COLOR OSCILLOSCOPE

New color shutter technology.

Crisp, high-resolution display.

Large 6.5 inch crt.

Three liquid-crystal colors.

Excellent contrast even in high ambient light.

Digital storage with requisite 5D10 Waveform Digitizer.

5D10 allows crt readout in same color as waveform.

2 MHz bandwidth.

1 MHz sample frequency with 5D10.

8 channels at 1 mV/div, 4 channels at 50 μV/div, 2 channels at 10 μV/div.

Compatible with 5000 Series plug-ins.

The 5116 Color Oscilloscope introduces Tek's proprietary color shutter: a new technology that makes high-resolution color practical in small instrument displays.

An entirely new method of producing color displays without shadow masks, color-dot phosphors, or any of the other usual techniques, Tek's liquid crystal crt system combines a black and white or monochrome crt with a liquid crystal "color switch." The result is a field-sequential color display whose resolution is as high as any monochrome crt.

Since all display writing is accomplished by a single electron beam, rather than by three beams as in a shadow mask display, the liquid crystal color switch cannot suffer misconvergence, but instead maintains crisp, high-contrast images of uniform purity at all points of the screen, under all ambient light conditions.

The 5116 lets you display, discriminate and compare the signals of events with new speed and confidence. Its color coding affords faster interpretation and differentiation of data, adds impact and appeal. You can use the entire 5116 crt to display two signals, without ambiguity at crossover points. You can see your display clearly, before you output it to an x-y plotter. And, in production environments, you can clarify test procedures by color-coding waveforms to probes and test points.

The 5116's color capability is implemented in conjunction with the 5D10 Waveform Digitizer plug-in. With the 5D10 in place, the 5116 offers the versatility and user-friendly features of a powerful, digital storage scope—including cursor-actuated measurements with automatic crt readout; pre-, post- and center triggering, or bislope triggering; waveform display in either X-Y or X-T format; and digital storage of waveform information.

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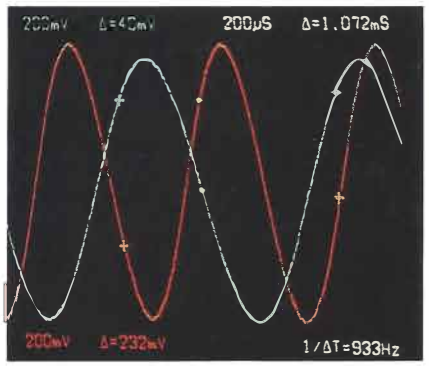
The 5116/5D10 combination provides for a display of three colors: orange, blue-green (cyan) and neutral. Monochromatic (cyan) displays are possible without use of the 5D10.

For single-channel acquisition, the 5116/5D10 provides storage for transient events with frequency components up to 100 kHz and up to 50 kHz for dual-channel acquisitions.

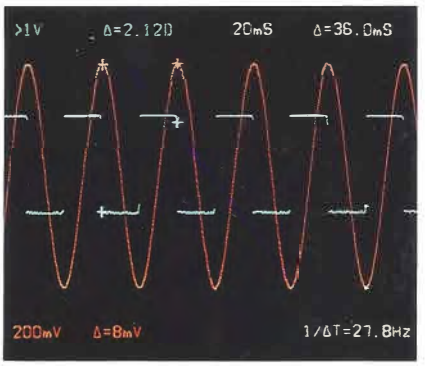
Crt readout. Readout of front panel set-up and measurements are displayed digitally for quick reference in same color as the waveform. Movable color coded cursors let you define exactly that portion of the waveform you wish to measure: use a single cursor for readout of time and amplitude of any point on the waveform. Use two cursors to get difference readings of time and amplitude with an accuracy to 1%.

Various channels/bandwidths for flexible, accurate measurements. With the appropriate 5000 Series amplifier, the 5116 is capable of acquiring eight channels at 1 mV/div, four channels at 50 μV/div and two channels at 10 μV/div.

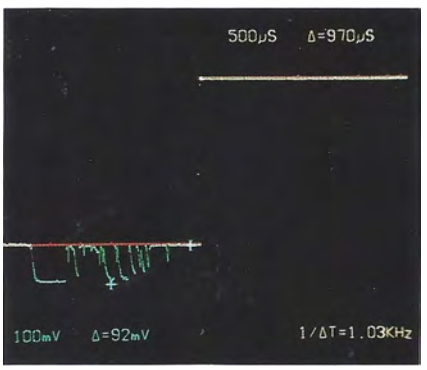
Compatibility with Tek 5000 Series plug-ins. Choose from a wide range of amplifiers, time bases, and differential amplifiers, as well as a curve tracer, spectrum analyzer and dual trace sampler, to tailor a measurement system to your specific needs. You'll find the 5116 not only answers many of your current waveform analysis needs, its modularity ensures the flexibility for future applications as well.



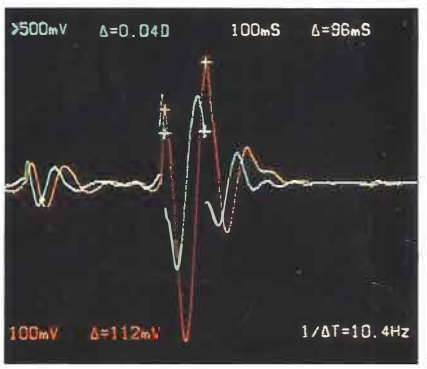
Another feature of the 5116 with the 5D10 is a direct readout of frequency or 1/ΔT (see display where 1/ΔT = 933 Hz). This is one less step for you to get your measurement results.



In a typical dual channel application, color quickly distinguishes between each channel at every crossing point for the full amplitude over the display.



A particular advantage of color is in difficult-to-see signal deviations. In this example, one color is used for the reference trace and the color shows the signal deviation. Also, by overstepping both channels of the cyan and orange traces, you create a neutral color trace and, of course, deviations show up easily in their respective color.



In a situation with unpredictable signals, typical of transducer measurements such as in structural resonance, the different color traces clearly show compatibility or phase difference.

Characteristics

CRT and Display Features

CRT—Internal 8 x 10 div (1.27 cm/div) parallax-free, illuminated graticule.
Accelerating Potential—4.5 kV.
Color Shutter—With 5D10: Three-color display of blue-green (cyan), orange, and neutral. Without 5D10: Blue-green (cyan) display.

Vertical System

Channels—Left plug-in compartment compatible with all 5100 Series plug-ins. Center compartment and right plug-in compartments accept the 5D10 Waveform Digitizer for dual-trace color and digital storage of displays.

Chopped Mode—The mainframe vertical amplifier will chop between left and center plug-in compartments, and/or between two or more amplifier channels. The total time segment per channel is ≈5 μs, consisting of ≈4 μs displayed, ≈1 μs blanked. Chop or alternate mode is selected at the time base unit.
Alternate Mode—Each amplifier plug-in is swept twice before switching to the next. A single-trace amplifier is swept twice and each channel of a dual-trace amplifier is swept once before switching to the second amplifier.

The 5116 color display can easily be photographed in color by either a Tek C5C or Tek C59A camera pack. Each has special attributes depending on the film chosen.

Horizontal System

Channel—Right-hand plug-in compartment compatible with all 5100 Series plug-ins. 5D10 Waveform Digitizer utilizes right-hand and center compartments for dual trace color and digital storage of displays.
Fastest Calibrated Sweep Rate—0.1 ms/div with 5D10.
X-Y Mode—Phase shift within 1° from dc to 100 kHz.

Other Characteristics

Ambient Temperature—Performance characteristics valid from 0°C to +45°C.
Line Voltage Ranges—100, 110, 120, 200, 220, and 240 V ac ±10% (except that maximum input should not exceed 250 V ac). Internally selected with quick change jumpers.
Line Frequency Range—48 Hz to 440 Hz.
Maximum Power Consumption—110 W.
External Intensity Input— +5 V turns beam on from off condition. −5 V turns beam off from on condition. Frequency range dc to 1 MHz. Input R and C is ≈10 kΩ paralleled by ≈40 pF. Maximum input ±50 V (dc + peak ac.)
Calibrator—Voltage output 400 mV within 1%. Current output (loop) 4 mA within 1%. Frequency is 2 times line frequency.
Beam Finder—Positions beam on screen regardless of vertical and horizontal position control settings.
Included Accessory—Instruction manual.

Option 07 Rear Panel Signal Outputs

Left and Center Compartments—Two BNC connectors provide access to the crt related signals from the left and center plug-in amplifiers. Sensitivity: 0.5 V/crt division. Output impedance: 1 kΩ.

Right Compartment—Sweep: One BNC connector provides access to the crt-related sweep waveform. Sensitivity is 0.5 V/crt division; positive-going sawtooth, ≥5 V. Output impedance is 1 kΩ. Gate: One BNC connector provides access to TTL compatible gate. Positive-going, coincident with displayed sweep.
X-Y Mode—Crt-related X-Y signals are available at the appropriate rear panel connectors when amplifier plug-ins are used in either the left or center compartment and the right compartment to display X-Y information. Sensitivity (X-Y): 0.5 V/crt division.

Included Accessories

Power cord (161-0066-00); instruction manual.

Ordering Information

(Plug-Ins Not Included)

5116 Oscilloscope

Option 02—Protective Panel Cover (Cabinet Models Only). The cover protects the front panel and knobs during transportation and storage.

Option 07—Add Rear Panel Signals Out

Conversion Kits
Cabinet-to-Rackmount Conversion Kit
Order 040-0583-03

Protective Panel Cover Kit
Order 040-0620-00

Rear Panel Signal Outputs Conversion Kit (Option 07)
Order 040-0915-01

International Power Cords and Plug Options

Option A1—Universal Euro 220 V/13 A, 50 Hz
Option A2—UK 240 V/13, 50 Hz
Option A3—Australian 240 V/10 A, 50 Hz
Option A4—North American 240 V/15 A, 60 Hz
Option A5—Switzerland 220 V/10 A, 50 Hz

5D10 Waveform Digitizer

The 5D10 is required for implementation of the 5116 color capability.

The 5D10 enhances all Tektronix 5000 Series mainframes by providing digital storage for transient events with frequency components up to 100 kHz for a single channel acquisition and up to 50 kHz for dual channel acquisition, all in a compact two-wide plug-in.

Characteristics

Vertical
Vertical Modes—CH 1, CH 2, ADD, Dual, X-CH 1, and Y-CH 2.
Channel 2 Modes—V/div, Left plug-in.
Deflection Factor—1 mV/div to 20 V/div in 14 calibrated steps (1-2-5 sequence).
Accuracy—Input to Readout Numbers: 5 mV/div to 1 V/div ±1%; 1 mV/div to 2 mV/div ±2%; 2 V/div to 20 V/div ±2%; Input to crt graticule ±2%. From Left Vertical Plug-in: Add ±1% to above specifications. Add Mode: Add ±1% to above specifications.
Input R and C—1 MΩ ±0.5% at ≈47 pF.
Maximum Input—250 V (dc + peak ac); 250 V p-p ac at 1 kHz or less.

Bandwidth
Single Channel—Suitable from dc to 100 kHz.
Dual Channel—Suitable from dc to 50 kHz.
Ac Coupling—3 dB point—10 Hz or less (1 Hz with 10x probe).
Common Mode Rejection—At least 50:1, dc to 100 kHz.

Resolution
Vertical—X-Y or Y-T; 0.04 div (8-bit digitizer).
Horizontal—Y-T; 0.01 div (1024 memory locations shared among all traces displayed).
Phase Shift—≤1.0° phase shift between CH 1 and CH 2, dc to 100 kHz.

Display Output (to X-Y Recorder)
Amplitude—0.2 V/div ±2%.
Speed—Compatible with X-Y recorders with 20 in/s slew rate, or faster.
Pen Lift—Isolated switch contacts, SPST (floating); normally open or normally closed selected by internal jumper.

Time Base
Sweep Rates—0.1 ms to 50 s/div in 18 calibrated steps 1-2-5 sequence.
Accuracy—Within ±1% of readout numbers.
External Input—Allows external pulse generator to determine acquisition rate. Accepts TTL levels up to 1 MHz rate.
Possible Under-Sampling Indicator—Indicator lights when fewer than eight sample pulses occur during interval between successive threshold crossing of triggering signals.

Triggering
Sources—CH 1, CH 2, left plug-in (via mainframe), line, external.
Coupling—Dc, ac.

Sensitivity
External—100 mV; dc to 50 kHz or pulsewidth >5 μs; 250 mV 50 kHz to 250 kHz or pulsewidth >1 μs.
CH 1, CH 2, Left Plug-in: 0.4 div, dc to 50 kHz or pulsewidth >5 μs; 1.0 div, 50 kHz to 250 kHz or pulsewidth >1 μs.
Bi-Slope Trigger—Amplitude, frequency, and pulsewidth specifications apply to absolute value of signal (rectified).

External Trigger Input
Input R and C—1 MΩ ±2% at ≈47 pF. Maximum input 250 V (dc + peak ac). 250 V p-p ac at 1 kHz or less.

Order 5D10 Waveform Digitizer

For further information, contact:

U.S.A., Asia, Australia, Central & South America, Japan
Tektronix, Inc.
P.O. Box 1700
Beaverton, OR 97075
For additional literature, or the address and phone number of the Tektronix Sales Office nearest you, contact:
Phone: 800/547-1512
Oregon only: 800/452-1877
TWX: 910-467-8708
TLX: 15-1754
Cable: TEKTRONIX

Europe, Africa, Middle East
Tektronix Europe B.V.
European Headquarters
Postbox 827
1180 AV Amstelveen
The Netherlands
Phone: (20) 471146
Telex: 18312-18328

Canada
Tektronix Canada Inc.
P.O. Box 6500
Barrie, Ontario L4M 4V3
Phone: 705/737-2700

Tektronix sales and service offices around the world:
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