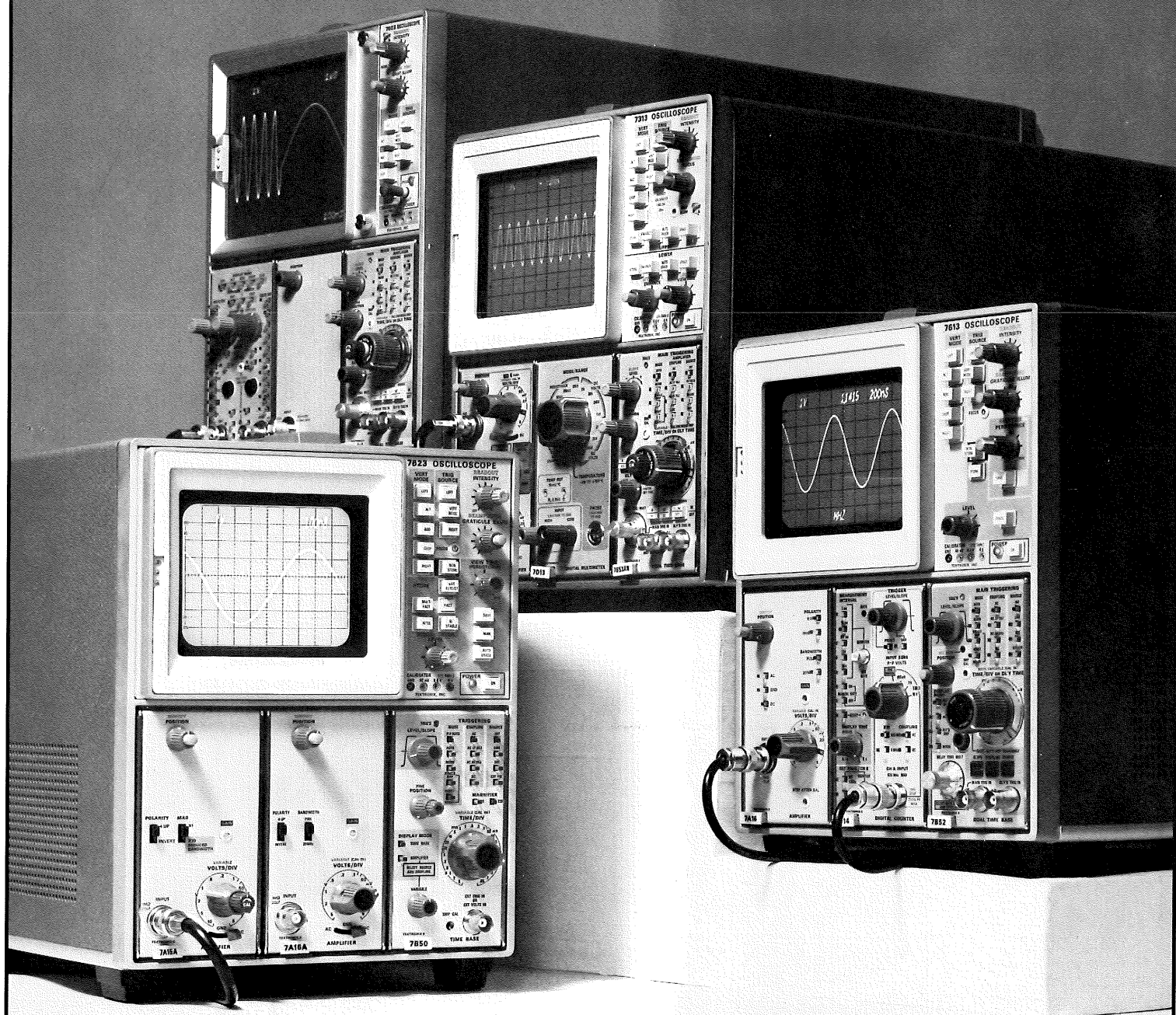




TEKTRONIX®

7000 SERIES



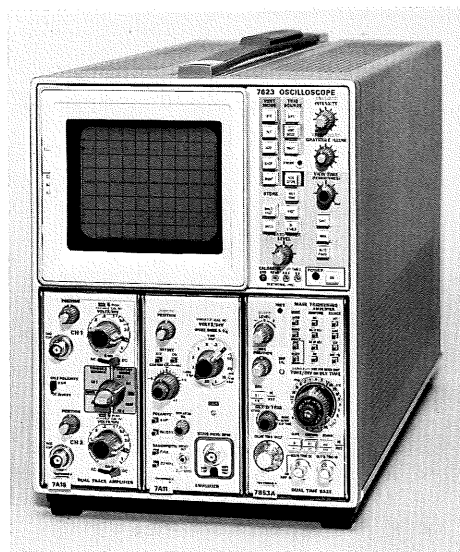
**STORAGE
FAMILY**

&

**7600
FAMILY**

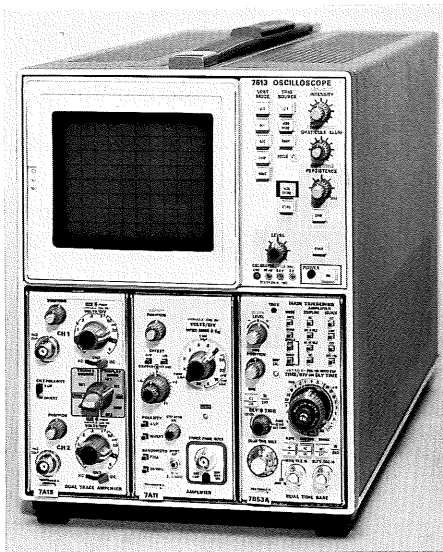
7000-SERIES STORAGE FAMILY

Reference



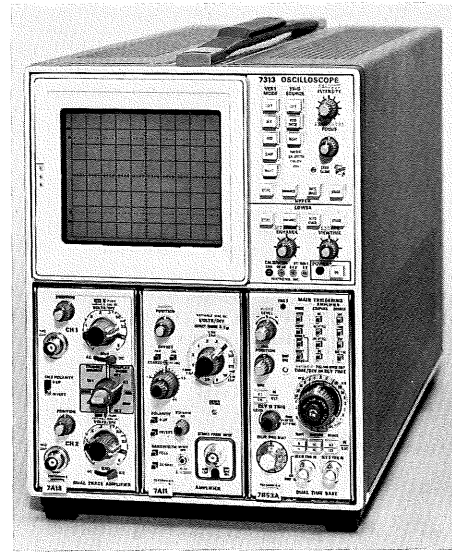
7623

- 200 cm/ μ s STORED WRITING SPEED
- MULTIMODE STORAGE
- DC-to-100 MHz BANDWIDTH



7613

- VARIABLE PERSISTENCE STORAGE
- DC-to-100 MHz BANDWIDTH



7313

- SPLIT-SCREEN BISTABLE STORAGE
- DC-to-25 MHz BANDWIDTH

FAMILY FEATURES

- EXTREMELY BURN RESISTANT CRT
- 5 $\frac{1}{4}$ -INCH RACKMOUNT
- THREE-PLUG-IN FLEXIBILITY
- VERSATILE TRIGGER SOURCE SELECTION
- VERTICAL MODE SWITCHING
- COLOR-KEYED PANELS
- PUSH-BUTTON SWITCHING
- LIGHTWEIGHT

PLUG-IN VERSATILITY

Plug-ins are available to make virtually any measurement desired. Examples are:

- 525-MHz Direct Counter
- 1.8 GHz Spectrum Analyzer
- Sampling to 14 GHz
- Dual Time Base
- Single Trace
- Digital Multimeter
- 1 mA/Div Current Amplifier
- Differential Comparator
- Delayed Sweep
- Dual Trace
- 45-ps Risetime TDR
- 10 μ V/Div Differential
- Curve Tracer
- Single Time Base
- Multi-Trace Combinations
- Delay Line
- Mixed Sweep

STORAGE FAMILY — VERTICAL SYSTEM SPECIFICATIONS

AMPLIFIER PLUG-IN	PERFORMANCE FEATURE	MIN DEFL FACTOR	7313		7613 and 7623				SIG OUT BW (MHz)	ACCURACY* WITHOUT PROBE	PRICE
			BW (MHz)	Tr (ns)	BW (MHz)	Tr (ns)	BW (MHz)	Tr (ns)			
7A11	Low Capacitance Built-In FET Probe Amplifier	5 mV/div	25	14	0° C to +35° C 100	+35° C to +50° C 3.5	+35° C to +50° C 90	3.4	60	2%	\$950
7A12	Dual-Channel Amplifier with DC Offset	5 mV/div	25	14	80	4.4	75	4.7	55	2%	\$900
7A13	Differential DC Offset, High-Freq CMRR Amplifier	1 mV/div	P6053A 25	14	75	5.0	70	5.0	55	1.5%	\$1250
			P6055 24	15	55	6.4	55	6.4	45		
7A14	AC Current Probe Amplifier (2 current probes)	1 mA/div	P6021 24	15	50	7.0	45	7.8	40	2%	\$700
			P6022 25	14	80	4.4	75	4.7	50		
7A15A 7A15AN	Low-Cost Conventional Input Amplifier with X10 Gain	5 mV/div (0.5 mV/div) [†]	25	14	65	5.4	60	5.9	50	2%	\$280 (7A15A) \$250 (7A15AN)
7A16	Wide-Bandwidth Conventional Input Amplifier	5 mV/div	25	14	100	3.5	90	3.9	60	2%	\$625
7A17	Low-Cost, Easy to Customize 50 Ω Amplifier	50 mV/div	25	14	100	3.5	90	3.9	15	Adjustable	\$95
7A18 7A18N	Dual-Channel Amplifier	5 mV/div	25	14	70	5.0	65	5.4	50	2%	\$535 (7A18) \$500 (7A18N)
7A22	DC-Coupled, High Gain Differential Amplifier	10 μ V/div	1 \pm 10%	350 ns \pm 9%	1 MHz \pm 10%	350 ns \pm 9%	1 \pm 10%	350 \pm 9%	1 \pm 10%	2%	\$575

System Environmental Specifications—Operating temperature range is from 0°C to +50°C (except where noted). Operating altitude to 15,000 feet. Non-operating to 50,000 feet.

[†]Obtained with X10 gain at reduced bandwidth of 10 MHz.

*Accuracy percentages apply to all deflection factors. Plug-in gain must be set at the deflection factor designated on each plug-in. When a probe is used, the gain must be set with the calibration signal applied to the probe tip. The calibration signal is supplied by an external calibrator whose accuracy is within 0.25%.

7000-SERIES STORAGE FAMILY Reference

TIME BASES

TIME BASE	PERFORMANCE FEATURE	MAX SWEEP RATE	FREQUENCY TRIGGERING RANGE	PRICE
7B50	Calibrated Time Base	5 ns/div	DC - 100 MHz	\$450
7B53AN	Low cost, Calibrated Mixed Sweep	5 ns/div	DC - 100 MHz	\$750
7B53AN Opt 5	Low cost, TV Sync Separator Triggering	5 ns/div	DC - 100 MHz	\$810

7000-SERIES STORAGE FAMILY

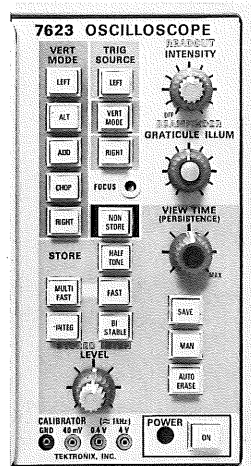
There are six models to choose from in the TEKTRONIX 7000-Series Storage FAMILY: three cabinet models and three 5¼-inch rackmount versions. Each mainframe has three-plug-in versatility and is compatible with the 27 TEKTRONIX 7000-Series plug-ins, available for making virtually any measurement.

SPECIALIZED PLUG-INS

MEASUREMENT REQUIREMENT	PLUG-IN	PERFORMANCE FEATURE	PRICE
Curve Tracing	7CT1N	Low Power Semiconductor Curve Tracer	\$ 400
Digital Multimeter	7D13	Digital Multimeter Plus a unique Temperature Probe	\$ 560
Digital Counting	7D14	Directly Gated Counter to 625 MHz	\$1400
Spectrum Analysis	7L12	100 kHz to 1.8 GHz Spectrum Analyzer	\$4850
Delay Line	7M11	High Quality Dual 50-Ω Delay Line	\$ 325
Sampling	7S11	Accepts Plug-In Sampling Heads	\$ 575
TDR and Sampling	7S12	TDR and Sampling Applications	\$1200
Sampling Sweep	7T11	Random or Sequential, Equivalent or Real-Time Sampling	\$1625

Transfer Storage Oscilloscope 7623

- 200 cm/μs STORED WRITING SPEED
- MULTIMODE STORAGE
- DC-to-100 MHz BANDWIDTH
- EXTREMELY BURN RESISTANT CRT



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

Chopped Mode—Repetition rate is approximately 1 MHz.

Delay Line—Permits viewing leading edge of displayed waveform.

HORIZONTAL SYSTEM

Channels—One right-hand plug-in compartment; compatible with all 7000-Series plug-ins.

Fastest Calibrated Sweep Rate—5 ns/div with the 7B53AN.

X-Y Mode—The phase shift between vertical and horizontal channels is 2° from DC to 35 kHz. Bandwidth is DC to at least 2 MHz.

CRT AND DISPLAY FEATURES

Standard Storage CRT—Internal 8 x 10-div (0.9 cm/div) graticule with variable illumination.

Option 12, Fast Writing Speed CRT—Offers 200 cm/μs stored writing speed. Internal 8 x 10-div (0.9 cm/div) graticule with variable illumination.

Accelerating Potential—8.5 kV.

Phosphor—P31.

Storage Display Modes—Nonstore, Fast, Variable Persistence, Bistable.

DISPLAY MODE	FAST	VARIABLE PERSISTENCE	BISTABLE
STORED WRITING SPEED	200 cm/μs - Opt 12* (220 div/μs) 100 div/μs - Std*	0.5 div/μs	30 div/ms
VIEW TIME	until erased	15 s at max writing speed** 1 minute at 100/div/ms**	until erased
ERASE TIME	0.5 s or less	0.5 s or less	0.5 s or less

*Measured over center 4 x 5 div area, derated towards display edges.

**May be extended by selecting SAVE mode.

At 200 cm/μs the TEKTRONIX 7623 (Option 12) Storage Oscilloscope is delivering the World's Fastest Stored Writing Speed. The standard 7623 performs at 100 div/μs (0.9 cm/div). A new proprietary TEKTRONIX storage CRT is used to achieve these ultra-fast stored writing speeds. The CRT incorporates a special high-speed target and uses a unique mesh-to-mesh transfer technique. This unparalleled design and operation provides the extremely fast writing speed without compromising viewing time. This means stored traces can be viewed for hours or even days, without fading. The tube is extremely burn resistant. This means that there are no special operating precautions to be observed.

The instrument has four operating modes: Fast Bistable Storage, Regular Bistable Storage, Variable Persistence Storage, and Conventional (nonstorage). Now, in just one oscilloscope, the operator can select the mode that best satisfies his measurement requirements.

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 Storage FAMILY Vertical System Specification Chart.

7000-SERIES STORAGE FAMILY

7623 Transfer Storage Oscilloscope

Persistence—(Variable Persistence mode only) Continuously variable, selects trace persistence from 0.2 s to 1 min (upper limit dependent on store LEVEL setting). Persistence may be turned off when not needed.

Auto Erase—Viewing time continuously variable up to 12 s. The sequence begins with the arrival of the signal. The signal initiates a sweep. After each sweep, the stored display is retained and further sweeps are locked out for the viewing interval selected by the VIEW TIME control. Then, the display is erased and the time base is enabled for the next sweep. This cycle will automatically repeat itself as long as a signal is available. The stored display may also be erased by the MANUAL control.

Save—Prevents erasing and storing of display, also extends viewing time.

Integrate—Provides additional writing speed for repetitive signals by allowing the storage target to integrate the written information over several signal repetitions.

External Z-Axis Input—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. Maximum input voltage is 10 V (DC + Peak AC) and P-P AC.

Auto-Focus—Reduces the need for additional manual focusing with changes in intensity after focus control has been initially set.

Beam Finder—Limits display within graticule area.

OUTPUTS/INPUTS

+**Sawtooth**—Sawtooth starts 1 V or less from ground (into 1 M Ω). 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 within 2%.

+**Gate**—Positive pulse of the same duration and coincident with sweep. Output voltage is 0.5 V ($\pm 10\%$) into 50 Ω , 10 V ($\pm 10\%$) into 1 M Ω . Risettime is 20 ns or less into 50 Ω , output R is 950 Ω within 2%. Source is selectable from Main, Delayed or Auxiliary Gate.

Sig Out—Selected by TRIGGER SOURCE switch. Output voltage is 25 mV/div ($\pm 10\%$) into 50 Ω , 0.5 V/div ($\pm 10\%$) into 1 M Ω . The bandwidth depends upon vertical plug-in, see Storage FAMILY Vertical System Specification Chart. Output R is 950 Ω within 2%.

External Single Sweep Reset—Ground closure, rear panel BNC provides input to reset sweep.

Remote Erase—Ground closure, rear panel BNC provides input to erase stored trace.

Option 7 Without Signals Outputs/Inputs—Deletes previously described OUTPUTS/INPUTS.

CAMERA POWER OUTPUT

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

CALIBRATOR

Voltage Output—Rectangular waveshape, positive-going from ground. (DC voltage 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°C to $+35^{\circ}\text{C}$); within 2% (0°C to $+50^{\circ}\text{C}$). Repetition rate is approx 1 kHz.

Current Output—40 mA DC or 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—100, 110, 120, 200, 220 and 240 V AC $\pm 10\%$; internally selectable with quick-change jumpers.

Line Frequency—50 Hz to 66 Hz.

Option 5, Line Frequency Change (50 - 400 Hz)—Converts the R7623 to 50 - 400 Hz operation (not available for 7623).

Max Power Consumption—180 Watts, 2.0 Amps at 115 V line, 60 Hz. Cooling is provided by a fan for both models.

DIMENSIONS AND WEIGHTS

DIMENSIONS	HEIGHT		WIDTH		LENGTH	
	in	cm	in	cm	in	cm
7313, 7613, 7623	11.4	28.9	8.7	22.1	24.0	60.9
R7313, R7613, R7623	5.25	13.3	19.0	48.2	24.7	62.9
SINGLE-WIDTH PLUG-INS	5.0	12.7	2.8	7.1	14.5	36.9
DOUBLE-WIDTH PLUG-INS	5.0	12.7	5.5	14.0	14.5	36.9
WEIGHTS (Approx)	NET		DOMESTIC SHIPPING		EXPORT PACKED	
	lb	kg	lb	kg	lb	kg
7613, 7623 R7613, R7623	30.0	13.6	42.0	19.0	55.0	25.0
7313, R7313	32.0	14.5	44.0	20.0	57.0	25.8
SINGLE-WIDTH PLUG-INS	2.0	0.9	5.0	2.3	10.0	4.5
DOUBLE-WIDTH PLUG-INS	9.0	4.1	12.0	5.4	17.0	7.7

Included Accessories—(For 7623 and R7623) 20-inch cable (two-pin-to-BNC) (175-1178-00); CRT filter (Gray 378-0625-02). The R7623 includes rackmounting hardware.

ORDERING INFORMATION

(Plug-ins not included)

7623 STORAGE OSCILLOSCOPE \$2850
R7623 STORAGE OSCILLOSCOPE \$2950

7623 OPTIONS

Option 1 W/O CRT READOUT Sub \$400
Option 3 EMI MODIFICATION Add \$75
Option 7 W/O SIG OUT/IN Sub \$50
Option 12 FAST WRITING SPEED CRT Add \$500

R7623 OPTIONS

Option 1 W/O CRT READOUT Sub \$400
Option 3 EMI MODIFICATION Add \$50
Option 5 LINE FREQ CHANGE (50 - 400 Hz) Add \$100
(Not available for 7623)
Option 7 W/O SIG OUT/IN Sub \$50
Option 12 FAST WRITING SPEED CRT Add \$500

7623 CONVERSION KITS

040-0630-00 CRT READOUT \$400
040-0631-00 EMI MODIFICATION \$100
040-0629-00 SIG OUT/IN \$50

R7623 CONVERSION KITS

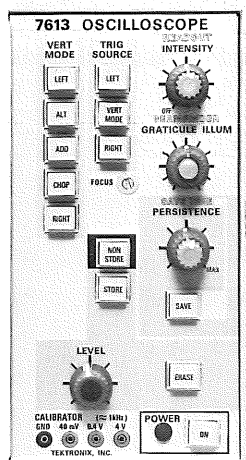
040-0630-00 CRT READOUT \$400
040-0632-00 EMI MODIFICATION \$75
040-0633-00 SIG OUT/IN \$50

U.S. Sales Prices FOB Beaverton, Oregon

7000-SERIES STORAGE FAMILY

Variable Persistence Storage Oscilloscope 7613

- VARIABLE PERSISTENCE STORAGE
- DC-to-100 MHz BANDWIDTH
- EXTREMELY BURN RESISTANT CRT



The TEKTRONIX 7613 Storage Oscilloscope offers Variable Persistence operation with a stored writing speed of 5 div/ μ s or conventional (nonstorage) operation. Stored traces can be viewed up to 15 minutes on a display area of 8 x 10 div (0.9 cm/div). The 7613 CRT is extremely burn resistant and doesn't require any special operating precautions.

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 Storage FAMILY Vertical System Specification Chart.

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

Chopped Mode—Repetition rate is approximately 1 MHz.

Delay Line—Permits viewing leading edge of displayed waveform.

HORIZONTAL SYSTEM

Channels—One right-hand plug-in compartment; compatible with all 7000-Series plug-ins.

Fastest Calibrated Sweep Rate—5 ns/div with the 7B53AN.

X-Y Mode—The phase shift between vertical and horizontal channels is 2° from DC to 35 kHz. Bandwidth is DC to at least 2 MHz.

CRT AND DISPLAY FEATURES

Variable Persistence Storage CRT—Internal 8 x 10 div (0.9 cm/div) graticule with variable illumination.

Option 6, Special Internal Graticule (Spectrum Analyzer)—Internal 8 x 10 div (0.9 cm/div) with variable illumination including LIN, LOG and FREQUENCY markings.

Accelerating Potential—8.5 kV.

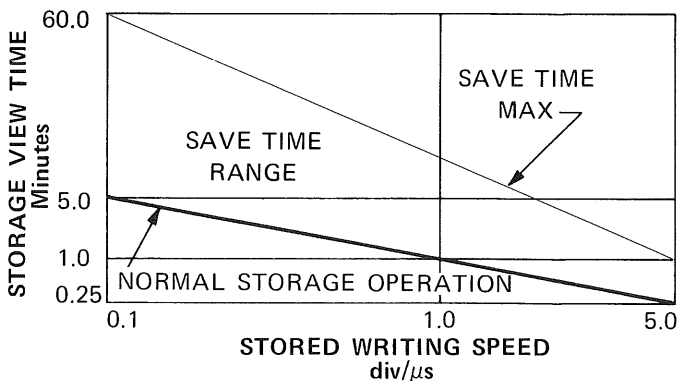
Phosphor—P31.

Non-Store Mode—For displaying waveforms in the conventional (non-storage) mode.

Store Mode—For displaying waveforms utilizing the variable persistence storage feature.

Stored Writing Speed—Greater than 5 div/ μ s.

Save—Prevents erasing and storing of display, also extends viewing time.



Storage View Time—(See chart) may be increased by selecting SAVE and adjusting for reduced viewing brightness with SAVE TIME control.

Erase Time—0.5 s or less.

Persistence—Continuously variable, selects trace persistence from 0.2 s to 1 min (upper limit dependent on storage LEVEL setting). Persistence may be turned off when not needed.

External Z-Axis Input—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. Maximum input voltage is 10 V (DC + Peak AC) and P-P AC.

Auto-Focus—Reduces the need for additional manual focusing with changes in intensity after focus control has been initially set.

Beam Finder—Limits display within Graticule area.

OUTPUTS/INPUTS

+Sawtooth—Sawtooth starts 1 V or less from ground (into 1 M Ω). 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 within 2%.

+Gate—Positive pulse of the same duration and coincident with sweep. Output voltage is 0.5 V ($\pm 10\%$) into 50 Ω , 10 V ($\pm 10\%$) in 1 M Ω . Risettime is 20 ns or less into 50 Ω , output R is 950 Ω within 2%. Source is selectable from Main, Delayed or Auxiliary Gate.

Sig Out—Selected by TRIGGER SOURCE switch. Output voltage is 25 mV/div ($\pm 10\%$) into 50 Ω , 0.5 V/div ($\pm 10\%$) into 1 M Ω . The bandwidth depends upon vertical plug-in, see Storage FAMILY Vertical System Specification Chart. Output R is 950 Ω within 2%.

External Single Sweep Reset—Ground closure, rear panel BNC provides input to reset sweep.

Remote Erase—Ground closure, rear panel BNC provides input to erase stored trace.

Option 7, Without Signals Outputs/Inputs—Deletes previously described OUTPUTS/INPUTS.

CAMERA POWER OUTPUT

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

7000-SERIES STORAGE FAMILY

7613 Variable Persistence Storage Oscilloscope

CALIBRATOR

Voltage Output—Rectangular waveshape, positive-going from ground. (DC voltage 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 $+50^{\circ}\text{C}$). Repetition rate is approx 1 kHz.

Current Output—40 mA DC or 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—100, 110, 120, 200, 220 and 240 V AC $\pm 10\%$; internally selectable with quick-change jumpers.

Line Frequency—50 Hz to 66 Hz.

Option 5, Line Frequency Change (50 - 400 Hz)—Converts the R7613 to 50 - 400 Hz operation (not available for 7613).

Max Power Consumption—180 Watts, 2.0 Amps at 115 V line, 60 Hz. Cooling is provided by a fan for both models.

DIMENSIONS AND WEIGHTS

Please refer to the 7623 dimensions and weights chart.

Included Accessories—(For 7613 and R7613) 20-inch cable (two-pin-to-BNC) (175-1178-00); CRT filter (Gray 378-0625-02). The R7613 includes rackmounting hardware.

ORDERING INFORMATION

(Plug-ins not included)

7613 STORAGE OSCILLOSCOPE	\$2500
R7613 STORAGE OSCILLOSCOPE	\$2600

7613 OPTIONS

Option 1	W/O CRT READOUT	Sub \$400
Option 3	EMI MODIFICATION	Add \$75
Option 6	SPECIAL INT GRATICULE (Spectrum Analyzer)	No Charge
Option 7	W/O SIG OUT/IN	Sub \$50

R7613 OPTIONS

Option 1	W/O CRT READOUT	Sub \$400
Option 3	EMI MODIFICATION	Add \$50
Option 5	LINE FREQ CHANGE (50 - 400 Hz)	Add \$100
	(Not available for 7613)	
Option 6	SPECIAL INT GRATICULE (Spectrum Analyzer)	No Charge
Option 7	W/O SIG OUT/IN	Sub \$50

7613 CONVERSION KITS

040-0630-00	CRT READOUT	\$400
040-0631-00	EMI MODIFICATION	\$100
040-0629-00	SIG OUT/IN	\$50

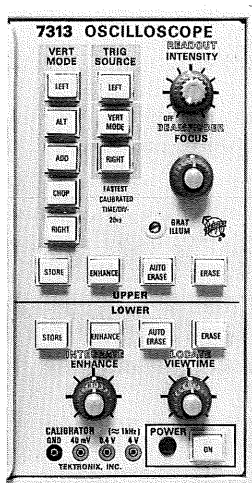
R7613 CONVERSION KITS

040-0630-00	CRT READOUT	\$400
040-0632-00	EMI MODIFICATION	\$75
040-0633-00	SIG OUT/IN	\$50

U.S. Sales Prices FOB Beaverton, Oregon

7313 Bistable Storage Oscilloscope

- SPLIT-SCREEN BISTABLE STORAGE
- DC-to-25 MHz BANDWIDTH
- EXTREMELY BURN RESISTANT CRT



The TEKTRONIX 7313 Storage Oscilloscope offers Split-Screen Bistable operation or conventional (nonstorage) operation. It has a stored writing speed of 5 div/ μs . Stored traces can be viewed up to 4 hours on a display area of 8 x 10 div (0.98 cm/div). The 7313 CRT is extremely burn resistant and doesn't require any special operating precautions.

The split-screen storage CRT provides the convenience of storage and conventional displays on the same CRT at the same time. This capability is useful in many applications. For instance, the operator may wish to store a reference trace and then view the change in waveform characteristics as he varies

circuit components. He does this easily by operating half of the display in a stored mode and the other half in a conventional mode. Thus, amplitude, duration, and other characteristics of waveforms displayed in a conventional mode can be adjusted precisely to the stored reference trace.

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, limited to 25 MHz.

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

Chopped Mode—Repetition rate is approximately 1 MHz.

Delay Line—Permits viewing leading edge of waveform.

HORIZONTAL SYSTEM

Channels—One right-hand plug-in compartment; compatible with all 7000-Series plug-ins.

Fastest Calibrated Sweep Rate—20 ns/div with the 7B53AN.

X-Y Mode—The phase shift between vertical and horizontal channels is 2° from DC to 35 kHz. Bandwidth is DC to at least 2 MHz.

STORAGE CRT AND DISPLAY FEATURES

Bistable Split-Screen Storage CRT—Internal 8 x 10 div (0.98 cm/div) nonilluminated graticule. Store on either upper or lower half of screen with nonstore display on other half. Store on entire screen or nonstore on entire screen. Independent operation on both halves.

Accelerating Potential—4 kV.

7000-SERIES STORAGE FAMILY

Bistable Storage Oscilloscope 7313

Phosphor—P1.

Stored Writing Speed—Normal, 500 cm/ms; adjustable to at least 5000 cm/ms in Enhance Mode.

Storage View Time—Up to 4 hours.

Auto Erase View Time Range—0.5 or less to at least 12 s after end of sweep.

Erase Time—300 ms or less.

Enhance Mode—Controls single-sweep writing capabilities of the storage CRT. Up to 5000 cm/ms or better can be stored with minimal loss of resolution and contrast.

Integrate Mode—Provides additional writing speed for repetitive signals by allowing the storage target to integrate the written information over several signal repetitions.

Auto Erase Mode—Viewing time continuously variable up to 12 s. The sequence begins with the arrival of the signal. The signal initiates a sweep. After each sweep, the stored display is retained and further sweeps are locked out for the viewing interval selected by the VIEW TIME Control. Then, the display is erased and the time-base is enabled for the next sweep. This cycle will automatically repeat itself as long as a signal is available. The stored display may also be erased by the MANUAL control.

External Z-Axis Input—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. Maximum input voltage is 10 V (DC + Peak AC) and P-P AC.

Beam Finder—Limits display within Graticule area.

OUTPUTS/INPUTS

†**Sawtooth**—Sawtooth starts 1 V or less from ground (into 1 M Ω). 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 within 2%.

†**Gate**—Positive pulse of the same duration and coincident with sweep. Output voltage is 0.5 V ($\pm 10\%$) into 50 Ω , 10 V ($\pm 10\%$) into 1 M Ω . Risettime is 20 ns or less into 50 Ω , output R is 950 Ω within 2%. Source is selectable from Main, Delayed or Auxiliary Gate.

Sig Out—Selected by TRIGGER SOURCE switch. Output voltage is 25 mV/div ($\pm 10\%$) into 50 Ω , 0.5 V/div ($\pm 10\%$) into 1 M Ω . The bandwidth depends upon vertical plug-in, see 7313 Vertical System Specification Chart. Output R is 950 Ω within 2%.

External Single Sweep Reset—Ground closure, rear panel BNC provides input to reset sweep.

Remote Erase—Ground closure, rear panel BNC provides input to erase stored trace. Internally selectable for either or both halves of CRT.

Option 7, Without Signals Outputs/Inputs—Deletes previously described Outputs/Inputs.

CAMERA POWER OUTPUT

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

CALIBRATOR

Voltage Output—Rectangular waveshape, positive-going from ground. (DC voltage 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 $+50^{\circ}\text{C}$). Repetition rate is approx 1 kHz.

Current Output—40 mA DC or 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—100, 110, 120, 200, 220 and 240 VAC $\pm 10\%$; internally selectable with quick-change jumpers.

Line Frequency—50 Hz to 400 Hz (7313), 50 Hz to 66 Hz (R7313).

Option 5, Line Frequency Change (50 - 400 Hz)—Converts the R7313 to 50 - 400 Hz operation (not required for 7313).

Max Power Consumption—180 Watts, 2.0 Amps at 115 V line, 60 Hz. Cooling is provided by a fan for the R7313.

DIMENSIONS AND WEIGHTS

Please refer to the 7623 dimensions and weights chart.

Included Accessories—(For 7313 and R7313) 20-inch cable (two-pin-to-BNC) (175-1178-00); CRT filter (Gray 378-0625-02). The R7313 includes rackmounting hardware.

ORDERING INFORMATION

(Plug-ins not included)

7313 STORAGE OSCILLOSCOPE	\$2000
R7313 STORAGE OSCILLOSCOPE	\$2100

7313 OPTIONS

Option 1	W/O CRT READOUT	Sub \$400
Option 3	EMI MODIFICATION	Add \$75
Option 7	W/O SIG OUT/IN	Sub \$50

R7313 OPTIONS

Option 1	W/O CRT READOUT	Sub \$400
Option 3	EMI MODIFICATION	Add \$50
Option 5	LINE FREQ CHANGE (50 - 400 Hz)	Add \$100
	(Not required for 7313)	
Option 7	W/O SIG OUT/IN	Sub \$50

7313 CONVERSION KITS

040-0630-00	CRT READOUT	\$400
040-0631-00	EMI MODIFICATION	\$100
040-0629-00	SIG OUT/IN	\$50

R7313 CONVERSION KITS

040-0630-00	CRT READOUT	\$400
040-0632-00	EMI MODIFICATION	\$75
040-0633-00	SIG OUT/IN	\$50

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7600-FAMILY OSCILLOSCOPES

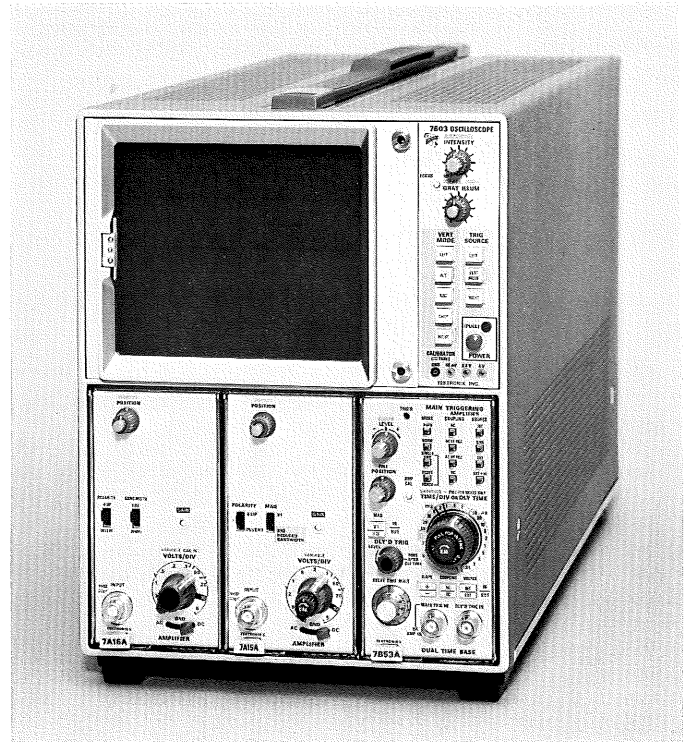
7603 100-MHz Oscilloscope

- DC-to-100 MHz BANDWIDTH
- CRT READOUT
- 6½-INCH CRT
- 5¼-INCH RACKMOUNT
- THREE-PLUG-IN FLEXIBILITY
- VERSATILE TRIGGER SOURCE SELECTION
- VERTICAL MODE SWITCHING
- COLOR-KEYED PANELS
- PUSH-BUTTON SWITCHING
- LIGHTWEIGHT

The TEKTRONIX 7603 Oscilloscope, R7603 Rackmount Oscilloscope and their recommended plug-ins are called the TEKTRONIX 7600 FAMILY.

The TEKTRONIX 7600 FAMILY provides a wide performance range through plug-in and mainframe versatility. The family is also compatible with 8 additional specialized plug-ins, expanding it beyond a general purpose measurement system.

Other 100-MHz mainframes are available, the TEKTRONIX 7613 and 7623 Storage Oscilloscopes, described in the Storage FAMILY .



PLUG-IN VERSATILITY

Plug-ins are available to make virtually any measurement desired. Examples are:

- 525-MHz Direct Counter
- 1.8 GHz Spectrum Analyzer
- Sampling to 14 GHz
- Dual Time Base
- Single Trace
- Digital Multimeter
- 1 mA/Div Current Amplifier
- Differential Comparator
- Delayed Sweep
- Dual Trace
- 45-ps Risetime TDR
- 10 μ V/Div Differential
- Curve Tracer
- Single Time Base
- Multi-Trace Combinations
- Delay Line
- Mixed Sweep

100 MHz 7600 FAMILY VERTICAL SYSTEM SPECIFICATIONS

PLUG-IN AMPLIFIER	PERFORMANCE FEATURE	MIN DEFL FACTOR	BW	Tr	SIG OUT BW	ACCURACY* WITHOUT PROBE	PRICE
7A11	Low Capacitance Built-In FET Probe Amplifier	5 mV/div	100 MHz	3.5 ns	60 MHz	2%	\$950
7A12	Dual-Channel Amplifier with DC Offset	5 mV/div	80 MHz	4.4 ns	55 MHz	2%	\$900
7A13	Differential DC Offset, High-Freq CMRR Amplifier	1 mV/div	P6053A 75 MHz	5.0 ns	55 MHz	1.5%	\$1250
			P6055 55 MHz	6.4 ns	45 MHz		
7A14	AC Current Probe Amplifier (2 current probes)	1 mA/div	P6021 50 MHz	7.0 ns	40 MHz	—	\$700
			P6022 80 MHz	4.4 ns	50 MHz		
7A15A 7A15AN	Low-Cost Conventional Input Amplifier with X10 Gain	5 mV/div (0.5 mV/div)†	65 MHz	5.4 ns	50 MHz	2%	\$280 (7A15A) \$250 (7A15AN)
7A16	Wide-Bandwidth Conventional Input Amplifier	5 mV/div	100 MHz	3.5 ns	60 MHz	2%	\$625
7A17	Low-Cost, Easy to Customize 50 Ω Input Amplifier	50 mV/div	100 MHz	3.5 ns	15 MHz	Adjustable	\$95
7A18 7A18N	Dual-Channel Amplifier	5 mV/div	70 MHz	5.0 ns	50 MHz	2%	\$535 (7A18) \$500 (7A18N)
7A22	DC-Coupled, High-Gain Differential Amplifier	10 μ V/div	1 MHz \pm 10%	350 ns \pm 9%	1 MHz \pm 10%	2%	\$575

System Environmental Specifications—Operating temperature range is from 0°C to +50°C. Operating altitude to 15,000 feet. Non-operating to 50,000 feet.

†Obtained with X10 gain at reduced bandwidth of 10 MHz.

*Accuracy percentages apply to all deflection factors. Plug-in gain must be set at the deflection factor designated on each plug-in. When a probe is used, the gain must be set with the calibration signal applied to the probe tip. The calibration signal is supplied by an external calibrator whose accuracy is within 0.25%.

7600-FAMILY OSCILLOSCOPES

100-MHz Oscilloscope 7603

SPECIALIZED PLUG-INS

MEASUREMENT REQUIREMENT	PLUG-IN	PERFORMANCE FEATURE	PRICE
Curve Tracing	7CT1N	Low Power Semiconductor Curve Tracer	\$ 400
Digital Multimeter	7D13	Digital Multimeter Plus a unique Temperature Probe	\$ 560
Digital Counting	7D14	Directly Gated Counter to 525 MHz	\$1400
Spectrum Analysis	7L12	100 kHz to 1.8 GHz Spectrum Analyzer	\$4850
Delay Line	7M11	High Quality Dual 50-Ω Delay Line	\$ 325
Sampling	7S11	Accepts Plug-In Sampling Heads	\$ 575
TDR and Sampling	7S12	TDR and Sampling Applications	\$1200
Sampling Sweep	7T11	Random or Sequential, Equivalent or Real-Time Sampling	\$1625

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 7600 Family Vertical System Specification Chart.

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

Chopped Mode—Repetition rate is approximately 1 MHz.

Delay Line—Permits viewing leading edge of displayed waveform.

HORIZONTAL SYSTEM

Channels—One right-hand plug-in compartment; compatible with all 7000-Series plug-ins.

Fastest Calibrated Sweep Rate—5 ns/div with the 7B53AN.

X-Y Mode—The phase shift between vertical and horizontal channels is 2° from DC to 35 kHz. Bandwidth is DC to at least 2 MHz.

CRT AND DISPLAY FEATURES

Standard—Internal 8 x 10 div (1.22 cm/div) graticule with variable illumination. Accelerating potential is 15 kV with P31 phosphor standard.

Option 4, Maximum Brightness CRT—Internal 8 x 10-cm graticule with variable illumination. Accelerating potential is 18 kV with P31 phosphor standard, P11 optional.

Option 8, Phosphor Change (Specify)—Standard CRT: P1, P2, P7, P11, P7SA (Phosphor/Spectrum Analyzer graticule combination); Maximum Brightness CRT: P11.

TIME BASES

TIME BASE	PERFORMANCE FEATURE	MAX SWEEP RATE	TRIGGERING FREQUENCY RANGE	PRICE
7B50	Calibrated Time Base	5 ns/div	DC to 100 MHz	\$450
7B53AN	Low Cost, Calibrated Mixed Sweep	5 ns/div	DC to 100 MHz	\$750
7B53AN Opt 5	Low Cost, TV Sync Separator Triggering	5 ns/div	DC to 100 MHz	\$810

Minimum Photographic Writing Speed—Using Polaroid* film without film fogging. Can be increased by using the TEKTRONIX Writing Speed Enhancer (see Camera Booklet for more information).

MAINFRAME	WRITING SPEED cm/μs				CAMERA	LENS
	P31		P11			
Standard 8 X 10 div (1.22 cm/div)	10,000 ASA	3000 ASA	10,000 ASA	3000 ASA	C-51-R	f/1.2 1:0.5
	980	490	1320	660		
	180	90	245	125	C-59-R	f/2.8 1:0.67
Option 4 8 X 10 cm	1500	750	2000	1000	C-51-R	f/1.2 1:0.5
	300	150	400	200	C-59-R	f/2.8 1:0.67

External Z-Axis Input—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. Maximum input voltage is 10 V (DC + Peak AC) and P-P AC..

Auto-Focus—Reduces the need for additional manual focusing with changes in intensity after focus control has been initially set.

Beam Finder—Limits display within graticule area.

OUTPUTS/INPUTS

+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 within 2%.

+Gate—Positive pulse of the same duration and coincident with sweep. Output voltage is 0.5 V (±10%) into 50 Ω, 10 V (±10%) into 1 MΩ. Risettime is 20 ns or less into 50 Ω, output R is 950 Ω within 2%. Source is selectable from Main, Delayed or Auxiliary Gate.

Sig Out—Selected by TRIGGER SOURCE switch. Output voltage is 25 mV/div (±10%) into 50 Ω, 0.5 V/div (±10%) into 1 MΩ. The bandwidth depends upon vertical plug-in, see 100-MHz Family Vertical System Specification Chart. Output R is 950 Ω within 2%.

External Single Sweep Reset—Ground closure, rear panel BNC provides input to reset sweep.

Single-Sweep Ready Indicator—Rear panel BNC provides 5 V for single-sweep ready condition.

Option 7, Without Signal Outputs/Inputs—Deletes previously described Outputs/Inputs.

*Registered Trademark Polaroid Corporation

7600-FAMILY OSCILLOSCOPES

7603 100-MHz Oscilloscope

CAMERA POWER OUTPUT

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

CALIBRATOR

Voltage Output—Rectangular waveshape, positive-going from ground. (DC voltage 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°C to +35°C); within 2% (0°C to +50°C). Repetition rate is approx 1 kHz.

Current Output—40 mA DC or 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—100, 110, 120, 200, 220 and 240 VAC $\pm 10\%$; internally selectable with quick-change jumpers.

Line Frequency—50 Hz to 400 Hz (7603), 50 Hz to 66 Hz (R7603).

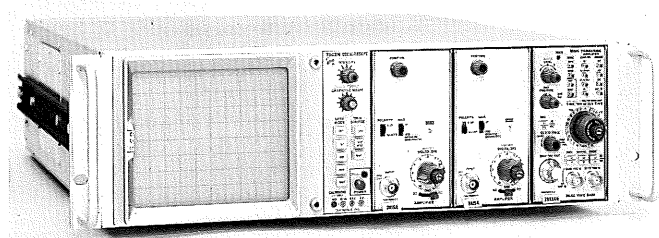
Option 5, Line Frequency Change (50 - 400 Hz)—Converts the R7603 to 50 - 400 Hz operation (not required for 7603).

Max Power Consumption—180 Watts, 2.0 Amps at 115 V line, 60 Hz. Cooling is provided by a fan for the R7603.

DIMENSIONS AND WEIGHTS

DIMENSIONS	HEIGHT		WIDTH		LENGTH	
	In	cm	In	cm	In	cm
7603	11.4	28.9	8.7	22.1	24.0	60.9
R7603	5.25	13.3	19.0	48.2	24.7	62.9
SINGLE-WIDTH PLUG-INS	5.0	12.7	2.8	7.1	14.5	36.9
DOUBLE-WIDTH PLUG-INS	5.0	12.7	5.5	14.0	14.5	36.9
WEIGHTS (Approx)	NET		DOMESTIC SHIPPING		EXPORT PACKED	
	lb	kg	lb	kg	lb	kg
7603, R7603	30.0	13.6	42.0	19.0	55.0	25.0
SINGLE-WIDTH PLUG-INS	2.0	0.9	5.0	2.3	10.0	4.5
DOUBLE-WIDTH PLUG-INS	9.0	4.1	12.0	5.4	17.0	7.7

Included Accessories—(For 7603 and R7603) 20-inch cable (two-pin-to-BNC) (175-1178-00); CRT filter (Blue 378-0625-00, Clear 378-0625-03). The R7603 includes rackmounting hardware.



The R7603 requires only 5¼ inches of rack height in a standard 19-inch rack. It is fan-cooled and comes complete with slide-out chassis tracks.

ORDERING INFORMATION

(Plug-ins not included)

7603 OSCILLOSCOPE	\$1600
R7603 OSCILLOSCOPE	\$1700

7603 OPTIONS

Option 1	W/O CRT READOUT	Sub \$400
Option 3	EMI MODIFICATION	Add \$75
Option 4	MAX BRIGHTNESS CRT	Add \$75
Option 7	W/O SIG OUT/IN	Sub \$50
Option 8	PHOSPHOR CHANGE (Specify) (P1, P2, P7, P7/SA, P11 Available)	No Charge

R7603 OPTIONS

Option 1	W/O CRT READOUT	Sub \$400
Option 3	EMI MODIFICATION	Add \$50
Option 4	MAX BRIGHTNESS CRT	Add \$75
Option 5	LINE FREQ CHANGE (50 - 400 Hz) (Not required for 7603)	Add \$100
Option 7	W/O SIG OUT/IN	Sub \$50
Option 8	PHOSPHOR CHANGE (Specify) (P1, P2, P7/SA, P11 Available)	No Charge

7603 CONVERSION KITS

040-0630-00	CRT READOUT	\$400
040-0631-00	EMI MODIFICATION	\$100
040-0629-00	SIG OUT/IN	\$50

R7603 CONVERSION KITS

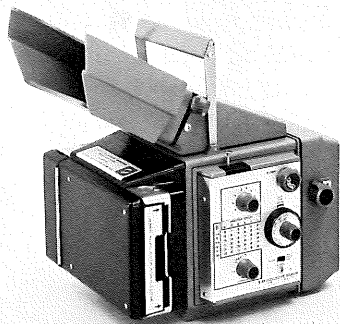
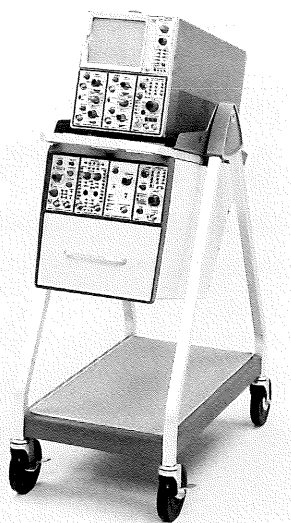
040-0630-00	CRT READOUT	\$400
040-0632-00	EMI MODIFICATION	\$75
040-0633-00	SIG OUT/IN	\$50

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Optional Accessories to Enhance Your Oscilloscope System - - -

The 203-2 SCOPE-MOBILE® CART is recommended for the 7600 Family. The cart features a tilt-locking tray (nine positions), a storage drawer and plug-in carrier for holding five 7000-Series plug-ins. A latch-operated hold-down device, front-wheel brakes and three AC receptacles are also standard equipment.

Order 203-2 SCOPE-MOBILE
CART \$155



The C-59-P Camera is recommended for the 7600 Family. Its features include • accurate exposure control • trace-brightness photometer • range-finder focusing. The shutter is mechanically actuated with speeds from 1 to 1/50 second. A magnification of 0.67 and aperture settings from f/2.8 to f/16 optimizes this camera for general-purpose trace recording.

Order C-59-P CAMERA (Pack-Film Back) \$450

CRT Light Filters—Four colors are available, Blue 378-0625-00; Amber 378-0625-01; Smoke-gray (standard) 378-0625-02; Green 378-0625-03 \$1.60 Each

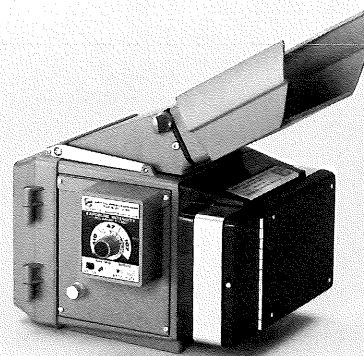
Blank Plug-In Chassis—Provides a blank printed circuit board, plug-in frame and securing hardware for users who wish to construct a special purpose plug-in.

Order 040-0553-00 \$46

Blank Plug-In Panel—When operating the 7000-Series instruments with less than the full complement of plug-ins, the blank plug-in panel may be used to cover unused channels.

Order 016-0155-00 \$6

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The TEKTRONIX Writing Speed Enhancer is a camera accessory for increasing photographic writing speed by accurate and repeatable film fogging. The writing speed increase for 3000 and 10,000 ASA film is ≈ 4 times (as compared to front illumination of the print without enhancement). The battery powered unit is simple to install and easy to use. It is available for several TEKTRONIX Cameras.

WRITING SPEED ENHANCER, for C-59, Order 016-0290-00 \$175

VOLTAGE PROBES

Probes are not supplied with 7000-Series plug-ins (except 7A11) and should be ordered separately according to the application.

P6053A

The P6053A miniature, 10X probe is recommended for the 7A15A, 7A16, and 7A18 amplifiers. The input capacitance is adjustable to match a nominal input capacitance of 15 to 24 pF. The input capacitance of the 3.5-foot probe is 9.5 pF.

P6053A 3.5-FT PROBE, Order 010-0248-00 \$55
Probe is available in a 6-ft version (same price).

P6056 and P6057

The P6056 (DC to 3.5 GHz 10X) or P6045 (DC to 1.7 GHz 100X) Probes are recommended for use with the 7A17 Amplifier. Both probes are compatible with 50 Ω systems.

P6056 6-ft PROBE, Order 010-6056-03 \$45

P6057 6-ft PROBE, Order 010-6057-03 \$45
Both probes are available in a 9-ft version (same price).

P6061

The P6061 miniature, 10X Probe is recommended for the 7A15AN and 7A18N amplifiers. The input capacitance is adjustable to match a nominal capacitance of 20 pF. The input capacitance of the 3.5-foot probe is 9.5 pF.

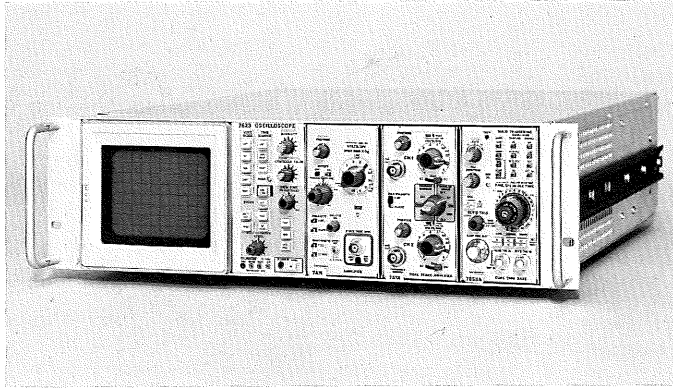
P6061 3.5-FT PROBE, Order 010-6061-01 \$38
Probe is available in 6-ft and 9-ft versions (same price).

For additional information on these or any other TEKTRONIX products please call your local TEKTRONIX Field Engineer or write:

Tektronix, Inc.

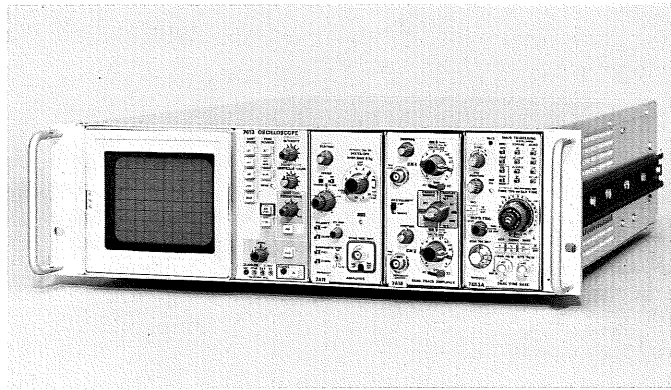
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TEKTRONIX FIELD OFFICES in principal cities throughout the world. Consult Telephone Directory

5¹/₄-INCH RACKMOUNTS

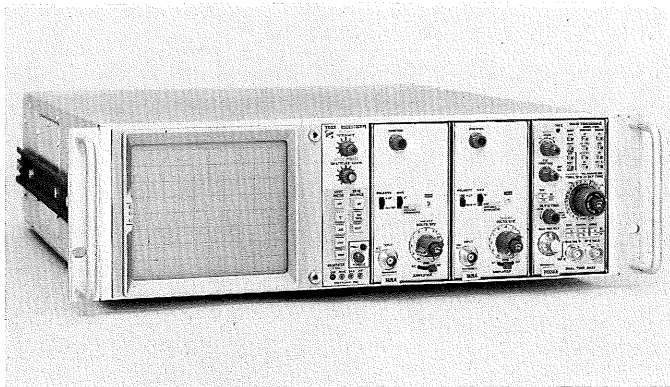
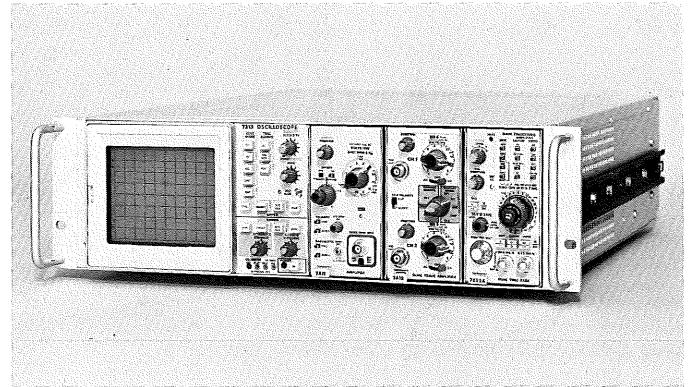


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STORAGE FAMILY



7600 FAMILY

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