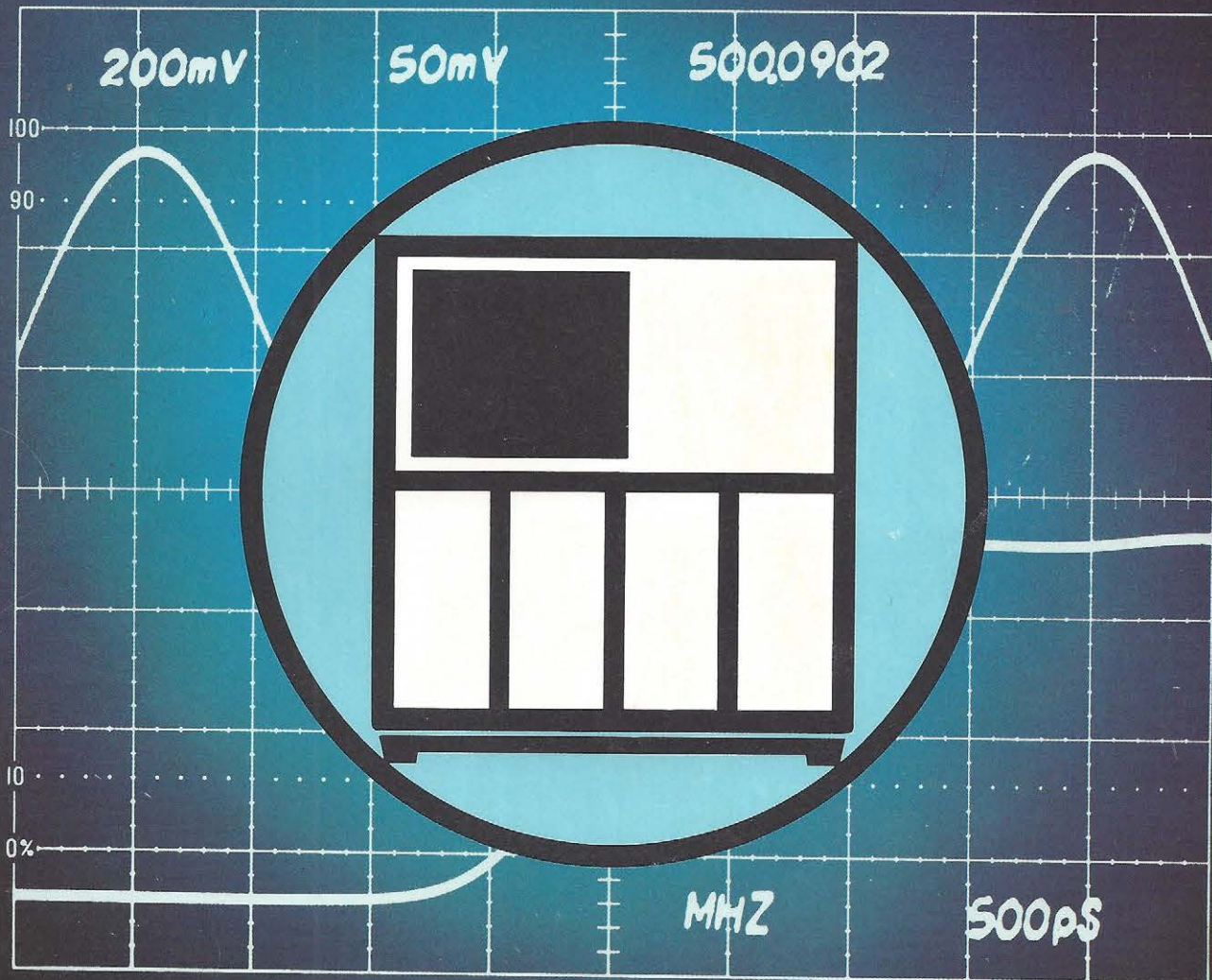


7000 series

...more than just an oscilloscope

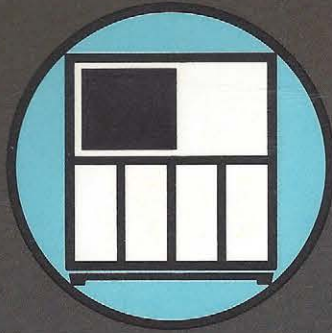


TEKTRONIX®

March 1973

TEKTRONIX 7000 Series

...more than just
an oscilloscope



Choose from:

Real-Time Bandwidths to 1 GHz

Storage

Multimode

Variable Persistence

Split-Screen Bistable

Digital Measurements

Universal Counter/Timer

525-MHz Direct Counter

Delay by Time or Events

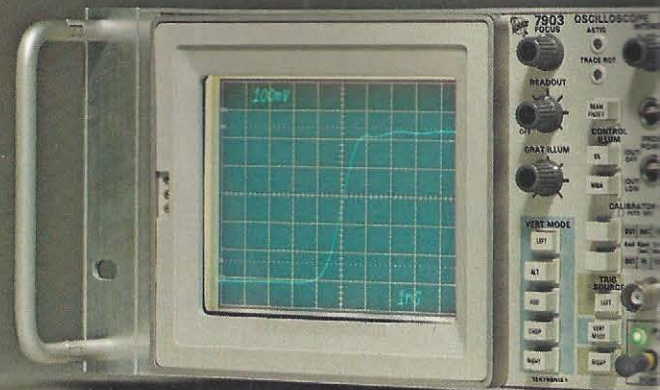
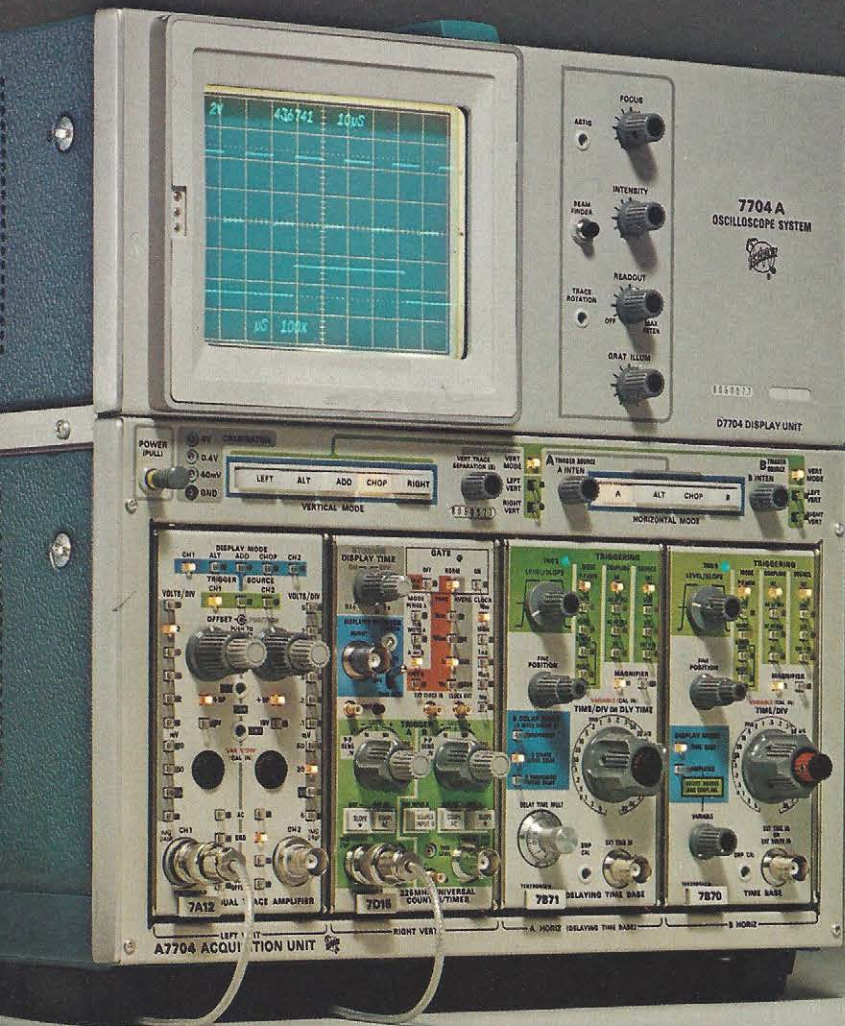
DMM with Temperature Capability

1.8-GHz Spectrum Analyzer

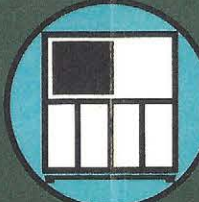
Sampling to 14 GHz

45-ps Risetime TDR

Curve Tracer

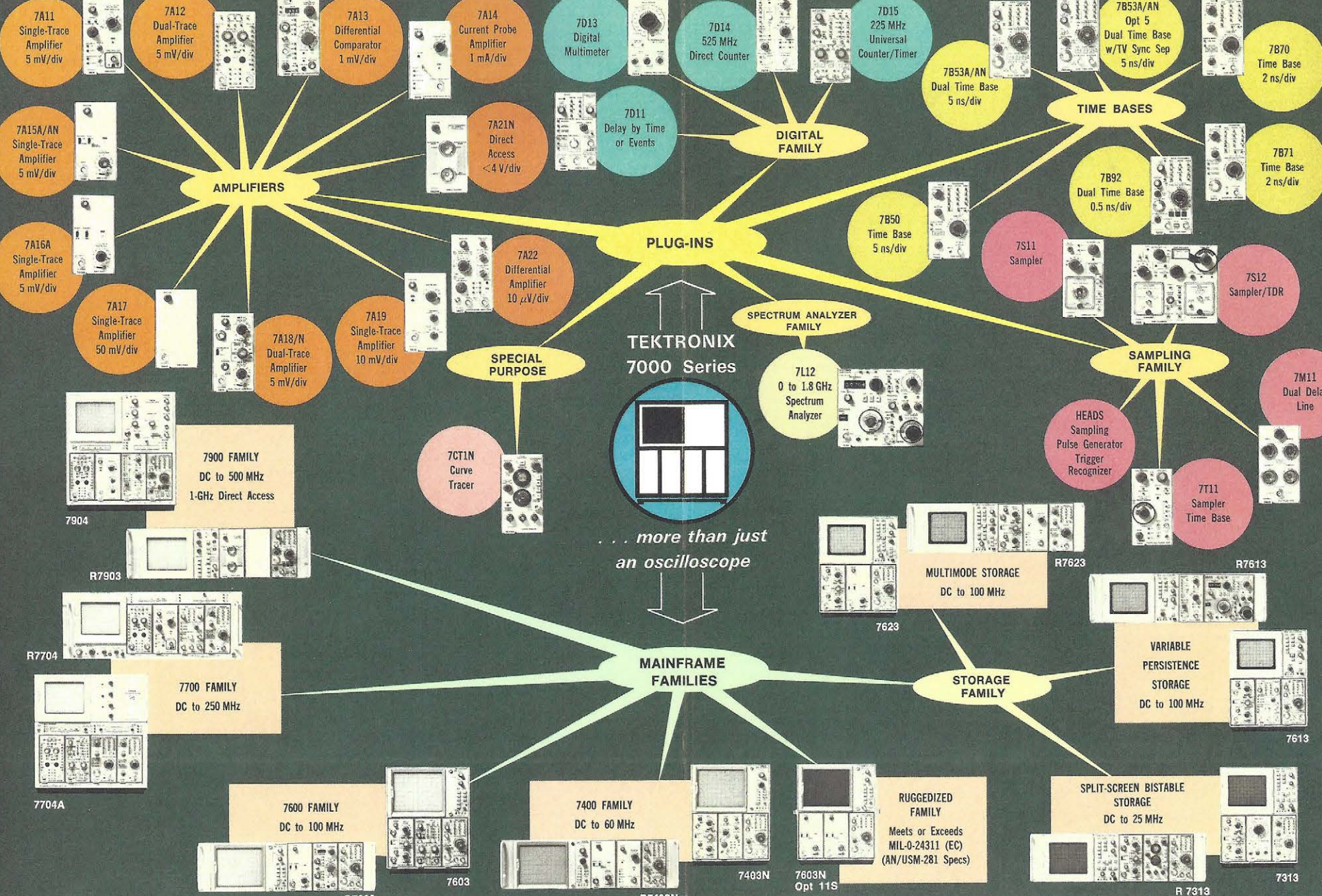


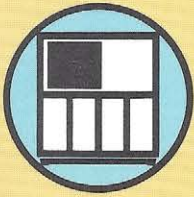
TEKTRONIX 7000 Series



... more than just an oscilloscope

MAINFRAME FAMILIES





Introduction

TEKTRONIX 7000 Series

Tektronix, Inc. has always sought to provide products and services which are superior—those which excel in today's technology and have the growth potential for the tomorrows. We believe that such criteria safeguards your instrument investment and works to our mutual best interests. The 7000-Series products and accessories described in this catalog meet this criteria. They offer more performance than any other general-purpose plug-in oscilloscope system available. And there is room for additional growth.

In developing the TEKTRONIX 7000 Series we pioneered many instrument concepts. Their implementation into the 7000 Series provides a degree of flexibility, versatility, and operating convenience not available in any other oscilloscope system. Yet, the 7000-Series prices are very competitive.

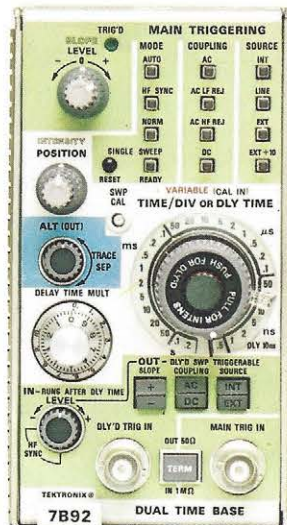
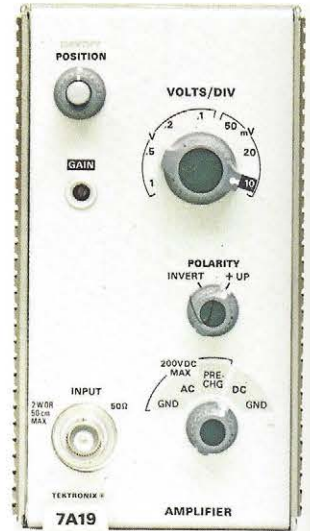
This new catalog completely describes the 7000 Series and tells why it is more than just an oscilloscope.

Please read the next 8 pages first. They describe the overall advantages and features of the TEK 7000 Series. Pages 13 thru 28 describe the Bandwidth and Application Families. The rest of the catalog details specifications for the mainframes, plug-ins and accessories.

We hope that this method of cataloging will make it easier for you to choose the 7000-Series products best suited to your applications.

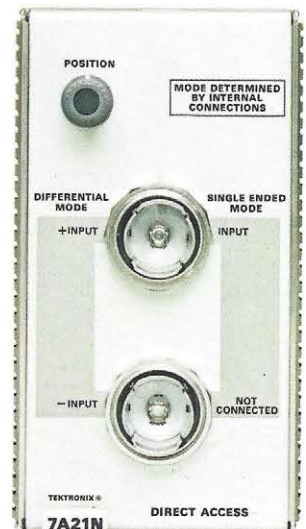
...more than just an oscilloscope...it is SUPERIOR PERFORMANCE IN REALTIME MEASUREMENTS

500 MHz The Single-Trace 7A19 Amplifier delivers the widest-real-time-bandwidth presently available when used in combination with either the 7904 or the 5¼-inch rack-mount R7903. A variable delay option for the 7A19 allows you to match the channel transit times (thru the probe and plug-in) to better than 50 ps.



500 ps The exceptionally fast sweep speed of the 7B92 matches the ultra-high bandwidth of the 7904/R7903 mainframes. Four display modes contribute more to the superior performance of the overall package. They are normal, intensified delaying sweep (controllable contrast), delayed sweep and alternate. Alternate mode, when selected, displays the main sweep with the intensified portion and the delayed waveform at the same time.

1 GHz Use the 7900 CRT up to its maximum bandwidth with the 7A21N. Install the simple vertical amplifier bypass cables and circuit boards and plug in the 7A21N. The 50-ohm input (single ended or differential) is directly coupled to the CRT for 20-kHz to 1-GHz BW with a 350-ps T_r . The deflection factor is less than 4 V/div. When using the 7A21N the Vertical Amplifier functions are bypassed and the CRT READOUT is inoperative.

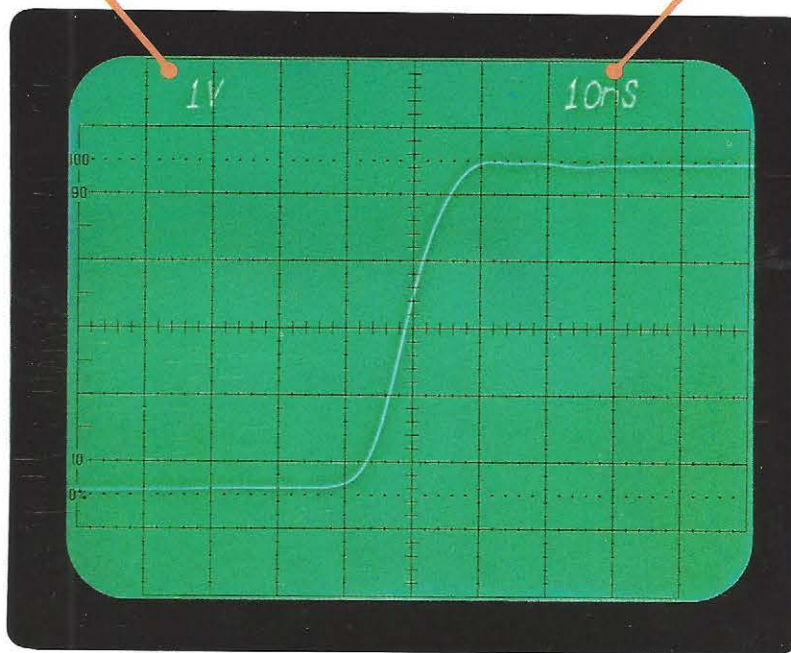


...more than just an oscilloscope...it gives you superior performance in storage

Vertical sensitivity of 1 V is conveniently stored along with the waveform.

Fast Stored Writing Speeds
Long View Times
Bright Displays
Extremely Burn Resistant CRT's

This fast-rise pulse is stored at a sweep speed of 10 ns/div (0.9 cm/div) or a writing speed of over 200 cm/ μ s.



7623 Multimode Storage Oscilloscope

TEKTRONIX 7000-Series Storage offers you excellent high-speed trace retention ability as exhibited by the display above. And, directly coupled to this fast storage ability are long display times, 10's of hours, even days if necessary. The displays are bright, too. Even under high ambient light conditions your display can easily be viewed. All TEKTRONIX Storage CRT's are extremely burn resistant, and no special operating precautions are necessary.

Choose from three types of storage: Multimode, Variable Persistence, and Split-Screen Bistable. Multimode storage has four modes of operation: fast bistable, variable persistence, bistable, and nonstore. The other two types also have a nonstore mode. All are available in either cabinet or rackmount mainframes, and are compatible with a large selection of plugs to fit most requirements.

The list of measurement requirements increases every day, and with it, TEKTRONIX 7000-Series storage oscilloscopes are solving more and more of these needs.

The storage oscilloscope's long display retention feature lets you: view a nonrecurrent signal, compare changes in a given signal with respect to time or environment, compare two or more signals occurring at different times or at different places, view low repetition rate signals without annoying flicker, and view very slowly moving traces so that the entire trace is displayed.

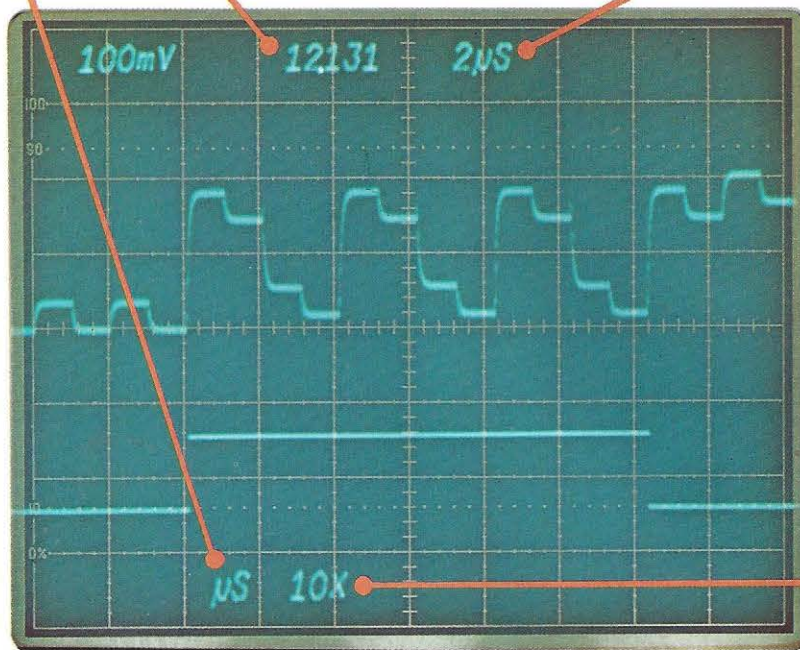
Moreover, storage oscilloscopes give advantages over conventional oscilloscopes not normally thought of. These include the ability to: view, in normal ambient light, a signal that otherwise would be too dim to see, view a noisy signal with an effectively reduced noise level, enhance other trace-recording techniques such as photographing the display, and (in many cases) even replace alternative recording techniques such as oscillographic recorders.

...more than just an oscilloscope. It's also a...

Universal Counter/Timer
525-MHz Direct Frequency Counter
Digital Multimeter with
Temperature Mode
Digital Delay by Time and Events

A 7D15 Universal Counter/Timer measures a time interval of $12.131 \mu\text{s}$, accurate to within 0.1%. (Lower trace is the counter's measurement interval.)

With a sweep speed of $2 \mu\text{s}/\text{div}$ you can compare the digital measurement with the analog display. However, the analog display accuracy is 2% while the digital measurement accuracy is 0.1%.



The 10X readout indicates the 7D15's measurement average. A range of 1X to 1000X averages are available in decade steps. Increasing the averages by a factor of 10 increases the accuracy a factor of 10.

TEKTRONIX 7000-Series digital plugins provide many unique and superior measurement capabilities for solving today's complex measurements. Together, with a 7000-Series mainframe, they give you the advantage of seeing what you're measuring and the accuracy of digital techniques.

Combining digital measurement capabilities with the 7000-Series mainframe brings you many advantages over separate test units:

- scope-controlled digital measurements
- see what you're counting
- measuring convenience and confidence
- increased accuracy
- easier and faster solutions to complex problems
- fewer dollars invested
- more bench working space
- signal conditioning

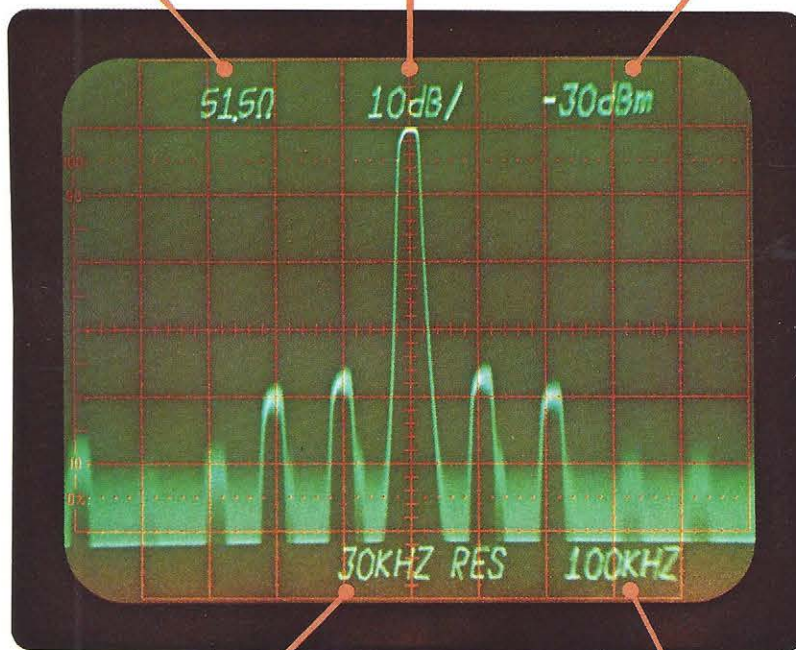
Add to these, the new dimension of scope-controlled measurements and you realize that the 7000 Series is more than just an oscilloscope.

...more than just an oscilloscope...it provides superior spectrum analyzer displays from 0 to 1800 MHz

7D13 Digital Multimeter
(extra plug-in)
measures 51.5 Ω
on a test termination

Y-axis calibration
10 dB per division

Reference level
at top line
-30 dBm



7623 Storage
Oscilloscope/7L12
Spectrum Analyzer

Resolution bandwidth
30 kHz

Frequency span
100 kHz per division

The photo above represents the high quality display a 7L12/7000-Series mainframe produces. The 7L12 combines with any 7000-Series mainframe to make an absolutely-calibrated spectrum analyzer.

Spurious free measurements are an outstanding ability of the 7L12. Products of intermodulation in the 7L12 are substantially more than 70 dB below full screen.

When the 7L12 is used in a four-plug-in compartment mainframe, you can employ both time & frequency-based displays simultaneously. This is a very powerful measurement system for measurements such as pulsed RF analysis.

The CRT READOUT located on the upper and lower portions of the CRT photo above is an extremely helpful measurement aid. It displays analyzer parameters, as well as others, right on the CRT where you see, measure and record your data.

The CRT... Superior Performance in Data Display

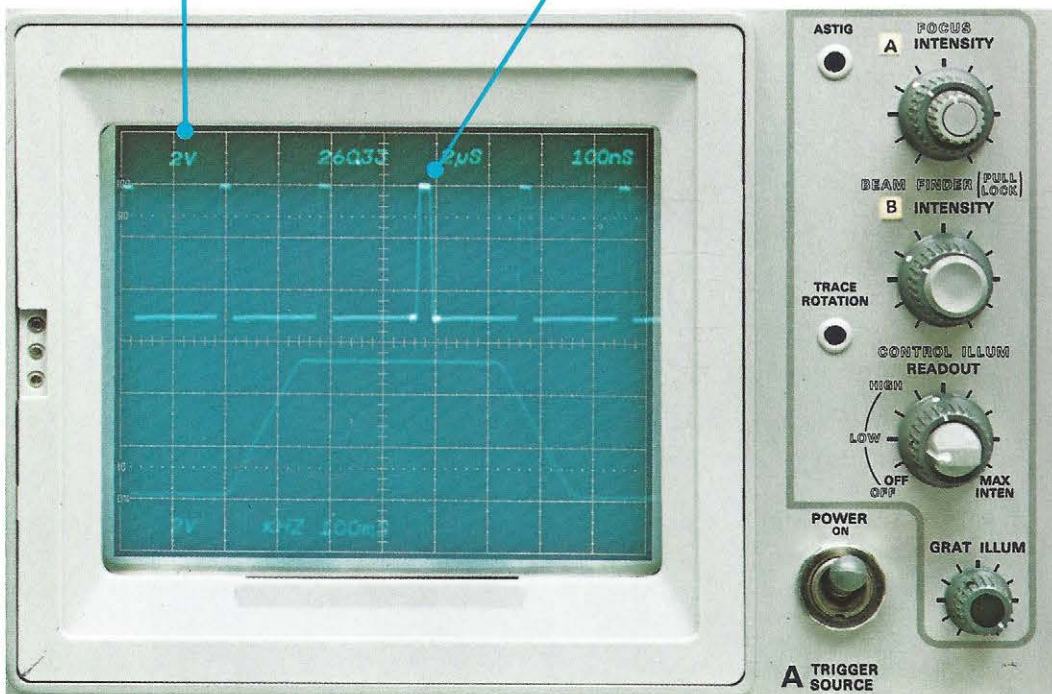
CRT READOUT really tells you the full story. It takes the guesswork out of oscilloscope measurements by displaying the measurement parameters right on the CRT. Look at it, photograph it, and you'll find that with CRT READOUT you can make your measurements a lot quicker, easier and with increased accuracy.

Bright Trace

The 7000-Series Oscilloscope CRT's are very bright and have excellent photographic writing speeds. For applications requiring maximum writing speeds most mainframes have an optional 4 cm x 5 cm reduced-scan CRT.

Large Display

The display area is 8 cm x 10 cm with a parallax-free, illuminated graticule. The 7603 and 7403N have a 10 cm x 12 cm area. The optional fast writing speed, reduced-scan CRT's have a 4 cm x 5 cm area.



Three intensity controls allow independent adjustment of "A" sweep, "B" sweep, and READOUT brightness. When making measurements, you adjust the intensity of each sweep to the level that's best for your applications.

Auto focus—after the focus is initially set, an auto-focus circuit reduces the need for additional manual adjustments assuring a focused trace with changes in intensity.

Adjustable graticule illumination means easier viewing and better photos.

Camera power and control signals are conveniently available. A standard bezel connector matches all TEKTRONIX C-50-Series Cameras and 7000-Series mainframes.

Operator convenience is a user's byword for the 7000 Series. All the display controls are aimed at one area, the CRT. Here everything is brought together and operation is made easier.

Wrong answers due to overlooked control settings are now passé. More speed, perception and convenience is realized because the CRT READOUT actively displays your measurement parameters.

Your measurement data is all put together on the CRT in a TEKTRONIX 7000-Series Oscilloscope.

The Mainframe... Superior Performance in Data Acquisition

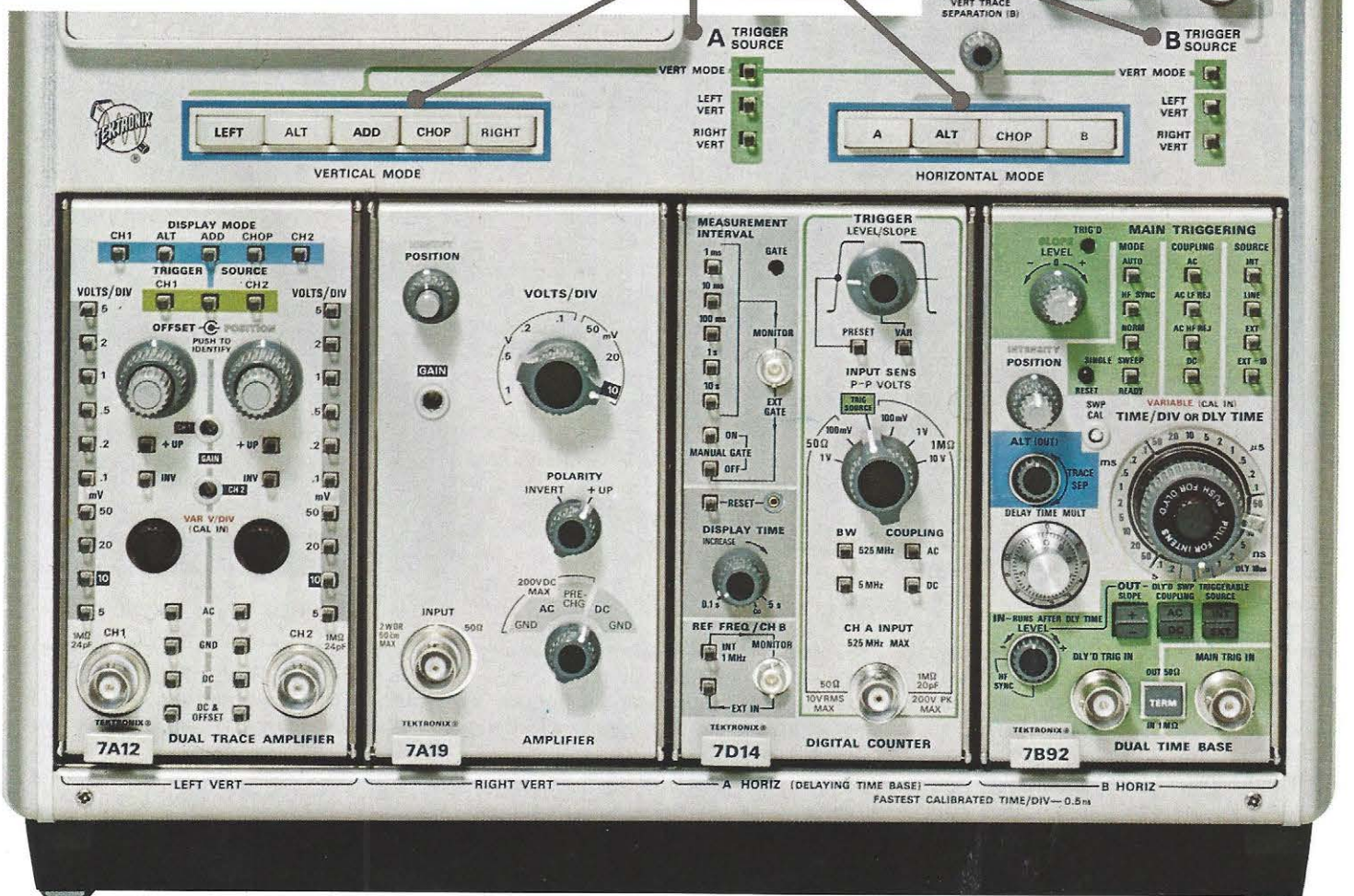
Flexibility begins with the mainframe, and the addition of the 7000-Series plug-in versatility results in more measurement solutions than offered by any other oscilloscope. Mainframe flexibility does not stop at the three- or four-hole configuration. There are also options for "customizing" your oscilloscope to specific measurement requirements.

Plug-in versatility is one more part of the 7000-Series saying, "more than just an oscilloscope." Now there are more than 30 plug-ins in the series. Each plug-in brings you a broad measurement capability and in combinations they offer the widest range of measurement solutions.

The Calibrator . . . a multi-function generator. A "standard" for calibrating plug-ins and compensating probes. Signal outputs are also available to use when a signal generator is not handy.

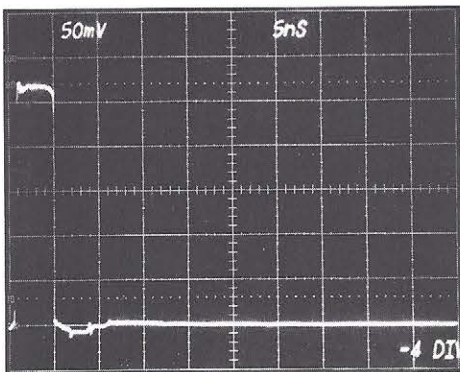
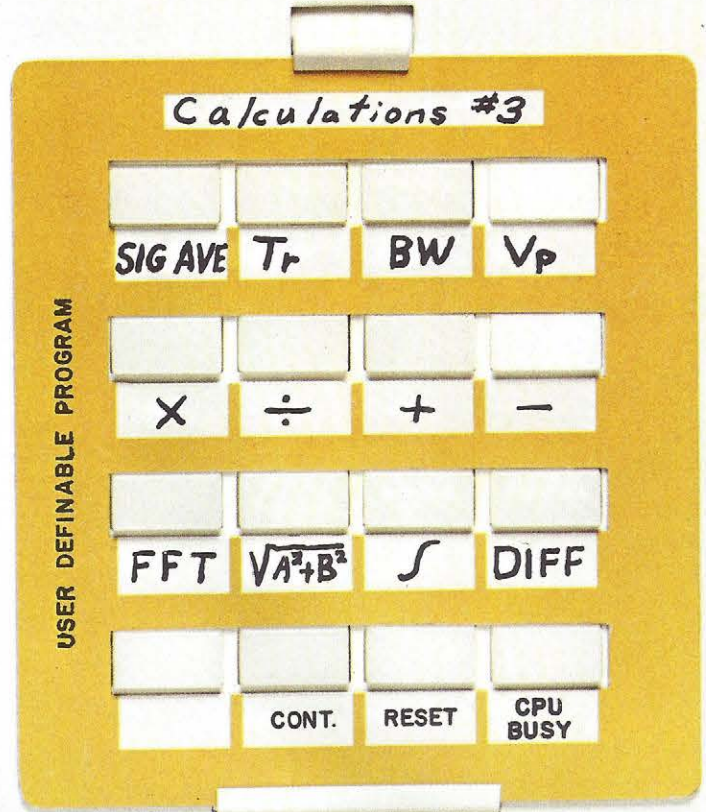
Internal trigger selection allows you to selectively pick the trigger source. In the VERT Mode, it eliminates the need to continually select the source, which is selected via the mainframe mode switching.

Easy display selection. Mainframe vertical and horizontal mode switching allows the user to choose two vertical plug-ins or two independent/slaved time bases. These combinations give you dual-beam simulation and wide selection of multi-trace performance options.



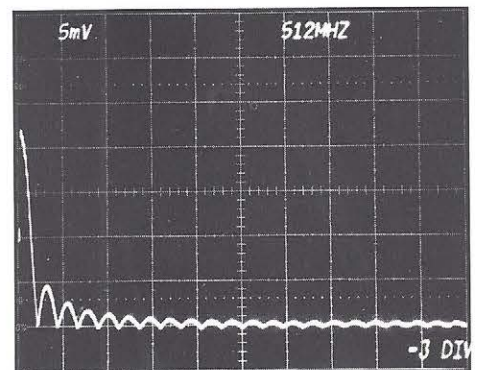
Your Choice Of Completely New Measurement Capabilities With The Digital Processing Oscilloscope

- ANY WAVEFORM ON THE DISPLAY MAY BE STORED IN MEMORY AND PROCESSED
- ALL STORED OR PROCESSED WAVEFORMS MAY BE DISPLAYED ON THE CRT
- PUSH-BUTTON ACCESS TO FULL COMPUTER PROCESSING POWER
- APPLICATION SOFTWARE INCLUDED
- MESSAGE DISPLAY—TWO LINES OF FORTY CHARACTERS
- FULL 7000-SERIES SIGNAL ACQUISITION CAPABILITIES
- FULL 7704A DISPLAY CAPABILITIES
- COMPATIBLE WITH EXISTING 7704A OSCILLOSCOPES



waveform #1

With the TEKTRONIX Digital Processing Oscilloscope you can perform nearly any type of calculation derived from your waveform. The User Definable Program above is only one of many programs that you can use for processing your waveforms.



waveform #2

The calculation and waveforms shown demonstrate how easy it is to simply push a button (that you preprogrammed) and display your results all in a matter of seconds.

Waveform #1 is a stored high-frequency pulse from a 7S12 TDR Sampling unit. Waveform #2 is the result of a Fast Fourier Transform (FFT) performed on waveform #1. Note: the horizontal scale factor on waveform #2 is 512 MHz/div (0 MHz represents left edge of CRT, 5.12 GHz represents right edge of CRT).

Processing... The 7000-Series Oscilloscope's New Link Between Acquisition And Display

Display Module—This portion is the top half of a 7704A Oscilloscope System. All data, digital and analog is displayed on its CRT.

Processing Module—This portion and its accompanying PDP-11/05 minicomputer (bottom of SCOPE-MOBILE® cart) along with included software, perform analog-to-digital conversions and mathematical operations on variables derived from your waveforms.

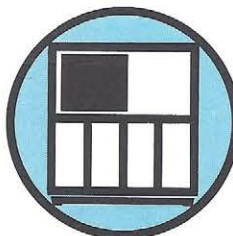
Acquisition Module—This portion is the lower half of the 7704A Oscilloscope System. All the 7000-Series plug-ins are compatible for signal acquisition, and greatly contribute to the vast measurement solving power of the Digital Processing Oscilloscope.



Just how significant is this new measurement capability? Very, Very significant, because if your variables in a calculation are obtained from waveforms on an oscilloscope, then the Digital Processing Oscilloscope will provide you with your answers. And, you get the advantages of speed, accuracy, lower-cost and convenience over alternate techniques. Often these advantages are so large that alternate techniques will not exist.

The waveform examples on the preceding page dramatize the before-and-after results you can achieve with push-button ease. How many calculations can be performed? We know for sure, that the amount is beyond our ability to count today.

*for complete information
on the Digital Processing Oscilloscope
check the reply card
next to inside back cover*

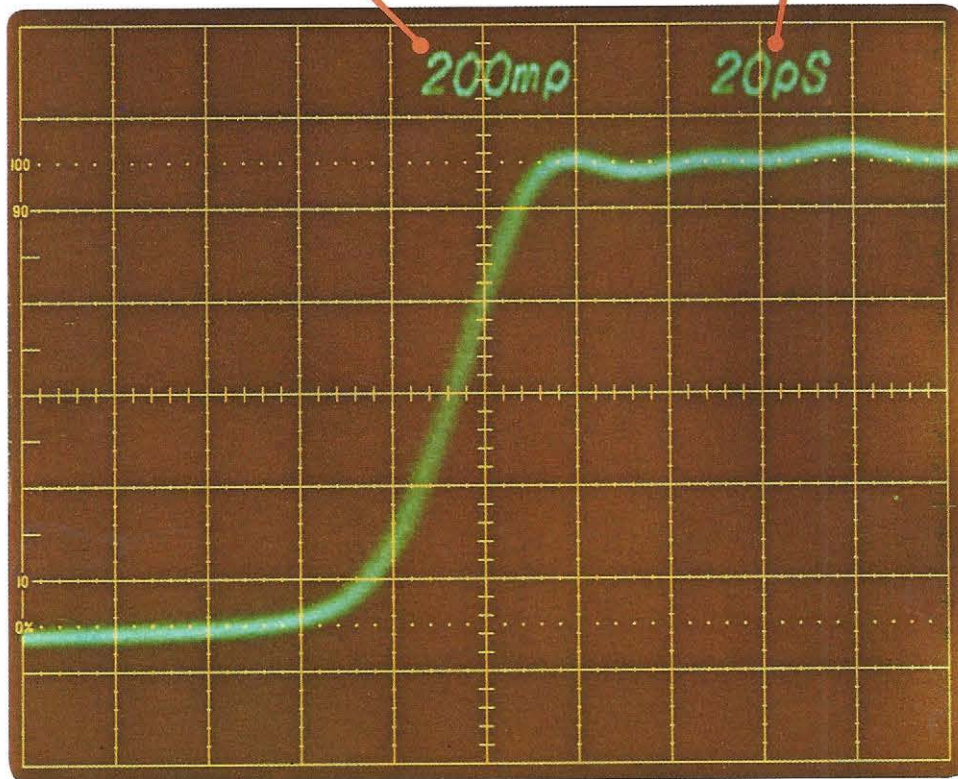


TEKTRONIX 7000 Series
... more than just an oscilloscope

...more than just an oscilloscope ...it gives you superior performance in sampling and high-resolution TDR

Vertical sensitivity is calibrated in either mV or mp (milli-rho).

Horizontal time is calibrated in μ S, ns or ps.



7S12 TDR with S-6 and S-52 heads

The waveform above was generated by an S-52 25-ps pulse generator head installed in the 7S12. An S-6 30-ps sampling head was installed in the other compartment of the 7S12 and used to display the incident pulse. The display is not smoothed.

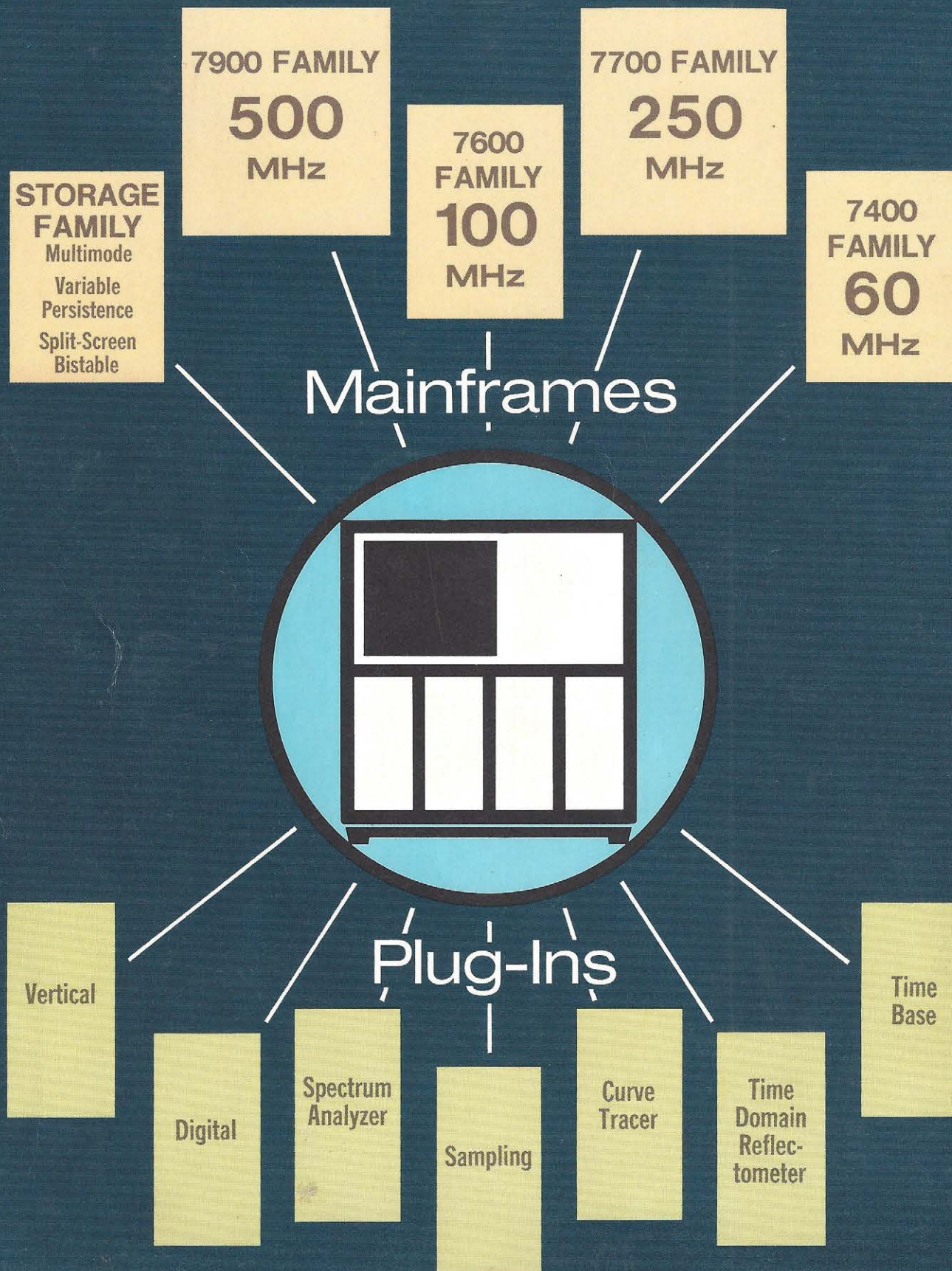
TEKTRONIX 7000-Series sampling plug-in units provide some unique and important measurement capabilities not available in other sampling oscilloscopes. Compared to conventional scopes, you can get better bandwidth, distortionless overscan, and the capability of chart records from your trace.

Also, consider these advantages compared to other sampling scopes:

- Low cost CRT for slow scans
- Random Mode; see leading edges without pretrigger or delay line
- Sampling and conventional at the same time
- Sampling Head Versatility
 - Wide choice, minimal cost
 - Dual trace if and only if you need it
 - Dual trace with different type heads
 - Extendable or plug-in

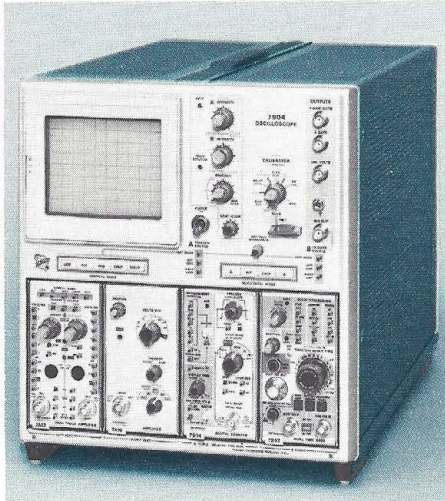
TEKTRONIX 7000 Series

...more than just an oscilloscope



7900-FAMILY OSCILLOSCOPES

7904 and R7903 500-MHz Oscilloscopes



7904 and R7903 — VERTICAL SYSTEM

Channels—Two left-hand plug-in compartments; compatible with all 7000-Series plug-ins. Bandwidth determined by mainframe and plug-in unit.

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

Chopped Mode—Repetition rate is approximately 1 MHz.

Trace Separation Range (dual-sweep modes)—The B trace can be positioned 4 div above or below the A trace.

Delay Line—Permits viewing leading edge of displayed waveform when using 7B70 and 7B90 sequence Time Bases.

7904 — HORIZONTAL SYSTEM

Channels—Two right-hand plug-in compartments; compatible with Time Bases of the 7B70 and 7B90 sequences. 7000-Series Vertical Amplifiers and Specialized plug-ins may also be used.

Fastest Calibrated Sweep Rate—500 ps/div with the 7B92.

Chopped Mode—Chopping rate is approx 200 kHz between two horizontal plug-in compartments.

X-Y Mode—PHASE SHIFT is within 2° from DC to 35 kHz without phase correction (DC to 1 MHz with phase correction opt 2) between vertical and horizontal channels. Bandwidth is DC to at least 1 MHz.

R7903 — HORIZONTAL SYSTEM

Single Channel—Right-hand plug-in compartment compatible with Time Bases of 7B70 and 7B90 sequences. 7000-Series Vertical Amplifiers and Specialized plug-ins may also be used.

Fastest Calibrated Sweep Rate—500 ps/div with the 7B92.

7904 and R7903 — CRT AND DISPLAY FEATURES

Standard—Internal 8 x 10 cm graticule with variable illumination.

Option 1, Without CRT READOUT—Deletes CRT READOUT.

Option 4, Maximum Brightness CRT—Internal 8 x 10 division (0.5 cm/div) graticule with variable illumination. Provides extremely high photographic and information writing speed and increases the visibility of low-amp-rate high-speed signals.

Option 8, Phosphor Change (P11)—Specify P11 when ordering.

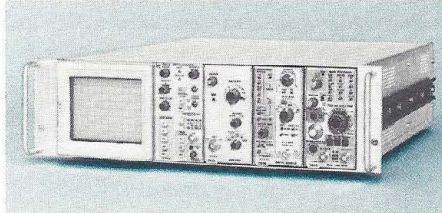
Option 10, Pulsed Graticule (R7903 only)—Provides a means of pulsing the graticule lights, at a preset level, coincident with a single shot event in one exposure. The graticule lights can be pulsed by the event, an external ground closure, or a front panel push button. If the mainframe is equipped with CRT READOUT, Opt 10 provides additional controls and inputs for CRT READOUT pulsed operation.

Accelerating Potential—24 kV.

Phosphor—P31 standard.

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

CRT	WRITING SPEED cm/ns				CAMERA	LENS
	P31		P11			
	10,000 ASA	3000 ASA	10,000 ASA	3000 ASA		
Standard 8 X 10 cm	2.8	1.4	6.1	3.1	C-51-R	f/1.2 1:0.5
	1.1	0.6	2.6	1.3	C-52-R	f/1.4 1:1
Option 4 4 X 5 cm	5.0	2.5	10.0	5.0	C-51-R	f/1.2 1:0.5
	2.0	1.0	4.3	2.1	C-52-R	f/1.4 1:1



The R7903 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.

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.

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.

7904 — CALIBRATOR

Output Waveshape—Rectangular positive-going from ground, 1 kHz or DC.

Voltage Ranges—4 mV, 40 mV, 0.4 V, 4 V into an open circuit; 2 mV, 20 mV, 0.2 V, 0.4 V into 50 Ω.

Current Output—40 mA DC or 1 kHz.

R7903 — CALIBRATOR (Not available with Opt 10)

Output Waveshape—Rectangular positive-going from ground, 1 kHz.

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 connected to calibrator output, output R is 450 Ω.

7904 — 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 approx 950 Ω.

+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. Rise time is 5 ns or less into 50 Ω, output R is approx 950 Ω.

Sig Out—Selected by B 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 the 7900 FAMILY Vertical Systems Specifications Chart. Output R is approx 950 Ω.

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 provide correct operating voltages for two active probes.

R7903 — 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 approx 950 Ω.

+Gate—Positive-going rectangular waveform derived from Main or Aux Gate. Output voltage 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 approx 950 Ω.

Sig Out—Selected by TRIGGER SOURCE switches. Output voltage is 25 mV/div ±10% into 50 Ω, 0.5 V/div ±10% into 1 MΩ. The bandwidth depends on the vertical plug-in. See the 7900 FAMILY Vertical Systems Specifications Chart. Output R is approx 950 Ω.

Single Sweep Ready Indicator—+5 V, rear panel BNC output, for single-sweep ready indication.

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

CRT READOUT, Single Shot—Ground closure, rear panel BNC input initiates one frame of CRT READOUT. Not available with Option 10.

CRT READOUT, Inhibit—Ground closure, rear panel BNC input locks out CRT READOUT. Not available with Option 10.

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 front-panel connectors provide correct operating voltages for two active probes. Not available for R7903 Opt 10.

R7903 — OUTPUTS/INPUTS OPTIONS

Option 10, Pulsed Graticule—CRT READOUT Single-Shot input, CRT READOUT Inhibit input, Calibrator, and Probe Power are deleted. Single-Shot Graticule and CRT READOUT (ground closure) rear panel BNC input is added. Initiates one frame of CRT READOUT and pulses graticule. CRT READOUT inputs are not functional with Option 1.

POWER REQUIREMENTS

7904 Power Requirements—Like voltage ranges, 90 to 132 V AC and 180 to 264 V AC. Line frequency, 48 to 440 Hz. Max power consumption, 190 W, 2.5 A at 115 V line, 60 Hz.

R7903 Power Requirements—Line voltage ranges, 90 to 132 V AC and 180 to 264 V AC. Line frequency, 48 to 440 Hz. Max power consumption, 160 W, 2 A at 115 V line, 60 Hz.

DIMENSIONS AND WEIGHTS

DIMENSIONS	HEIGHT		WIDTH		LENGTH	
	in	cm	in	cm	in	cm
7904	13.5	34.2	12.0	30.5	23.3	59.0
R7903	5.25	13.5	19.0	48.3	22.8	57.9
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
7904	32.0	14.5	52.0	23.5	63.0	28.6
R7903	27.0	12.3	42.8	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

7904 Included Accessories—Test adaptor (012-0092-00); two 18-inch test leads (012-0087-00); 9-pin cable-mount plug (134-0049-00).

R7903 Included Accessories—Jack, BNC-post (012-0092-00); two 18-inch patch cords (012-0087-00); rackmounting hardware.

7904 ORDERING INFORMATION (Plug-ins not included)

7904 OSCILLOSCOPE \$2900

7904 OPTIONS

Option 1 W/O CRT READOUT Sub \$400
 Option 2 X-Y HORIZ COMP Add \$75
 Option 3 EMI MODIFICATION Add \$75
 Option 4 MAX BRIGHTNESS CRT Add \$350
 Option 8 PHOSPHOR CHANGE (P11) No Charge

7904 CONVERSION KITS

040-0605-01 CRT READOUT \$400
 040-0606-00 X-Y HORIZ COMP \$75
 040-0570-00 EMI MODIFICATION \$95

R7903 ORDERING INFORMATION (Plug-ins not included)

R7903 OSCILLOSCOPE \$2900

R7903 OPTIONS

Option 1 W/O CRT READOUT Sub \$400
 Option 3 EMI MODIFICATION Add \$75
 Option 4 MAX BRIGHTNESS CRT Add \$350
 Option 8 PHOSPHOR CHANGE (P11) No Charge
 Option 10 PULSED GRATICULE Add \$100

R7903 CONVERSION KITS

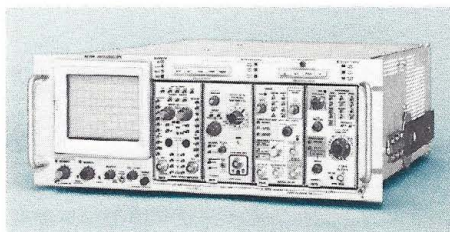
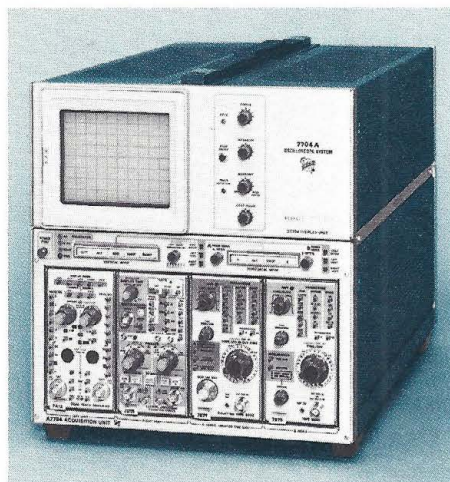
040-0605-01 CRT READOUT \$400
 040-0647-00 EMI MODIFICATION \$100

U.S. Sales Prices FOB Beaverton, Oregon



7700-FAMILY OSCILLOSCOPES

250-MHz Oscilloscope System 7704A



The R7704 requires 7 inches of rack height and is the only four-plug-in rackmount oscilloscope available today; it offers 175 MHz bandwidth.

Minimum Photographic Writing Speed—Using Polaroid¹ film without film fogging. Can be increased by using the TEKTRONIX Writing Speed Enhancer.

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 7700-FAMILY Vertical System Specification Chart.

Option 9 Bandwidth Change (250 MHz)—7704A vertical circuit performance is adjusted to extend frequency response to 250 MHz (upper -3 dB) when 7A19 is used. Provides additional performance for those working in the frequency domain.

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

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

HORIZONTAL SYSTEM

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

Fastest Calibrated Sweep Rate—2 ns/div with 7B70, 7B71 or 7B92.

Chopped Mode (between horizontal plug-ins)—7704A, repetition rate is internally selectable, approx 20 kHz or 200 kHz; R7704, fixed approx 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 2, X-Y Horizontal Compensation (R7704 only)—Provides phase shift compensation to less than 2° from DC to 2 MHz.

CRT

Standard—Internal 8x10-cm graticule with variable illumination. Accelerating potential is 24 kV with P31 phosphor standard.

Option 1, Without CRT Readout—Deletes CRT READOUT.

Option 4, Maximum Brightness CRT (7704A only)—Internal 4x5-cm graticule with variable illumination. Accelerating potential is 24 kV with P31 phosphor standard. This provides extremely high photographic and information writing speed and increases the visibility of low rep rate high speed signals.

Option 8, Phosphor Change (P11)—Specify P11 when ordering.

MAINFRAME	WRITING SPEED cm/ns				CAMERA	LENS
	P31		P11			
7704A R7704 8 x 10 cm	10,000 ASA	3000 ASA	10,000 ASA	3000 ASA	C-51-R	f/1.2 1:0.5
	2.8	1.4	5.3	2.7		f/1.4 1:1
	1.1	0.6	2.2	1.1		f/1.2 1:0.5
7704A Option 4 4 x 5 cm	5.0	2.5	10.0	5.0	C-51-R	f/1.2 1:0.5
	2.0	1.0	4.3	2.2	C-52-R	f/1.4 1:1

¹Registered Trademark Polaroid Corporation.

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.

External Z-Axis Input (7704A only)—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.

External Z-Axis Inputs (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%. Maximum 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 60 V; 60 V P-P for full intensity range from DC to 100 MHz. A positive signal blanks the trace; input R is 18 kΩ within 20%. Maximum 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 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. 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 (±10%) into 50 Ω, 0.5 V/div (±10%) into 1 MΩ. The bandwidth depends upon vertical plug-in; see 7700-FAMILY Vertical System Specification Chart. Output R is 950 Ω nominal.

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

Option 7, Without Signals Outputs/Inputs (7704A only)—Deletes previously described Outputs/Inputs and External Z-Axis Input.

Camera Power—Three-contact 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 1 of 7704A.

CALIBRATOR

Voltage Output—Rectangular waveshape, positive-going from ground. (40 V and 40 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 approx 1 kHz.

Current Output—40 mA rectangular waveshape with 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 5, Line Frequency Change (50 - 400 Hz)—Converts the R7704 to 50 - 400 Hz operation (not required for 7704A).

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

DIMENSIONS	HEIGHT		WIDTH		LENGTH	
	in	cm	in	cm	in	cm
7704A	13.6	34.5	12.0	30.6	22.7	57.7
R7704	7.0	17.8	19.0	48.2	22.4	56.9
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
7704A	30.0	13.6	50.0	22.7	61.0	27.6
R7704	44.0	20.0	59.0	27.0	79.0	36.0
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 7704A: 20-inch cable, two-pin-to-BNC, (175-1178-00). For R7704: 42-inch BNC 50-Ω cable (012-0057-01); 20-inch cable, two-pin-to-BNC, 175-1178-00; current-loop adapter, (012-0259-00); rackmounting hardware.

ORDERING INFORMATION

(Plug-ins not included)

7704A OSCILLOSCOPE	\$2400
R7704 OSCILLOSCOPE	\$2650

7704A OPTIONS

Option 1	W/O CRT READOUT (W/O Probe Power)	Sub \$400
Option 3	EMI MODIFICATION	Add \$75
Option 4	MAX BRIGHTNESS CRT	Add \$350
Option 7	W/O SIG OUT/IN	Sub \$50
Option 8	PHOSPHOR CHANGE (P11)	No Charge
Option 9	BANDWIDTH CHANGE (250 MHz)	No Charge

7704A OPTIONS

Option 1	W/O CRT READOUT	Sub \$400
Option 2	X-Y HORIZ COMP	Add \$75
Option 3	EMI MODIFICATION	Add \$75
Option 5	LINE FREQ CHANGE (50 - 400 Hz)	Add \$50
(Not required for 7704A)		
Option 8	PHOSPHOR CHANGE (P11)	No Charge

7704A CONVERSION KITS

040-0613-00	CRT READOUT	\$400
040-0612-00	EMI MODIFICATION	\$95
040-0619-00	SIG OUT/IN	\$50

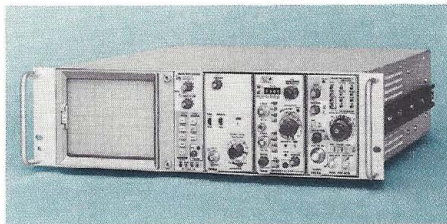
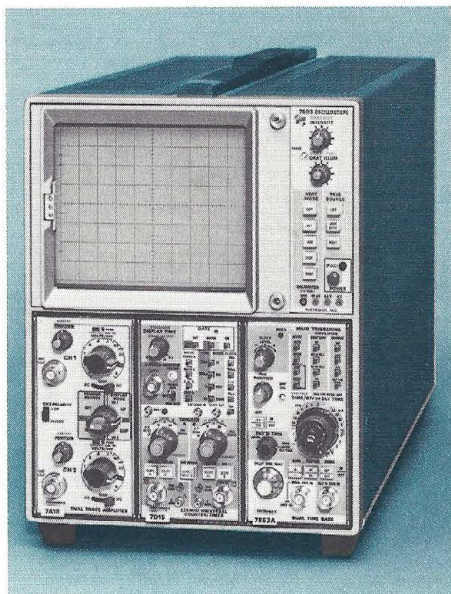
R7704 CONVERSION KITS

040-0533-01	CRT READOUT	\$400
040-0529-00	X-Y HORIZ COMP	\$75
040-0562-00	EMI MODIFICATION	\$100

U.S. Sales Price FOB Beaverton, Oregon

7600-FAMILY OSCILLOSCOPES

7603 100-MHz Oscilloscope



The R7603 requires only 5 1/4 inches of rack height in a standard 19-inch rack. It is fan-cooled and comes complete with slide-out chassis tracks.

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 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.

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% ($\pm 15^\circ\text{C}$ to $\pm 35^\circ\text{C}$); 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 (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.

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.

Note—All 7000-Series plug-ins with lighted push-buttons do not light in the vertical or horizontal compartments.

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 7B53A or 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 1, Without CRT READOUT—Deletes CRT READOUT.

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

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

Minimum Photographic Writing Speed—Using Polaroid* film without film fogging. Can be increased by using the TEKTRONIX Writing Speed Enhancer.

MAINFRAME	WRITING SPEED cm/ μ s				CAMERA	LENS
	P31		P11			
	10,000 ASA	3000 ASA	10,000 ASA	3000 ASA		
Standard 8 X 10 div (1.22 cm/div)	980	490	1320	660	C-51-R	1/1.2 1:0.5
	180	90	245	125		C-69-R
Option 4 8 X 10 cm	1500	750	2000	1000	C-51-R	1/1.2 1:0.5
	300	150	400	200		C-69-R

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.

*Registered Trademark Polaroid Corporation

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 337-1700-01, Clear 337-1700-04). The R7603 includes rackmounting hardware.

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

040-0654-00 CRT READOUT	\$400
040-0662-00 EMI MODIFICATION	\$75
040-0629-00 SIG OUT/IN	\$50

R7603 CONVERSION KITS

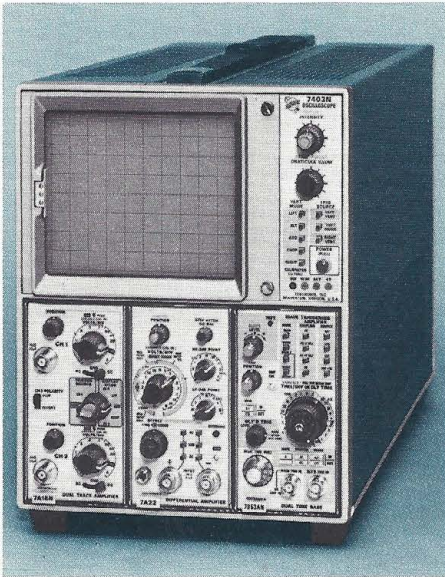
040-0654-00 CRT READOUT	\$400
040-0632-00 EMI MODIFICATION	\$75
040-0633-00 SIG OUT/IN	\$50

U.S. Sales Prices FOB Beaverton, Oregon



7400-FAMILY OSCILLOSCOPES

60-MHz Oscilloscope 7403N



VERTICAL SYSTEM

Channels—Two left-hand plug-in compartments; compatible with all 7000-Series plug-ins (except Digital plug-ins). Bandwidth determined by mainframe and plug-in unit, see 7400 FAMILY Vertical System Specification chart.

Note—All 7000-Series plug-ins with lighted push-buttons do not light in the vertical or horizontal compartments.

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 (except Digital Plug-ins).

Internal Trigger Modes—LEFT VERT, VERT MODE, RIGHT VERT.

Fastest Calibrated Sweep Rate—5 ns/div.

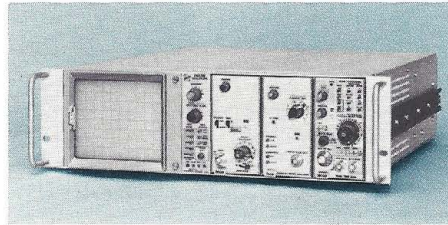
X-Y Mode—The phase shift between vertical and horizontal channels is 2° from DC to 35 kHz. Bandwidth is at least 2 MHz.

CRT

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.

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



The R7403N 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.

Minimum Photographic Writing Speed—Using Polaroid® film without film fogging. Can be increased by using the TEKTRONIX Writing Speed Enhancer.

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

Beam Finder—Limits display within graticule area.

EXTERNAL Z-AXIS INPUT

2V 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.

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.

*Registered Trademark Polaroid Corporation

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 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 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 ±10%; internally selectable with quick-change jumpers.

Line Frequency—48 Hz to 440 Hz (7403N), 48 Hz to 66 Hz (R7403N).

Option 5, Line Frequency Change (48 - 440 Hz)—Converts the R7403N to 48-440 Hz operation (not required for 7403N).

Max Power Consumption—130 Watts, 2.0 Amps at 115 V line, 60 Hz (7403N); 168 Watts, 2.1 Amps at 115 line, 60 Hz (R7403N). Cooling is provided by a fan for the rackmount version.

DIMENSIONS AND WEIGHTS

	7403N		R7403N	
	In	cm	In	cm
HEIGHT	11.4	28.9	5.25	13.3
WIDTH	8.7	22.1	19.0	48.2
LENGTH	24.0	60.9	24.7	62.9
	lb	kg	lb	kg
NET WEIGHT	30.0	13.6	30.0	13.6
DOMESTIC SHIPPING WEIGHT	≈42.0	≈19.0	≈42.0	≈19.0
EXPORT-PACKED WEIGHT	≈55.0	≈25.0	≈55.0	≈25.0

Included Accessories—20-inch cable (two-pin-to-BNC) (175-1178-00); The R7403N includes rackmounting hardware.

ORDERING INFORMATION

(Plug-ins not included)

7403N OSCILLOSCOPE \$950
R7403N OSCILLOSCOPE \$1050

7403N OPTIONS

Option 4 MAX BRIGHTNESS CRT Add \$75
Option 8 PHOSPHOR CHANGE (Specify) No Charge
(P1, P2, P7, P7/SA, P11 Available)

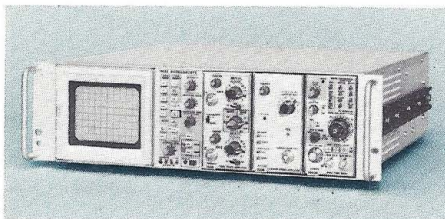
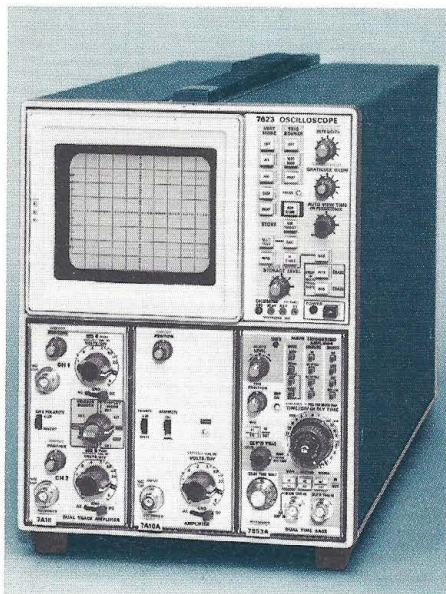
R7403N OPTIONS

Option 4 MAX BRIGHTNESS CRT Add \$75
Option 5 LINE FREQ CHANGE (48 - 440 Hz) Add \$50
(Not required for 7403N)
Option 8 PHOSPHOR CHANGE (Specify) No Charge
(P1, P2, P7/SA, P11 Available)

U.S. Sales Prices FOB Beaverton, Oregon

7000-SERIES STORAGE FAMILY

7623 Multimode Storage Oscilloscope



The R7623 requires only 5 1/4 inches of rack height in a standard 19-inch rack. It is fan-cooled and comes complete with slide-out chassis tracks.

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 additional displays, also extends viewing time in variable persistence mode.

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 useful 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°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	62.8
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	30.0	13.6	42.0	19.0	55.0	25.0
R7613, R7623	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

040-0656-00 CRT READOUT \$400
040-0662-00 EMI MODIFICATION \$75
040-0629-00 SIG OUT/IN \$50

R7623 CONVERSION KITS

040-0656-00 CRT READOUT \$400
040-0632-00 EMI MODIFICATION \$75
040-0633-00 SIG OUT/IN \$50

U.S. Sales Prices FOB Beaverton, Oregon

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 Storage FAMILY Vertical System Specification Chart.

Note—All 7000-Series plug-ins with lighted push-buttons do not light in the vertical or horizontal compartments.

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.

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 1, Without CRT Readout—Deletes CRT READOUT.

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, deraled toward display edges.

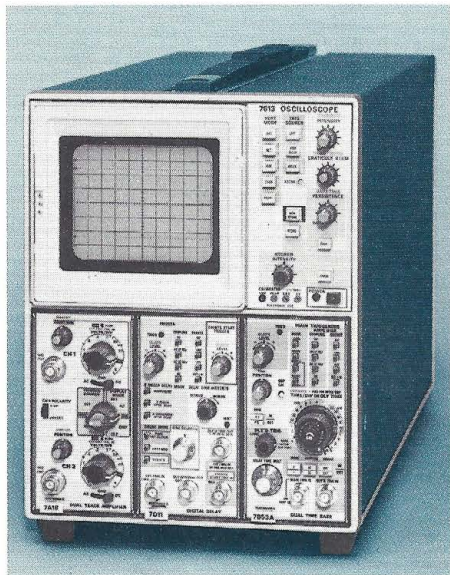
**May be extended by selecting SAVE mode.

Persistence—(Variable Persistence mode only) Continuously variable, persistence may be turned off when not needed.



7000-SERIES STORAGE FAMILY

Variable Persistence Storage Oscilloscope 7613



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.

Note—All 7000-Series plug-ins with lighted push-buttons do not light in the vertical or horizontal compartments.

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.

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 1, Without CRT Readout—Deletes CRT READOUT.

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.

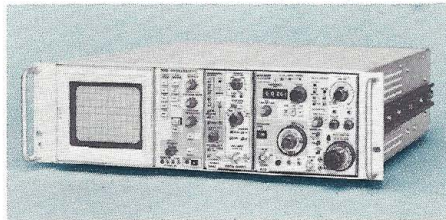
Phosphor—P31.

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 additional displays, also extends viewing time in variable persistence mode.



The R7613 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.

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, 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 . Rise time 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% ($+15^\circ\text{C}$ to -35°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

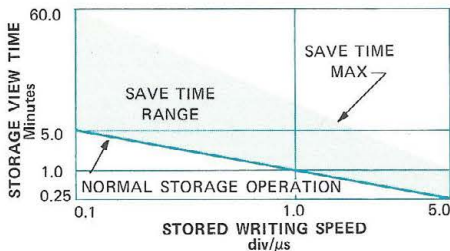
7613 CONVERSION KITS

040-0656-00 CRT READOUT	\$400
040-0662-00 EMI MODIFICATION	\$75
040-0629-00 SIG OUT/IN	\$50

R7613 CONVERSION KITS

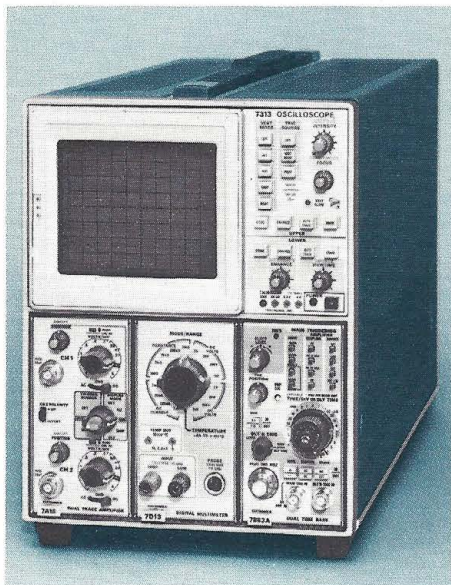
040-0656-00 CRT READOUT	\$400
040-0632-00 EMI MODIFICATION	\$75
040-0633-00 SIG OUT/IN	\$50

U.S. Sales Prices FOB Beaverton, Oregon



7000-SERIES STORAGE FAMILY

7313 Bistable Storage Oscilloscope



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.

Note—All 7000-Series plug-ins with lighted push-buttons do not light in the vertical or horizontal compartments.

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.

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) graticule with variable illumination. 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.

Phosphor—P1.

Stored Writing Speed—Normal, 500 div/ms; adjustable to at least 5000 div/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.

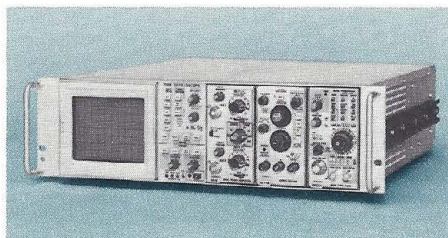
Enhance Mode—Controls single-sweep writing capabilities of the storage CRT. Up to 5000 cm/ms or better can be stored with minimal loss of resolution and contrast.

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.



The R7313 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.

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°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 440 Hz (7313), 50 Hz to 60 Hz (R7313).

Option 5, Line Frequency Changes (50 - 440 Hz)—Converts the R7313 to 50 - 440 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.

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. 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.

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 (Light Green 378-0625-08). 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 - 440 Hz)	Add \$100
(Not required for 7313)	
Option 7 W/O SIG OUT/IN	Sub \$50

7313 CONVERSION KITS

040-0655-00 CRT READOUT	\$400
040-0664-00 EMI MODIFICATION	\$75
040-0629-00 SIG OUT/IN	\$50

R7313 CONVERSION KITS

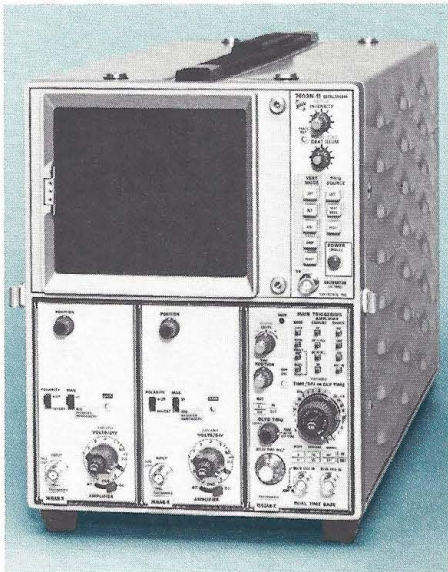
040-0655-00 CRT READOUT	\$400
040-0632-00 EMI MODIFICATION	\$75
040-0633-00 SIG OUT/IN	\$50

U.S. Sales Prices FOB Beaverton, Oregon



RUGGEDIZED OSCILLOSCOPE SYSTEM

7603N Option 11S



ENVIRONMENTAL

Temperature—Nonoperating —62°C to +75°C, operating —28°C to +65°C.

Humidity—0 to 95% RH over entire temperature range, operating or nonoperating.

Altitude—Nonoperating sea level to 50,000 feet, operating sea level to 15,000 feet.

Vibration (operating)—5 to 15 Hz at 0.060 inches ±0.012 inches P-P amplitude, 16 to 25 Hz at 0.040 inches ±0.008 inches P-P amplitude, 26 to 33 Hz at 0.020 inches ±0.004 inches P-P amplitude.

Shock (operating)—9 consecutive 400 pound hammer blows without failure from 1, 3 and 5 feet in vertical, horizontal, and longitudinal axis as per MIL-S-901 for Grade A, Class 1, Type A for lightweight equipment.

Inclination (operating)—As per MIL-E-16400.

Drizzleproof (nonoperating)—As per MIL-STD-198.

Salt Spray (nonoperating)—As per MIL-E-16400.

Electromagnetic Interference—As per MIL-STD-462 performed by MIL-STD-461 for the following tests:

CE01	30 Hz to 20 kHz	Power lead emission
CE03	20 kHz to 50 MHz	Power lead emission
CS01	30 Hz to 50 kHz	Power lead, radiation susceptibility
CS02	50 kHz to 400 MHz	Power lead, radiation susceptibility
CS06	Spike Test	Power lead, spike susceptibility
RE01	30 Hz to 30 kHz	Instrument radiation, magnetic
RE02	14 kHz to 10 GHz	Instrument radiation, electric
RS01	30 Hz to 30 kHz	Instrument susceptibility, magnetic
RS03	14 kHz to 10 GHz	Instrument susceptibility, electric

Reliability—Optimum performance and reliable service is provided during continuous or interrupted operation. The MIL-0-24311(EC) MTBF requirement of greater than 600 hours is met as tested under the following conditions: Temperature +40°C ±2°C; Relative Humidity 70% ±5%; Vibration 25 Hz at 0.040 inches ±0.008 inches P-P amplitude for 10 minutes of each "Power On" hour during each day of the 8-hour manned schedule; Power cycled at 4-hour intervals with 10 minutes power off for each 4-hour period of the manned test schedule. An MTBF of greater than 2000 hours was actually achieved during testing.

VERTICAL SYSTEM

(Includes two 7A15AN Option 11 plug-ins)

Channels—Two left-hand plug-in compartments, with a delay line which allows the leading edge of displayed waveform to be viewed. All 7000-Series plug-ins are compatible (except those which require CRT READOUT).

Display Modes—LEFT, ALT, ADD, CHOP, RIGHT. Chopped frequency is approx 1 MHz. Added mode displays signals algebraically with a CMRR of 20:1 to 25 MHz.

Bandwidth/Sensitivity—DC to 65 MHz from 5 mV/div to 10 V/div, accuracy within 2%, variable extends to 25 V/div. Maximum sensitivity is 0.5 mV at 10 MHz with X10 gain. AC coupling lower -3 dB point is less than 2 Hz. Risettime is 7 ns with less than 2% aberrations.

Input R and C—1 MΩ within 2%, less than 27 pF.

Max Input Voltage—400 V (DC + Peak AC).

DC Stability—Less than 1 div/hr drift at 25°C.

HORIZONTAL SYSTEM

(Includes one 7B53AN Option 11 plug-in)

Channels—One right-hand plug-in compartment. All 7000-Series plug-ins are compatible (except those which require CRT READOUT).

Internal Trigger Modes—LEFT VERT, VERT MODE, RIGHT VERT.

X-Y Mode—The phase shift between vertical and horizontal channels is less than 2° from DC to 35 kHz. Bandwidth is at least 2 MHz. Risettime is less than 175 ns. Using the 7B53AN Option 11 time-base external amplifier, 10 mV, 100 mV and 1 V sensitivities (±10%) are available. Input R and C for 7B53AN Option 11 is 1 MΩ within 2%, 20 pF within 2 pF. Any vertical plug-in, such as the 7A15AN Option 11, may be used in the horizontal compartment providing a greater number of sensitivities for calibrated X-Y displays.

Sweep Display Modes—Main Sweep, Main Sweep Intensified by Delayed Sweep, Delayed Sweep.

MAIN (DELAYING) SWEEP

Sweep Rate—0.05 μs/div to 5 s/div in 25 steps (1-2-5 sequence). 5 ns/div fastest calibrated sweep rate, obtained with X10 magnifier. The uncalibrated variable is continuous between steps and to 12.5 s/div.

Sweep Accuracy—Within 3% from 0.05 μs/div to 5 s/div, within 5% at 5 ns/div.

Sweep Modes—Normal, Auto, Single Sweep.

Delay Time—Multiplier range is 0 to 10 times the Time/Div setting. Accuracy is within 1% from 0.5 s/div to 0.5 μs/div, within 2% from 5 s/div to 1 s/div. Incremental linearity is within 0.2% of full scale. Jitter is less than 1 part in 20,000 of X10 Time/Div setting.

Triggering (source/sensitivity)—Internal, 0.5 cm to 50 MHz. External, 0.25 V to 20 MHz, 0.5 V to 50 MHz. Ext → 10, 2.5 V to 20 MHz, 5 V to 50 MHz. Triggering extends to 100 MHz with reduced sensitivity in both Internal and External modes. Input R and C is 1 MΩ within 2%, 20 pF within 2 pF.

Triggering Frequency Range—AC, 30 Hz to 50 MHz; AC LF Rej, 30 kHz to 50 MHz; AC HF Rej, 30 Hz to 50 kHz; DC, DC to 50 MHz. Slope is plus or minus with external level range ±30 V.

DELAYED SWEEP

Triggering (source/sensitivity)—Internal, 0.3 div to 10 MHz increasing to 1.5 div at 50 MHz. External, 0.1 V to 10 MHz increasing to 0.5 V at 100 MHz. Input R and C is 1 MΩ within 2%, 20 pF within 2 pF.

Triggering Frequency Range—AC, 30 Hz to 50 MHz; DC, DC to 50 MHz.

Sweep Rate—0.05 μs/div to 0.5 s/div in 22 steps (1-2-5 sequence). The delayed sweep runs after delay time or triggerable after delay time.

Sweep Accuracy—Within 3% from 50 ms/div to 0.5 μs/div, within 4% for all other sweep rates except the magnified X10 sweep rate of 5 ns/div which is within 6%.

CRT

Accelerating Potential—15 kV.

Phosphor—P31.

POWER REQUIREMENTS

Input Voltage—100, 110, 120, 220 and 240 V AC ± 10% internally selectable with quick-change jumpers with 47.5 Hz to 440 Hz single phase line frequency. Maximum power consumption is 125 watts.

Graticule—Internal 8 x 10 cm with variable illumination. The 6½-inch CRT permits 2 cm of linear overscan in both axes, making a total viewing area of approx 10 x 12 cm.

CRT Controls—Located on front panel are Focus, Intensity, Graticule Illumination, Beam Finder. Internal controls are Astigmatism and Trace Rotation.

External Z Axis Input—(BNC connector on rear panel) 2 V P-P for full intensity range from DC to 2 MHz, intensity range diminishes to 20% of full range at 10 MHz. Maximum input voltage is 10 V (DC + Peak AC).

OUTPUTS

Calibrator—(BNC connector on front panel) 1 V within 1%, 1 kHz squarewave within 20%.

Horizontal—Main Sweep +5 V, Delayed Sweep +5 V, Main Sweep Gate +2 V, Delayed Sweep Gate +2 V, Delayed Trigger +1 V with pulse width of greater than 50 ns. All amplitudes are minimum and measured when working into at least 100 kΩ and 15 pF.

INCLUDED ACCESSORIES

(All packaged in cover)

Two P6006 Probe Packages (010-0127-00); two 8 ft long 50 Ω BNC cables (012-0366-00); two BNC female to UHF male adapters (103-0015-00); two BNC male to UHF female adapters (103-0032-00); two BNC male to binding post adapters (103-0033-00); two BNC T connectors (103-0030-00). One set of technical manuals (not packaged in cover).

DIMENSIONS AND WEIGHTS

	7603N Option 11S		7603N Option 11		7A15AN Option 11		7B53AN Option 11		C281	
	in	cm	in	cm	in	cm	in	cm	in	cm
HEIGHT	11.6	29.2	11.5	29.2	5.0	12.7	5.0	12.7	10.9	27.7
WIDTH	9.7	24.6	9.7	24.6	2.8	7.1	2.0	7.1	9.7	24.6
DEPTH	25.2	64.0	23.5	59.7	14.5	36.9	14.5	36.9	3.3	8.3
NET WEIGHT	45.0	21.0	36.0	16.3	1.8	0.8	2.8	1.3	2.8	1.3
DOMESTIC SHIPPING WEIGHT (approx)	57.0	25.8	48.0	21.7	5.0	2.3	6.0	2.7	7.0	3.2
EXPORT-PACKED WEIGHT (approx)	70.0	31.7	61.0	27.6	10.0	4.5	11.0	5.0	12.0	5.4

ORDERING INFORMATION

7603N Option 11S OSCILLOSCOPE SYSTEM (AN/USM-281C) .. \$3025
System Includes—One each 7603N Option 11 Oscilloscope, two each 7A15AN Option 11 Amplifier Plug-ins, one each 7B53AN Option 11 Time Base, and one each C281 Cover with Accessories.

To Order Separately:

7603N Option 11 OSCILLOSCOPE (OS-245(P)/U)	\$1500
7A15AN Option 11 AMPLIFIER PLUG-IN (AM-6565/U)	\$275
7B53AN Option 11 TIME BASE PLUG-IN (TD-1085/U)	\$885
016-0553-00, C281 COVER W/ACCESSORIES	\$90

System Without MIL-Nomenclature

7603N Option 11SA OSCILLOSCOPE SYSTEM \$3025
System Includes—One each 7603N Option 11A Oscilloscope, two each 7A15AN Option 11A Amplifier Plug-ins, one each 7B53AN Option 11A Time Base, and one each C281A Cover with Accessories.

To Order Separately:

7603N Option 11A OSCILLOSCOPE	\$1500
7A15AN Option 11A AMPLIFIER PLUG-IN	\$275
7B53AN Option 11A TIME BASE PLUG-IN	\$885
016-0553-01, C281A COVER W/ACCESSORIES	\$90

Blue shading indicates the specification exceeds MIL-0-24311(EC) requirements
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