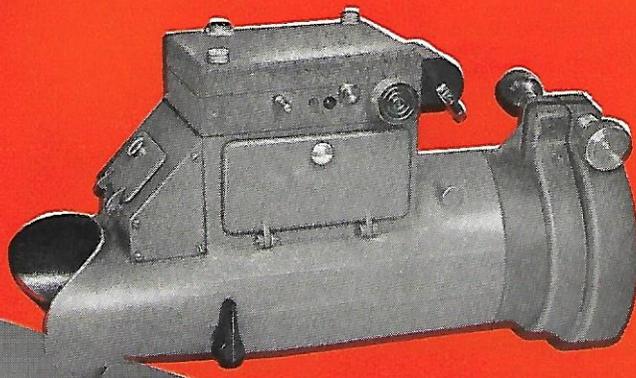
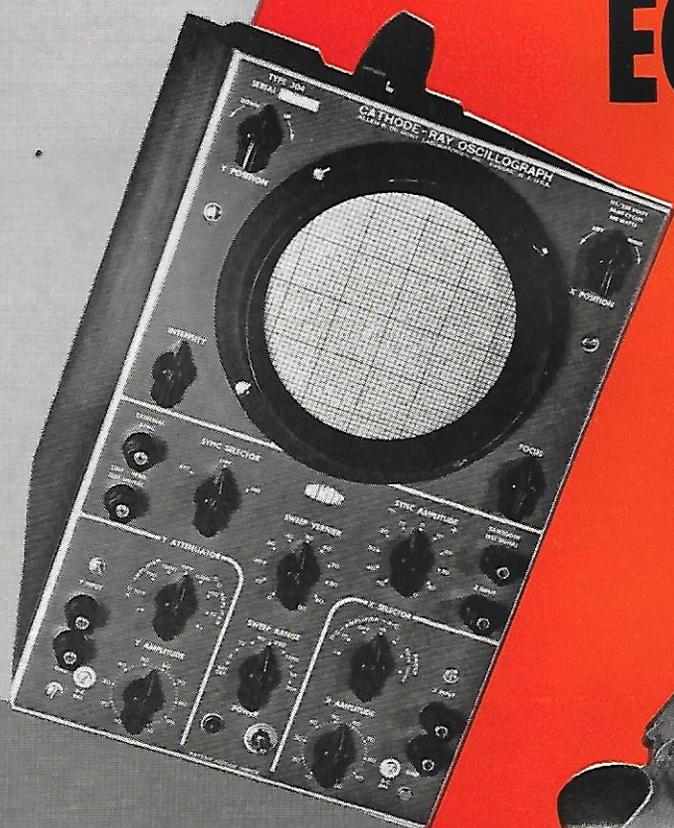


DU MONT



CATHODE-RAY EQUIPMENT



FOR OUTSTANDING PERFORMANCE

TYPE 304-A



The new Du Mont Type 304-A Cathode-ray Oscillograph, successor to the world-famous Type 304-H, is a true electronic voltmeter, enabling rapid, accurate amplitude measurements of any portion of a 0 to 1000 volt signal within the frequency range of the instrument. The Type 304-A features a sensitivity of 100 millivolts d-c full scale, equivalent to a deflection factor of 25 peak-to-peak millivolts per inch (10 peak-to-peak millivolts/cm), and high gain a-c or d-c amplification.

Amplitude measurements of even the most complex waveforms are simple with the Type 304-A. The CALIBRATE push button is depressed and a square-wave voltage standard of 0.1, 1, 10 or 100 volts, as selected by the VOLTS FULL SCALE switch is applied to the screen and adjusted by means of a MULTIPLIER control. By depressing the CALIBRATE push button again the signal under study is returned to the screen, where any amplitude portion of the signal, may be read directly in volts from the calibrated scale.

A wholly new cathode-ray tube, designated the Type 5ADP, is incorporated to promote accuracy of measurement. Features of the new precision-built tube include a deflection-plate alignment tolerance of $\pm 1\%$, a new electron-gun design that provides a brilliant trace with excellent resolution, a sensitivity more than twice that of conventional tube designs, and a flat face to minimize errors of measurement owing to parallax. An auxiliary focus system reduces astigmatism to negligible proportions.

The high gain assures that the Type 304-A can be used directly with most transducers, while d-c amplification provides that the lowest frequency portions of signals will be faithfully reproduced. Good stability is assured by regulation of the heaters of the Y-input stages.

Driven and recurrent sweeps may be expanded up to six times full-screen diameter with full positioning. Provision is made for connecting an external capacitance to obtain sweeps of extremely long duration.

Stabilized synchronization provides stable signal presentation without horizontal jitter, and sync limiting for both driven and recurrent operation prevents spurious or distorted response from excessive synchronizing signal. Provision is made for balanced input of signals.

To facilitate calibration, the scale of the Type 304-A is numbered and edge illuminated.

SPECIFICATIONS

Cathode-ray Tube: Type 5ADP, flat-face Cathode-ray Tube operated at an overall accelerating potential of 3000 volts.

Vertical Deflection — Deflection factor — through amplifier at full gain, 0.1 volt d-c full scale, equivalent to 0.025 volt d-c per inch. Direct to deflection plates, 128 to 156 volts d-c full scale. **Undistorted deflection:** More than 4 inches. Equivalent to 16 inches of vertical expansion. **Sinusoidal Frequency Response:** (For any setting of controls) with direct coupling, is down not more than 10% at 10 and 100,000 cps; a-c or d-c coupling, down not more than 50% at 300,000 cps. **Input Impedance:** to amplifier, 2 megohms paralleled by 50 μf ; direct (unbalanced), 1.5 megohms paralleled by 20 μf ; direct (balanced) 3 megohms paralleled by 20 μf .

Maximum Allowable Input Potential: a-c coupling 1,000 volts d-c plus peak a-c; d-c coupling, 1000 volts d-c plus peak a-c on all ranges of the VOLTS FULL SCALE switch except 0.1 where it is 100 volts d-c plus peak a-c.

Horizontal Deflection — Deflection factor — through amplifier at full gain, 1.2 volts d-c full scale. Direct to deflection plates, 160 to 200 volts d-c full scale.

Sinusoidal Frequency Response: (for any setting of controls) with direct coupling, is down not more than 10% from 0 to 100,000 cps; with capacitive coupling, is down not more than 10% at 10 and 100,000 cps; a-c or d-c coupling, down not more than 50% at 300,000 cps. **Input Impedance:** to amplifier, 2.2 megohms paralleled by 50 μf ; direct (unbalanced), 1.5 megohms paralleled by 20 μf ; direct (balanced), 3 megohms paralleled by 20 μf .

Linear Sweeps — Frequency Range — Recurrent and driven sweeps variable in frequency from 2 to 30,000 cps. Provision incorporated for extra low-frequency sweeps by attaching external capacitance to convenient terminals, with 0.5 second sweep secured for each microfarad of external capacitance. **Sweep Amplitude:** Four inch minimum of undistorted sweep is available; sweep amplitude at minimum X-amplitude control setting is less than $\frac{1}{2}$ inch; both driven

and recurrent sweeps expandable up to 6 times full-screen diameter with positioning over the entire range and negligible distortion present in the visible portion; direction of sweep, from left to right, return trace automatically blanked; sweep synchronization from signal of either polarity, with sync limiting on driven and recurrent sweep. Maximum sweep speed, with sweep expansion, is one inch per microsecond. **Voltage Measurement:** Within frequency range of the instrument, will measure signals in amplitude range from 0 to 1000 volts; VOLTS FULL SCALE range, 0 to 0.1, 1, 10, 100 volts with accuracy of $\pm 2\%$; MULTIPLIER range, from X1 to X10 continuously; calibration voltage accuracy, 5%.

Intensity Modulation: A Z-axis front panel connection available at input impedance of 0.2 megohm paralleled by 80 μf ; positive signals increase intensity of beam.

Maximum Photographic Writing Rates: With Type 296 using f/2.8 lens, 0.8 inches/ μsec ; with Types 321 and 295, using f/1.5 lens, 2.8 inches/ μsec .

Tube Complement: 2-6AL5; 6-12AU7; 2-6J6; 1-5Y3GT; 2-6AQ5; 1-0B2; 1-6Q5G; 2-1X2A; 2-5963.

Power Source: 115 or 230 volts $\pm 10\%$ at 50-400 cycles; 110 w.

Physical Characteristics: Instrument is housed in metal cabinet provided with leather carrying handle. **Overall Dimensions:** height, 13 $\frac{1}{2}$ " (33.6 cm); width, 8 $\frac{3}{4}$ " (22 cm); depth, 19 $\frac{1}{2}$ " (49.5 cm). **Weight:** 50 lbs. (22.6 kg). Instrument is supplied with illuminated, calibrated scale and proper filter. Illumination is adjustable from zero to more than adequate level for recording.

Cat. No.	Description
1622-A	115 volts, 50-400 cps. Type 5ADP1 Cathode-ray Tube
1625-A	115 volts, 50-400 cps. Type 5ADP7 Cathode-ray Tube
1626-A	115 volts, 50-400 cps. Type 5ADP11 Cathode-ray Tube
1627-A	230 volts, 50-400 cps. Type 5ADP1 Cathode-ray Tube
1630-A	230 volts, 50-400 cps. Type 5ADP7 Cathode-ray Tube
1631-A	230 volts, 50-400 cps. Type 5ADP11 Cathode-ray Tube

TYPE 304-AR

The Du Mont Type 304-AR Cathode-ray Oscillograph is identical to the Type 304-A except that the former has been redesigned physically for mounting in a standard 19-inch relay rack. Dimensions of the Type 304-AR are: Height, 8 $\frac{3}{4}$ inches; width, 19 inches; depth, 19 $\frac{1}{2}$ inches. Performance specifications for the Type 304-AR are the same as those of the Type 304-A.

Cat. No.	Description
1642-E	115 volts, 50-400 cps., Type 5ADP1 Cathode-ray Tube
1645-E	115 volts, 50-400 cps., Type 5ADP7 Cathode-ray Tube
1646-E	115 volts, 50-400 cps., Type 5ADP11 Cathode-ray Tube
1647-E	230 volts, 50-400 cps., Type 5ADP1 Cathode-ray Tube
1650-E	230 volts, 50-400 cps., Type 5ADP7 Cathode-ray Tube
1651-E	230 volts, 50-400 cps., Type 5ADP11 Cathode-ray Tube

TYPES 303-AH AND 303-A



The new Du Mont Type 303-AH is a wide-band, high-gain, quantitative cathode-ray oscillograph that is particularly well suited to the measurement of random, rapid, single transients with low repetition rates. The Type 303-AH features a choice of three accelerating potentials: 3000, 7000 and 10,000 volts.

For those who desire a cathode-ray oscillograph similar to the Type 303-AH, but do not require the high accelerating potential, Du Mont offers the Type 303-A with an overall accelerating potential of 3000 volts.

Nominal bandwidth of the Type 303-AH is 10 megacycles; however, sinusoids of 20 megacycles or higher may be displayed successfully. The vertical amplifier will not degrade a rise time of 0.01 microsecond, or less, to more than 0.033 microsecond. High sensitivity, excellent resolution assured by the accelerating potentials employed, and internally-generated time and amplitude calibration contribute to make the new Type 303-AH an appropriate tool for the exacting waveform analyses of the laboratory, or production line.

Amplitude calibration is accomplished by means of internally supplied square waves of 0.1, 1, 10, or 100 peak-to-peak volts, which are substituted for the input signal. Accurate time calibration may be obtained by substituting internally supplied damped oscillations of known frequency for the input signal. The frequencies of these oscillations are 10 kc, 100 kc, 1 mc, or 10 mc (indicating respectively 100 microseconds, 10 microseconds, 1 microsecond, and 0.1 microsecond), accurate to better than $\pm 3\%$.

Three accelerating potentials, 3000, 7000, or 10,000 volts, may be selected in the Type 303-AH. The higher accelerating voltages assure that high-speed phenomena having low repetition rates will be clearly presented on the screen, while the lowest accelerating potential provides maximum sensitivity and undistorted deflection in instances where pattern brilliance is not at a premium. With 3000 volts acceleration, the deflection factor of the vertical amplifier is 0.1 peak-to-peak volt per inch, or 0.35 peak-to-peak volt per centimeter (full gain).

Matching the capabilities of the vertical amplifier are the linear, high-speed, driven and recurrent sweeps of the Type 303-AH. Sweep speeds up to 10 inches per microsecond (25.4 centimeters per microsecond) are provided. Sweeps may be expanded up to six times full-screen diameter for exacting examination of any portion of the trace, and full positioning of the linear sweep over the entire range may be obtained. The sweep is directly coupled through the horizontal amplifier to the deflection plates to minimize horizontal jitter when triggered by random pulses. D-C restoration of the sweep voltage is thus unnecessary. Also, multiple triggering is eliminated by means of a "lock-out" circuit which renders the sweep circuit insensitive to triggering signals once a sweep cycle has been initiated.

Additional features include: A built-in 0.25 μ sec signal delay; a negative gate output of 50 volts; provision for intensity modulation; an illuminated calibrated scale; a coaxial terminal adapter; and a factory adjusted astigmatism control to assure uniform spot size over the entire screen area.

SPECIFICATIONS

Cathode-ray Tube — Type 5XP-: Acceleration, 3000 volts, 7000 volts, or 10,000 volts.

Vertical Deflection — Deflection Factor — through amplifier (full gain): At 3000 volts accelerating potential, 0.1 peak-to-peak (0.035 rms) volt/inch; at 7000 volts accelerating potential, 0.14 peak-to-peak (0.05 rms) volt/inch; at 10,000 volts accelerating potential, 0.16 peak-to-peak (0.057 rms) volt/inch. Direct to deflection plates: At 3000 volts accelerating potential, 28 peak-to-peak (10 rms) volts/inch; at 7000 volts accelerating potential, 40 peak-to-peak (14 rms) volts/inch; at 10,000 volts accelerating potential, 46 peak-to-peak (16 rms) volts/inch.

Sinusoidal Frequency Response: down not more than 30% from 10 cps to 10 mcps, with no positive slope above 10 kc. **Pulse response:** Will not degrade a rise time of 0.01 microsecond, or less, to more than 0.033 microsecond.

Undistorted deflection (scanning area limited by cutoff of Y-axis deflection plates of cathode-ray tube) — At 3000 volts accelerating potential: symmetrical signals, 3 inches, unidirectional signals, 1.5 inches. At 7000 volts accelerating potential: symmetrical signals, 2.1 inches; unidirectional signals, 1.05 inches. At 10,000 volts accelerating potential: symmetrical signals, 1.9 inches; unidirectional signals, 0.95 inches.

Useful vertical scan: At 3000 volts accelerating potential, 2.5 inches; at 7000 volts accelerating potential, 1.8 inches; at 10,000 volts accelerating potential, 1.6 inches.

Input Impedance: through amplifier, 2 megohms, 40 μ f; direct (balanced) 7.8 megohms, 10 μ f; direct (unbalanced) 3.9 megohms, 10 μ f.

Maximum allowable input potential: 600 volts, d-c plus peak a-c.

Horizontal Deflection — Deflection factor — through amplifier (full gain): At 3000 volts accelerating potential, 0.35 peak-to-peak (0.12 rms) volt/inch; at 7000 volts accelerating potential, 0.5 peak-to-peak (0.18 rms) volt/inch; at 10,000 volts accelerating potential, 0.57 peak-to-peak (0.20 rms) volt/inch. **Undistorted deflection:** At 3000 volts accelerating potential, 4.25 inches; at 7000 volts accelerating potential, 3.6 inches; at 10,000 volts accelerating potential, 3 inches. **Sinusoidal frequency response:** uniform within

30% to 700 kc; flat to d-c. **Input impedance:** 2.2 megohms, 40 μ f. **Linear time base:** Driven and recurrent sweeps continuously variable in duration from 0.1 second to 2 microseconds. Sweeps may be expanded up to 6 times full-screen diameter with no on-screen distortion. **Sweep writing rate:** At 3000 volts accelerating potential, 10 inches/ μ sec; at 7000 volts accelerating potential, 7 inches/ μ sec; at 10,000 volts accelerating potential, 6 inches/ μ sec. **Synchronization:** from internal or external signal, or from internally supplied voltage of power-line frequency. Synchronization is possible from sine wave signals of frequencies as high as 20 mcps.

Voltage calibration: Square waves of 0.1, 1, 10, or 100 volts amplitude may be substituted for signal under study. Accuracy, $\pm 5\%$.

Time calibration: Damped oscillations indicating intervals of 0.1, 1, 10, or 100 microseconds may be substituted for the signal under study. Accuracy, $\pm 3\%$.

Intensity modulation: Positive polarity decreases intensity. Fifteen volts blanks beam at normal intensity settings.

Maximum photographic writing rates: Type 296 (f/2.8 lens): 1 inch/ μ sec. Types 295 and 321 (f/1.5 lens): 3.5 inches/ μ sec.

Negative gate output: Negative gate of not less than 50 volts amplitude is provided at a front-panel binding post. Output impedance, less than 1000 ohms.

Primary power: 115/230 volts, 50-60 cps.

Size: 12 $\frac{1}{8}$ " w; 16" h; 19 $\frac{3}{4}$ " d; 84 lbs.

TYPE 303-AH

Cat. No.	Description
1610-E	115 volts, 50-60 cps., Type 5XP2 Cathode-ray Tube
1612-E	115 volts, 50-60 cps., Type 5XP11 Cathode-ray Tube
1614-E	230 volts, 50-60 cps., Type 5XP2 Cathode-ray Tube
1616-E	230 volts, 50-60 cps., Type 5XP11 Cathode-ray Tube

TYPE 303-A

1589-E	115 volts, 50-400 cps., with Type 5YP1 Cathode-ray Tube
1590-E	115 volts, 50-400 cps., with Type 5YP2 Cathode-ray Tube
1592-E	115 volts, 50-400 cps., with Type 5YP11 Cathode-ray Tube
1593-E	230 volts, 50-400 cps., with Type 5YP1 Cathode-ray Tube
1594-E	230 volts, 50-400 cps., with Type 5YP2 Cathode-ray Tube
1596-E	230 volts, 50-400 cps., with Type 5YP11 Cathode-ray Tube

FOR DUAL-BEAM OSCILLOGRAPHY

TYPE 322

Essentially two Du Mont Type 304-H oscillographs in a single cabinet, the new Du Mont Type 322 is not just another specialized dual-beam oscillograph. It is an outstanding general-purpose instrument of laboratory quality that is, at the same time, sufficiently light weight and rugged for industrial and production applications. Thus the Type 322 provides all of the features that have made the Type 304-H the most popular oscillograph ever designed, but offers in addition the advantages of a dual-beam oscillograph. In the minimum of bench space with fewer connections to the instrument, the Type 322 adds to the features of two separate general-purpose oscillographs the advantages of individual or common time bases on a single screen; all controls at finger tips on a single small panel; Z-axis modulation of each beam individually; single-ended or balanced input on both channels; and amplitude calibration of either channel on both axes.

High gain a-c and d-c amplification is provided for both the vertical and horizontal axes of the two channels. D-C amplification, aside from permitting the presentation of a signal together with its d-c component, enables the display of very-low-frequency phenomena without the distortion that would be introduced in such signals by the capacitance in the a-c coupling circuits. Consistent with d-c amplification are the low-speed sweeps provided in the Type 322. Driven and recurrent sweeps are variable from 30,000 to 2 cycles per second, and sweeps of very long duration are possible by connection of an external capacitance at convenient front-panel terminals.

Panel layout is completely symmetrical with controls for channel A located on the left side of the panel symmetrically opposite those of Channel B on the right side of the panel. Controls common to both channels are situated in the center of the panel. Thus either channel may simply be operated as a separate 5" oscillograph with characteristics identical to those of the Type 304-H. Concentric controls



with transparent, skirted knobs afford centralized, finger-tip control. Controls of similar function are mounted on the same axis to give the operator even greater facility in the use of the Type 322. Extra stability is assured by such refinements as the regulated filament supply on Y-input stages. Separate power supplies are employed for each channel.

An illuminated, calibrated scale is supplied as a component part of the Type 322, and a dimmer control is located on the front panel of the instrument.

Two sawtooth voltages, at the frequency of the time base generators, are available at front-panel terminals, and are useful for initiating external circuits in synchronism with the sweeps of the Type 322.

SPECIFICATIONS

Cathode-ray Tube: Type 5SP- Dual-beam Cathode-ray Tube. Accelerating potential, 3000 volts overall.

Vertical Deflection — Deflection factor amplifiers (full gain), 0.028 p-p (0.01 rms), a-c or d-c coupling; direct 55-84 p-p v/in. **Input impedance:** to amplifiers, 2 megohms paralleled by 50 μf ; direct (balanced), 3 megohms paralleled by 20 μf ; direct (unbalanced), 1.5 megohms paralleled by 20 μf .

Sinusoidal frequency response of amplifiers (any setting of attenuator and gain controls): direct coupling, down no more than 10% at 100,000 cycles per second; capacitive coupling, down no more than 10% at 5 and 100,000 cycles per second; down not more than 50% at 300,000 cycles per second either input. **Maximum allowable input potential (single-ended)**, a-c coupling, 1000 volts d-c plus peak a-c; d-c coupling, 1000 volts d-c plus peak a-c on all attenuation ranges except 1:1 where it is 100 volts d-c plus peak a-c; **d-c balanced input** (at 1:1 position of attenuator only), may be operated up to +20 volts above ground with 4½ volts peak-to-peak between grids.

Horizontal Deflection — Deflection factor amplifiers (full gain) 0.3 p-p (0.1 rms) v/in; direct, 47-71 v/in. **Input impedance** to amplifiers, 2 megohms paralleled by 50 μf ; direct (balanced) 3 megohms paralleled by 20 μf ; direct (unbalanced) 1.5 megohms paralleled by 20 μf . **Sinusoidal frequency response: single-ended** (for any setting of attenuator and gain controls) direct coupling, down not more than 10% at 100,000 cycles per second; capacitive coupling, down not more than 10% at 5 and 100,000 cycles per second; down not more than 50% at 300,000 cycles per second.

Sinusoidal frequency response: common horizontal amplifier, within 10% from 0 to 70,000 cycles per second; within 50% from 0 to 200,000 cycles per second.

Linear Time Base: Recurrent and driven sweeps variable in frequency from 2 to 30,000 cycles per second. Provision incorporated for sweeps of lower frequency by attaching external capacitance to convenient terminals; 0.5 seconds of sweep time is secured for each microfarad of external capacitance. Both driven and recurrent sweeps expandable up to 6 times full-screen diameter, with positioning available over entire range. Direction of sweep is from left

to right. Return trace is automatically blanked. Sweep may be synchronized by signal of either polarity. Provision for sweep "A" to deflect both beams simultaneously and provide common time base for both channels. Built-in compensation to equalize both X-deflection factors and X-positions when operating with common sweep.

Intensity Modulation: Input impedance to external signals is 0.2 megohm, paralleled by 80 μf . A negative signal of 15 volts peak will blank beam at normal intensity settings. Separate Z-input terminal available for intensity modulation of each beam individually.

Beam Control Switch: A beam control switch has been provided on the front panel to turn the beams on or off independently or simultaneously.

Calibrator: Regulated potentials of 50 millivolts and 1 p-p volt squarewave at power-line frequency available at front-panel binding posts. Vertical or horizontal amplifiers are calibrated by applying these potentials to the amplifiers.

Maximum Photographic Writing Rates: (With Du Mont 35 mm. oscillograph-record cameras) Type 296, using f/2.8 lens, 0.8 inches/ μsec ; Types 321 and 295, using f/1.5 lens, 2.8 inches/ μsec .

Tube Complement: 17-12AU7; 4-6AQ5; 2-6Q5G; 2-OB2; 4-6J6; 2-5Y3GT; 2-2X2A; 1-6AL5; 1-5651; 1-6X4; plus 2 ballast regulator tubes.

Power Source: 115 or 230 volts, 50-400 cycles/sec. Power consumption, 225 watts. Fuse protection, 3 amperes (115 volts), 1½ amperes (230 volts).

Physical Characteristics: Overall dimensions, height 15¾", width 12½", depth 22⅞", weight 75 lbs. Illuminated scale with dimmer control; suitable filter provided for screen type; concentric controls.

Cat. No.	Description
1581-A:	115 volts, 50-400 cps, with Type 5SP1 Cathode-ray Tube
1583-A:	115 volts, 50-400 cps, with Type 5SP7 Cathode-ray Tube
1584-A:	115 volts, 50-400 cps, with Type 5SP11 Cathode-ray Tube
1585-A:	230 volts, 50-400 cps, with Type 5SP1 Cathode-ray Tube
1587-A:	230 volts, 50-400 cps, with Type 5SP7 Cathode-ray Tube
1588-A:	230 volts, 50-400 cps, with Type 5SP11 Cathode-ray Tube

FOR SERVICING APPLICATIONS



TYPE 274-A

The Du Mont Type 274-A Cathode-ray Oscilloscope is an inexpensive, general-purpose instrument for laboratory, radio service, and educational applications. The Type 274-A serves as an excellent null-indicator on inductance-capacitance bridges, as a means for viewing waveforms, as an output meter, as a means for measuring time and amplitude of pulses, as an indicator in studies of sound, light, electricity, and electronics, and many other general applications.

Provision is incorporated in the Type 274-A to intensity-modulate the electron beam, so that markers indicating such quantities as angle, time, or distance may be impressed upon the trace. A sinusoidal test signal of 17 peak-to-peak volts amplitude, at power-line frequency, is provided at a front-panel binding post. This signal is useful for such applications as trouble-shooting electronic circuits, and may also be used to synchronize the time base at power-line frequency.

SPECIFICATIONS

Cathode-ray Tube: Type 5BP-A. Acceleration, 1200 volts.
Vertical Deflection: Deflection Factor, through amplifier, 0.7 peak-to-peak volt per inch; Direct, 45 peak-to-peak volts per inch, $\pm 18\%$. **Sinusoidal frequency response:** uniform within 10% from 20 to 50,000 cps; down not more than 50% at 200,000 cps. **Input impedance:** To amplifier, 1 megohm paralleled by 40 μf ; direct, 4.7 megohms paralleled by 50 μf .

Horizontal deflection: Deflection factor, through amplifier, 0.7 peak-to-peak volt per inch; direct, 51 peak-to-peak volts per inch $\pm 18\%$. **Sinusoidal frequency response:** uniform within 10% from 20 to 50,000 cps; down not more than 50% at 200,000 cps. **Input impedance:** To amplifier, 1 megohm paralleled by 40 μf ; direct, 4.7 megohms paralleled by 50 μf .

Linear Time Base: Recurrent sweeps continuously variable in frequency from 8 to 30,000 cps.

Intensity Modulation: 28 peak-to-peak volts provides satisfactory modulation.

Primary Power: 115/230 volts, 50-60 cps. **Power consumption:** 50 watts.

Size: Height, 14"; width, 8 $\frac{5}{8}$ ", depth, 19 $\frac{3}{8}$ "; Weight, 35 lbs. (Metric equivalent, 35.6 cm h, 21.8 cm, w, 49.2 cm, d, 15.9 kg.)

Cat. No.	Description
1420-A:	115 volts, Type 5BP1-A Cathode-ray Tube
1422-A:	115 volts, Type 5BP11-A Cathode-ray Tube
1423-A:	230 volts, Type 5BP1-A Cathode-ray Tube

TYPE 292

The Type 292 is a compact, economical instrument for use wherever a highly portable, general-purpose oscilloscope is required, and is particularly useful in radio and television servicing. The compact design of this instrument is made possible largely by the use of the new Du Mont Type 3RP-A Cathode-ray Tube which features unusually short overall length and a flat face. The flat face permits observation of wave forms with a minimum of error owing to parallax. The special electron-gun and deflection-plate construction of the Type 3RP-A overcome the problem of pin-cushion distortion usually associated with cathode-ray tubes of short length and large deflection angle. Distortion of the trace is further minimized by the use of balanced signals for both the vertical and horizontal deflection.



SPECIFICATIONS

Cathode-ray Tube: Type 3RP1A. Acceleration, 1000 volts.
Vertical Deflection: Deflection factor, through amplifier at full gain, 0.40 rms volt per inch; Direct, 20 rms volts per inch. **Undistorted deflection:** 3 inches. **Sinusoidal frequency response:** Uniform within 30% from 5 to 100,000 cps. **Input impedance:** To amplifier, 1 megohm paralleled by 70 μf ; Direct, 4.7 megohms paralleled by 25 μf .

Horizontal deflection: Deflection Factor, through amplifier at full gain, 0.56 rms volt per inch; direct, 31 rms volts per inch $\pm 15\%$. **Undistorted deflection:** 3 inches. **Sinusoidal frequency response:** Uniform within 30% from 5 to 100,000 cps. **Input impedance:** to amplifier, 1 megohm

paralleled by 70 μf ; Direct, 4.7 megohms paralleled by 25 μf .

Linear Time Base: Continuously variable in frequency from 8 to 30,000 cps. Return trace blanking incorporated.

Power source: 115/230 volts $\pm 10\%$, 50/60 cps. **Power consumption:** 50 watts.

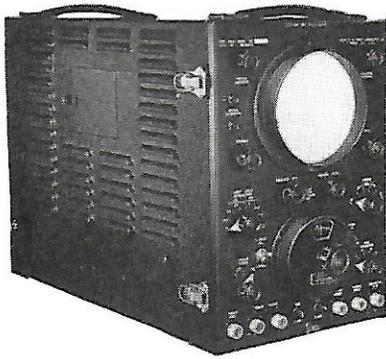
Size: 10 $\frac{7}{8}$ " h.; 8 $\frac{1}{8}$ " w.; 11" d.; 21 lbs.

Metric equiv. 27.6 cm. h.; 20.6 cm. w.; 28.0 cm. d.; 9.5 kg.

Cat. No.	Description
1500-A	115 volts, 50-60 cps, with Type 3RP1-A Cathode-ray Tube
1505-A	230 volts, 50-60 cps, with Type 3RP1-A Cathode-ray Tube

DU MONT OSCILLOGRAPHS FOR

TYPES 256-D & 256-E



The Du Mont Types 256-D and 256-E Cathode-ray Oscillographs are precision instruments designed for the study of short-duration pulses and the measurement of time intervals as small as a fraction of one microsecond. The Types 256-D and 256-E differ only in that the Type 256-D is calibrated in microseconds, while the Type 256-E is calibrated in yards. The instruments provide a variety of sweep lengths, delay circuits, crystal-controlled markers, variable trigger generator, and a wide-band amplifier. The frequency response of the vertical amplifier is uniform within 30% up to 8 mc per second and is down 50% at 11 mc per second. The sweep-delay is read directly with an accuracy of $\pm 0.1\%$ of full scale.

SPECIFICATIONS

Cathode-ray Tube: Type 5CP-A; 4000 volts accelerating potential. **Vertical deflection — video amplifier:** Attenuator — 1:1, 3:1, 10:1, 30:1 and 100:1, stepped, R-C compensated; **input impedance** — 1 megohm, 20 μf ; **gain** — 125 approx.; **sine wave response** — down 3 db at 8 mc, down 6 db at 11 mc; **low-frequency response** — flat down to 100 cps., and within ± 2 db at 20 cps.; **pulse response** — sum of rise and fall time of 1.0 μsec pulse with rise and fall of 0.01 μsec does not exceed 0.08 μsec when passed through video amplifier; **input to overload** μsec , duration 1.0 μsec , accuracy $\pm 0.02\%$. **Triggered operation — external:** Trigger input ± 15 volts minimum at 100 volts/ μsec rise for accurate timing. **Trigger amplifier:** Makes trigger operation independent of waveform; input trigger rise of 10 volts/ μsec triggers the sweep.

— 1 volt approx. with no attenuation; **deflection** — 0.25 volt rms and full video gain for 1" min.; **maximum input voltage** — 600 volts d-c + peak a-c; **polarity** — positive signal deflects upward. **Vertical deflection — direct:** **Deflection factor** — $79 \pm 20\%$ d-c volts/in; **polarity** — positive signal deflects upward; **maximum input voltage** — 1000 v d-c plus peaks a-c.

Undelayed Sweeps: 4500, 1000, 100, 25, 10, 4* μsec . **Delayed sweeps:** 25, 10, 4 μsec sweeps are delayable to cover any portion of the 100 μsec sweep from 4 to 100 μsec ; 25 and 10 μsec sweeps are delayable to cover any portion of the 1000 μsec sweep from 5 to 1000 μsec . Delay accuracy is $\pm 0.1\%$ of full scale. First few microseconds may be observed on the 4 or 10 μsec undelayed sweeps.

Triggered operation — internal: Provides output pulse of 100 volts peak, positive or negative, rise time 0.3 μsec , duration 1.0 μsec , repetition rate 80 to 400 a second on 1000 μsec and 4500 μsec range; 80 to 2000 a second on 100 μsec range. Crystal controlled timing marks: Each 10 and 50 μsec (first 50 μsec mark appears at 40 μsec and each subsequent 50 μsec later). Timing mark Rise 0.25

Repetition rate: 2000 maximum on 100 μsec scale; 400 on 1000 μsec scale. No time marks available on external trigger. **Intensity modulation:** Input available at Z IN position of markers switch.

Primary power: 115 v, single phase, 60 cps., 220 watts, usable to 1200 cps.

Size: 11 $\frac{3}{8}$ " w., 16 $\frac{1}{4}$ " h., 26" d.; 104 lbs.

TYPE 256-D

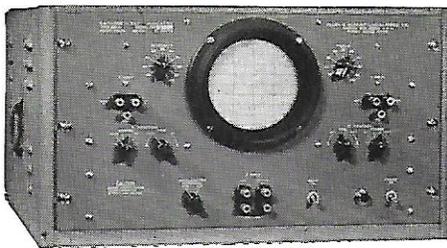
Cat. No.	Description
1296-E:	115 volts, 60-1200 cps. Type 5CP1-A Cathode-ray Tube
1297-E:	115 volts, 60-1200 cps. Type 5CP2-A Cathode-ray Tube
1300-E:	115 volts, 60-1200 cps. Type 5CP11-A Cathode-ray Tube

TYPE 256-E

Cat. No.	Description
1562-E:	115 volts, 60-1200 cps. Type 5CP1-A Cathode-ray Tube
1563-E:	115 volts, 60-1200 cps. Type 5CP2-A Cathode-ray Tube
1566-E:	115 volts, 60-1200 cps. Type 5CP11-A Cathode-ray Tube

*References to sweep lengths in microseconds apply to the Type 256-D. In every instance, sweep lengths of 1000, 100, 25, 10, and 4 microseconds in the Type 256-D correspond to sweeps representing 200,000, 20,000, 4000, 2000, and 800 yards in the Type 256-E. Sweep lengths of 4500 microseconds are common to both instrument Types.

TYPE 281-A



The Du Mont Type 281-A Cathode-ray Indicator is a basic instrument designed to utilize the full capabilities of the high-voltage Type 5RP-A Cathode-ray Tube. The Tube 281-A contains the cathode-ray tube, power supplies, and controls for intensity, focus, and positioning. Provision is made for external deflection amplifiers, an external time-base generator, and external or internal high-voltage intensifier-power supplies. The Type 281-A is invaluable for needs too specialized or advanced for standard, commercially available cathode-ray equipment. The Type 281-A is capable of displaying photographic writing speeds as high as 300 in./ μsec . when used with the Du Mont Type 286-A High-voltage Power Supply.

SPECIFICATIONS

Cathode-ray Tube: Type 5RP-A; 4000 or 8000 volts accelerating potential with internal power supplies; to 29,000 volts with external supply. (Du Mont Type 286-A High-voltage Power Supply is recommended).

Vertical and Horizontal Deflection: **Deflection factor**, dependent upon accelerating potential:

Intensifier voltage	4 kv	8 kv	30 kv
Second anode voltage	2 kv	4 kv	4 kv
Y-axis d-c volts/in.	$\pm 20\%$	85	160
X-axis d-c volts/in.	$\pm 20\%$	90	170

Input impedance: to terminals on front panel, 2 megohms, 30 μf (balanced); 1 megohm, 40 μf (single-ended); to top terminals 5 μf (balanced); 10 μf (single-ended).

Intensity modulation: Terminals capacitively coupled to grid and cathode of cathode-ray tube. Input impedance to grid, 0.5 megohm, 50 μf ; to cathode, 4700 ohms, 60 μf . Cut-off bias of 5RP-A with

2000 volts on second anode, -60 volts $\pm 50\%$; with 4000 volts on second anode, -120 volts $\pm 50\%$.

Power supplies: 2000 and 4000-volt negative supplies regulated within $\pm 1\%$.

Primary power: 115/230 v, 50-60 cps., 100 watts.

Size: 11 $\frac{3}{4}$ " h., 20 $\frac{3}{4}$ " w., 20 $\frac{1}{2}$ " d.; with cabinet 120 lbs., without cabinet 90 lbs.

Metric equiv. 29.9 cm. h.; 52.6 cm. w.; 52 cm. d.; 54.4 kg. (with cabinet); 40.7 kg. (without cabinet).

The Type 281-A is not usually carried in stock.

Cat. No.	Description
1397-E:	115 volts, 50-60 cps. Type 5RP2-A Cathode-ray Tube
1400-E:	115 volts, 50-60 cps. Type 5RP11-A Cathode-ray Tube
1402-E:	230 volts, 50-60 cps. Type 5RP2-A Cathode-ray Tube
1405-E:	230 volts, 50-60 cps. Type 5RP11-A Cathode-ray Tube

SPECIALIZED APPLICATIONS

TYPE 293

The Du Mont Type 293 is a complete recording and indicating instrument for high-voltage impulse-testing. In addition to a hot cathode, sealed-off cathode-ray tube of special design, the Type 293 contains input attenuators, sweep circuits, a trigger generator for initiating external circuits, provision for time and amplitude calibration, and self-contained power supplies. Also, a choice may be made of either a Du Mont Type 2594 Oscillograph-record Camera having an object-to-image ratio of approximately 1, with remote-control facilities, or a Du Mont Type 2599 Oscillograph-record Camera, employing 35-mm film. (Type 2594 illustrated at right.)

Frequency response of both the vertical and horizontal channels is essentially flat from d-c to 25 megacycles. Exponential sweep durations from 0.5 to 1000 microseconds may be selected. These features assure that any high-frequency component of significance to the impulse test will be faithfully reproduced on the screen.

SPECIFICATIONS

Cathode-ray Tube: Type K1068P-, Acceleration, 26,000 volts.

Vertical Deflection — Signal Attenuation: 10 steps of attenuation permit control of signal amplitude in increments of 10% of unattenuated value. Frequency response independent of attenuator setting. Accuracy for any step, 1%.
Deflection Factor: approximately 250 peak-to-peak volts per inch with maximum acceleration and minimum attenuation. **Frequency Response:** essentially uniform from d-c to 25 megacycles per second. **Pulse Response:** 0.01 μ sec. **Maximum Input Potential:** 2500 peak-to-

peak volts. **Signal Delay:** a built-in signal delay of 0.25 μ sec may be inserted at operator's option. **Input Impedance:** 75 ohms.

Horizontal Deflection — Signal Attenuation: 10 steps of attenuation permit control of signal amplitude in increments of 10% of unattenuated value. Frequency response independent of attenuator setting. Accuracy for any step, 1%.
Deflection Factor: approximately 250 peak-to-peak volts per inch with maximum acceleration and minimum attenuation. **Frequency Response:** essentially uniform from d-c to 25 megacycles per second. **Pulse Response:** 0.01 μ sec.

Maximum Input Potential: 2500 peak-to-peak volts. **Signal Delay:** a built-in signal delay of 0.25 μ sec may be inserted at operator's option. **Input Impedance:** 75 ohms.

Sweeps: Semi-logarithmic sweeps have durations of 0.5, 2.5, 10, 50, 250, and 1000 microseconds. **Sweep Initiation:** internally (by impulse test signal), externally (by tripping source), manual (by push-button). **Sweep Starting Time:** less than 0.2 μ sec. **Output Trigger Generator:** Output Trigger pulse of approximately 1200 volts amplitude is initiated by front-panel push-button. **Rate of Rise:** not less than 6000 volts per microsecond. Maximum repetition rate, once in 2 seconds. **Output Impedance:** 75 ohms. **Trigger Delay:** variable from 0.5 to 15 microseconds.

Voltage Calibrator: Metered continuously variable d-c potential applied through selector to signal deflection plate. Calibrates range to 1000 volts with accuracy of 1% of full scale.

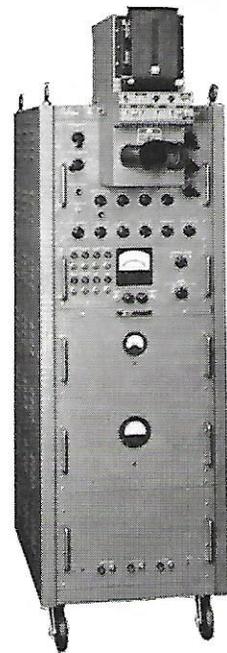
Time Calibrator: Sinusoidal wave train, each cycle of which indicates intervals of 0.05, 0.1, 1, 10, or 100 μ sec. Time Calibration accurate to $\pm 0.2\%$.

Recording Camera: Type 2594. Single frame, detachable. **Film:** 4" by 5" cut film, 4" x 5" film pack, standard Graflex film holders, sheet film magazines and film pack adapters. **Lens Aperture:** Effective aperture of f/2.8 at object-to-image ratio of approximately 1. **Shutter Speeds:** "Time" and "Bulb." **Maximum Photographic Writing Rate:** 50 inches/ μ sec. **Recording Camera:** Type 2599. Single frame, detachable. **Film:** 35-mm film or recording paper, perforated or un-

perforated; cut sheet film or paper. **Lens Aperture:** f/1.5. **Shutter Speeds:** "Time" and "Bulb." **Maximum Photographic Writing Rate:** 150 inches/ μ sec.

Physical Characteristics: 64" (height), 21" (width), 28" (depth) Camera excluded. Weight, 475 lbs.

Cat. No.	Description
1525-E	115 volts, 50-60 cps. Type K1068P2 Cathode-ray Tube and Type 2599 35-mm Camera
1526-E	115 volts, 50-60 cps. Type K1068P11 Cathode-ray Tube and Type 2599 35-mm Camera
1527-E	230 volts, 50-60 cps. Type K1068P2 Cathode-ray Tube and Type 2599 35-mm Camera
1528-E	230 volts, 50-60 cps. Type K1068P11 Cathode-ray Tube and Type 2599 35-mm Camera
1632-E	115 volts, 50-60 cps. Type K1068P2 Cathode-ray Tube and Type 2594 Camera
1633-E	115 volts, 50-60 cps. Type K1068P11 Cathode-ray Tube and Type 2594 Camera
1634-E	230 volts, 50-60 cps. Type K1068P2 Cathode-ray Tube and Type 2594 Camera
1635-E	230 volts, 50-60 cps. Type K1068P11 Cathode-ray Tube and Type 2594 Camera
1617-E	Type 2594 Camera with special lens having effective aperture of f/2.8 at object-to-image ratio of 1
1636-E	Type 2599 35-mm Camera



TYPE 275-A

The Du Mont Type 275-A Cathode-ray Polar-coordinate Indicator is especially suitable for the investigation of mechanical devices. A circular trace, or "analog circle," is automatically synchronized with the drive-shaft of the device under study. The frequency response of the radial amplifier is uniform within 10% to the fundamental motion of a shaft rotating at speeds from 120 rpm to the 500th harmonic of 3600 rpm. For obtaining the voltages from which the analog circle is derived, a two phase generator is supplied.

SPECIFICATIONS

Cathode-ray Tube: Type 5CP-A: Acceleration, 3000 volts. **Size:** 17" h., 10 $\frac{1}{2}$ " w., 19 $\frac{1}{2}$ " d.; 65 lbs.

Analog Circle: Provides circle diameter up to 4 $\frac{1}{2}$ inches.

Radial amplifier: Less than 0.4 rms volt for deflection to center of circle. **Frequency-response:** uniform from 2 to 30,000 cps.

Primary power: 115/230 volts, 50-60 cps., 100 watts.

Cat. No.	Description
1250-E:	115 volts, 50-60 cps. Type 5CP1-A
1253-E:	115 volts, 50-60 cps. Type 5CP7-A
1254-E:	115 volts, 50-60 cps. Type 5CP11-A
1255-E:	230 volts, 50-60 cps. Type 5CP1-A
1258-E:	230 volts, 50-60 cps. Type 5CP7-A
1259-E:	230 volts, 50-60 cps. Type 5CP11-A

HIGH VOLTAGE OSCILLOGRAPHY

TYPE 250-AH

The Du Mont Type 250-AH Cathode-ray Oscillograph is a versatile instrument suitable for the display of either recurrent or transient phenomena. Equipped with both a-c and d-c amplifiers, the Type 250-AH is particularly well suited for the investigation of low-frequency signals, or observation of an a-c signal together with its d-c component.

The Du Mont Type 5RP-A High-Voltage Cathode-ray Tube is employed in the Type 250-AH, and, when used in conjunction with the Du Mont Type 263-B High-Voltage Power Supply, is operated at accelerating potentials as high as 13,500 volts. The use of such high accelerating potentials provides extremely high light output, and increases the efficiency of long-persistence screens, thus facilitating the study of low-frequency and transient phenomena. Driven and recurrent sweeps are continuously variable in duration from 5 seconds to 10 microseconds, and exceptional sweep linearity is maintained over this entire range. Automatic beam blanking is provided in the Type 250-AH. A voltage calibrator is built into the Type 250-AH, and provision is incorporated for modulating the intensity of the fluorescent trace.



SPECIFICATIONS

Cathode-ray Tube: Type 5RP-A; Acceleration: 3200 volts. Up to 13,500 volts with Du Mont Type 263-B High-voltage Power Supply. (See Page 12 for description of Type 263-B).

Vertical Deflection: Deflection factor, (with 3200-V acceleration) through a-c amplifier, 0.015 rms volts per inch; through d-c amplifier, 0.9 d-c volt per inch; direct, 21 rms volts per inch $\pm 20\%$.

Sinusoidal frequency response: of a-c amplifier, uniform within 10% from 5 to 200,000 cps; of d-c amplifier, uniform within 10% from d-c to 200,000 cps.

Horizontal Deflection: Deflection factor, (with 3200-V acceleration) through a-c amplifier, 0.4 rms volt per inch; through d-c amplifier, 1.2 d-c volts per inch; direct, 23 rms volts per inch $\pm 20\%$. **Sinusoidal frequency response:** of a-c amplifier, uniform within 10%

from 5 to 200,000 cps; of d-c amplifier, uniform within 10% from d-c to 200,000 cps.

Linear Time Base: Recurrent and driven sweeps are continuously variable in duration from 5 seconds to 10 microseconds.

Voltage Calibrator: Square wave amplitudes of 0.01, 0.1, 1, 10, or 100 volts. Accuracy, $\pm 5\%$.

Intensity Modulation: 5 volts peak will blank beam at normal intensity settings.

Primary Power: 115/230 v., 50-60 cps. Power consumption, 250 w.

Size: Height, 15"; width, 11"; depth, 19"; weight, 68 lbs.

Cat. No.

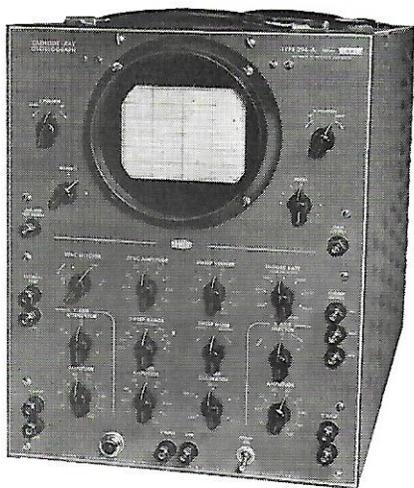
Description

1481-E: 115 volts, 50-60 cps. Type 5RP2-A Cathode-ray Tube

1484-E: 115 volts, 50-60 cps. Type 5RP11-A Cathode-ray Tube

1486-E: 230 volts, 50-60 cps. Type 5RP2-A Cathode-ray Tube

1489-E: 230 volts, 50-60 cps. Type 5RP11-A Cathode-ray Tube



TYPE 294-A

The Du Mont Type 294-A is a wide-band, high-gain, high-voltage cathode-ray oscillograph designed primarily for the investigation of pulses, although the instrument is amply versatile for many general-purpose laboratory applications. Transient response of the vertical amplifier is 0.03 microsecond. While the nominal bandwidth of this amplifier is 12 megacycles, it is usable for sinusoidal frequencies considerably in excess of this figure since the frequency-response characteristic falls very slowly at the high-frequency end. A signal-delay line is built into the vertical amplifier. The Type 5XP- Cathode-ray Tube is operated in the Type 294-A at accelerating potentials of either 7000 or 12,000 volts, with the selection of voltage accomplished by a switch on the indicator. The high-voltage power supply for the intensifier potential is built into the indicator. The low-voltage power supply is packaged as a separate unit.

SPECIFICATIONS

Cathode-ray Tube: Type 5XP—. Acceleration, 7000 or 12,000 volts.

Vertical Deflection: (With 12,000 volts accelerating potential) Deflection factor: through amplifier, 0.56 p-p v/in; amplifier and probe, 5.6 p-p v/in; direct, not more than 50 p-p v/in. **Sinusoidal frequency response of amplifier:** uniform within 10% from 2 cps to 5 mcps; down not more than 30% at 12 mcps. **Undistorted deflection:** 2.75 inches with symmetrical signals; +1.5 or -1.3 inches with unidirectional signals. Useful scan of CRT, 1.75 inches, max. **Input impedance:** to amplifier, 2 megohms, 30 μmf ; through probe, 5 megohms, 15 μmf ; direct (balanced) 9.4 megohms, 10 μmf ; direct (unbalanced) 4.7 megohms, 20 μmf .

Horizontal Deflection: (With 12,000 volts accelerating potential) Deflection factor: through amplifier, 2.2 p-p v/in. **Sinusoidal frequency response:** uniform within 20% from 2 cps to 1 mcps. **Undistorted deflection:** not less than 3 inches for symmetrical signals. Operation at 7000 volts acceleration results in increase of approx. 20% in all specifications dependent on deflection sensitivity.

Input impedance: to amplifier, 1 megohm, 40 μmf .

Linear time base: Recurrent sweeps from 10 to 150,000 cps; driven sweeps from 3 μsec to 0.1 second (sweep speeds as high as 0.25

$\mu\text{sec/inch}$ with sweep expansion). Starting time of driven sweep not more than 0.2 μsec for 0.01 μsec rise time of input signal (pulse). Incremental non-linearity (with 12,000 volts accelerating potential) is not more than 10% for 2.7 in. horizontal deflection.

Timing oscillator: Internally generated markers indicating intervals of 0.1, 1, 10, or 100 μsec applied by means of front panel switch.

Trigger generator: Pulses of 75-volt amplitude, variable in frequency from 200 to 3600 pps, of either polarity, are available at front panel binding posts. Leading-edge rise time not more than 0.25 μsec from 10% to 90% of peak amplitude. Output impedance: + trigger, less than 330 ohms; - trigger, less than 1000 ohms.

Signal delay: 0.25 μsec delay. Preceding specifications include performance of delay line.

Primary power: 115 volts $\pm 10\%$, 50-60 cps. 600 watts.

Size: Indicator, 15 $\frac{3}{4}$ " h.; 12 $\frac{3}{4}$ " w.; 24 $\frac{1}{2}$ " d.; 62 lbs. Power supply, 15 $\frac{3}{4}$ " h.; 12 $\frac{3}{4}$ " w.; 19 $\frac{3}{4}$ " d.; 100 lbs.

Cat. No.

Description

1541-E: 115 volts, 50-60 cps. Type 5XP2 Cathode-ray Tube

1544-E: 115 volts, 50-60 cps. Type 5XP11 Cathode-ray Tube

DU MONT AUXILIARY INSTRUMENTS



TYPE 263-B HIGH-VOLTAGE POWER SUPPLY

The Du Mont Type 263-B High-voltage Power Supply provides a positive d-c potential for application to the intensifier electrodes of such cathode-ray Tubes as the Types 5RP-A or 5XP-. Output of the Type 263-B is variable from 6000 to 12,000 volts and is indicated by a direct-reading meter on the front panel. A shielded cable with connector is provided. Danger of injury from shock is virtually eliminated, as is damage due to accidental short-circuiting, since very little power is stored in the filtering circuits.

SPECIFICATIONS

Output: 6000 to 12,000 volts; up to 200 microamperes. **Output voltage variation,** 20% max, from 0 to 200 microamperes external load. **Ripple voltage** on output 0.1% maximum of d-c output. **Primary Power:** 115/230 volts, 50-60 cps. **Power consumption,** 90 watts. **Size:** 10 $\frac{7}{8}$ " h; 8 $\frac{1}{8}$ " w; 14 $\frac{3}{4}$ " d; 24 lbs. Metric equiv. 27.4 cm h; 20.2 cm w; 37.4 cm d; 10.8 kg.

Cat. No.	Description
1208-E	115 volts, 50-60 cps
1209-E	230 volts, 50-60 cps

The Type 308-A is similar to the Type 263-B except that the Type 308-A is adapted for mounting on a standard 19" relay rack.

TYPE 308-A HIGH-VOLTAGE POWER SUPPLY

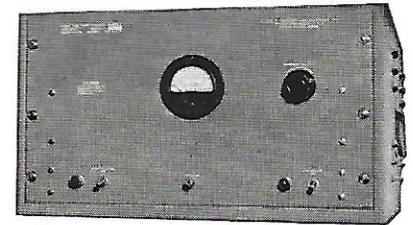
Cat. No.	Description
1433-E	115 volts, 50-60 — cycle operation
1434-E	230 volts, 50-60 — cycle operation

TYPE 286-A HIGH-VOLTAGE POWER SUPPLY

The Type 286-A is a rectified r-f high-voltage power supply with regulated output. The Type 286-A is used primarily as an intensifier supply for high-voltage cathode-ray tubes. A constant output potential is maintained even with large changes in power-line voltage and extreme current requirements. High-voltage hazards are minimized in the Type 286-A, because very little power is stored in its filtering circuits.

SPECIFICATIONS

Output: Variable from 18,000 to 25,000 volts, regulated. Power-line voltage variation of $\pm 10\%$ or external current change from 0 to 500 μ amperes produces less than 5% variation in output voltage. **Primary Power:** 115/230 volts, 50-60 cps. **Size:** 11 $\frac{3}{4}$ " (29.9 cm) h; 20 $\frac{3}{4}$ " (52.6 cm) w; 20 $\frac{1}{2}$ " (52 cm) d; 90 lbs (40.7 kg) with cabinet; 60 lbs (27.2 kg) rack-mounted.



Cat. No.	Description
1416-E	115 volts, 50-60 cycles
1417-E	230 volts, 50-60 cycles

TYPE 264-B VOLTAGE CALIBRATOR

The Du Mont Type 264-B Voltage Calibrator is a simplified, inexpensive instrument for use in conjunction with any cathode-ray oscillograph to measure the amplitude of an applied signal or to determine the deflection sensitivity of the oscillograph at any setting of the amplifier-gain controls. To use the Type 264-B, no leads need be disconnected or switched at any time.

SPECIFICATIONS

Square-wave output: Variable over ranges of 0 to 0.1 volt, 0 to 1 volt, 0 to 10 volts, 0 to 100 volts; **accuracy:** $\pm 5\%$ of full scale for each range. **Signal-input impedance:** 20 μ f. **Primary power:** 115/230 v, 50-60 cps., 20 watts. **Size:** 4 $\frac{1}{2}$ " h., 8" w., 5 $\frac{3}{4}$ " d.; 5 lbs.

Cat. No.	Description
1441-A:	115 volts, 50-60 cps.
1442-A:	230 volts, 50-60 cps.



TYPE 185-A ELECTRONIC SWITCH

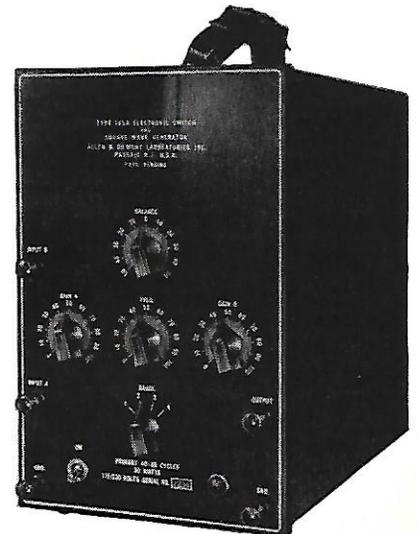
The Type 185-A is a portable instrument which makes possible simultaneous observation of two recurrent patterns on the screen of a single cathode-ray oscillograph. The relative positions may be varied so that the patterns are superimposed or separated by a desired amount. Direct comparison of amplitudes, waveforms, frequency, and phase relationships is thereby readily accomplished. The direct-coupled amplifiers in the Type 185-A are alternately operative and inoperative at a rate determined by the switching frequency. The instrument is therefore effective for "chopping" a d-c signal, making it suitable for transmission through the a-c amplifiers. A square-wave voltage of variable frequency and amplitude is available

at the output terminals for use as a test signal in studying the transmission characteristics of vacuum-tube amplifiers and other circuits.

SPECIFICATIONS

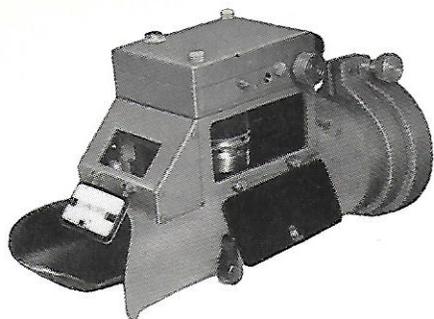
Switching rate: Continuously variable, 10 to 2000 times a second. Frequency response: d-c to 5 kc. **Voltage gain:** 10. Input resistance: 0.1 megohm. **Output resistance:** 50,000 ohms. Maximum signal output: 75 volts peak-to-peak. Primary power: 115/230 volts, 40-60 cps., 30 watts. **Size:** 11 $\frac{1}{2}$ " h., 7 $\frac{3}{8}$ " w., 13" d.; 17 lbs. **Metric equiv.** 29.2 cm. h.; 19.7 cm. w.; 33 cm. d.; 7.7 kg.

Cat. No.	Description
1072-A:	115 volts, 40-60 cps.
1073-A:	230 volts, 40-60 cps.



THE COMPLETE LINE FOR

TYPE 295



The Type 295 is a single-frame Oscillograph-record Camera intended primarily for the recording of ultra-high-speed phenomena, although it will also serve over the entire range of general-purpose, single-frame recording. The extremely high writing rate capabilities of the Type 295 are obtained by the use of an $f/1.5$ coated lens having excellent resolution and minimum rectilinear distortion. Either perforated or unperforated 35-mm film or recording paper may be used in the Type 295, and the camera will take up to 40 exposures on a standard 36-exposure film strip. A convenient shear attachment enables immediate removal of exposed film in the take-up cassette without danger of fogging the unexposed film in the camera.

An illuminated data card is built into the housing of the Type 295, and provision is made for binocular viewing while recording.

The Type 295 may be used with any standard 5-inch cathode-ray oscillograph. For oscillographs other than those manufactured by Du Mont, a Du Mont Type 2501 Bezel will be required, and should be ordered as a separate item.

SPECIFICATIONS

Optical System: Wollensak $f/1.5$ coated Raptar lens. **Image Reduction Ratio:** 4.5

Shutter: Wollensak blade movement permitting exposures of Time and Bulb. Provision for operation by means of solenoid.

Recording Material: Perforated or unperforated 35-mm film in standard cassettes or 35-mm recording paper.

Writing-rate Capability: More than 35 in./ μ sec with Type 5RP11-A Cathode-ray Tube operated at 12,000 volts

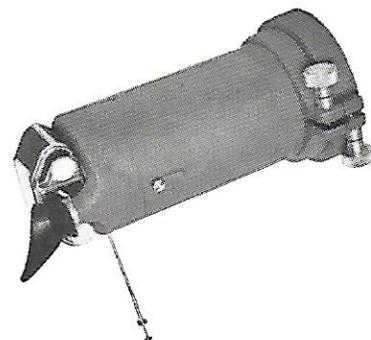
Physical Dimensions: Length, 15 in.; Height, 10 in.; Width, 6 in.; Weight, 20 lbs. Finished in blue-gray wrinkle.

Cat. No.	Description
1550-E	Type 295 with Wollensak, Raptar, 50-mm, coated, $f/1.5$ lens

TYPE 296

The Du Mont Type 296 is a low-price, compact Oscillograph-record Camera for general-purpose, single-frame recording. While the design of this camera is highly simplified, the Type 296 is sufficiently versatile for all normal recording functions except those requiring moving-film or ultra-high-speed equipment. The Type 296 may be quickly mounted on any standard 5-inch cathode-ray oscillograph. All structural members of the camera are fabricated from conductive material. Thus the entire assembly may be grounded, eliminating danger of static fog. A comfortable soft-rubber eye-piece permits simultaneous viewing and recording.

For use on five-inch oscillographs other than those manufactured by Du Mont, the Du Mont Type 2501 Bezel is required, and should be ordered as a separate item.



SPECIFICATIONS

Optical System: Wollensak $f/2.8$ Raptar lens coated. **Image-Reduction Ratio:** 5

Shutter: Wollensak Alphax shutter having speeds of Time, Bulb, 1/200, 1/100, 1/50, 1/25 and 1/10.

Recording Material: 35-mm film, perforated, in standard cassettes.

Physical Dimensions: Length, 12 in.; max. diameter, $5\frac{1}{4}$ in.; Weight, 4.5 lbs. Finished in blue-gray wrinkle.

Writing Rate Capability: More than 10 inches/ μ sec with Type 5RP11-A Cathode-ray Tube operated at 12,000 volts.

Cat. No.	Description
1427-E	Type 296 with Wollensak, Raptar, 41.5-mm, coated, $f/2.8$ lens

TYPE 2512 MOTOR DRIVEN PROCESSING UNIT

The Type 2512 comprises a light-tight steel tank, two spools, a small synchronous driving motor, and tank cover plate. The spools accommodate up to 100 feet of 35-mm film, and may be easily removed for loading or unloading. Solution may be added or poured off without removing the cover plate.

Cat. No. 1372-E

POLAROID-LAND FILM

Polaroid-Land recording material, Type 41 (black and white), for use with the Du Mont Type 297 Oscillograph-record Camera is supplied in cartons of six rolls each. One carton provides a total of 48 individual frames.

Cat. No. 1561-E

TYPE 2513 STAINLESS STEEL TANK

This Tank is for use with the Type 2512 Motor-driven

Processing Unit, and is similar to the one supplied with that unit except that it has no solution spout. Cat. No. 1374-E

TYPE 2514 PORTABLE DRYING RACK

This is an all-metal rack which will hold up to 200 feet of 35 mm film. A motor drive turns the Rack slowly, moving the film past a heating unit consisting of four infra-red lamps. A film squeegee is provided to remove excess moisture from the film as it is wound onto the rack. Clamps on the Rack hold the ends of the film in place. A re-winding spool is also provided for winding the film from the rack after drying is complete.

The Type 2514 may be folded up when it is to be transported or is not in use. A carrying case is furnished with it for this purpose

Cat. No. 1375-E

OSCILLOGRAPHIC RECORDING

TYPE 297

Under certain circumstances it is necessary to obtain a finished oscillogram in the shortest possible time. To meet this requirement, Du Mont has developed the Type 297 Oscillograph-record Camera. The Type 297, operating on the Polaroid-Land principle, provides a finished oscillogram, $3\frac{1}{4}$ by $4\frac{1}{8}$ inches, in 60 seconds after exposure. A simple slide enables recording a number of traces on a single frame. An illuminated data card is built into the housing of the Type 297. This feature is extremely useful for avoiding confusion of recordings. Provision is incorporated for comfortable binocular viewing while recording. The Type 297 is sturdily constructed, and mounts firmly on any standard 5-inch oscillograph. For use on five-inch oscillographs not manufactured by Du Mont, the Du Mont Type 2501 Bezel is required and should be ordered as a separate item.



SPECIFICATIONS

Optical Equipment: Special Du Mont-Wollensak f/2.8 or f/1.9 coated lens; **Image-reduction Ratio:** 2.25

Shutter: Wollensak Alphax, with speeds of Time, Bulb, 1/100, 1/50, and 1/25 with f/2.8 lens; Time, Bulb, 1/100, 1/50, 1/25, 1/10, 1/5, 1/2 and 1 second, with f/1.9.

Recording Material: Polaroid-Land film.

Writing Rate Capability: 1 in./ μ sec (for f/2.8 lens), 2 in./ μ sec

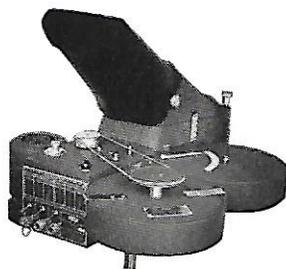
(for f/1.9 lens) with Type 5RP11-A Cathode-ray Tube operated at 12,000 volts

Physical Dimensions: Length, 15 in.; width, 6 in.; height, 10 in.; weight, 12 lbs. Finished in blue-gray wrinkle.

Cat. No.

Description

1552-E Type 297 with Wollensak, 75-mm, coated f/2.8 lens
1553-E Type 297 with Wollensak, 75-mm, coated f/1.9 lens



TYPE 321

The Type 321 is a continuous-motion oscillograph record camera that features unusual simplicity of operation together with great versatility. In loading film, there is no complicated path to follow. Both the take-up and supply magazines may be quickly and easily removed. The camera is equipped with a shearing blade that enables removal of an exposed length of film without danger of fogging the unexposed film in the camera. Film speed is variable in 16 steps from 1 to 3600 inches per minute. Two high-speed ranges, 5400 and 10,800 inches per minute are also provided for use with film strips up to 10 feet in length.

The focus of the coated, f/1.5 lens of the Type 321 is fixed for general oscillographic applications, but may be adjusted where required. Either perforated or unperforated 35-mm film may be used in the Type 321. The entire camera, including controls, is packaged as a single unit and

is mounted on an adjustable, movable stand. Provision is incorporated for remote control of operation. Additional features include a time-calibrating light, a built-in illuminated data card, a film-supply indicator, and provision for simultaneous binocular viewing and recording.

SPECIFICATIONS

Optical System: Wollensak f/1.5 coated Raptar lens. **Image Reduction Ratio,** 4.5

Shutter: Permits exposures of Time and Bulb. Provision for operation by solenoid.

Writing-rate Capability: 35 in./ μ sec with Type 5RP11-A Cathode-ray Tube operated at 12,000 volts.

Film Speed: Variable in 18 steps. Low-speed sprocket, 0.8, 2.5, 7.4, 22.2, 66.6, 200, 600, 1800 inches/minute and 5,400 inches/minute (last-named in direct drive). High-speed sprocket, 1.6, 4.9, 14.8,

44.4, 133.3, 400, 1200, 3600 inches/minute and 10,800 inches/minute (last named in direct drive). Film strips up to 10 ft. in length may be used in direct drive.

Recording Material: Perforated or unperforated 35-mm film or, recording paper in lengths up to 400 ft.

Cat. No.

Description

1554-E Type 321 with Wollensak Raptar, 50-mm, coated, f/1.5 lens for 115 v. 60-cps. only.
1556-E As above, for 50 cps. operation.

TYPE 2580

FILM TAKE-UP CASSETTE

The Type 2580 Film Take-up Cassette is designed for use with the Du Mont Type 295 Oscillograph-record Camera. Equipped with light baffles and a built-in shear, this light-tight cassette enables removal of short lengths of exposed film from the Type 295, without danger of fogging the unexposed supply in the Camera. Cat. No. 1558-E

TYPE 2581

FILM SUPPLY MAGAZINE

The Type 2581 is intended for use with the Du Mont Type 321 Oscillograph-record Camera. The Type 2581 will accommodate up to 400 feet of 35-mm film or paper, and may be readily attached or removed. Cat. No. 1559-E

TYPE 2582

FILM TAKE-UP MAGAZINE

Designed for use with the Type 321 Oscillograph-record Camera, the Type 2582, enables removal of exposed lengths

of 35-mm film or recording paper without disturbing the supply in the camera. Removal or attachment of the Type 2582 may be readily accomplished. Cat. No. 1560-E

CAMERA CARRYING CASES

Sturdily constructed carrying cases, finished outside in grey leatherette, and inside, in velvet, provide safe means for transporting or storing Du Mont Oscillograph-record Cameras. In addition to supporting the camera properly, these carrying cases have compartments for extra film, the operating instruction manual, and such accessories as color filters.

Cat. No.	Type No.	Description
1597-E	2583	Carrying Case for Du Mont Types 295 and 297 Oscillograph-record Cameras
1598-E	2584	Carrying Case for Du Mont Type 296 Oscillograph-record Camera
1599-E	2585	Carrying Case for Du Mont Type 321 Oscillograph-record Camera

DU MONT ACCESSORIES

TYPE 2592 — TERMINAL ADAPTER

This terminal adapter permits the use of coaxial cables for carrying the input signal to the terminals of an oscillograph, and it also provides the correct termination for the coaxial cable. The Type 2592- may be employed on any in-

strument having plug-in type terminals spaced $\frac{3}{4}$ " on centers.

Built into the adapters are impedance-matching resistors with the nearest 5% RMA value to the surge impedance of the cable.

Cat. No.	Type No.	Amphenol Plug Type No.	Description
1600-A	2592-52	83-15P, 83-1SPN, 83-776	52-ohm Terminal Adapter for use with UHF coaxial connector
1601-A	2592-75	"	75-ohm Terminal Adapter for use with UHF coaxial connector
1602-A	2592-93	"	93-ohm Terminal Adapter for use with UHF coaxial connector
1607-A	2592-N52	UG-18B/U, UG-21B/U, UG-94A/U	52-ohm Terminal Adapter for use with Type N coaxial connector

Cat. No.	Type No.	Amphenol Plug Type No.	Description
1608-A	2592-N75	UG-18B/U, UG-21B/U, UG-94A/U	75-ohm Terminal Adapter for use with Type N coaxial connector
1618-A	2592-B52	UG-88/U, UG-260/U	52-ohm Terminal Adapter for use with Type BNC coaxial connector
1619-A	2592-B75	"	75-ohm Terminal Adapter for use with Type BNC coaxial connector
1620-A	2592-B93	"	93-ohm Terminal Adapter for use with Type BNC coaxial connector

TYPE 2562 — ILLUMINATED CALIBRATED SCALE KIT

This kit facilitates amplitude and time calibration for both visual and photographic applications by means of a variably illuminated, calibrated scale which will fit any 5-inch cathode-ray oscillograph equipped with a standard Du Mont Type 2501 Bezel. The Type 2562- Kit is especially useful under darkened room conditions or inside a camera hood where an ordinary unilluminated scale is difficult to discern. Calibrations on the plastic scale are engraved ten lines to the inch, both vertically and horizontally, with one-inch vertical lines and half-inch horizontal lines accentuated.

The Type 2562- Kit comes complete with four incandescent, bayonet-type lamps and sockets, and a combination dimmer control and power switch for the entire instrument. The dimmer control allows a continuous variation of illumination of the calibrated scale, while front and rear

masks help to make the illumination uniform throughout the scale.

In addition, the Type 2562- Kit includes a suitable filter to improve pattern contrast for visual observation. Complete installation details are given with the kit, and the normal complement of hand tools is all that is necessary to complete the job.

Cat. No.	Type No.	Type No. (Filter)	Description
1604-A	2562-A	2560-D	Illuminated, Calibrated Scale Kit with green filter for P1 or P2 screen
1605-A	2562-B	2560-E	Illuminated, Calibrated Scale Kit with blue filter for P11 screen
1606-A	2562-C	2560-F	Illuminated, Calibrated Scale Kit with amber filter for P7 screen

TYPE 189 MOVABLE TABLE

In a laboratory it is often convenient to be able to move oscillographs, signal generators, meters, and similar instruments from place to place as a unit without disturbing connections and without having to consume valuable workbench space. The Type 189 Movable Table fulfills just such a need. Ruggedly constructed of cold-rolled steel, the table

moves effortlessly on large, rubber-tired swivel casters. The top, at standard workbench height, provides an area of more than 600 square inches of space. The table also includes a large drawer and a lower shelf for auxiliary instruments. Specifications: Width 20 $\frac{1}{2}$ "; depth 32 $\frac{1}{4}$ "; height 30 $\frac{3}{4}$ ". Weight, 78 lbs. Cat. No. 1159-E.

TYPE 276-A VIEWING HOOD

This black rubber hood may be easily fitted to any equipment which uses a 5-inch cathode-ray tube. It improves pattern contrast on the tube screen by reducing ambient light level, and is shaped so that it can completely shield the eyes of an observer, producing darkened-room conditions under any circumstances.

In addition to its use wherever unfavorable ambient light conditions exist, the Type 276-A is also used for viewing on a cathode-ray tube screen fast writing speeds which would not be visible with less favorable contrast. Overall length of the hood is 10 $\frac{1}{2}$ inches. Cat. No. 1210-A.

TYPE 2501 BEZEL

The Type 2501 Bezel is intended for mounting on a panel in front of any 5-inch cathode-ray tube. Its protruding flange is designed to accommodate the Du Mont Types 295, 296 and 297 Cameras and the Type 2542 Projection Lens. Also, the Type 2501 Bezel will accommodate

the Du Mont Type 2560 Filters, as well as the Types 2518, 2519 and 2520 Calibrated scales.

The Bezel is formed from sheet iron and has a durable, dull black finish. The maximum overall diameter is 6 $\frac{3}{8}$ inches; protrusion from the panel is 1-3/16 inches.

Cat. No. 1215-E

DU MONT ACCESSORIES

TYPE 2502 MAGNETIC SHIELD

This shield is intended for use with the Type 5RP-A series of cathode-ray tubes, to prevent distortion and intensity modulation of the electron beam due to stray magnetic fields. The shield is fabricated from annealed Mu-metal, an alloy with most excellent magnetic properties.

Holes are provided in the sides of the shield to permit easy access to the electrode terminals. The Type 2502 is supplied complete with a tube base clamp, ready to install. Maximum length of the Type 2502 shield is 10 inches; the maximum diameter is 5 $\frac{5}{8}$ inches. Cat. No. 1382-E.

TYPE 2503 MAGNETIC SHIELD

The Type 2503 Magnetic Shield is similar to the Type 2502, except that it is designed for use with the Types 5SP- and K1027 Cathode-ray Tubes. Maximum length of the Type 2503 is 16 $\frac{1}{8}$ inches; maximum outside diameter is 5-11/16. Cat. No. 1383-E

TYPE 2521 MAGNETIC SHIELD

This shield serves a function similar to that of Type 2502 Magnetic Shield, except that it is designed for use with the Du Mont Type 5CP-A Cathode-ray Tube. Overall length, including the tube base clamp, is 17 $\frac{1}{4}$ inches. Maximum diameter is approx. 5-2/3 inches. Cat. No. 1438-A.

TYPE 2518 CALIBRATED SCALE

This scale, fabricated from heavy ($\frac{1}{4}$ -inch thick), clear acrylic plastic, is designed for mounting under the Du Mont Type 2501 Bezel, where it is held in place by the same screws that secure the Bezel to the oscillograph. Black calibrations are engraved 10 x 10 to the inch, with tenth lines accentuated horizontally, and fifth lines accentuated vertically. The scale is equipped with a rectangular mask, 3.2 inches by 4.2 inches, inside dimensions, which blocks off the unused portion of the screen to facilitate reading. Cat. No. 1435-A

TYPE 2520 CALIBRATED SCALE

The Type 2520 scale has black calibrations engraved 10 x 10 to the inch, with tenth lines accentuated, both vertically and horizontally. It is equipped with a circular mask whose inside diameter is 4.8 inches. Cat. No. 1437-A

TYPE 2560 COLOR FILTERS

The Type 2560 filters, made of heavy plastic, improve pattern contrast when there is an undesirably high level of ambient light upon the screen. The filters also separate the initial excitation from the persistence characteristic of a screen such as the P7, so that either characteristic, depending upon the type of filter selected, may be viewed. They are designed to fit under the Du Mont Type 2501 Bezel or the Du Mont Type 2562 Illuminated Calibrated Scale, and are secured by the same screws that hold the bezel in place.

Cat. No.	Type No.	Description
1578-A	2560-D	Green filter
1579-A	2560-E	Blue filter
1580-A	2560-F	Amber filter

TYPE 2504 STEP-DOWN TRANSFORMER

This transformer is designed to operate from 50-60 cycle, single-phase, 230-volt power. It delivers 115 volts and has a maximum output rating of 250 volt-amperes. There is a power cord and plug for making the 230-volt connection; 115-volt output is available from a standard receptacle on the case. Cat. No. 1384-A

TYPE 2505 STEP-DOWN TRANSFORMER

This transformer is designed to operate from 50-60 cycles, single-phase, 230-volt power. It delivers 115 volts and has a maximum output rating of 1000 volt-amperes. A power cord and plug are provided for making the 230-volt connection; 115-volt output is available from a standard receptacle on the case. Cat. No. 1385-A

TYPE 2546 CHASSIS CABLE CONNECTOR

Intended for use with the Du Mont Type 2547 High-Voltage Cable, this male connector provides a means for attaching of either the Du Mont Type 263-B or 286-A High-Voltage Power Supply to an Oscillograph. Cat. No. 1446-A

TYPE 2547 HIGH-VOLTAGE CABLE

The Type 2547 High Voltage Cable is designed for use with the Du Mont Types 263-B and 286-A High-Voltage Power Supplies and is designed to carry up to 25 kilovolts dc, at low current values, with minimum corona loss. Cat. No. 1445-A

SCALES AND FILTERS

TYPE 2519 CALIBRATED SCALE

This scale is similar to the Type 2518, except that it has a circular mask, 4.5 inches inside diameter, rather than a rectangular mask. Cat. No. 1436-A

TYPE 216 SCALES AND FILTERS

The Type 216 Calibrated Scales are made of clear, non-inflammable plastic and are held in place by tabs which grasp the sides of the cathode-ray tube.

The Type 216 Color Filters are 5-inch disks of colored plastic which serve functions similar to those of the Type 2560 Color Filters. The Type 216 Calibrated Scales and Color Filters are intended for use on instruments not equipped with the Du Mont Type 2501 Bezel.

Cat. No.	Description
1129-A:	3-inch calibrated scale; Type 216-A
1128-A:	5-inch calibrated scale; Type 216-C
1130-A:	5-inch decrement scale; Type 216-D
1131-A:	5-inch Q scale; Type 216-E
1132-A:	5-inch polar-coordinate scale, calibrated 0-360°; Type 216-F
1133-A:	5-inch green filter, Type 216-G
1134-A:	5-inch blue filter, Type 216-H
1135-A:	5-inch amber filter, Type 216-J
1136-A:	5-inch green polar-coordinate scale calibrated 0-720°; Type 216-K

TYPE 2561 CALIBRATED SCALE

This three-inch calibrated scale is made of clear, non-inflammable plastic and are calibrated in 10th inches horizontally and vertically. The Type 2561 is designed for use with the Type 3RP-A Cathode-ray Tube. Cat. No. 1523-A

CATHODE-RAY TUBES

TYPES 2507 AND 316 TEST PROBES

While all Du Mont general-purpose oscillographs are designed to have high input impedance, there are instances where a higher impedance than that provided in the oscillograph may be required. In other cases, low input capacitance to the oscillograph is essential. The Du Mont Types 2507 and 316 Input Probes have sufficiently high input

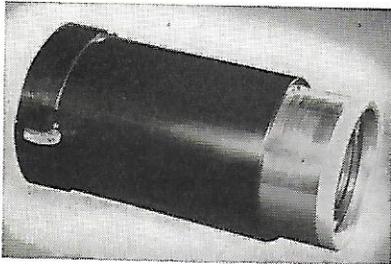
impedance and sufficiently low input capacitance for such applications.

Type 2507 Test Probe is d-c coupled while the Type 316 is a-c coupled. In other respects, the probes are similar, and detailed characteristics of both are presented in the following table.

	Type 2507	Type 316
Frequency Range	d-c to 20 mcps.	20 cps. to 20 mcps.
Input Terminal	Alligator clip	Alligator clip
Output Terminal	General Radio Type 274ND	General Radio Type 274ND
Max. Input Potential	500 volts (d-c & peak a-c)	1600 volts (d-c & peak a-c, with peak a-c not exceeding 500 volts)
Input Impedance	4.7 megohms; 15 μ f	4.7 megohms; 15 μ f
Attenuation	10:1 working into 2-megohm input impedance paralleled by a 20-50 μ f	10:1 working into 2-megohm input impedance paralleled by a 20-50 μ f
Cable Length	60 inches	60 inches

Catalog No.	Type No.	Description
1443-A	2507	Test probe, d-c coupled
1444-A	316	Test probe, a-c coupled

TYPE 2542 PROJECTION LENS



The Type 2542 Projection Lens throws a bright, sharp image of the pattern on the face of a cathode-ray tube onto a regular projection screen. Images up to 12 feet square in a semi-darkened room are possible, making the lens an invaluable aid to lecturing and demonstration. The Type 2542 is intended for use in conjunction with the Types 5RP-A or 5XP-

Cathode-ray Tubes, since these tubes alone, operating at accelerating potentials of from 12,000 to 29,000 volts, are capable of the light output required for satisfactory projection. The lens can be adapted to any equipment employing a Type 5RP-A Cathode-ray Tube at the above accelerating potentials. Cat. No. 1431-E

CATHODE-RAY TUBE*

TYPE 3AP-A

The Type 3AP-A Cathode-ray Tube employs electrostatic deflection and focus, low accelerating-voltage, unbalanced deflection. The Type 3AP-A is used in oscillographs of simplified design.

TYPE 3GP-A

The Type 3GP-A Cathode-ray Tube employs electrostatic deflection and focus, and low accelerating voltage. The Type 3GP-A has four free deflection-plates for balanced deflection to minimize defocusing.

TYPE 3JP-

The Type 3JP- Cathode-ray Tube employs electrostatic deflection and focus, an intensifier for increased light output, and maintains high deflection sensitivity. The Type 3JP- is a relatively short tube.

TYPE 3RP-A

The new Type 3RP-A employs electrostatic deflection and focus, low accelerating voltage, and balanced deflection. Flat face of tube and special construction of deflection plates minimize pattern distortion. Overall physical length of the Type 3RP-A is extremely short.

TYPE 5ADP-

The new Type 5ADP- is an electrostatically focused and deflected cathode-ray tube with very high sensitivity, achieved by the use of long deflection plates. Tolerances are closely controlled with the angle alignment between the D1D2 and D3D4 traces held to 90° ± 1%. Other features include a flat face to minimize parallax, and an electron gun which draws negligible focusing electrode current.

TYPE 5BP-A

The Type 5BP-A Cathode-ray Tube employs electrostatic deflection and focus, and low accelerating voltage. The Type 5BP-A has four free deflection plates for balanced deflection.

*SCREEN CHARACTERISTICS

The P1 screen is used for visual, general-purpose oscillographic applications. The trace on a P1 screen is a medium-persistence green of high visual efficiency.

The P2 screen is used to obtain long persistence at high writing rates. The trace on a P2 screen is a long-persistence blue-green fluorescence followed by yellow-green phosphorescence. More efficient than P7 at accelerations of more than 4000 volts.

The P7 screen is used for slow and intermediate writing rates. The trace on a P7 screen has long persistence with blue fluorescence and yellow phosphorescence. More efficient than P2 at accelerations of less than 4000 volts.

The P11 screen, having high photographic efficiency, is used for recording high writing rates. The trace on a P11 screen is a short-persistence blue.

CATHODE-RAY TUBES

TYPE 5CP-A

The Type 5CP-A Cathode-ray Tube employs electrostatic deflection and focus, an intensifier electrode for maximum brightness, and maintains high deflection-sensitivity. A diheptal base provides insulation for high altitude installations.

TYPE 5JP-A

The Type 5JP-A Cathode-ray Tube employs electrostatic deflection and focus, and low deflection plate capacitances with short, direct leads.

TYPE 5LP-A

The Type 5LP-A Cathode-ray Tube employs electrostatic deflection and focus, and an intensifier electrode for maximum deflection sensitivity at a given accelerating voltage. The Type 5LP-A has four free deflection plates for balanced deflection.

TYPE 5RP-A

The Type 5RP-A Cathode-ray Tube employs high accelerating voltages distributed over four intensifier bands. Accelerating potentials up to 30,000 volts have been applied to the anodes of the Type 5RP-A to achieve writing rates of 400 in./microsecond, while maintaining adequate deflection sensitivity.

TYPE 5SP-

The Type 5SP- Cathode-ray Tube embodies two complete and independent electron guns and deflection plate assemblies for the production of two separate electron beams. The Type 5SP- presents two separate traces on the screen. Intensifier electrodes are used for high light output at maximum deflection sensitivity.

TYPE 5XP-

The new Type 5XP- High-voltage, High-sensitivity Cathode-ray Tube is similar to the Type 5RP-A, except that the vertical deflection sensitivity of the Type 5XP- is approximately three times greater than that of the Type 5RP-A, due to the design of the vertical deflection plates of the Type 5XP-. Otherwise, operating conditions of the two types are identical.

TYPE 5YP-

The Type 5YP- is a high-sensitivity cathode-ray tube for low- and medium-voltage oscillography. Low deflection-plate capacitance is achieved by bringing deflection plate connections out through the neck of the Type 5YP-, making the tube particularly well suited for the display of high-frequency phenomena.

CONNECTORS FOR CATHODE-RAY TUBES

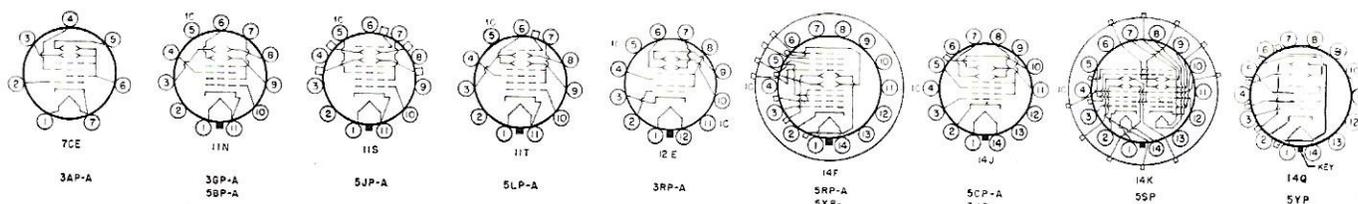
For the convenience of those purchasing Du Mont Cathode-ray Tubes, sets of connectors are available to match the terminals on the glass bulb of those tubes whose connectors are not generally available through the usual sources of supply. Sockets, which are generally available, are not included in these sets.

Catalog No. of Connector Set	For Tube Type
2365-E	5RP-A
2366-E	5SP-
2367-E	5XP-
2368-E	5YP-

TUBE CATALOG NUMBERS

2201-A: 3AP1-A	2381-E: 5ADP1	2252-A: 5JP2-A	2077-E: 5SP7
2206-A: 3AP11-A	2382-E: 5ADP2	2255-A: 5JP7-A	2078-E: 5SP11
2211-A: 3GP1-A	2385-E: 5ADP7	2256-A: 5JP11-A	2347-E: 5XP1
2216-A: 3GP11-A	2386-E: 5ADP11	2261-A: 5LP1-A	2348-E: 5XP2
2025-A: 3JP1	2221-A: 5BP1-A	2262-A: 5LP2-A	2351-E: 5XP7
2026-A: 3JP2	2226-A: 5BP11-A	2265-A: 5LP7-A	2352-E: 5XP11
2029-A: 3JP7	2231-A: 5CP1-A	2266-A: 5LP11-A	2359-A: 5YP1
2030-A: 3JP11	2232-A: 5CP2-A	2282-E: 5RP2-A	2360-A: 5YP2
2353-A: 3RP1-A	2235-A: 5CP7-A	2286-E: 5RP11-A	2363-A: 5YP7
2358-A: 3RP11-A	2236-A: 5CP11-A	2073-E: 5SP1	2364-A: 5YP11
	2251-A: 5JP1-A	2074-E: 5SP2	

BASING DIAGRAMS



(Tube Specifications on Next Page)

CATHODE-RAY TUBES

DU MONT ELECTROSTATIC CATHODE-RAY TUBES

TYPE	Nominal Diameter	Overall Length	RMA Basing	Filament		Maximum		TYPICAL OPERATING CONDITIONS					APPLICATIONS
				E	I	Eb2	Eb3	Eb2	Eb3	Ec1 cut-off	D1-D2	Deflection Factor D3-D4	
3AP-A	3	11½	7CE	2.5	2.1	1500	—	1000	—	-30	75	70	Portable oscillographic
3GP-A	3	11½	11N	6.3	0.6	1500	—	1000	—	-30	80	70	Small-space, high-altitude operation; radar; high intensity
3JP-	3	10	14J	6.3	0.6	2000	4000	1500	3000	-45	150	110	General oscillographic
3RP-A	3	9⅞	12E	6.3	0.6	2500	—	1000	—	-45	85	60	Small-space, general oscillographic
5ADP-	5¼	16¾	14J	6.3	0.6	2600	6000	1500	3000	-45	45	37	High-sensitivity, general oscillographic Tight tolerances for greater accuracy
5BP-A	5¼	16¾	11N	6.3	0.6	2000	—	1500	—	-30	60	55	General oscillographic
5CP-A	5¼	16¾	14J	6.3	0.6	2000	4000	1500	3000	-50	70	60	General oscillographic
5JP-A*	5⅝	16¾	11S	6.3	0.6	2000	4000	1500	3000	-55	70	70	High-frequency oscillographic
5LP-A	5⅝	16¾	11T	6.3	0.6	2000	4000	1500	3000	-45	75	65	General oscillographic
5RP-A*	5¼	16¾	14F	6.3	0.6	3500	25,500	2000	10,000	-60	130	120	High-writing-rate oscillography
5SP.*	5¼	18¼	14K	6.3	0.6	2000	6000	1500	3000	-45	70	60	Dual-channel oscillography
5XP.*	5¼	17⅝	14F	6.3	0.6	3500	25,500	2000	10,000	-60	120	35	High-sensitivity, high-voltage oscillography
5YP.*	5¼	17⅝	14Q	6.3	0.6	3500	8000	1500	1500	-45	45	14	High-sensitivity oscillography

* Deflection-electrode leads brought out through neck of tube to minimize deflection-electrode capacitance.

DU MONT SELLING AGENTS

Merritt, Ron
217 Ninth Avenue North
Seattle 9, Washington
Seneca 4948

Hill, J. T. Sales Co.
800 W. 11th Street
Los Angeles 15, California
Richmond 7-5384

J. T. Hill Sales Co.
625 Laurel Ave.
Menlo Park, Calif.
Davenport 5-4983

Gates, Franklin Y.
200 South Main Street
Salt Lake City, Utah
Salt Lake City 9-1101

Gates, Franklin Y.
110 Harvard Drive, S.E.
Albuquerque, N. Mex.
Alb. 3-8010

Birch-Jones and Co.
119 Pender St. W.
Vancouver, B. C., Canada
Marine 2048

Harris-Hanson Co.
5506 S. Kingshighway
St. Louis 9, Mo.
Sweetbriar 5584

Earl Lipscomb Associates
5103 W. Lovers Lane
P. O. Box 8042
Dallas 5, Texas
Elmhurst 5345

Earl Lipscomb Associates
2420-B Rice Blvd.
P.O. Box 6573
Houston, Texas
Madison 9955

Alfred Crossley and Associates
4501 N. Ravenswood Ave.
Chicago 40, Illinois
Upton 8-1141

Alfred Crossley and Associates
11 W. Monument Ave.
Dayton 2, Ohio
Mich. 8721

Murphy and Cota
1409 Peachtree St. N.E.
Atlanta, Georgia
Elgin 3020

Bayly Engineering, Ltd.
5 First Street
Ajax, Ontario, Canada
Waverly 6866

Sterling, S. Company
15310 W. McNichols Rd.
Detroit 35, Mich.
Broadway 3-2900

Ransford Co., H. E.
Grant Building
Pittsburgh 19, Pa.
Grant 1-1880

Gawler-Knoop Co.
178 Eagle Rock Ave.
Roseland, N. J.
Caldwell 6-4545

In Wash., D. C., Va. & Md.
Gawler-Knoop Co.
9204 Second Ave.
Silver Spring, Md.
Sligo 7550

In Philadelphia, Pa. & Vicinity
Gawler-Knoop Co.
407 Greenwood Ave.
Wyncote, Pa.
Ogontz 8805

Ossmann, Edward A. &
Assoc. Inc.
3 Juniper St.
Rochester 10, New York
Culver 7640

Ossmann, Edward A. &
Assoc. Inc.
RFD #1, Delanson, N. Y.
Delanson 2319

Waters, Robert A., Inc.
4 Gordon Street
Waltham, Massachusetts
Waltham 5-3438

Allen B. Du Mont Laboratories,
Inc.
Instrument Division
1500 Main Avenue
Clifton, New Jersey
Mulberry 4-7400

Export Division
Allen B. Du Mont Laboratories,
Inc.
750 Bloomfield Ave.
Clifton, New Jersey
Cable Address Albeedu,
E. Paterson

ALLEN B. DU MONT LABORATORIES, INC.
Instrument and Cathode-ray Tube Divisions
1500 MAIN AVENUE
CLIFTON, N. J.

760—OWP—15K

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