
Help Volume

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Display: Waveform Display Tool

Using the Digital Waveform Tool



Use the Digital Waveform tool to zoom or pan waveforms, mark and search for time or patterns, and read the difference between placed markers.

- Searching for a Single Data Value or Pattern (see the *Markers* help volume)
- “Searching for Timing Violations” on page 24
- “Checking Time Intervals Between Two Events” on page 22
- “Zooming - Setting the Time Base” on page 8
- “Offsetting Waveforms - Setting the Delay” on page 10
- “Loading and Saving Waveform Configurations” on page 26
- “Printing the Waveform Window” on page 29

See Also

Working with Markers (see the *Markers* help volume)

“Working with Labels to Set Waveform Attributes” on page 13

“Seeing Measurement Results - Popup on Run” on page 33

“Panning the Waveform” on page 20

“Displaying Waveforms by Time or Samples” on page 19

“Selecting Markers Trigger Reference” on page 27

“Snap a Marker to an Edge” on page 28

“Turning Tabs On or Off in the Display Window” on page 32

Using the Analysis Tab (see the *Agilent Technologies 16700A/B-Series Logic Analysis System* help volume)

Using the Mixed Signal Tab (see the *Agilent Technologies 16700A/B-Series Logic Analysis System* help volume)

Main System Help (see the *Agilent Technologies 16700A/B-Series Logic Analysis System* help volume)

Glossary of Terms (see page 41)

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Glossary

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Using the Digital Waveform Tool

Zooming - Setting the Time Base



Time/Samples Unit Field

To zoom in and view small areas of waveform data, use the time/samples unit field. This field displays either Seconds/div or Samples/div, depending on the display mode selected. The smaller the selected number, the smaller the waveform area displayed.

1. Select the value entry field.
2. Backspace or delete the current numbers.
3. Type in the new value.

or,

- Select the icons.

Quick Zoom Using the Touchscreen

To zoom, touch the upper-left corner and drag your finger to the lower-right corner, then lift your finger. The zoomed display area will be the box you draw. To undo a zoom, touch any open space in the data area, then select *Undo Scaling* from the shortcut selection list that appears.

See Also

“Displaying Waveforms by Time or Samples” on page 19

“Returning to Previous Zoom View - Undo” on page 8

Using the 16702B Knobs and Buttons

Using the 16702B Touchscreen

Returning to Previous Zoom View - Undo

After several zoom operations on waveform data, you may want to return to a previous zoom view. To return to previous zoom views:

- Select anywhere in the viewing area, and select *Undo scaling* from the list.

See Also

Using the 16702B Knobs and Buttons

Using the 16702B Touchscreen

Offsetting Waveforms - Setting the Delay



Delay Field

1. Select the delay value entry field.
2. Backspace or delete the current numbers.
3. Type in the new value.

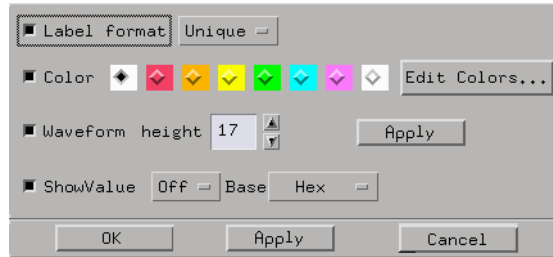
or,

- Select the icons.

See Also

“Panning the Waveform” on page 20

Setting Waveform Height and Color



To set height and color of all labels

1. Select one label, a set of labels, or all labels (see page 31) to adjust height and color.
2. Select one or more attributes (see page 30) to change.
3. Select the color you wish to use.
If the color you want is not shown, select *Edit Colors* (see page 35) to create the color you want.
4. Use the arrows to select the desired waveform height.
5. Select *OK* to accept your changes or *Cancel* to preserve the former settings.

NOTE:

You can also simply drag the bottom edge of the label box to make waveform height adjustments.

See Also

Since each waveform is associated with a label, operations on labels will also affect how waveforms are displayed. For example, changing the polarity of a label in the *Format* window will invert the waveform on the display.

“Inserting, Replacing, or Deleting Labels” on page 14

“Overlaying or Expanding Waveforms” on page 16

“Rearranging the Label Order” on page 17

“Setting Waveform Default Attributes” on page 12

Setting Waveform Default Attributes

The buttons down the left-hand edge of the dialog select the associated attributes. To select a subset of the available attributes, select the buttons down the left-hand edge.

- Black buttons indicate attributes that are selected.
- Gray buttons indicate attributes that will be ignored.

By selecting a subset of the attributes in the dialog, you can modify some of the defaults but leave the other defaults unchanged.



To Set the Waveform Default Attributes

1. In the waveform menu bar, select *Edit*, and select *Set default attributes*.
2. From the Default Attribute dialog, select the desired label name width (see page 13).
3. Select the color you wish to use.
If the color you want is not shown, select *Edit Colors* (see page 35) to create the color you want.
4. Use the arrows to select the default waveform height.
5. Set *ShowValue* (see page 17) On or Off, and choose the numerical base.
6. Select *OK* to accept your changes or *Cancel* to preserve the former default settings.

Working with Labels to Set Waveform Attributes

NOTE:

Labels are created in the Format window of the Instrument tool being used. If you need to create new labels or modify existing label names, or change the polarity of a label, go to the Instrument tool's *Format* window.

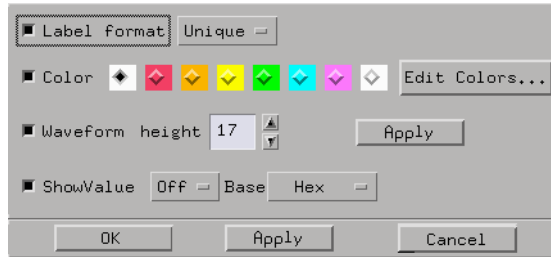
The following label operations are performed in the waveform display:

- “Inserting, Replacing, or Deleting Labels” on page 14
- “Adjusting the Label Name Width” on page 13
- “Rearranging the Label Order” on page 17
- “Overlaying or Expanding Waveforms” on page 16
- “Display Data Values in Waveforms” on page 17
- “Setting the Label Font Size” on page 14
- “Setting Waveform Height and Color” on page 11
- “Setting Waveform Default Attributes” on page 12

Adjusting the Label Name Width

The label name can be set to the following types:

- *Short* - only the name of the label name.
 - *Unique* - the name of the Machine and label.
 - *Full* - the name of the Frame, Slot, Machine, and label.
1. Select one label, a set of labels, or all labels (see page 31) to adjust the label name width.
 2. Select one or more attributes (see page 30) to change.
 3. Select the *Label format* field and select the desired label name type.
 4. Select *OK*.

**See Also**

“Setting Waveform Height and Color” on page 11

“Setting Waveform Default Attributes” on page 12

“Display Data Values in Waveforms” on page 17

Setting the Label Font Size

Font settings are global. The font size you select is applied to all text in the display area.

1. From the waveform menu bar, select *Options*. Select *Font*.
2. From the selection list that appears, select the desired font size.

Inserting, Replacing, or Deleting Labels

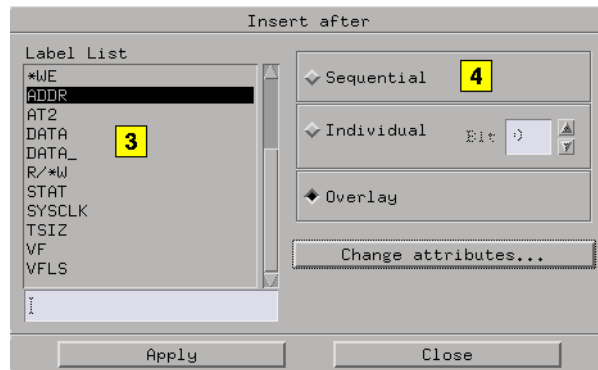
NOTE:

Labels that appear in the Label List are defined in the *Format* window of the Instrument tool being used.

To insert or replace labels

1. *Point* to the desired label.
2. Select the desired *Insert* or *Replace* function.
3. From the Label Dialog, select a label from the *Label List*.
4. Select the desired label display mode (see page 15), and select *Apply*.

5. If you are done, select *Close*.



To delete labels

1. *Point* to a label.
2. Select *Delete* in the selection list that appears.

You can also access the label edit functions through *Edit* in the tool's menu bar.

Label Display Mode

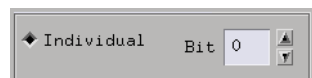
When labels are inserted, you can pick how they are displayed.

Sequential

When labels are displayed in *Sequential* form, all bits in a label are displayed on separate lines, and, in descending order.

Individual

When labels are displayed in *Individual* form, each bit in a label is selected separately and inserted on a separate line.



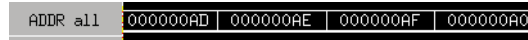
Individual Bit Selection

Overlay

When labels *Overlay*, all bits in a label appear on the same line with the word *all* appearing to the right of the label name.

Display Data Values in Waveforms

When a label is displayed in *Overlay* mode, by default the data values of the waveform are shown within the waveform.



Data Values Displayed in Overlay Mode

To turn data values on or off

1. Select one label, a set of labels, or all labels (see page 31) to turn values on or off.
2. Select Change attributes... (see page 30).
3. Select ShowValue On or Off
4. Select the desired numerical base.
5. Select *OK*.



Show Values Toggle Field

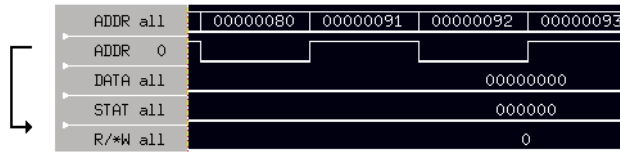
NOTE:

The values are affected by the polarity which was set in the *Format* window. For example, the hexadecimal value "0000" will change to "FFFF" if the polarity of a label is changed from + to -.

Rearranging the Label Order

1. *Point* to a label.
2. Drag the highlighted label to its new location then release.

Chapter 1: Using the Digital Waveform Tool
Working with Labels to Set Waveform Attributes



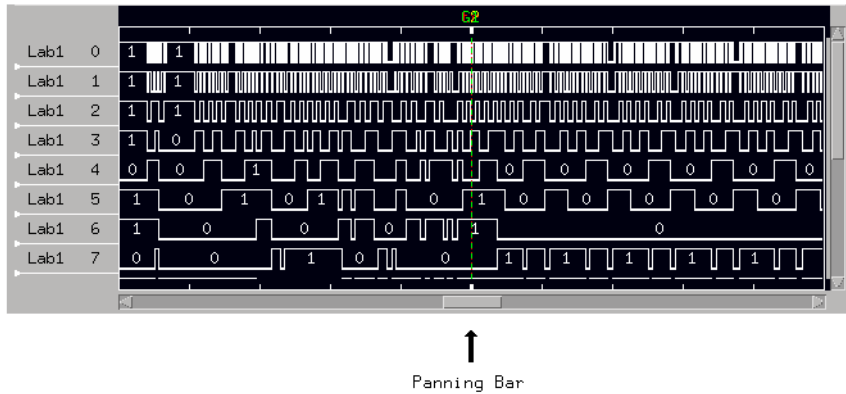
Displaying Waveforms by Time or Samples

You can view waveform data in units of time/div or units of samples/div. Time units are referenced from the system clock, while samples are referenced from the sample clock.

1. Directly above the waveform display area, select the *Seconds/div* or *Samples/div* field.
2. Select the desired display mode.

Panning the Waveform

To pan or scroll through the displayed waveform, drag the waveform panning bar side to side.



As you pan (scroll the waveform data) using the panning bar, the Delay field will also change, showing the current delay from trigger.

See Also

“Offsetting Waveforms - Setting the Delay” on page 10

Searching or Finding a Pattern or Event in Data

To search for and find patterns or events in the waveform data, use *markers*.

1. Activate one marker. (see the *Markers* help volume)
2. Assign the marker (see the *Markers* help volume) as a *Pattern* marker.
3. Define a pattern (see the *Markers* help volume) that matches the event you wish to find.
4. To specify a particular occurrence of the pattern or event, change the marker's *occurs* field and *from* reference field accordingly.
For example, you could select the 10th occurrence of the pattern from the beginning of the data.

You can also read the time interval between this event and other markers or the trigger by using a Marker Interval (see the *Markers* help volume) readout.

Checking Time Intervals Between Two Events

To check the time interval between two events, you need to use two *markers*. There are two ways to set up this measurement:

- “Point to the Events and Manually Place the Markers” on page 22
 - “Define the Events and Automatically Place the Markers” on page 22
-

Point to the Events and Manually Place the Markers

1. Activate two markers. (see the *Markers* help volume) You can skip this step if you are going to use G1 and G2 because they are always active.
 2. Assign both markers (see the *Markers* help volume) as *Time* markers.
 3. In the display, point to the first desired event.
 4. In the shortcut menu that appears, select *Place marker*, then select one of the markers. The marker you chose will appear marking the first event.
 5. Point to the second event and place another marker on it.
 6. Read the interval (see the *Markers* help volume) between the two referenced markers.
-

Define the Events and Automatically Place the Markers

1. Activate two markers. (see the *Markers* help volume) You can skip this step if you are going to use G1 and G2 because they are always active.
 2. Assign both markers (see the *Markers* help volume) as *Pattern* markers.
 3. In the Marker Setup dialog beside the first marker, select *Define* and define the pattern for the first event of interest. Set up the *Marker Pattern For* dialog as shown in the *Search Pattern - Listing* example.
-

(see the *Markers* help volume)

4. Define the other marker as the other event.
5. Set the marker's *occurs* field and *from* field to mark the particular occurrence of the event you want to check.
6. Read the interval (see the *Markers* help volume) between the two referenced markers.

Searching for Timing Violations

To search your data for timing violations, you use *markers* to define the timing event and to check whether the duration of the event meets your expectations. Setup time, hold time and bus cycle duration are examples of timing events that you could check in this way. There are two ways to search for timing violations:

- “Define the Beginning and End of the Event and Check the Duration” on page 24
 - “Define the Duration and Check Each Event Occurrence Against It” on page 24
-

Define the Beginning and End of the Event and Check the Duration

This measurement requires two activated markers. By default, G1 and G2 are available. If you wish to use the x or o markers, you must activate them (see the *Markers* help volume). This procedure will use the default G1 and G2 markers.

1. Place marker G1 (see the *Markers* help volume) at the beginning of the event.
 2. Search and place marker G2 at the end of the event.
 3. Read the interval (see the *Markers* help volume) between G1 and G2.
 4. Optional – Select the *Search* tab and increment the *Next* and *Prev* buttons to view all occurrences of the duration.
-

Define the Duration and Check Each Event Occurrence Against It

1. Activate two markers. (see the *Markers* help volume) You can skip this step if you are going to use G1 and G2 because they are always active.
-

2. Assign one marker (see the *Markers* help volume) as a *Pattern* marker and the other marker as a Time marker.
3. In the Marker Setup dialog, select *Define* for the pattern marker, and define the pattern (see the *Markers* help volume) as the beginning of the event you want to check.
4. Set the time marker value to the expected interval from the pattern marker. Reference the Time marker from the pattern marker. For example, if you were verifying a bus cycle that should be 80 nanoseconds or less, set up the time marker to be 80 nanoseconds from the pattern marker.
5. Check the waveform to see if the event fits within or exceeds the width of the two markers.
6. To find the next occurrence of the event, increment the *occurs* field in the Marker Setup dialog for the pattern marker. The time marker will track the pattern marker automatically.

Loading and Saving Waveform Configurations

Waveform Tool settings can be saved to a configuration file along with the tools connected to it, and loaded from a previously saved configuration file.

- Loading Configuration Files (see the *Agilent Technologies 16700A/B-Series Logic Analysis System* help volume)
- Saving Configuration Files (see the *Agilent Technologies 16700A/B-Series Logic Analysis System* help volume)

NOTE:

The *Load Configuration* window can be accessed via File->Load Configuration.

The *Save Configuration* window can be accessed via File->Save Configuration.

Selecting Markers Trigger Reference

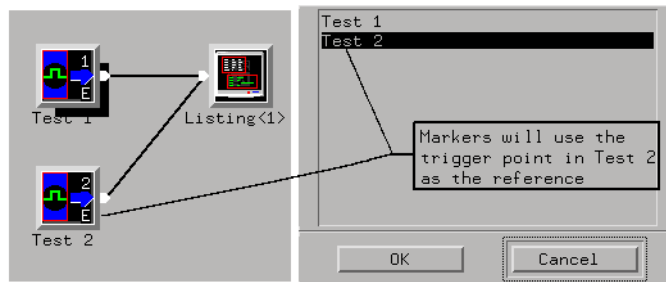
When you have multiple data sets from a configuration with more than one Instrument tool, you can select the trigger point from any data set as the reference for markers.

1. From the waveform menu bar, select *Options*. Select *Reference trigger*.
2. From the Reference trigger dialog, select the desired data set.
3. Select *Apply*.

NOTE:

If you only have one Instrument tool in the configuration, the *Trigger reference* dialog is not available. The trigger point of the single data set is assigned by default.

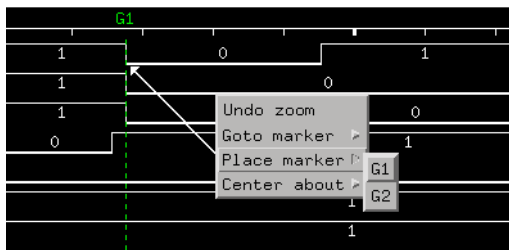
The following example shows a multiple Instrument configuration and the selection of a data set. The trigger point of the selected data set is used by the markers as the trigger reference.



Snap a Marker to an Edge

The *Place marker* function snaps the marker to the closest edge of a waveform. This function is convenient when display resolution is too low to guarantee exact placement of the marker.

1. In the waveform display area, *point* to the desired waveform edge.
2. From the selection list that appears, select *Place marker*, then select the marker you want to place on that edge.



NOTE:

By default, *Place marker* works as described above. To override the default and place a marker at the present position of the cursor, select the *Markers* tab, then select any activated marker field to open the *Marker Setup* dialog. From the Marker Setup dialog, select the *Place on edge* selection box. The *Place on edge* selection box is a switch that enables or disables the "Snap to nearest edge" feature.

Printing the Waveform Window

The print windows operation enables you to print just the Waveform tool window. Use this operation if you want a hardcopy or electronic record of configurations and data currently displayed in the viewing area of the Waveform window.

NOTE:

Only the currently displayed viewing area of the Waveform window is printed. If any data or configuration fields appear offscreen, scroll the desired data or configuration fields into the window's viewing area before printing.

1. Optional - configure the Print Options (see the *Agilent Technologies 16700A/B-Series Logic Analysis System* help volume) if desired. Print Options include print destination, file format type, filename autoincrement, color/b&w; pixel mapping, and landscape/portrait orientation.
2. In the Waveform tool menu bar, select *File*. Select *Print This Window*. The print output will be as configured in the Print Options (Step 1 above).

See Also

Print Option (see the *Agilent Technologies 16700A/B-Series Logic Analysis System* help volume)

Printer Setup (see the *Agilent Technologies 16700A/B-Series Logic Analysis System* help volume)

“Including Comments on Screen Prints” on page 34

Selecting Attributes to Change

The buttons down the left-hand edge of the dialog select the associated attributes. To select a subset of the available attributes, select the buttons down the left-hand edge.

- Black buttons indicate attributes that are selected.
- Gray buttons indicate attributes that will be ignored.

By selecting a subset of the attributes in the dialog, you can modify the defaults for the affected labels, but leave the other attributes for those labels unchanged.

See Also

“Selecting Labels to Change” on page 31

Selecting Labels to Change

To select one label to change:

- Select the label and select *Change attributes*.
The Attribute dialog will open.

To select all labels to change:

1. In the waveform menu bar, select *Edit* and select *Select all*.
2. Select *Edit* again and select *Change attributes*.
The Attribute dialog will open.

See Also

“Selecting Attributes to Change” on page 30

Turning Tabs On or Off in the Display Window

The tabs in the display window give you quick access and visual reference to all the capabilities in the display window. You may wish to turn the tabs off to simplify display content.

- In the menu bar of the display tool, select *Options*, then select *Tabs* and set to *On* or *Off*.

Seeing Measurement Results - Popup on Run

By default, measurement results do not pop up automatically when an analyzer completes its run. If you wish to have a display of measurement results pop up when a run is completed, do the following:

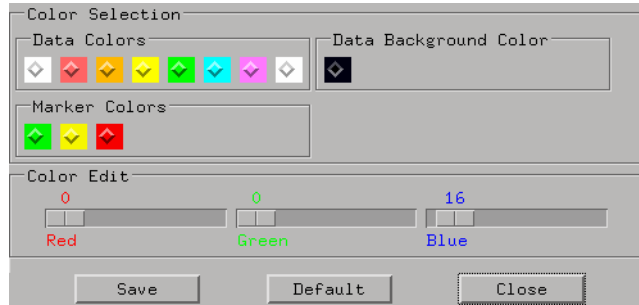
- In the menu bar of the display tool, select *Options*, then select *Popup on Run* and set to *On*.

Including Comments on Screen Prints

When you have tabs turned on, you can also enter your own comments on screen. This allows you to obtain a printed copy of your screen that includes your comments.

- Turn tabs on, (see page 32) and under the *Tabs On* option, select *Stack comments*.
- Enter the text you wish to see in the print of your display. Each print can include multiple comment lines. If you need more than the default two comment lines, resize the comment text window using the sash.

Editing Colors



To edit a color

1. Select a color to change.
2. Move the *Color Edit* sliders to obtain the desired colors.
The colors change in the display to show the result of your modifications.
3. Select *Save* to accept and use the new colors, and save them as the powerup default colors.
Optional - Select *Default* to restore the original colors and save them as the powerup default colors.
4. Select *Close*.

Run/Group Run Function

Using Run - Run All - Group Run

The Run/Stop functions are initiated by selecting icons in the icon bar at the top of the tool windows. All instrument, display, and analysis tool windows will have one of the Run icons shown below to initiate the run function.

When two or more instrument tools are configured, they can be run either independently or as a group. If run in a group, it is called an Intermodule measurement. Use the Intermodule Window (see the *Agilent Technologies 16700A/B-Series Logic Analysis System* help volume) to coordinate the arming in a "Group Run". A common "Group Run" configuration is to configure one instrument to trigger and then arm another instrument to start evaluation of its own trigger condition.



The Run Single icon appears if you have a single instrument configured in your measurement and you want to run a single acquisition.



The Run All icon always appears in the System, Workspace and Run Status windows. Also appears in instrument and display windows when you are using multiple instruments in your measurement and these instruments ARE NOT configured in an intermodule measurement (Group Run). This choice runs a single acquisition on all instruments in the configuration.



The Group Run icon appears in all windows when you are using multiple instruments, and these instruments are configured into a Group Run. This choice runs a single acquisition on all instruments in the Group Run configuration.



The Run Repetitive icon appears in all windows. It is used to run a *Run Single*, *Run All*, and a *Group Run* acquisition repetitively. The current run mode will continue to run until *Cancel* is selected.

Using Stop



The Stop icon terminates all of the run functions shown above.

- Stops a single instrument running a measurement (perhaps waiting for a trigger condition).
- Stops all instruments running separate measurements (easily viewed from the Workspace window).
- Stops all instruments running in a Group Run configuration.

See Also

“Demand Driven Data” on page 38

“Checking Run Status” on page 37

Checking Run Status

The *Run Status* dialog provides status information about the currently configured instruments, and the status of the run with respect to the trigger specification.

To access the *Run Status* dialog, select the *Run Status* icon in the System Window, or, select *Window -> System -> Run Status*



Demand Driven Data

When an analyzer measurement occurs, acquisition memory is filled with data that is then transferred to the display memory of the analysis or display tools you are using, as needed by those tools. In normal use, this *demand driven data* approach saves time by not transferring unnecessary data.

Since acquisition memory is cleared at the beginning of a measurement, stopping a run may create a discrepancy between acquisition memory and the memory buffer of connected tools. Without a complete trace of acquisition memory, the display memory will appear to have 'holes' in it which appear as filtered data.

This situation will occur in these cases:

- If you stop a repetitive measurement after analyzer data has been cleared and before the measurement is complete.
- If a trigger is not found by the analyzer and the run must be stopped to regain control.

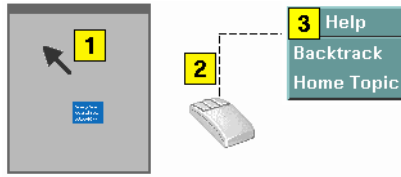
To make sure all of the data in a repetitive run is available for viewing:

- In the workspace, attach a Filter tool to the output of the analyzer.
- In the Filter, select "Pass Matching Data"
- In the filter terms, assure the default pattern of all "Don't Care" (Xs).

This configuration will always transfer all data from acquisition memory. While this configuration will increase the time of each run, it will guarantee that repetitive run data is available regardless of when it is stopped.

Help - How to Navigate Quickly

1. Place mouse cursor anywhere in a help window.
2. Press the right mouse button.
3. Select desired destination.



You can also access all navigation and search commands from the help window menu bar.

Glossary

absolute Denotes the time period or count of states between a captured state and the trigger state. An absolute count of -10 indicates the state was captured ten states before the trigger state was captured.

acquisition Denotes one complete cycle of data gathering by a measurement module. For example, if you are using an analyzer with 128K memory depth, one complete acquisition will capture and store 128K states in acquisition memory.

analysis probe A probe connected to a microprocessor or standard bus in the device under test. An analysis probe provides an interface between the signals of the microprocessor or standard bus and the inputs of the logic analyzer. Also called a *preprocessor*.

analyzer 1 In a logic analyzer with two *machines*, refers to the machine that is on by default. The default name is *Analyzer<N>*, where N is the slot letter.

analyzer 2 In a logic analyzer with two *machines*, refers to the machine that is off by default. The default name is *Analyzer<N2>*, where N is the slot letter.

arming An instrument tool must be

armed before it can search for its trigger condition. Typically, instruments are armed immediately when *Run* or *Group Run* is selected. You can set up one instrument to arm another using the *Intermodule Window*. In these setups, the second instrument cannot search for its trigger condition until it receives the arming signal from the first instrument. In some analyzer instruments, you can set up one analyzer *machine* to arm the other analyzer machine in the *Trigger Window*.

asterisk (*) See *edge terms*, *glitch*, and *labels*.

bits Bits represent the physical logic analyzer channels. A bit is a *channel* that has or can be assigned to a *label*. A bit is also a position in a label.

card This refers to a single instrument intended for use in the Agilent Technologies 16600A-series or 16700A/B-series mainframes. One card fills one slot in the mainframe. A module may comprise a single card or multiple cards cabled together.

channel The entire signal path from the probe tip, through the cable and module, up to the label grouping.

click When using a mouse as the

Glossary

pointing device, to click an item, position the cursor over the item. Then quickly press and release the *left mouse button*.

clock channel A logic analyzer *channel* that can be used to carry the clock signal. When it is not needed for clock signals, it can be used as a *data channel*, except in the Agilent Technologies 16517A.

context record A context record is a small segment of analyzer memory that stores an event of interest along with the states that immediately preceded it and the states that immediately followed it.

context store If your analyzer can perform context store measurements, you will see a button labeled *Context Store* under the Trigger tab. Typical context store measurements are used to capture writes to a variable or calls to a subroutine, along with the activity preceding and following the events. A context store measurement divides analyzer memory into a series of context records. If you have a 64K analyzer memory and select a 16-state context, the analyzer memory is divided into 4K 16-state context records. If you have a 64K analyzer memory and select a 64-state context, the analyzer memory will be

divided into 1K 64-state records.

count The count function records periods of time or numbers of state transactions between states stored in memory. You can set up the analyzer count function to count occurrences of a selected event during the trace, such as counting how many times a variable is read between each of the writes to the variable. The analyzer can also be set up to count elapsed time, such as counting the time spent executing within a particular function during a run of your target program.

cross triggering Using intermodule capabilities to have measurement modules trigger each other. For example, you can have an external instrument arm a logic analyzer, which subsequently triggers an oscilloscope when it finds the trigger state.

data channel A *channel* that carries data. Data channels cannot be used to clock logic analyzers.

data field A data field in the pattern generator is the data value associated with a single label within a particular data vector.

data set A data set is made up of all labels and data stored in memory of any single analyzer machine or

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instrument tool. Multiple data sets can be displayed together when sourced into a single display tool. The Filter tool is used to pass on partial data sets to analysis or display tools.

debug mode See *monitor*.

delay The delay function sets the horizontal position of the waveform on the screen for the oscilloscope and timing analyzer. Delay time is measured from the trigger point in seconds or states.

demo mode An emulation control session which is not connected to a real target system. All windows can be viewed, but the data displayed is simulated. To start demo mode, select *Start User Session* from the Emulation Control Interface and enter the demo name in the *Processor Probe LAN Name* field. Select the *Help* button in the *Start User Session* window for details.

deskewing To cancel or nullify the effects of differences between two different internal delay paths for a signal. Deskewing is normally done by routing a single test signal to the inputs of two different modules, then adjusting the Intermodule Skew so that both modules recognize the signal at the same time.

device under test The system under test, which contains the circuitry you are probing. Also known as a *target system*.

don't care For *terms*, a "don't care" means that the state of the signal (high or low) is not relevant to the measurement. The analyzer ignores the state of this signal when determining whether a match occurs on an input label. "Don't care" signals are still sampled and their values can be displayed with the rest of the data. Don't cares are represented by the *X* character in numeric values and the dot (.) in timing edge specifications.

dot (.) See *edge terms*, *glitch*, *labels*, and *don't care*.

double-click When using a mouse as the pointing device, to double-click an item, position the cursor over the item, and then quickly press and release the *left mouse button* twice.

drag and drop Using a Mouse: Position the cursor over the item, and then press and hold the *left mouse button*. While holding the left mouse button down, move the mouse to drag the item to a new location. When the item is positioned where you want it, release the mouse button.

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Using the Touchscreen:
Position your finger over the item, then press and hold finger to the screen. While holding the finger down, slide the finger along the screen dragging the item to a new location. When the item is positioned where you want it, release your finger.

edge mode In an oscilloscope, this is the trigger mode that causes a trigger based on a single channel edge, either rising or falling.

edge terms Logic analyzer trigger resources that allow detection of transitions on a signal. An edge term can be set to detect a rising edge, falling edge, or either edge. Some logic analyzers can also detect no edge or a *glitch* on an input signal. Edges are specified by selecting arrows. The dot (.) ignores the bit. The asterisk (*) specifies a glitch on the bit.

emulation module A module within the logic analysis system mainframe that provides an emulation connection to the debug port of a microprocessor. An E5901A emulation module is used with a target interface module (TIM) or an analysis probe. An E5901B emulation module is used with an E5900A emulation probe.

emulation probe The stand-alone equivalent of an *emulation module*. Most of the tasks which can be performed using an emulation module can also be performed using an emulation probe connected to your logic analysis system via a LAN.

emulator An *emulation module* or an *emulation probe*.

Ethernet address See *link-level address*.

events Events are the things you are looking for in your target system. In the logic analyzer interface, they take a single line. Examples of events are *Label1 = XX* and *Timer 1 > 400 ns*.

filter expression The filter expression is the logical *OR* combination of all of the filter terms. States in your data that match the filter expression can be filtered out or passed through the Pattern Filter.

filter term A variable that you define in order to specify which states to filter out or pass through. Filter terms are logically *OR*'ed together to create the filter expression.

Format The selections under the logic analyzer *Format* tab tell the

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logic analyzer what data you want to collect, such as which channels represent buses (labels) and what logic threshold your signals use.

frame The Agilent Technologies 16600A-series or 16700A/B-series logic analysis system mainframe. See also *logic analysis system*.

gateway address An IP address entered in integer dot notation. The default gateway address is 0.0.0.0, which allows all connections on the local network or subnet. If connections are to be made across networks or subnets, this address must be set to the address of the gateway machine.

glitch A glitch occurs when two or more transitions cross the logic threshold between consecutive timing analyzer samples. You can specify glitch detection by choosing the asterisk (*) for *edge terms* under the timing analyzer Trigger tab.

grouped event A grouped event is a list of *events* that you have grouped, and optionally named. It can be reused in other trigger sequence levels. Only available in Agilent Technologies 16715A, 16716A, and 16717A logic analyzers.

held value A value that is held until

the next sample. A held value can exist in multiple data sets.

immediate mode In an oscilloscope, the trigger mode that does not require a specific trigger condition such as an edge or a pattern. Use immediate mode when the oscilloscope is armed by another instrument.

interconnect cable Short name for *module/probe interconnect cable*.

intermodule bus The intermodule bus (IMB) is a bus in the frame that allows the measurement modules to communicate with each other. Using the IMB, you can set up one instrument to *arm* another. Data acquired by instruments using the IMB is time-correlated.

intermodule Intermodule is a term used when multiple instrument tools are connected together for the purpose of one instrument arming another. In such a configuration, an arming tree is developed and the group run function is designated to start all instrument tools. Multiple instrument configurations are done in the Intermodule window.

internet address Also called Internet Protocol address or IP address. A 32-bit network address. It

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is usually represented as decimal numbers separated by periods; for example, 192.35.12.6. Ask your LAN administrator if you need an internet address.

labels Labels are used to group and identify logic analyzer channels. A label consists of a name and an associated bit or group of bits. Labels are created in the Format tab.

line numbers A line number (Line #s) is a special use of *symbols*. Line numbers represent lines in your source file, typically lines that have no unique symbols defined to represent them.

link-level address Also referred to as the Ethernet address, this is the unique address of the LAN interface. This value is set at the factory and cannot be changed. The link-level address of a particular piece of equipment is often printed on a label above the LAN connector. An example of a link-level address in hexadecimal: 0800090012AB.

local session A local session is when you run the logic analysis system using the local display connected to the product hardware.

logic analysis system The Agilent Technologies 16600A-series or

16700A/B-series mainframes, and all tools designed to work with it.

Usually used to mean the specific system and tools you are working with right now.

machine Some logic analyzers allow you to set up two measurements at the same time. Each measurement is handled by a different machine. This is represented in the Workspace window by two icons, differentiated by a 1 and a 2 in the upper right-hand corner of the icon. Logic analyzer resources such as pods and trigger terms cannot be shared by the machines.

markers Markers are the green and yellow lines in the display that are labeled *x*, *o*, *G1*, and *G2*. Use them to measure time intervals or sample intervals. Markers are assigned to patterns in order to find patterns or track sequences of states in the data. The *x* and *o* markers are local to the immediate display, while *G1* and *G2* are global between time correlated displays.

master card In a module, the master card controls the data acquisition or output. The logic analysis system references the module by the slot in which the master card is plugged. For example, a 5-card Agilent Technologies 16555D

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would be referred to as *Slot C: machine* because the master card is in slot C of the mainframe. The other cards of the module are called *expansion cards*.

menu bar The menu bar is located at the top of all windows. Use it to select *File* operations, tool or system *Options*, and tool or system level *Help*.

message bar The message bar displays mouse button functions for the window area or field directly beneath the mouse cursor. Use the mouse and message bar together to prompt yourself to functions and shortcuts.

module/probe interconnect cable

The module/probe interconnect cable connects an E5901B emulation module to an E5900B emulation probe. It provides power and a serial connection. A LAN connection is also required to use the emulation probe.

module An instrument that uses a single timebase in its operation. Modules can have from one to five cards functioning as a single instrument. When a module has more than one card, system window will show the instrument icon in the slot of the *master card*.

monitor When using the Emulation Control Interface, running the monitor means the processor is in debug mode (that is, executing the debug exception) instead of executing the user program.

panning The action of moving the waveform along the timebase by varying the delay value in the Delay field. This action allows you to control the portion of acquisition memory that will be displayed on the screen.

pattern mode In an oscilloscope, the trigger mode that allows you to set the oscilloscope to trigger on a specified combination of input signal levels.

pattern terms Logic analyzer resources that represent single states to be found on labeled sets of bits; for example, an address on the address bus or a status on the status lines.

period (.) See *edge terms*, *glitch*, *labels*, and *don't care*.

pod pair A group of two pods containing 16 channels each, used to physically connect data and clock signals from the unit under test to the analyzer. Pods are assigned by pairs in the analyzer interface. The number of pod pairs available is determined

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by the channel width of the instrument.

pod See *pod pair*

point To point to an item, move the mouse cursor over the item, or position your finger over the item.

preprocessor See *analysis probe*.

primary branch The primary branch is indicated in the *Trigger sequence step* dialog box as either the *Then find* or *Trigger on* selection. The destination of the primary branch is always the next state in the sequence, except for the Agilent Technologies 16517A. The primary branch has an optional occurrence count field that can be used to count a number of occurrences of the branch condition. See also *secondary branch*.

probe A device to connect the various instruments of the logic analysis system to the target system. There are many types of probes and the one you should use depends on the instrument and your data requirements. As a verb, "to probe" means to attach a probe to the target system.

processor probe See *emulation probe*.

range terms Logic analyzer resources that represent ranges of values to be found on labeled sets of bits. For example, range terms could identify a range of addresses to be found on the address bus or a range of data values to be found on the data bus. In the trigger sequence, range terms are considered to be true when any value within the range occurs.

relative Denotes time period or count of states between the current state and the previous state.

remote display A remote display is a display other than the one connected to the product hardware. Remote displays must be identified to the network through an address location.

remote session A remote session is when you run the logic analyzer using a display that is located away from the product hardware.

right-click When using a mouse for a pointing device, to right-click an item, position the cursor over the item, and then quickly press and release the *right mouse button*.

sample A data sample is a portion of a *data set*, sometimes just one point. When an instrument samples the target system, it is taking a single

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measurement as part of its data acquisition cycle.

Sampling Use the selections under the logic analyzer Sampling tab to tell the logic analyzer how you want to make measurements, such as State vs. Timing.

secondary branch The secondary branch is indicated in the *Trigger sequence step* dialog box as the *Else on* selection. The destination of the secondary branch can be specified as any other active sequence state. See also *primary branch*.

session A session begins when you start a *local session* or *remote session* from the session manager, and ends when you select *Exit* from the main window. Exiting a session returns all tools to their initial configurations.

skew Skew is the difference in channel delays between measurement channels. Typically, skew between modules is caused by differences in designs of measurement channels, and differences in characteristics of the electronic components within those channels. You should adjust measurement modules to eliminate as much skew as possible so that it does not affect the accuracy of your

measurements.

state measurement In a state measurement, the logic analyzer is clocked by a signal from the system under test. Each time the clock signal becomes valid, the analyzer samples data from the system under test. Since the analyzer is clocked by the system, state measurements are *synchronous* with the test system.

store qualification Store qualification is only available in a *state measurement*, not *timing measurements*. Store qualification allows you to specify the type of information (all samples, no samples, or selected states) to be stored in memory. Use store qualification to prevent memory from being filled with unwanted activity such as no-ops or wait-loops. To set up store qualification, use the *While storing* field in a logic analyzer trigger sequence dialog.

subnet mask A subnet mask blocks out part of an IP address so that the networking software can determine whether the destination host is on a local or remote network. It is usually represented as decimal numbers separated by periods; for example, 255.255.255.0. Ask your LAN administrator if you need a the subnet mask for your network.

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symbols Symbols represent patterns and ranges of values found on labeled sets of bits. Two kinds of symbols are available:

- Object file symbols - Symbols from your source code, and symbols generated by your compiler. Object file symbols may represent global variables, functions, labels, and source line numbers.
- User-defined symbols - Symbols you create.

Symbols can be used as *pattern* and *range* terms for:

- Searches in the listing display.
- Triggering in logic analyzers and in the source correlation trigger setup.
- Qualifying data in the filter tool and system performance analysis tool set.

system administrator The system administrator is a person who manages your system, taking care of such tasks as adding peripheral devices, adding new users, and doing system backup. In general, the system administrator is the person you go to with questions about implementing your software.

target system The system under test, which contains the microprocessor you are probing.

terms Terms are variables that can be used in trigger sequences. A term can be a single value on a label or set of labels, any value within a range of values on a label or set of labels, or a glitch or edge transition on bits within a label or set of labels.

TIM A TIM (Target Interface Module) makes connections between the cable from the emulation module or emulation probe and the cable to the debug port on the system under test.

time-correlated Time correlated measurements are measurements involving more than one instrument in which all instruments have a common time or trigger reference.

timer terms Logic analyzer resources that are used to measure the time the trigger sequence remains within one sequence step, or a set of sequence steps. Timers can be used to detect when a condition lasts too long or not long enough. They can be used to measure pulse duration, or duration of a wait loop. A single timer term can be used to delay trigger until a period of time after detection of a significant event.

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timing measurement In a timing measurement, the logic analyzer samples data at regular intervals according to a clock signal internal to the timing analyzer. Since the analyzer is clocked by a signal that is not related to the system under test, timing measurements capture traces of electrical activity over time. These measurements are *asynchronous* with the test system.

tool icon Tool icons that appear in the workspace are representations of the hardware and software tools selected from the toolbox. If they are placed directly over a current measurement, the tools automatically connect to that measurement. If they are placed on an open area of the main window, you must connect them to a measurement using the mouse.

toolbox The Toolbox is located on the left side of the main window. It is used to display the available hardware and software tools. As you add new tools to your system, their icons will appear in the Toolbox.

tools A tool is a stand-alone piece of functionality. A tool can be an instrument that acquires data, a display for viewing data, or a post-processing analysis helper. Tools are represented as icons in the main window of the interface.

trace See *acquisition*.

trigger sequence A trigger sequence is a sequence of events that you specify. The logic analyzer compares this sequence with the samples it is collecting to determine when to *trigger*.

trigger specification A trigger specification is a set of conditions that must be true before the instrument triggers.

trigger Trigger is an event that occurs immediately after the instrument recognizes a match between the incoming data and the trigger specification. Once trigger occurs, the instrument completes its *acquisition*, including any store qualification that may be specified.

workspace The workspace is the large area under the message bar and to the right of the toolbox. The workspace is where you place the different instrument, display, and analysis tools. Once in the workspace, the tool icons graphically represent a complete picture of the measurements.

zooming In the oscilloscope or timing analyzer, to expand and contract the waveform along the time base by varying the value in the s/Div

field. This action allows you to select specific portions of a particular waveform in acquisition memory that will be displayed on the screen. You can view any portion of the waveform record in acquisition memory.

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