

and one  $32\Omega$  load @ 240 watts. Caution: unit may become very hot at full load. Adequate ventilation is required. Reactance: less than 10% at 100 kHz. Discontinued early in 1979 after only about 18 months in the catalog. Not replaced. Size: 9 wide x 4 high x 9 deep. Weight: 5 pounds.



**IG-18**  
**Sine/Square Audio Generator**  
 1969-1977  
 \$99.95

The solid-state IG-18 was similar to the IG-72 with respect to switch-selection of frequency and general specifications, and the two models were sold side-by-side until 1976. The major difference was that the IG-18 added square waves. Frequency selection: two significant digits plus a 0-1 vernier, and multiplier (X1, X10, X100 and X1000). Accuracy:  $\pm 5\%$ . **Sine wave output:** 1 Hz to 100 kHz. Voltage output: 8 ranges—0.003 to 10 volts RMS (full scale) with  $10\text{ k}\Omega$  or higher external load; 6 ranges—0.003 to 1 volt (full scale) with  $600\Omega$  internal or external load. db ranges:  $-62$  to  $+22$ ,  $-12$  to  $+2$  on the meter, and  $-50$  to  $+20$  db on the amplitude switch in 10 db steps,  $+2$  db maximum into  $600\Omega$  load. Output variation:  $+1$  db from 10 Hz to 100 kHz. Output indication: two voltage and 1 db scale on meter. Output impedance: 10 volt range—0 to  $1000\Omega$ ; 3 volt range—800 to  $1000\Omega$ ; 1 volt and lower— $600\Omega$ . Meter accuracy:  $\pm 5\%$  of full scale with proper load termination. **Square wave output:** 5 Hz to 100 kHz. Output voltage ranges (p-p): 0.1, 1.0 and 10 volts into  $2000\Omega$  or higher load. Output impedance: 0.1 and 1-volt ranges  $52\Omega$ , 10-volt range up to  $220\Omega$ . Rise time: less than 50 nS. Replaced by the IG-5218 in 1977. Power: 6 watts. Size: 5 high x 13.25 wide x 7 deep. Weight: about 8 pounds.

STEVE GLADSTEIN COLLECTION



**IG-72**  
**Sine Wave Audio Generator**  
 1962-1976  
 \$41.95

The IG-72 is a cosmetic upgrade of the AG-9. The two units are electronically identical. The IG-72 was the last of the series. See AG-9 for details and specifications.



**IG-82**  
**Sine/Square Audio Generator**  
 1962-1969  
 \$51.95

The IG-82 is a cosmetic upgrade of the AG-10. The two units are electronically identical. See AG-10 for details and specifications.



**CT-1**  
**Capacitor Tester**  
**“Capaci-Tester”**  
 1957-1962  
 \$7.95

Based on the number of these seen online and at hamfests Heath must have sold tens of thousands. The price was certainly right. The CT-1 uses an electron ray indicator “magic eye” tube in a clever circuit that uses a transformer power supply but no rectification, and built into the same cabinet as the V-7 VTVM. A five-position switch steps through the “open” and “short” tests. Indication on the tube shows good, bad or intermittent. The CT-1 is an in-circuit tester and will detect open caps from about 50 pF and up provided they are not shunted by an excessively low resistance (shunted by more than 2k $\Omega$  at 50 pF, 400 $\Omega$  at 100 pF, and 30 $\Omega$  at 350 pF or more). It will detect shorted caps up to about 20 pF not shunted by less than 10 $\Omega$ . Test frequencies: short—60 Hz; open—19 MHz. Replaced by the restyled but otherwise identical IT-22 in 1962. Tube: (1) 1629. Size: 7.5 high x 4.75 wide x 4 deep. Weight: about 3 pounds.



STEVE GLADSTEIN COLLECTION

**IT-11**  
**Capacitor Checker**  
 1961-1968  
 \$29.95

The IT-11 is an updated and improved version of the C-3, now called a capacitor checker instead of a condenser checker. The improvements include low voltage test settings for miniature electrolytics, a comparator circuit for use in testing components using an external standard and the ability to test inductance values using an external standard. It is also possible to measure transformer turns ratios. A new control permits selection of capacitor type: electrolytic, miniature electrolytic, paper, mica, etc. The IT-11 will measure capacitance values from 10 pF to 1000  $\mu$ F in five ranges. Test voltages range from 3 to 600 volts in 16 steps. Resistance measurement values from 5  $\Omega$  to 50 M $\Omega$  in four ranges. No inductance range is specified but the external standard and component under test must have of a maximum ratio of not greater than 25:1. The electron ray “magic eye” indicator was changed from the 1629 used in previous versions to a 6E5. Note: This is not an in-circuit tester. Replaced by the electronically identical IT-28 in 1968. Tubes: (1) 6X4, (1) 6BN8, (1) 6E5. Power: 30 watts. Size: 9.5 high x 6.5 wide x 5 deep. Weight: 5 pounds.



## IB-1100 30 MHz Frequency Counter

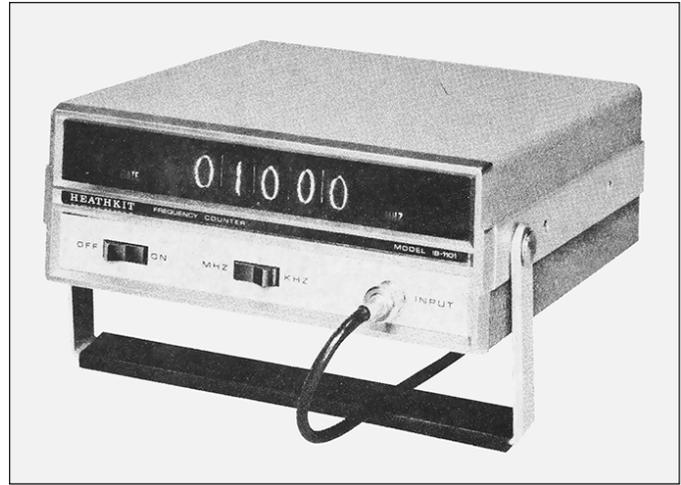
1972-1975  
\$184.95

The 5-digit 30 MHz IB-1100 was designed in an effort to maintain a low-priced counter in the product line. It was sold side-by-side with the IB-102 scaler, which had been reduced to just \$99. The combination bought you a 175 MHz counter for \$285—cheaper per megahertz and faster than any other single Heath counter. Frequency range: 1 Hz to 30 MHz. Accuracy:  $\pm 1$  digit. Input impedance: 1 MW. Maximum input voltage: 150 volts RMS to 100 kHz. De-rate by 48 volts per decade above 100 kHz. Maximum DC input: 200 volts. Time base frequency: 1 MHz. Front panel indicators: five digits plus “overrange.” Solid-state: 27 ICs, 11 transistors, 1 J-FET. All chips and display tubes mount in sockets. Discontinued in 1975. Replaced by the IM-4100. Power: 120/240, 15 watts. Size: 3 high x 7.25 wide x 9 deep. Weight: about 4 pounds.

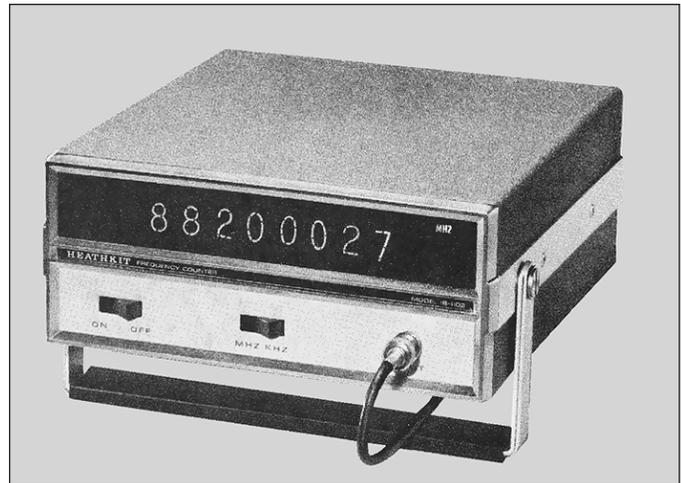
## IB-1101 100 MHz Frequency Counter

1972-1975  
\$295.00

The 100 MHz IB-1101 replaced the 15 MHz IB-101 after a brief overlap in the catalog. Outwardly the two units appear identical. Like the IB-101, the 1101 can be calibrated with nothing more than an AM radio. Circuit uses 26 TTL ICs on a double-sided plated-thru PC board and a five-digit nixie display with “Hz,” “kHz,” “overrange” and “gate” indicators. ICs and display tubes are socketed. Frequency range: 1 Hz to 100 MHz. Accuracy:  $\pm 1$  digit plus time base. Sensitivity: 50 mV RMS from 1 Hz to 50 MHz; 100 mV from 50 MHz to 100 MHz. Gate time: 1 mS or 1 second with auto reset. Input



impedance:  $1M\Omega$  shunted by less than 15 pF. Maximum input voltage: 250 volts RMS at zero to 5 MHz, decreasing to 3 volts RMS at 100 MHz. Maximum DC input: 250 volts. External standard input: 1 MHz, 2.5 to 6.5 volts RMS sine or square wave approx.  $2.5k\Omega$ , 70 pF. Time base (after 30 minute warm up): 1 MHz. Stability (after 30 minute warm up): better than  $\pm 3$  ppm between 45 and 90°F. Discontinued in 1975. Pushed aside by the IB-1102 and IB-1103. Power: 120/240 VAC, 15 watts. Size: 8.25 wide x 3.5 high x 9 deep. Weight: about 5 pounds.



## IB-1102 120 MHz Frequency Counter

1972-1977  
\$374.96

This 120 MHz counter was an incremental improvement over the 100 MHz IB-1101 and cost an additional \$70, but in those early days of frequency counters plenty of people more than happy to trade up. In addition to the extra 20 MHz the 1101 also provided better sensitivity and better stability than the IB-102. ICs and readout tubes are socket mounted. Range: 1 Hz to 120 MHz. Gate

**EUW-17**  
**Transistorized Power Supply**  
 1963-1973  
 \$20.00

Output voltage (unregulated): 0-25 volts at maximum current, 0-35 volts under no load. Output volts (maximum current in mA): 4 (60), 8 (80), 12 (100), 16 (125), 20 (200), 25 (200). Output resistance: less than 50Ω. Ripple: less than 0.1% at full load. Circuit type: full-wave. By 1973 the EUW-17 had been replaced by the IP-18 (page 12-01). Semiconductors: (1) R265A transistor; (2) 100 PIV silicon diodes. Size: 4.25 long x 4.75 wide x 5 high. Weight: 3 pounds.



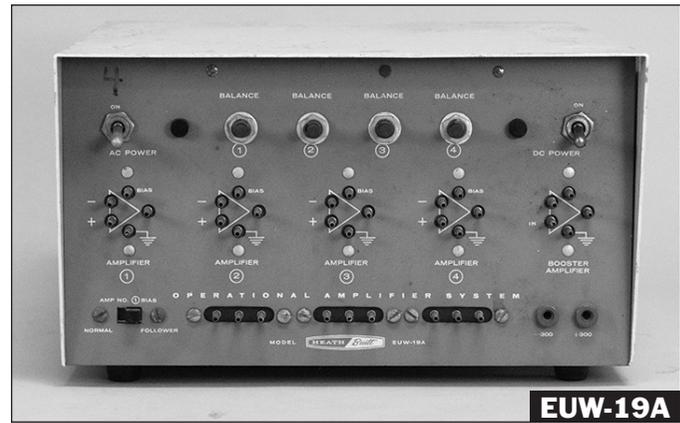
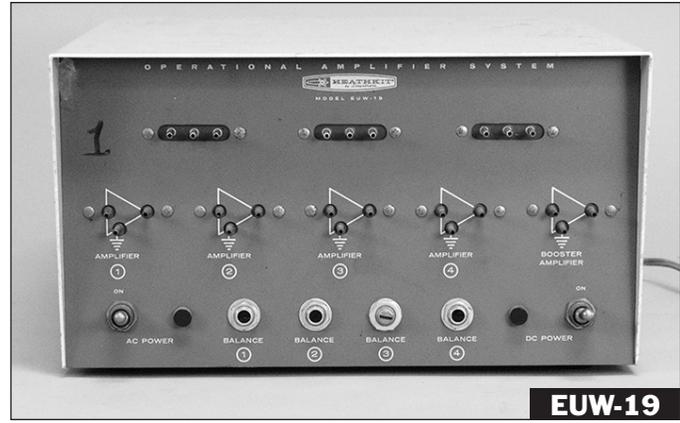
**EUW-18**  
**Laboratory Meter**  
 1963-1973  
 \$22.00

Meter scales: 0-15 and 0-50. Basic movement: 1 mA. Accuracy: ±2% of full scale. Meter resistance: 50Ω. Supplied with parts to build four shunts for 1.5, 5, 15 and 50 mA full-scale readings. The 1.5 and 50 mA shunts use a 100Ω and 1.02Ω resistor respectively, while the 5 and 15 mA shunts must be wound with supplied "resistance wire." All shunts are made with banana plug assemblies. Size: 5 high x 4.75 wide x 4.25 deep. Weight: 1 pound.



**EUW-19(A)(B)**  
**Operational Amplifier**  
 See text for dates  
 \$135.00

The EUW-19 is made up of the following subsystems: four high-gain differential input operational amplifiers, four bias supplies for DC zero adjustment, a high-current booster amplifier and a regulated power supply



(+ and - 300 volts). One of the bias supplies may be switched for use as an inverting or follower amplifier. Rear panel connectors provide access to the filament and high voltage supplies for use with other equipment. The amplifier input/output connector pins accommodate Heath's quick-connect parts scheme but are arranged so that they will also fit a standard 5-pin tube socket. Three versions were produced: EUW-19 (1965-1968), EUW-19A (1968-1970), and EUW-19B (1970-1973). While there are some obvious outward differences, they are all just subtle refinements that share the same specifications. **Operational amplifiers:** DC gain, open

Center frequency: 100 MHz, adjustable to  $\pm 2$  MHz. Pilot modulating frequency: 19 kHz  $\pm 2$  Hz. FM modulation: left and right channel stereo, phase test (left plus right in phase), monophonic FM. Deviation: adjustable to 75 kHz. Sweep rate: (used for RF and IF alignment) 60 Hz. Sweep width: (used for RF and IF alignment) adjustable to 750 kHz. RF attenuator range: 60 db in 20 db steps. Crystal-controlled markers: 10.7, 90.95, 96.30, 101.65 and 107 MHz. Audio output: 400, 1000 and 5000 Hz, 19 kHz, 38 kHz, and SCA (65 or 67 kHz). Distortion: (at 400, 1000 and 5000 Hz) less than 5%. Alignment requires an AC VTVM and an oscilloscope. Replaced in 1967 by the redesigned but otherwise identical IG-37. Tubes: (1) 12AT7, (1) 6AU8, (1) 6AN8, (3) 12AU7. Power: 35 watts. Size: 10.4 high x 8 deep x 13 wide. Weight: about 7 pounds.



JERRY O'REILLY COLLECTION

## IM-4180 FM Deviation Meter

1977-1987

\$149.95

Measures FM peak deviation (modulation) of transmitters and signal generators with carrier frequencies between 25 MHz and 1000 MHz. Band switching is not required. Deviation ranges: 0-2, 0-7.5, 0-20 and 0-75 kHz. Accuracy:  $\pm 3\%$  of full scale. Sensitivity: 10 mV at 25-50 MHz, 35 mV at 50-500 MHz, 100 mV at 500-1000 MHz. Input impedance: 50W. Maximum safe input: 5 volts. Scope output: 13 mV/kHz peak. De-emphasis: 750 mS for two-way service, 75 mS for broadcast. Local oscillator drift:  $\pm 10$  kHz for first hour after power up. Demodulated signals can be routed to an 8 $\Omega$  speaker via a jack on the front panel. Operating temperature range for rated accuracy: 68-85° F. Discontinued in 1987. Not replaced. Power: 10 AA cells. Caution: do not use an external power supply if other than rechargeable batteries are installed. Operates about 80 hours in intermittent use on alkaline batteries or about 35 hours on NiCads. Size: 10.5 wide x 5 high x 7.25 deep. Weight: about 4 pounds.

STEVE GLADSTEIN COLLECTION



## IG-5237 FM Stereo Generator

1977-1977

\$99.00

The IG-5237 is a restyled version of the IG-37, which in turn was a restyled version of the IG-112. See IG-112 for details and specifications. Sold for less than a year before being discontinued late in 1977. Not replaced.



STEVE GLADSTEIN COLLECTION

**IG-1275**  
**Lin/Log Swept Function Generator**  
 1977-1983  
 \$319.95

Provides sine, square and triangle waveforms from 0.03 Hz to 6 MHz, plus swept-function wave forms. Basic modes of operation include continuous output (CW), gated CW, a burst mode that completes a variable integral number of cycles and linear or logarithmic sweeps for a 1000:1 sweep range. Start and stop frequency may be set independently. Sweep mode can be triggered externally. Includes a remote pen-lift and chart control for Heath (and other) chart recorders. Features a 50 db attenuator variable between ranges; adjustable symmetry from 5% to 95%; variable offset; analog, sweep and sweep gate outputs for system control and VCG input for control of main generator. Output: 50Ω, short circuit protected. Output flatness: ±0.1 db to 300 kHz, ±0.5 db to 3 MHz. Square wave rise/fall: less than 60 nS. Triangle linearity: no deviation greater than 1% to 300kHz. Sweep generator (6 ranges): 10 mS to 1 second. Each range may be extended by 100 with a variable control. Sweep output: 0-4.5 volt linear ramp at sweep generator rate from a 1000Ω source. Discontinued late in 1983. Not directly replaced but the IG-1277 pulse generator was introduced in 1984 and the smaller IG-1271 (sans swept-function) carried on until 1987. Power: 120/240 VAC, 20 watts. Size: 15 wide x 12 deep x 5.5 high. Weight: about 12 pounds.



STEVE GLADSTEIN COLLECTION

**IG-1277**  
**Pulse Generator**  
 1984-1985  
 \$179.95

Produces pulse repetition periods from 1 nS to 200 nS (1 Hz to 5 MHz) with identical pulse width and delay ranges from 100 nS to 1 second in seven decade ranges. All ranges are continuously variable using 1-decade vernier range switches. Pulse width is adjustable to 100% duty cycle. The 1277 has three separate outputs. A 50W output offers an adjustable DC offset with an open-circuit output range from 0.2 to 20 volts p-p including a rise/fall time of less than 15 nS. One TTL output drives loads using a fixed level for logic "0" of less than 0.4 volts and a logic "1" of greater than 2.4 volts with a rise/fall time of less than 25 nS. The third output can be used either to trigger an oscilloscope or drive up to three TTL loads. Discontinued in 1985. Not replaced but the IG-1271 continued until 1987. Power 120 VAC, 30 watts. Size: 3.75 high x 10 wide x 12.5 deep. Weight: about 7 pounds.

unit is now AC powered using a transformer, a selenium rectifier, and a silicon diode, and the General Radio hummer was replaced with a vacuum tube oscillator. Uses battery-type tubes for zero warm up and stability time. The IB-2A was released in 1958. Curiously, the IB-2A vanished from the catalog for at least the last few month of 1967, only to appear again in 1968 as the IB-2B and wearing the New Look colors. Otherwise, it appears to be electronically identical to the IB-2 and 2A. Replaced by the restyled but identical IB-28 in 1969. The series began with the IB-1 in 1949 and ended IB-3128 in 1980—a run of 31 years—making it one of Heath's most enduring products. Tubes: (2) 1U4, (2) 1L4. Power: 10 watts. Size: 8 high x 17 wide x 6 deep. Weight: about 8 pounds.



JAY WHIPPLE COLLECTION

## IB-3128 Impedance Bridge

1977-1980

\$129.95

The IB-3128 was the last version of a product that began as the IB-1 in 1949 and is essentially identical in function. See IB-1(A)(B) for details and specifications. When the IB-3128 was discontinued in 1980 the series had been in the catalog for 31 years, making it one of the longest running products Heath ever made. Made obsolete by the not-nearly-as-cool IB-5281 in 1977. Sold until supplies ran out in 1980.



STEVE GLADSTEIN COLLECTION

## IB-28 Impedance Bridge

1969-1977

\$89.00

The IB-28 is a restyled version of the IB-2(A) which was restyled from the IB-1(A)(B). See IB-1(A)(B) for details and specifications. Replaced by the restyled but identical IB-3128 in 1977.



JAY WHIPPLE COLLECTION

## IB-5281 RCL Bridge

1977-1990

\$37.95

The IB-5281 was one of family of five like-styled, low-end products that seemed to suggest Heath was on a downward slope. The others included the IG-5285 audio oscillator, the IG-5280 RF generator, the IM-5284 VOM and the IT-5283 signal tracer. A companion power cube

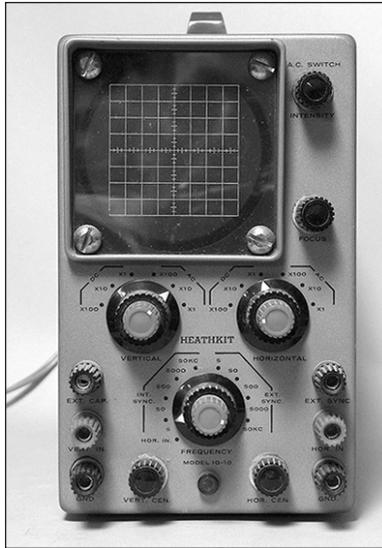
## IO-10 200 kHz DC Single Trace Oscilloscope

“Space Saver”

1960-1971

\$79.95

The IO-10 was Heath's second three-inch scope (after the OL-1), but its first three-inch DC-coupled scope, and one of five scopes in the catalog by late 1960. Designed in a very small package, the IO-10 shares a design style with the OR-1 and OP-1 in the use of a silver anodized front panel, knobs and panel callouts and an off-set CRT, all variations of Classic I design. **Identical vertical and horizontal amplifiers:** Bandwidth: DC to 200 kHz (the OL-1 was 400 kHz); Sensitivity: 0.1 volts p-p per 1/4 inch (uncalibrated); Attenuator: 3-position, compensated type; Gain control: continuously variable; Input impedance: 3.6 MΩ shunting 35 pF; Coupling: AC or DC, switch-selected; Relative phase-shift between channels: less than 5°; Sweep generator: recurrent type, linear saw-tooth generated by a multivibrator, 5 Hz to 50 kHz in four overlapping ranges with binding posts for external capacitance for lower sweep rates; point-to-point construction. Tubes: (3) 6BS8, (2) 12AU7, (2) 12BH7, (1) 6X4, (1) 1V2, (1) 0A2, (1) 0C2, (1) 3RP1; Power: 105-125 volts, 50/60 Hz, 100 watts; Size: 7.5 high x 4.5 wide x 11 deep. Weight: 14 pounds.



## IO-12 5 MHz Single Trace Oscilloscope

“Extra Duty”

1962-1968

\$79.95

The IO-12 is electronically identical to the IO-30, but physically restyled to the Classic II design. While Heath advertised the IO-12 as the “extra duty” scope it didn't actually say that on the front panel. Front panel verbiage



said “laboratory oscilloscope.” See IO-30 for details and specifications. Replaced by the IO-18 in 1968. Same tube complement as IO-30: (1) 6AB4, (1) 6AN8, (1) 6J6, (1) 6C4, (1) 12BH7, (3) 12AU7, (1) 6CA4, (1) 1V2, (1) 5UP1. Replaced in 1968 by the IO-18. Power: 80 watts. Size: 14 high x 8.75 high x 16 deep. Weight: 19 pounds.

## IO-14 8 MHz DC Single Trace Oscilloscope

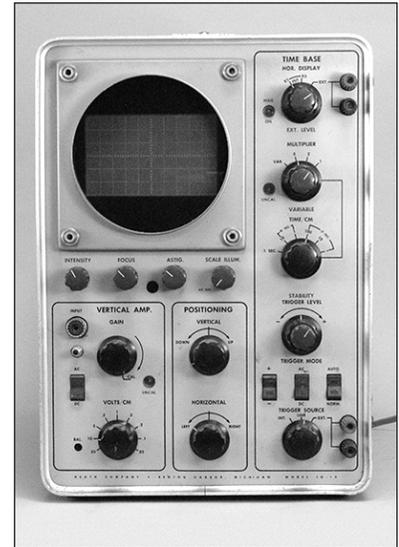
“Professional”

1966-1971

\$259.00

The IO-14 is a descendent of the OP-1, Heath's first oscilloscope aimed at the high-end scientific and engineering markets, and shared the OP-1's flat-faced CRT. These scopes were

designed to compete with HP and Tektronix, and did so with a fair degree of success. With a total of 26 tubes and a net weight of 40 pounds, the IO-14 gave new meaning to the term “heavy duty.” **Vertical channel:** Input impedance: 1 MΩ shunted by 15 pF; Sensitivity: 0.05 volts/cm; Frequency response: DC to 5 MHz -1 db or less, DC to 8 MHz -3 db or less; Rise time: 0.04 μS; Signal delay: 0.25 μS; Attenuator: 9-position, fully compensated, calibrated in a 1, 2, 5 sequence from 0.05 volts/cm, ±3% on each step, and an uncalibrated variable control; Maximum input voltage: 600 volts p-p, 120 volts provides full 6 cm pattern in least sensitive position; **Horizontal channel:** Time base: triggered with 18 calibrated rates in a 1, 2, 5 sequence from 0.5 seconds/cm to 1 μS/cm, ±3%, and an uncalibrated variable control; Sweep magnifier: X5, fastest sweep rate becomes 0.2 μS/cm, overall time base accuracy ±3% with magnifier on; Triggering capability: Internal, external, or line triggering, selection of + or - slope (with trigger level control), selection of AC or DC coupling, auto position for normal signals without use of trigger level control; Triggering requirements: Internal: 1/2 cm to 6 cm display; external: 0.5 volts to 120 volts p-p; Horizontal input: 1 volt/cm uncalibrated, bandwidth DC to 200 kHz, ±3 db. Input connections: Vertical input: coaxial connector with a binding post as an added ground connection (3/4" spacing); Horizontal and trigger: Binding posts with 3/4" spacing; Z-axis and direct vertical plate access also provided; Power supply: All critical DC voltages regulated; CRT potential: About



JERRY O'REILLY COLLECTION

kits. Last advertised in August 1950. Tubes: (5) 6SN7, (2) 5Y3, (1) 5BP1 or 5BP4 or 5GP1. Size: 8.5 wide x 13 high x 17 deep. 24 pounds.

**O-6**  
**2 MHz Single Trace Oscilloscope**  
 1950-1951  
 \$39.50

Released in September 1950, one year after the O-5. A refinement of the O-5 advertised as having 12 improvements. These are listed as 1) improved Allegheny Ludlum magnetic metal CRT shield, 2) new AC/DC push-pull amplifier, 3) both vertical and horizontal amplifiers use push-pull pentodes for maximum gain, 4) improved amplifiers for better response to 2 MHz, 5) high gain amplifiers for deflection of 0.04 volts per inch horizontal and 0.09 vertical, 6) new intensity circuit for greater brilliance, 7) extended sweep range from 15 Hz to 100 kHz, 8) sync circuit that works with either positive or negative signal peaks, 9) new step-attenuated frequency-compensated input, 10) non frequency discriminating input control, 11) filter capacitor has separate vertical and horizontal sections, and 12) new heavy duty power transformer has 68% less magnetic field. In previous models Heath did not distinguish between vertical and horizontal deflection sensitivity, listing as simply 0.05 volts per inch. This falls between the two separate figures listed above, so whether or not it is an actual improvement is not clear. Tubes: (3) 6J5, (4) 6SJ7, (2) 5Y3, (1) 5BP1. Size: 8.5 wide x 13 high x 17 deep. Weight: 30 pounds.

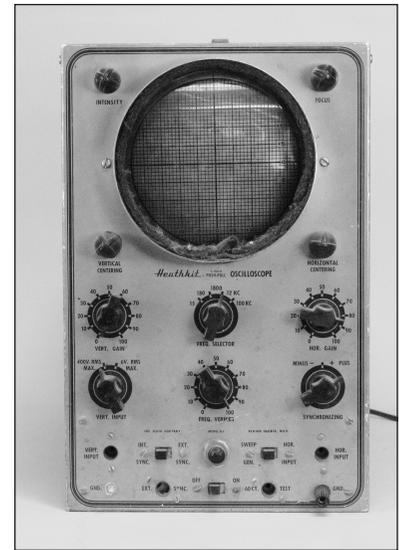


JERRY O'REILLY COLLECTION

**O-7**  
**5 MHz Single Trace Oscilloscope**  
 1951-1952  
 \$43.50

Released in September 1951, the O-7 would be the last scope to use the Pre-Classic pinstripe design. Improvements included the addition of a "spot shape" (astigmatism) control for sharper focus; 10 tubes including the CRT and five miniatures; cascaded vertical amplifiers followed by phase splitter and balanced push-pull deflection amps; greatly reduced retrace time;

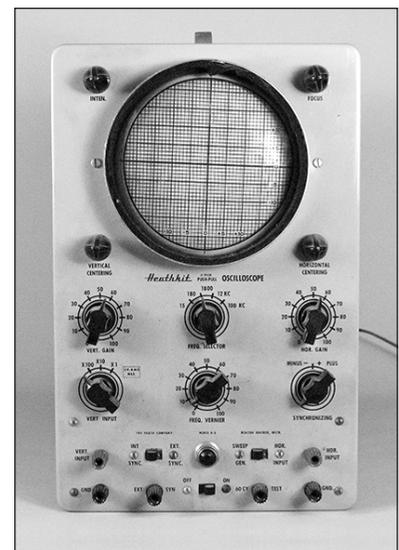
step-attenuated frequency-compensated cathode follower vertical input; low impedance vertical gain control for minimum distortion; mounting of phase splitter and deflection amplifiers nearer to CRT; greatly simplified wiring; increased frequency response useful to 5 MHz; vertical deflection of 0.03 volts per inch; horizontal deflection of 0.6 volts per inch; positive or negative internal sync. Sweep generator with course and fine adjustments with a sweep rate to 135 kHz. Vertical frequency response (1 inch deflection at 1 kHz reference): +2db @ 10 Hz, -2 db @ 200 kHz, -6 db @ 500 kHz, -12 db @ 1 MHz, -24 db @ 2 MHz. Horizontal frequency response (1 inch deflection at 1 kHz reference): +2db @ 10 Hz, -3 db @ 500 kHz, -6 db @ 1 MHz, -12 db @ 2 MHz. Input impedance: 25 pF shunting 1 MΩ. Tubes: (2) 6J5, (4) 12AT7, (1) 6C4, (2) 5Y3GT, (1) 5BP1 or 5BP4 or 5GP1. Size: 8.5 wide x 13 high x 17 deep. 29 pounds.



JERRY O'REILLY COLLECTION

**O-8**  
**5 MHz Single Trace Oscilloscope**  
 1952-1953  
 \$43.50

Released September 1952. The first Late Pre-Classic design scope, characterized by a cabinet with rounded corners. Improvements include a new wide-band vertical amplifier providing ±2 db from 10 Hz to 1 MHz, but useful to over 5 MHz and vertical deflection of 0.025 volts per inch. The O-8 also added a 3-step input attenuator (x1, x10 and x100), Z-axis input and was the first scope to use the 5CP1 "intensifier-type" CRT for greater brightness. Sweep generator operates from 15



JERRY O'REILLY COLLECTION

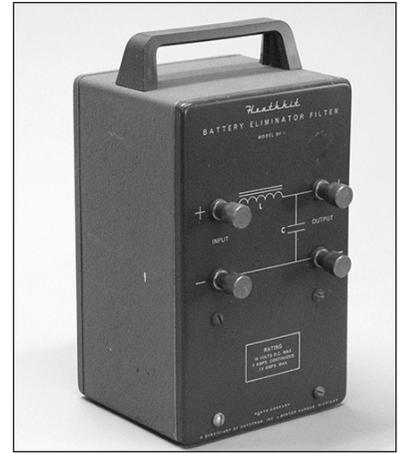


**BE-5**  
**Battery Eliminator**  
 1957-1962  
 \$39.95

The BE-5 was introduced in 1957 and was sold alongside the BE-4 for about a year. The point of differentiation was that the BE-5 provided a low ripple output. In fact, the BE-5 uses exactly the same circuit as the BE-4 but added a choke and a third 10,000  $\mu\text{F}$  electrolytic capacitor—essentially a built-in BF-1. The BE-5 had two sets of outputs—one partially filtered as in the BE-4 and the other with the added filter choke and capacitor. The ripple specification from the low-ripple output terminals is less than 0.3% at 5 amps (ripple in the BE-4 was never specified). The voltage and current specifications are otherwise the same as the BE-4: The output is continuously variable in two switch-selected ranges: 0-8 (10 amps continuous or 15 amps intermittent) or 0-16 volts (5 amps continuous or 7.5 amps intermittent). Note: The maximum current rating from the low-ripple output side of the supply is 5 amps continuous, 7.5 amps intermittent. Meters read 0-15 volts and 0-15 amps. Power: 200 watts at full load. Can be used as a battery charger. Replaced by the IP-12 in 1962. Size: 13 wide x 7 deep x 8.5 high. Weight: 20 pounds.

**BF-1**  
**Ripple Filter**  
 1957-1959  
 \$10.95

The BF-1 was an external ripple filter offered as an option for the BE-4, but could be used with any similar power supply. The unit contains a choke (value not specified) and a 20 volt 10,000  $\mu\text{F}$  electrolytic capacitor. Designed for operation from 0-15 volts. Maximum current rating was 5 amps at 12 volts. When used with the BE-4 it would reduce ripple to 0.3% with a load of 5 amps. The BF-1 is built into the BE-5. Size: 7.5 high x 4.75 wide x 4 deep. Weight: about 5 pounds.



STEVE GLADSTEIN COLLECTION



**IP-12**  
**Battery Eliminator**  
 1962-1976  
 \$47.50

The IP-12 is a restyling of the BE-5. The two units are electronically identical. The meters were updated from metal to plastic cases. Two different meter styles have been identified—narrowed (earlier versions) and square (later versions). The IP-12 was one of Heath's longer-lived products and remained unchanged for 14 years. It never made the switch to New Look styling. Replaced by the IP-2715 (Post New Look style) in 1976. See BE-5 for details and specifications.

not known, but it may have been wildly unstable. Heath advertised the G-4 as a high frequency generator. The front panel says “HF-AM Generator.” By this Heath tried to draw a point of distinction between it and the G-1. While the G-1 covered from 100 kHz to 34 MHz, the G-4 started at 34 MHz and went to 110 MHz on fundamentals with “extremely strong harmonics” to 220 MHz. In those days “high frequency” had a different meaning than it does today. Exactly what Heath meant by “AM” is not clear. A 400 Hz sawtooth signal generated by a neon lamp was available from a separate output for audio testing. Probably discontinued by July 1949. Not directly replaced. The G-5, released in December, only covered to 102 MHz. Heath would not go above 200 MHz again until the SG-8 in 1953. Tubes: (2) 6C4, (1) 6X5. Size: 9 wide x 6 high x 5 deep. Weight: about 5 pounds.



**G-5**  
**RF Generator**  
 1949-1950  
 \$19.50

The G-5, released in December 1949, is a subtle refinement of the G-1. Outwardly, the G-5 and G-1 are virtually identical. The difference on the front panel is that the “AUDIO” control of the G-1 has been relabeled as “AF” and has a provision for external modulation. Other improvements include an improved tuning dial with a 5:1 reduction mechanism (replacing the G-1’s direct drive), new precision coils for “greater output,” and a cathode follower output “for greater stability.” Calibrated from 150 kHz to 34 MHz in five bands plus the third harmonic of the fifth band, scaled from 36 to 102 MHz. 400 Hz modulation is provided by a neon relaxation oscillator. Early version used a plain handle. Later handles were inscribed “Heathkit Precision.” Tubes: (1) 6X5, (1) 6SN7. Replaced by the SG-6 late in 1950. Size: 9 wide x 6 high x 5 deep. Weight: 4.5 pounds.



**IG-42**  
**RF Generator**  
**“Laboratory”**  
 1962-1977  
 \$56.95

The IG-42 is electronically identical to the LG-1, which was released in 1953. The “upgrade” to the IG-42 is entirely cosmetic, changing from the Classic I to Classic II design which included new knobs and a nicer looking (but less expensive) meter. In the 1977 Christmas catalog the generator was shown in the New Look style but with the meter used in the Classic II, and still designated IG-42. In the 1978 Fall catalog it was shown in the older Classic II style but the model number had changed to IG-5242. By 1979 a black and white photo displayed the unit in what appeared to be New Look colors, but with a meter style typical of Post New Look. By this time it was designated IG-5242 and advertised as “new.” These various discrepancies are probably attributable to cut and paste errors. This was, after all, a time when the art department was actually cutting and pasting pictures and text. Since the circuit was not changed after its introduction in 1953, this LG/IG series of generators was one of Heath’s most enduring and profitable products. See LG-1 for details and specifications.

ERICH BRUESCHKE COLLECTION

## DR-1 Decade Resistance Box

See RD-1

## EUW-30 Decade Resistance Box

See listing in chapter 4.



## IN-11 Decade Resistance Box

1962-1967  
\$24.94

The IN-11 was not just a cosmetic makeover of the DR-1, it also added another complete decade. The unit was introduced in Classic II styling in 1962. Provides ohms values from 1 to 999,999 in one ohm steps. Uses 0.5% resistors and switches that make before break. Working current ratings in milliamps (maximum rating in parentheses): X1—500(1000); X10—150(300); X100—50(100); X1K—15(30); X10K—5(10); X100K—1.5(3). Minimum DC resistance: 0.43  $\Omega$  at terminals with all switches set to zero. Maximum working voltage not specified, but the related RS-1 was rated at 500 volts. Replaced by the functionally identical New Look IN-17 in 1967. Starting in 1964 the IN-11 was also dressed in green and sold as the EUW-30, part of the Malmstadt/Enke series of pre-wired products aimed at the education market. See EUW section. Size: 7.5 wide x 5 high x 6.5 deep. Weight: 2.5 pounds.

## IN-12 Resistance Substitution Box

1962-1967  
\$5.95

The IN-12 is a cosmetic restyling of the RS-1. The two models are electrically identical. See RS-1 for details and specifications. Replaced by the essentially identical IN-17 in 1962.



## IN-17 Decade Resistance Box

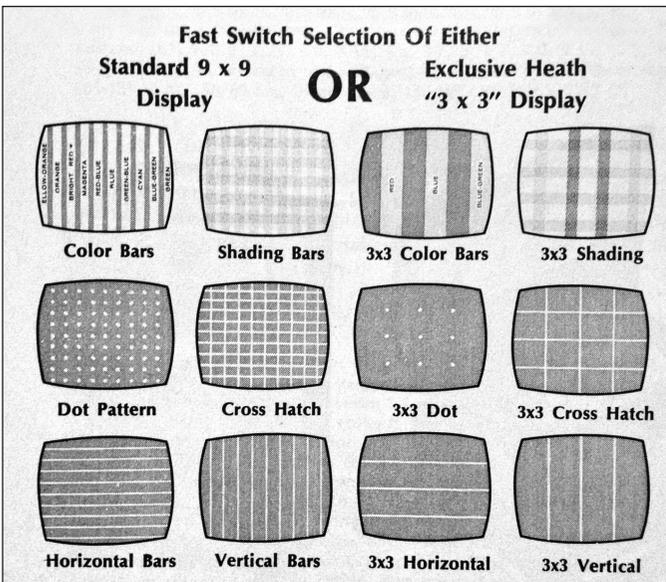
1967-1977  
\$6.95

The IN-17 was a cosmetic restyling of the IN-11, which itself was an improved version of the RD-1 and its identical twin, the DR-1. The IN-17 and IN-11 are electrically identical except that the minimum resistance with all switches set to zero was lowered to 0.025  $\Omega$ . See IN-11 for details and specifications. Replaced by the restyled IN-3117 in 1977. Size: 7.5 wide x 5 high x 6.5 deep. Weight: 2.5 pounds.



STEVE GLADSTEIN COLLECTION

sets having separate video and sync demodulator phase adjustments. Also includes a switchable 4.5 MHz crystal-controlled sound carrier output, shielded rear-panel test leads for connection to circuits, individual red, blue and green gun shorting switches, and two 500-watt grounded AC receptacles. Replaced by the restyled but otherwise identical IG-5228 in 1977. Size: 13.5 wide x 5.5 high x 8 deep. Weight: 6.5 pounds.



**IG-28**  
**TV Color Bar and Dot Generator**  
 1969-1977  
 \$89.95

The IG-28 was the solid-state replacement for the IG-52 and earlier CD-1 and provided essentially the same functionality. Heath also used the same basic circuit in the IO-101 "Vectorscope," released the following year (1970). The IG-28 could be used to perform a variety of adjustments including raster, convergence, gray scale, 3.85 MHz oscillator, demodulator angle, chroma bandpass and others, and could produce color bars, shading bars, cross hatch and dots in 12 variations of 3x3 or 9x9. Output signals: Video—greater than  $\pm 1$  volt p-p composite signal for composite signal injection beyond the video detector; RF—variable to approximately 50,000 mV output (25,000 mV in IO-101) channels 2-6 for injection at the antenna terminals; Sync—greater than 3.5 volts p-p for servicing sync circuits without video, or



JERRY O'REILLY COLLECTION

**IG-52**  
**TV Alignment Generator**  
 1962-1972  
 \$54.95

The IG-52 is a cosmetic update of the TS-4A. The two units are electronically identical. See TS-4(A) for specifications and details. Supplanted by the solid-state IG-57 in 1968. The two units overlapped until 1972.



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**IT-2232**  
**Component Tracer**  
 1984-1990  
 \$249.95

The IT-2232 can be used to check PC boards and components of any kind, not just semiconductors. Can be used with components in or out of circuit but components and board must have no power applied. From the manual: "The component tracer can determine the operational quality of semiconductor components for conditions such as leakage, noise, shorts, opens and any problems between these states. An electronic component or circuit has a unique voltage-current 'signature.' The Component Tracer displays this signature on a [built-in 3 inch] CRT by applying an alternating voltage across the component under test and simultaneously monitoring the current through it. The voltage is displayed in the horizontal axis and the current on the vertical. The resultant display is the characteristic curve or signature." The 2232 has two inputs so that a component under test can be compared to a known good sample. The two displays may be viewed separately or superimposed. Channel A displays a solid line while channel B is shown as a dotted line. Test voltages: 5 and 50 volts p-p. Current limits: 50 volts p-p at 5 mA, and 50 volts p-p at 0.5 mA. Discontinued mid 1990. CRT: 3RP1A. Power: 120/240 VAC. Size: 4 high x 10 wide x 12.5 deep. Weight: 8.4 pounds.



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**IT-3118**  
**Transistor Tester**  
 1978-1979  
 \$34.95

The IT-3118 is a Post New Look update of the IT-18. The front panel changed from beige to white and the cabinet changed from brown to blue. See IT-18 for specifications and details. Discontinued in 1979. Not replaced.



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**IT-3120**  
**FET/Transistor Tester**  
 \$54.95  
 1977-1989

This is the same as the IT-121. See IT-121 for details and specifications. Discontinued in 1989. Not replaced.

test 4, 5, 6, and 7-pin large-base tubes, octals, loctals, 7 and 9-pin miniatures, Hytron 5-pin tubes and pilot lights. Basic meter movement is 1 mA. Tube chart data is compatible with the TC-1 and TC-3. Limited forward compatibility with the IT-21, IT-17 and IT-3117 due to the addition of three more selector levers in models starting with the IT-21. Replaced by the TC-3 in 1958.



## TC-3 Tube Tester

1958-1962  
\$39.95

With the TC-3 Heath brought their now wildly popular tube tester into the modern look of the Classic I style and added some significant refinements, but it is still a simple emission-type tester. Gone are the birch cabinets and square corners. The meter is fully integrated into all-metal cabinet and is illuminated, as is the roll chart. Basic meter movement is 1 mA. With this iteration Heath ditched the Hytron 5-pin socket and replaced it with a 7-pin subminiature. A blank socket provided for future expansion. The TC-3 will test 4, 5, 6, and 7-pin large-base tubes, octals, loctals, 7 and 9-pin miniatures, 7-pin subminiatures and pilot lights. Heath added separate slide switches for “short and leakage” and for “line adjust, short and test” functions. The filament voltage selector switch was increased to 20 positions (up from 14) and includes an “off” setting. Tube chart data is backward compatible with the TC-1 and TC-2. Limited forward compatibility with the IT-21, IT-17 and IT-3117 due to the addition of three more selector levers in models starting with the IT-21. Replaced by the IT-21 in 1962. Size: 5.5 deep x 8.5 high x 13 wide. Weight: 8 pounds.



## TT-1(A) Tube Tester

1961-1973  
\$134.95

Introduced around May 1960, the TT-1 is still regarded as one of the finest tube testers ever made. Rather than a simple emission-type tester like the TC series, et al, the TT-1(A) is a sophisticated mutual conductance unit with just about every feature one could ask for. Mutual conductance tests read on a basic scale of 0-3000 micro-mhos with multiplies for values as high as 24,000. Grid current tests will indicated as little as 0.25  $\mu$ A, and tests for gas, leakage from grids to other elements, and grid emission. Diode and rectifier tubes are tested on the basis of total cathode emission. Voltage regulators are tested with an independent power supply with direct voltage readings indicated on the meter. Includes a constant-current heater supply for any tube drawing 300, 450, or 600 mA. A “life test” function reduces filament voltage by 10% to provide an estimate of future life. Also features a built-in switch-operated calibration circuit (inside the cabinet). A “disconnect” switch removes all potentials on selector switches. Separate cathode, plate and grid buss switches permit testing both sections of a twin triode individually without having to adjust the selectors. Plate supply (solid state): DC volts: 26, 90, 135 and 225 volts, plus variable from 80 to 200 volts (separate DC supply for space charge grids). AC volts: 20, 45 and 177. Bias supply (solid state): low range: 0 to minus 5 volts DC; high range: 0 to minus 20 volts DC. Signal voltages: 2, 1, 0.5 and 0.25 volts AC @ 5 kHz. Filament voltages: 17 settings from 0.65 to 117 volts. Testing circuits: GM: 0 to 24,000 micro-mhos; Emission: rectifiers and diodes; Leakage: direct reading ohmmeter; Grid current: 0.25  $\mu$ A sensitivity, and conduction capabilities; Eye tubes: control grid characteristics, Basic meter: AC: 1000 ohms/volt, 1 volt full scale; DC: 89 mA full scale. Just a few months after its introduction Heath upgraded



JAY WHIPPLE COLLECTION

## IM-5284

VOM

1977-1983

\$39.95

As the cost of kit products slowly ticked up over the years Heath developed five low-cost matching instruments and released them as a family in 1977 in an effort to retake some of the lower ground. The effort was spectacularly successful insofar as price is concerned, but the products looked like something you might find at Radio Shack. How well they worked is a matter of opinion. The other instruments included the IG-5282 audio generator, the IG-5280 RF generator, the IB-5281 RCL bridge and the IT-5283 signal tracer. The IM-5284 will measure AC and DC volts to 1000 volts, DC current to 1000 mA, and ohms. All measurements are divided into four ranges: 0-1, 10, 100, and 1000. Ohm meter ranges: X1, X100, X1k and X1M. DC input resistance: 10 M $\Omega$ . AC input impedance: 1 M $\Omega$ . Requires two 9-volt batteries or the optional IPA-5280-1 power pack. Size: 5.75 high x 11 wide x 7.75 deep. Weight: 3.25 pounds.

## M-1

VOM

"Handitester"

1949-1957

\$13.50

The M-1 was introduced in September 1949, was based on the Simpson model 240 "microtester," and cost about half as much as the Simpson. Curiously,



even though the M-1 was brand new ad copy for it read "more features than ever before." And in the same ad an arrow with the word "new" pointed at the ohms adjust thumbwheel. AC and DC ranges: 0 to 10, 30, 300, 1000, and 5000 volts. Ohms ranges: 0-3000 $\Omega$ , and 0 to 300k $\Omega$ , "30" center-scale. Milliampere range: 0-10 mA and 0-100 mA. Accuracy: 1% ceramic resistors used, 3-inch meter accurate to 2% of full scale. Basic meter movement: 400  $\mu$ A. Battery: 1.5 volt "C" cell. It is interesting to note that the M-1's Bakelite case would be used in many subsequent products including substitution boxes, the BT-1 battery meter and the CR-1 crystal radio among others. Discontinued in 1967 and not replaced. Size: 6 high x 3 wide x 2.5 deep. Weight: about 1 pound.

## MM-1

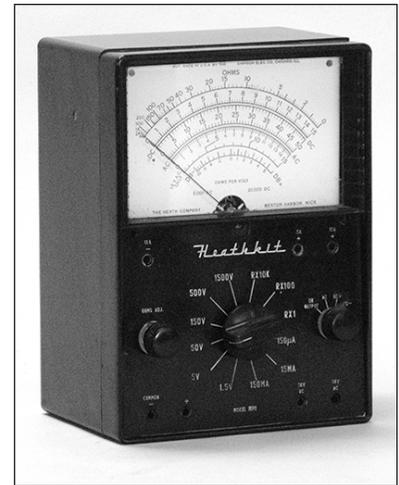
VOM

1953-1971

\$26.50

Patterned loosely on the Simpson 260, the MM-1 was a kind of "big brother" to the M-1 VOM released in 1949. The MM-1 was built into a black Bakelite case with a leather carrying handle and featured a recessed 4.5 inch Simpson meter.

The unit proved to be one of Heath's more successful products and was in the catalog for 18 years. Sensitivity: 20k $\Omega$ /volt DC, 5k $\Omega$ /volt AC. AC/DC voltmeter range: 1.5, 5, 50, 150, 500, 1500, and 5000 volts. DC current range: 150 mA; 15, 150 and 500 mA; and 15.0 amps. Ohmmeter range: 0.2 $\Omega$  to 20M $\Omega$  in three ranges—X1, X1000, X10,000. Decibels range: -10 to +65 db. Basic meter movement: 50 mA. Circuit uses 1% resistors. Requires one 1.5 volt "C" battery. Two color meter scale. Discontinued in 1971. Overtaken by the IM-17 (released in 1970) and replaced by the IM-105 in 1971. Size: 7.5 high x 5.5 wide x 4 deep. Weight: 4 pounds.



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printed circuit construction. The six-inch meter was first introduced in the IM-10, from which the IM-13 and IM-28 evolved. See IM-13, IM-10, and V-7 for specifics. Replaced by the restyled IM-5228 in 1977. Size: 12.5 wide x 5 high x 4.75 deep including knobs, feet and side knobs for bracket, but excluding bracket. Weight: 5 pounds.

## IM-32

**VTVM**  
1962-1963  
\$32.95

In mid 1962 Heath restyled the IM-10 from Classic I to Classic II and re-branded it as the IM-32. In 1963 it was again restyled and became the IM-13. There were no functional changes. Electronically identical to the V-7. See V-7 and IM-10 for details.

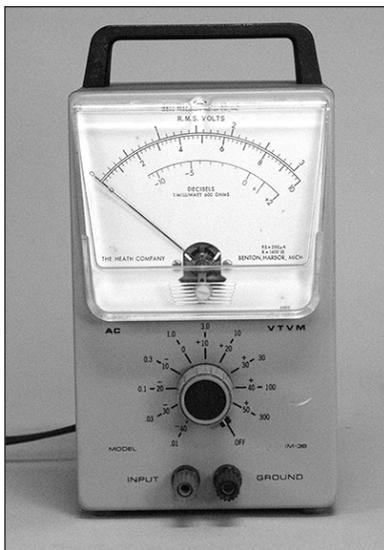


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## IM-38

**AC VTVM**  
1969-1976  
\$41.95

The IM-38 is electronically identical to the IM-21 and was the last tube-type meter in the series that began with the AV-1 in 1951. See IM-21 for details and specifications. The IM-38 was the last product to be emblazoned with the original Heathkit script logo. The script logo was replaced by the classic oval logo in 1962 and the introduction of the Classic II style. Replaced by the solid-state IM-5238 in 1976. See that listing, chapter 19. Size: 8.75 high x 4.75 wide x 5 deep including knobs, feet and handle. Weight: 3 pounds.



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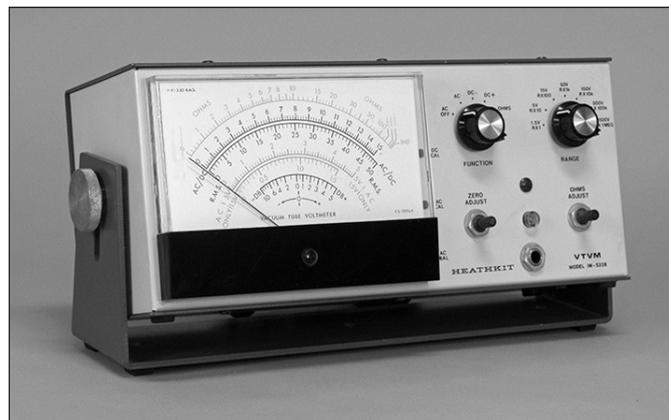
## IM-5218

**VTVM**  
1977-1983  
\$49.95

The IM-5218 is a re-styled Post New Look version of the IM-18, and electronically identical to the V-7A. The IM-5218 also has the distinction of being the last in a long series of Heath VTVMs that began in 1947 with the release of the V-1. See V-7, IM-11 and IM-18 for specifics. Size: 8.75 high x 4.75 wide x 5 deep including knobs, feet and handle. Weight: 3 pounds.



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## IM-5228

**VTVM**  
1977-1989  
\$49.95

The IM-5228 is a re-styled Post New Look version of the IM-28, and electronically identical to the V-7. The IM-5228 was discontinued in 1989 and was not replaced. See V-7 for details and specifics. Size: 12.5 wide x 5 high x 4.75 deep including knobs, feet and side knobs for bracket, but excluding bracket. Weight: 5 pounds.

## TO-1

### Test Oscillator

1958-1960

\$16.95

The short-lived TO-1 is simple single-tube oscillator designed mostly for working on superhet broadcast band receivers and is housed in the same cabinet as the V7 VTVM. The unit provides switch selection of five common IF frequencies: 262, 455, 465, 600 and 1400 kHz. Accuracy  $\pm 0.5\%$ . There is also a provision for two user-supplied crystals for other frequencies ( $32 \mu\mu\text{F}$  input capacitance). Available output: AF only, modulated RF (30%), or unmodulated RF. Output level: AF—variable with a maximum of at least 10 volts RMS; RF—more than 0.1 volts maximum. Features a transformer operated power supply with a selenium rectifier. Some units have been found with ceramic crystal sockets, but the unit was never shown in advertising photos except with phenolic sockets. Discontinued early in 1960. Not replaced. Compare and contrast with the look-alike FMO-1 FM test oscillator. Tube: (1) 12AU7. Power: 10 watts. Size: 7.5 high x 4.75 wide x 4.5 deep. Weight: 2.5 pounds.



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PAUL MARCH COLLECTION

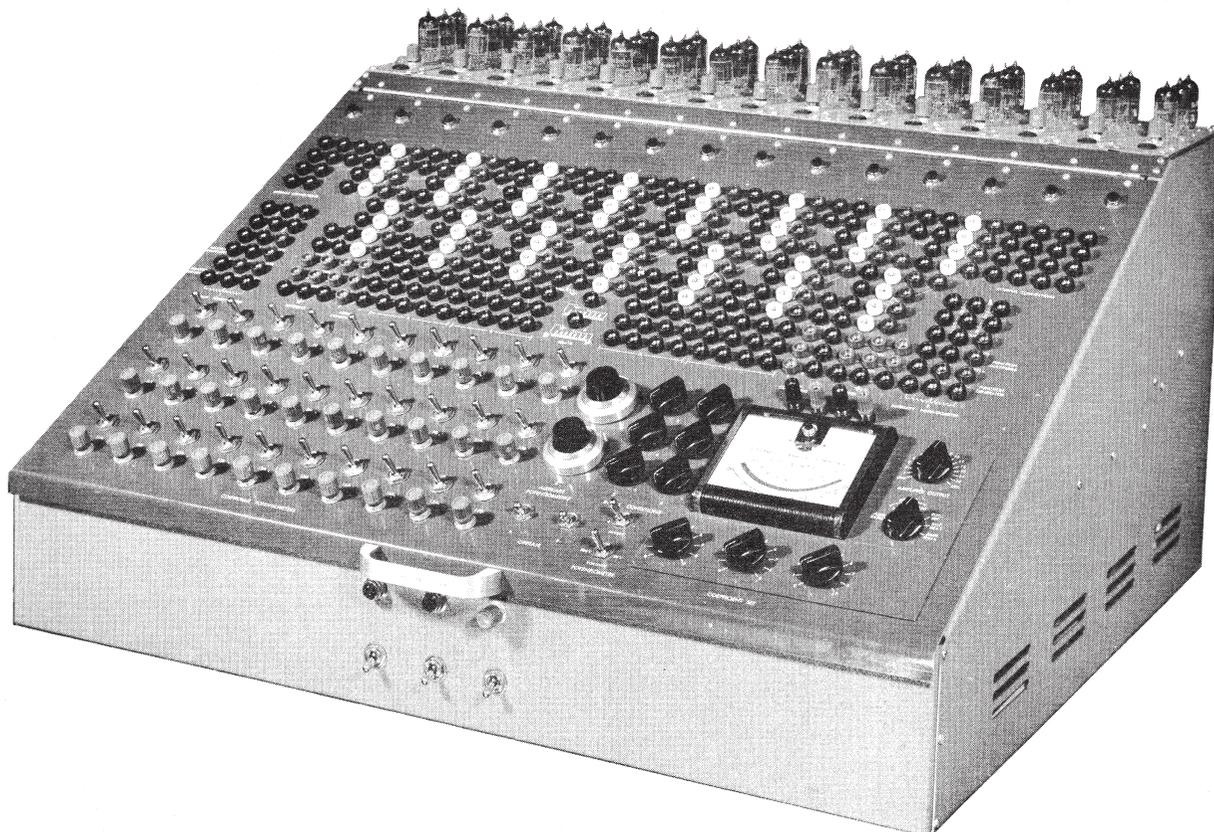
## TV Troubleshooter

1970-1975

\$ see text

This small VOM was included with Heath's GR-270 color television in 1970. It was a kit to be assembled before assembly of the TV itself and was stored inside the set when completed. It was designed to aid in testing of individual modules prior to their installation in the set as well as for troubleshooting once the set had been completed. It was also included with the GR-271 and GR-900 televisions but was discontinued with the release of the GR-2000 in 1975. The Troubleshooter was never sold separately. The Troubleshooter measures DV voltages in three ranges: 0-5, 0-50 and 0-500 volts. Two ohms ranges measure from 0-10k and 0-100k. For the less technically inclined a lettered scale (A through E) was referenced in the TV assembly manual as a way of simplifying meter readings. Basic movement is  $50 \mu\text{A}$ . Notched holes on the right side were used to secure the unit inside the TV set. Uses one 1.5-volt AA battery. Size: 4.25 wide x 3.25 tall x 2 deep. Weight: about 0.5 pounds.

# HEATH ELECTRONIC ANALOG COMPUTER CABINET AND FRONT PANEL MODEL ES-400



## SPECIFICATIONS

Power Requirements (complete computer): . . . 105 - 125 volts AC, 60 cycles, 420 watts.

Dimensions: . . . . . 26 1/2" long, 15" high, 32 1/2" wide.

	Net Weight:	Shipping Weight:
ES-400 . . . . .	70 lbs.	76 lbs.
ES-447 . . . . .	3 lbs.	4 lbs.
ES-450 . . . . .	1 lb.	2 lbs.

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