CHAPTER THREE: *Display Your Signal*

In this chapter, see how

To view signal changes over time

To set up the display

To set up for Analog Persistence™

To choose a grid style

To save and recall panel setups

Display Persistence

You can use Waverunner colors and tools to display your signal on the screen.

View one, two, four, or eight grids and up to eight traces (depending on model) at the same time. Adjust display and grid intensity. Choose from several grid styles. Or fill the entire screen with your waveforms using Full Screen.

You can personalize your Waverunner display, while managing color and screen intensity automatically. The displayed signal and all related information share identifying colors chosen by you. Show signals and traces opaquely or transparently, so that overlapping objects — traces over traces, traces over grids — are always visible.

Other invaluable tools and techniques, such as the Analog Persistence feature, help you display your waveform and reveal its idiosyncrasies.

TIP: To clear your settings and make a "fresh" start on a new waveform:

1. ***Connect the signal to be measured to a Waverunner channel.***
2. ***Simultaneously press the second and fifth menu buttons from the top, and the CHANNEL SELECT 1 button, to revert to the default settings.***
3. ***Turn off any unwanted traces by pressing A, B, C, or D.***
4. ***Press SELECT 1, 2, 3, or 4 for the signal's channel and choose "Coupling." Ensure that the coupling matches the circuit's impedance. If not, set it correctly using the menu button.***
5. ***Press AUTO SETUP twice.***

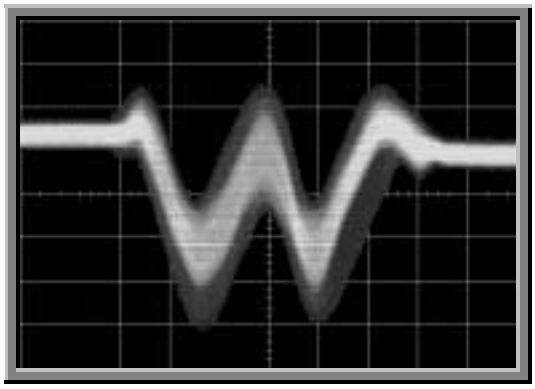
Then follow the steps below.

VIEW SIGNAL CHANGES OVER TIME

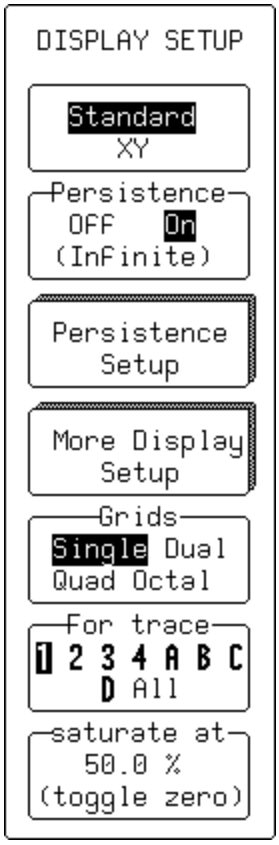
Use Persistence to accumulate on-screen points from many acquisitions and see your signal change over time. Waverunner persistence modes show the most frequent signal path "three-dimensionally" in intensities of the same color, or graded in a spectrum of colors.

To display your waveform with persistence:

1. Press ANALOG PERSIST to display your signal with Analog Persistence or Color Graded persistence.
2. Press DISPLAY to display the "Display Setup" menus.



SET UP YOUR DISPLAY



3. Use these menus to set up your display. When *not* using persistence, some menus are different, as indicated below.

To select standard or XY display: **Standard** is selected by default. See Chapter 9, "Display More," for XY display.

To turn persistence on or off. Or press ANALOG PERSIST to toggle it on or off.

To set up the persistence display (see next page). When Persistence is **Off**, this menu becomes Dot Join: when there are more than 400 sample points on the screen, the points are connected by line segments.

To access more display setup menus. See Chapter 9, "Display More."

To select the grid style and number. See page 40.

Used with persistence to select the displayed trace for the menu action below. When persistence is not being used, this menu is called **W'form + Text** and its knob adjusts waveform and text brightness.

Used with persistence to select the percentage of saturation: 100% spreads the spectrum across the entire depth of the persistence data map; at lower values, the spectrum will saturate — brightest color or shade — at the percentage value specified. Lowering this percentage causes the pixels to be saturated at a lower data intensity, and makes visible rarely hit pixels not seen at higher percentages.

When persistence is not being used, this menu is called Grid intensity; its knob adjusts the intensity of the grid. Grids can be brightened, or blended with displayed traces by reducing their intensity. Also press this menu button to return brightness from 0% to the default level.

TIP: At 0% intensity in Standard display without persistence, the waveform and text disappear.

Press DISPLAY ***to return them to normal brightness.***

SET UP FOR PERSISTENCE

4. Press the button for "Persistence Setup" to access these menus.

5. Use them to set up your persistence display.

To display (**On**) the last trace captured.

To select the persistence duration, in seconds. If this were to be set at 1 s, for example, each captured trace would be displayed for one second and then deleted. The number of sweeps included in the display (up to one million) is indicated at the bottom of the displayed trace label. The default is selection is **Infinite**.

To select persistence for all, or the top two labeled traces displayed. This becomes useful when four traces or functions are shown and persistence will not be applied to all of them.

To select **Analog**, and render the persistence data maps to the screen in intensities of the trace color, or **Color Graded**, where the maps are rendered in a red-to-violet spectrum.

To select the displayed trace for the menu action below.

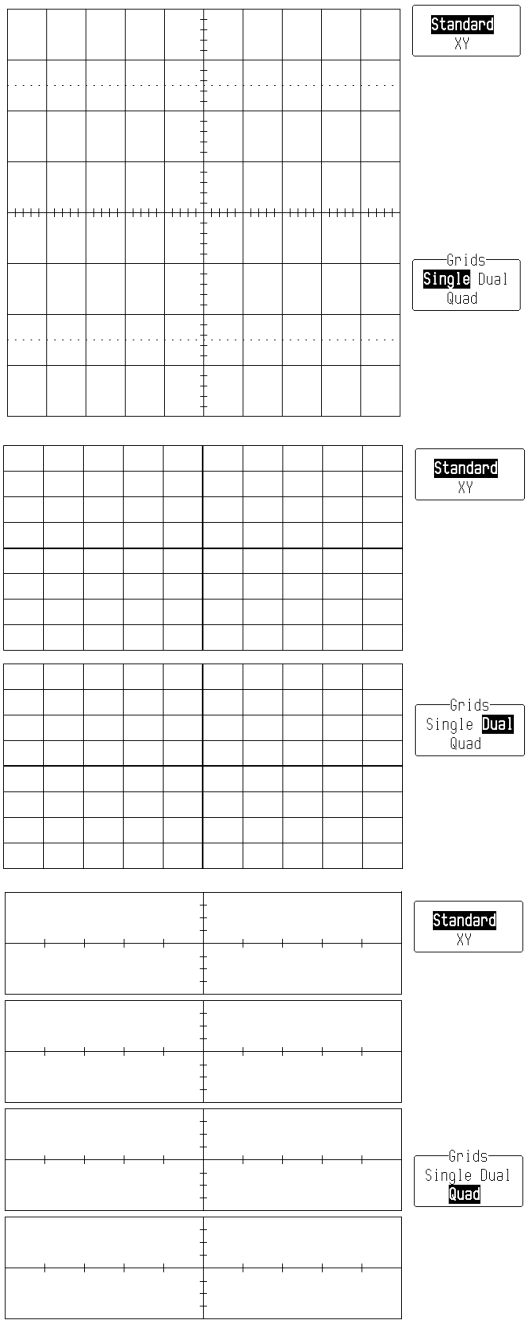
To select the percentage of saturation. See menu explanation on the previous page.

RETURN

6. Press to go back to the main display setup menus.

CLEAR SWEEPS

TIP: Press to restart the persistence accumulation of points — for example, when you change the signal source and want to clear the previous trace.



CHOOSE A GRID STYLE

At left are the **Standard** grid styles for one, two, and four grids. Depending on the Waverunner model, six or eight traces on six or eight grids can be shown at once (see facing page), with their trace labels and any combination of math, zoom, and memories. Standard grids present source waveforms versus time (for FFT, versus frequency). **XY** display, on the other hand, compares one source waveform with another. It has its own special grids (see Chapter 9, "Display More"). The **Parameter**-style grid is displayed automatically when parameters are used (see next chapter).

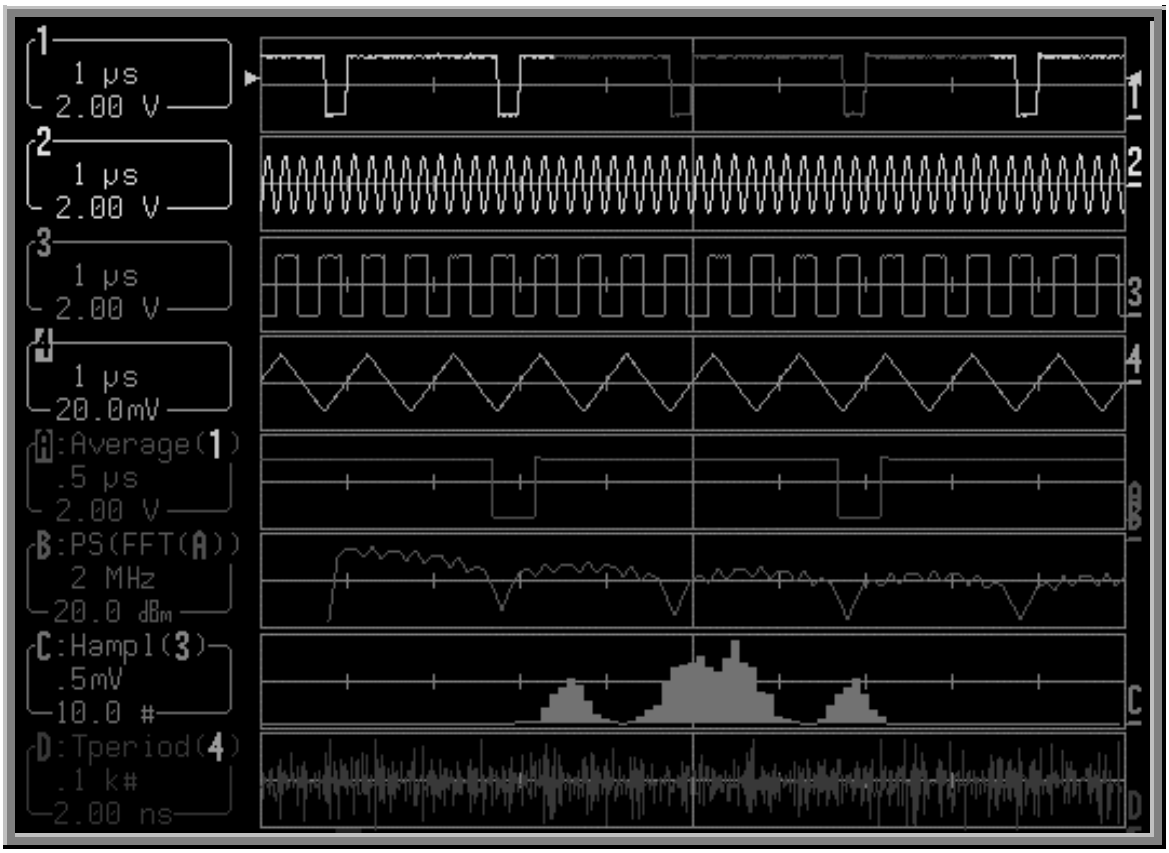
TO LINK AND SEPARATE OBJECTS WITH COLOR

Advanced color management *ensures that objects — grids, waveforms, cursors, or text — are always visible, even when overlapping. Signals and their related data are color associated. Each trace has its own dedicated color. Persistence displays are automatically color matched to the parent trace. Related traces and text, icons and parent-daughter zoom regions are also linked by color.*

The choice of background color *is limited to the darker colors so that displayed objects will be clearly defined and recognizable. The colors of objects that are too close in hue to the chosen background color are automatically changed so that the objects always stand out.*

Each trace has its own color. *But expanded or zoomed sections of a trace can be given their own colors, so that a single trace may have a number of colors at once: its principal color plus those of a number of expanded regions.*

Trace-related text *includes pieces of on-screen information that describe measurement parameters, cursors, triggers, waveforms, and channels. A standard text color covering all on-screen text exists in the preset color schemes, or can be chosen for custom palettes. See Chapter 9, "Display More."*



Waveform source descriptions, trace labels and the information they contain will always take the color of their respective traces, as in this four-channel model's Octal-grid, eight-trace display.

Most menus are displayed in the text color only. *The active trigger edge or condition shows source related information in the trace color, as does the trigger icon. Channel Coupling menu titles are trace colored, and Math Set-Up menu sources have their own color.*

Select ***Opaque*** *to place overlapping waveforms one on top of the other in normal, non-transparent layers. Select* ***Transparent*** *for overlap mixing: those areas of the waveforms that overlap will automatically change color, while grid intensity remains constant. See Chapter 9, "Display More."*

Objects are automatically overlaid in sequence. *With traces of the same type, the foremost is described in the top trace label, the next in the second-from-top trace label, and so on in descending order toward the background. Choose the order in which traces appear using the SELECT buttons. When different types of traces are displayed, placed by default in ascending order from the grid at the bottom are: envelope traces, persistence traces, normal traces, and cursors (foremost on the screen). This sequence can also be customized.*

Save and Recall Your Panel Setups

Your Waverunner scope allows you to store your preferred display settings and recall them later. Or choose to recall a default setup already installed in the scope. Storing and recalling panel setups is very practical when you have set up elaborate zoom and math displays on multiple traces and would like to use them on another signal. The scope can store four panel setups in volatile memory, and many more to floppy disk or the optional PC Card slot (memory card or hard disk card), in numbered files marked with their date and time of storage. You can recall them quickly and easily for later use.

SAVE PANEL SETUPS

1. Press PANELS  for the PANEL SETUPS menus.

Use these menus to save your preferred panel setups — to SETUP1 in this example.

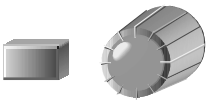
 2. Press to select **Save**.

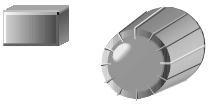
 3. Press to save to SETUP1.

 To save to SETUP2.

 To save to SETUP3.

 To save to SETUP4.

 To save to PC Card slot.

 To save to floppy disk.

RECALL PANEL SETUPS

1. Press  to 

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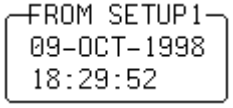
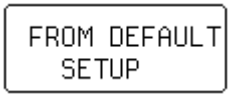
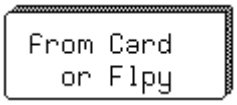
2. Press  to select 

and recall the setup you stored for example in SETUP 1.

   Or, to recall a default setup already stored in your scope, press the button to select 

   Or, when you store setups to floppy disk or PC Card, press the button to select 

   The last alternative accesses the RECALL SETUPS menu, which enables you to recall setups from a floppy disk in the floppy disk drive, or an optional portable storage device (PC memory card or hard disk card) in the PC Card slot.

To store and recall the waveforms themselves, see Chapter 5, "Use Math Tools."