

TEK 200 MHz GENERAL PURPOSE OSCILLOSCOPE SYSTEM

7704A R7704

Dc to 200 MHz with Optimum
Pulse Response

1.8 ns Risetime

Dc to 250 MHz Bandwidth Option

Greater than 15 cm/ns
Enhanced Writing Speed with
Optional CRT and WSEN

CRT Readout

APPLICATIONS

Communications

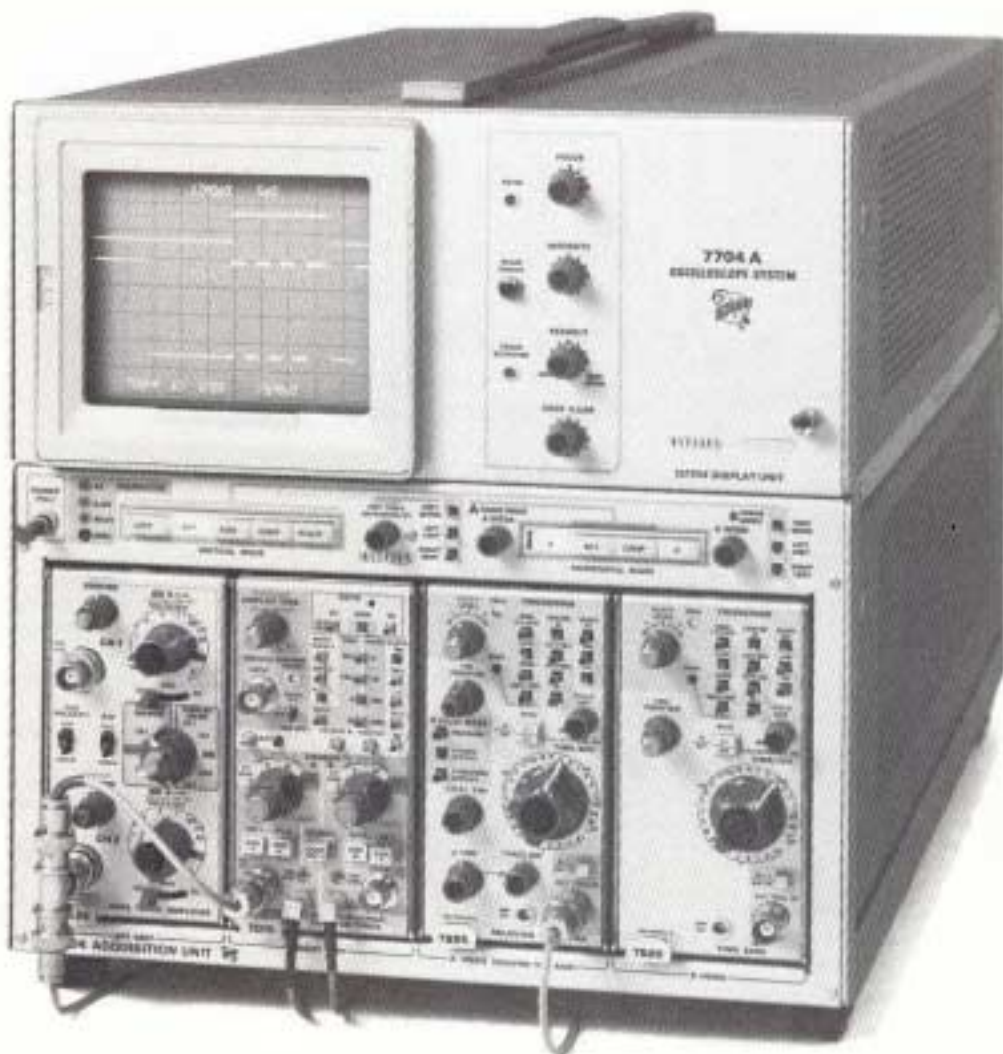
Digital Design

Component Testing

The 7704 family is a wide bandwidth general-purpose oscilloscope measurement system.

The 7704A Oscilloscope offers you the capability to optimize the oscilloscope's response for your type of work. For pulse analysis aberrations are reduced below the normal level in the optimized transient response version while still giving you a bandwidth of 200 MHz. The 250 MHz option is optimized for bandwidth performance for high-frequency applications. The R7704 offers a 175 MHz bandwidth.

Quite often the need arises to photograph the waveforms that are produced. The 7704A gives you a choice of two designs available for this purpose: the standard 8 x 10 cm CRT and an optional 4 x 5 cm reduced-scan CRT for high writing-speed applications. For additional information on the Writing Speed Enhancer (WSEN) see pages 316 and 320; for a comparison of the 7000 Series writing rate specifications see page 161.



VERTICAL SYSTEM

Channels — Two left-hand plug-in compartments; compatible with all 7000 Series Plug-ins. Bandwidth determined by main-frame and plug-in unit; see Vertical System Specifications Chart.

Option 09 Bandwidth Change (250 MHz) — 7704A vertical circuit performance is adjusted to extend frequency response to 250 MHz at 20 mV/div (upper -3 dB) when 7A19 is used. Provides additional performance for those working in this frequency domain.

Modes of Operation — LEFT, ALT, ADD, CHOP RIGHT.

Chopped Mode — 7704A, repetition rate is internally selectable, ~100 kHz or 1 MHz; R7704, fixed at ~1 MHz.

Trace Separation Range (Dual-sweep Modes) — The B trace can be positioned above or below the A trace.

Delay Line — Permits viewing leading edge of waveforms.

HORIZONTAL SYSTEM

Channels — Two right-hand plug-in compartments; compatible with all 7000 Series Plug-ins.

Fastest Calibrated Sweep Rate — 2 ns/div with 7B80 or 7B90 Series.

Chopped Mode (between Horizontal Plug-ins) — 7704A, repetition rate is internally selectable, ~20 kHz or 200 kHz; R7704, fixed at ~200 kHz.

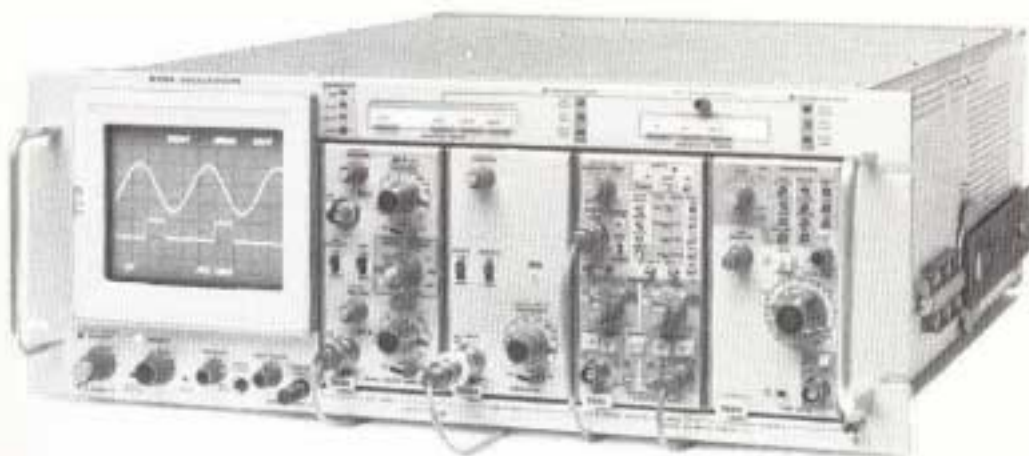
X-Y Mode — Phase shift is within 2° from dc to 50 kHz (7704A); from dc to 35 kHz (R7704) between vertical and horizontal channels. Frequency response at 10% down is dc to at least 3 MHz.

Option 02, X-Y Horizontal Compensation (R7704 only) — Provides phase shift compensation to $\pm 2^\circ$ from dc to 2 MHz.

CRT

Standard — Internal 8 x 10 cm graticule with variable illumination. Accelerating potential is 24 kV with P31 Phosphor standard.

Option 01, Without CRT Readout — No CRT readout.



The R7704 requires 7 inches of rack height and offers 175 MHz bandwidth.

Option 04, Max Brightness CRT with Reduced Area (7704A Only) — Internal 4 x 5 cm graticule with variable illumination. Accelerating potential is 24 kV with P31 Phosphor standard, P11 optional. This provides extremely high photographic and fluoron writing speed and increases the visibility of low-amplitude, high-speed signals.

Option 76, P11 Phosphor
Minimum Photographic Writing Speed (Using Polaroid Film Type 612 20,000 ASA without Film Fogging) — Can be increased by using the TEKTRONIX Writing Speed Enhancer. In typical applications, P31 Phosphor has approximately one-half the writing speed of P11 Phosphor. See chart on page 161 for further information.

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

Beam Finder — Limits display within graticule area.

External Z-Axis Input (7704A only) — 2 V p-p for full intensity range. A positive signal blanks the trace. Max input voltage is 15 V (dc + peak ac) and p-p ac. Input is dc-coupled.

External Z-Axis Input (R7704 only) — High sensitivity input: minimum pulse width to blank trace is 30 ns at 2 V; 2 V p-p for full intensity range from dc to 2 MHz; intensity range diminishes to 20% of full range at 10 MHz. A positive signal blanks the trace; input R is 500 Ω within 10%. Max input voltage is 15 V (dc + peak ac) and p-p ac.

High Speed Input — Minimum pulse width to blank trace is 3.5 ns at 50 V; 60 V p-p for full intensity range from dc to 100 MHz. A positive signal blanks the trace; input R is 18 k Ω within 20%. Max input voltage is 60 V (dc + peak ac) and p-p ac.

OUTPUTS/INPUTS

+Sawtooth — Sawtooth starts 1 V or less from ground (into 1 M Ω). Internally selectable from A or B horizontal. Output voltage is 50 mV/div ($\pm 15\%$) into 50 Ω ; 1 V/div ($\pm 10\%$) into 1 M Ω . Output R is 950 Ω nominal.

+Gate — Positive-going rectangular waveform derived from A, B, or Delayed Gate, internally selectable. Output voltage is 0.5 V ($\pm 10\%$) into 50 Ω ; 10 V ($\pm 10\%$) into 1 M Ω . Rise time is 20 ns or less into 50 Ω ; output R is 950 Ω nominal.

Sig Out — Selected by B TRIGGER SOURCE switch. Output voltage is 25 mV/div into 50 Ω ; 0.5 V/div into 1 M Ω . The bandwidth depends upon vertical plug-in; see Vertical System Specifications Chart. Output R is 950 Ω nominal.

External Single-sweep Reset — Ground closure, rear-panel input to reset sweep.

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

Probe Power — Two rear-panel connectors provide correct operating voltages for two active probes. R7704 connectors are located on both the front and rear panels. Probe power is deleted on Option 01 of 7704A.

CALIBRATOR

Voltage Output — Rectangular waveshape, positive-going from ground (40 V and 4 mV available when selected by internal jumper). Ranges are 40 mV, 0.4 V, 4 V into 1 M Ω ; 20 mV, 0.2 V, 0.4 V into 50 Ω . Amplitude accuracy is within 1% ($+15^\circ\text{C}$ to $+35^\circ\text{C}$); within 2% (0°C to -50°C). Repetition rate is 1 kHz within 0.25% ($+15^\circ\text{C}$ to -35°C); within 0.5% (0°C to 50°C).

Current Output — 40 mA rectangular waveshape with optional current-loop accessory (012-0259-00) connected between 4 V and gnd pin jacks.

POWER REQUIREMENTS

Line Voltage Ranges — 90 to 132 V ac and 180 to 264 V ac.

Line Frequency — 48 to 440 Hz (7704A) 48 to 66 Hz (R7704).

Option 05, Line Frequency Change (50-400 Hz) — Converts the R7704 to 50-400 Hz operation (not required for 7704A).

Max Power Consumption — 180 W, 2.5 A at 115 V line, 60 Hz (7704A); 225 W, 2.8 A at 115 V line, 60 Hz (R7704).

Included Accessories — For 7704A: 20 in cable, two-pin-to-BNC, (175-1178-00). For R7704: 42 in BNC 50 Ω cable (012-0057-01), 20 in cable, two-pin-to-BNC (175-1178-00); rack-mounting hardware.

Weights and Dimensions — See page 153.

For Recommended Cameras — see page 154.

For Recommended Plug-ins — See page 152.

ORDERING INFORMATION

(Plug-ins not included)

7704A Oscilloscope

R7704 Oscilloscope

7704A OPTIONS

Option 01 Without CRT Readout

and Probe Power

Option 03 Emc Modification

Option 04 Max Brightness CRT with 4x5 cm Display (Specify Phosphor)

Option 06 Bandwidth Change (250 MHz)

Option 76 P11 Phosphor

R7704 OPTIONS

Option 01 Without CRT Readout

Option 02 X-Y Horiz Comp

Option 03 Emc Modification

Option 05 Line Freq Change (50-400 Hz) (not required for 7704A)

Option 76 P11 Phosphor

7704A CONVERSION KITS

040-0613-00 CRT Readout and Probe Power

040-0612-00 Emc Modification

040-0619-01 Sig Out/In

R7704 CONVERSION KITS

040-0533-01 CRT Readout

040-0529-00 X-Y Horiz Comp

040-0562-00 Emc Modification

INTERNATIONAL POWER CORD AND PLUG OPTIONS

Option A1 Universal Euro 220 V/16A

Option A2 UK 240 V/13A

Option A3 Australian 240 V/10A

Option A4 North American 240 V/15A