

Online Help



Protocol Trigger and Decode

077-0009-00

Adapted from the Protocol Trigger and Decode Online Help, Version 1.0.0
(February, 2005)

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Protocol Trigger and Decode Tool Online Help, 076001900, Version 1.0.0

General Safety Summary

Review the following safety precautions to avoid injury and prevent damage to this product or any products connected to it. To avoid potential hazards, use this product only as specified.

Only qualified personnel should perform service procedures.

While using this product, you may need to access other parts of the system. Read the *General Safety Summary* in other system manuals for warnings and cautions related to operating the system.

To Avoid Fire or Personal Injury:

Connect and Disconnect Properly: Do not connect or disconnect probes or test leads while they are connected to a voltage source.

Observe All Terminal Ratings: To avoid fire or shock hazard, observe all ratings and markings on the product. Consult the product manual for further ratings information before making connections to the product.

Do Not Operate With Suspected Failures: If you suspect there is damage to this product, have it inspected by qualified service personnel.

Symbols and Terms: The following terms and symbols may appear in the online help.



WARNING: Warning statements identify conditions or practices that could result in injury or loss of life.



CAUTION: Caution statements identify conditions or practices that could result in damage to this product or other property.

Terms on the Product: The following terms may appear on the product:

DANGER indicates an injury hazard immediately accessible as you read the marking.

WARNING indicates an injury hazard not immediately accessible as you read the marking.

CAUTION indicates a hazard to property including the product.

Symbols on the Product: The following symbol may appear in the product:



CAUTION Refer to Help

Welcome to the Protocol Trigger and Decode Application

The Protocol Trigger and Decode (PTD) application enables you to decode and simultaneously display protocol-level information and physical layer signaling.

The PTD application includes the following features:

- Simultaneously view signal, characters, and protocol
- Decode 8b/10b encoded serial data
- Correlate events across physical and link layers
- Synchronize your host oscilloscope with the application

What do you want to do next?

[Learn about related documentation](#)

[Learn more about the Protocol Trigger and Decode application](#)

Related Documentation

Refer to the *Optional Applications Software on a Windows-Based Oscilloscope Installation Manual* for the following information:

- Software warranty
- Software license agreement
- List of all available applications, compatible oscilloscopes, and relevant software and firmware version numbers
- How to use the 5-time free trial
- Installation procedures
- How to enable an application
- How to download files from the Tektronix Web site

The *Optional Applications Software on a Windows-Based Oscilloscope CD-ROM* includes many PDF files in the Documents directory that you can view and print.

See also:

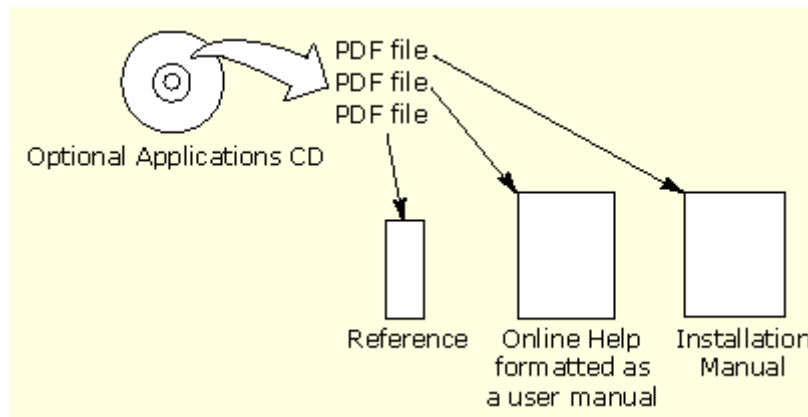
[Application CD Contents](#)

[Access to PDF Files](#)

Application CD Contents

The *Optional Applications Software on a Windows-Based Oscilloscope CD-ROM* includes files for the following types of documentation:

- Printable file of the RT-Eye Serial Data Compliance and Analysis online help
- Printable file of the Protocol Trigger and Decode Tool online help
- PDF files of the Methods of Implementation (MOI) for the InfiniBand and the PCI Express serial data standards as they apply to the corresponding compliance modules
- Reference guides
- Optional Applications Installation manual



See also:

[Access to PDF Files](#)

Access to PDF Files

You can use any of the following methods to view the various PDF files associated with this application:

- Access a file in the Documents directory on the Applications CD from any PC
- Select a file from the Start menu in the oscilloscope task bar; you may need to first minimize the application.
- Access a file from the Help drop-down list in the PDT application.

Note: If you do not have an Acrobat reader to view a PDF file, you can get a free copy of the reader from the www.adobe.com/products/acrobat Web page.

Conventions

Online help topics use the following conventions:

- The term "click" is used to indicate choosing an option either with a mouse or by tapping as you would with a Touch Screen.
- The term "Compliance Module" refers to optional "plug-in applications" from Tektronix used for compliance testing to specific serial data standards.
- The term "channel" is context dependent. It can refer to the transmit channel of the device under test or to an oscilloscope channel.
- The term "DUT" is an abbreviation for Device Under Test.
- When steps require a sequence of selections using the application interface, the ">" delimiter marks each transition between a menu and an option. For example, one of the steps to recall a setup file would appear as File> Recall.

Contacting Tektronix

Phone	1-800-833-9200*
Address	Tektronix, Inc. Department or name (if known) 14200 SW Karl Braun Drive P.O. Box 500 Beaverton, OR 97077 USA
Web site	www.tektronix.com
Sales support	1-800-833-9200, select option 1*
Service support	1-800-833-9200, select option 2*
Technical support	www.tektronix.com/support 1-800-833-9200, select option 3* 6:00 a.m. - 5:00 p.m. Pacific time

* This Telephone number is toll free in North America. After office hours, please leave a voice mail message. Outside North America, contact a Tektronix sales office or distributor; See the Tektronix web site for a list of offices.

Feedback

Tektronix values your feedback on our products. To help us serve you better, please send us suggestions, ideas, or other comments you may have about your application or oscilloscope.

You can email your feedback to techsupport@tektronix.com, FAX it to (503) 627-5695, or call 1-800-833-9200 (select option 3). Please be as specific as possible and include the following information:

General Information

- Oscilloscope model number and hardware options, if any
- Probes used
- Serial data standard
- Signaling rate
- Your name, company, mailing address, phone number, FAX number

Note: Please indicate if you would like to be contacted by Tektronix regarding your suggestion or comments.

Application-Specific Information

- Software version number
- Description of the problem such that technical support can duplicate the problem
- If possible, save the oscilloscope waveform file as a .wfm file
- If possible, save the oscilloscope and application setup files from the application to obtain both the oscilloscope .set file and the application .ini file.

Once you have gathered this information, you can contact technical support by phone or through e-mail. If using e-mail, be sure to enter in the subject line "PTD Problem," and attach the .set, .ini, and .wfm files.



Tip To include screen shots, from the oscilloscope menu bar, select File> Export. In the Export dialog box, enter a file name with a .bmp extension and select Save. The file is saved in the C:\TekScope\Images directory. You can then attach the file to your email (depending on the capabilities of your email editor).

Protocol Trigger and Decode Control Window

The Protocol Trigger and Decode control window consists of three windows, which you can show or hide from view. Use the Display Window drop-down list in the application window to select which windows to show and which ones to hide from view.



The application window includes:

- Controls for selecting data sources and serial standards
- Controls for the type of information displayed
- Controls for oscilloscope acquisitions
- Controls for synchronization

The symbolic window includes:

- Character and protocol displays
- Controls for configuring information display

The waveform window includes:

- Waveform display
- Horizontal zoom controls

What do you want to do next?

[Learn about application controls.](#)

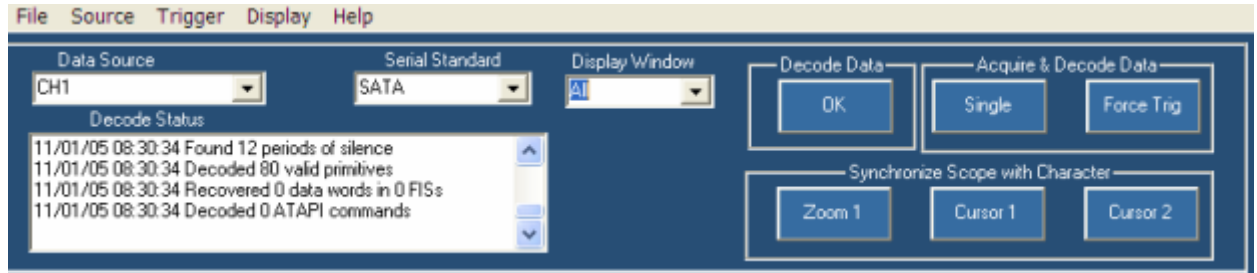
[Learn about the symbolic controls.](#)

[Learn about the waveform display.](#)

[Learn about trigger setup controls](#)

Application Controls

The application window includes controls for selecting data sources and serial standards, the type of information displayed, and oscilloscope acquisitions and synchronization



Use the **Data Source** drop-down list to select your data source. Data sources can be Channels 1-4, Math 1-4, Ref 1-4, or File. Selecting File allows you to browse for waveforms stored in .wfm format. If your data source contains FastFrame data, then an additional control appears (to select the frame). Enter the frame number in the Frame control to navigate to a specific frame for analysis.

The **Decode Status** is a scrolling area that displays information about the decoding process.

Use the Serial Standard drop-down list to select the serial standard that you want to use in your analysis. You can select PCI Express, SATA, or define your own. The standard that you select will also determine what appears in the Character and Protocol displays.

Use the **Display Windows** drop-down list to display or hide the Waveform and Symbolic windows. Selecting All from the list displays both the Waveform and Symbolic windows.

Click the **Decode Data** button to analyze the data that is currently selected in the source drop-down list.

If you need to acquire data, click the **Single** button. This button works similarly to the Single button on the front of an oscilloscope. Clicking the Single button in the application starts an acquisition, analyzes the acquired data, and then updates the display windows. Use the Force Trigger button if you need to simulate a trigger event to complete the acquisition. Once the acquisition is complete, the application analyzes the acquired data and updates the display windows.

To synchronize the host oscilloscope with the data that is displayed by the application, use the buttons under Synchronize Scope with Character. If you want to see the same area on your oscilloscope that is displayed in the Waveform window in the PTD application, click **Zoom 1**. The oscilloscope will zoom in on the portion of the waveform that you have displayed in the PTD application. To synchronize the host oscilloscope using cursors, be sure that you have cursors turned on and set to V-bars on the host instrument. Select a line in either the Character or Protocol display and then click **Cursor 1**. The position of Cursor 1 on the oscilloscope will be updated to match the selection in the PTD application.

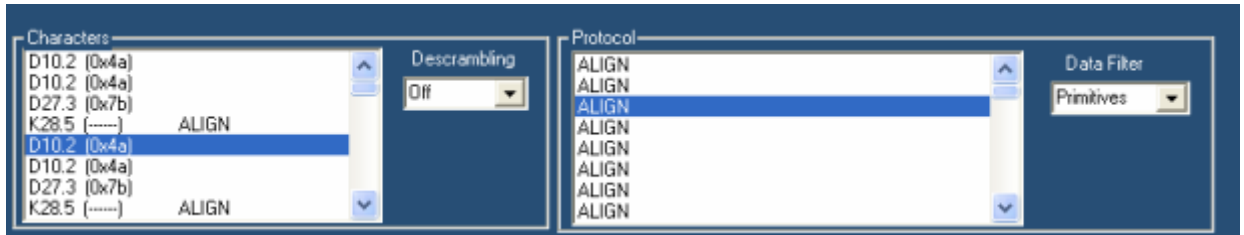
What do you want to do next?

[Learn about the symbolic area controls.](#)

[Learn about the waveform display.](#)

Symbolic Window Controls

The symbolic window controls character and word displays as well as configuring information displays.



Use the **Descrambling** drop-down list to turn data scrambling on or off. This descrambles the data before presenting it in the Character or Protocol fields.

Use the **Data Filter** drop-down list to select the level of abstraction that you want in the Protocol display. Your choices will vary depending on the standard selected.

SATA provides the following choices:

- Primitives—Dwords (four-character sequences) beginning with a control character
- FIS—Frame Information Structure, disassembly includes frame header information
- ATAPI—AT Attachment Packet Interface

PCI Express allows you to choose the following:

- Dwords
- DLLP
- TLP

What do you want to do next?

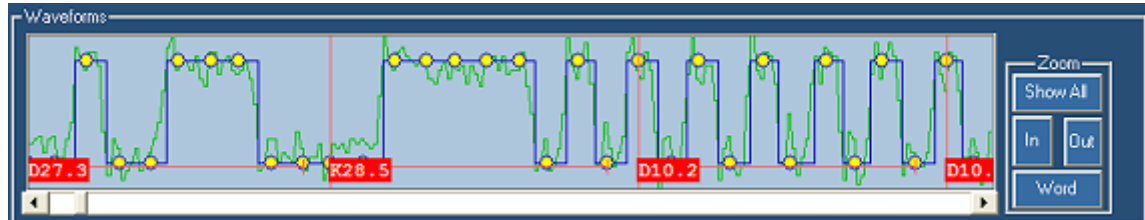
[Learn about the waveform display.](#)

[Learn about application controls.](#)

Waveform Window Controls

The waveform window displays the waveform and annotations and allows you to zoom on a displayed waveform.

To display the entire waveform, click the Show All button. To magnify the waveform horizontally, click the In button. To reduce the waveform, click the Out button. Click the Word button to set the waveform window to contain four 10b symbols of data.



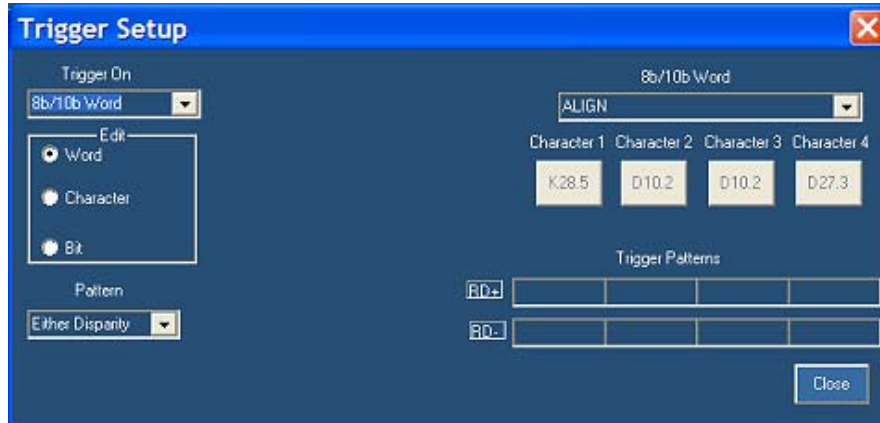
What do you want to do next?

[Learn about application controls.](#)

[Learn about the symbolic area controls.](#)

Trigger Setup Controls

Use the Trigger Setup control window to set up direct hardware triggering on 8b/10b characters and words. This enables you to fill the instrument's memory with an event of interest rather than taking a random snapshot. Serial protocol triggering allows you to isolate a variety of link layer faults, control sequences, or faults. To open this control window, go to the Trigger menu and select Setup.



Use the **Trigger On** drop-down list to select different serial trigger types: 8b/10b Word, 8b/10b Character, 8b/10b Code Error, or Bit Pattern. Selecting 8b/10b Word allows you to specify a four-character sequence of 8b/10b-coded characters to trigger on. This can be either from a list of predefined words or as individual characters. To select predefined primitives, select Word under Edit, and then use the 8b/10b Word drop-down list to select the word. The standard determines which predefined words are available in the list. To select individual characters, you must choose Character under Edit. The Character 1-4 buttons display the value for the currently selected word. You can change the character values by clicking a [Character button](#).

Select 8b/10b Character from the Trigger On drop-down list to trigger on only one character. Selecting Specific Character under Edit allows you to trigger on one specific character. Click the [Character button](#) to change the character value that you want to trigger on. Selecting Any Valid Control Character allows you to trigger on the first valid control character found.

To trigger on a code error select [8b/10b Code Error](#) from the Trigger On drop-down-list, and then select the type of errors that you want to trigger on. You can select any combination of errors from the list.

To trigger on a specific bit pattern, select Bit Pattern from the Trigger On drop-down list, and then select either [Binary](#) or [Hex](#) from the Format drop-down list. Enter the bit pattern, and then click Apply.

By default, the trigger system is loaded with patterns for both positive and negative running disparity. You can use the Pattern drop-down list to select only characters that arrive after a positive or a negative running disparity. Note that the Trigger Patterns reflect your selection in the Pattern drop-down list.

What do you want to do next?

[Learn about application controls.](#)

[Learn about the symbolic controls.](#)

[Learn about the waveform display.](#)

Character Entry Dialog Box

Use the Character Entry dialog box to modify or change the characters that you want to trigger on. To access this dialog box, click a Character button in the Trigger Setup control window.

Select either Character or Hex Data Format. In Character format, click either K or D and then enter the decimal values for the character. If you entered a K-character, its symbolic name is shown in the Value/Name field. If you entered a D-character, its hexadecimal value is shown in the Value/Name field. You can also click a Control Symbol button and the Character field will show the value of that control symbol.



In Hex Data format, enter the Hex Data Byte using the keypad. The corresponding code value is shown in the Character field. You can also click a Control Symbol button and the Character field will show the value of that control symbol. The Value/Name field displays the 8b/10b character equivalent.

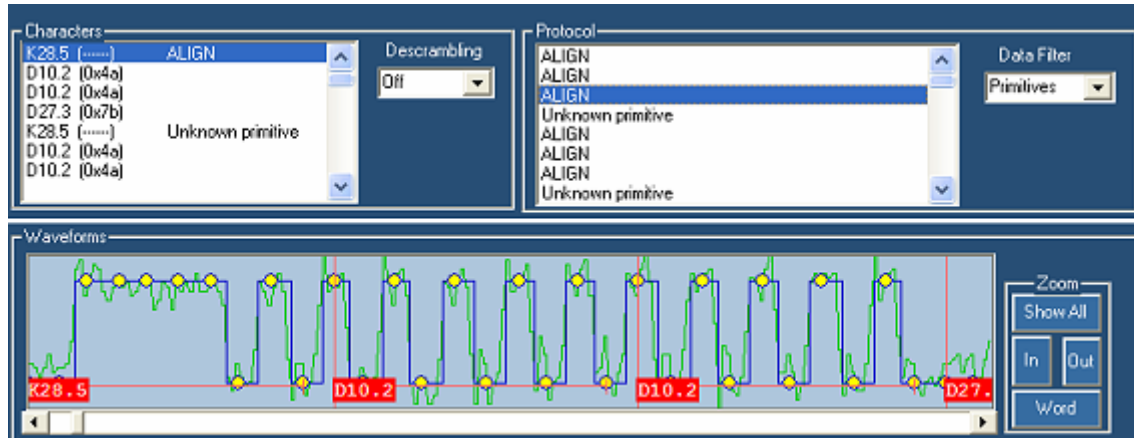


What do you want to do next?

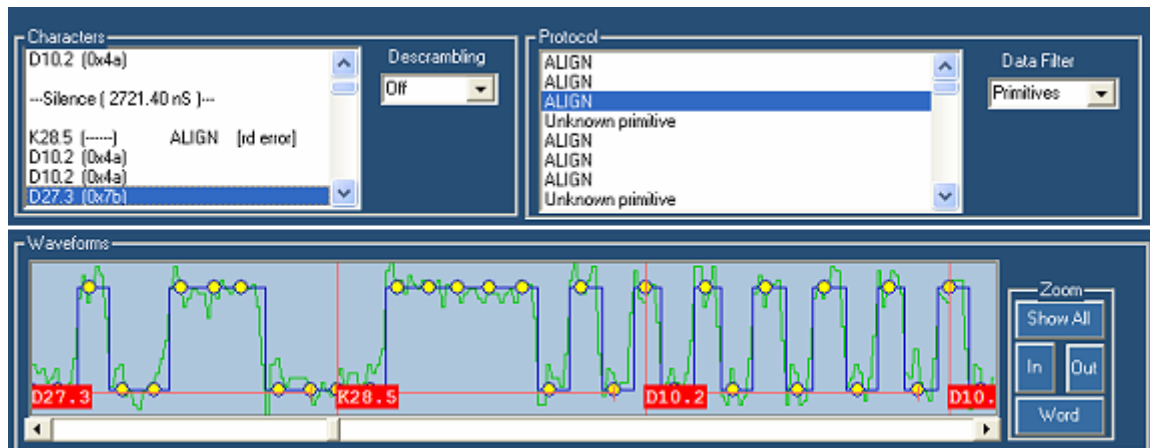
[Learn about other trigger setup controls.](#)

Synchronize Data in the Symbolic and Waveform Windows

When you click any word in the Protocol field, the Waveform displays the beginning of that sequence, starting at the left. The corresponding character in the Character field is highlighted.



When you click any character in the character field, the Waveform displays the beginning of that sequence, starting at the left. The word in the Protocol field will be highlighted.



What do you want to do next?

Learn about the symbolic area controls.

Learn about the waveform display.

Synchronize Data with the Host Oscilloscope

To synchronize the host oscilloscope with the data that is displayed by the PTD application, do the following:

Click Zoom 1 under Synchronize Scope with Character. The oscilloscope display changes to match the area of the waveform that you have displayed in the PTD application.

To use cursors for synchronizing data, be sure cursors are turned on and set to V-bars on the host oscilloscope.

- 1 Click Cursor 1 or Cursor 2.
- 2 Move the cursor in the PTD application to the area of the waveform that you want to see displayed on the host instrument.

The oscilloscope displays the area of the waveform in which you have placed the cursor.

Change the Window Size

To change the size of the symbolic window or the waveform window, do the following:

- 1 Click the white line that separates the window from other windows. The white line will change color.
- 2 Drag the line either up or down.

What do you want to do next?

[Learn how to hide or show windows.](#)

Show and Hide Windows

To show or hide windows, do the following:

- 1 Click the Display Window drop-down list.
- 2 Select the window(s) you want to show.
 - **All** displays both the Symbolic and Waveform windows
 - **Symbolic** displays the Symbolic window but hides the Waveform window
 - **Waveform** displays the Waveform window but hides the Symbolic window
 - **None** hides both the Symbolic and Waveform windows

What do you want to do next?

[Learn how to change the window size.](#)

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