7704A

Dc to 250 MHz Bandwidth (Option 09)

Dc to 200 MHz with Optimum Pulse Response

1.8 ns Risetime

2 ns/div Fastest Calibrated Sweep Rate

Greater Than 15 cm/ns Enhanced Writing Speed with Optional CRT Option 13 and WSEN

CRT Readout

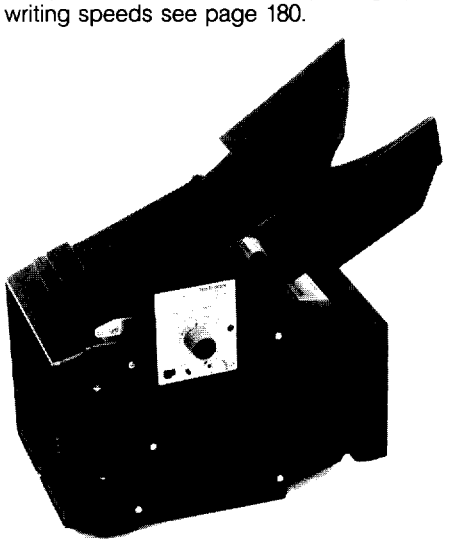
TYPICAL APPLICATIONS

- **Communications**
- **Digital Design**
- **Component Testing**

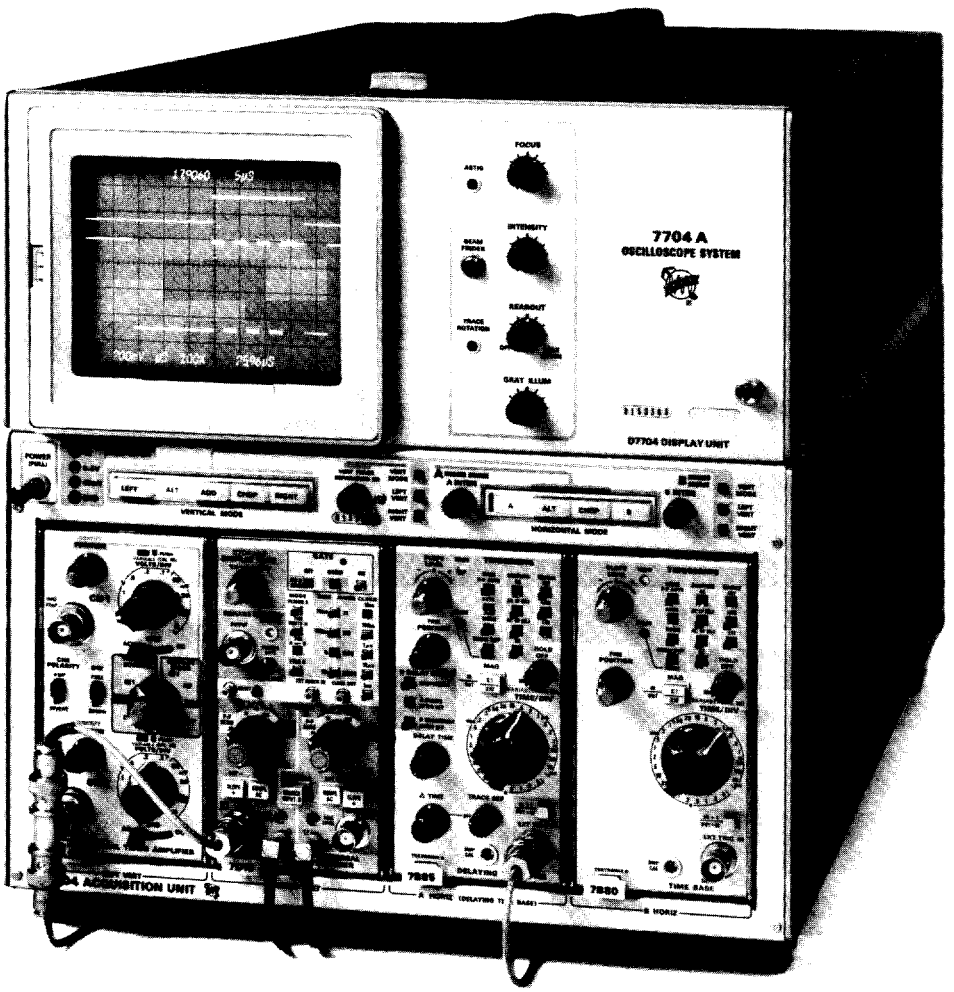
See page 192 for available Application Notes.

The 7704A offers you a choice of bandwidth performances to optimize the oscilloscope for your type of application. In the standard model, pulse aberrations are minimized while giving you a bandwidth of 200 MHz. For higher frequency applications, Option 09 provides a bandwidth of 250 MHz.

For high writing speed applications, Option 13 provides BE (P11) phosphor and a reduced scan CRT yielding >15 cm/ns photographic writing rate with the Tektronix C-51 Camera and WSEN (writing speed enhancer described on page 405). For a comparison of 7000-Series photographic writing speeds see page 180.



C-51P Camera shown with WSEN.



CHARACTERISTICS

VERTICAL SYSTEM

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

Bandwidth — Determined by mainframe and plug-in unit. See page 190.

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 7A29 is used. Provides additional performance for those working in this frequency domain.

Risetime — Determined by mainframe and plug-in unit. See page 190.

Deflection Factor — Determined by plug-in unit. See page 190.

Display Modes — Left, Alt, Add, Chop, Right. Chopped mode repetition rate is internally selectable ≈100 kHz or 1 MHz.

Trace Separation — In dual sweep modes, positions B trace above and below A trace.

Delay Line — Permits viewing leading edge of waveform.

HORIZONTAL SYSTEM

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

Fastest Calibrated Sweep Rate — 2 ns/div.

Chopped Mode (Between Horizontal Plug-ins) — Repetition rate is internally selectable, ≈20 kHz or 200 kHz.

X-Y Mode — Phase shift is within 2° from dc to 50 kHz between vertical and horizontal channels. Frequency response: <10% down at 3 MHz.

CRT AND DISPLAY FEATURES

CRT — Internal 8 cm x 10 cm graticule with variable illumination. Accelerating potential is 24 kV. GH (P31) phosphor is standard.

Option 04, Maximum Brightness CRT with Reduced Area — Internal 4 cm x 5 cm graticule with variable illumination. Accelerating potential is 24 kV. GH (P31) phosphor is standard.

Option 13, Maximum Brightness CRT with Reduced Area — Internal 4 cm x 5 cm graticule with BE (P11) phosphor. Accelerating potential is 24 kV.

Option 78, BE (P11) Phosphor — Replaces standard GH (P31) phosphor.

Typical Photographic Writing Speed*[1]

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

*[1] *Using the optional BE (P11) phosphor and Polaroid Type 612 20,000 ASA Film without film fogging.*

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. Minimum pulse width to blank trace is 30 ns at 2 V. Maximum input voltage is 15 V (dc + peak ac) and p-p ac. Input is dc-coupled.

OUTPUTS/INPUTS

+Sawtooth — Sawtooth starts 1 V or less from ground (into 1 MΩ). Internally 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 nominal.

+Gate — Positive-going rectangular waveform derived from A, B, or Delayed Gate, internally selectable. Output voltage is 0.5 V (±10%) into 50 Ω, 10 V (±10%) into 1 MΩ. Risetime is 20 ns or less into 50 Ω. Output R is 950 Ω nominal.

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. The bandwidth depends upon vertical plug-in. 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.

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 MΩ; 20 mV, 0.2 V, 0.4 V into 50 Ω. Amplitude accuracy is within 1% (+15°C to +35°C); within 2% (0°C to +50°C). Repetition rate is 1 kHz within 0.25% (+15°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 ground pin jacks.

POWER REQUIREMENTS

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

Line Frequency — 48 Hz to 440 Hz.

Maximum Power Consumption — 180 W, 2.5 A at 115 V line, 60 Hz.

ENVIRONMENTAL AND SAFETY

Ambient Temperature — Operating: 0°C to +50°C. Nonoperating: −55°C 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 Hz to 50 Hz 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).

PHYSICAL CHARACTERISTICS

Dimensions	mm	in
Width	305	12.0
Height	345	13.6
Depth	577	22.7
Weights ≈	**kg**	**lb**
Net	13.6	30.0
Shipping	19.5	43.0

ORDERING INFORMATION
(PLUG-INS NOT INCLUDED)

7704A Oscilloscope **$4,995**

Includes: 20 in two-pin-to-BNC cable (175-1178-00); instruction manual (070-0981-00).

OPTIONS

Option 03 — EMC Capability. **+$395**

Option 04 — Maximum Brightness 4 cm x 5 cm CRT Display. GH (P31) Phosphor is Standard. **+$500**

Option 09 — Bandwidth Change to 250 MHz. **+$500**

Option 13 — Maximum Brightness 4 cm x 5 cm CRT Display with BE (P11) Phosphor. **+$600**

Option 78 — BE (P11) Phosphor. **+$100**

CONVERSION KITS

CRT Readout — With Probe Power. Order 040-0613-06 **$700**

EMC Capability — Order 040-0612-00 **$375**

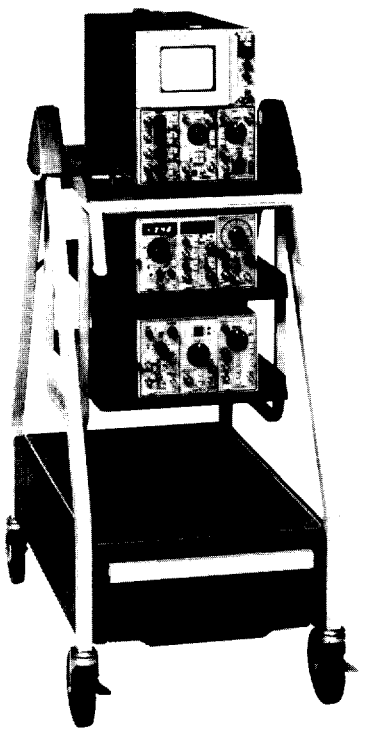
Signal Out/In — Order 040-0619-03 **$200**

INTERNATIONAL POWER PLUG OPTIONS

Option A1 — Universal Euro 220 V/16 A, 50 Hz.
Option A2 — UK 240 V/13 A, 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.

OPTIONAL ACCESSORIES

Recommended Plug-ins — See page 190.
Recommended Probes — See pages 191 and 426.
Recommended Cameras — See pages 192 and 406.
Recommended Cart — K213 Option 12 — See page 424.



The K213 cart shown with optional plug-in storage and keyboard drawer.

Tektronix offers service training classes on the 7704A General Purpose Oscilloscope. For further training information, contact your local sales/service office or request a copy of the Customer Service training Catalog on the return card in the back of this catalog.