

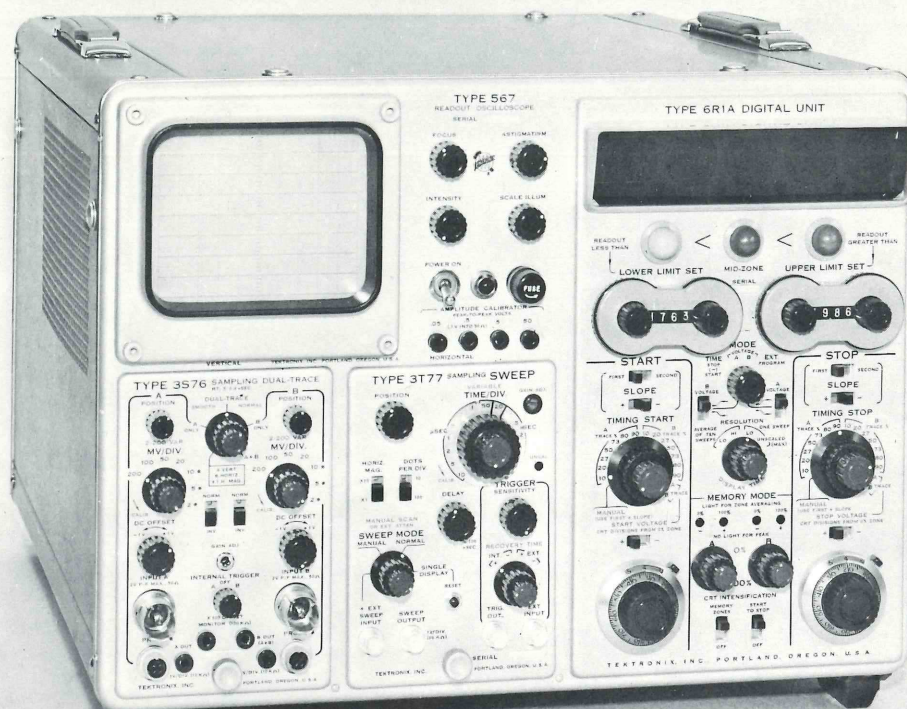
567



DIGITAL READOUT OSCILLOSCOPE & PROGRAMMER

Alleenvertegenwoordiging voor
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Type 567 DIGITAL READOUT OSCILLOSCOPE



DIGITAL READOUT PLUS ANALOG DISPLAYS

DIGITAL READOUT PLUS ANALOG DISPLAYS

DIGITAL READOUT OF RISE TIME

DIGITAL READOUT OF AMPLITUDE

DIGITAL READOUT OF TIME DIFFERENCES

SELECTABLE HIGH AND LOW NO-GO LIMITS

EXTERNALLY PROGRAMMABLE

DIGITAL AND GO/NO-GO OUTPUTS

The Type 567 Readout Oscilloscope introduces a new concept in oscilloscopes—DIGITAL READOUT of signal information in addition to a conventional cathode-ray oscilloscope display.

With the Type 567 you can make measurements with greater accuracy, speed, and convenience than possible when interpreting just a cathode-ray oscilloscope display.

To make measurements, you select measurement points on the displayed waveform, then read data directly in four-digit resolution—tell instantly, by means of indicator lights, whether a measurement is IN, ABOVE, or BELOW preset limits. Using sampling units and the digital unit in a Type 567 you can obtain digital readings of events within the range of microseconds to picoseconds.

Many accessories and associated instruments are available to add to the operational versatility of the Type 567. For example, with the new Tektronix Type 262 Programmer you can very conveniently externally program the Type 567—with completely automatic or manual sequencing of programs.

On a production line or in a laboratory, the Type 567 Readout Oscilloscope can speed-up and simplify your measurement applications.

WHAT THE TYPE 567 READOUT OSCILLOSCOPE CAN DO

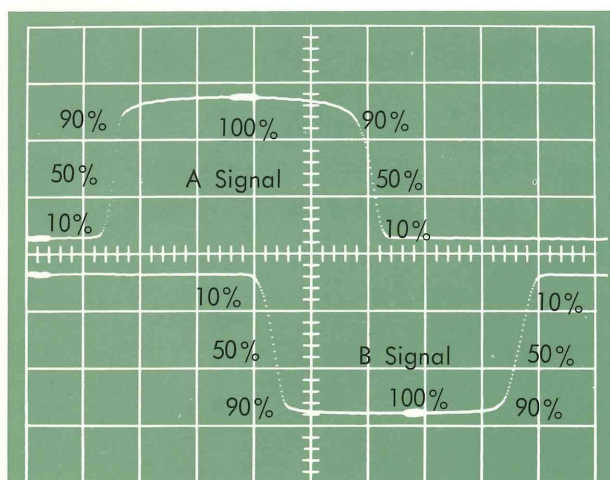
The Type 567 Readout Oscilloscope utilizes a Type 6R1A Digital Unit and either of two sets of sampling vertical and time-base units for digital readout with a simultaneous crt display.

One set is the Type 3S76 Dual-Trace Sampling Unit with the Type 3T77 Sampling Sweep Unit—for 0.4-nsec risetime dual-trace sampling displays and readout.

The other set is the Type 3S3 Dual-Trace Sampling Unit with the Type 3T77 Sampling Sweep Unit—for dual-trace sampling displays and readout with smoothing and risetime controls, and retention of full sensitivity even when operated from source impedances above 50 ohms.

The Type 3A2 Dual-Trace Amplifier and the Type 3B2 Time Base enable low and medium frequency digital readout on the Type 6R1A.

For additional versatility, when digital readout is not needed, the Type 567 will operate with other Tektronix 2 and 3-Series Plug-In Units—with or without the Type 6R1A Digital Unit.



DUAL-TRACE DISPLAY
SHOWING TYPICAL MEASUREMENTS

MEASUREMENT	6R1A PROGRAM	
	Start	Stop
Risetime A	+10%A	+90%A
Falltime A	-90%A	-10%A
Risetime B	-10%B	-90%B
Falltime B	+90%B	+10%B
Delay A to B	+10%A	-10%B
Storage A to B	-90%A	+90%B
Turn on A to B	+10%A	-90%B
Turn off A to B	-90%A	+10%B
Width A	+50%A	-50%A
Width B	-50%B	+50%B

With digital and sampling units in a Type 567 you can:

1. Read, digitally, time differences as small as 20 psec up to 100 μ sec—displayed-pulse risetimes as fast as 0.4 nsec—pulse amplitudes as small as 2 mv, pk-pk.
2. Control start and stop time of measurements on each input signal or between either input signal through automatic timing systems.
3. Measure time intervals between selected percentage points (10, 20, 27, 50, 73, 80, 90) on one or both dual-trace waveforms—thus eliminate the need to manually "line-up" the display.
4. Initiate and/or stop time-interval measurements by means of continuously-variable calibrated amplitude-discriminators or by any combination of percentage, amplitude, polarity—first or second pulse crossing.
5. Readout peak amplitude between 0% and 100% points on the displayed waveform.
6. Set 0% and 100% zones that automatically normalize themselves with changes in amplitude or vertical position, or time measurements independent of dc position or pulse amplitude.
7. Select and intensify measurement points on the display for easy cross-reference with the digital information.
8. Preset the digital comparators for automatic readings of three categories: (1) less than lower limit preset, (2) greater than upper limit preset, (3) mid-zone, through upper and lower limits.
9. Readout, in up to four digit resolution, the actual measurement. Decimal point and class of indication (nsec, μ sec, msec, mv, v) are automatically presented when time/div, amplitude/div, or program is changed.
10. Use external program control such as punch-tapes or stepping relays for automatic sequential operation in automatic-test systems—systems check-out—component testing—micro-circuit testing.
11. Provide digital and go/no-go outputs for use with printers, summary punches, etc.
12. Use the Type 262 Programmer to externally program and sequence the Type 6R1A for any measurement that can be made manually through use of the Type 567/6R1A front-panel controls.
13. Trigger internally from either vertical input, as well as externally.

HOW THE TYPE 567 READOUT OSCILLOSCOPE MEASURES TIME

SAMPLING PROCESS

With each repetition of a signal, the circuit measures one point (sample) at a time a little later than the last sample. This process of advancing the sampling time in fixed increments is called strobing. A reconstructed signal, much slower than the original signal, is reproduced on the crt as an amplitude vs. time, point-to-point graph.

EQUIVALENT TIME BASE CLOCK

The equivalent time between each sample depends upon the number of samples per centimeter and the sweep time per centimeter. For instance, 1 nsec/cm and 100 samples/cm = 10 psec/sample. By counting the number of samples between two selected portions of a waveform, the time between these portions can be measured.

AUTOMATIC REFERENCE ZONES

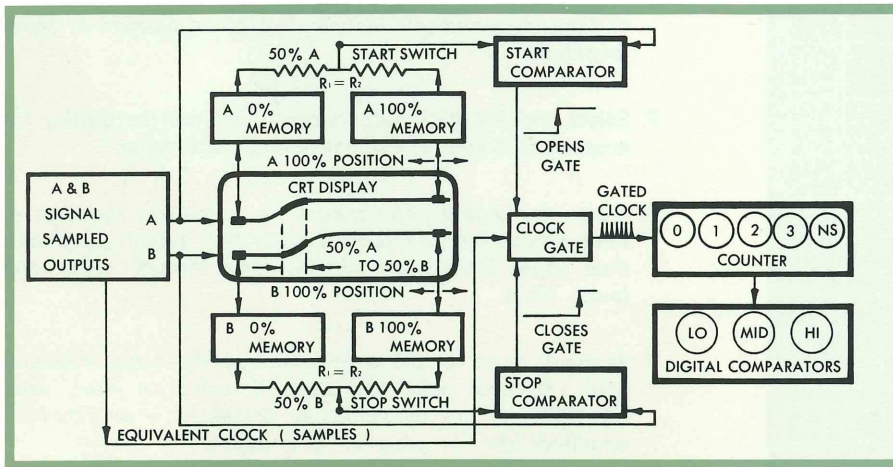
Two intensified zones on each trace indicate 0% and 100% zones. The zones can be positioned at any point on the display. After the first sweep, the amplitudes corresponding to the four zones are stored in memory circuits. Changes in amplitude, vertical position, or waveform automatically re-establish new 0% and 100% memory amplitudes.

START-STOP SYSTEM

In a typical measurement, voltage divider taps between the 0% and 100% memory outputs are set for start and stop timing at selected percentage points such as 10, 20, 27, 50, 73, 80, and 90% of either waveform. The selected percentage reference levels are then compared against the sampled input waveform on the second sweep. Coincidence of the waveform amplitudes with the selected percentage reference amplitudes is sensed by comparators which open and close the clock gate to the digital counter. The crt display can be intensified for the duration of the measured interval as a reference check. The number of clock pulses are read out digitally in nanoseconds, microseconds, or milliseconds, with decimal points included.

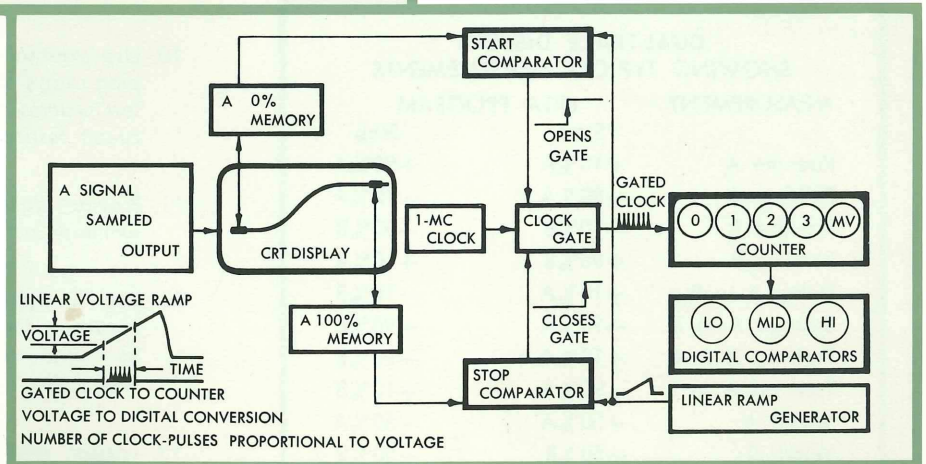
HOW IT MEASURES VOLTAGE

Start and stop comparators gate 1-mc clock pulses for the period of time that a linear ramp voltage is at values between the 0% and 100% amplitudes. The number of clock pulses is proportional to the voltage between the selected measurement points. Readout is in millivolts and volts, with decimal points included.



TYPE 567
BLOCK DIAGRAM
MEASURING TIME

TYPE 567
BLOCK DIAGRAM
MEASURING VOLTAGE



READOUT OSCILLOSCOPE

AMPLITUDE CALIBRATOR is at line frequency and has 4 calibrated pk-to-pk square wave voltages of 0.05 v, 0.5 v, 5 v, and 50 v available at front panel. The 0.5 v position provides 100 mv into a 50-Ω load, for convenient calibration of sampling plug-ins.

DC-VOLTAGE SUPPLIES are electronically regulated to compensate for widely varying line conditions. Separate regulated heater supply is provided.

POWER REQUIREMENT is 105 v to 125 v or 210 v to 250 v, 50 to 60 cps, (approximately 405 watts with Type 3S76, 3T77, 6R1A Units). A thermal cutout switch prevents overheating of the instrument.

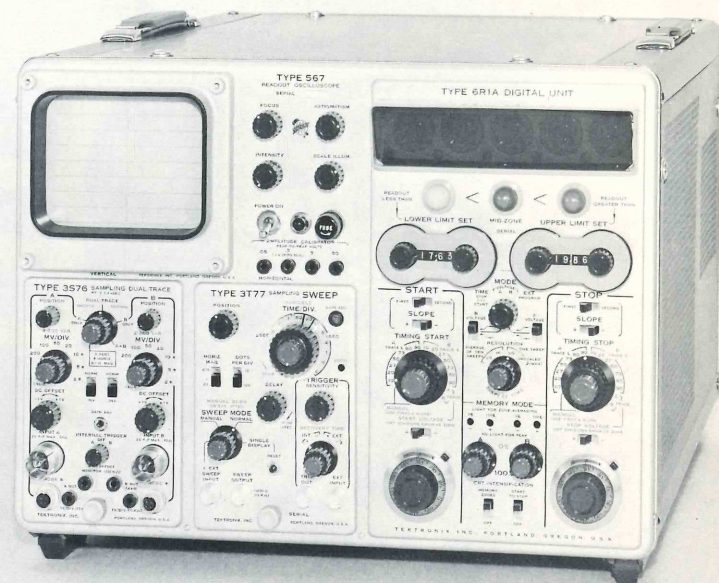
CATHODE-RAY TUBE is a 5-inch rectangular crt using 3.5-kv accelerating potential. A P2 phosphor is normally supplied.

ILLUMINATED GRATICULE has controlled edge-lighting and is marked in 8 vertical and 10 horizontal cm divisions.

MECHANICAL SPECIFICATIONS: Dimensions are 13 $\frac{5}{8}$ " high by 17" wide by 23" deep. Net weight is 49 pounds. Shipping weight is 76 pounds, approx.

TYPE 567, without plug-in units

Each instrument includes: 1 — power cord, 1 — light filter, 2 — instruction manuals.



Type RM567 RACK MOUNT

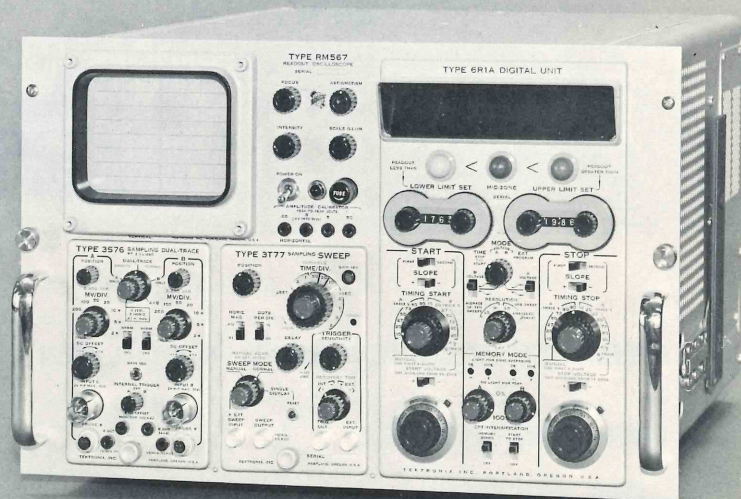
The Type RM567 Readout Oscilloscope is electrically identical to the Type 567 but adapted to rack mounting in a standard 19-inch rack. The instrument mounts to the rack on slide-out tracks.

MECHANICAL SPECIFICATIONS: Dimensions are 12 $\frac{1}{4}$ " high by 19" wide by 22" deep. Net weight is 50 $\frac{1}{2}$ pounds. Shipping weight is 85 pounds, approx.

TYPE RM567, without plug-in units

Each instrument includes: 1 — power cord, 1 — light filter, 2 — instruction manuals, 1 — pair guide rails.

SUPPORTING CRADLES: When Type RM567 is used in a backless rack, these cradles are necessary for rear slide support. Order Part Number 426-165



MAINTENANCE of the Type 567 or RM567 and the plug-in units will require these items:

Plug-In Extension for Sampling and Digital Units.

Order Part Number 012-066 (24-pin extension)

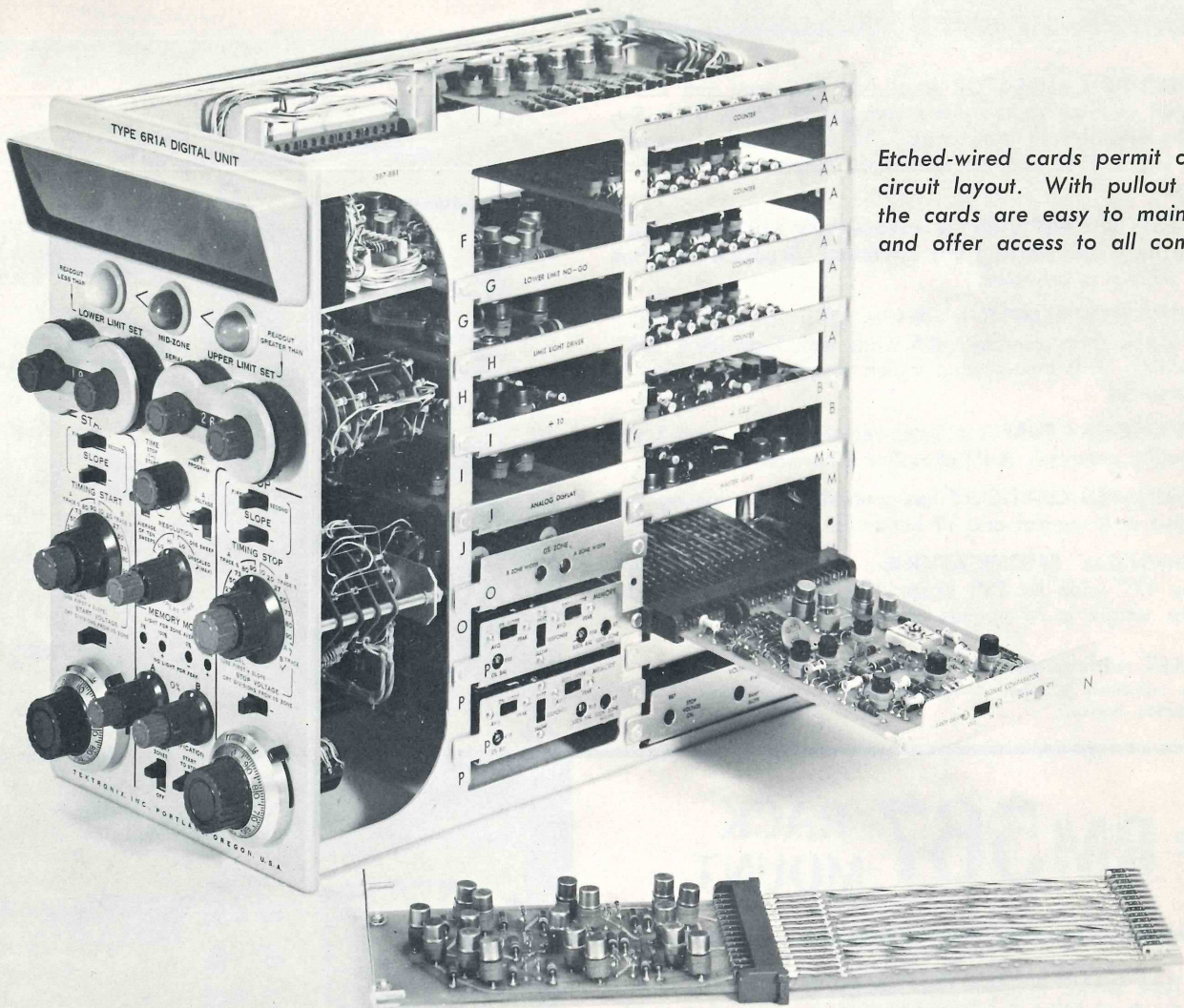
Circuit-Card Extensions for Digital Unit

Order Part Number 012-068 (20-pin extension)

Order Part Number 012-067 (15-pin extension)

These items are offered for the convenience of companies with in-plant facilities. If your company has this facility, or if you intend performing your own maintenance, please include 2 plug-in extensions and 2 circuit-card extensions (one each of 15-pin and 20-pin extensions). One set of 4 will usually be adequate for maintenance of several instruments.

Type 6R1A DIGITAL UNIT



Etched-wired cards permit compact circuit layout. With pullout feature, the cards are easy to maintain and offer access to all components.

PRESENTS OSCILLOSCOPE MEASUREMENTS IN DIGITAL FORM

DIGITAL READOUT PARAMETERS

- PULSE AMPLITUDE
- PULSE RISE AND FALL
- PULSE WIDTH
- TIME INTERVAL

PROVISIONS FOR EXTERNAL PROGRAMMING AND READOUT

LIMIT SETTINGS AND INDICATORS

The Type 6R1A Digital Unit equips a Tektronix Type 567 Oscilloscope for digital readout. Used with vertical and timing units for the crt displays, the Type 6R1A enables presentation of digital data for a wide variety of repetitive-pulse measurements. The digital presentations can designate voltage measurements, time-difference measurements between similar pulses, and time-difference measurements between percentages of pulse amplitudes. In addition, the Type 6R1A has provision for external programming to facilitate automatic sequential operations. The Type 6R1A enables these time and amplitude measurements to be read directly with up to 4 digit units of measurement.

The 6R1A contains the circuitry for the analog to digital and digital readout functions of the Type 567 Readout Oscilloscope. The characteristics are described by giving the purpose of each front-panel control.

NOTE: In this presentation, any reference to A or B Channel or A or B trace designates use of a dual-trace unit in the vertical channel of the Type 567 Readout Oscilloscope (along with a sweep unit in the horizontal channel).

GO/NO-GO CONTROLS

LOWER LIMIT SET presets the lower limit. Any digital reading less than the lower limit causes the LOWER LIMIT indicator to light.

UPPER LIMIT SET presets the upper limit. Any digital reading greater than the upper limit causes the UPPER LIMIT indicator to light. Readings between the lower and upper limits cause the MID-ZONE indicator to light.

MODE SWITCH

TIME STOP-START enables operation of start and stop timing systems.

VOLTAGE A measures voltage on A-channel trace between the 0% and 100% zones.

VOLTAGE B measures voltage on B-channel trace between the 0% and 100% zones.

EXTERNAL PROGRAM allows the start-stop and other functions of the 6R1A to be programmed externally from a remote or automatic sequencer. Easy access to the 6R1A circuits is provided.

ZONE POSITIONING CONTROLS

A 0% and 100% ZONE SETS allow establishing the 0% and 100% references on the displayed waveform. Each zone representing a selected portion of the total sweep is positionable throughout 9 cm or more of horizontal sweep of the A trace.

B 0% and 100% ZONE SETS duplicate on the B waveform those functions of the A Zone Sets.

0% AND 100% INTENSIFIED ZONES control two intensity markers on each trace at 0% and 100% zones for ease in establishing the position of the zones in relation to the displayed waveforms.

START-TO-STOP INTENSIFIED ZONE intensifies the start-to-stop zone on the displayed waveform and allows verifying start-to-stop interval. When manual start-stop timing is used the intensified zone allows the start-stop positions to be set to any portion of the waveform.

MEMORY MODES

The Type 6R1A has two memory modes—averaging and peak-to-peak. The mode of operation is made apparent by NE-2 indicators on the front panel.

AVERAGING MODE of operation is when the average DC level of the signal occurring during the 0% and 100% memory zones is stored and used to develop the "Timing Start" and "Timing Stop" percentage levels. Zones are adjustable in width and positionable on the sweep.

PEAK-TO-PEAK MODE of operation is when the most positive and most negative voltage levels of the signal are stored during the 0% and 100% zones. The zones are adjustable in width from 1 mm to 10 cm and positionable on the sweep.

RESOLUTION SWITCH

Time measurements are performed by gating clock-pulses during the measurement interval. The clock in the case of sampling is the samples per unit equivalent time. For instance, sweep speed = 10 nsec/div, samples/div = 100, then

equivalent time/sample = 0.1 nsec. If a measurement interval occupied 2.5 cm, 250 samples would be registered in the digital readout counter. Reading would be 25.0 nsec on the readout indicator.

AVERAGE 10 SWEEPS LO minimizes random noise that could be associated with a measurement. The digital readout counter registers 10 timing intervals (sweeps) and automatically divides the reading by 10. The units nixie indicator is rendered inoperative so no reading shows even though its scalar is operating.

AVERAGE 10 SWEEPS HI permits obtaining reading to high resolution using all four decades. Same as LO except that the units nixie indicator is restored to operation.

1 SWEEP LO registers one sweep only in the digital readout counter. For sweep speed with multipliers of 2 or 5 the counter only registers 1 out of 2 or 5, respectively, clock-pulses and repositions the decimal point to give the correct reading.

1 SWEEP UNSCALED enables obtaining maximum resolution in just one sweep in the 2 and 5 multiplier positions. Only one sweep is used to fill the digital counter. The reading on the indicator will only be relative on the 2 and 5 multiplier positions of the plug-ins. Decimal points and units of measurement are not indicated in this position to show that readings are only proportional to time.

DISPLAY TIME CONTROL

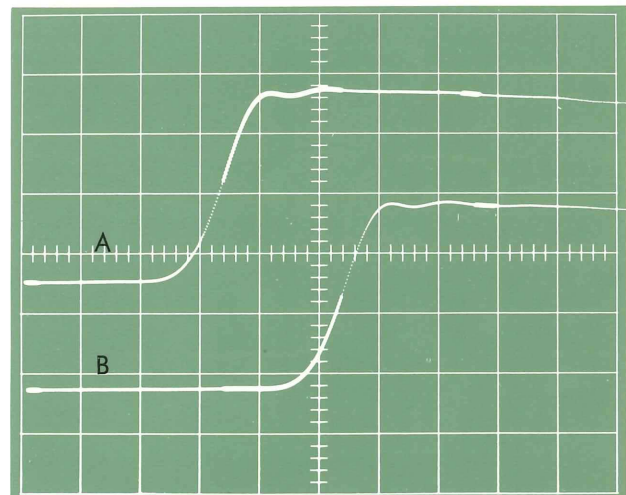
A continuously variable control between approximately 6 sec and 0.1 sec holds the display for the time needed to observe readings or operate peripheral equipment. (Can be modified for variable control between 1 sec to 10 msec for use with high-speed automatic testing).

START-TIMING CONTROLS

These controls program the initiation of timing.

+SLOPE, —SLOPE selects which direction of the waveform will be used to start the timing.

FIRST, SECOND (Crossing) allows selecting start-timing on



DELAY-TIME INTERVAL MEASUREMENT
Start: +50% A Trace Stop: +50% B Trace

6R1A

either the first or second crossing of the waveform through the selected start-timing setting.

TIMING START provides 7 calibrated percentage steps at 10, 20, 27, 50, 73, 80 and 90% from either A or B trace (in reference to 0% and 100% zone amplitude). Automatically starts timing at the selected percentage. The 27% and 73% positions correspond to 1 time constant and are useful for TC readings without resorting to slide rule.

MANUAL START enables start-timing at any point on the waveform. Continuously variable over 9 cm or more of the sweep.

START VOLTAGE + OR - selects which polarity from 0% zone the waveform will start timing after reaching the amplitude as set by the START VOLTAGE helidial setting.

START VOLTAGE HELIDIAL permits start-timing continuously variable between 0-10 divisions of amplitude from 0% zone reference.

STOP-TIMING CONTROLS

Program the termination of the timing interval. Identical in capability and operation to the start-timing controls in all other respects.

OTHER CHARACTERISTICS

READOUT is in a numerical range from 0.0001 to 9999. Display time is variable from 0.1 second to 6 seconds. Units of measure include: microvolts, millivolts, and volts; nanoseconds, microseconds, milliseconds, and seconds.

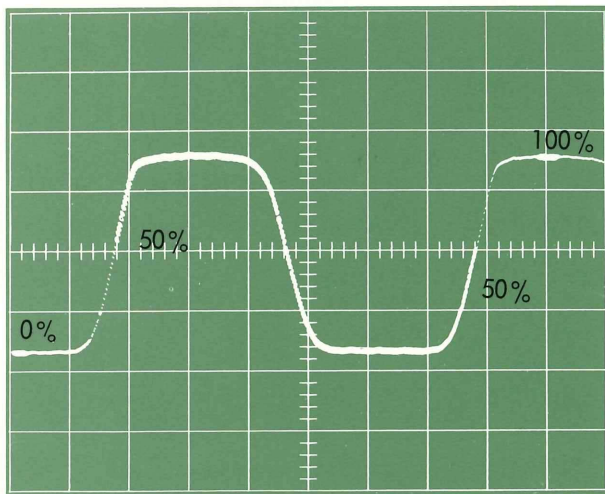
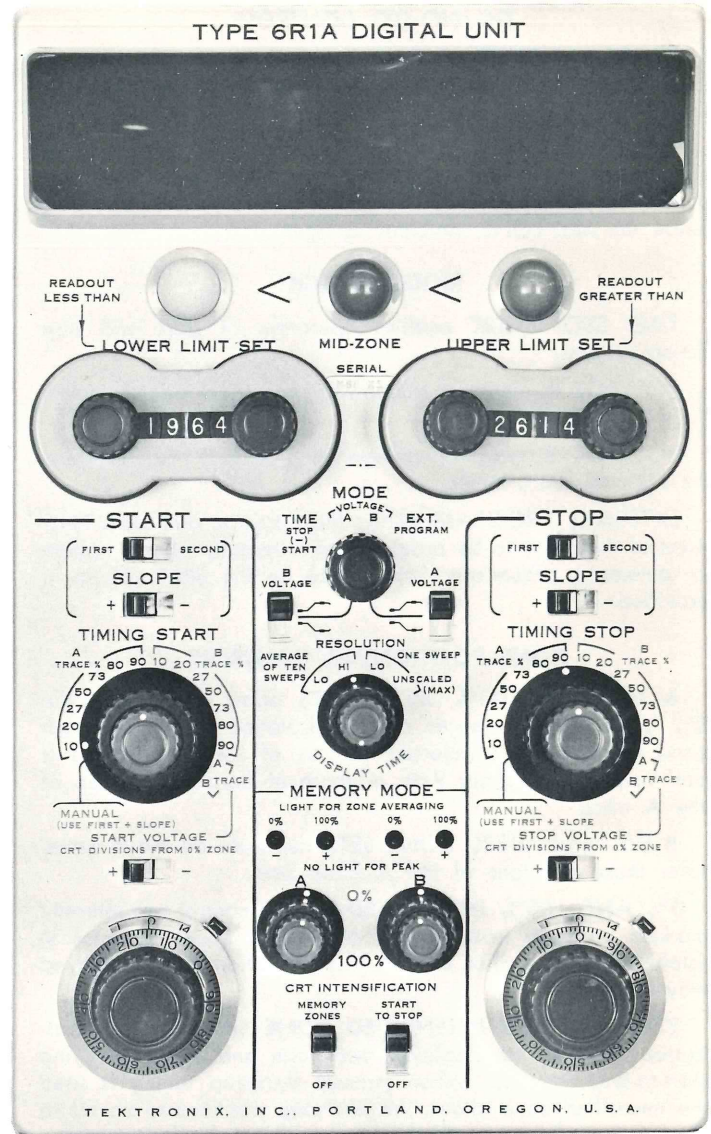
DIGITAL READOUT ACCURACY of the Type 6R1A is better than the accuracy obtainable by visual measurement of the same waveform on a conventional oscilloscope display. For assistance in determining system accuracy in specific applications, consult your Tektronix Field Office.

INPUT is internally connected from horizontal and vertical plug-in units.

MECHANICAL FEATURES include an aluminum-alloy chassis and anodized front panel. Net weight is 13³/₄ pounds. Shipping weight is 21 pounds, approx.

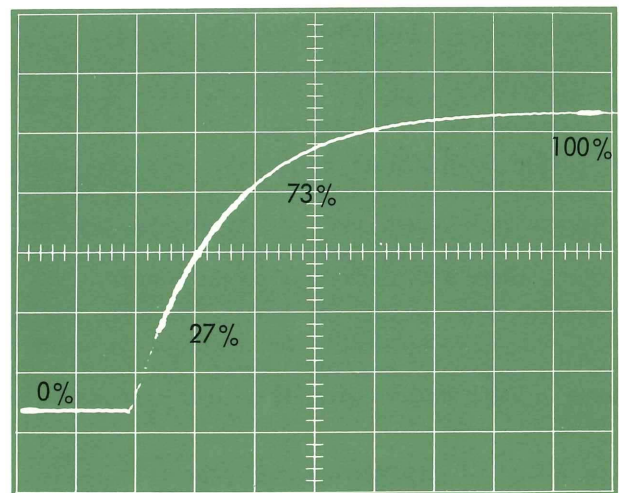
TYPE 6R1A DIGITAL UNIT

Each instrument includes: 1—polarized light filter, 2—instruction manuals.



PERIOD (1 CYCLE) MEASUREMENT

Start: +50% A Trace 1st Crossing
Stop: +50% A Trace 2nd crossing



TIME-CONSTANT MEASUREMENT

Start (from) 27% A Trace
Stop (to) +73% A Trace



DUAL-TRACE SAMPLING UNIT Type 3S76

Internal Triggering and Delay Lines

0.4-nsec or less Risetime

2 Identical Channels

5 Operating Modes

Recorder Outputs

The Type 3S76 Sampling Unit is a dual-trace amplifier. Used with a sampling time-base unit, the unit can perform in one of five operating modes for a variety of single, dual-trace, and X-Y displays. The Type 3S76 has two separate channels, each with identical characteristics. The unit can be used in the Type 561A, 564, and 567 Oscilloscopes*. In the Type 567 and RM567, information can be presented in digital form as well as the usual crt analog form.

OPERATING MODES include Channel A only (normal or inverted); Channel B only (normal or inverted); Dual-Trace—electronic switching between the traces with either channel normal or inverted; A + B—outputs of Channel A and B algebraically added (either channel normal or inverted); A Vertical and B Horizontal—Channel A produces vertical deflection and Channel B produces horizontal deflection for X-Y displays (either channel normal or inverted).

CALIBRATED SENSITIVITY is from 2 mv/cm to 200 mv/cm in 7 calibrated steps, accuracy within 3%, except on the 2 mv/cm and 5 mv/cm steps, which have accuracy within 5%. A variable control permits continuous adjustment between steps.

FREQUENCY RESPONSE is equivalent to dc-to-3-db down at 875 Mc.

RISETIME is 0.4 nsec or less, with less than $\pm 3\%$ peak overshoot and undershoot.

NOISE is equivalent to an input signal of 2 mv pk-to-pk with Smooth-Normal Switch in NORMAL position and 1 mv pk-to-pk with Smooth-Normal Switch in SMOOTH position.

DC OFFSET is -1 to $+1$ v, referred to input, and monitorable at the front panel at 100X magnitude.

INPUT IMPEDANCE is 50 ohms.

INPUT SIGNALS can be up to 2 v pk-to-pk.

*For optimum operation, Type 561 Oscilloscopes below Serial Number 580 must be modified with Modification Kit Tektronix No. 040-267.



SIGNAL DELAY through 55-nsec internal delay line for each channel allows viewing of leading edge of input waveform.

TRIGGER SOURCE selects built-in trigger takeoff signal from either channel, or terminates.

RECORDER SIGNAL OUTPUT is 1 v/div (through 10 kilohms) dc-coupled at $+10$ volt level, both channels.

PROBE POWER is provided on both channels for cathode-follower probes.

NET WEIGHT is $7\frac{1}{2}$ pounds. Shipping weight is 12 pounds, approx.

TYPE 3S76 DUAL-TRACE SAMPLING UNIT

Each instrument includes: 2—50- Ω 10:1 attenuators, 2—5-nsec RG8A/U cable, 2—instruction manuals.

PROBES

The following Tektronix probes are recommended for use with the Type 3S76 and other Type 2-Series and 3-Series Sampling Plug-In Units. See Catalog Accessory Section for complete information on the probes.

Use	Input Impedance		Rating	Prob. No.
	R	C		
10:1 Attenuator	500 Ω	0.7 pf	16 vdc-500 vac	P6034
100:1 Attenuator	5 k Ω	0.6 pf	50 vdc-500 vac	P6035
Selectable Attenuator	10 meg Ω	varies	varies	P6032
Current	—	—	500 ma	CT1/P6040

Type 3T77 SAMPLING SWEEP UNIT



Internal or External Triggering

10 μ sec/cm to 0.02 nsec/cm Sweep Speeds

Variable Sweep Delay through 100 nsec

Single-Display Provision

Recorder Output

The Type 3T77 is a Sampling Sweep Plug-In Unit. It paired with a Sampling Amplifier Unit provides sub-nano-second capabilities. The Type 3T77 can be used in the Type 561A, 564, and 567 Oscilloscopes*. In the Type 567 and RM567, information can be presented in digital form as well as the usual crt analog form.

TRIGGERING CHARACTERISTICS

EXTERNAL TRIGGERING

AMPLITUDE RANGE is 10 mv pk-to-pk minimum, 800 mv pk-to-pk maximum. Damaging overload occurs at 5 volts and greater.

PULSE REPETITION RATE is 10 cps to 300 Mc. Trigger circuitry counts down to maximum sampling rate of approximately 100 kc. (Rate with 3S76, 50 pps to 300 Mc.)

JITTER is 50 picoseconds or 0.1% of fast ramp duration, whichever is greater, for pulses of 50-mv amplitude, 2 nsec width (or 10 mv, 10 nsec width) with repetition rate less than 10 Mc. Jitter increases with less amplitude and/or pulse width, and with repetition rates above 10 Mc.

INTERNAL TRIGGERING

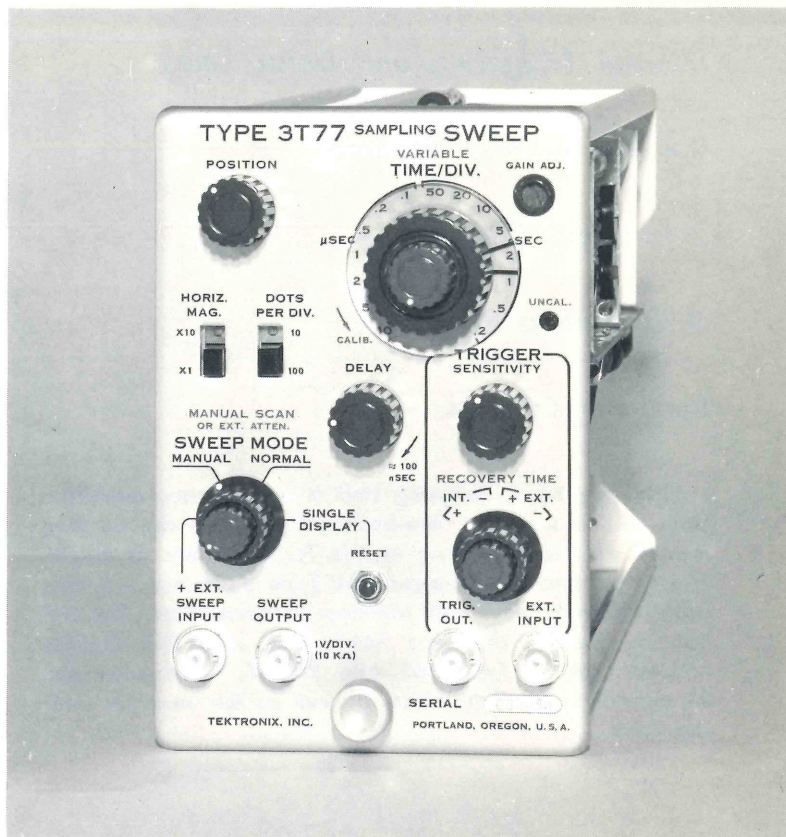
Same specifications as EXTERNAL TRIGGERING, but modified by vertical plug-in being used. When used with 3S76, all specifications are the same except 5X amplitude is required at A or B vertical input.

OTHER CHARACTERISTICS

DISPLAY can be either 10 or 100 dots/cm.

CALIBRATED SWEEP RANGE is from 0.2 nsec/div to 10 μ sec/div in 15 calibrated steps, 1-2-5 sequence. Accuracy is within 3%. A variable control permits continuous adjustment uncalibrated between calibrated rates.

* For optimum operation, Type 561 Oscilloscopes below Serial Number 580 must be modified with Modification Kit Tektronix No. 040-267.



10X MAGNIFIER extends the calibrated sweep rate to 0.02 nsec/cm.

MANUAL SCAN OR EXTERNAL ATTENUATOR, a dual-purpose control, permits manual scanning of signals or control of external sweep amplitudes.

EXTERNAL SWEEP INPUT is dc-coupled and accepts a minimum 50-v positive going sweep for 10-cm display.

SINGLE DISPLAYS useful for photography can be initiated by a reset button.

RECORDER SWEEP OUTPUT is 1 v/cm (through 10 kilohms), useful for driving recorders and other devices.

SWEEP DELAY of approximately 100-nsec permits observation of a selected portion of a waveform.

NET WEIGHT is 5½ pounds. Shipping weight is 9 pounds, approx.

TYPE 3T77 SAMPLING SWEEP UNIT

Each instrument includes: 1—BNC to UHF adapter, 1—BNC to GR adapter, 2—10 nsec RG58A/U cables, 2—10X attenuators, 2—instruction manuals.



SAMPLING-PROBE DUAL-TRACE UNIT Type 3S3

EXTREMELY COMPACT PROBES
DUAL-TRACE DISPLAYS
100 K, 2 pf INPUT
LOW NOISE
RECORDER OUTPUTS

The Type 3S3 Sampling Unit is a low-noise dual-trace amplifier. Used with a sampling time-base unit and Type P6038 Probe, the unit can perform in one of five operating modes for a variety of single, dual-trace, and X-Y displays. The Type 3S3 has two separate channels, each with identical characteristics. The unit can be used in the Type 561A, 564, and 567 Oscilloscopes*. In the Type 567 and RM567, information can be presented in digital form as well as the usual crt analog form.

OPERATING MODES include Channel A only (normal or inverted); Channel B only (normal or inverted); Dual-Trace—electronic switching between the traces with either channel normal or inverted, A + B—outputs of Channel A and B algebraically added (either channel normal or inverted); A Vertical and B Horizontal—Channel A produces vertical deflection and Channel B produces horizontal deflection for X-Y displays (either channel normal or inverted).

CALIBRATED SENSITIVITY is 5 mv/div, 10 mv/div, 20 mv/div, 50 mv/div, and 100 mv/div; accuracy within 3%. An uncalibrated continuous control extends the sensitivity to approximately 2 mv/div.

RISETIME AND SMOOTHING controls adjust the instrument for least noise, best risetime, or a compromise between the two while maintaining correct dot transient response. A switch selects one of two risetimes. The smoothing control affects both the noise level and dot transient response. The smoothing control has an adjustment range that maintains correct dot transient response and the noise level is adjusted within this range.

At low signal repetition rates, there is one smoothing control setting for correct dot transient response and thus no further adjustment for noise level is available. As the signal repetition rate increases, there is an increasingly wider range of smoothing control settings for correct dot transient response and therefore greater adjustment range for noise level is then available.

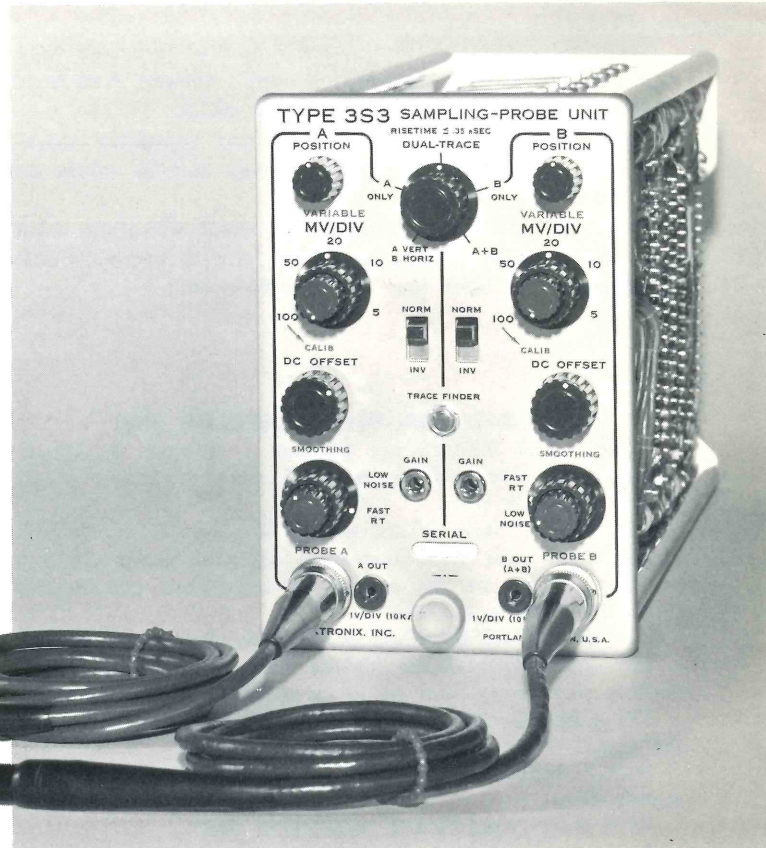
RISETIME (with a 50-ohm input source impedance) is 0.35 nsec with the switch set at the FAST RISETIME position and 1 nsec at the LOW NOISE position.

NOISE (with 50-input source impedance) can be adjusted to a minimum value equal to an input signal of less than 0.5 mv peak-to-peak.

CORRECT DOT TRANSIENT RESPONSE can be achieved with source impedances of less than 25 ohms to at least 300 ohms.

INPUT IMPEDANCE is 100 k paralleled by approx. 2 pf.

*For optimum operation, Type 561 Oscilloscopes below Serial Number 580 must be modified with Modification Kit Tektronix No. 040-267.



MAXIMUM INPUT SIGNAL is ± 1.5 v with Risetime control set to LOW NOISE and ± 3 v when the control is set to FAST RISETIME.

EXTERNAL TRIGGER is required, approximately 50 nsec prior to signal. Minimum repetition rate is 50 cps.

RECORDER SIGNAL OUTPUT of Channel A, Channel B, or Channel (A + B) is 1 v/div (through 10 kilohms), dc-coupled at +10 volt level.

DC OFFSET provides a means of displaying selected portions of signals having off-screen amplitudes. A control permits displaying of signals riding on a dc voltage as high as ± 0.5 v.

TRACE FINDER button returns the trace to crt screen to aid in vertical positioning when the trace is driven off the screen by a large signal.

PROBE (Type P6038) used with the Type 3S3 is extremely compact. The sampling bridge is contained in the probe head to obtain optimum results with the input impedance of 100 k paralleled by 2 pf. Probe can be changed from channel to channel with only minor recalibration.

NET WEIGHT is 6 $\frac{3}{4}$ pounds. Shipping weight is 9 pounds, approx.

TYPE 3S3 AMPLIFIER UNIT
 (with two Type P6038 Probes)

Each instrument includes: 2—instruction manuals.

REPLACEMENT P6038 PROBE (Part Number 010-156)

Each probe includes: Normalizer, 10X attenuator, capacitor coupler, miscellaneous tips.

Type **3A2** DUAL-BEAM AMPLIFIER UNIT

Type **3B2** TIME-BASE UNIT



Tektronix Type 3A2 Dual-Trace Amplifier Unit and Type 3B2 Time-Base Unit enable low and medium frequency digital readout on the Tektronix Type 6R1A.

Measurements can be made on any repetitive waveform and some types of measurements can be made on single-shot transients.

For amplitude measurements, the input waveform must maintain constant amplitude for at least 5 microseconds, in order to establish the 100% reference level.

TYPE 3A2 DUAL-TRACE AMPLIFIER UNIT

OPERATING MODES are Channel 1, Channel 2, Added, Alternate, or Chopped. In chopped mode, switching occurs at about a 40-kc rate.

SENSITIVITY from 10 mv/div to 10 v/div, is in 10 calibrated steps with 1-2-5 sequence, accuracy within 3%. A variable control permits continuous adjustment uncalibrated from 10 mv/div to 25 v/div.

AMPLIFIER PASSBAND is dc to 500 kc for analog display.

SEPARATE CONTROLS include those for attenuation, inversion, positioning, and ac or dc-coupling of each channel.

TRIGGERING can be from Channel 1, Channel 2, or from the signal displayed on the screen.

INPUT IMPEDANCE is 1 megohm, paralleled by approximately 47 pf.

TYPE 3A2 DUAL-TRACE AMPLIFIER UNIT

Each instrument includes: 1—BNC to binding post adapter, 2—instruction manuals.

TYPE 3B2 TIME-BASE UNIT

TRIGGERING LEVEL operates over a ± 12 volt range.

TRIGGER-SOURCE can be internal with 2 mm signal display (from oscilloscope calibrator), external with 0.4 v signal, or line.

TRIGGER COUPLING can be AC Slow, AC Fast, or DC; \pm Slope.

SWEEP RANGE from 2 μ sec/div to 1 sec/div is in 18 calibrated steps with 1-2-5 sequence, accuracy within 3%. Calibrated digital readout available from 1 sec/div through 20 μ sec/div ranges.

DIGITAL RESOLUTION selects clock rates from 0.1 μ sec to 10 msec in 6 decade steps. Resolution can be selected independent of sweep time, for increased readout accuracy when the first significant digit is known. The front panel indicates the maximum resolution, without counter overflow, that can be attained for each sweep rate. When used with the Type 567 Oscilloscope and Type 6R1A Digital Unit, resolution to 1 μ sec can be attained.

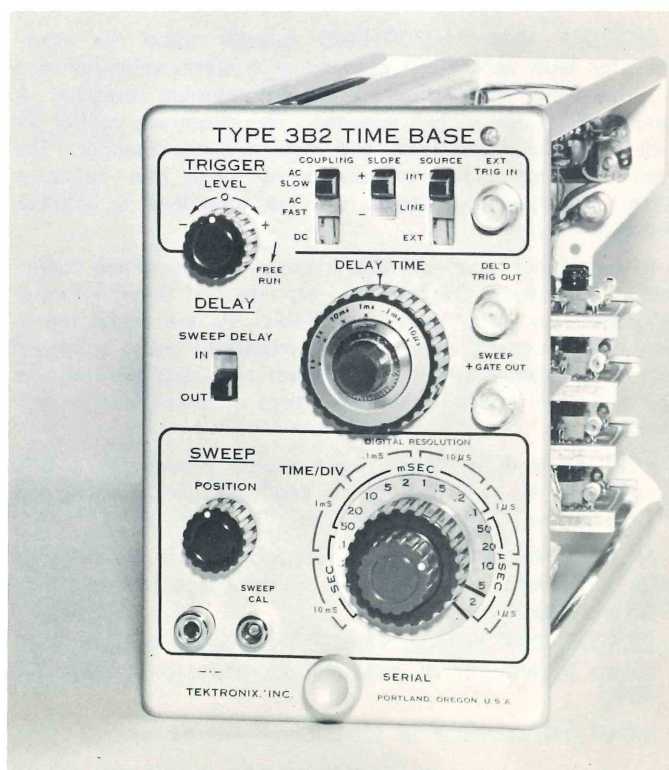
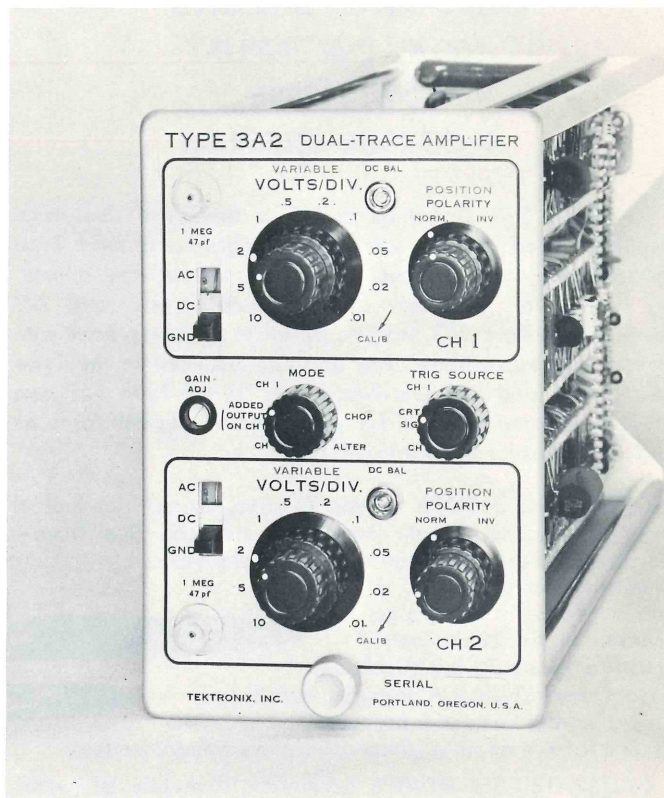
1-MC CLOCK is crystal controlled for added stability.

CALIBRATED SWEEP DELAY can be switched in or out. Delay time is continuously variable from 5 μ sec to 10.5 sec, accuracy within 1%.

OUTPUTS are available at front-panel BNC connectors. The Delayed Trigger output is nominally + 5 v; Sweep Gate is nominally + 15 v.

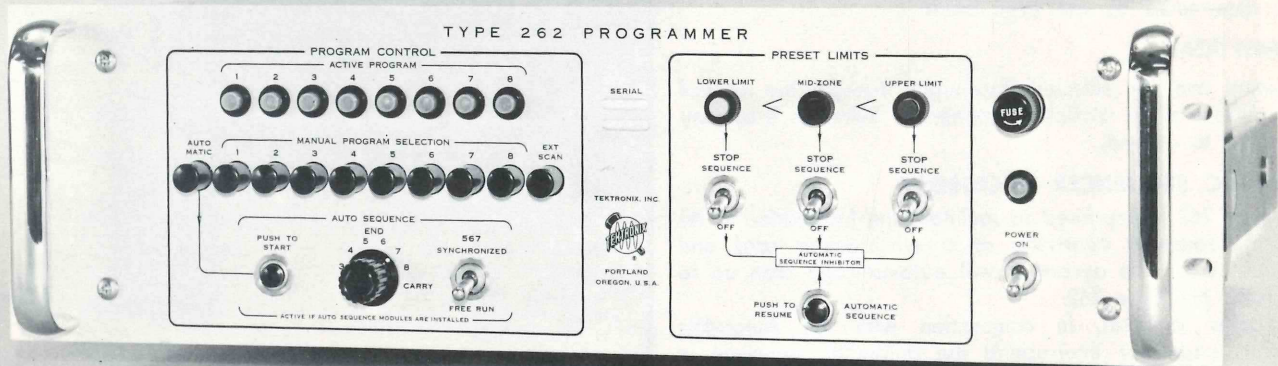
TYPE 3B2 TIME-BASE UNIT

Each instrument includes: 2—instruction manuals.





PROGRAMMER Type 262



8 DIFFERENT MEASUREMENT PROGRAMS PER TYPE 262

UP TO 3 TYPE 262's OPERATE IN SERIES

UP TO 8 PROGRAMS PER SECOND

MANUAL PUSH-BUTTON PROGRAM SELECTION

REMOTE PROGRAM SELECTION

OPTIONAL AUTOMATIC SEQUENCING

The Type 262 Programmer functions as an auxiliary piece of equipment in Tektronix Type 567/6R1A measurement systems. Any measurement made manually through use of the Type 567/6R1A front-panel controls can be externally programmed with the Type 262.

The Programmer provides the Type 567/6R1A system with an outlet to faster measurement methods and a way to become involved with more complex systems. For example, a faster measurement method is one that programs digital readout on the Type 6R1A without having to resort to the Type 6R1A start-stop switches. Setting of the Type 6R1A start-stop switches is replaced by merely pressing a single push-button switch on the Type 262. Auxiliary programming cards allow the Type 262 to program addi-

tional equipment within a complex system, such as signal attenuators and generators.

All information required to program the Type 567/6R1A, including upper and lower test limits, is contained in the program cards. Each Type 262 holds up to eight program cards. By cascading three* Type 262's a sequence of twenty-four test programs becomes available in either manual or automatic operation modes.**

PROGRAM CARDS

Plug-in program cards come pre-wired, ready for programming. Cards are programmed by soldering in appropriate jumpers and values of resistors. This manner of program connection assures maximum electrical and mechanical reliability.

Each Type 262 holds up to 8 program cards. Each card can be programmed for a particular time or amplitude measurement such as risetime, delay time, period, pulse amplitude, time interval between percentage or voltage points on either A or B signal waveforms of either polarity, 1st or 2nd pulse selection. Upper and lower test limits can also be programmed on the cards.

If a change of a measurement program is desired, the plug-in program cards can be removed and other pre-wired programs inserted in a matter of seconds, or the cards can be easily re-wired.

* Cable capacitance and environmental noise limits the number of Programmers that can be used in series.

** Automatic sequencers are required.

AUXILIARY PROGRAMMING

The Type 262 also accommodates 8 auxiliary plug-in programming cards. The connectors from the auxiliary cards have parallel connections to 54 control lines available at the rear-panel of the Type 262 for programming signal attenuators, signal generators, trigger source switches, signal switches, and power supplies.

MANUAL CONTROL

Front-panel push-buttons allow selection of measurements. The sequence is determined by the operator and any program can be held for as long a period as needed. The measurement rate is determined by the Type 6R1A.

EXTERNAL SCAN

Programs can be selected externally through the control lines available at the rear-panel connector. Selection is by contact closure to ground.

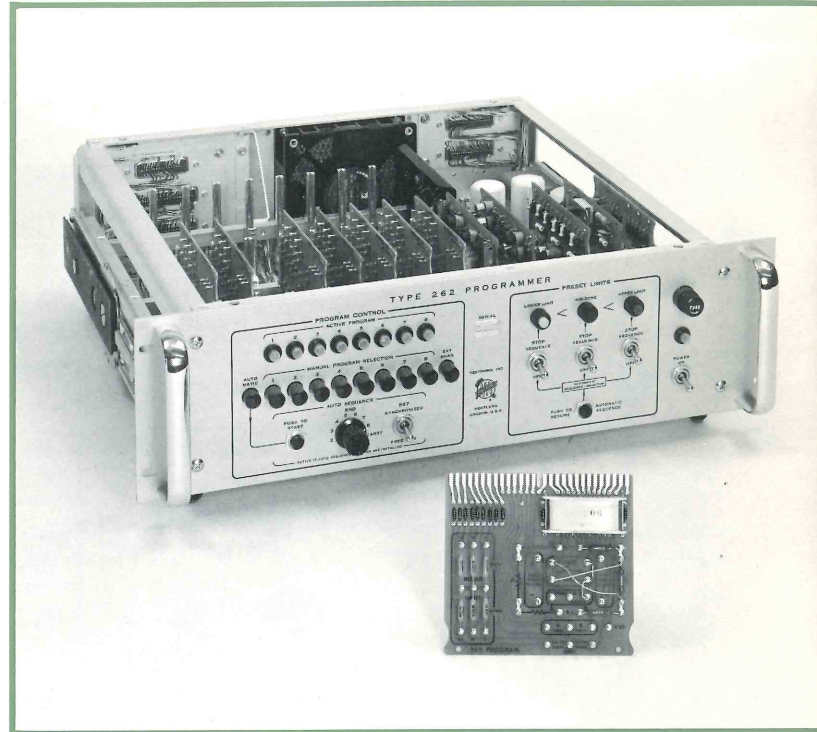
AUTOMATIC SEQUENCER ACCESSORY

The Type 262 is pre-wired to facilitate the installation of an automatic sequencer consisting of a synchronizer card and a counter card. This accessory will automatically scan up to 8 programs per Type 262.

Front-panel switches, in conjunction with the Automatic Sequencer, allow for interrupting the automatic sequence in accordance with pre-established upper and lower limits. Any combination of the upper, middle, or lower limits can be used.

The position of the cards can be interchanged to achieve any particular sequence of measurements wanted.

The automatic sequencer can be synchronized with data recording devices such as printers, card punches, or with various test fixtures.



Both manual push-button control and external control are still available when the automatic sequencer is installed.

Up to three Type 262 Programmers can be used in series for a total of 24 different measurement programs. For automatic sequencing, each individual Type 262 requires an automatic sequencer accessory.

MEASUREMENT RATE

WITHOUT AUTOMATIC SEQUENCER

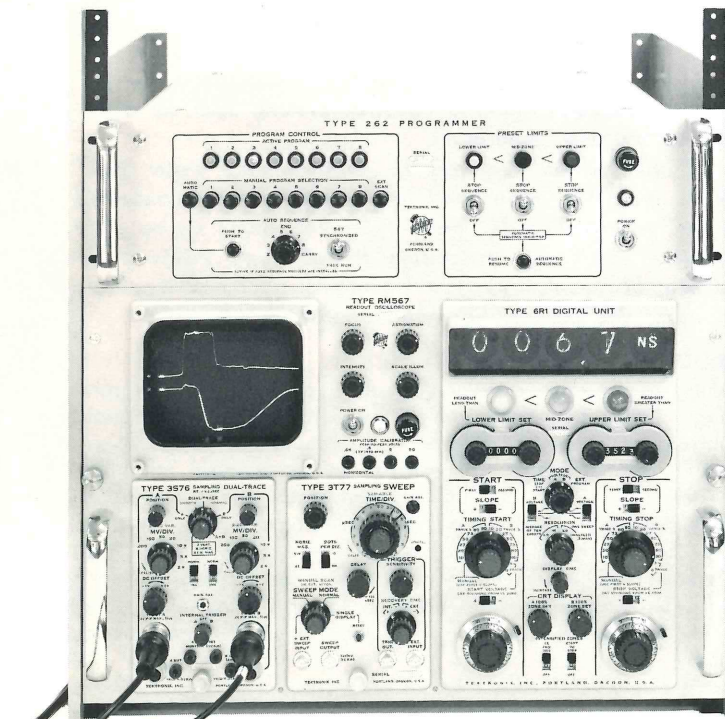
The measurement rate is governed by the Type 6R1A display time of 0.1 to 6 seconds, and is also dependent upon the sweep time.

WITH AUTOMATIC SEQUENCER

With the Automatic Sequencer installed, the measurement rate can be synchronized with auxiliary equipment or can be determined by the Type 567 and Type 262.

In a non-synchronized mode of operation, the measurement rate is determined by the sum of the Type 6R1A display time and the Type 262 display time. Display time of the Type 262 is continuously variable within the range of 50 to 500 milliseconds. In this mode, up to 8 measurements per second can be made.

In a synchronized mode of operation, the display is held, upon completion of a measurement, until an external completion pulse is received. In the synchronized mode, up to 6 measurements per second can be made.



Type 262 programming the Type RM567/6R1A in a sequence of transistor switching measurements. Risetime (10% to 90%) measurement shown.

MECHANICAL FEATURES

The Type 262 mounts in a standard 19" rack and occupies only 5 1/4" of rack height. It has slide-out tilt-lock tracks that permit it to be pulled forward, tilted, and locked in any of five positions for convenient programming and servicing. Cabinet feet are included for installation when not rack-mounted.

TYPE 262 PROGRAMMER

Includes: 1—cabinet feet kit, 2—instruction manuals, 1—power cord.

NECESSARY ACCESSORIES FOR BASIC OPERATION

For basic operation of the Type 262, at least one program card is required. One of two types of interconnecting cable is also required: (1) for connecting the Type 262 to the Type 6R1, (2) for connecting the Type 262 to another Type 262.

PROGRAM CARD (Part No. 670-037)

TYPE 262/6R1 CABLE (Part No. 012-081)

TYPE 262/262 CABLE (Part No. 012-082)

PROGRAM CARD EXTENSION

A 56-pin rigid extension enables the program cards to operate out of the type 262 housing for servicing convenience.

56-PIN RIGID CARD EXTENSION (Part No. 012-078)

AUTOMATIC SEQUENCER ACCESSORY

A sequencer, composed of a synchronizer card and a counter card, provides for automatic scan of up to 8 programs per Type 262.

AUTOMATIC SEQUENCER (synchronizer card and counter card) (Part No. 040-331)

SYNCHRONIZER CARD Only (Part No. 670-039)

COUNTER CARD Only (Part No. 670-040)

AUXILIARY PROGRAMMING CARDS (not furnished with Type 262)

The Type 262 accommodates 8 auxiliary plug-in programming cards. Each card has gold, through-hole plating for best possible electrical contact.

Card with 11 reed relay assy. (Part No. 018-003)

Card only (Part No. 018-004)

OPTIONAL RESISTOR KIT

A resistor kit containing 176, 1/4 w, 1% resistors is available for use with program cards. (Part No. 016-056)

Complete instructions to program the cards are included in the instruction manual.

SAMPLING ACCESSORIES

The usefulness of the Type 567 and Type RM567 Oscilloscope is further augmented by a wide range of accessories and associated instruments. Brief descriptions of some of these are given here.



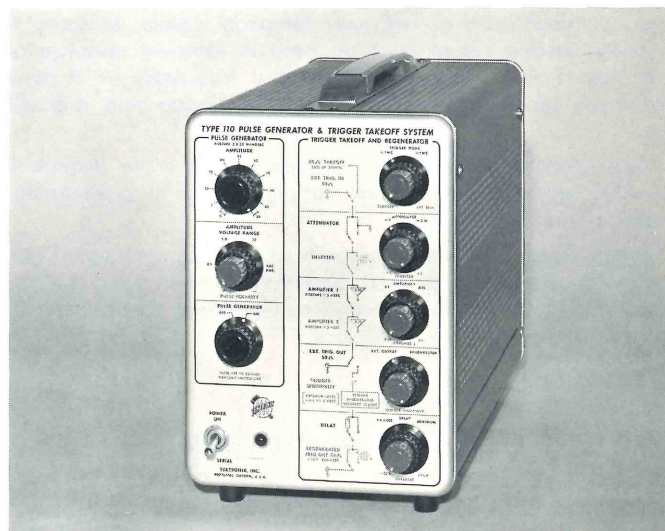
TYPE 109 PULSE GENERATOR

The Type 109 produces 0.25-nsec risetime pulses of either equal or alternately different time duration. Pulse width is 0.5 to a maximum of 40 nsec at the full repetition rate of typically 550 to 720 pulses/sec; to 300 nsec at half repetition rate.

Pulse amplitude can be selected from three calibrated ranges extending from 0 v through 50 v, accuracy within 3%. Polarity can be either positive or negative.

External dc charge voltage inputs permit alternate pulses of different amplitudes and/or polarity.

TYPE 109 PULSE GENERATOR



TYPE 110 PULSE GENERATOR AND TRIGGER TAKE-OFF SYSTEM

The Type 110 is similar to the Type 109 plus a Trigger Takeoff and Regenerator. Approximately 98% of the input voltage appears at the output after passing through the takeoff, and approximately 20% of the signal voltage appears as a trigger signal.

A regenerated trigger signal of ± 6 v to ± 10 v amplitude and 220-nsec to 280-nsec duration is available. Timing delay is nominally 20 nsec, and recovery time is 10 μ sec, with count-down from about 100 Mc at a uniform repetition rate.

TYPE 110 PULSE GENERATOR

SAMPLING ACCESSORIES

TYPE 111 PULSE GENERATOR

The Type 111 is a high-repetition rate, fast-rise pulse generator that provides two pulse outputs: OUTPUT PULSE—with risetime equal to or less than 0.5 nsec for positive; slightly longer for negative pulse. Repetition rate is continuously adjustable from 10 pps to 100 kc. Pulse duration is 2 nsec minimum to 100 nsec maximum with an external charge line. Pulse amplitude is over ± 5 volts.

PRETRIGGER PULSE amplitude is 10 v, duration is 250 nsec, and half-amplitude risetime is 4 nsec. (Approximately).

Time delay between pretrigger and output pulse is continuously variable from 30 nsec to 250 nsec.

TYPE 111 PULSE GENERATOR

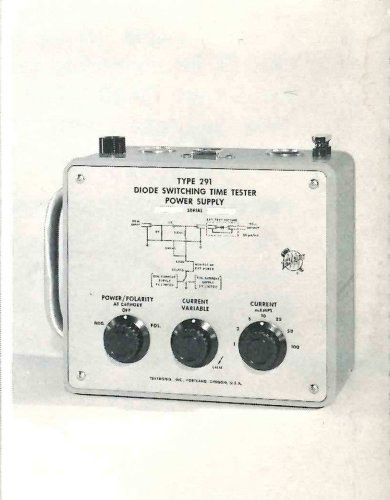
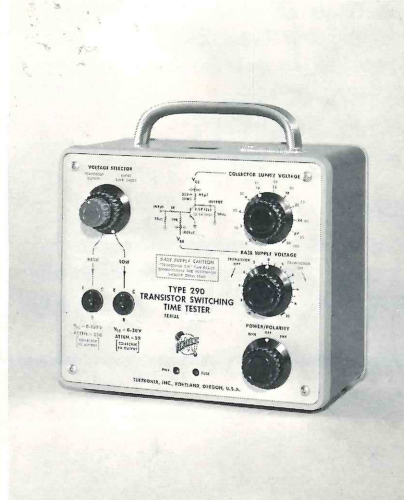


TYPE 280 TRIGGER COUNTDOWN UNIT

The Type 280, used with the Type 567/3S76/3T77 or Type 567/3S3/3T77, allows synchronization on frequencies up to 5 Gc. The Type 280 can be used to lower the frequency of the triggering signals to within a range of 15 to 45 Mc. This permits the trigger circuit of the sampling system to lock in solidly with a much higher input signal frequency.

Input frequency is from 30 Mc to 5 Gc; input signal range is 50 mv to 4 v, peak-to-peak. Output repetition rate is continuously variable from 15 to 45 Mc. Fast-rise trigger output is 150 mv with less than 0.4-nsec risetime and 1.5 v with less than 4-nsec risetime.

TYPE 280 TRIGGER COUNTDOWN UNIT



TYPE 290 TRANSISTOR SWITCHING-TIME TESTER

The Type 290, driven by a Tektronix fast rise pulse generator and combined with a Tektronix sampling system, provides a transistor testing system with an over-all transient response of less than 1 nsec. This system tests fast transistors on a short duty-cycle basis for delay time, risetime, storage time, and fall time.

Two continuously variable collector voltages are available: 0-to-30 v and 0-to-100 v. Base supply voltage is continuously variable from 0 to ± 10 v.

When using a single-trace oscilloscope, the input signal can be switched to the output for observation; when using a dual-trace oscilloscope, the input and output signal can be viewed simultaneously.

TYPE 290

TYPE CT-1 CURRENT TRANSFORMER AND P6040 PROBE

The Type CT-1 Current Transformer and P6040 Probe, used with the Type 567, will measure milliampere currents at frequencies beyond 1 Gc. Sensitivity of the Type CT-1/P6040 is 5 mv/ma into a 50- Ω load. Risetime is less than 0.35 nsec, and accuracy is $\pm 3\%$.

The Type CT-1/P6040 gives true readings of current flow while keeping loading effects to a minimum. The P6040 Probe is used as a convenient plug-on inter-connecting cable for the Type CT-1.

TYPE CT-1 and P6040 (Part No. 015-041)

TYPE CT-1 only (Part No. 015-040)

TYPE P6040 only (Part No. 010-133)

TYPE 291 DIODE SWITCHING-TIME TESTER and TEST FIXTURE

The Type 291 enables measurement of fast-switching diode characteristics. The diode under test is magnetically held in the Test Fixtures.

The Type 291 provides a range of dc test currents to 100 ma—with provision for external current supply to 500 ma and an external current monitor. The Type 291 and Test Fixture response is less than 0.35 nsec. The input pulse should be supplied from a fast-rise generator such as the Tektronix Type 109 or 110.

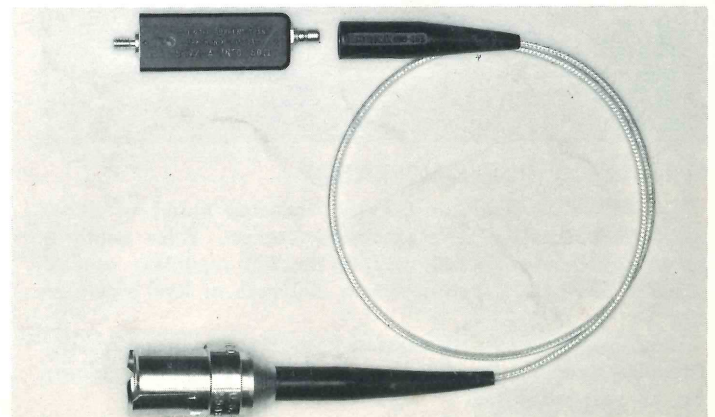
TYPE 291 (without test fixture)

TEST FIXTURES: Two are available.

(1) Jig (Part No. 013-080)

Adapter for Jig (Part No. 017-075)

(2) Type TF-1 (Part No. 017-072)



Tektronix, Inc.

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