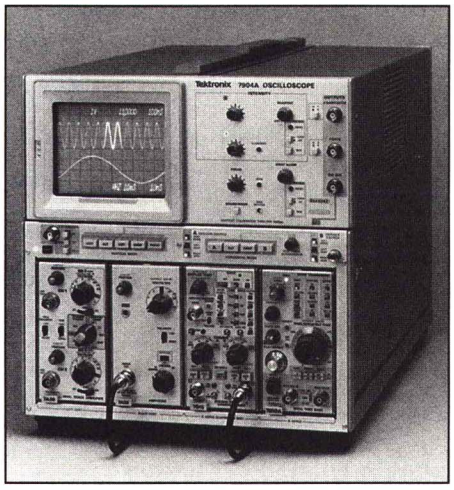


7904A/R7903

TYPICAL APPLICATIONS

- **Digital Design**
- **Radar**
- **Laser Research**

BENEFITS

- **Over 30 Compatible Plug-ins**
- **Good Cost/Perform Ratio**
- **Real Time Signal Analysis**
- **Ability to Make High CMRR Differential Measurements**

FEATURES

- **500 MHz at 10 mV/Div**
- **700-ps Rise Time (7904A)**
- **500-ps/Div Fastest Calibrated Sweep Rate**
- **Greater Than 7-cm/ns Writing Speed With Optional CRT (Option 13) and WSEN**
- **CRT Readout**
- **900-MHz FET Probe Available**

See the 7000-Series Reference section for available Application Notes.

The 7904A and 5.25-inch rackmount R7903 are high-bandwidth, general-purpose oscilloscopes. The 7A29 Amplifier/7904A mainframe attains 500 MHz at 10 mV/div. A 7A29 variable-delay option allows for the matching of signal-transit times of two plug-ins and their probes to better than 50 ps.

The P6201 1X FET probe gives you high impedance and wide bandwidth. It has a 900-MHz bandwidth by itself, and in combination with the 7A29/7904A, it provides a system bandwidth of 450 MHz at 10 mV/div.

The CRT, the major contributor to the performance of the 7904A and R7903, has good visual brightness and an 8×10-cm display area.

CHARACTERISTICS

The following characteristics are common to the 7904A and R7903, except those noted under the R7903.

VERTICAL SYSTEM

Channels—Two left-hand plug-in compartments. Compatible with all 7000-Series plug-ins.

Bandwidth, Rise Time, and Deflection Factor—Determined by plug-in unit. See 7000-Series Vertical-System specifications in the 7000-Series Reference Section.

Display Modes—Left, Alt, Add, Chop, Right. Chopped-mode repetition rate is ≈1 MHz.

Trace-Separation Range—(7904A only) In dual-sweep modes, positions B trace at least four divisions above and below A trace.

Delay Line—Permits viewing leading edge of displayed waveform when using 7B80- and 7B90-Series time bases. 7B50-Series not recommended.

HORIZONTAL SYSTEM

Channels—7904A: Two right-hand plug-in compartments. R7903: One right-hand plug-in compartment. 7904A and R7903: Compatible with 7B80- and 7B90-Series time bases, 7000-Series vertical amplifiers and specialized plug-ins.

Bandwidth—DC to at least 1 MHz.

Display Modes—A, Alt, Chop, B. Chopped-mode repetition rate is ≈200 kHz.

Fastest Calibrated Sweep Rate—500 ps/div with the 7B92A.

X-Y Mode—With Delay Compensation: Phase shift is within 2° from dc to 1 MHz. Without Delay Compensation: Phase shift is within 2° from dc to 35 kHz.

CRT AND DISPLAY FEATURES

For CRT phosphor data see Comparative CRT-Phosphor Data chart in the Oscilloscope Reference section.

CRT—Internal 8×10-division (0.85 cm/div) graticule with variable illumination. Accelerating potential is 24 kV. GH (P31) phosphor is standard.

Option 78, BE (P11) Phosphor—Replaces standard GH (P31) phosphor. Contact your local sales representative for details.

Typical Photographic Writing Speed*1

CRT	Camera	Lens	Writing Speed cm/ns
Opt 04 4×5 cm	C-51P	f/1.2 1:0.5	2
Opt 13 4×5 cm			7
Opt 78 8×10 cm			2.5

*1 *Using Polaroid Type 612 20,000 ASA Film without film fogging.*

In typical applications, GH (P31) phosphor has approximately one-half the writing speed of BE (P11) phosphor. The writing speed can be increased by using controlled film fogging with a writing speed enhancer (camera accessory).

Autofocus—Reduces the need for additional manual focusing with changes in intensity after focus control has been set.

Beam Finder—Aids in locating offscreen signal.

External Z-Axis Input—2 V p-p for full intensity range. A positive signal blanks the trace. Maximum input voltage is 15 V (dc + peak ac) and p-p ac. Input is dc coupled.

CALIBRATOR

Output Waveshape—Rectangular positive going from ground.

Voltage Ranges—40 mV, 0.4 V, 4 V into an open circuit. 4 mV, 40 mV, 0.4 V into 50 Ω. Amplitude accuracy is within 1%. Repetition rate is 1 kHz within 0.25%.

Current Output—40 mA with optional current-loop accessory (012-0341-00) connected to calibrator output. Output R is 450 Ω.

OUTPUTS/INPUTS

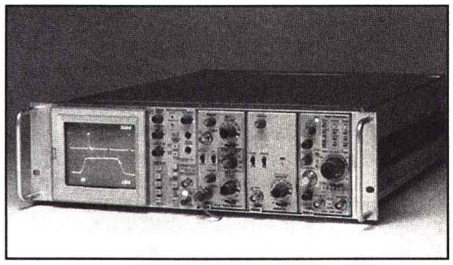
+Sawtooth—Sawtooth starts 1 V or less from ground into 1 MΩ. Front-panel selectable from A or B horizontal. Output voltage is 50 mV/div (±15%) into 50 Ω, 1 V/div (±10%) into 1 MΩ. Output R is ≈950 Ω.

+Gate—Positive-going rectangular waveform derived from A, B, or Delayed Gate, front-panel selectable. Output voltage is 0.5 V (±10%) into 50 Ω, 10 V (±10%) into 1 MΩ. Rise time is 5 ns or less into 50 Ω.

Vertical Signal Out—Selected by B Trigger Source switch. Output voltage is 25 mV/div into 50 Ω, 0.5 V/div into 1 MΩ. Output R is ≈950 Ω. Bandwidth depends upon vertical plug-in. See 7000-Series Vertical-System Specifications in the 7000-Series Reference section.

Camera Power—Three-prong connector to the left of the CRT provides power, ground, and remote single-sweep reset access for C-50 Series cameras.

Probe Power—Two rear-panel connectors for two active probes.



The R7903 requires only 5.25 inches of rack height in a standard 19-inch rack. It is fan-cooled and comes complete with slideout chassis tracks.

POWER REQUIREMENTS

Line-Voltage Ranges—90 to 132 V ac and 180 to 250 V ac.
Line Frequency—48 to 440 Hz.
Maximum Power Consumption—210 W, 3.5 A at 90-V line, 60 Hz.

ENVIRONMENTAL AND SAFETY

Ambient Temperature—Operating: 0 to +50°C. Nonoperating: −55 to +75°C.
Altitude—Operating: 5000 m (15,000 ft). Nonoperating: 15 000 m (50,000 ft).
Vibration—Operating: 15 minutes along each of the three major axes. 0.04 cm (0.015 in) p-p displacement 10 to 55 to 10 Hz in one minute cycles. Held for three minutes at 50 Hz.
Humidity—Operating and Nonoperating: 95%, five cycles (120 hours), referenced to MIL-E-16400F.
Shock—Nonoperating: 30 g's, ½ sine, 11-ms duration in each direction along each major axis. Total of six shocks.
EMC Capability—(Option 03) Meets MIL-STD-461B requirements when tested in accordance with certain test methods of MIL-STD-462. Contact your Tektronix representative for more information.
Safety—UL listed (UL 1244) and CSA certified (CSA 556B) 7904A only.

PHYSICAL CHARACTERISTICS

	Cabinet		Rackmount	
Dimensions	**mm**	**in.**	**mm**	**in.**
Width	305	12.0	483	19.0
Height	345	13.6	135	5.3
Depth	577	22.7	579	22.8
Weight ≈	**kg**	**lb**	**kg**	**lb**
Net	16.9	37.2	12.3	27.0
Shipping	21.4	47.0	23.6	52.0

CHARACTERISTICS (R7903)

The following characteristics for the R7903 are in addition to or in lieu of those listed previously.

HORIZONTAL SYSTEM

Channel—Single right-hand plug-in compartment. Compatible with 7B80 Series, 7B90 Series, 7000-Series vertical amplifiers and specialized plug-ins.

Fastest Calibrated Sweep Rate—500 ps/div with the 7B92A.

CRT AND DISPLAY FEATURES

Option 10, Pulsed Graticule—Provides a means of pulsing the graticule lights at a preset level coincident with a single-shot event in one exposure. The graticule lights may be pulsed by the event, an external ground closure, or a front-panel pushbutton. If the mainframe is equipped with CRT readout, Option 10 provides additional controls and inputs for CRT readout pulsed operation.

CALIBRATOR (NOT AVAILABLE WITH OPTION 10)

Voltage Ranges—4 mV, 40 mV, 0.4 V, 4 V into an open circuit; 4 mV, 40 mV, 0.4 V into 50 Ω.
Current Output—40 mA rectangular waveshape with optional current loop accessory (012-0341-00) connected to calibrator output. Output R is 450 Ω.

OUTPUTS/INPUTS (STANDARD)

+Sawtooth—Sawtooth starts 1 V or less from ground (into 1 MΩ). Output voltage is 50 mV/div (±15%) into 50 Ω, 1 V/div (±10%) into 1 MΩ. Output R is ≈950 Ω.
+Gate—Positive-going rectangular waveform derived from Main or Auxiliary Gate. Output voltage is 0.5 V (±10%) into 50 Ω, 10 V (±10%) into 1 MΩ. Rise time is 7 ns or less into 50 Ω. Output R is ≈950 Ω.
Vertical Signal Out—Selected by Trigger Source switches. Output voltage is 25 mV/div into 50 Ω, 0.5 V/div into 1 MΩ. Output R is ≈950 Ω. Bandwidth depends upon vertical plug-in. See 7000-Series Vertical-System Specifications in the 7000-Series Reference section.
External Single-Sweep Reset—Ground closure, rear-panel input to reset sweep.
Single-Sweep Ready Output—Rear-panel BNC provides 5 V out to indicate single-sweep-ready condition.
Probe Power—Two front-panel connectors for two active probes. Not available for Option 10.
CRT Readout—Inhibit: Ground closure, rear-panel BNC input locks out CRT readout. Not available with Option 10. Single Shot: Ground closure, rear-panel BNC input initiates one frame of CRT readout. Not available with Option 10 separately, but in combination with the pulsed-graticule input.

OUTPUTS/INPUTS (OPTIONS)

Option 10, Pulsed Graticule—No CRT readout single-shot input, CRT-readout inhibit input, calibrator, and probe power. Single-shot graticule and CRT readout (ground closure) rear-panel BNC input is added. Initiates one frame of CRT readout and pulsed graticule.

POWER REQUIREMENTS

Line-Voltage Ranges—90 to 132 V ac and 180 to 264 V ac.
Maximum Power Consumption—160 W, 2 A at 115-V line, 60 Hz.

ORDERING INFORMATION

(PLUG-INS NOT INCLUDED)

Ordering information is common to the 7904A and R7903 unless otherwise noted.

7904A Oscilloscope **$11,530**
Includes: Power cord (161-0066-00); instruction manual (070-4593-00).

R7903 Oscilloscope **$10,980**
Includes: Power cord (161-0066-00); test adaptor (012-0092-00); two 18-in. test leads (012-0087-00); slide guide (351-0314-01); hardware kit (016-0099-00); instruction manual (070-1464-00).

OPTIONS

Option 02—(7904A only) X-Y Horizontal Compensation. Adds X-Y delay compensation network to equalize the signal delay between the vertical and the B horizontal compartments. **+$260**
Option 03—EMC Capability. Adds special shielding for protection to the instrument when operated in severe EMC environments. **+$395**
Option 10—(R7903 only) Pulsed Graticule. **+$260**
Option 78—BE (P11) Phosphor. **+$100**

CONVERSION KITS

X-Y Horizontal Compensation—(7904A only) Order 040-0606-00 **$470**
EMC Capability—(7904A)*[1]
(R7903) Order 040-0647-00 **$375**
CRT Readout—(R7903 only) Order 040-0605-08*[1]

INTERNATIONAL POWER PLUG OPTIONS

Option A1—Universal Euro 220 V, 50 Hz.
Option A2—UK 240 V, 50 Hz.
Option A3—Australian 240 V, 50 Hz.
Option A4—North American 240 V, 60 Hz.
Option A5—Switzerland 220 V, 50 Hz.

*[1]*Contact your local sales representative.*

OPTIONAL ACCESSORIES

Recommended Plug-Ins—See 7000-Series Vertical-System Specifications on pages 200–201.
Recommended Probes—See 7000-Series Oscilloscope Systems/Probe-Selection Guide on pages 200–201.
Recommended Cameras—See 7000-Series Mainframe/Time Base/Camera Selection Guide on pages 200–201.
Recommended Carts—See Instrument/Cart Compatibility Guide in the Cart section.
K213 Option 12—(7904A) **+$765**
K217—(7903) **$510**

TRAINING

Tektronix offers service training classes on the 7904A General-Purpose Oscilloscope. For further training information, contact your local Sales/Service Office and request a copy of the Customer Service Training Catalog.