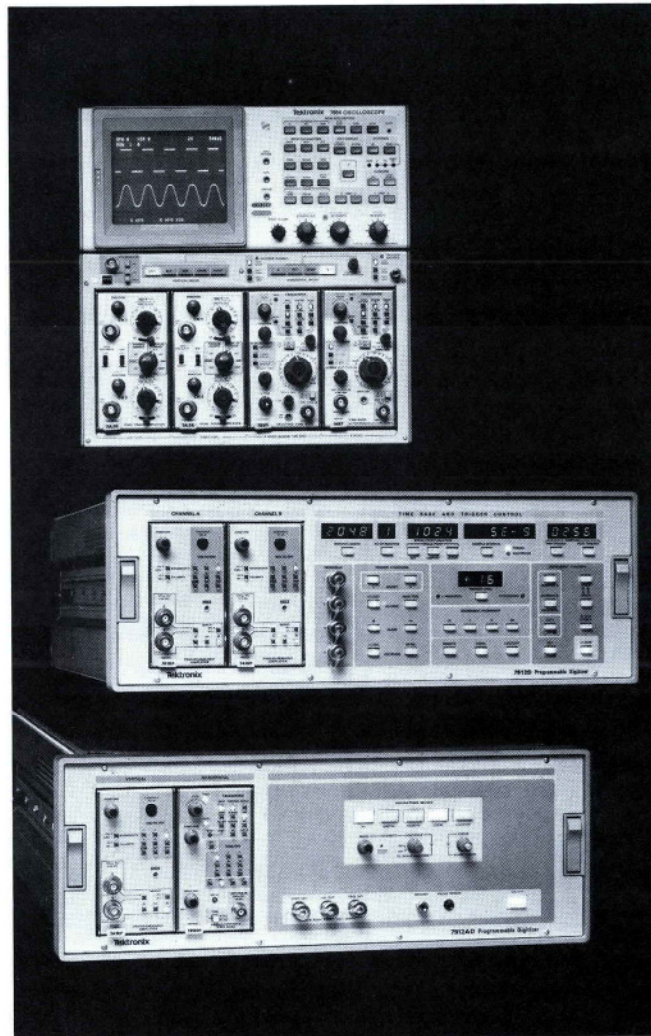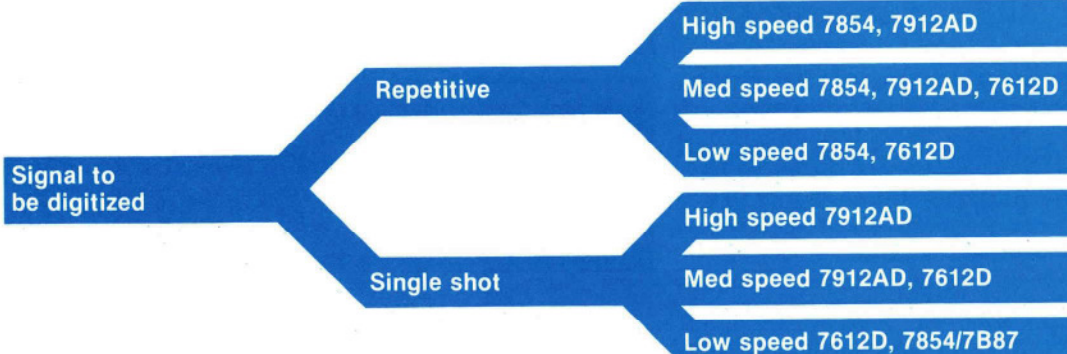# 7000 Series Digital Mainframes
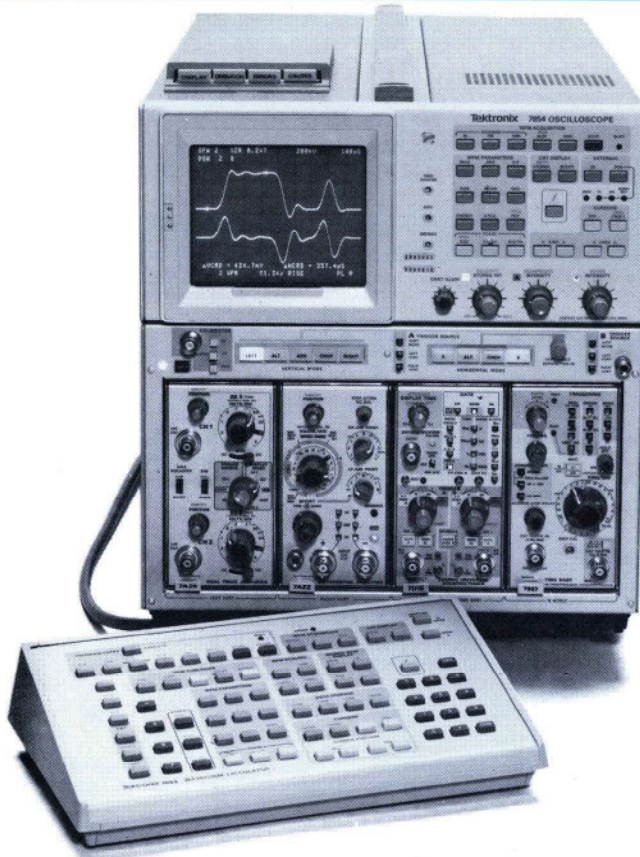

GPIB
COMPATIBLE

Especially designed for precise automatic waveform measurements in demanding applications in R&D and production environments.

7000 Series Digital Mainframes offer wide performance capabilities suited to today's demanding measurement needs. Depending on mainframe, capture high or low speed signals that are repetitive or single shot. Configure mainframes to your individual needs from a choice of over 30 plug-ins. The 7854 combines outstanding analog and digital performance with microprocessor-based waveform processing where as the 7612D and 7912AD combine outstanding analog and digital performance with full programmability. All mainframes are fully GPIB compatible.

Signal to be digitized

Repetitive
- High speed 7854, 7912AD
- Med speed 7854, 7912AD, 7612D
- Low speed 7854, 7612D

Single shot
- High speed 7912AD
- Med speed 7912AD, 7612D
- Low speed 7612D, 7854/7B87

400 MHz Waveform Processing Oscilloscope

Signal averaging can recover signals buried in noise and improve measurement accuracy. One or two cursors selectable for voltage and time measurements. One cursor provides measurements referenced to ground and time zero, whereas two cursors provide Δ time and Δ voltage. Cursors also bracket areas of the waveform that are to be measured with standard waveform measurement routines; i.e., min, max, p-p.

For single-shot use, the 7B87 Time Base plug-in provides pre-trigger control which allows storage of events that precede the trigger. The amount of pre-trigger data can be varied from 0 to 100%.

The mainframe and calculator keyboards contain a series of buttons representing the most commonly used waveform parameters. These functions operate on stored waveforms. Keystroke programming from the keyboards enable the user to design measurement routines tailored to individual tests or experiments.

7854 SPECIFICATIONS

VERTICAL REAL TIME SYSTEM

Input — Two plug-in compartments; compatible with 7000 Series plug-ins.

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

Mainframe Bandwidth — 400 MHz with 7A29 and 7A19 Amplifier plug-in.

Mainframe Step Response — 0.9 ns or less with 7A29 and 7A19 Amplifier plug-in.

Chopped Mode — Rep. rate is approximately 1 MHz.

Delay Line — Permits viewing leading edge of displayed waveform (7B50 Series time bases not recommended for 7854 except 7B50A).

Trace Separation Range — In dual-sweep modes, B trace can be positioned 4 divisions above or below the A trace.

CRT AND DISPLAY FEATURES

CRT Display Modes —
SCOPE (Conventional display.)
STORED (Digital data display.)
BOTH (Stored mode plus real time waveforms.)
PROGRAM ENTRY (User program text display.)

HORIZONTAL REAL TIME SYSTEM

Input — Two plug-in compartments; compatible with 7000 Series plug-ins. 7000 Series vertical amplifiers and specialized plug-ins may also be used.*
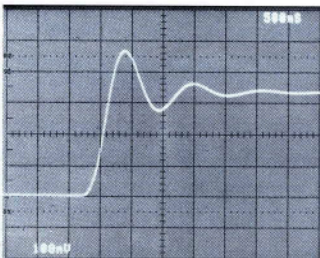
Modes of Operation — A, ALT, CHOP, B.

**Fastest Calibrated Sweep Rate** — 0.5 ns/div.

Chopped Mode — Repetition rate is approximately 200 kHz.

X-Y Mode — Phase shift between vertical and horizontal channels is within 2° from dc to 35 kHz without phase correction, (dc to 1 MHz with phase correction, B horizontal only, Option 02).

*Note: See plug-in compatibility for exceptions for digital storage.

NEW 7854

Waveform Parameters at the Touch of a Key

Dc to 400 MHz Bandwidth @ 10 mV/div

Calibrated Sweep Rates to 500 ps/div

Stores Repetitive Waveforms up to 400 MHz

Single Shot Events up to 50 μs/div (with 7B87 Time Base)

Signal Averaging

Pretrigger (with 7B87 Time Base)

Resolution up to 0.01 div on Stored Data (10 bits)

Choose 128, 256, 512, 1040 Points/Waveform

Keystroke Programming (up to 1000 lines)

GPIB Interface (Standard)

GPIB Product

The 7854 is designed to comply with IEEE Standard 488-1978, and with Tektronix *Codes and Formats* Standard. GPIB Interface Functions: Talk, Listen.

The 7854 Oscilloscope represents a new approach to waveforms. It displays solutions to common measurement problems on screen at the touch of a button. Now you can concentrate on decision making instead of measurement taking.

The 7854 gives you the features of a Tektronix 7000 Series high performance scope linked with advanced digital storage and waveform processing. It also offers programmable measurement routines, GPIB interface, and compatibility with 7000 Series plug-in units.

The 7854 can display real time and stored waveforms separately or simultaneously. With optional memory up to 40 waveforms can be stored and recalled for easy comparison.

Conventional Scope. In the SCOPE mode, the 7854 provides a complete plug-in scope giving standard displays like other Tektronix high performance scopes.
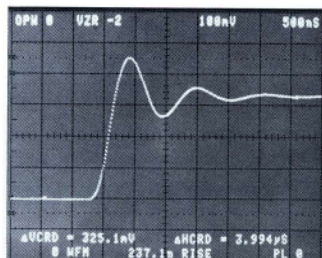
Storage Scope. Rise time is calculated by pushing a single key. Time and voltage differences between cursors are shown on the line above rise time.
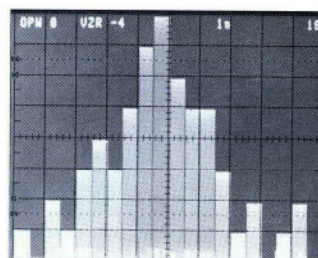
Multiple Storage and Calculation. Volts, current, and power are all shown on the display. Power (V•I) is calculated with two keystrokes.

Keystroke Programming enables the user to design measurement routines tailored to individual tests or experiments.

MEMORY FORMAT

	STANDARD				OPTION 2D				OPTION 0D
Points Per Waveform*	128	256	512	1024	128	256	512	1024	512
Max. No. of Waveforms	16	8	4	2	40	20	10	5	1
Max. No. of Constant Registers	50				100				0
Max. No. of Prog. Commands plus lines	920				2000				0

*Unless otherwise selected, default value is 512 at power-up.

PROGRAM STORAGE

Keystroke programming allows the mainframe to remember a sequence of keystrokes (with remote calculator keyboard or GPIB.*)

Editing — Line by line editing capability.

*Note: Vertical and Horizontal mainframe modes and all other keys except edit commands are programmable.

DIGITAL STORAGE

Equivalent Time Bandwidth — 400 MHz. See 7000 Series System bandwidth specifications.

Accuracy — Refer to Plug-in specifications.

Acquisition Channels — One or two simultaneous channels (Plug-in CHOP mode not valid).

Acquisition Window — ±5 divisions from center screen both vertically and horizontally.

Resolution —

Vertical, 0.01 divisions.

Horizontal, selectable points/waveform on remote keyboard only.

Horizontal Resolution (divs)	Points per waveform
0.01	1024
0.02	512
0.04	256
0.08	128

PLUG-IN COMPATIBILITY

All 7000 Series Plug-ins are compatible in the standard oscilloscope display mode. The 7L5 and 7L18 Spectrum Analyzers require factory modification for optimum use with digital storage operation. The 7D01, 7D02 and 7T11 are not compatible in STORED mode.

The 7B87 has the same characteristics as the 7B80/7B85 time base plug-ins except for single shot pre-trigger capability. Pre-trigger allows you to view what has occurred before the trigger event in single shot applications. The amount of pre-trigger time is determined by the Acquire-Stop delay time setting. The total amount of pre-trigger is 0.2 to 9.9 times the time/div setting.

Single Shot Performance — Using 7B87 with 7854 Internal Clock.

Fastest Sweep (Time/Div)	Points per waveform
50μs	128
100μs	256
200μs	512
500μs	1024

OUTPUTS/INPUTS

+Sawtooth — Positive-going with baseline at 0 V ±1 V into 1 MΩ. Voltage is 1 V/div (±10%) into 1 MΩ, 50 mV/div (±15%) into 50 Ω. Output R is approximately 950 Ω.

+Gate — Positive pulse of the same duration and coincident with sweep. Output voltage is 10 V (±10%) into 1 MΩ, 0.5 V (±10%) into 50 Ω.

Output R is approximately 950 Ω. Source is selectable from A gate, B gate, or DELAYED gate.

Vertical Signal Out — Selected by a trigger source switch. Output voltage is 0.5 V/div into 1 MΩ, 25 mV/div into 50 Ω. Output R is approximately 950 Ω. Bandwith depends upon vertical plug-in.

Remote Single Sweep Reset — Rear Panel BNC, ground closure activated.

TTL Output — Rear panel BNC, TTL output under remote keyboard control (SWH and SWL).

External Z-Axis Input — 2 V peak-to-peak for full intensity range from dc to 1 MHz. Positive signal blanks the trace. Maximum input voltage is 15 V (dc plus peak ac).

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

Memory Back-Up Power Input — 6.0 V to 6.5 V at 0.7 amp to preserve stored data if mainframe's power is interrupted.

CALIBRATOR

Voltage Output — Squarewave, positive-going from ground. Ranges are 40 mV, 0.4 V, and 4 V into 100 kΩ; 4 mV, 40 mV, and 0.4 V into 50 Ω. Amplitude accuracy is within 1%; repetition rate is 1 kHz within 0.25%.

Current Output — 40 mA available through Calibrator output with optional BNC to current loop adapter.

POWER REQUIREMENTS

Line Voltage Ranges — 90 V-132 V, 180 V-250 V.

Line Frequency — 48-440 Hz.

Max Power Consumption — 230 W.

Included Accessories — Power Cord (161-0066-00).

BNC-to-BNC Cable — (012-0208-00).

PHYSICAL CHARACTERISTICS
Dimensions and Weights

		in	cm
Mainframe	Height	13.7	34.8
	Width	12.0	30.5
	Length	24.7	62.7
Waveform Calculator	Height	2.7	6.9
	Width	10.9	27.7
	Length	6.5	16.5
	Cord Length	5.6	1.4 (within 7 cm)

	lbs	kg
Net Weight	45	20.4
Shipping	62	28.2

IEEE 488 INTERFACE

Standard — Conforms to IEEE 488-1978 standard.

Interface Functions Subset Implemented:

SH1	Complete Source Handshake
AH1	Complete Acceptor Handshake
T5	Talker Function
L3	Listener Function
SR1	Complete Service Request Capability
RL1	Complete Remote/Local Capability
DC1	Complete Device Clear Capability
DT1	Complete Device Trigger Capability

I/O Records — Waveforms constants, program text, and display text.

End of Message Terminator (Selectable in TALK/LISTEN mode for EOI or LF/EOI.) — Compatible with Tektronix and other popular controllers.

Device Address — Selectable via rear panel switch.

Remote Operation — All keystroke functions and vertical and horizontal modes can be remotely operated via the GPIB.

ORDERING INFORMATION
(Plug-ins not included)

|	
7854 Oscilloscope (including remote calculator keyboard)	**$10,500**
Option 02 (X-Y Phase Correction)	Add $150
Option 03 (EMC Modification)	Add $250
Option 78 (P11 Phosphor)	Add $35
Option OD (Delete GPIB and Remote Keyboard, one waveform storage)	Sub $500
Option 2D (Expanded Memory, 40 waveform storage)	Add $1500
Option A1 Universal Euro 220 V/16A	No Charge
Option A2 UK 240 V/13A	No Charge
Option A3 Australian 240 V/10A	No Charge
Option A4 North American 240 V/15A	No Charge
7B87 Time Base required only for pretrigger and single shot digitizing	$400

The 7854 is also available as a WP1310 Signal Processing System. This system is a synergistic combination of the Tektronix 7854 Oscilloscope and 4052 Graphic Computer. Together, these two instruments automate the entire waveform test and measurement process, from acquisition and calculation to storage and display formatting.

Tektronix 7854 WAVEFORM CALCULATOR

Programmable Waveform Digitizer
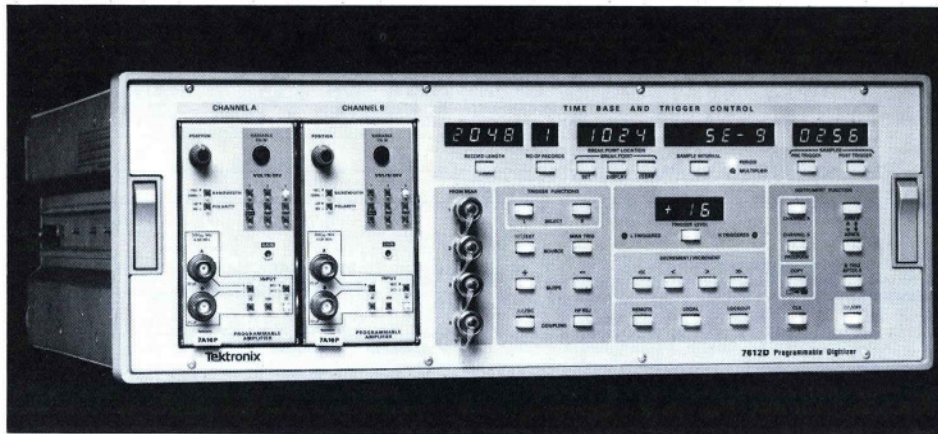
NEW 7612D

200 MHz Maximum Sampling Rate

Two Channels, Two Time Bases

8 Bit Resolution

2048 Words of Memory per Channel

5 ns to 1 s Selectable Sampling Intervals with Interval Switching Allowed During Waveform Acquisition

Pretrigger and Posttrigger Operation

Fully Programmable over IEEE 488 Bus For System Oriented Operation

GPIB Product

The 7612D is designed to comply with IEEE Standard 488-1978, and with Tektronix *Codes and Formats* Standard. GPIB Interface Functions: Talk, Listen.

The 7612D Programmable Digitizer is a dual-channel, dual time base waveform digitizer for use under computer control. It has a maximum sampling rate of 200 MHz. Each channel has its own analog-to-digital converter, a new type designed by Tektronix for accurate, high-speed waveform digitizing. Each channel also has its own time base operating from a single 200 MHz crystal-controlled clock. The result . . . two fully independent channels capable of capturing one waveform each, simultaneously, with the same or different vertical sensitivities and time-base settings.

And there's still more flexibility available. The number of samples per waveform (record length) can be selected, from 256 to 2048. The sample rate can be changed during waveform digtizing, for example, using dense sampling on fast transitions and switching to sparser sampling for slow decays. Also, each channel's local memory can be partitioned into one to eight equal-length records. You have the choice, too, of looking at waveforms before the triggering event

(pretrigger), immediately after the trigger, or delayed from the trigger (posttrigger). Or you can choose to operate the channels dependently by triggering one after the other.

All 7612D functions can be selected manually or operated under program control over the IEEE 488 bus. Add two 7A16P Programmable Amplifier plug-ins, one for each channel, and you have program control over every waveform acquisition function.

Extracting information from medium-speed signals is a typical application of 7612D systems.
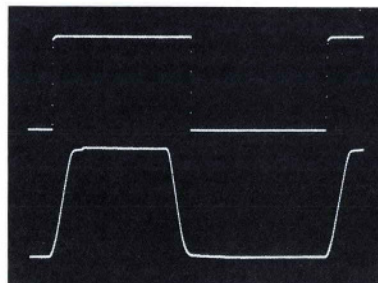

Figure 1. The complete period of a signal (top trace) is recorded at 200 ns; by changing the sample rate to 10 ns during rise and fall times and 800 ns during the plateau (bottom trace), you can measure rise time, fall time, pulse width and interval accurately on a single shot signal.
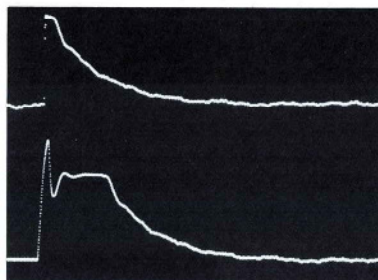

Figure 2. A decaying signal recorded at a 10 μs sampling rate (top trace); the same signal can be recorded at a 100 ns sampling rate during the initial portion and switched back to a 10 μs sampling rate (bottom trace), to capture all information on a single shot signal.
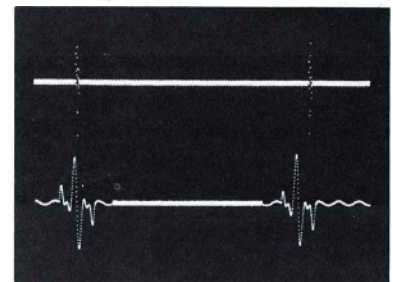

Figure 3. A signal with two echoes recorded at a uniform sampling rate (top trace), the same signal recorded at an increased sampling rate during each echo (bottom trace), to capture each echo with increased resolution.
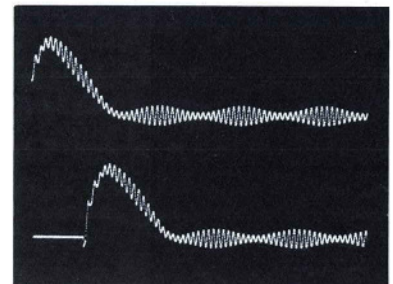

Figure 4. A transient response of a system at power-up recorded with no pre-trigger (top trace); by using the pre-trigger the complete response can be digitized (bottom trace).
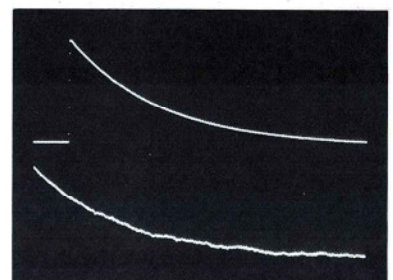

Figure 5. The initial portion of an exponential decay is recorded on Channel A (top trace); Channel B, set at a higher sensitivity and triggered to record after channel A has finished, captures the remaining pulse tail with increased vertical resolution (bottom trace).

7612D SPECIFICATIONS

VERTICAL SYSTEM

Channels — Two left-hand plug-in compartments compatible with all 7000 Series amplifier plug-ins. Fully programmable when 7A16P plug-ins are used.

Bandwidth — 90 MHz. (Mainframe)

Modes of Operation — Left channel with Time Base A and right channel with Time Base B.

TIME BASES A AND B

Type — Two built-in digital time bases with a common crystal-controlled clock.

Clock — Internal: 200 MHz ±0.0035%; stability: of 10 ppm/year. External: from signal source less than or equal to 200 MHz.

Sample Interval — With internal clock: Selectable from 5 ns to 1 s in a 1, 2, 3 . . . 9 sequence (excluding 6, 7, 8 and 9 ns). With external clock: Selectable from 1 to 200 x 10⁶ times the external clock period in a 1, 2, 4, 6 . . . 20 sequence.

Interval Switching — Sample interval can be changed up to 13 times per waveform record with preservation of time relationships.

TIME MEASUREMENT ACCURACY

Without sample interval switching: 0.0035% (stability 10 ppm/year). With sample interval switching: 0.0035% (stability 10 ppm/year) for all sample intervals slower than 5 ns.

Modes of Operation — Time Base A with left channel and Time Base B with right channel. Independent or B triggerable after A completes its acquisition.

TRIGGERING A AND B

Source — Left or right plug-in, external, manual by push button.

Mode — Single sweep.

Coupling — Ac, dc, ac Hf REJ, dc Hf REJ.

Slope — Positive or negative.

Level Range — Internal: at least ±128 LSB in 256 steps. External: at least ±1.28 V in 256 steps.

Trigger Jitter (Internal) — 0.1 ns or less, dc to 100 MHz.

Triggering Error — ±1 sample ambiguity in recognizing the trigger, 1 sample maximum recognition error between channels (using same trigger channel for both time bases).

Trigger Sensitivity —

Coupling	Triggering Frequency Range	Minimum Signal Required	
		Internal	Ext
Ac	40 Hz to 50 MHz	20 LSB	50 mV
	50 MHz to 100 MHz	44 LSB	100 mV
Ac Hf REJ	40 Hz to 50 kHz	20 LSB	50 mV
Dc	dc to 50 MHz	20 LSB	50 mV
	50 MHz to 100 MHz	44 LSB	100 mV
Dc Hf REJ	dc to 50 kHz	20 LSB	50 mV

ARMING A AND B

Push button or computer control.

DIGITIZING AND STORAGE

Method — Continuous, sequential digitizing of the input signals with storage of samples selected by instrument settings.

Resolution — 8 bits.

Dynamic Accuracy — Signal to noise ratio and effective bits performance at 25°C for a half scale sine-wave input signal (an ideal 8 bit digitizer would give a S/N ratio of 43.8 dB).

Signal Freq.	S/N Ratio	Effective Bits
300 kHz	42.0	7.8
20 MHz	32.0	6.0
80 MHz	20.0	4.0

Internal Memory — Type: ECL. Size: 2048 8-bit words per channel, total of 4096 8-bit words.

Record Length, A or B — 256, 512, 1024, or 2048 samples. Number of stored records: up to eight 256-word, four 512-word, two 1024-word, or one 2048-word records per channel, each requires a trigger. Trigger is automatically rearmed after each record acquisition.
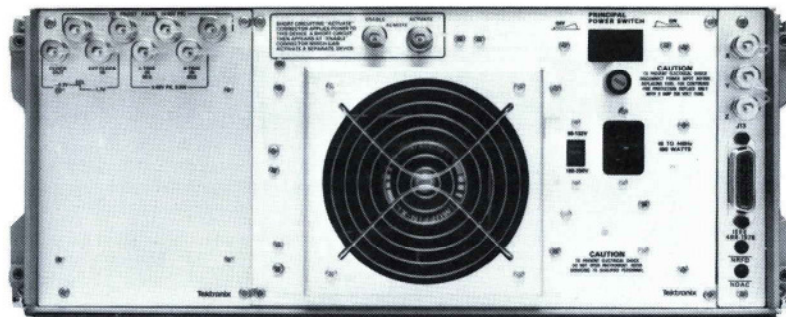
7612D rear-panel: the GPIB connector and outputs for an X-Y Z monitor (right); clock input/output, trigger inputs, and BNC connectors to feed signals to the front panel (left); remote power ON/OFF is also provided through the two central BNC connectors.

Pretrigger Delay Range — Selectable in multiples of 8 samples. Without sample interval switching: from 0 up to 16 samples less than the record length. With sample interval switching: from 0 up to 16 samples less than the position of the first sample interval change.

Posttrigger Delay Range — Selectable in multiples of 8 samples from 8 to the record length (requires selection of only one record).

OUTPUTS/INPUTS

X, Y, Z Analog Output — Provides for analog display of data in memory. X and Y level is 1 V p-p into 100 kΩ or greater; adjustable from 0.75 V to 1.3 V. Z level is 0 to 1 V (full white) into 100 kΩ or greater.

Clock Out — Provides internal clock signal at ECL level.

External Clock In — ECL levels. Less than or equal to 1 ns rise and fall time. 2.5 ns minimum pulse width and less than or equal to 200 MHz.

L and R TRIG IN. — Provide external trigger input to the left and right trigger channels (50 Ω terminated).

1, 2, 3, 4 — Four feed-through connections to the front panel.

Digital Interface — Conforms to IEEE Standard 488-1978.

IEEE 488 INTERFACE

Standard — Conforms to IEEE 488-1978 standard.

Interface Functions Subset Implemented:

SH 1	Complete source handshake.
AH1	Complete acceptor handshake.
TE6	Extended talker function.
LE4	Extended listener function.
SR 1	Complete service request capability.
RL 1	Complete remote/local function.
PP0	No parallel poll.
DC1	Complete device clear capability.
C0	No controller function.
DT0	No device trigger capability.

Response to Interface Control Messages — The 7612D responds to the following interface control messages:

GTL — Go to local.

LLO — Local lockout.

SDC-DCL — Selected device clear and device clear.

SPE-SPD — Serial poll enable and disable.

IFC — Interface clear.

IEEE 488 Bus Addresses — Mainframe and programmable plug-ins share a common primary address and are differentiated through the use of secondary addresses.

Programmable Functions — All instrument settings and operating modes are programmable.

Format — Commands in ASCII, waveform data in binary (range 0 to 377₈).

Transfer rate — 710 K bytes/second maximum.

Waveform Transfer Time — To an infinitely fast controller: 8.35 ms for one 2048 points record. Actual transfer time depends on controller and software speed.

ENVIRONMENTAL

Temperature Range — Operating: 0-40°C. Non-operating: −62°C to +85°C.

Altitude — Operating: −250 to +15,000 feet (−76 to +4570 meters).

Non-operating: −250 to +50,000 feet (−76 to +15,200 meters).

POWER REQUIREMENTS

Line Voltage Range — 90 V to 132 V ac and 180 V to 250 V ac.

Line Frequency — 48 to 440 Hz.

Power Consumption (including plug-ins) — Maximum 400 watts, 5 A at 115 V 60 Hz.

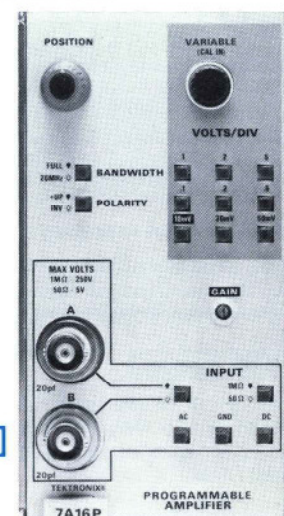**Remote Control** — Remote power ON/OFF capability is provided.

PHYSICAL CHARACTERISTICS

Size — Fits 19 inch rack. Height: 7 in (17.8 cm). Width: 19 in (48.3 cm). Length: 26.75 in (67.9 cm).

Weight — 55 lbs. (25 kg).

STANDARD ACCESSORIES

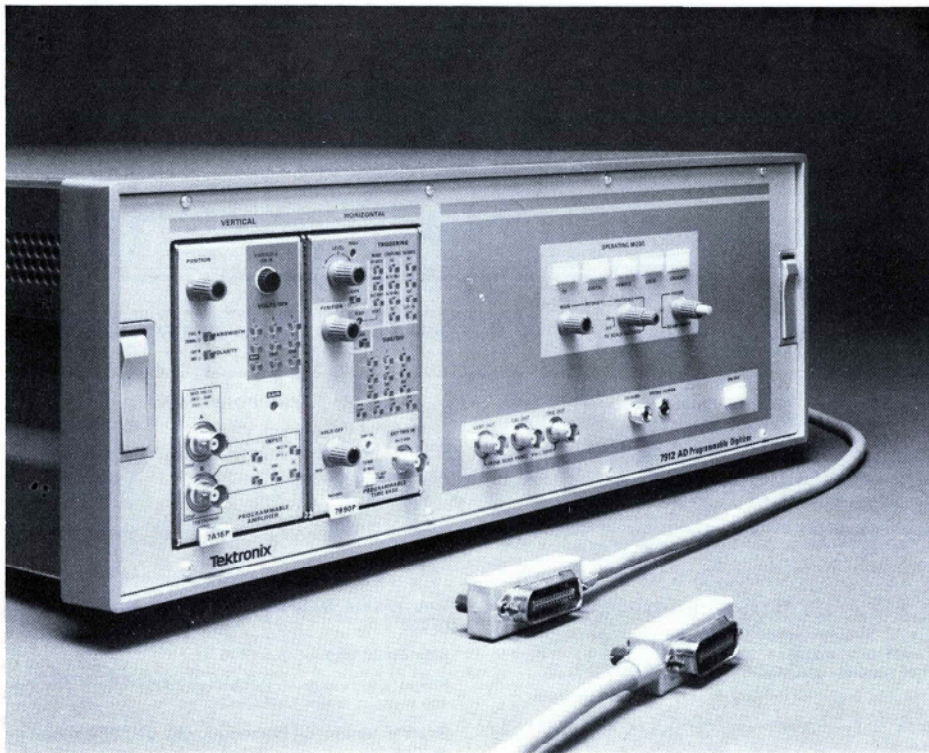Operators and Service Manuals, set of rack slides, power cord, IEEE 488 bus cable.

GPIB Product

The 7A16P is a fully programmable vertical amplifier used in the 7612D. For further information, see plug-in specifications in the 7000 Series Plug-in section pages 111-132.

ORDERING INFORMATION
(Plug-ins not included)

7612D Programmable Digitizer **$25,700**

500 MHz Programmable Waveform Digitizer

7912AD

Digitize and Store Single-Shot or Repetitive Signals from Millisecond to Subnanosecond duration

500 MHz Bandwidth at 10 mV/div

500 ps/div Fastest Calibrated Sweep Rate

Waveform Digitizing to 9-Bit Vertical and 9-Bit Horizontal Resolution

Built-In Signal Averaging Capability

Fully Programmable over IEEE 488 Bus For System Oriented Operation

GPIB Product

The 7912AD is designed to comply with IEEE Standard 488-1978, and with Tektronix *Codes and Formats* Standard. GPIB Interface Functions: Talk, Listen.

Capturing high-speed waveforms is the 7912AD's forte. Each waveform can be sampled up to 512 times within selectable time window ranging from ten milliseconds to five nanoseconds (50 kHz to 100 GHz equivalent sampling rate).

This performance is accomplished by a Tektronix scan converter which writes the signal onto a silicon-diode target array. In TV Mode, the signal information is read from the target and converted to composite video for a bright display on a television monitor. However, in the Digital Mode the waveform data is read into an internal memory. From this memory, the digitized waveform can be transferred via the IEEE 488 bus to an external controller for processing.

The 7912AD Mainframe is programmable over the same IEEE 488 bus. When the programable plug-ins (one 7A16P Programmable Amplifier and one 7B90P Programmable Time Base) are used, the 7912AD becomes a fully programmable digitizer with a bandwidth of 200 MHz. This is a significant step toward fully automated test and measurement in disciplines such as laser and energy-related research, component or subassembly testing, and other areas requiring information extraction from high-speed waveforms.

VERTICAL SYSTEM

Channels — Single plug-in compartment accepts any 7000 Series amplifier plug-in. Fully programmable when 7A16P is used.

Bandwidth — Determined by amplifier plug-in. 7A16P: 200 MHz. 7A19: 500 MHz.

Delay Line — Permits viewing of leading edge of acquired waveform.

HORIZONTAL SYSTEM

Channels — Single plug-in compartment accepts any 7000 Series time base. Fully programmable with 7B90P.

Fastest Calibrated Sweep Rate — 500 ps/div with the 7B90P or 7B92A Time Bases.

Slowest Recommended Sweep Rate — 1 ms/div in digital mode, possible loss of data below this limit.

DIGITIZING AND STORAGE

Method — Scan conversion.

Resolution — 9 bits. In the Digital Mode, the target is scanned in a 512 x 512 point matrix offering at least 400 discrete horizontal elements, each with a range of at least 320 discrete vertical values. In the TV Mode, the target is scanned in a standard TV format with a resolution of at least 400 lines at 50% response.

Writing Rate ($+10°C$ to $+40°C$) — TV Mode: writes an 8-div sine wave of at least 500 MHz in a single sweep. Digital Mode: Stores a single 8-div pulse with a rise time of 1 ns or less. Option 04, increases TV Mode writing rate by factor of 2 and Digital Mode writing rate by 2.5.

Target Defects — No more than six points digitized other than those written by input waveform. Built-in firmware allows for defect removal by an external controller.

Memory — Type: semiconductor. Size: 4096 10-bit words for data from target and two 512 16-bit word areas for internally processed and reduced data. Record Length: 512 samples per waveform maximum.

ELECTRONIC GRATICULE

8 x 10 division dot matrix written onto the scan-converter target immediately after waveform acquisition. Can be displayed simultaneously with the input signal on the TV monitor or digitized and stored.

OUTPUTS/INPUTS

X, Y, Z Analog Output — Provides for analog display of data in memory. X and Y level is 1 V p-p into 100 KΩ or greater; adjustable from 0.75 V to 1.3 V. Z level is 0 to 1 V (full white) into KΩ or greater.

COMPOSITE VIDEO OUTPUT — Only available in TV mode. Used to drive a TV monitor for displaying signal written on scan-converter target as an aid to setting intensity for complete digitizing. Linear Output: Replica of the signal read from the target with sync added. Binary Output: Two-level output derived from the linear composite video output. Used to indicate on the TV monitor how well a waveform will be digitized. Scale factor readout included in both linear and binary.

Sync Output — At least 4 V into 75 Ω. Conforms to EIA RS-170.

Sync Loop — Allows TV Mode to be synchronized with external EIA RS-170 sync waveform.

+Gate Output — Provides a positive pulse with a duration equal to and coincident with the time-base sweep.

Z Axis Input — ±1 V input modulates the writing gun intensity over its full range.

Vert. In, Cal. In, Trig. In — Three internal 50 Ω coaxial cables connect signals from the rear panel to the front panel to ease system configuration in rack mounts.

Probe Power — Provides power for Tektronix active probes.

IEEE 488 INTERFACE

Standard — Conforms to IEEE 488-1978 standard.

Interface Functions Subset Implemented:

SH 1	Complete source handshake.
AH1	Complete acceptor handshake.
TE6	Extended talker function.
LE4	Extended listener function.
SR 1	Complete service request capability.
RL 1	Complete remote/local function.
PPØ	No parallel poll.
DC1	Complete device clear capability.
CØ	No controller function.
DT1	Device trigger complete.

ENVIRONMENTAL

Temperature Range — Operating: 0-40°C. Nonoperating: −55°C to +75°C.

Altitude — Operating: Up to 15,000 ft (4 570 m). Non-operating: Up to 50,000 ft (15 200 m).

EMC (plug-ins inserted) — Meets MIL-STD-461A and 462 radiated and conducted interference from 30 Hz to 1 GHz.

POWER REQUIREMENTS

Line Voltage Range — 90 V to 132 V ac and 180 V to 250 V ac.

Line Frequency — 48-440 Hz.

Power Consumption (including plug-ins) — 360 watts maximum.

Remote Control — Remote power ON/OFF capabilities provided.

PHYSICAL CHARACTERISTICS

Size — Fits 19 inch rack. Height: 7 in (17.7 cm). Width: 19 in (48.3 cm). Length: 26.8 in (67.9 cm).

Weight — 54.6 lbs (24.7 kg).

STANDARD ACCESSORIES

Power cord, set of rack slides, IEEE 488 bus cable, Operator and Service manuals.

ORDERING INFORMATION
(Plug-ins not included)

It is recommended that 7912ADs not be purchased or operated without an accompanying TEKTRONIX 634 Raster Scan Display Monitor with Option 01 (see pg. 65).

7912AD Programmable Digitizer . . . $23,800

OPTIONS

Option 04 Change to Fast Digitize (changes scanning matrix to 526 x 256 points, changes electronic graticule to mark only every other division, increases writing rate . . . . **No Charge**
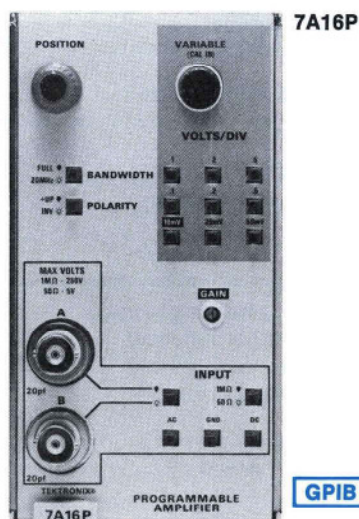
Option 09 Change Line Voltage (220 V/50 Hz) . . . . **No Charge**

Option 13 Change TV scan to 625 lines at 50 Hz . . . . **No Charge**

Option 30 Delete IEEE bus cable . . . . **Sub $90**

634 Option 01 Raster Scan Display Monitor **$1270**

Programmable Amplifier

Programmable Time Base

The 7A16P and 7B90P are programmable plug-ins used in the 7912AD. For further information, see plug-in specifications in the 7000 Series Plug-in Section.

Tektronix offers maintenance training classes on the 7912AD Programmable Digitizer. For further training information, contact your local Field Office or request a copy of the Tektronix Customer Training Catalog on the return card at the back of this catalog.
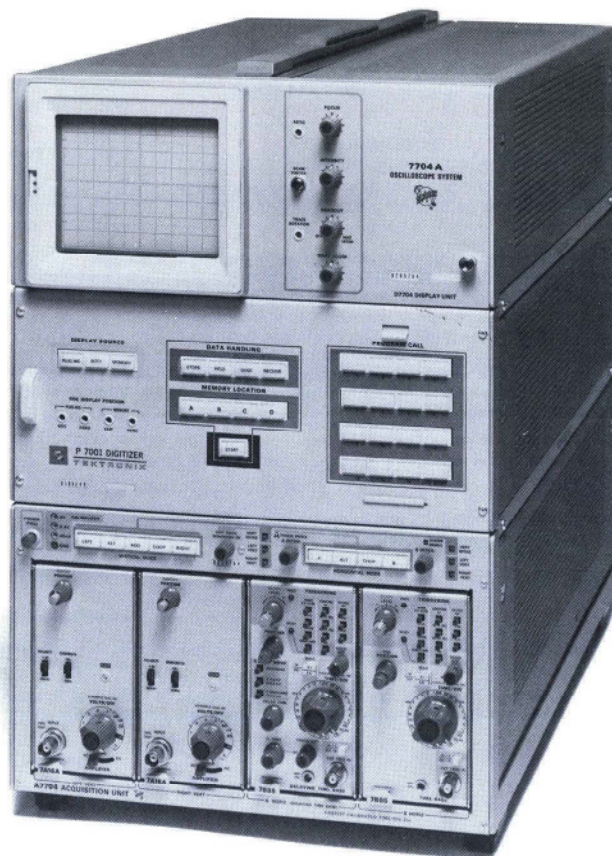
175 MHz Digital Processing Oscilloscope

DPO

Dc to 175 MHz Bandwidth

Waveform Digitizing to 10 Bit Vertical and 9 Bit Horizontal Resolution

Internal Waveform Storage (4K MOS Memory)

IEEE 488 and Other Interfaces Available

GPIB Product

The DPO (Digital Processing Oscilloscope) offers both enhancement and extension of standard oscilloscope measurements. This is accomplished by adding a digitizing, storage, and interfacing unit (the P7001 Digitizer) to a TEKTRONIX 7704A General Purpose Oscilloscope System.

Standard 7000 Series plug-ins offer versatile performance from dc to 175 MHz. Additional capabilities are available via sampling plug-ins, and up to 60 GHz with spectrum analyzer plug-ins. With dual-channel plug-ins, up to four waveforms can be displayed in real time on the DPO CRT. Also, up to four waveforms with scale factor information can be stored —simultaneously or individually—in the internal MOS memory.

Waveform storage is in digital format. Amplitude samples of the waveform are taken at 512 equally spaced horizontal locations. Each amplitude sample is digitized to 10 bits (1024 distinct levels possible for each sensitivity setting) and stored in the DPO memory.

Any of the four stored waveforms can be accessed at any time by push button for re-display on the DPO CRT. Or, because they are in digital format, any or all of the stored waveforms can be transferred from the DPO to an interfaced controller. Processed waveforms can also be transferred back to the DPO for display of results.

This latter capability, the transfer of digitized waveforms to and from a computer or controller, is a DPO feature of great significance. Not only does it allow making oscilloscope measurements at computer speeds and computer resolutions, but it extends your measurement capabilities to include complete waveform analysis under program control.

Extracting information from high-speed repetitive signals is a typical application of Digital Processing Oscilloscope Systems.

VERTICAL SYSTEM

Channels — Two left-hand plug-in compartments accept all 7000 Series plug-ins; function and bandwidth determined by the 7000 Series plug-ins used; 7D01 and 7D02 plug-ins are not recommended for use in the digitizing mode.

Bandwidth — 175 MHz with 7A19 plug-in amplifier.

Modes of Operation — LEFT, ALT, ADD, CHOP, RIGHT during real-time displays and LEFT, ALT, or RIGHT during digitizing and storage.

Delay Line — Permits viewing leading edge of waveform.

HORIZONTAL SYSTEMS

Channels — Two right-hand plug-in compartments compatible with all 7000 Series plug-ins; 7T11 not recommended for use in digitizing mode.

SYSTEMS

The DPO is also available in WP100 Series Signal Processing Systems. These semiautomatic systems are designed, assembled, tested, and documented to satisfy the demand for speed, accuracy, and repeatability in characterizing devices or phenomena which give rise to repetitive waveforms in the millisecond to picosecond range. For more information on these systems, contact your local Tektronix Field Engineer.

Modes of Operation — A, ALT, CHOP, B for real-time displays. A, ALT, B for digitizing and storage with some restrictions in combinations of plug-in and mainframe vertical and horizontal switching modes.

CRT

Refer to 7704A CRT characteristics, described on page 90.

OUTPUTS/INPUTS

Refer to 7704A Outputs/Input characteristics, described on page 90.

CALIBRATOR

Refer to 7704A Calibrator characteristics, described on page 90.

DIGITIZING AND STORAGE

Method — Pseudo-random every 6.5 microseconds with a maximum of 512 samples per waveform. Any transient longer than five milliseconds or any repetitive signals that can be displayed on the CRT can be stored in internal memory along with its scale factors and redisplayed on the CRT.

Resolution — 10 bits (1024 levels).

Memory — Type: MOS. Size: 1024 10-bit words per waveform, total of 4K words. Record Length: 512 samples per waveform plus scale factors and areas for computer-generated messages.

PROGRAMMABLE FUNCTIONS

The P7001 Data Handling mode, Display Source, and Memory Locations can be selected by an external controller, and the Program Call Buttons generate interrupts which can be processed by an external controller. Also, an external controller can be used to read the status of the time-base single sweep and to arm the sweep for transient acquisition.

INTERFACING

And IEEE 488 compatible interface is available for general purpose use. Also, a 16 bit parallel interface (CP Bus Interface) is available for fast data transfer to 16 bit controllers. Complete interfacing to PDP*-11 series minicomputers available on request.

*PDP is a registered trademark of Digital Equipment Corporation.

POWER REQUIREMENTS

Range — 90 to 132 V ac. Option 09, 180 to 264 V ac.

Line Frequency — 48 to 440 Hz.

Power Consumption — 300 watts maximum at 115 V, 60 Hz.

PHYSICAL CHARACTERISTICS

Dimensions — Height, 18.9 in (47.5 cm). Width, 12 in (30.6 cm). Length, 22.7 in (57.7 cm).

Weight — 48 lbs. (21.8 kg).

STANDARD ACCESSORIES

One pin-to-BNC cable.

One each Operator and Service manuals.

ORDERING INFORMATION
(Plug-ins not included)

DPO $11,350

DPO OPTIONS

03	Add EMC shielding	Add $185
09	Change line voltage (230 V/50 Hz)	No Charge
18	Change to 1K MOS memory	Sub $1045
19	Change to 2K MOS memory	Sub $760
20	Change to 4K core memory	Add $315
31	Add IEEE 488 Bus Interface (021-0206-00)	Add $2000
32	Add CP Bus Interface (021-0116-03); order cable separately (012-0432-00)	Add $475