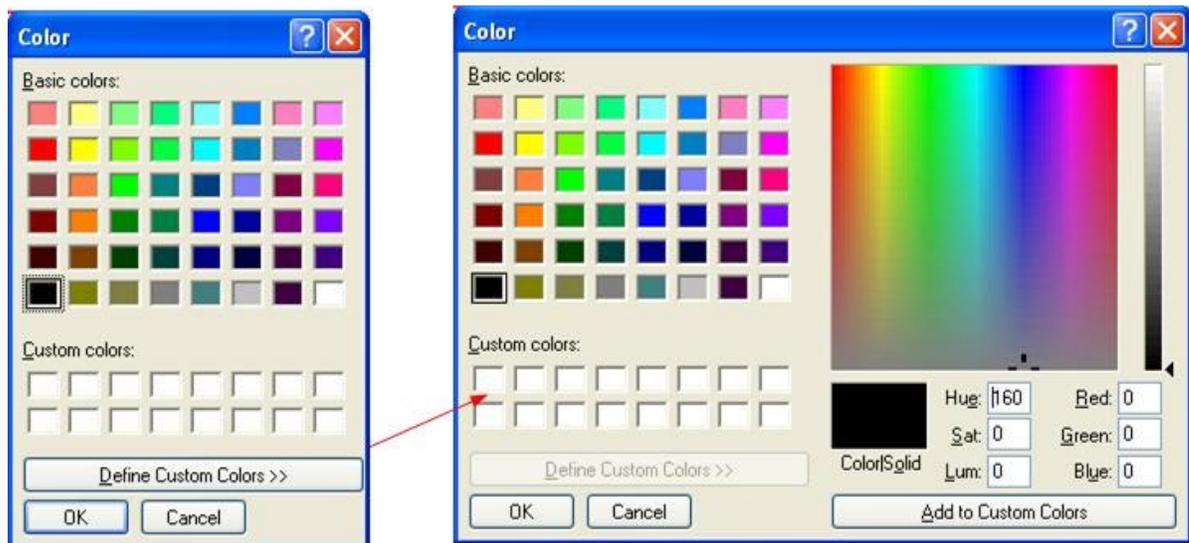
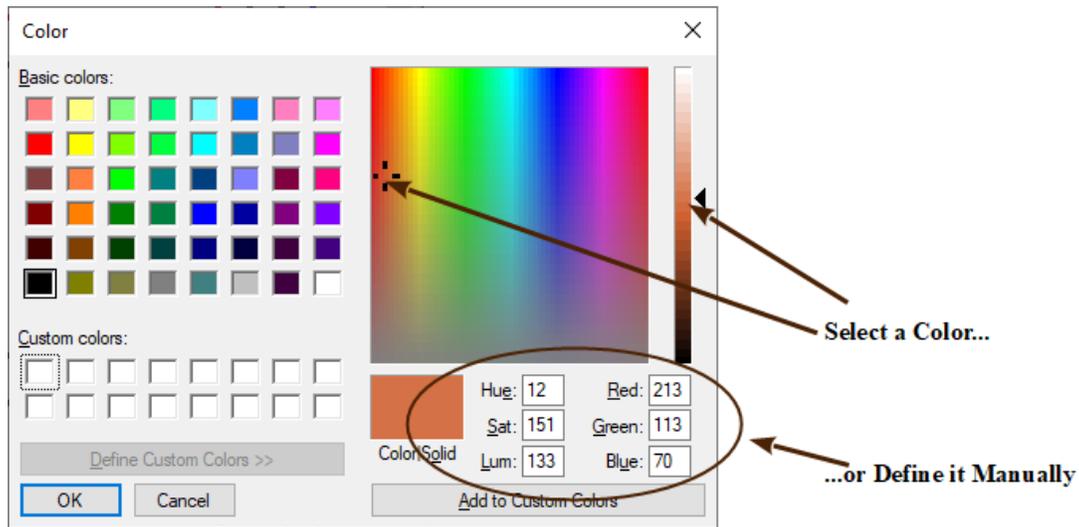


Figure 3 - Select or Define the Color.

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Step 4: Using any of the available methods, select or define the new color. Then click *OK*. The Task box color will be updated.



...then Click *OK*



Figure 4 - Finish the Update.

Append User Text to a Task

Step 1: In an open Test Definition Graph select a Task by left-clicking within the Task box limits. The Task will appear as selected by changing color to a pink highlight.

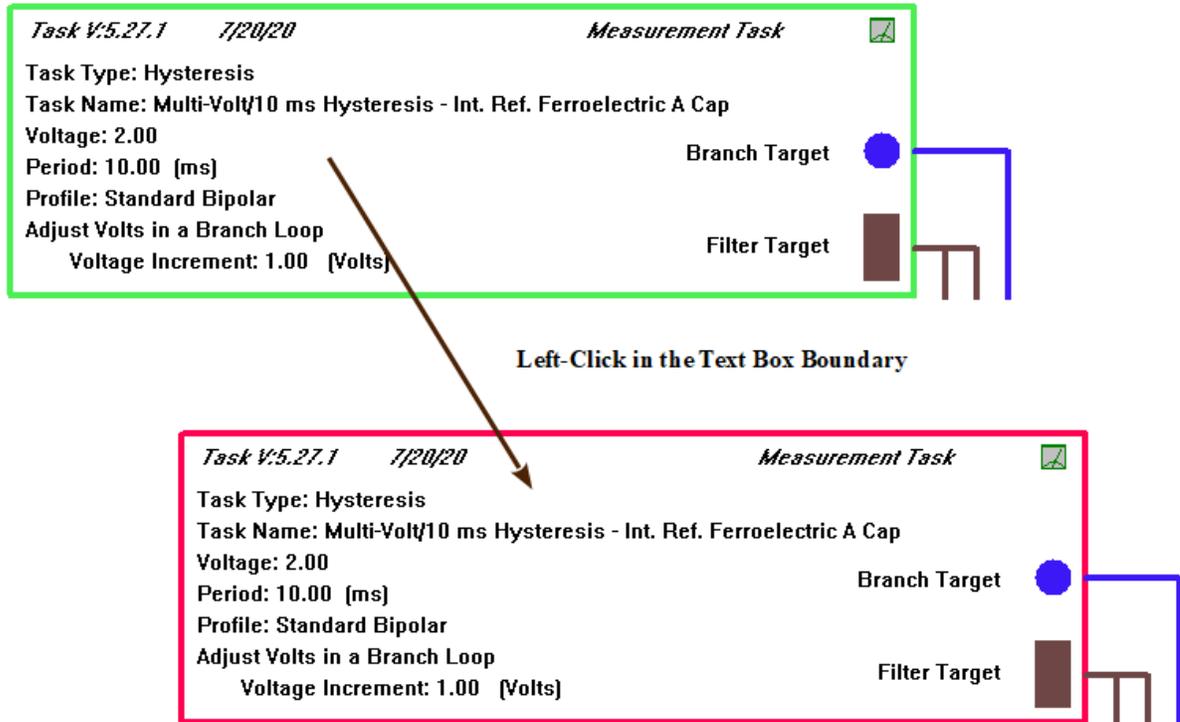


Figure 1 - Select a Task in the Graph.

Step 2: Right-Click and select "Append to Task Text" from the popup menu.

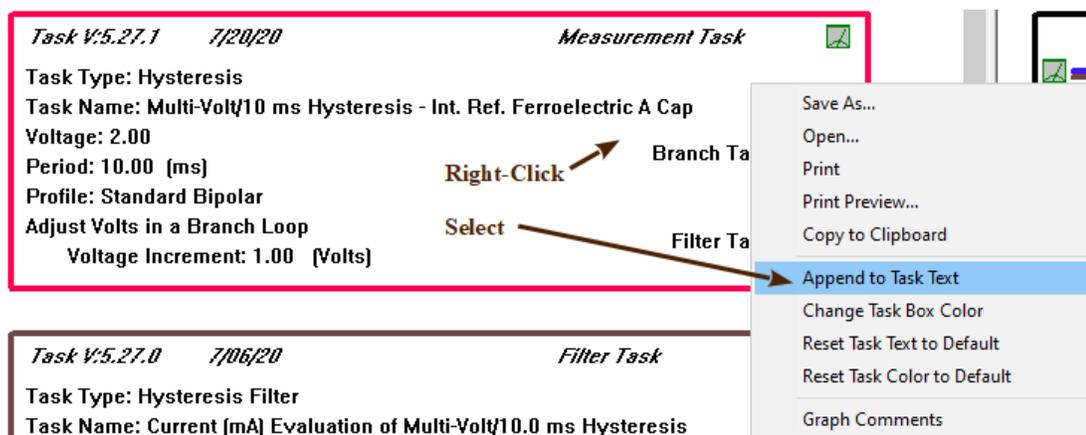


Figure 2 - Initiate the Text Addition.

Step 3: In the text dialog that appears type the desired text. The text is unlimited in length and carriage returns are acceptable. Please note that carriage returns should be used since the text can easily overrun the right edge of the Task box.

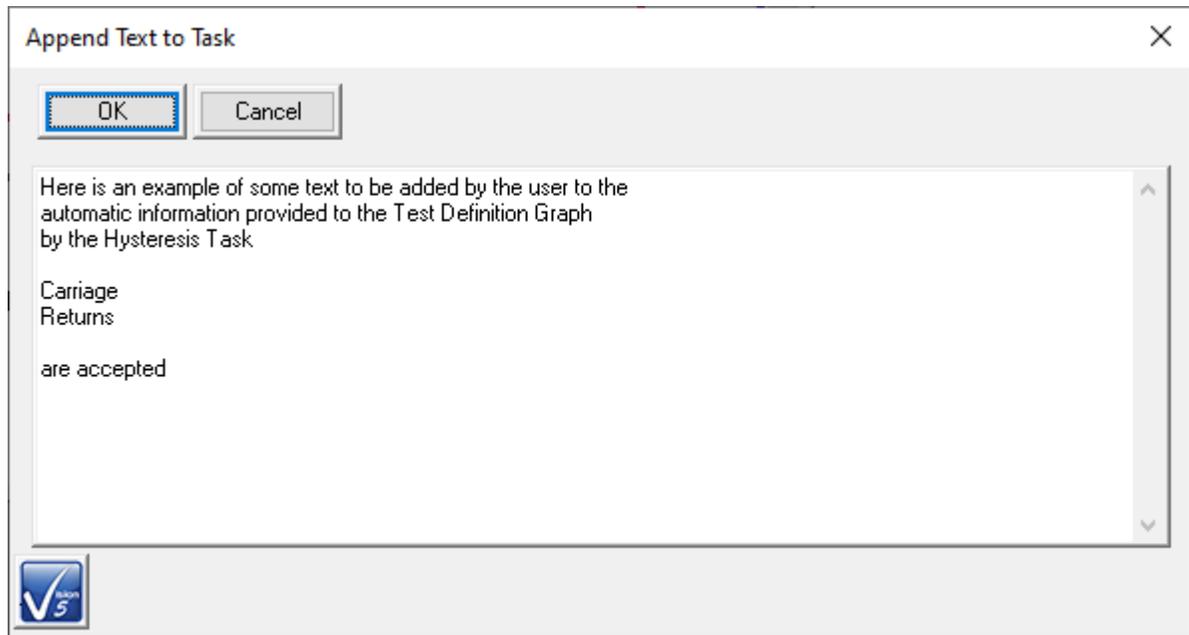


Figure 3 - Type the Desire Text.

Step 4: Click *OK*. The updated text will appear in the Task box.

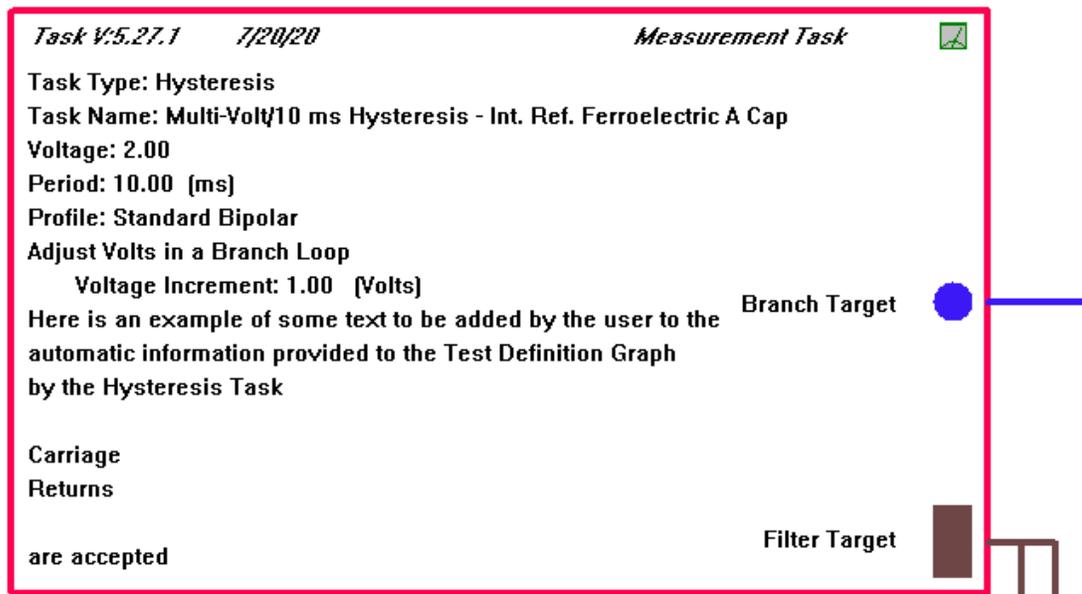


Figure 4 - Updated Task Box with User Text.

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Reset Text Box Color and Text

Step 1: In an open Graph, select a Task with appended User Text by left clicking in the Task Box boundary. The Task will appear selected by having its box highlighted in pink.

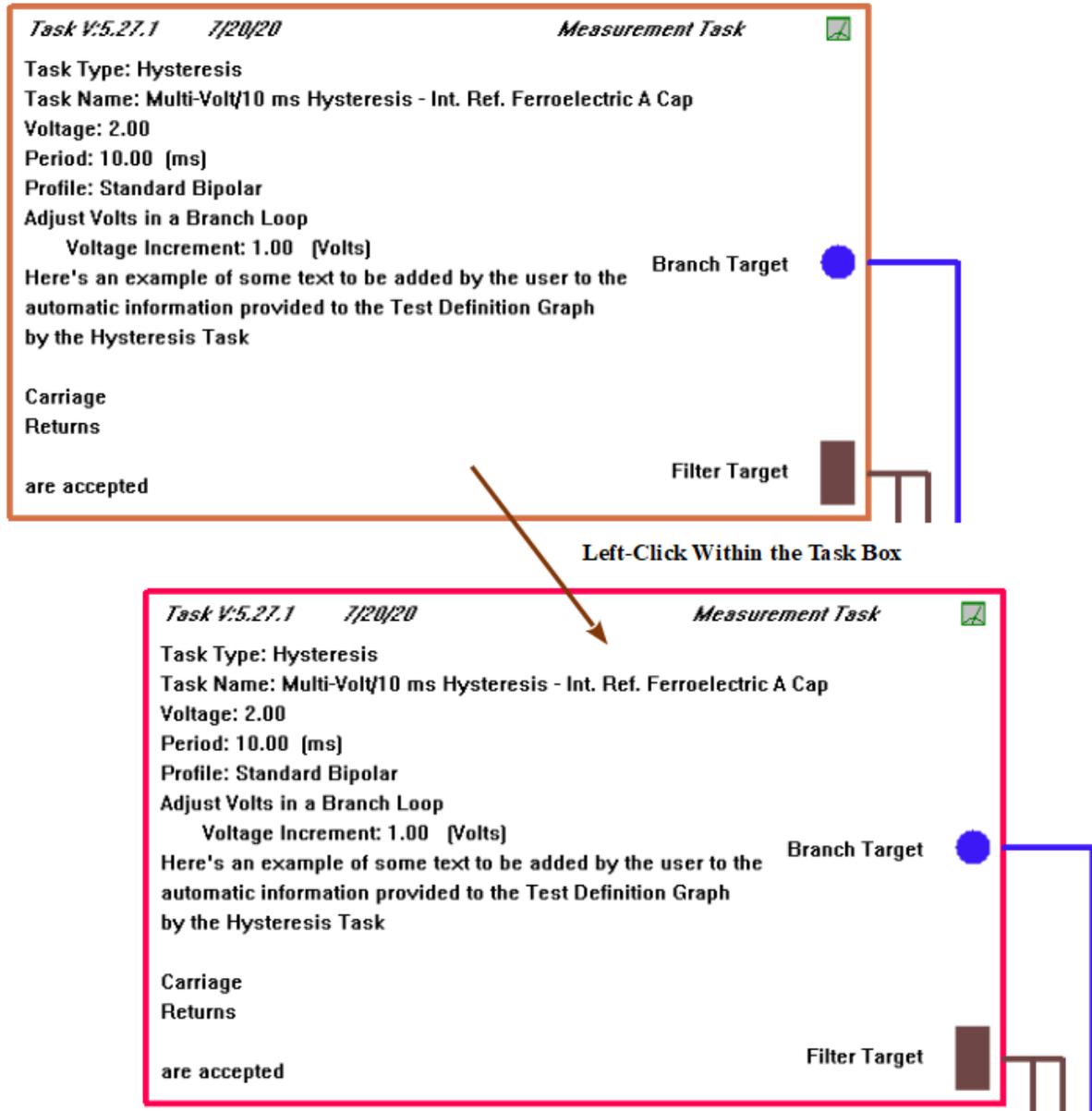


Figure 1 - Select a Task in the Graph.

Step 2: Right-Click and select "Reset Task Text to Default" from the popup menu.

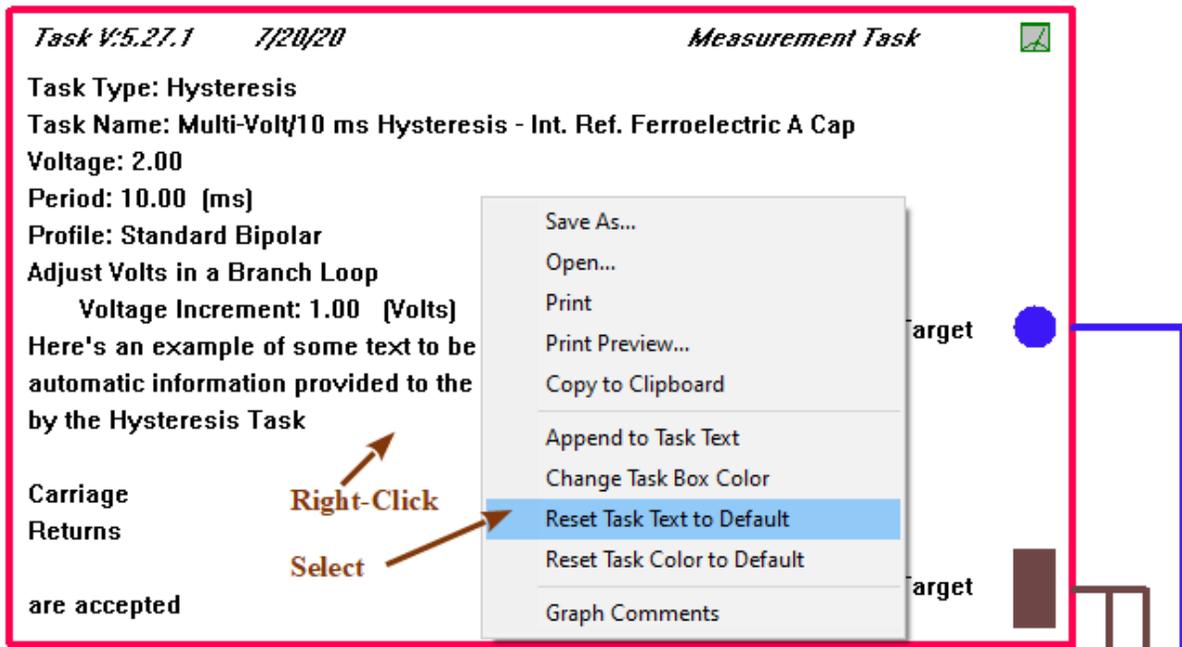


Figure 2 - Select "Reset Task Text to Default" in the Popup Menu.

Step 3: The user text will be removed and the original Task-supplied text will be restored.



Figure 3 - Original Task-Supplied Text is Restored.

Step 4: Right-click and select "Reset Task Color to Default" from the popup menu.

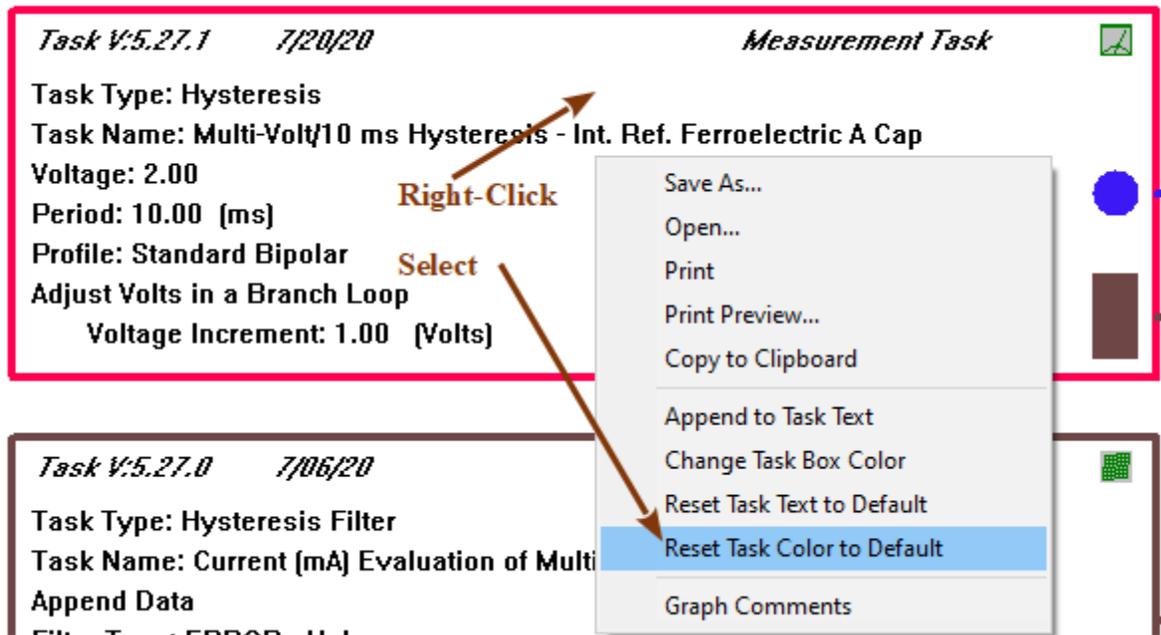


Figure 4 - Select "Reset Task Color to Default" in the Popup Menu.

Step 5: The original Task box color will be restored.



Figure 5 - Original Task Color is Restored.

Print Preview & Printing

Step 1: Right-click in any open Test Definition Graph and select "Print Preview..." from the popup menu.

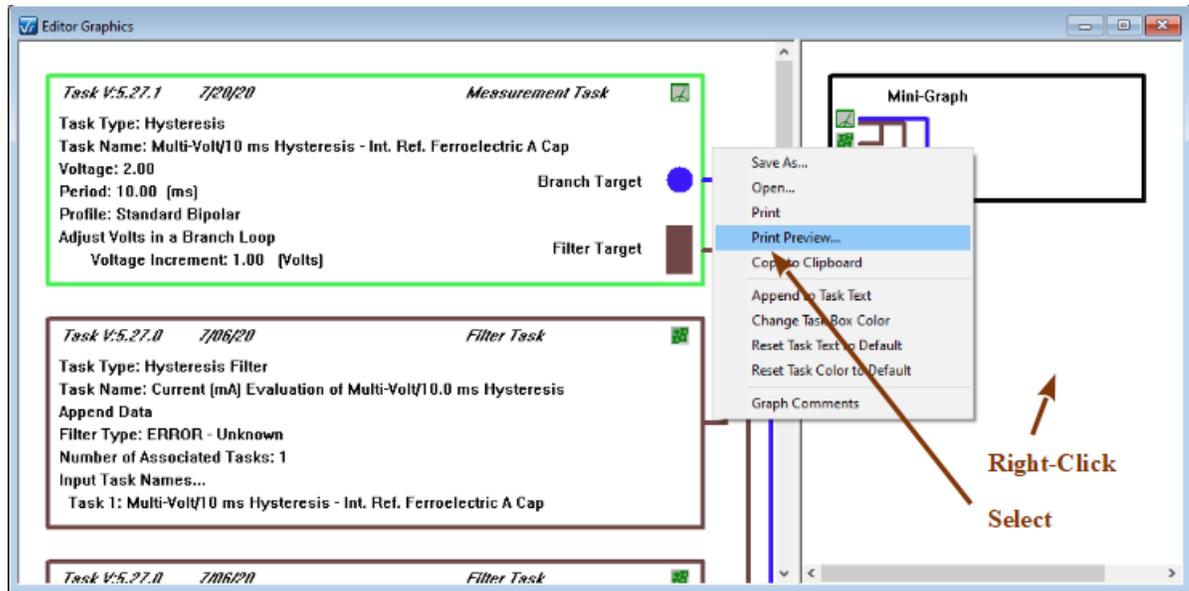


Figure 1 - Initiate Print Preview.

Step 2: A standard Windows Print Preview window will open. The print preview will comprise at least two pages. The first page (**Figure 2A**) shows the Mini-Graph and any User Comments. The remaining pages show the Task boxes of the left view pane. Note that the icon bitmaps do not operate properly in the Print Preview. They will be misplaced on the page (**Figure 2A**) or may even fail to appear (**Figure 2B**).

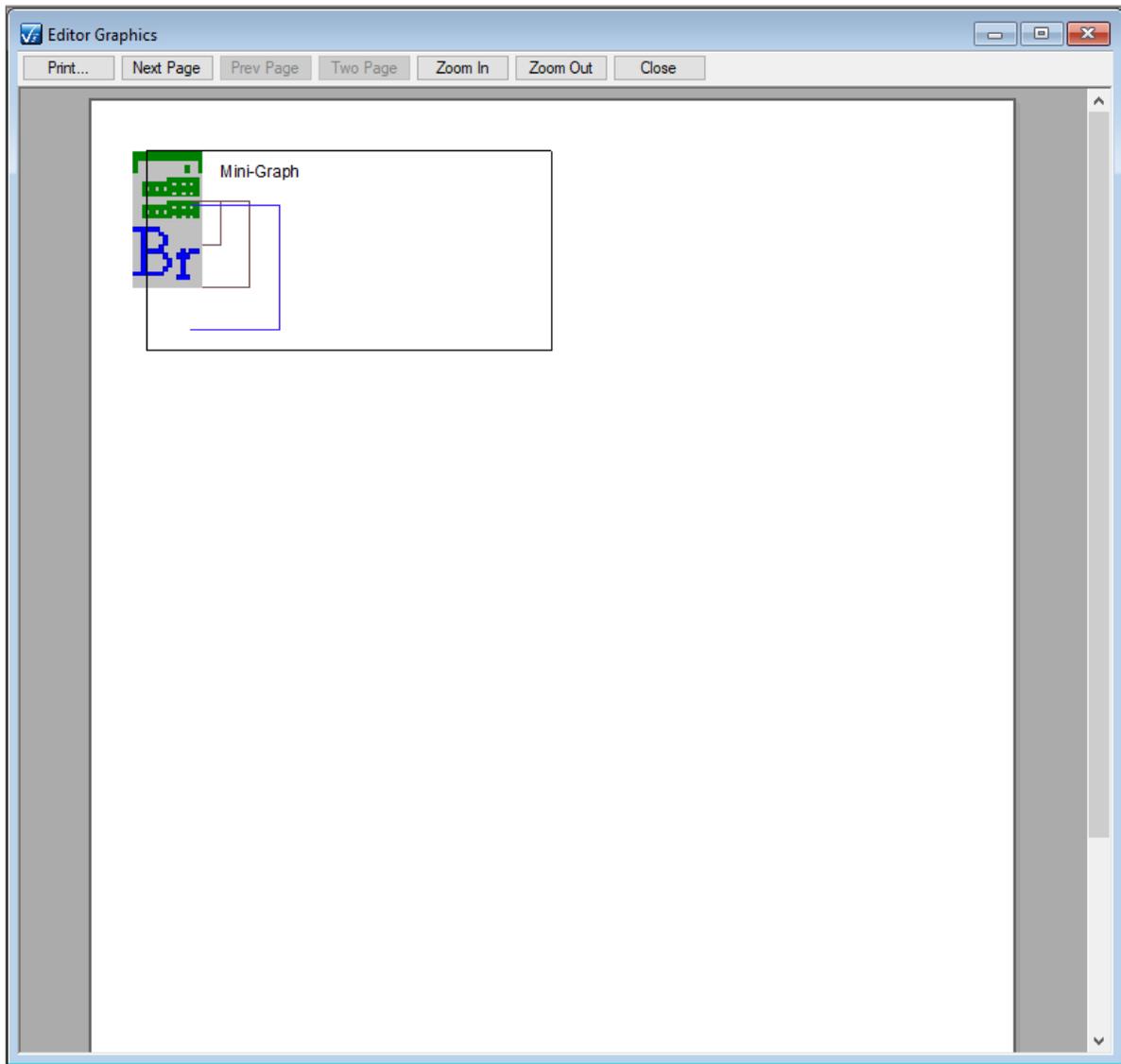


Figure 2A - Print Preview First Page - Right Graph Pane.

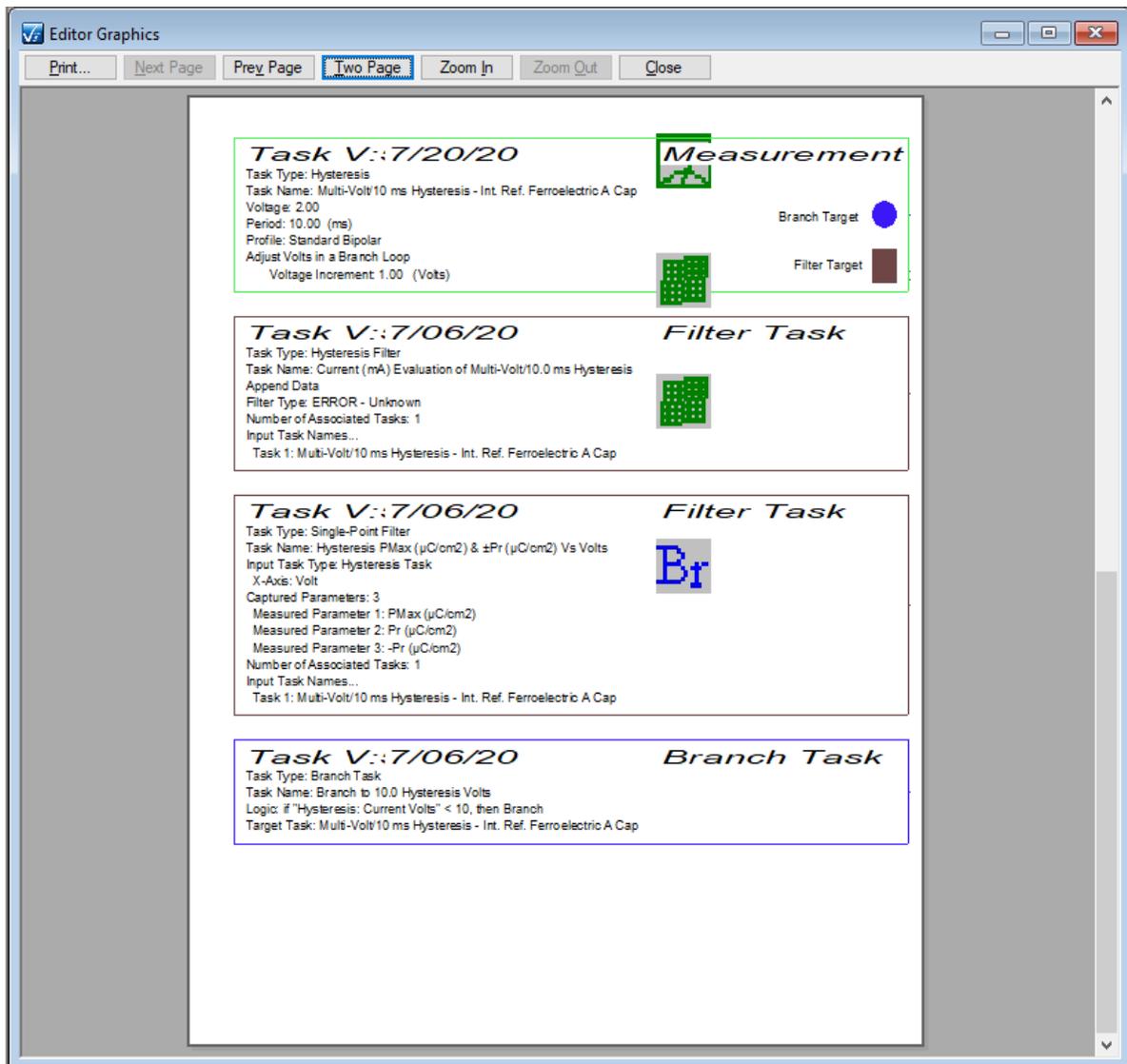


Figure 2B - Print Preview Second Page and Beyond - Left Graph Pane.

Step 3: Right-click and select "Print" from the popup menu. A standard Windows printer configuration dialog will appear. Click *OK* and the printout will appear at the printer selected in the dialog. Please note that the icon bitmap offset problem should not appear on the actual printout. Icons should be properly placed.

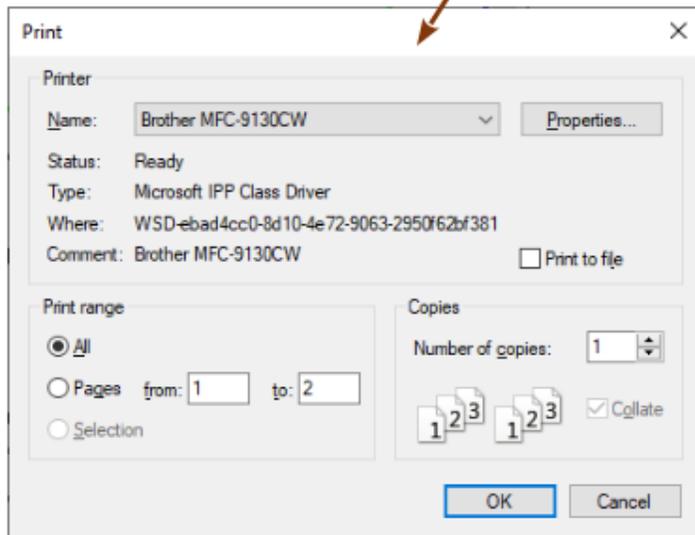
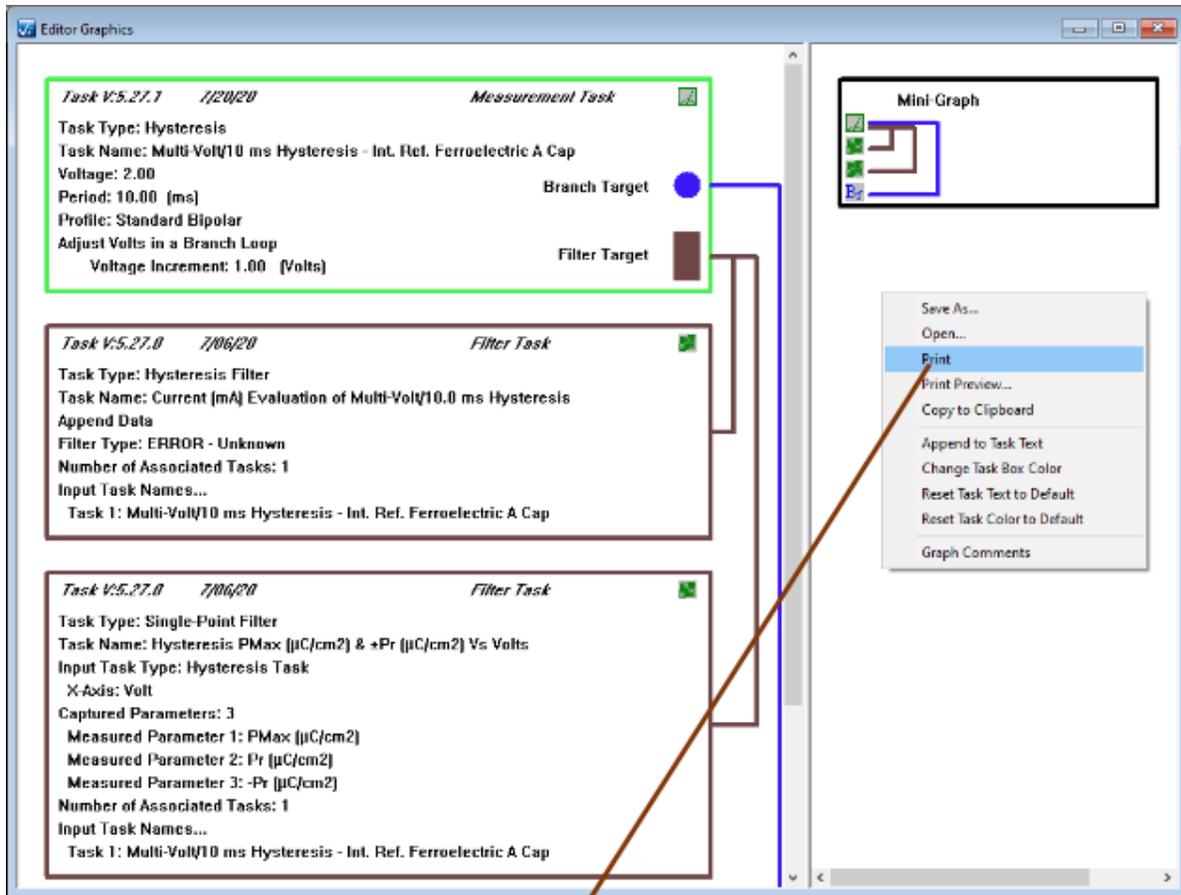


Figure 3 - Initiate Printing.

Exporting

Step 1: Right-Click in the window of any open Test Definition Graph and select "Copy to Clipboard" from the popup menu.

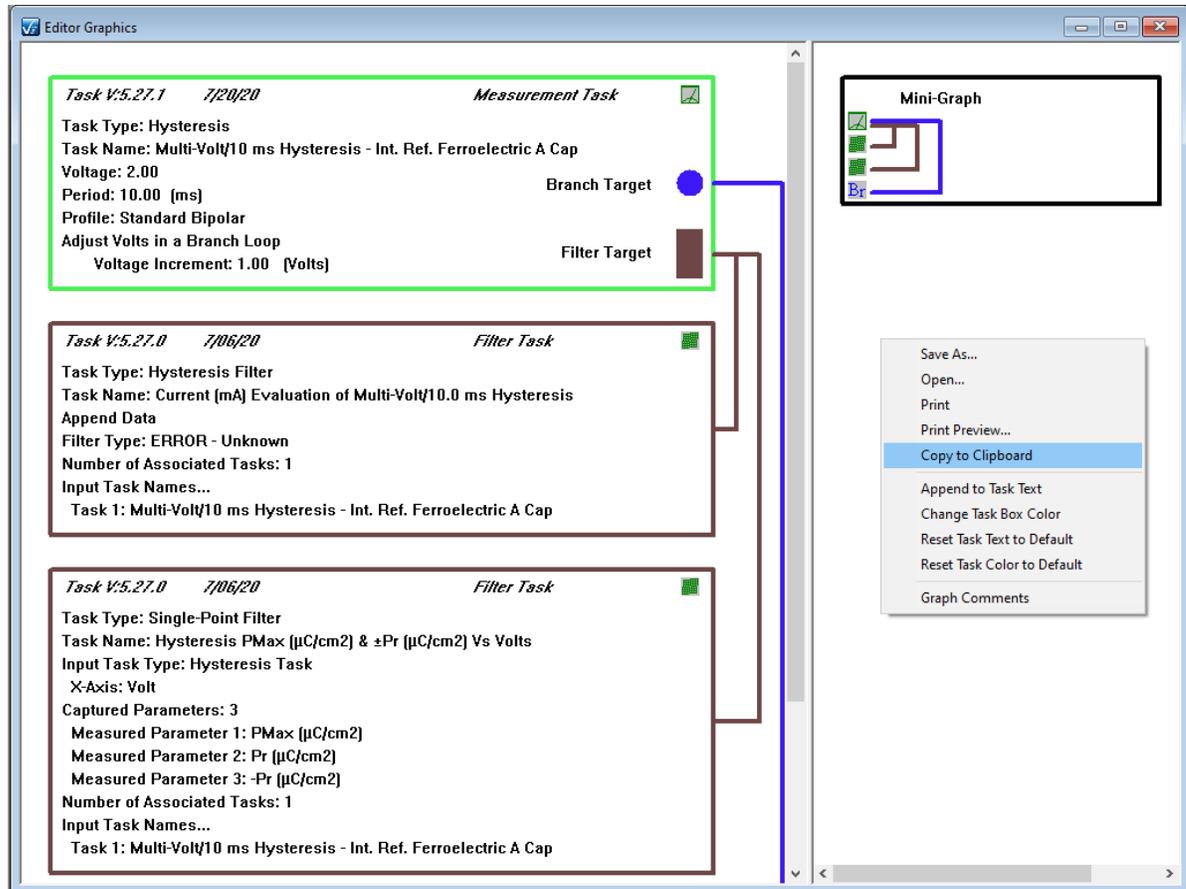


Figure 1 - Export the Graph to the Windows Clipboard.

Step 2: Open any suitable target program (Microsoft Word, in **Figure 2**) and select File->Paste or <Ctrl-V>. The list of Task boxes will appear. Note that the Graph is pasted as a single image. For longer Test Definitions, the image may be too long for the target program. It can be resized, but may require excessive adjustment for some programs. Programs that are not page, such as Microsoft Excel, will present the entire Graph.

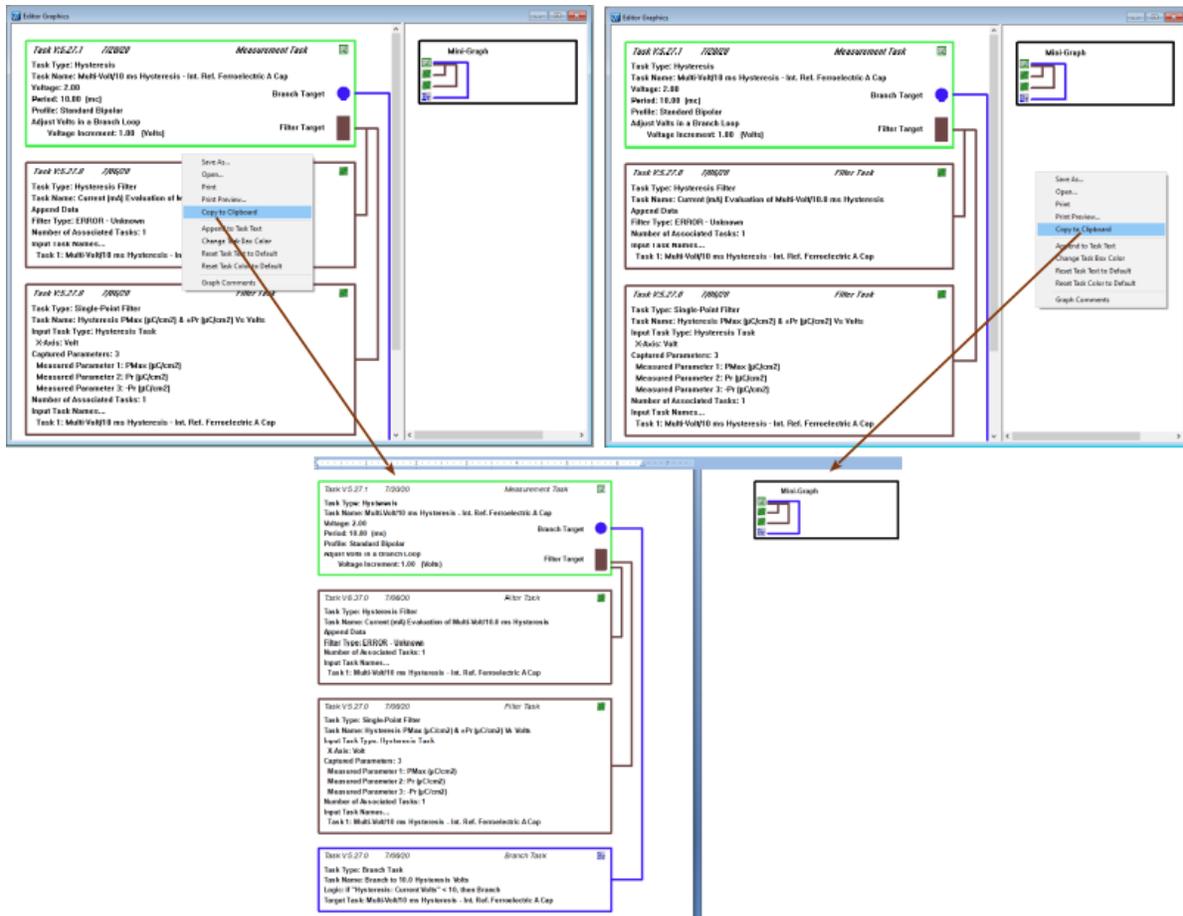


Figure 2 - Paste the Graph into Another Program.

Saving and Recalling a Graph

Step 1: From any open Test Definition Graph, right-click and select "Save As..." from the popup menu. Note that if you do not save a Graph, you will be prompted to save when you close the Graph. <Ctrl-G> closes all open Graphs without prompting to save.

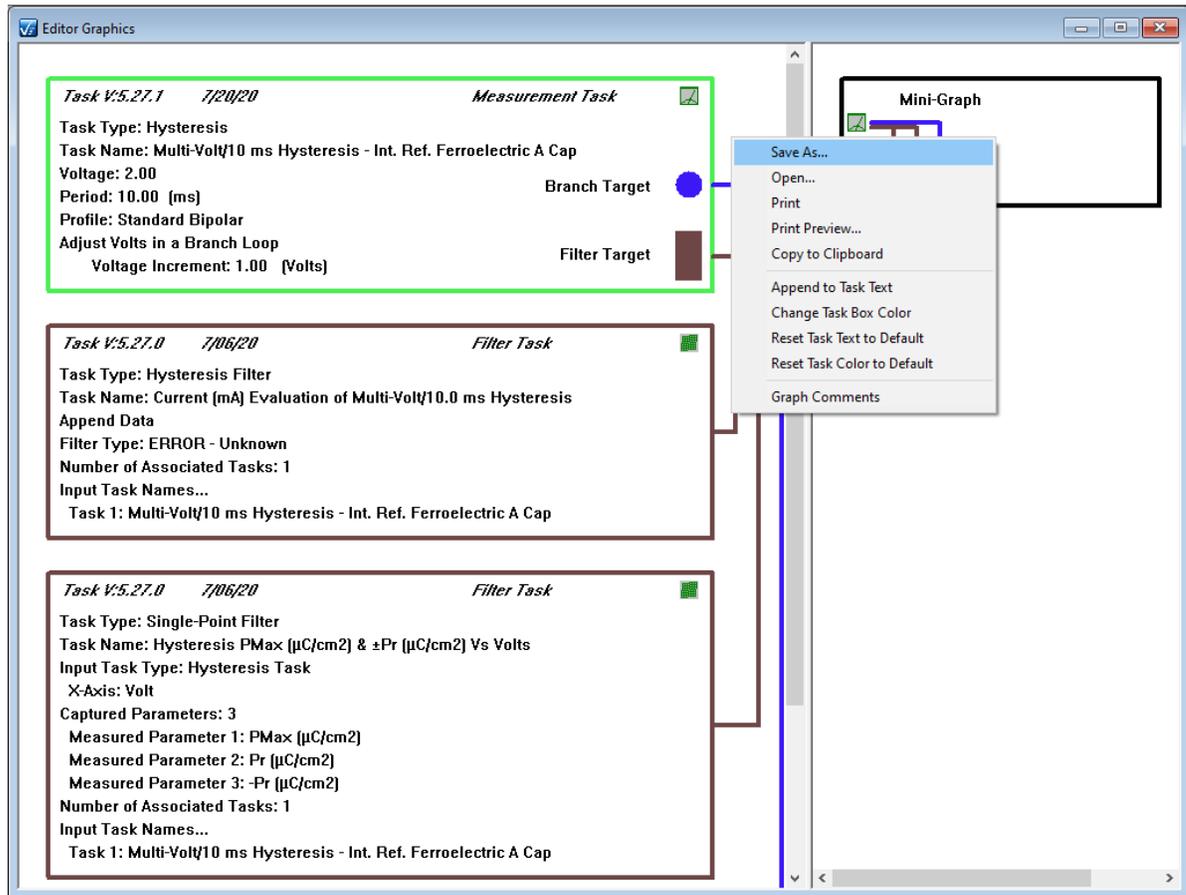


Figure 1 - Initiate a File Save of the Graph.

Step 2: A standard Windows File Browser dialog will appear. Use the browser to navigate to an appropriate file location and assign an appropriate file name. By default the file will have a *.grph extension.

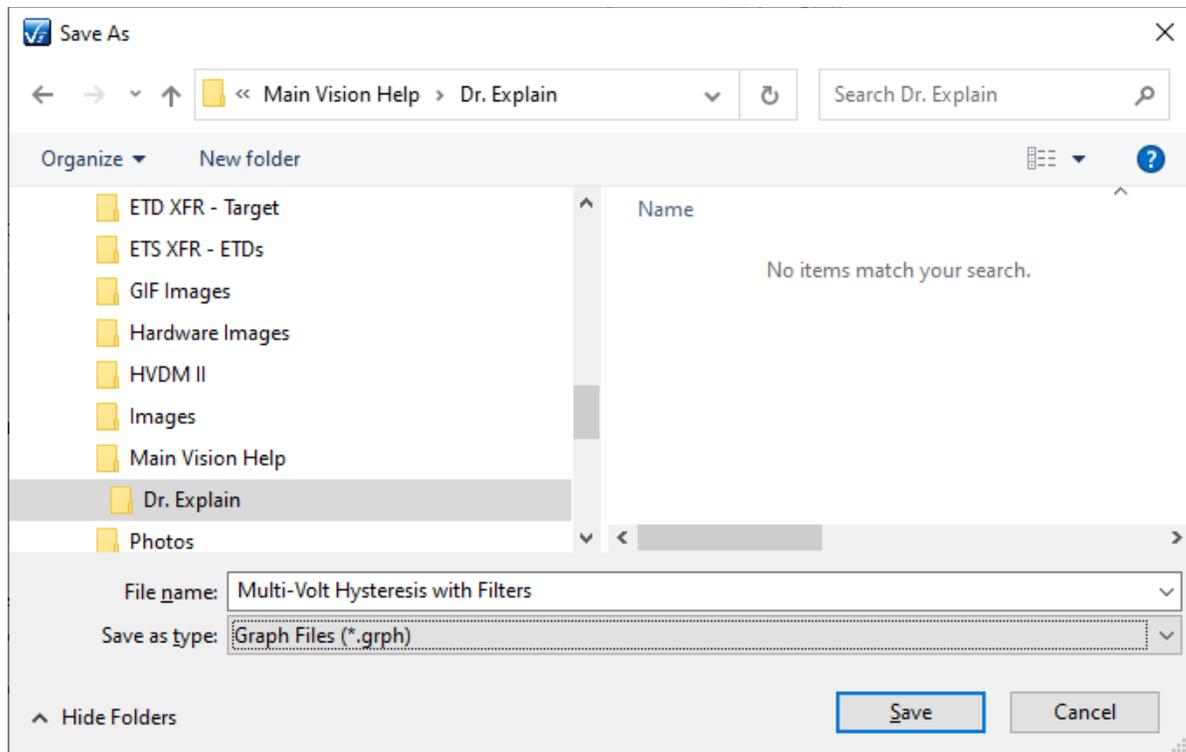


Figure 2 - Specify the File Path and File Name.

Step 3: Click *Save*. The file will be written to the location and name specified.

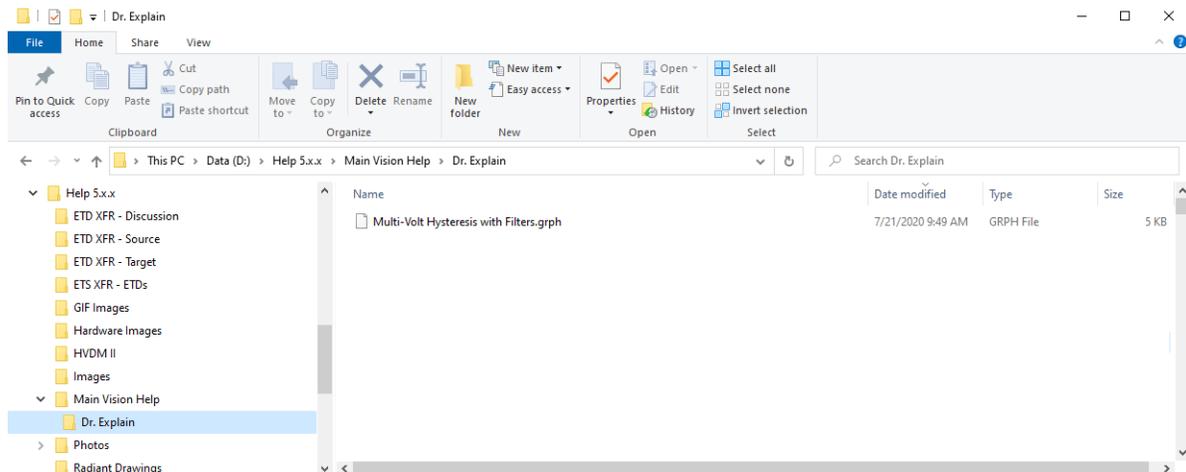


Figure 3 - File is Written to the Vision Host Disk.

Step 4: Select File->Open a Test Definition Graph from the main Vision menu. As an alternative, right-click in any open Graph and select "Open...". If this option is chosen, the

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original Graph will be overwritten by the Graph recalled from the file.

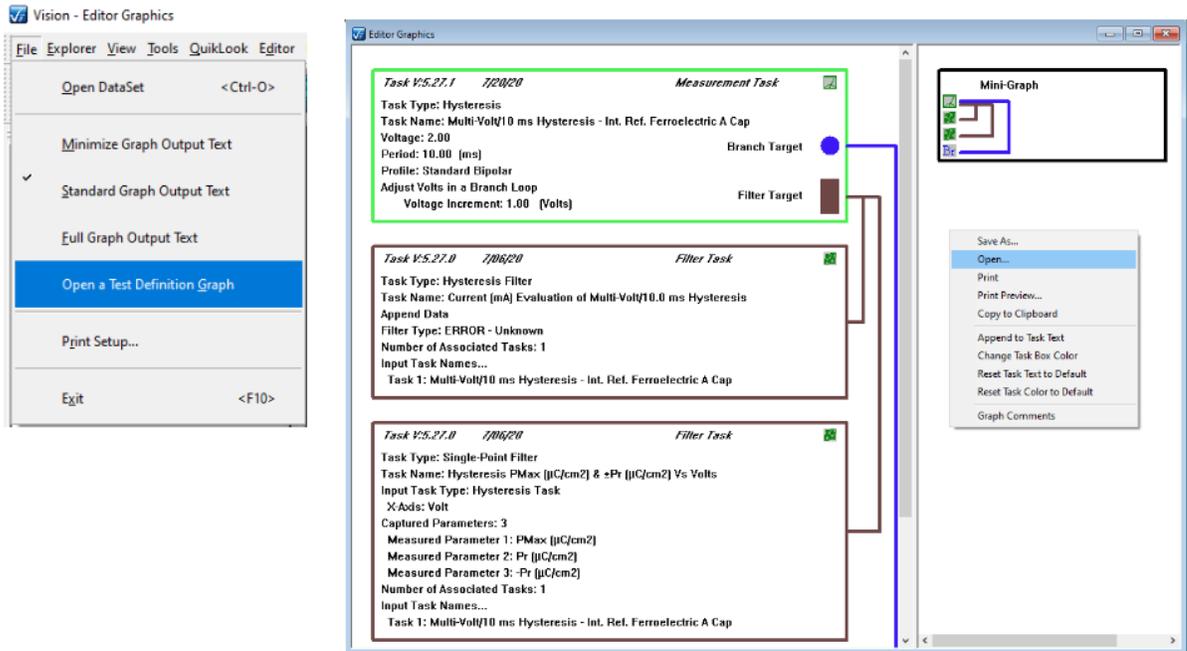


Figure 4 - Initiate a Graph File Reload.

Step 5: Another Window File Browser will open. This is to be used to navigate to and identify an existing Test Definition Graph file. The browser will automatically filter for *.grph files.

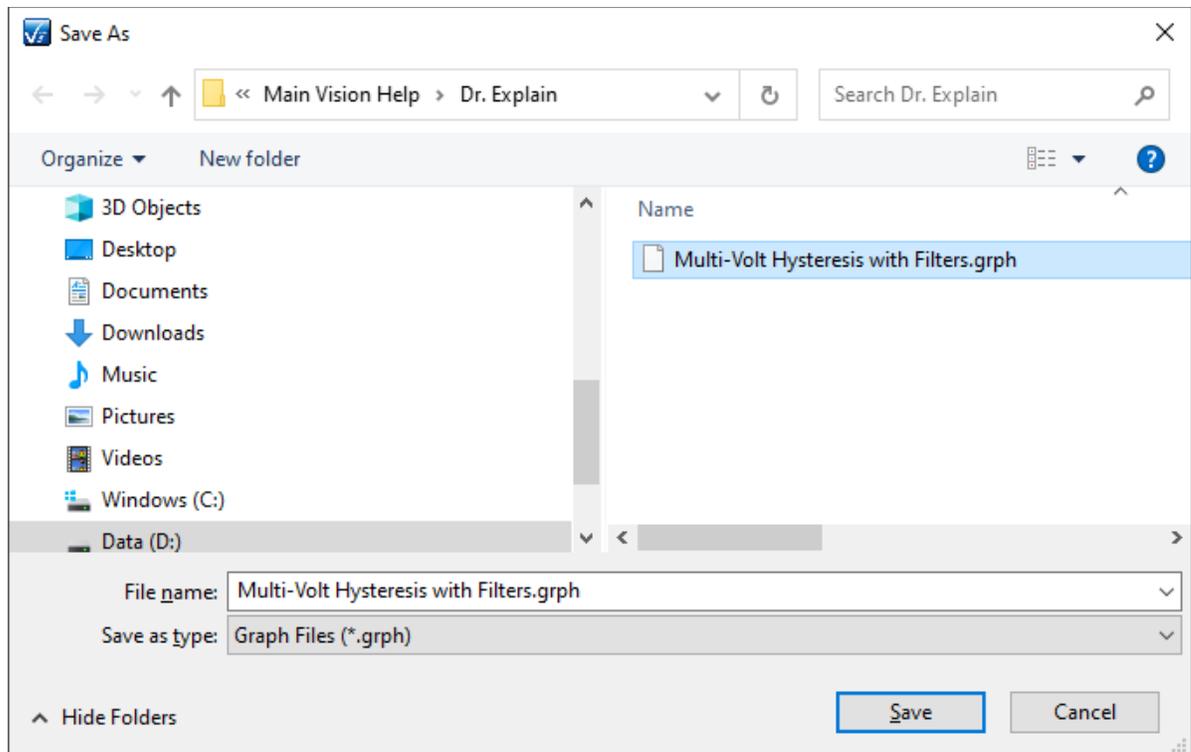


Figure 5 - Locate the Existing File.

Step 6: Click *Save*. If the Vision Menu File->Open a Test Definition Graph option is used a new Graph window will be opened and the file-stored Graph will be shown in it. If the process was initiated by right-clicking in an existing Graph window, the original Graph will be overwritten by the file-stored graph.

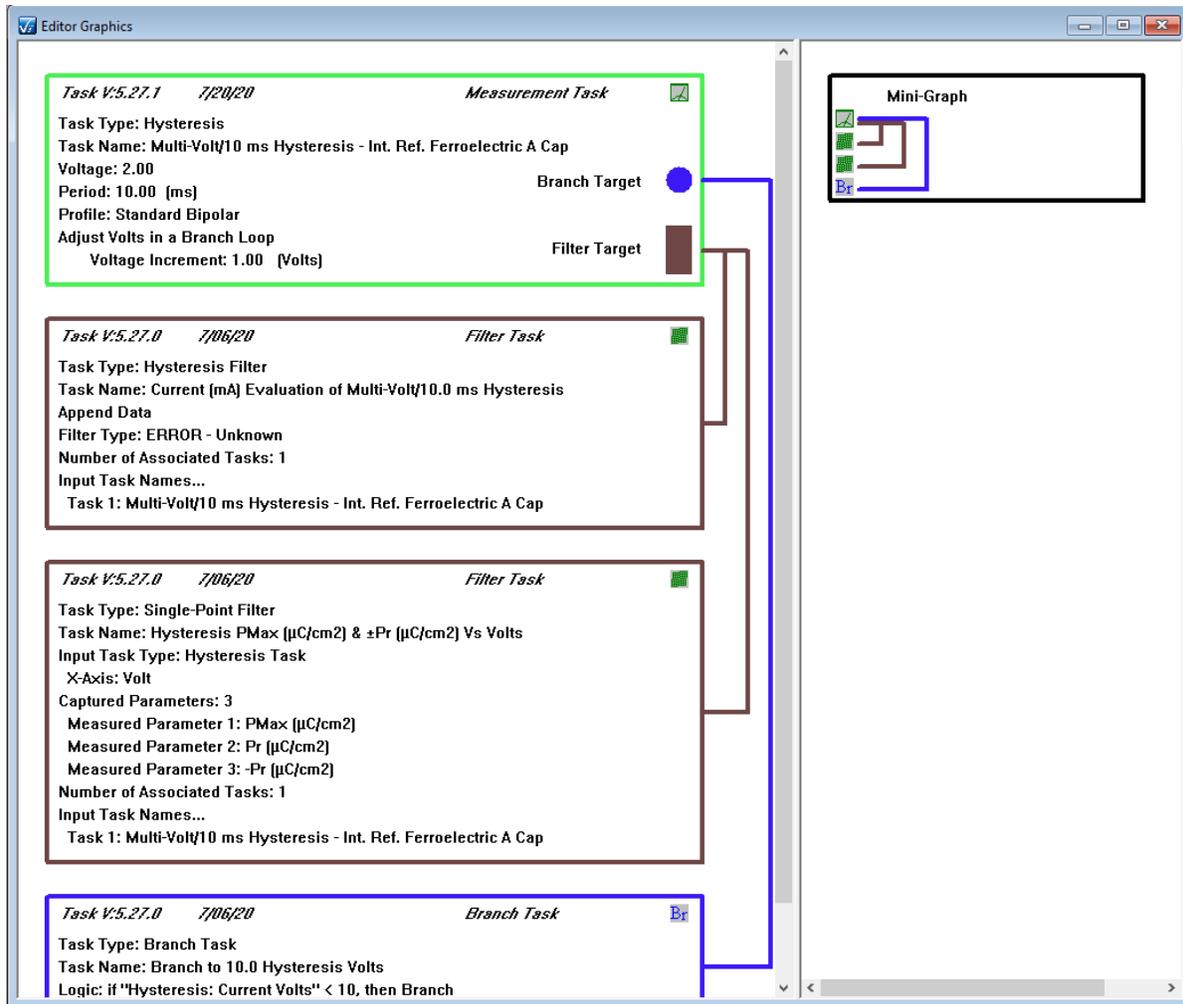


Figure 6 - Test Definition Graph Restored from File.

Documents Library

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Documents Library

The Document Library, by default, appears at the lower-right corner of the Vision display, just beneath the TASK LIBRARY. This window displays folders that represent various types of documents located in specific folders. It searches the path C:\DataSets\User-Printable Help for *.pdf files and loads them into the "User-Printable Help Files" Folder. Likewise, it searches C:\Program Files\Radiant Technologies\Vision\Help for all *.chm files and loads all such files into the "CHM Files" folder. Both of these file paths have such files written to them by the installer. These represent the help pages for Vision. Finally, the path C:\DataSets\Documents is search for files of extension:

1. *.txt
2. *.doc/*.docx
3. *.xls/*.xlsx
4. *.ppt/*.pptx
5. *.jpg
6. *.vsd (VISIO drawing program)
7. *.html.

As any or all of these types of files are located in the C:\DataSets\Documents folder, a folder is created in the Documents Library for them and the files are listed there. Any files the user places in that location of these types are directly accessible through the Documents Library window. Furthermore, the installer writes a variety of these types of files, as demonstration files, to that location.

Step 1: With Vision stopped, move any files of any of the types listed above into C:\DataSets\Documents.

Step 2: Start Vision and observe the folders in the Documents Library.

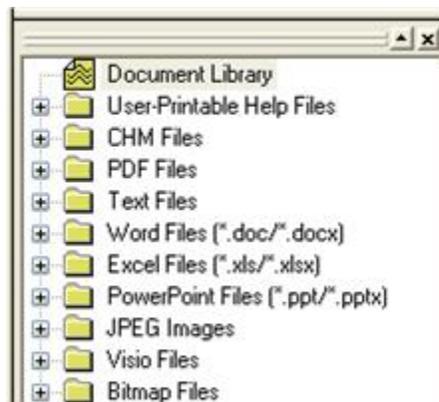


Figure 1 - The Document Library Window on Vision Startup.

Step 3: Expand any folder in the Documents Library window. Double-click any of the files located in the folder. Provided the appropriate program is installed on the Vision host

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computer, the file will open in that program. (Note that **Figure 2** shows two Word documents named "Demo". One of these is Demo.doc and the other is Demo.docx, written by Word 2007 or later.)

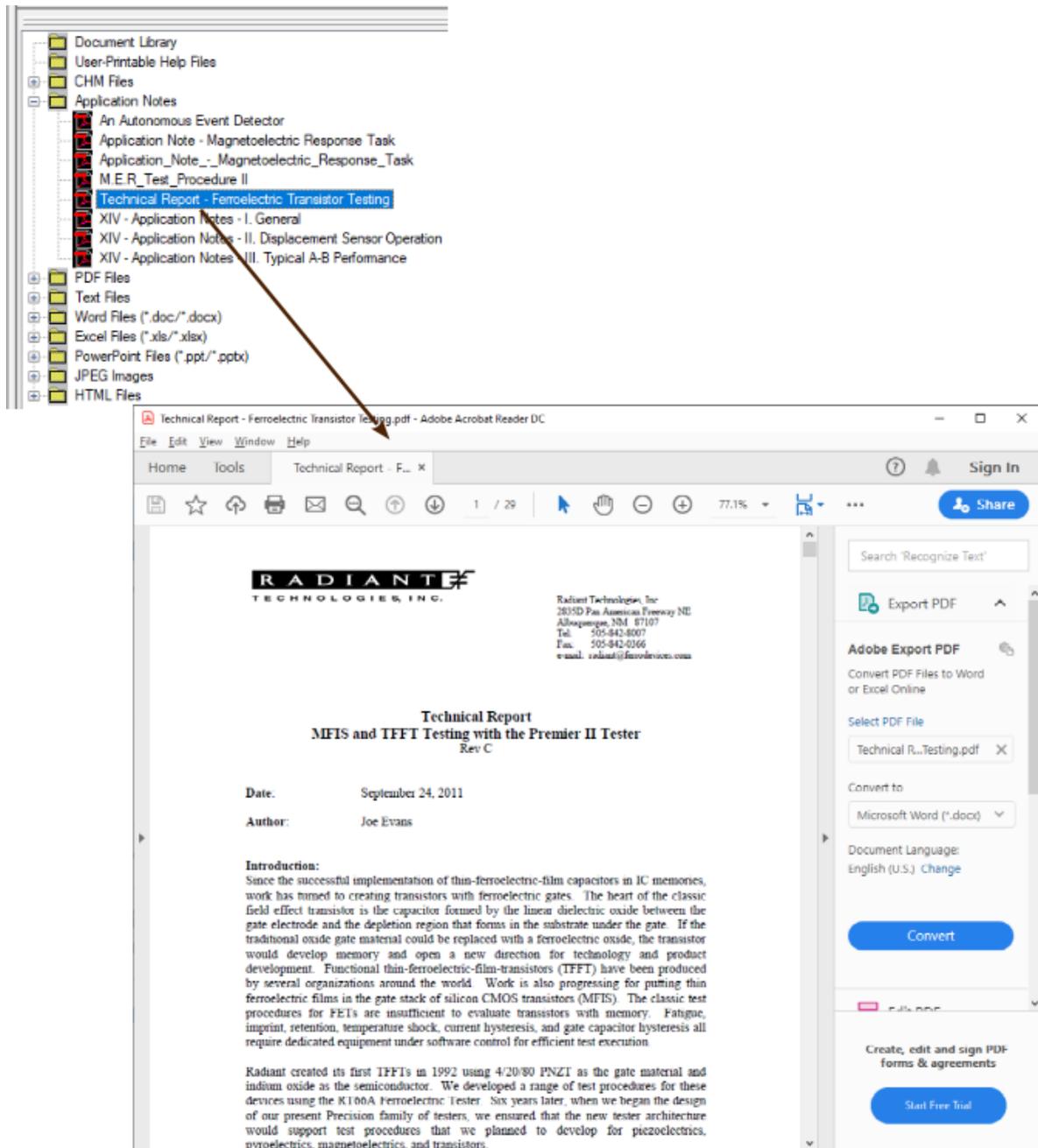


Figure 2 - Opening A PDF Document from the Document Window.

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