



CATHODE - RAY  
OSCILLOSCOPES  
*AND AUXILIARY INSTRUMENTS*

INCLUDING **NEW** INSTRUMENTS

SHORT FORM  
CATALOG  
AUGUST 1957



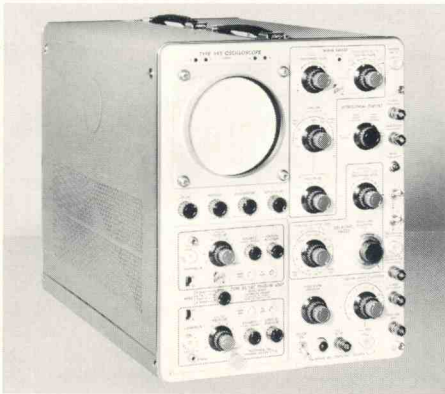
# TYPE 530-SERIES and TYPE 540-SERIES

## Abundant Versatility Provided by Plug-In Preamplifiers

Type 530-Series and Type 540-Series Oscilloscopes are quickly and easily converted to any of a wide variety of applications by plugging in the appropriate vertical preamplifier. Characteristics available in the various plug-in units provide each oscilloscope with the capabilities of several . . . at less cost, and with easier handling and lower space requirements.

### DC-TO-30 MC OSCILLOSCOPES

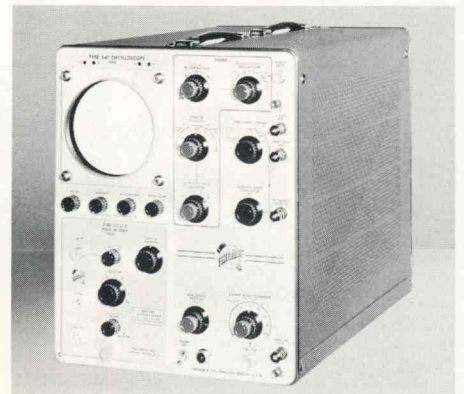
**NEW MECHANICAL DESIGN** — Redesigned mechanically for easier access to the interior of the instrument, the Type 541, 545, 531, 535 and 532 Oscilloscopes now have a more streamlined appearance. Cabinet sides are held in place by quick-opening fasteners; removal and replacement of either side takes just seconds.



**Type 545 Oscilloscope**, in combination with the new Type 53/54K Fast-Rise Plug-In Unit, opens the way to quicker, easier analyses of fast-rising waveforms

. . . providing faithful displays and accurate measurement facilities well beyond the range of previous oscilloscopes of its size and cost. Risettime of the Type 545-Type 53/54K combination is 12 millimicroseconds. Passband is dc to approximately 30 mc. (Response is down 3 db  $\pm$  1/2 db at 30 mc, 6 db at approximately 41 mc, 12 db at approximately 55 mc.) Deflection factor . . . 0.05 v/cm to 20 v/cm in 9 calibrated steps. Full 4 cm linear vertical deflection; 0.2- $\mu$ sec vertical-signal delay. Convertibility to most laboratory applications is provided by Type 53/54 Plug-In Units. Two P410 probes are furnished. All other characteristics of the Type 545 Oscilloscope are the same as those of the Type 535 described below, including delayed sweeps. Weight 65 pounds. Price, without plug-in units, \$1450.

**Type 541 Oscilloscope** has the same gen-



eral characteristics as the Type 545, but is without provision for delayed sweeps. Weight 61 1/2 lbs. Price, without plug-in units, \$1145.

### DC-TO-10 MC OSCILLOSCOPES

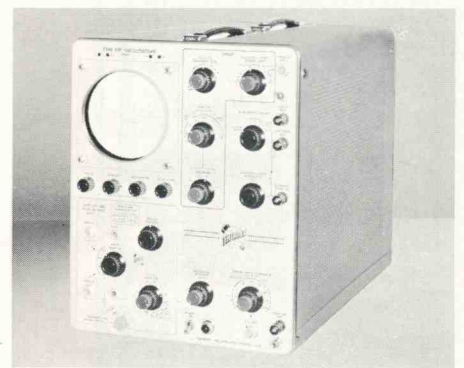
**Type 535 Oscilloscope** has a wide-band main amplifier with a risetime of 0.03  $\mu$ sec, designed to work with all Type 53 and Type 53/54 Plug-In Units. It offers a wide range of sweep delay, 1  $\mu$ sec to 0.1 sec, in 12 calibrated ranges, accurate within 1%. (Longer delay available at slight extra cost.) Sweep delay is continuously

variable, with incremental accuracy within 0.2% of full scale. Delay circuitry has two operating modes—conventional, with jitter less than 1 part in 20,000—and triggered, providing jitter-free displays even in the presence of jitter in the signal. Delay circuitry provides a continuously variable trigger-rate source, 10 cycles to 40 kc. Other features of the Type 535 are:

Wide-range sweep circuit—0.02  $\mu$ sec/cm to 12 sec/cm continuously variable with 24 calibrated steps from 0.1  $\mu$ sec/cm to 5 sec/cm, accurate 5x magnification on all ranges; trigger amplitude-level selection with preset or manual stability control, and fully automatic triggering; dc-coupled unblanking, 10-kv accelerating potential. New metalized crt, manufactured by Tektronix, Inc., provides full 6 x 10 cm viewing area; horizontal input amplifier, deflection factor 0.2 v/cm to approximately 15 v/cm continuously variable; 0.25- $\mu$ sec vertical signal delay; square-wave amplitude calibrator—0.2 mv to 100 v; electronically-regulated power supply; beam-position indicators.

Weight 65 lbs. Price, without plug-in units, \$1300.

**Type 531 Oscilloscope** has the same general characteristics as the Type 535, but is without provision for delayed sweeps. Weight 61 1/2 lbs. Price, without plug-in units, \$995.





# CONVERTIBLE OSCILLOSCOPES

## DC-TO-5 MC OSCILLOSCOPE

**Type 532 Oscilloscope** offers the advantages of all Type 53 and Type 53/54 Plug-In Units, with only the wide-band units being limited to a passband of DC to 5 mc and risetime of 0.07  $\mu$ sec by the characteristics of its main amplifier. The Type 532 is designed for users who do not need the high-speed sweeps, high writing rate, and wide passband of the Type 531. Simplified circuitry eases vacuum-tube loading; lower accelerating potential reduces possibility of screen damage at very-slow sweep speeds and makes possible greater linear vertical deflection. Sweep range—0.2  $\mu$ sec/cm to 12 sec/cm continuously variable, with 21 calibrated steps from 1  $\mu$ sec/cm to 5 sec/cm,

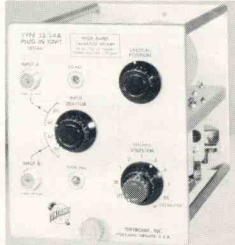


accurate within 3%. 5x magnifier accurate on all ranges. Versatile trigger circuitry includes amplitude-level selection with preset or manual stability control, and fully automatic triggering. 4-kv accelerating potential. New precision crt, manufactured by Tektronix, Inc., provides 8 cm vertical deflection. Horizontal input amplifier, deflection factor 0.2 v/cm to approximately 15 v/cm; square-wave amplitude calibrator, 0.2 mv to 100 v in 18 steps, accurate within 3%. DC-coupled unblanking, electronically-regulated power supply, vertical beam-position indicators. Wt. 52 lbs. Price, without plug-in units. \$825.

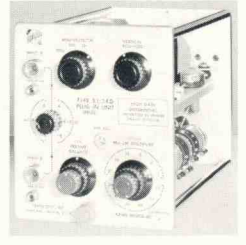
## PLUG-IN PREAMPLIFIERS

(Frequency response down 3 db  $\pm$  1/2 db at limits quoted.)

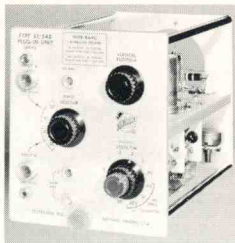
**Type 53/54A Wide-Band DC-Coupled Unit**—dc to 20 mc, 0.018- $\mu$ sec risetime with Types 541 and 545...dc to 10 mc, 0.035- $\mu$ sec risetime with Types 531 and 535...dc to 5 mc, 0.07- $\mu$ sec risetime with Type 532. Deflection factor 0.05 to 50 v/cm, ac or dc, continuously variable, with 9 calibrated steps from 0.05 to 20 v/cm. 60-db isolation between two input connectors. Weight 3 1/2 lbs. Price \$85.



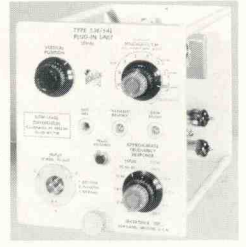
**Type 53/54D High-Gain Differential DC Unit**—passband dc to 350 kc at 1 mv/cm, increasing to dc to 2 mc at 50 mv/cm. Calibrated deflection factor from 1 mv/cm to 50 v/cm, continuously variable from 1 mv/cm to 125 v/cm. Normal drift from 2 to 5 mv/hr. High rejection ratio. Weight 4 pounds. Price \$145.



**Type 53/54B Wide-Band High-Gain Unit**—same as the Type 53/54A with the addition of an ac-coupled input stage providing deflection factor of 5 mv/cm to 0.05 v/cm continuously variable, with 3 calibrated steps—at 2 cycles to 12 mc, 0.03- $\mu$ sec risetime with Types 541 and 545—2 cycles to 9 mc, 0.04- $\mu$ sec risetime with Types 531 and 535—2 cycles to 5 mc, 0.07- $\mu$ sec risetime with Type 532. Weight 3 1/2 lbs. Price \$125.



**Type 53/54E Low-Level Differential AC Unit**—deflection factor 50  $\mu$ v/cm to 10 millivolts/cm in 8 calibrated steps. Frequency response 0.06 cycles to 30 kc at full gain, increasing to 60 kc at 0.5 mv/cm. Differential input—50,000 to 1 rejection ratio at full gain for in-phase signals of  $\pm$ 2 v or less. Maximum combined noise and hum is 5  $\mu$ v, rms, with input grids grounded. Weight 4 1/2 lbs. Price \$165.



**Type 53/54C Dual-Trace DC Unit**—two identical amplifier channels, each with passband and risetime of...dc to 24 mc, 0.015  $\mu$ sec with Types 541 and 545...dc to 10 mc, 0.035  $\mu$ sec with Types 531 and 535...dc to 5 mc, 0.07  $\mu$ sec with Type 532. Deflection factor 0.05 to 50 v/cm continuously variable, with 9 calibrated steps from 0.05 to 20 v/cm. Electronic switching triggered by sweep, or free-running at about 100 kc. Weight 5 1/2 lbs. Price \$275.



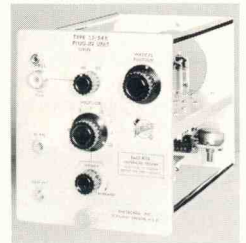
**Type 53/54G Wide-Band Differential DC Unit**—dc to 20 mc, 0.018- $\mu$ sec risetime with Types 541 and 545...dc to 10 mc, 0.035- $\mu$ sec risetime with Types 531 and 535...dc to 5 mc, 0.07- $\mu$ sec risetime with Type 532. Deflection factor 0.05 to 50 v/cm continuously variable, with 9 calibrated steps from 0.05 to 20 v/cm. Separate step attenuators for both inputs. Rejection is better than 100 to 1 at full gain for the entire passband, 300 to 1 at 60 cycles. Weight 4 1/2 lbs. Price \$175.



**Type 53/54K Fast-Rise Unit**—With Type 545 and Type 541—risetime 12 millimicroseconds, passband dc to approximately 30 mc. (Response is down 3 db  $\pm$  1/2 db at 30 mc, 6 db at approximately 41 mc, 12 db at approximately 55 mc.) 0.05 v/cm to 20 v/cm deflection factor in 9 calibrated steps. Input impedance direct—20  $\mu$ f, 1 megohm; with P410 probe—8  $\mu$ f, 10 megohms. Characteristics with Type 535 and Type 531—risetime 0.031  $\mu$ sec, passband dc to 11 mc. Weight 3 1/2 pounds. Price \$125.

Low Input Capacitance With Accessory Probes for Type 53/54C and 53/54K Units

Probe	Input Impedance	Attn.	Price
P405	12 $\mu$ f, 5 megohms	5:1	\$10.50
P410	8 $\mu$ f, 10 megohms	10:1	10.50
P420	5.5 $\mu$ f, 10 megohms	20:1	10.50
P450-L	2.5 $\mu$ f, $\pm$ 10%, 10 m	50:1	12.50
P4100	2.5 $\mu$ f, $\pm$ 10%, 10 m	100:1	12.50

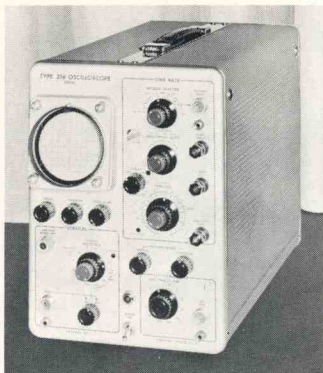




# NEW INSTRUMENTS

**Type 316 Portable 3" Oscilloscope** is a dc-to-10 mc instrument for both field and laboratory applications. Passband and risetime—dc to 10 mc, 0.035  $\mu$ sec from 0.1 to 50 v/div; 2 cycles to 9 mc, 0.04  $\mu$ sec from 0.01 to 0.1 v/div; signal delay, 0.25  $\mu$ sec. 22 calibrated sweep rates from 0.2  $\mu$ sec/div to 2 sec/div are selected by a single control which also indicates the new sweep rate when the 5x magnifier is in use. Versatile triggering includes amplitude-level selection with preset or manual stability control, and fully automatic triggering. 1.85-kv accelerating potential on new Tektronix precision 3" crt; square-wave voltage calibrator, 0.05 to 100 v in 11 steps; electronically-regulated power supplies. Size—8½" w, 12" h, 19½" d. Weight 35 lbs.

Price, Type 316 (50 to 60 cycle supply) .....\$725  
 Price, Type 316-S1 (50 to 800 cycle supply) .....\$760



**Type RM16 Oscilloscope** is a mechanically rearranged Type 316, for mounting in a standard 19" rack. Dimensions are: 7" h, 19" w, 16¾" rack depth, 19¼" d overall. For servicing convenience it can be tilted vertically on its slide-out mounting. Electrical specifications are identical to the Type 316 Oscilloscope.

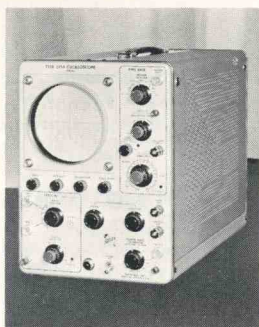
Type RM16 (50 to 60 cycle supply) .....\$795  
 Type RM16-S1 (50 to 800 cycle supply) .....\$830

The Type RM16 will also be available with power supply separated from indicator unit for racks of limited depth. Indicator unit depth, 11¾". Power supply depth, 5½".



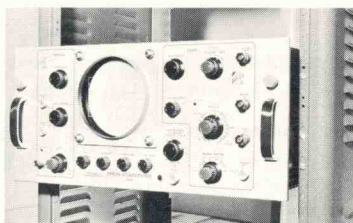
**REGULAR PRODUCTION AND INITIAL SHIPMENT EXPECTED TO BEGIN APPROXIMATELY NOVEMBER, 1957.**

**Type 515A Oscilloscope** is a 5" general-purpose laboratory instrument of reduced size (9¾" w, 13½" h, 21½" d). Passband is dc to 15 mc, with 0.023- $\mu$ sec risetime; deflection factor is calibrated in 9 steps from 0.05 v/cm to 20 v/cm, continuously variable from 0.05 v/cm to 50 v/cm; 0.25- $\mu$ sec balanced delay network. Twenty-two calibrated sweep rates from 0.2  $\mu$ sec/cm to 2 sec/cm are accurate within 3%, 5x magnifier is accurate on all ranges, full sweep range is 0.04  $\mu$ sec/cm to 6 sec/cm continuously variable; amplitude-level selection with preset or manual stability control, and fully automatic triggering. Accelerating potential is 4 kv on new precision Tektronix crt. Power supply is electronically regulated. Square-wave calibrator has 11 steps from 0.05 v to 100 v accurate within 3%, frequency about 1 kc. Weight 40 lbs. Price \$750.



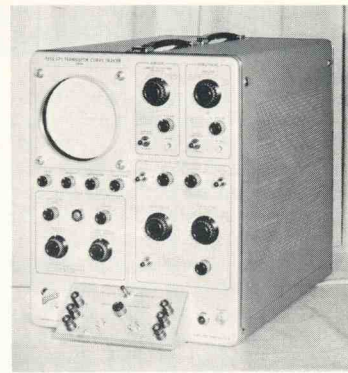
**Type RM15 Oscilloscope** is a mechanically rearranged Type 515A Oscilloscope, for mounting in a standard 19-inch rack. The instrument mounts to the rack on slide-out tracks. It can be pulled forward, tilted, and locked in any of seven positions for servicing convenience. Electrical characteristics of the Type RM15 are identical to the Type 515A Oscilloscope.

Dimensions are 8¾" h, 19" w, 25" d overall. Wt. 43 lbs. Price \$825.



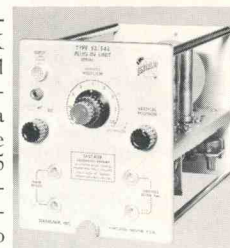
**Type 575 Transistor-Curve Tracer** displays characteristic curves of both PNP and NPN transistors on the face of a cathode-ray tube, calibrated to permit accurate voltage and current readings directly from the screen. Features include: 10-ampere collector supply; 2.4-ampere base supply; positive or negative collector sweep in two ranges, 0 to 20 v at 10 amps and 0 to 200 v at 1 amp, with 15 load resistors from 0.35 ohm to 50 kilohms available for limiting collector dissipation.

Positive or negative base stepping with 4 to 12 steps per family, repetitive or single family display, 17 current per step positions ranging from 0.001 ma/step to 200 ma/step, 5 voltage per step positions from 0.01 v/step to 0.2 v/step with 24 different driving resistances from 1 ohm to 22 kilohms; steps/sec rate is 120 or 240. Vertical axis is calibrated in collector current, base voltage, base current, and base source voltage. Horizontal axis is calibrated in collector voltage, base voltage, base current, and base source voltage. Collector current range is in 16 steps from 0.01 ma/div to 1000 ma/div; base voltage range is from 0.01 v/div to 0.5 v/div in 6 steps. Collector voltage range is from 0.1 v/div to 20 v/div in 11 steps. Other features include an input selector switch for changing the test conditions from common-emitter to common-base configuration, electronically-regulated power supply, comparison tests of two transistors by manual switching. Weight approximately 70 lbs. Price \$925.

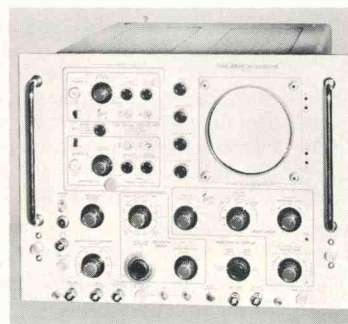


**REGULAR PRODUCTION AND INITIAL SHIPMENT EXPECTED TO BEGIN APPROXIMATELY OCTOBER, 1957.**

**Type 53/54L Fast-Rise High-Gain Plug-In Preamplifier**—essentially a Type 53/54K Unit with the addition of an ac-coupled amplifier to increase the sensitivity of Tektronix Type 540-Series Oscilloscopes by a factor of 10 for fast-rise applications. The basic deflection factor is increased to 0.005 v/cm with nine VOLTS/CM steps. Passband and transient response with the additional amplifier in the circuit is 3 cycles to 24 mc, 0.015- $\mu$ sec risetime with Types 541 and 545—3 cycles to 10 mc, 0.035- $\mu$ sec risetime with Types 531 and 535. Other specifications identical to the Type 53/54K Plug-In Unit. Weight 4½ lbs. Price \$185.



**Types RM31, RM35, RM32, RM41, RM45 Oscilloscopes** are mechanically rearranged Types 531, 535, 532, 541, 545 Oscilloscopes for mounting in a standard 19-inch rack. The instrument mounts to the rack on slide-out tracks. It can be pulled forward, tilted, and locked in any of seven positions for servicing convenience. Electrical characteristics of the rack-mounting models of the Type 530 and 540-Series Oscilloscopes are identical to the standard models. Controls and terminals are located for maximum convenience in rack-mounted operation. Dimensions are 14" h, 19" w, 24" d overall. Weight and price: RM31—64½ lbs, \$1095; RM35—68 lbs, \$1400; RM32—55 lbs, \$925; RM41—64½ lbs, \$1245, and RM45—68 lbs, \$1550.

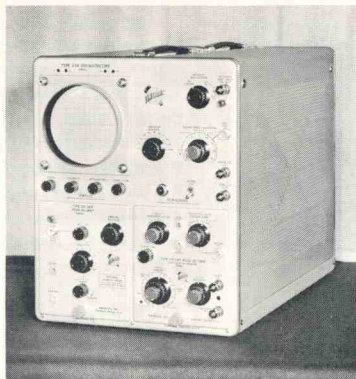


**REGULAR PRODUCTION AND INITIAL SHIPMENT EXPECTED TO BEGIN APPROXIMATELY OCTOBER, 1957.**



# NEW INSTRUMENTS

**Type 536 "X-Y" Oscilloscope** is a wide-band instrument with identical horizontal and vertical deflection systems, extending the application of familiar techniques to high-frequency problems. Any of the eight available Type 53/54 Plug-In Preamplifiers can be used in both deflection systems. Type 53/54G Units provide dc-to-10 mc passbands, and differential input eliminates the need for a common X Y terminal. Relative phase difference with 53/54G Units is less than one degree from dc to 15 mc, and phase balance can be obtained at any one frequency to over 25 mc. Other characteristics are: square-wave amplitude calibrator—0.2 mv to 100 v, electronically-regulated power supplies, beam-position indicators, 10 by 10-division viewing area. Weight 57 lbs. Price, without plug-in units, \$995.

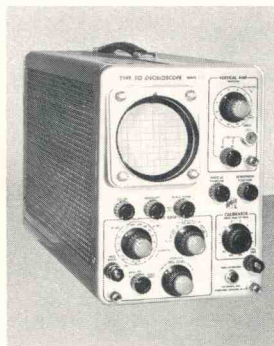


**Type 53/54T Time-Base Generator**—this plug-in unit is intended to provide sawtooth sweep voltages to drive the horizontal-deflection system of the Type 536 "X-Y" Oscilloscope. The unit can also be used in the vertical-deflection systems of any of the Tektronix Type 530 or 540-Series Oscilloscopes. Specifications include 22 calibrated sweep rates from 0.2  $\mu\text{sec}/\text{div}$  to 2 sec/div with calibration accuracy typically within 1% of full scale, and within 3% in all cases; 5x magnifier accurate within 5% of the displayed portion of the magnified sweep; trigger amplitude selection with preset or manual stability control, and fully automatic triggering; dc-coupled unblanking. Weight 5 lbs. Price \$225.



The Type 536 is also an excellent general-purpose laboratory oscilloscope. The new Type 53/54T Plug-In Unit provides the horizontal deflection system with a wide range of sweep rates and versatile triggering facilities.

## CATHODE-RAY INSTRUMENTS

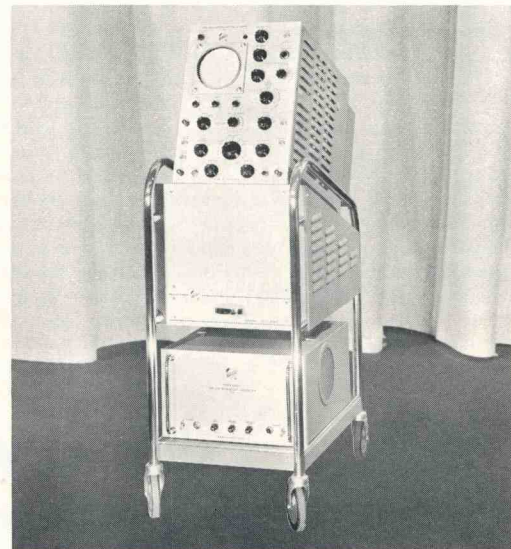


**Type 310 Oscilloscope** is a dc-to-4 mc portable precision instrument, designed for both field and laboratory applications. With its small size... 10" h by 6 $\frac{3}{4}$ " w by 17" d... and its light weight, only 23 $\frac{1}{2}$  lbs... the Type 310 handles easily and fits into tight spots, yet it is fully capable of performing much of your laboratory work. Features include: Wide-range sweep circuit—0.5  $\mu\text{sec}/\text{div}$  to 0.6 sec/div continuously variable with 18 calibrated steps from 0.5  $\mu\text{sec}/\text{div}$  to 0.2 sec/div, accuracy within 3%; 5x magnifier, accurate on all ranges; trigger amplitude selection or automatic triggering; dc-coupled unblanking. Vertical-amplifier risetime 0.09  $\mu\text{sec}$ ; accurately calibrated deflection factor from 0.1 v/div to 50 v/div in 9 steps at dc to 4 mc; with 3 additional steps from 0.01 v/div to

0.05 v/div at 2 cycles to 3.5 mc; continuously variable from 0.01 v/div to 150 v/div. Square-wave voltage calibrator; 1.85-kv accelerating potential on 3" crt; regulated power supply; hinged chassis for easy accessibility. Weight 23 $\frac{1}{2}$  lbs. Price \$595 (105-125 volts, 60 to 800 cycles only).

Type 310-S1—Has heavier transformer for operation on 105-125 v or 210-250 v, 50 to 800 cycles. Weight 25 $\frac{1}{2}$  lbs. Price \$595.

**Type 570 Characteristic-Curve Tracer** presents an accurate graphic analysis of vacuum-tube characteristics under almost any conceivable operating conditions. It displays families of characteristic curves on the face of a cathode-ray tube, calibrated to permit accurate current and voltage readings directly from the screen. Features include: Curves per family adjustable from 4 to 12; plots 6 different characteristic curves: Ep-Ip, Eg-Ip, Ep-Ig<sub>2</sub>, Eg-Ig<sub>2</sub>, Ep-Ig, and Eg-Ig; 9 voltage ranges from 0.1 v/div to 50 v/div; 11 current ranges from 0.02 ma/div to 50 ma/div; 8 plate-supply sweep voltages from 5 to 500 v peak; 11 series-load resistors from 300 ohms to 1 megohm; 7 grid-step values from 0.1 v/step to 10 v/step; starting point of family adjustable—up to 12 negative-bias curves and up to 8 positive-bias curves can be displayed; 17 different heater voltages, variable approximately  $\pm 20\%$ ; 5 fixed +dc voltages from 20 to 300 v, with variable control to cover between steps; negative dc voltage continuously variable between 0 and 100 v; heater, +dc, -dc voltages measured on a front-panel meter; overload conditions can be momentarily displayed; quick comparisons of two tubes by manual switching; various socket-adaptor plates and patch-cord connectors accommodate practically all receiving-type tubes. Regulated power supply. Weight 67 pounds. Price \$925.



**Type 517A High-Speed Oscilloscope** is designed primarily for the observation and photography of very fast transients. It consists of two units, indicator and power supply, mounted on a scope-mobile to make up a convenient, mobile instrument. Features include: full 4x8-cm deflection; high writing rate, obtained by 24-kv accelerating potential on a metallized T54P11H crt; eleven calibrated sweep rates from 0.01  $\mu\text{sec}/\text{cm}$  to 20  $\mu\text{sec}/\text{cm}$ , accurate within 2%; sweep triggered by observed signals of 2 mm or greater amplitude; signal delay to permit observation of front of pulse; distributed vertical amplifier with 0.007- $\mu\text{sec}$  risetime and 0.05-v/cm deflection factor; cathode-follower input probe with capacitance attenuator; pulse-type amplitude calibrator with 6 ranges, full-scale accuracy within 4%; trigger-rate generator variable from 15 to 15,000 cycles; panel switch to reduce accelerating potential to 12 kv giving twice above deflection factor and sweep rates. Standard accessories: scope-mobile, cathode-follower probe and attenuators, 170-ohm step attenuator, bezel, viewing hood. Total wt., 190 pounds. Price \$3500.

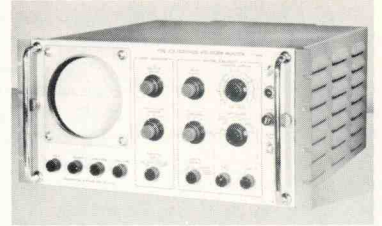


# CATHODE-RAY INSTRUMENTS

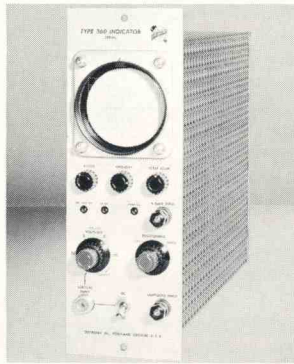
**Type 524AD Television Oscilloscope** is designed for TV transmitter and studio use for both monochrome and color, and has the following features: 0.1- $\mu$ sec/cm to 0.01-sec/cm sweep rates with zero to 25 milliseconds delay, a line at a time, on all sweeps; 3x and 10x magnification, accurate within 2% except at sweep rates less than 0.1  $\mu$ sec/cm; field selector for switching to either field of a frame; built-in sync separator; 60-cycle sine-wave sweep with amplitude and phase control; time-mark generator with phasing control—0.05 H, 0.025 H, 1  $\mu$ sec, 0.1  $\mu$ sec, and 0.05  $\mu$ sec intensity markers. Vertical amplifier passband dc to 10 mc, risetime 0.035  $\mu$ sec, 0.25  $\mu$ sec signal delay. Passband control provides 60-cycle to 5-mc response flat within 1%, and limited response to IRE recommendation for level measurements. Deflection factor ac-coupled, 0.015 v/cm; dc-coupled, 0.15 v/cm; 6 cm undistorted deflection. Variable duty cycle square-wave calibrator, full scale accuracy within 3%, control linear within 1%. 4-kv accelerating potential. Weight 61 pounds. Price \$1180.



**Type 525 Television Waveform Monitor** displays the television-signal waveform with the precision required for all television broadcasting, including color. Features include four frequency response characteristics — F L A T, within 1% between 60 cycles and 5 mc; LOW PASS, passes stair steps, eliminates high frequencies; HIGH PASS, passes high frequencies, eliminating stair steps; IRE, meets IRE standards for level measurements. Vertical-amplifier deflection factor is 0.015 v/cm; 3-step attenuator, 1x, 2x, 5x, and variable gain control; gain stability within 1% over a ten-hour period; excellent linearity; keyed clamp-type dc restorer; differential input; two pairs of input connectors at rear of instrument, either pair can bridge the video circuit or terminate it. Sweep circuit—sync separator circuit; automatic sweep synchronization at line or field rates, front-panel or remote selection of sweep frequency. Variable horizontal gain control, 1x, 5x, or 25x sweep magnifier. Pulse-type amplitude calibrator, continuously variable from 0.015 to 1.5 volts, peak-to-peak; 4-kv accelerating potential on Tektronix Type T52P1 precision 5" flat-faced crt. Regulated power supply. Cabinet designed for rack mounting with chassis attached on slide-out mounting, permitting tilting for easy access. Weight 54 pounds. Price \$1050.



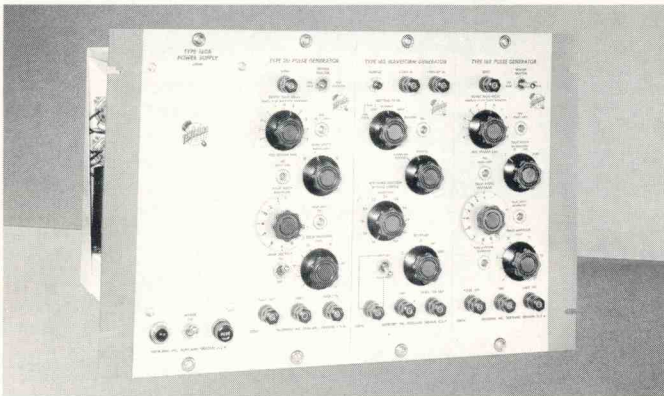
**Type 360 Indicator** contains a 3" flat-faced crt, accelerating-voltage supply, vertical amplifier with a deflection factor of 0.05 v/div and a calibrated vertical attenuator. It is designed to be powered by a Tektronix Type 160 or 160A Power Supply and to receive its sweep and unblanking voltages from a Tektronix Type 162 Waveform Generator or from any Tektronix oscilloscope; but can be operated from any source of the proper voltages and waveforms. A single Type 160A can supply power to five Type 360 Units. Three Type 360 Units can be powered by a Type 160 Power Supply. Features include: DC to 500 kc vertical-amplifier passband; four calibrated steps from 50 mv/div to 50 v/div with a 10-to-



1 attenuator for continuously variable adjustment from 50 mv/div to 500 v/div. Required input waveforms—a sawtooth waveform of either polarity with an overall amplitude from 110 v to 150 v with extreme voltage limits at -90 v and +170 v, and a 50-v positive gate. Horizontal gain control permits sweep calibration. Adapted to rack mounting. Weight 9 pounds. Price \$195.

**Type 126 Power Supply** provides the required voltages and currents necessary to power one Type 360 Indicator or any one of the Type 160-Series Waveform Generators. The Type 126 includes a cabinet to house both the Type 126 and the powered unit. Weight 10½ pounds. Price \$100.

## SPECIAL WAVEFORM GENERATORS



**Type 160-Series Waveform Generators** includes the Type 163 Fast-Rise Pulse Generator, Type 162 Waveform Generator, Type 161 Pulse Generator, and Type 160A Power Supply. Many combinations of pulses and many special waveforms are obtained by combining these generators in various hook-ups.

**Type 163 Pulse Generator**, when triggered, produces a calibrated positive pulse, 0 to 25 v amplitude, and a gate of 25 v fixed amplitude, both with a risetime of 0.2  $\mu$ sec. Duration is

from 1 to 10,000  $\mu$ sec, calibrated. Calibrated delay 0 to 100% of triggering sawtooth duration. Can be triggered by a positive pulse or negative-going sawtooth. Direct-reading dials. Weight 5 pounds. Price \$95.

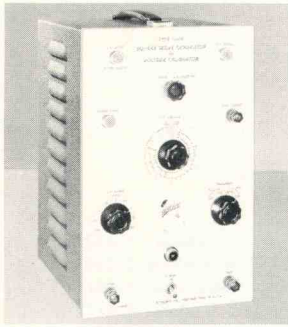
**Type 162 Waveform Generator** produces a linear sawtooth with a 130-v negative-going excursion from +150 to +20 v amplitude, calibrated duration of 100  $\mu$ sec to 10 sec, calibrated rate 0.1 cycle to 10 kc for recurrent operation,—a positive gate of 50 v, same duration, or a positive pulse of 50 v, calibrated duration of 10  $\mu$ sec to 0.2 sec. Can be triggered externally or by a front-panel button. Direct-reading dials. Weight 5 lbs. Price \$95.

**Type 161 Pulse Generator**, when triggered, produces a calibrated positive or negative pulse of 0 to 50 v, calibrated duration of 10  $\mu$ sec to 0.1 sec, risetime of 0.5  $\mu$ sec; and a positive gate of 50 v amplitude, same duration. Calibrated delay 0 to 100% of triggering sawtooth duration. Can be triggered by a positive pulse or negative-going sawtooth. Direct-reading dials. Weight 5 lbs. Price \$95.

**Type 160A Power Supply** produces the ac voltage and regulated dc voltages necessary to operate a Type 360 Indicator Unit with a combination of from four to six Types 161, 162, 163 units. Weight 21 lbs. Price \$140.



# AUXILIARY INSTRUMENTS



**Type 104A Square-Wave Generator** generates four fixed frequencies: 50 cycles, 1 kc, 100 kc and 1 mc. Risetime of the two high frequencies is 0.02  $\mu$ sec; the two low frequencies, 3  $\mu$ sec. Amplitude of both low-frequency outputs is continuously variable from 0 to 50 v and accurate within 3%—a convenient calibrating-voltage source. The two high frequencies are available through a matched cable terminated by a continuously variable attenuator, providing output of 0

to 5 v. Selected frequencies available on special order. Weight 22 pounds. Price \$195.

**Type 105 Square-Wave Generator** is continuously variable over the frequency range of 25 cycles to 1 mc. Risetime is 13 millimicroseconds into a 52-ohm cable terminated at both ends. Direct-reading frequency meter is accurate within 3% of full scale. Output amplitude—0 to 100 v maximum, 0 to 15 v across 93 ohms. Sync amplitude control permits sync input amplitude of 3 v to 50 v. A 5-v sync signal is present at the sync output terminal. Weight 35 lbs. Price \$395.



**Type 180 Time-Mark Generator** is a source of time markers, sine waves, and trigger impulses. Time markers of 1, 5, 10, 50, 100, 500 microseconds—1, 5, 10, 50, 100, 500 milliseconds—1 second, are available separately and simultaneously through pin jacks at 15 to 30 v, or mixed in any combination through uhf connector at 1 to 3 v. Sine waves of 5 mc, 10 mc, 50 mc at approximately 3 v, and trigger impulses of 1, 10, 100 cycles—1, 10, 100 kc at from 3 to 9 v are also

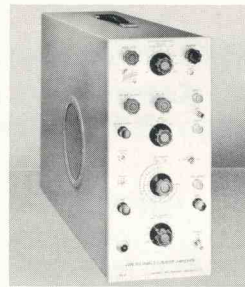
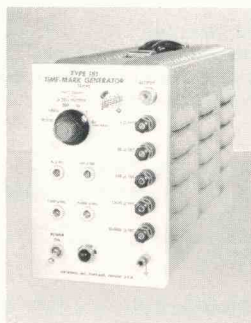
available. A crystal-controlled oscillator operating at 1 mc controls all outputs. The 1-mc frequency is accurate within 0.03%. Weight 35 lbs. Price \$575.

Type 180-S1—with temperature-stabilized precision crystal providing stability over 24-hour period within 2 ppm, \$625.

**Type 181 Time-Mark Generator** provides accurate markers that can be displayed on an oscilloscope for sweep calibration or comparison time measurements. Time markers of 1, 10, 100, 1000, and 10,000  $\mu$ sec, and 10-mc sine wave are available at a common coax connector through use of a selector switch, markers also available at front-panel binding posts, all outputs derived from 1-mc crystal-controlled oscillator with frequency tolerance within 0.03%, amplitude of markers and sine wave is at least 2 v; dc voltages electronically regulated. Wt. 17½ lbs. Price \$225.

Greater stability, 2 ppm over 24-hour period, can be achieved through use of an accessory crystal mounted in a temperature-controlled oven, interchangeable with standard crystal.

Type CO181A—\$27.



**Type 112 DC-Coupled Differential Amplifier** provides a voltage gain of 0.5 to 5000, continuously variable. Frequency response is dc to 2 mc for gains of 166 or less, and dc to 1 mc for gains of 166 to 5000. Output voltage is 150 v at high impedance, 75 v at 8000 ohms. Calibrator has range of 5 mv to 50 v continuously variable; full scale accuracy within 3%, control linear within 1%. A time-marker input and trigger output are provided. Weight 32 pounds. Price \$495.

**Type 121 Preamplifier** was designed primarily to augment the vertical amplifier of the Type 511A Oscilloscope, providing an overall deflection factor of 1.25 mv/cm while preserving the passband and transient response. Can be used with other oscilloscopes or wide-band equipment.

Voltage gain, 100; input impedance, 1 megohm paralleled by 20  $\mu$ mf; output  $\pm$ 3v, 93 ohms; passband 5 cycles to 12 mc; front-panel supply socket, 6.3 v dc and 20 to 100 v dc; self-contained regulated power supply. Weight 18 pounds. Price \$265.



**Type 122 Preamplifier** for low-level applications provides a voltage gain of 1000 with a maximum noise level of 4  $\mu$ v rms. Frequency response is 1/6 cycle to 40 kc, with separate controls for limiting both ends of the passband. Use of the differential input gives a rejection ratio of 80 to 100 db for in-phase signals. Front-panel switch reduces gain to 100. A maximum of 20 v peak-to-peak is available at the cathode-follower output. Input impedance is 10 megohms paralleled by approximately 50  $\mu$ mf. Battery operated for minimum noise level. Weight 5½ pounds. Price \$85.

**Type 130 L,C Meter** is a direct-reading meter for small values of L and C in components and circuits. Five ranges: 0 to 3, 10, 30, 100, and 300  $\mu$ h or  $\mu$ mf, accurate within 3% of full scale. Guard circuit lets you measure an unknown capacitance while eliminating the effects of other capacitances from the measurements. Coarse and fine zero-adjust controls, illuminated 4" meter. Weight 9 pounds. Price \$195.



**Type 190A Constant-Amplitude Signal Generator** is ideal for checking amplifier high-frequency response. It generates sine waves over the range of 350 kc to 50 mc, continuously variable, and a 50-kc reference signal. Output amplitude at the cable termination varies less than 2% from 350 kc to 30 mc; less than 5% to 50 mc. Amplitude is continuously variable from 40 mv to 10 v peak-to-peak in 10 ranges, with amplitude indication accurate within 10%. Frequency indication

is accurate within 2%. Attenuator has 36" connecting cable. Weight 24 pounds. Price \$275.

Prices f.o.b. Portland, Oregon

**For complete information on any Tektronix Instruments or for demonstrations, please call your Tektronix field engineer or representative. You'll find him listed on the back cover.**



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