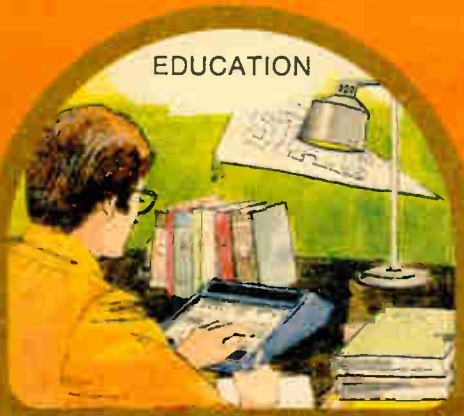
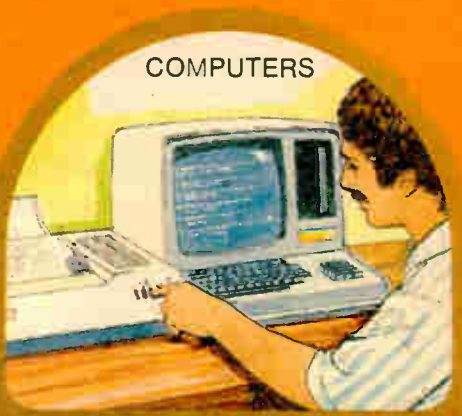
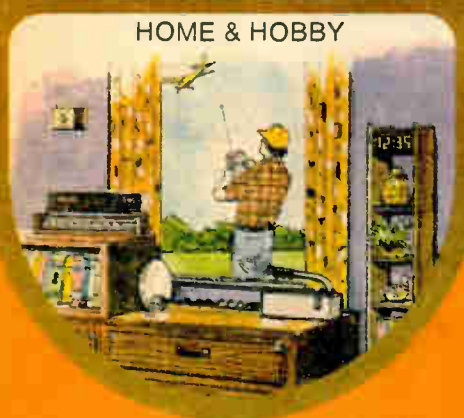
Heathkit®

QUALITY ELECTRONICS YOU CAN BUILD YOURSELF • FALL 1979







NEW

Exciting new kits shown for the first time in this Catalog:

- Economy hand-held Portable Digital Multimeter — see page 93
- Amateur Radio Antenna Remote Coax Switch — see page 21
- 12-Volt Digital Thermometer for RV's, boats, cars — see page 62
- Mathematics Self-Instruction Programs — see page 72
- Computer Concepts for Small Business — see page 44

SAVE 5% ON STEREO SYSTEMS

A great way to save money on your custom Heathkit Stereo Component System. See pages 4-13 for the complete array of quality amps, speakers, receivers, turntables and accessories. And check page 7 for complete details on the system discount.

HEATHKIT ELECTRONIC CENTER CATALOG NO. 846R

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HANDY INDEX ON BACK COVER

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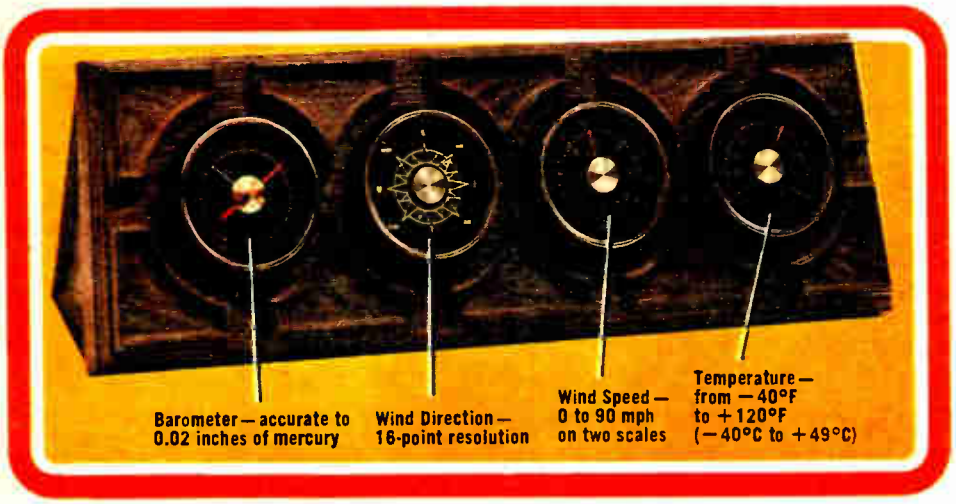
Heathkit deluxe electronic weather instruments



Handsome wood-grain plastic cabinet mounts horizontally or vertically on wall, or use on desk

Remote transmitter clamps onto any 1" to 1½" TV antenna mast

Get instant, accurate weather readings anywhere!

Easy-to-read precision Five-Function Weather Station

Wherever instant, electronically accurate weather information is needed, the Heathkit ID-1290 Weather Station keeps track of indoor and outdoor temperatures, barometric pressure, wind speed and direction. The thermometer is calibrated in two-degree increments from —40°F to +120°F (—40°C to +49°C), with a switch to select indoor or outdoor readings. The barometer helps you keep abreast of changing conditions by indicating movements as small as 0.02 inch of mercury. You can read wind speed from 0 to 90 mph in two ranges, with eight wind direction lights providing 16-point resolution for precision readings. With its walnut-grained plastic cabinet, the ID-1290 can be used as a handsome desk set, or can be hung horizontally or vertically. The remote transmitter assembly (windcups, weather vane and outdoor temperature sensor) is included with the ID-1290. It clamps onto any 1" or 1½" diameter TV antenna mast, and is connected to the cabinet with optional eight-wire cable (below).

Kit ID-1290, Shpg. wt. 8 lbs. **119.95**

8-Wire cable for remote transmitters. **IDA-1290-1,** 50 ft. cable, 2 lbs. **7.95**
IDA-1290-2, 100 ft. cable, 4 lbs. . . **13.95** **IDA-1290-3,** 150 ft. cable, 6 lbs. . . **18.95**

ID-1290 SPECIFICATIONS: Wind speed: 0-30 mph, ±2 mph; 0-90 mph, ± 5 mph. **Wind direction:** 16-point readout over 360°. **Temperature:** Typ. indoor: 0°F to +120°F, ±2°F (–18°C to +49°C, ±1°C). Typ. outdoor: –40°F to +120°F, ±2°F (–40°C to +49°C, ±1°C). **Barometric pressure:** 29 to 11 inches of mercury ±0.02 inch, accurate to 10,000 feet. **Power requirement:** 110 to 130 VAC, 50/60 Hz, 3.5 watts. **Dimensions:** Wall mount: 7" H x 20½" W x 2" D. Desk: 7" H x 20½" W x 6¾" D.

High-accuracy digital Wind Speed and Direction Indicator

Outstanding accuracy and an easy-to-read digital display make this kit a must for pilots, boaters — anyone whose activities are affected by the wind. Choose the two readout modes you want from the three available (miles per hour, kilometers per hour or knots). Switches select the mode and front panel lights show 16-point resolution. Includes remote transmitter as above. Order eight-wire which mode is in use. The eight principal compass points are marked by lights, providing 16-point resolution. Includes remote transmitter as above. Order eight-wire cable above.

Kit ID-1590, Shpg. wt. 7 lbs. **79.95**

ID-1590 SPECIFICATIONS: Wind speed: 0 to 99 in mph, km/h or knots (choice of two). **Response threshold:** 3 mph. **Accuracy:** ±1 digit or ±10%, whichever is greater. **Direction response threshold:** approx. 2 mph. **Operating temperature:** Receiver: 0°F to +150°F (–18°C to +65°C). Transmitter: –40°F to +120°F (–40°C to +49°C). **Power requirement:** 120 VAC, 50/60 Hz, 6.5 watts. **Dimensions:** 2½" H x 7" W x 5" D.

Easy-to-build digital Indoor/Outdoor Thermometer

Monitor indoor/outdoor (or any two) temperatures with a big, bright ½" high digital readout. The readout includes plus and minus signs, as well as indoor and outdoor indicator lights. Select Fahrenheit or Celsius temperatures, continuous readings of one temperature or alternate readings of both. The 10' indoor and 75' outdoor cables (included) let you place the temperature sensors almost anywhere (home freezer, hot house, basement, swimming pool and a variety of custom applications). Black Cycolac® plastic case with teak-grain vinyl inserts. A practical, easy-to-build kit that gives value year around.

Kit ID-1390, Shpg. wt. 5 lbs. **67.95**

ID-1390 SPECIFICATIONS: Temperature range: –40°F to +120°F (–40°C to +50°C). **Accuracy:** ±2°F from –30°F to +1°F from +20°F to +120°F, ±2°C from –30°C to –15°C, ±1°C from –15°C to +50°C. **Display:** 2½-digit planar gas discharge with + and – signs. **Power requirement:** 110 to 130 VAC, 60 Hz, 4 to 6 watts approx. **Dimensions:** 2½" H x 7" W x 5" D.

Get instant weather reports with this computerized weather station

THE Electronic Weatherman

SAVE $100.00 on the factory assembled and tested version

You get indoor and outdoor temperatures, wind speed and direction, barometric pressure...even the time and date...all right at your fingertips.

Heathkit Digital Weather Computer gives you instant, accurate past, present and future weather data. For boaters, pilots, campers, for anyone going outdoors, the weather station can tell you what to expect. Microprocessor-based electronics put everything at your fingertips.

Easy to use. A compact transmitter mounts on your TV antenna mast and relays weather data to the computerized console indoors. The transmitter unit, with windcups and weathervane, features special infra-red sensing devices that are far more sensitive and reliable than old-fashioned mechanical switches or wipers.

Beautiful styling. The Weather Computer has a handsome solid walnut cabinet. You get large, bright digital readouts for temperatures in degrees Fahrenheit or degrees Celsius, for wind speed and direction in miles and kilometers per hour or in knots, for barometric pressure in inches of mercury or millibars, and for time and date. It even calculates the wind chill factor.

Memory stores data. The Weather Computer stores the high and low temperatures, the minimum and maximum barometric pressures, peak and average winds, plus the time and date that each occurred. It calculates the rate at which the barometric pressure changes so you are alerted to storm fronts. You can even connect your own external battery to maintain the memory in case of power failure.

Order the Heathkit Weather Computer today, kit or assembled. And you'll have your own reliable, weather reports at the press of a button.

Kit ID-4001, Shpg. wt. 15 lbs. **389.95**

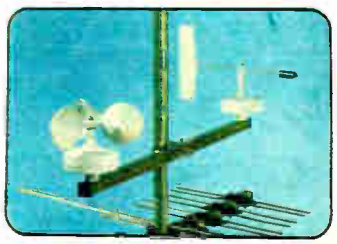
SAVE $100. Factory Assembled and Tested Version of above.
IDW-4001. Includes 100' cable. Shpg. wt. 22 lbs. **Was $595.00, Now 495.00**

ID-4001 SPECIFICATIONS: DIGITAL CLOCK/4-YEAR CALENDAR. Time Accuracy: Determined by accuracy of AC line. No accumulative error. **WIND VECTOR: Accuracy:** ±5% or better. **Direction Display: Accuracy:** ±11.26% degrees. **THERMOMETER: Temperature Range:** −40° to 70° C; −40° to 158° F. **Accuracy:** ±1° on Celsius readings; ±2° on Fahrenheit readings. **BAROMETER: Pressure Range:** 28.00 to 32.00 in Hg (inches of mercury). 981.9 to 1050 millibars. **Accuracy:** ±0.075 in Hg plus ±0.01 in Hg/°C. **Operating Temperatures:** Outdoor assemblies, −40° C to +70° C (−40° F to 158° F). Unit, 10° to 35° C (59° to 95° F). **Power Requirement:** 120/240 VAC. Provision for external battery connection for memory backup during power failures. **Dimensions:** 7¼" H x 16" W x 6" D.

8-Wire cable for ID-4001 kit version

IDA-1290-1, 50 ft. cable, 2 lbs. **7.95**
IDA-1290-2, 100 ft. cable, 4 lbs. **13.95**
IDA-1290-3, 150 ft. cable, 6 lbs. **18.95**

The ID-4001 can be interfaced to the H8 Computer. For details write Heath Tech Correspondence Dept.



The ID-4001 comes with the remote transmitter assembly shown here. The transmitter assembly attaches easily to your TV antenna mast. Cable for kit ID-4001 must be ordered separately in the length you require. IDW-4001 comes with 100' cable included.

Heathkit Pro-Series gives you studio

The finest Heathkit audio system ever

The Pro-Series has specs you can hear — and the flexibility to let you hear them just the way you like. The pride of building it, the pleasure of listening to it will last a lifetime.

HEATHKIT ELECTRONIC CENTER charg-a-kit REVOLVING CHARGE

1. Heathkit AJ-1600 Pro-Series FM/AM Tuner
2. Heathkit AP-1800 Pro-Series Preamplifier
3. Heathkit AD-1701 Graphic Output Indicator
4. Heathkit AA-1600 Pro-Series Stereo Amplifier

Heathkit Pro-Series components are also available with optional oak-finish wood cabinets. Cabinets are listed and sold separately for each component. Order from next page.

quality right in your own living room

1 Heathkit AJ-1600 Pro-Series Stereo FM/AM Tuner

The new Pro-Series Tuner is Heath's finest and one of the world's finest. It's loaded with features that let you adjust to strong signals or weak signals for distortion-free, noise-free reception: Super-sensitive 1.8 μV (mono) and 3.5 μV (stereo) for reception of distant stations. Signal-to-noise ratios of 83 dB (mono) and 75 dB (stereo) are the best you'll find for the money. 0.1% harmonic distortion levels assure full, rich sound. Extra-wide band-width reduces noise and improves separation. Band-width switch lets you select narrower band for minimal interference in crowded signal areas. RF attenuator adjusts sensitivity for clear, clean signal reception. Multipath switch lets you meter multipath distortion. 75/300-ohm antenna switch maximizes front-end sensitivity. Digital readout displays frequencies more accurately than tuning dial.

Both the 5-gang FM front end and FM IF/Stereo Demodulator boards are factory assembled and tested to shorten kitbuilding time and assure optimum performance. The open chassis layout and wiring harnesses also speed assembly.

Kit AJ-1600, Shpg. wt. 25 lbs. **399.95**

AEA-1800-2, Oak-Finish Cabinet for AJ-1600.
Shpg. wt. 6 lbs. **39.95**

Kit AJA-1600-2, Dolby FM Module for AJ-1600.
Shpg. wt. 1 lb. **54.95**

AJ-1600 SPECIFICATIONS: FM Section. Frequency Response: ±0.5 dB, 20 Hz to 15 kHz. **Antenna:** 300 ohm balanced, 75 ohm unbalanced. **Selectivity:** Wide IF Bandwidth, −40 dB. Narrow IF Bandwidth: −80 dB. **Signal to Noise Ratio:** 83 dB (mono), 75 dB (stereo). **Mono Harmonic Distortion:** 0.1% @ 1 kHz. **Image Rejection:** 100 dB. **IF Rejection:** 100 dB. **Spurious Rejection:** 100 dB. **Capture Ratio:** 1.2 dB. **AM Suppression:** 60 dB. **Stereo Channel Separation:** 45 dB at 1000 Hz. **Stereo Harmonic Distortion:** 0.1% at 1 kHz. **19 kHz and 38 kHz Suppression:** 65 dB. **AM Section: Sensitivity:** External Antenna, 30 μV. Radiated, 250 μV/meter. **Selectivity:** Alternate channel, −70 dB. **Image Rejection:** 70 dB at 600 kHz. 70 dB at 1400 kHz. **GENERAL: Power Requirement:** 120 or 240 VAC, 50/60 Hz, 20 watts. **Dimensions:** 5¾" H x 19" W x 14" D. **Net Weight:** 20.7 lbs.

2 Heathkit AP-1800 Pro-Series Stereo Preamplifier

Quality design and special features make it an extraordinary value: dual turnover tone controls permit more precise tone adjustment. Three phono inputs include one with a built-in preamp for moving coil cartridge. Selectable cartridge capacitance provides flattest frequency response for your cartridge. Phono overload indicator assures correct sensitivity. Magnetic phono preamp is designed for lowest noise with cartridge connected (rather than preamp shorted) for super-quiet performance under real working conditions. Dual turnover filters permit more subtle filtering. Built-in infra-sonic filter reduces rumble and low-frequency noise from your records. Versatile record mode lets you record from deck 1 to deck 2 or vice-versa while listening to source or tape. Independent loudness control is based on new, more accurate data. Adapter switch allows addition of noise reducer or equalizer. Precision attenuator-type volume control provides more accurate tracking between channels even at low levels. The AP-1800 switches up to 1500 watts (maximum) of power.

You get a "spare-nothing" design and total control that lets you hear your music just the way you like. It's one of the best combinations of beautiful performance and unbeatable value.

Kit AP-1800, Shpg. wt. 27 lbs. **399.95**

AEA-1800-2, Oak-Finish Cabinet for AP-1800.
Shpg. wt. 6 lbs. **39.95**

AP-1800 SPECIFICATIONS: Input Sensitivity: phono (moving coil), selectable 100 μV/200 μV/400 μV; phono, selectable 1 mV/2 mV/4 mV; high-level, 200 mV. **Overload*:** phono (moving coil 20 mV; phono, 200 mV; high-level, 10 V. **Hum and Noise*:** phono (moving coil −70 dB; phono, −75 dB: high-level, −95 dB. **Input Impedance:** phono (moving coil), 100 ohm; phono, 47K ohms; high-level, 50K ohms. **Frequency Response:** phono RIAA ±0.2 dB, 20 Hz-20 kHz; high-level, +0, −0.2 dB from 20 Hz to 20 kHz. **Rated output:** 1.5 V. **Total Harmonic Distortion:** phono, 0.03%; high-level, 0.02% from 20 Hz to 20 kHz. **Intermodulation IM Distortion:** 0.02% maximum. **Crosstalk:** −50 dB at 1000 Hz. **Separation:** phono, 50 dB at 1000 Hz; high-level, 50 dB at 1000 Hz. **Power Requirement:** 108-132 volts or 226-264 volts AC, 50/60 Hz. 20 watts typical. **Rear Panel AC Sockets:** 3 switched, 3 unswitched. **Dimensions:** 5.22" H x 19" W x 11¼" D. *Selectivity switch at 2 mV position.

3 Heathkit AD-1701 Pro-Series Graphic Output Indicator for accurate monitoring

Accurate monitoring of peak power output is critical to avoiding overloads and speaker damage. The AD-1701 is one of the finest output indicators available at any price.

Two rows of 15 LED's give visual indication of output enabling speaker balance to within a few tenths of a dB.

Six-position range switch gives you a wide range of sensitivity (see specs). Super-wide dynamic range (53 dB) covers almost any source material.

Switch to monitor peak or average values. Extremely fast response time detects transient bursts as short as ½ cycle of 20 kHz, so you're always right on top of the signal.

The AD-1701 is one of the most accurate, most sensitive output indicators you can buy.

It's a beautiful, as well as functional addition to your Pro-Series System.

Kit includes beautiful solid oak finish panels.

Kit AD-1701, Shpg. wt. 15 lbs. **199.95**

AD-1701 SPECIFICATIONS: PEAK MODE. Frequency Response @ 0 dB, 20 Hz to 20 kHz ±0.5 dB. **Display Accuracy at 1 kHz:** ±0.5 dB from +3 dB to −30 dB; ±1 dB from 35 dB to 50 dB. **Channel Tracking:** 0.5 dB from +3 to −30 dB; 1.0 dB from −35 to −50 dB. **Peak Detector Rise Time:** 13 μsec (50 dB rise). **Hold Time:** 50 msec. **Decay Time:** 3 msec. **Input Impedance:** 100 K ohms. **Range/Sensitivity:** Low-level, 0.1 volt; 0.32 volt; 1.0 volt. High level (8 ohms). 60 watts, 125 watts, 250 watts. **Dimensions:** 1¾" H x 19" W x 13" D. 2" H x 19¼" W w/side panels. **Power Requirement:** 120 or 240 VAC, 50/60 Hz.

4 Heathkit AA-1600 Pro-Series Stereo Amplifier

125 WATTS, MINIMUM RMS PER CHANNEL INTO 8 OHMS WITH LESS THAN 0.05% TOTAL HARMONIC DISTORTION FROM 20-20,000 HZ

The AA-1600 reproduces the entire musical spectrum with a clarity and definition that make it an excellent choice for use with the most demanding speaker systems. Hum and noise are a full 100 dB down, so music springs from a background of total silence. Transient intermodulation distortion is less than 0.05% for clean, well-defined sound, especially at the high end of the frequency spectrum. Gold-plated binding posts provide more reliable, distortion-free connections. Fused B+ and B− power supply lines for each channel, along with rugged output devices eliminate the need for dissipation limiters which can cause tweeter-damaging clicks and pops. Complete speaker and circuit protection includes speaker turn-on delay and a thermal circuit breaker.

To assure performance to specifications, the amplifier and power supply circuit boards are supplied fully assembled, tested and adjusted. Minimal point-to-point wiring and a clean, open chassis layout make building fast and easy. This beautifully designed power amp deserves to be part of the finest stereo system.

Kit AA-1600, Shpg. wt. 52 lbs. **379.95**

AEA-1800-1, Oak-Finish Cabinet for AA-1600:
Shpg. wt. 7 lbs. **39.95**

AA-1600 SPECIFICATIONS: Frequency Response: ±1 dB, 7 Hz to 50 kHz. −3 dB, 5 Hz to 100 kHz (at 1 watt). **Intermodulation Distortion (SMPTE):** Less than 0.05% from 250 mW to 125 watts. **Transient Intermodulation Distortion (T.I.M.),** after. Leinonen, Otala and Curl: 0.05%. **Damping Factor:** Greater than 50. **Hum and Noise:** 100 dB below 125 watts. **Channel Separation:** 70 dB minimum. **Input Impedance:** 20K ohms. **Input Sensitivity:** 1.5 Volts. **Net Weight:** 38¼ lbs. **Dimensions:** 7⅛" H x 19" W x 13" D. **Power Requirement:** 120 VAC, 60 Hz.

Heathkit Pro-Series Rack combines beauty and function

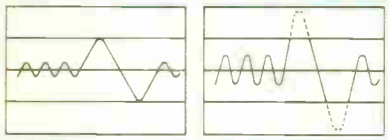
The AE-1705 Stereo Component Rack lets you bring together all your Pro-Series components in a way that makes them look their best and gives you easy access to all controls. It has handsome walnut veneer side panels and convenient swivel casters that lock in position. Standard EIA panels in any height are compatible. Record dividers and extra shelf are included.

Kit AE-1705, Shpg. wt. 74 lbs. **249.95**

Why you need a "Superamp"

Many audio systems need a "super-amp" like the AA-1640 because as sounds become louder, the ear becomes less sensitive. For one sound to seem twice as loud as another (20 dB louder), requires 10 times as much power. A 3 dB change is just noticeable, yet it requires twice as much power!

In an average-sized room, acoustic suspension speakers may require 20 watts per channel to produce a reasonable listening



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level — about 90 dB. But when a momentary musical peak of 10 dB comes along, your amplifier must try to produce 200 watts per channel. Tone controls, loudness circuits, and equalizers make the same demands. And if your amplifier is unable to deliver that much power, it clips off the peaks of the signals.

Clipping causes distortion and reduces the dynamic range — the contrast between loud and soft passages. Music sounds constricted, harsh and unreal. Clipping also produces harmonics which can actually damage the tweeters of your speaker system.

A high power amplifier can make a big difference. Its wider dynamic range lets more of the live-performance realism come through loud and clear. Perhaps the most striking difference you'll hear is the improved definition of your music... solid bass free of "boom" and distinct note for note... accurate treble clearly defined and open.

If you have top-quality, low-efficiency acoustic-suspension speakers, a superamp" like the Heathkit AA-1640 can help them deliver their finest sound.

The Heath AA-1640 Stereo Amplifier — an audiophile amplifier you can build!

$489.95
Less Meters

200 WATTS, MINIMUM RMS, PER CHANNEL INTO 8 OHMS WITH LESS THAN 0.1% TOTAL HARMONIC DISTORTION FROM 20-20,000 HZ

The AA-1640 is an amplifier for the audiophile who constantly strives for musical reproduction free from imperfection and coloration. It features distinctive styling, excellent specifications, and a unique combination of power and features which offer the ultimate in musical reproduction and the maximum in system protection.

The AA-1640 utilizes a unique speaker protection system which does not connect your speaker at turn-on until transients have decayed, and immediately disconnects them at turn-off. It also disconnects speakers when dangerous DC voltages and very low frequencies are present and prevents them from reaching and damaging your expensive speaker systems. The electronics found in the AA-1640 have but one purpose — clean, flawless reproduction of musical information. The amplifier inputs provide optimum matching and maximum preamplifier-to-power amplifier signal transfer. 8 output devices per channel and massive side mounted heat sinks develop maximum power and efficient cooling without need of noisy fans. Both channels are fused and current-limited for protection, should an external short occur.

The result of these painstaking efforts is an amplifier capable of reproducing both quiet passages and thundering fortissimos — all with equal ease and definition. Frequency response is flat within −1 dB from 7-50,000 Hz, total harmonic distortion infinitesimal, and hum and noise inaudible.

For more precise control add the optional peak-responding panel meters to your 1640. Sensitive enough to respond to peaks as short as a record click, the meters feature backlighted scales, and calibration from −30 to +3 dB and 0.2 to 200 watts (into an 8 ohm load). Install the meters after assembly or save $39.95 by purchasing them with your amplifier.

Kit AA-1640, Less Meters, Shpg. wt. 74 lbs.
UPS only **489.95**

Kit AAA-1640-1, Output meters,
Shpg. wt. 3 lbs. **69.95**

SAVE! Kit AAS-1640, Amp and Meter together.
Shpg. wt. 86 lbs. **529.95**

OTHER AA-1640 SPECIFICATIONS: Frequency Response: −1 dB, 7 Hz to 50 kHz; −3 dB, 5 Hz to 100 kHz. **Intermodulation Distortion:** less than 0.1% from 0.25 to 200 watts. **Damping Factor:** greater than 50. **Hum and Noise:** Less than 400 μV or 100 dB below full output. **Channel Separation:** 50 dB, min. **Input Impedance:** 50k ohms. **Input Sensitivity:** 1.5 V. **Net Weight:** 58 lbs. **Dimensions:** 7¼" H x 19" W x 18" D. **Power Requirement:** 120 VAC, 60 Hz only.

Audio Control Center adds flexibility to power amplifiers

Provides output monitoring and control for up to two sets of speakers plus other AC-powered components

Features peak-responding meters (same as AA-1640 above) to monitor power output, terminal strips for versatile amplifier and speaker hookup, headphone jacks for conventional phones and hookup for electrostatic headphones. Has four switched and four unswitched AC outlets (with a total of 1500 watts) for flexible control of other components. 4½" H x 17½" W x 8½" D.

Kit AD-1307, Shpg. wt. 11 lbs. **139.95**

Versatile Stereo Preamplifier ideal for use with the AA-1640

Features extremely wide dynamic range, 100 dB for all inputs and harmonic and IM distortion of less than 0.05%.

An outstanding budget-priced preamp for use with AA-1640 or other quality amplifiers. Has speaker relay to prevent turn-on "thumps", sub-sonic filter, high-frequency filter, two phono inputs with excellent overload specs, aux. and tuner inputs, tape monitor, headphone jack and front panel tape dubbing inputs and outputs. 4½" H x 17½" W x 8⅛" D.

Kit AP-1615, Shpg. wt. 12 lbs. **149.95**

Quality Heathkit Components to enhance your audio system

[1] Active Audio Processor reduces noise and expands dynamic range of most any program material

$219.95 Improves the sound of your hi-fi system without introducing distortion

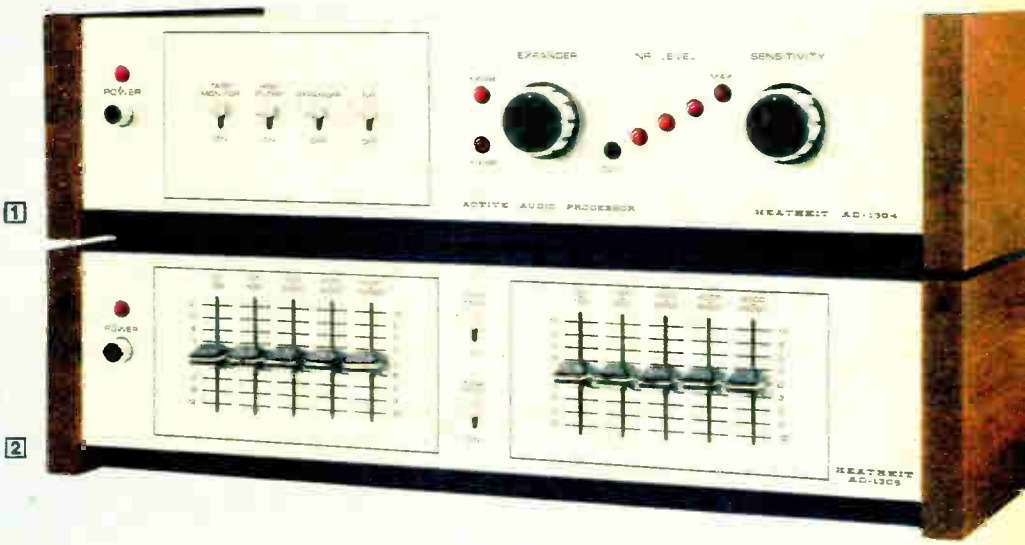
The Heathkit AD-1304 is specifically designed to both eliminate 10 dB of high frequency noise and add 7 dB of dynamic range expansion to any program source. A separate expander section accounts for 7 dB of dynamic range expansion. Three high-frequency dynamic filters work in conjunction with a sensitivity control to discriminate between noise and music for up to 10 dB of noise reduction. Each filter operates in its own separate portion of the audio spectrum to provide the best sound while maintaining overall frequency response. For inherently noisy material such as 78-rpm recordings, AM radio or 8-track tapes, a high-filter switch on the front panel activates a 7 kHz, linear phase, 12 dB per octave filter. The AD-1304 connects between the tape output and tape monitor jacks on most units. Tape monitor facilities are provided on the back panel of the AD-1304 so that the tape monitor function is not lost.

The front panel LED's provide an easy-to-read indication of the processor's operation. −3 dB and +4 dB LED's indicate the expander's gain. When both are of equal intensity, gain is unity. Noise Reduction LED's indicate the relative amount of noise reduction. All four "on" indicates maximum reduction, while the green LED at lower left indicates no noise reduction.

The Heathkit Audio Processor boosts your dynamic range in an unobtrusive way. Your sound remains natural, beautifully defined. Make it part of your system today.

Kit AD-1304, Shpg. wt. 12 lbs. **219.95**

AD-1304 SPECIFICATIONS: Rated Input: 200 mV. **Input Impedance:** 100K ohms. **Gain:** Expander off, 0 dB (unity) ±0.5 dB. Expander on, −3 dB to +4 dB. **Frequency Response:** +0, −0.2 dB from 20 Hz to 20 kHz. **High Filter:** 7 kHz, 12 dB octave rolloff. **Noise Reduction:** 10 dB typical between 4 kHz and 15 kHz. **Hum and Noise:** −70 dB, 20 Hz to 20 kHz. **Channel Separation:** 50 dB at 1 kHz. **Output Impedance:** 500 ohms. **Input Overload:** 5 volts. **Total Harmonic Distortion:** 0.1% from 20 Hz to 20 kHz. **Power Requirement:** 120/240 VAC, 50/60 Hz, 15 watts. **Dimensions:** 4½" H x 17½" W x 8⅛" D.



[2] 5-Band, 2-Channel Audio Equalizer gives you precise tone control

$139.95 Lets you control the entire frequency spectrum for exacting system response and beautiful sound.

The AD-1305 Audio Equalizer offers complete tone control with five slide controls for each stereo channel. It is designed for use with the AP-1615 preamp, or any receiver or amplifier having a preamp output and power amp input, or tape monitor. Provides precise corrections in each portion of the frequency spectrum, without overlapping.

A center detent allows exact "0" dB setting bypassing each band; a tone flat switch bypasses the equalizer entirely. Compensates for room acoustics, differences in cartridges and speakers, even deficiencies in program sources. Can also be used with tape recorders to filter old or scratchy records or broadcasts before recording. Bandpass filters with large, fully-shielded coils, ensure extremely low distortion even at full boost and cut.

The AD-1305's own tape monitor lets it be used in a receiver's tape monitor circuit without losing monitor capability.

The Heathkit Audio Equalizer is a fun-to-build kit, too, even for the first-time builders. Parts mount on three simple circuit boards. Price includes case with brushed aluminum front panel, black metal top and solid walnut end panels.

Kit AD-1305, Shpg. wt. 11 lbs. **139.95**

AD-1305 SPECIFICATIONS: **Input Impedance:** 100k ohms. **Output Impedance:** 100 ohms. **Rated Output:** 1.5 V rms. **Overload:** 5 V rms. **Signal-to-Noise Ratio:** 90 dB below 1.5 V. **Total Harmonic Distortion:** 0.05% from 20 Hz to 20 kHz at 1.5 V output. **IM Distortion:** 0.05% at 1.5 volts. **Frequency Control Range:** (separate controls for each channel), 30-125 Hz, 125-500 Hz, 500-2000 Hz, 2000 Hz to 8 kHz, 8 kHz-32 kHz. **Overall Gain (flat):** Zero dB (unity gain). **Slope of Filters:** 12 dB per octave. **AC outlets:** One switched, one unswitched. **Power Requirement:** 120/240 VAC, 60/50 Hz, 10 watts. **Dimensions:** 4⅞" H x 17½" W x 8" D.

Big 5% discount on Heathkit Stereo Component Systems

Simply choose

(1) a receiver and a pair of speakers; or (2) an amplifier, pair of speakers and a program source (tape deck, tuner or turntable). Add up the costs of the individual components, then deduct 5% (excluding shipping and handling charges). The same 5% also applies to any accessories you order with your system — extra speakers, cabinets, etc. — No Limit! It's just another way Heath gives you great sound for your money!

Heathkit Systems are designed to work together to give you beautiful sound.

HEATHKIT ELECTRONIC CENTER charg-a-kit REVOLVING CHARGE

A superbly designed receiver for thrilling sound

$649.95

70 WATTS, MINIMUM RMS, PER CHANNEL INTO 8 OHMS WITH LESS THAN 0.08% TOTAL HARMONIC DISTORTION FROM 20-20,000 HZ

From its half-inch tall LED frequency readouts to its extraordinarily low distortion, the Heathkit AR-1515 is the finest receiver Heath has ever designed.

The AR-1515's digital readout is far more accurate than dial-type tuning. Simply tune to the exact frequency you want. Signal-strength and center-channel meters then help you "zero in" on the strongest signal and lowest FM distortion. There's even an oscilloscope output to monitor multipath distortion.

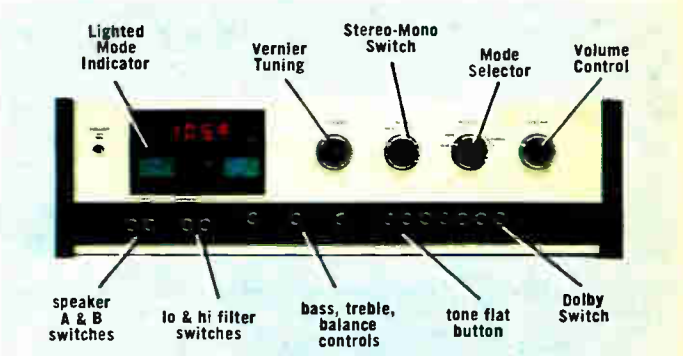
But digital readout is only the beginning. With 1.8 μV sensitivity, the FM section is one of the world's finest. The optional AD-1504 Dolby Module allows you to enjoy the reduced noise and increased dynamic range of Dolbyized FM broadcasts. The AM section is probably the finest in any receiver — dual-gate MOSFET's in the front end and a computer-designed 9-pole filter for outstanding selectivity.

The amplifier section meets the same high standards. Harmonic distortion is an infinitesimal 0.08%! Frequency response is +0, −1 dB from 8 Hz to 45,000 Hz and +0, −3 dB from 4 Hz to 80,000 Hz! That extra margin of performance assures clean, wide-range sound without audible strain or struggle on even the most complex musical passages. And you'll hear the music over a background of silence — hum and noise are 65 dB below full output in phono and 80 dB below full output on high-level sources.

The amplifier section is also unmatched in convenience. All the frequently-used controls — volume, input selector, stereo/mono switch, tuning — are on the front panel. The secondary controls are concealed behind a hinged door. Convenient indicator lights on the front panel show the input you've selected. The digits light only when listening to AM or FM and only the necessary tuning meters are illuminated — signal-strength only for AM, signal-strength and center-tune for FM.

The bass and treble controls act primarily at the frequency extremes to compensate for room acoustics and program deficiencies while maintaining smooth midrange response. And the AR-1515's preamp out/amp in jacks allow it to be used with any audio equalizer, such as the Heathkit AD-1305.

Elegant and functional. The luxurious brushed aluminum front panel is clean and uncluttered. Knobs are spaced for easy handling and meters are large and easy to read. Beautiful, solid walnut end panels are included at no extra charge. No other receiver in this price range gives you such a combination of beauty and performance. The pride you take in building it, the pleasure you get from listening to it will last a lifetime.



The AR-1515 is even easy to build! Obviously the AR-1515 is a complex and sophisticated receiver, but its well thought out, modular design and color-coded wiring harnesses simplify assembly. There's even a separate test meter to double-check your work each step of the way. Finally, the illustrated, step-by-step assembly manual makes it easy for even a novice to assemble the AR-1515.

Kit AR-1515, Shpg. wt. 47 lbs. **649.95**

Dolby FM Module.

Kit AD-1504, Shpg. wt. 1 lb. **49.95**

AR-1515 SPECIFICATIONS: AMPLIFIER — Frequency Response: +0, −1 dB, 8 Hz to 45 kHz; +0, −3 dB, 4 Hz to 80 kHz. **IM:** less than 0.08% from 0.25 to 70 watts (full output). **Damping Factor:** Greater than 60. **Input Sensitivity:** Phono 1 & 2, 2 mV. Aux., Tape & Dub., 200 mV. **Input Overload:** Phono, greater than 100 mV, Aux., Tape & Dub., greater than 10 V. **Hum and Noise:** Phono (2 mV reference), −65 dB. Aux., Tape & Dub., (200 mV reference) −80 dB. **FM Sensitivity:** 1.8 μV*. **Selectivity:** 100 dB*. **Image Rejection:** 90 dB*. **Harmonic Distortion:** 0.3%. **Intermodulation Distortion:** 0.1%. **Signal to Noise Ratio:** 70 dB*. **Spurious Rejection:** 90 dB*. **Separation:** 40 dB or greater at mid-frequencies; 35 dB at 100 Hz; 20 dB at 10 kHz. 20 dB (nominal) at 15 kHz. **Harmonic Distortion:** 0.35% with 100% modulation. **AM: Sensitivity:** 5 μV with 50-ohm direct input. **Selectivity:** 20 dB at 10 kHz. **AM Antenna:** external static-shielded loop. **Image Rejection:** 70 dB at 600 kHz. 50 dB at 1400 kHz. **GENERAL: Accessory AC Outlets:** One switched and one unswitched. **Power Requirement:** 120/240 VAC, 50/60 Hz. **Net Weight:** 35.8 lbs. **Dimensions:** 6¾" H x 21½" W x 15" D.

*Rated IHF (Institute of High Fidelity Standards).

Dolby is a trademark of Dolby Laboratories.

This can be the heart of a beautiful sound system for you

$389.95 **35 WATTS, MINIMUM RMS, PER CHANNEL INTO 8 OHMS WITH LESS THAN 0.1% TOTAL HARMONIC DISTORTION FROM 20-20,000 Hz.**

Here's a medium-power stereo receiver with specs that you'll find only on units costing a great deal more. It provides enough low-distortion power for most any listening area. And specifications that mean true professional performance! FM sensitivity is an excellent 1.8 μV and stereo separation is 40 dB. Two 4-pole ceramic filters are used in the AM section for superb, distinct station selection. Two 8-pole ceramic filters in the FM section ensure excellent FM selectivity. An improved FM-PLL stereo demodulator provides excellent stereo reception with minimum distortion. There are two high-level inputs, a magnetic phono input and pre-amp out/power-amp in jacks for audio accessories. A tape monitor lets you make professional style recordings. Attractive tuning scale has large, easy to read numbers. Signal and tuning meters make tuning easy and accurate. Complete controls include bass, treble and balance, FM mute and blend switches, loudness and tape-flat switches, so you can tailor the sound to your listening preference. For private listening, a headphone jack is provided on the front panel. You can also build and install the optional AD-1504 Dolby™ FM Module for the reduced noise and increased dynamic range of the Dolbyized FM broadcasts now offered by many stations. Compare this combination of features and specifications with any other similarly classed receiver. This is one of the finest medium-power receivers you can buy.

Kit assembly is easy with modular circuit board construction and color-coded wiring harnesses. Like all Heath electronic kits, it comes with its own comprehensive, easy-to-follow assembly manual that takes you step-by-step from unpacking to final assembly. You'll find it hard to beat the AR-1429 without spending a lot more money. Cabinet with solid-walnut end panels included.

Kit AR-1429, Shpg. wt. 32 lbs. **389.95**

Kit AD-1504, Optional Dolby FM Module, Shpg. wt. 1 lb. **49.95**

AR-1429 SPECIFICATIONS: AMPLIFIER — Frequency Response: −1 dB, 5 Hz to 45 kHz. **Damping Factor:** 60. **Input Sensitivity:** Phono, 2 mV; Aux. Tape and Tape Mon., 200 mV. **Hum and Noise:** Phono, −65 dB (−79 dB for 10 mV input); Aux., Tape and Tape Mon., −75 dB. **Phono RIAA* Equalization:** ±1 dB (30 Hz to 20 kHz). **FM SECTION — Sensitivity:** 1.8 μV* (10.3 dBf) usable, 4.0 μV (17 dBf @ 50 dB signal to noise). **Selectivity:** 65 dB. **Capture Ratio*:** 1.8 dB; **AM Suppression*:** 48 dB; **Image Rejection:** 90 dB*. **Stereo Separation:** 40 dB, typ. at 1000 Hz. **Frequency Response:** ±1 dB from 20 to 15,000 Hz. **AM SECTION — Sensitivity:** 10 μV. **Selectivity:** 20 dB. **Power Requirement:** 120/240 VAC, 50/60 Hz. **Dimensions:** 4¾" H x 20" W x 13½" D.

*Rated IHF (Institute of High Fidelity) Standards. Dolby is a trademark of Dolby Labs.

High-Performance Stereo Amplifier for low-distortion power and beautiful sound

70 WATTS MINIMUM RMS, PER CHANNEL, INTO 8 OHMS WITH LESS THAN 0.08% TOTAL HARMONIC DISTORTION FROM 20-20,000 HZ

The AA-1515 is the amplifier section of the AR-1515 receiver. It gives you the low-distortion power you need to drive most any speakers to "live performance" volume levels. Harmonic distortion is an amazing 0.08% over the 20-20,000 Hz range for exceptionally accurate music reproduction. Background noise is a full 65 dB down on phono input, 80 dB down on all other inputs. Has dual output meters calibrated in both watts and decibels for an accurate visual indication of amplifier output. The meters respond to peaks as short as a record click, making them useful as overload indicators. High and low filters help you get the best sound from old or worn records. There are complete tape outputs for monitoring and dubbing, preamp out and main-amp in jacks for audio accessories. The secondary controls are located behind a hinged front panel. Has bass and treble tone controls, balance, tone flat and loudness switches. There are outputs for two sets of speakers, and headphone jack. Handsome cabinet with brushed aluminum front panel, solid walnut side panels.

Kit AA-1515, Shpg. wt. 39 lbs. **319.95**

AA-1515 SPECIFICATIONS: Frequency Response: −1 dB, 8 Hz to 45 kHz; −3 dB, 4 Hz to 80 kHz. **IM Distortion:** less than 0.08% from 0.25 to 70 watts. **Damping Factor:** greater than 60. **Input Sensitivity:** Phono, 2 mV. Aux., Tuner, Tape Mon., Tape Dub., 150 mV. **Input Overload:** Phono, greater than 100 mV. All other inputs: greater than 10 volts. **Hum and Noise (Unweighted):** Phono, 65 dB. Tape, Tuner and Aux., 80 dB. **Power Requirement:** 120 or 240 volts; 60/50 Hz. **Dimensions:** 6⅛" H x 17½" W x 14¼" D.

Low kit prices–high Heathkit quality

Clean, clear sound delivery for your system from a value-priced receiver

$239.95 A low cost receiver with expensive looks and features — the right choice for your first system

15 WATTS, MINIMUM RMS, PER CHANNEL INTO 8 OHMS WITH LESS THAN 0.5% TOTAL HARMONIC DISTORTION FROM 20-20,000 HZ.

Low price — expensive performance

Hard to believe — yes. But when it comes to giving you performance at an economical price the AR-1219 is hard to beat! That's because we've taken years of audio engineering experience and packed them into a simple, low-cost receiver that really performs!

Just 15 watts per channel, but careful engineering of the AR-1219's amplifier section has made sure that the annoying colorations and imperfections, evident in most low cost systems, just aren't there! Intermodulation distortion is less than 0.5% at full power and less than 0.2% at 1 watt. Hum and noise? — imperceptible. –60 dB for phono, and 65 dB down for tape. And with its channel separation of 55 dB, you'll be assured of a spacious stereo performance no matter which program source you may select.

Impressive Features Too!

But impressive specifications aren't all the AR-1219 has to offer. There are also plenty of operating features which really add up!

Bass, treble, balance and volume controls aid selectively in the precise control of your musical environment. Each is large enough to be adjusted easily and all exhibit a solid, expensive feel. For private listening there's a headphone jack and speaker disconnect switch. And, for extra convenience, a tape-monitor switch.

High performance tuners

Rounding out the AR-1219 are two tuner sections which exhibit performance and specifications almost unheard of in receivers in this price class. AM sensitivity is 100 μV per meter and FM — 2 μV. Channel separation is typically 40 dB and quality ceramic filters in the IF section improve FM selectivity. An extra-wide slide rule dial assures easy and accurate tuning for both AM and FM. And a stereo pilot lamp.

Kit AR1219, Shpg. wt. 18 lbs. **239.95**

AR-1219 SPECIFICATIONS: AMPLIFIER — Frequency Response: ±1 dB, 7 Hz to 100 kHz. **IM Distortion:** less than 0.5%, full power; less than 0.2% at 1 watt. **Damping Factor:** Greater than 30. **Input Sensitivity:** Phono: 2 millivolts; Tape: 190 millivolts. **Hum and Noise:** Phono, –60 dB; Tape, –65 dB. **FM SECTION — Sensitivity:** 2 μV*. **Selectivity:** 60 dB*. **Image Rejection:** 50 dB*. **Stereo Separation:** 40 dB typ., 35 dB minimum. **Signal to Noise*:** 65 dB (65 dB). **Power Requirement:** 120/240 VAC, 60/50 Hz. **Dimensions:** 3⅞" H x 17" W x 13" D.

*Rated IHF (Institute of High Fidelity) Standards.

Good first-time kits for beautiful sound

15 WATTS, MINIMUM RMS, PER CHANNEL INTO 8 OHMS WITH LESS THAN 0.5% TOTAL HARMONIC DISTORTION FROM 20-20,000 HZ.

AA-1219 Stereo Amplifier

AA-1219 features the same excellent specifications found in the amplifier section of the AR-1219 Receiver. Intermodulation distortion is less than 0.5% at full power and less than 0.2% at 1 watt. Phono hum and noise are –60 dB, channel separation 55 dB — beautiful high fidelity. Styled to match AJ-1219.

Kit AA-1219, Shpg. wt. 14 lbs. **134.95**

AJ-1219 AM/FM Stereo Tuner

The pre-assembled and aligned FM front end provides 2 μV sensitivity with extremely low cross modulation and no overload, even on strong signals. A phase-lock-loop multiplex circuit provides excellent stereo separation with minimum distortion. Handsome metal case with stained walnut-veneer end panels. If your budget is limited, but you still want outstanding performance, this is your choice.

Kit AJ-1219, Shpg. wt. 12 lbs. **134.95**

Big savings on the amazing Modulus™ system

SAVE $239.95 **NOW ONLY $599.95**

$839.90 if purchased separately

Digital Tuner/Preamp

Power Amp

The Heathkit Modulus Tuner/Preamp is one of the finest components ever from Heath. Now with its matching amp included in the reduced price, it's an unheard of value. The matching amp delivers 60 watts minimum RMS, per channel into 8 ohms at less than 0.1% total harmonic distortion from 20-20,000 Hz. Features of the AN-2016 are: digital frequency readout that's far more accurate than dial tuning, signal-strength and center-channel tuning meters for tuning precision, peak-responding power output meters. And you can add the optional modules (order below) for even more performance.

SAVE $239.95! Kit ANS-2016, Tuner/Preamp and Amp together, Shpg. wt. 70 lbs. **599.95**

Kit AN-2016, Tuner/Preamp, Shpg. wt. 39 lbs. **619.95**

Kit AA-1506, Matching Amps, Shpg. wt. 25 lbs. **219.95**

Kit AD-1507, CD-4 Demodulator Module. Shpg. wt. 2 lbs. **89.95**

Kit AD-1504, Dolby FM Module. Shpg. wt. 1 lb. **49.95**

Kit AM-1503, Full-Logic SQ Decoder Module. Shpg. wt. 2 lbs. **59.95**

Innovative speaker designs for beautiful sound systems

New curved baffle reduces defraction for exceptional clarity of sound

$619.95
Sold in pairs only

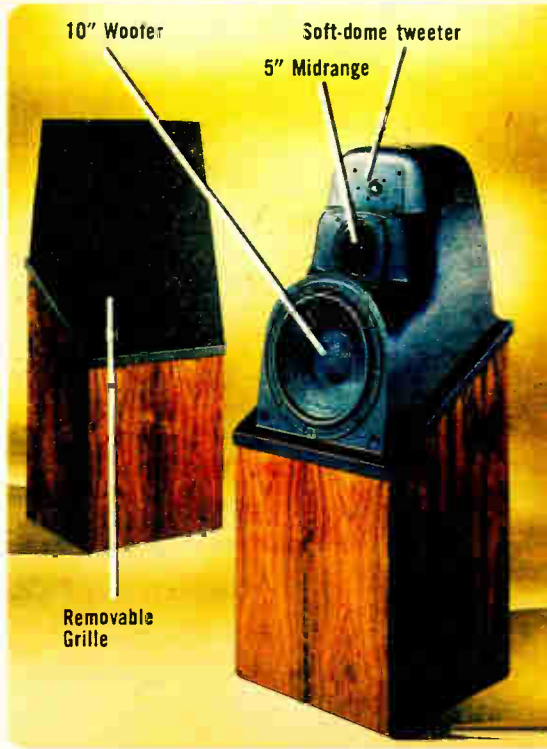
Designed for minimum transient distortion — an improvement in sound reproduction you can really hear

The ASX-1383 uses the same revolutionary design concept found in speaker systems costing $1000 and more. This linear phase design aligns each driver's radiating surface in the same plane so that the entire sound output — bass, treble and midrange frequencies — reaches your ears at the same time. The result is a clarity and richness of sound that you simply have to hear to believe. A unique curved baffle eliminates edges and corners and the defraction which causes transient distortion and ragged frequency response. The result is a spaciousness and open sound combined with outstanding stereo dispersion and imaging. You'll get great sound and excellent stereo definition no matter where you sit in your listening room. The drivers used in the ASX-1383 provide full frequency response with excellent dynamic range. The ASX-1383 uses a 10" high-compliance long-throw woofer, a 5" high compliance long-throw midrange and a soft-dome high-compliance 1" tweeter. The soft-dome tweeter provides the smoothest high frequency response of any tweeter we've seen. A linear phase, constant-voltage crossover network distributes frequencies smoothly and evenly without altering the system's phase response. The speaker elements are arranged for minimum line height (the entire distance from woofer voice coil to tweeter voice coil) to approximate a single-point sound source for increased dispersion and realism. Each speaker is individually fused to provide protection against over-powering.

The ASX-1383 has been designed to look as great as it sounds too. The cabinet is select Brazilian rosewood veneer with a center-book-matched front panel for an elegant look in any decor. A charcoal black "acoustically transparent" grille cloth complements the cabinet. Sold in matched pairs only. We believe they're the finest speakers you can buy at any price!

Kit ASX-1383, 114 lbs. Motor Freight **pair 619.95**

ASX-1383 SPECIFICATIONS: Frequency Range (−10 dB): 30 Hz to 30 kHz. **Frequency Response:** ±3 dB, 40 Hz to 25 kHz. **Impedance:** 8 ohms. **Recommended Amplifier Power:** 10 watts minimum to 200 watts (fused for larger amplifiers). **Crossover Frequencies:** 750 Hz, 4000 Hz. **Fuses:** Woofer, 1 amp slow-blow; midrange, ½-amp slow-blow; tweeter, ½-amp regular. **Dimensions:** 36" H x 13½" W x 13¼" D.



This 3-way system produces beautiful sound you have to hear to believe

$179.95 Each

For a great deal on speakers, buy a pair and save.

Our best-selling system possesses remarkable dynamic range and clarity not found in any other 3-way system in this price range

A truly outstanding floor/shelf speaker system, for use with the best components. The 10" woofer provides solid, well-defined bass. The woofer to midrange crossover frequency is 500 Hz to minimize IM distortion and insure smoothness. The 4½" midrange is isolated in its own polyester-damped subenclosure to prevent distortion caused by woofer vibrations and reflections. The 1" dome tweeter provides excellent power handling and definition, and features horizontal dispersion of a full 120° even at 12,000 Hz. All three drivers are flush mounted, and there are no "rails" around the cabinet to limit treble dispersion. For best stereo imaging, you can position the tweeter directly above the midrange whether you position the system vertically or horizontally — a Heath exclusive! While the AS-1373 can be used with almost any amplifier, a high-power amplifier like the AA-1640 reveals its awesome dynamic range and clarity. Has individual fusing for each driver, two high-frequency controls to match response to your listening area. Fully assembled walnut-finish veneer cabinet with deluxe, acoustically transparent foam grille. The AS-1373 is easy-to-build, even for first-time kitbuilders. Assembly requires just a couple of evenings per system, and you'll have a truly great sounding stereo pair! 8 ohms impedance.

Kit AS-1373, 68 lbs. UPS **179.95**
Kit AS-1373-2, 141 lbs. UPS . . . . . **pair 339.95**

AS-1373 SPECIFICATIONS: Frequency Range (−10 dB): 30 Hz to 22 kHz. **Frequency Response:** ±3 dB, 40 Hz to 20 kHz. **Impedance:** 8 ohms. **Recommended amplifier power:** 10 watts min. to 200 watts. (fused for larger amplifiers). **Crossover frequencies:** 500 Hz (12 dB/octave) and 3000 Hz (12 dB/octave). **Fuses:** Woofer, 1¼ amp Slow-Blow; midrange, ¾-amp Slow-Blow; tweeter, ½-amp regular. **Controls:** .3 kHz shelf/flat; 10 kHz rolloff/flat. **Dimensions:** 26" H x 14½" W x 11⅞" D, without 1¼" grille.

High-power 3-way Speaker System

$339.95 each

- **Massive 15" slot-loaded woofer**
- **Rare 22 Hz to 22 kHz frequency range**

Designed to stand with the finest stereo components, the AS-1348's offer the bass power and extra wide dynamic range to reproduce almost any kind of music realistically. They combine a massive 15" slot-loaded woofer, two 4½" midrange speakers and three 1" tweeters in a precision-designed cabinet for frequency range from 22 Hz to 22 kHz. Individual protective fuses for woofer, midranges and tweeters. 14-position attenuation controls. Fully assembled, acoustic-suspension enclosure with walnut and oak veneer finish.

Kit AS-1348, 110 lbs. Motor Freight each **339.95**

Kit AS-1348-2, 220 lbs.
Motor Freight ..... **pair 639.95**

AS-1348 SPECIFICATIONS: Frequency Range (−10 dB): 22 Hz to 22 kHz. Frequency Response: ±3 dB, 28 Hz to 20 kHz. Impedance: 8 ohms nominal. Recommended amplifier power: 8 watts min. to 250 watts (fused for larger amplifiers). Crossover frequencies: 500 Hz (12 dB/octave) woofer-to-midrange and 3000 Hz (6 and 12 dB/octave) midrange-to-tweeter. Dimensions: 38" H x 24" W x 15" D.

Solid-state mono amplifier makes the ideal beginner kit

- **Surprising sound**
- **Mono on a budget**

3.25 WATTS, MINIMUM RMS, INTO 8 OHMS WITH LESS THAN 1.5% TOTAL HARMONIC DISTORTION FROM 40-20,000 Hz

A low-cost amplifier for monaural sources. Use the AA-18 with a record player having ceramic cartridge, a tape player, a monophonic AM or FM tuner or any signal input of at least 250 millivolts. If you have an efficient 8-ohm speaker (such as our AS-1332), you'll be surprised at the volume the AA-18 delivers. And it is "clean sound," too. Also can be used as a good headphone amplifier. Ideal beginner kit, goes together in just a couple of evenings. With metal case. 2⅝" H x 7 1/16" W x 5⅜" D. 120/240 VAC, 60/50 Hz.

Kit AA-18, Shpg. wt. 4 lbs. **29.95**

Low-priced Stereo Mike Mixer Console for "pro" style tapes

- **0.5% Maximum distortion**
- **40-20,000 Hz response**
- **Use with most mikes**

Wide frequency response and low distortion give you clean, life-like mixing capability. Each of the TM-1626's two outputs has its own master level control and meter. Two high-level auxiliary inputs and four mike inputs. Each input can be switched to left, off, or right channel. The fourth mike input has a "pan" control to adjust its apparent location from left to right or anywhere in between. Backlighted meters with two switch-selected ranges and adjustable threshold (80 mV to 6.5 mV) show instantaneous peaks to prevent distortion. For 120/240 VAC, 50/60 Hz. Handsome cabinet with walnut stained veneer end panels. Dimensions: 5¾" H x 16" W x 9⅞" D.

Kit TM-1626, Shpg. wt. 12 lbs. **169.95**

Fully-assembled B•I•C and Dual automatic turntables/changers

Your records sound only as good as the turntable and tonearm that reproduce their information. Heath recommends these assembled turntables. Base, dust cover and Empire 2000 E/111 or Shure M91ED cartridge included (see page 13).

1 B•I•C 912C. Fully automatic unit has controls to virtually eliminate rumble and acoustic feedback. Specify choice of cartridge from page 13.
ACP-1282, Shpg. wt. 21 lbs. **149.95**

2 B•I•C 914C. As above, with true dynamically balanced tonearm and plug-in tonearm head shell. Specify cartridge from page 13.
ACP-1283, Shpg. wt. 21 lbs. **169.95**

3 Dual CS1246. Fully automatic single/multiple-play. Anti-resonance filters, high-torque synchronous motor. Specify cartridge from page 13.
ACP-1246, Shpg. wt. 19 lbs. **244.95**

4 Dual 721. One of the finest turntables available. Fully automatic single-play, electronic direct-drive motor, twin gimbal tonearm mounting, calibrated anti-skate. Includes Shure V15 Type III cartridge (see page 13).
ACP-1217, Shpg. wt. 25 lbs. **429.95**

Heathkit Speaker Systems give you great listening value

1 Low-priced 3-way bookshelf speaker

This full-range 3-way system features a 10" woofer, a 4½" midrange speaker and a 1" dome tweeter. The woofer-to-midrange crossover frequency is 750 Hz (6 dB/octave) to ensure a smooth-sounding midrange; while the midrange to tweeter crossover is 4000 Hz (6 and 12 dB/octave). Adjust the AS-1363's sound to suit your listening room with two-position midrange and tweeter switches. Each driver is individually fused for protection. Impedance is 8 ohms. The factory-assembled cabinet features a handsome pecan-veneered Mediterranean finish and hardwood trim — looks as good as it sounds.

Kit AS-1363, Shpg. wt. 55 lbs. UPS . . . . **each 159.95**
Kit AS-1363-2, Shpg. wt. 128 lbs. UPS. . . **pair 289.95**

AS-1363 SPECIFICATIONS: Frequency Range (−10 dB): 30 Hz to 20 kHz. **Frequency Response:** ±3 dB, 45 Hz to 18 kHz. **Impedance:** 8 ohms, 6 ohms minimum. **Recommended Amplifier Power:** 5 watts min. to 130 watts. **Dimensions:** 23¾" H x 14¼" W x 11½" D.

2 High-efficiency 2-way speaker system

The AS-1342 doesn't need much amplifier power to provide great sound, making it ideal for small systems. Uses an 8" woofer and a 2x6" horn-type tweeter that can be mounted either horizontally or vertically for best frequency dispersion — a Heath exclusive! Has a continuous tweeter level control. Factory-assembled walnut-finish vinyl-covered enclosure is an attractive addition to any room.

Kit AS-1342, Shpg. wt. 32 lbs. UPS . . . . . **each 84.95**
Kit AS-1342-2, Shpg. wt. 78 lbs. UPS . . . **pair 159.95**

AS-1342 SPECIFICATIONS: Frequency Range (−10 dB): 40 Hz to 16 kHz. **Frequency Response:** ±3 dB, 60 Hz to 14 kHz. **Impedance:** 8 ohms nominal. **Recommended Amplifier Power:** 3 watts min. to 25 watts (fused for larger amplifiers). **Crossover Frequency:** 2500 Hz (12 dB/octave). **Dimensions:** 22¼" H x 12" W x 10½" D.

3 2-way Sound Column speaker system

This speaker sounds outstanding no matter where you sit in the room. Two 1" dome tweeters and two 6½" full-range drivers are mounted in separate woofer-tweeter arrays on adjacent sides of the cabinet for well-balanced sound. Combined cone area of woofers is equivalent to a 9" woofer. The woofers are located well above the floor for solid, well-defined bass response. No midbass boom or resonance means mid-frequencies come through loud and clear. The tweeters deliver a full 10 to 20 dB more off-axis response than conventional tweeters for bright, clean highs — and their amazing 270° dispersion pattern maintains well-balanced stereo imaging regardless of speaker placement. Has a nominal 4 ohms impedance, so most amps will deliver up to TWICE their rated 8 ohm power. Separately fused woofers and tweeters, flat/−3 dB level control. Light walnut-vinyl finish on all four sides.

Kit AS-1344, 57 lbs. UPS . . . . . **each 159.95**
Kit AS-1344-2, 122 lbs. UPS . . . . . **pair 299.95**

AS-1344 SPECIFICATIONS: Frequency Range (−10 dB): 35 Hz to 22 kHz. **Frequency Response:** ±3 dB, 55 Hz to 20 kHz. **Recommended Amplifier Power:** 9 watts min. to 100 watts (fused for larger amplifiers). **Crossovers:** 4000 Hz mechanical (on woofer) and 12 dB/octave electrical on tweeter. **Control:** 2-position tweeter level, flat and −3 dB. **Dimensions:** 40" H x 11" W x 11" D.

Economy speakers for smaller systems

Amazing sound from a low-priced speaker. This 4½" full-range acoustic suspension speaker has a full-bodied 70-16,000 Hz response. Only 12" H x 7" W x 6" D, it's ideal for smaller rooms. 8 ohms impedance. Sold in pairs only.

Kit AS-1140, Shpg. wt. 16 lbs. . . . . **pair 39.95**

This low-priced 2-way speaker system features an 8" woofer and a 1¾" tweeter. Frequency response is 40 Hz to 20 kHz. 9 watts to 50 watts.

Kit AS-1332, 29 lbs. UPS . . . . . **each 64.95**
Kit AS-1332-2, 63 lbs. UPS . . . . . **pair 119.95**

SAVE Super-discount prices on top quality tapes

Now you can save up to $4.00 on quality Deluxe Scotch® Master™ Series cassette tapes. Whether you're looking for expanded dynamic range with normal bias; extra high- and low-frequency response with chrome (CrO_2) bias; or increased low- high-frequency sensitivity with ferri-chrome (FeCR) bias — there's a Master Series cassette for you! Each cassette is designed for long life and mechanical reliability. These tapes will capture more of your system's range of recording capability . . . and save you money, too. Order more than one package to increase your savings.

Stock No.	Master Series	Type of Bias	Playing Time	Shpg. Wt.	Package of 4 Was	Package of 4 Now
ADP-1904	MI-C90	Normal	90 min.	1 lb.	15.95	11.95
ADP-2604	MII-C60	CrO_2	60 min.	1 lb.	13.95	10.95
ADP-2904	MII-C90	CrO_2	90 min.	1 lb.	17.95	13.95
ADP-3604	MIII-C60	FeCr	60 min.	1 lb.	13.95	11.49
ADP-3904	MIII-C90	FeCr	90 min.	1 lb.	17.95	14.49

Improve your system with a famous-brand stereo cartridge

These quality cartridges are recommended by Heath to help you get the best sound from your records. They have been selected for excellent tracking ability and smooth, uncolored sound reproduction. Choose the cartridge that best meets your needs from the table below. Order one with a turntable from the selection on page 12 and save as much as $75.00.

Model	Response (Hz)	Output	Separation	Stylus	Tracking	Price Alone	With Turntable
Shure M91ED ADP-1062, Wt. 1 lb.	20-20,000	5.0 mV	25 dB	Ellipt. 0.2 x 0.7	¾ to 1½ gr.	49.95	FREE
Empire 2000E/111 ADP-1147, Wt. 1 lb.	20-20,000	4.5 mV	28 dB	Ellipt. 0.2 x 0.7	½ to 1½ gr.	59.95	FREE
Shure V-15 Type III AD-1059, Wt. 1 lb.	10-25,000	3.5 mV	28 dB	Ellipt. 0.2 x 0.7	¾ to 1¼ gr.	85.00	45.00
Audio-Tech, AT-14Sa ADP-1139, Wt. 1 lb.	5-45,000	2.7 mV	25 dB	Shibata	¾ to 1¾ gr.	89.95	45.00
Shure V-15 Type IV ADP-1259, Wt. 1 lb.	10-25,000	4.0 mV	25 dB	Ellipt. 0.2 x 0.7	¾ to 1¼ gr.	99.95	75.00

Records last longer, sound better with Disckit™

Disckit™ by Discwasher keeps your records and cartridge clean for better sound and longer life! Includes Discwasher record brush, fluid, Zero-stat antistatic pistol, test light, precision stylus cleaner. All in solid walnut tray.

ADP-1286, Shpg. wt. 4 lbs. **49.95**

Heath's Learning Dictionary helps answer all your questions about electronics

NEW

Having the language of electronics compiled in handy dictionary form is reason enough to put this book on your reference shelf. Even better, included with the Heathkit Learning Dictionary is a compendium of 16 topic outlines. Want to learn all about filters, amplifiers, etc? Each topic outline lists related terms so your Dictionary becomes an effective learning tool.

EB-1010 . . . . . **14.95**

Heathkit Reference Library gives you electronics know-how

Transistor Substitution Handbook. Replacements for over 19,000 American and foreign bipolar transistors. 544 pages. **EDP-175** **5.95**

The 555 Timer Applications Source Book with experiments. Use of the 555 timer. 160 pages. **EDP-249** **6.95**

The TTL Data Book. Specifications, pin outs, test data and applications of transistor-transistor logic. 832 pages. **EDP-220** **5.95**

ABC's of Soldering. EDP-178 . . **3.95**

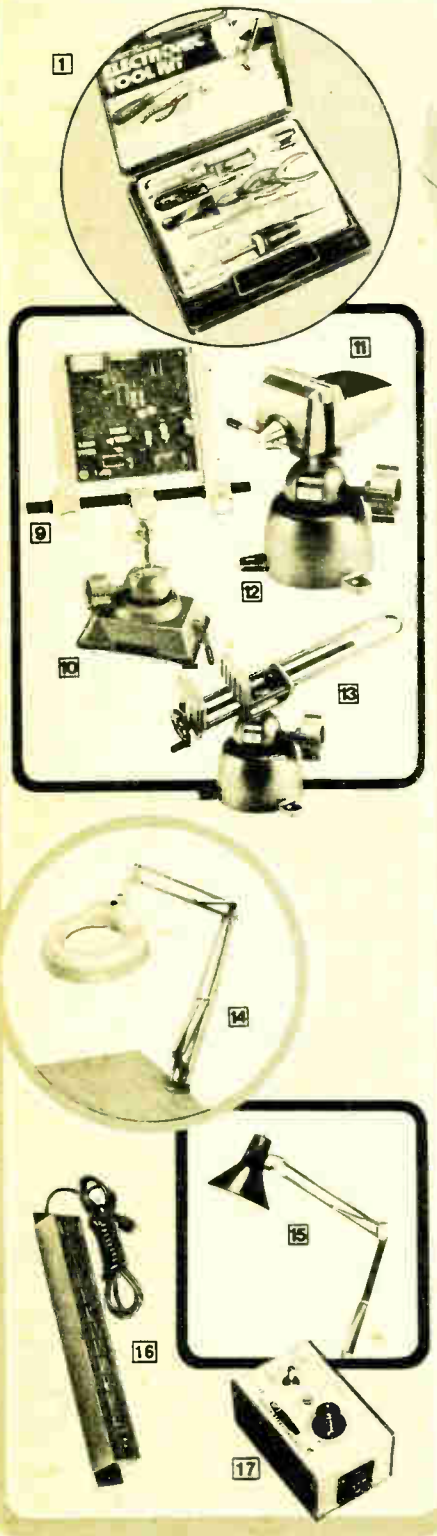
Tube Substitution Handbook. Lists 12,000 replacements for all types of American and foreign receiving and picture tubes. 112 pages. **EDP-174** **2.95**

TTL Cookbook. What TTL is, how it works and how to use it. Includes several projects. **EDP-183** **8.95**

Home TV-FM Antennas. Antennas, towers, lead-in, rotators, amps. 208 pages. **EDP-186** **6.50**

Building and Installing Electronic Intrusion Alarms. EDP-135 . . . . . **4.50**

Heath-recommended tools for easier kitbuilding



1 Kitbuilders' Tool Set. Includes wire stripper; diagonal side cutter; small long-nose pliers; three screwdrivers (3/32", 1/8", 3/16"); Weller WP-25 soldering iron; nutdriver; nut starter; soldering aid; and solder.
GHP-1270, Shpg. wt. 3 lbs. **29.95**

2 Heat Controlled Solder Station. Weller WTCPN soldering station is transformer powered and features "closed loop" control of tip temperature. Has heat shield, indicator lamp, and sponge. With 700°F soldering iron tip.
GDP-1108, Shpg. wt. 5 lbs. **59.95**

Set of Replacement Tips for above (all 700°F). Set includes: 1/16" Screwdriver, 1/8" Screwdriver, 3/16" Screwdriver, 1/32" Long Conical, 3/64" Long Screwdriver.
GDP-1109, Shpg. wt. 1 lb. **11.95**

3 3-Heat Soldering Iron Kit. Stand with metal cage keeps iron secure. 3 heat settings. Six foot power cord. 120 VAC.
Kit GH-17A, Shpg. wt. 5 lbs. **34.95**

4 Heathkit Nut Driver Set. 3/16", 1/4", 5/16", 3/8", 13/32", 7/16" and 1/2" sizes.
GDP-204, Shpg. wt. 2 lbs. **13.95**

5 Heath-approved Weller 25-Watt Pencil Soldering Iron. 1/8" chisel tip develops 860° heat.
GDP-207, Shpg. wt. 1 lb. **12.95**

6 Solder/de-Solder Set. As above, with de-solder bulb. Weller 25-watt pencil iron develops 860°. Includes de-solder, bulb.
GDP-1009, Shpg. wt. 1 lb. **13.95**

7 Soldering Iron For Close Work. Wall 25-watt pencil soldering iron for work on high-density boards. 3-wire cord. For 120 VAC.
GDP-1231, Shpg. wt. 1 lb. **7.95**

8 Heath Approved Soldering Iron for use on high-density circuit boards. 40 watts with standard tip.
GDP-1105, Shpg. wt. 1 lb. **7.95**

9 Circuit Board Holder. Holds most any shape or size circuit board. Spring loaded for quick change. Tilts 220 degrees.
GDP-1254, Shpg. wt. 2 lbs. **18.95**

10 Vacuum Base—Attaches securely to any smooth, non-porous surface. Powerful rubber suction pad holds without marring tabletop. Overall height 3 3/16". Base dimensions 5 x 4 1/4".
GDP-1252, Shpg. wt. 2 lbs. **17.95**

11 Vertical Jaw Vise Head—For most hobby applications. Nylon jaws open to 2 1/4".
GDP-1253, Shpg. wt. 2 lbs. **13.95**

12 Standard Height Base—Designed for permanent installation. Three mounting lugs let you attach it securely to the work surface. Choose desired vise head from three styles listed.
GDP-1251, Shpg. wt. 2 lbs. **12.95**

13 Vertical Vise Head—Holds bulkier items—model parts, chassis, etc. Jaws open to 6 1/2". Neoprene pads are reversible and replaceable.
GDP-1255, Shpg. wt. 2 lbs. **13.95**

14 Illuminated Magnifier Kit. Fluorescent lighting and 5" diameter 3 diopter lens take the strain out of close work at your bench. Requires 22-watt T-9 Circline Fluorescent tube (not included). Easy mechanical assembly only.
Kit GDP-200, Shpg. wt. 7 lbs. **49.95**

15 Extension Lamp Kit. Extension arm comes assembled. You attach socket, shade and cord. 34" reach, 360° sweep; vented shade, and moveable base clamp. Less bulb.
Kit GDP-202, Shpg. wt. 4 lbs. **17.95**

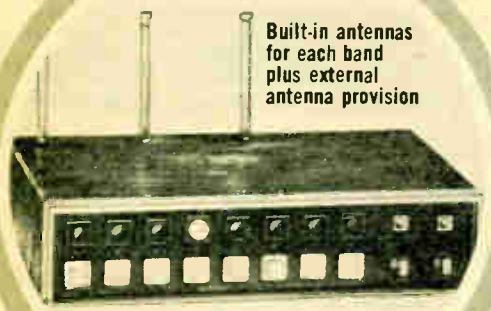
16 NEW! Versatile Multi-Outlet Box Kit. Has 11 switched outlets, 1 unswitched outlet to power all your equipment. All are 3-hole outlets for equipment with ground plugs. Helps keep your shop or hobby bench neat and organized. Includes 12' cord.
Kit HD-1274, Shpg. wt. 3 lbs. **16.95**

17 Motor Speed Control. Ideal for use with any universal motor with rating of 15 amps or less. (Not for use with Dremel tools).
Kit GD-973A, Shpg. wt. 2 lbs. **24.95**

Electronic Darkroom Timer (Not shown). Control your enlarger in two switch-selected ranges—up to 99 seconds in 1 second steps or up to 9.9 seconds in 0.1 second steps. Automatically turns the safe light off when printing and a time/focus switch turns the safelight off when focusing. 2% repeatability. 3 1/4" H x 6 5/8" W x 6 1/2" D.
Kit PT-15, Shpg. wt. 4 lbs. **39.95**

Action-packed scanner

SAVE $50.00



Built-in antennas for each band plus external antenna provision

Checks priority channel every 4 seconds

VHF/UHF Monitor puts you right in the action on three high-traffic bands

$79.95

- Built-in antenna for each band
- Automatically scans channels
- AC and 12 VDC power supplies

Monitor fire calls, police, ambulance, Amateur 2-meter FM, marine emergency vehicles, gov't weather stations, more. Automatically scans each channel, stopping on any signal, then resumes scan after broadcast. Priority feature — checks priority channel every 4 seconds. 4-pole crystal filter (for better selectivity order optional 8-pole filter below); channel lockout buttons; extra-large lighted channel indicators. Telescoping antennas. Built-in speaker, volume and squelch controls. Order crystal certificates below.

Kit GR-1132, Shpg. wt. 9 lbs. **Was $129.95, Now 79.95**

Crystal Certificate. You send one to crystal mfr. for each specific frequency. Crystal returned postpaid.
GRA-1100-1 .....each **4.95**

Outdoor Scanner Antenna (Antenna Specialists MONR 31). Tri-band base- and center-loaded base station ground plane antenna. For masts to 1½" dia. SO-239 receptacle. **GRA-1132-1**, 2 lbs. ...**24.95**

GRA-1131-1, Mobile Mounting Bracket, 1 lb. ...**4.95**

GRA-1100-2, 8-pole crystal filter. 1 lb. **11.95**

4-Band Shortwave Receiver — just right for the beginning kit builder — your introduction to the fascinating world of shortwave listening

$89.95

- Complete coverage from 550 kHz to 30 MHz in four bands
- Built-in AM rod antenna plus connection for external short wave antenna
- Built-in speaker plus front panel jack for external speaker or headphone

If you're looking for a great first-time radio kit — or simply a great low-priced shortwave receiver — the SW-717 is for you. It's an ideal introduction to the fun and fascination of electronic kit construction — and the assembled radio will bring you many years of listening enjoyment.

Tunes foreign broadcasts from all over the globe — amateur and CB radio bands — local and marine weather reports — ships at sea — plus standard AM — it's a world of exciting listening at your fingertips!

Features wide slide-rule tuning dial with logging scale; bandspread tuning for easy separation of crowded stations, variable BFO for code reception; built-in speaker; front panel jack for external speaker or headphone; switchable automatic noise limiting; signal-strength tuning meter; built-in AM rod antenna plus connection for SWL antenna.

Solid-state circuitry is used throughout the SW-717. Most of the components are mounted on a single printed circuit board, both for ease of assembly and for reliability of performance. The built-in power supply is transformer-operated from either 120 VAC or 240 VAC, and uses four silicon diodes in a full-wave bridge circuit. Alignment of the receiver can be performed without instruments; however the Heathkit manual for the SW-717 includes instructions for instrument-alignment should you prefer.

The SW-717 is an ideal kit for the beginning electronics hobbyist, and it's especially recommended for use with our ER-3701 Amateur Radio Novice License program (see page 16). The manual includes instructions for operation, and a reception guide listing bands, frequencies, zones and times of best shortwave reception. Complete, easy-to-follow instructions and careful engineering make the SW-717 an attractive, responsive receiver. You'll be proud to tell your friends, "I built it myself."
Kit SW-717, Shpg. wt. 10 lbs. **89.95**

Long-wire SWL Antenna. Really helps you pull in distant stations. 75' long wire with 30' lead-in, all insulators and hardware for easy setup. A must for the serious listener.
GRA-72, Shpg. wt. 2 lbs. **5.95**

Superex Headphones. Ideal for use with the SW-717 and other shortwave receivers. Feature dual coils for excellent sensitivity, wide headband for comfortable listening. 600 ohms impedance.
GD-396, Fully assembled, Shpg. wt. 2 lbs. **6.95**

SW-717 SPECIFICATIONS: Frequency coverage: 550 kHz - 1500 kHz, 1.5 – 4 MHz, 4 – 10 MHz, 10 – 30 MHz. **Meter:** Indicates relative signal strength. **Headphone Jack:** Accepts low impedance headphone or external speaker. **Loudspeaker:** Built-in. **Power Requirement:** 120/240 VAC, 60/50 Hz, 8 W. **Dimensions:** 5⅓" H x 14½" W x 8" D.

A great addition to your SWL library

99 Ways to Improve Your Shortwave Listening. Details inexpensive and no-cost ways to get more pleasure from your hobby. Includes: antennas and installation, receiver improvements, listening techniques, trouble-shooting tips and more. For the hobbyist, but valuable for the technician, too.
EDP-155 .....**4.50**

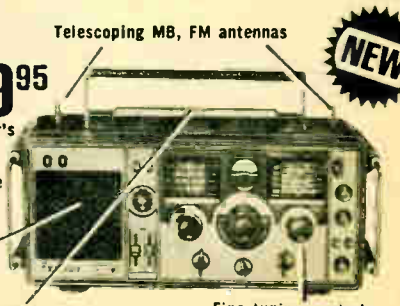
Sanyo 9-band Portable Shortwave Receiver with SW double conversion

NEW! The SWP-3010 (Sanyo RP8880) receives high marks from the Heath Co. evaluation dept. It features tuned RF stages covering 525-1615 kHz, 88-108 MHz, 150-350 kHz, 1.6-2.3 MHz, 2.3-5.95 MHz, 5.95-6.2 MHz, 6.2-10 MHz, 11.7-20 MHz, 20-30 MHz. Separate bass, treble, BFO and RF gain controls. External antenna terminals. AC, 12 VDC or 8 "D" cells (not included).

SWP-3010, Fully Assembled, 12 lbs. **279.95**

$279.95

Manufacturer's list price $329.95
Heath price $279.95



Amateur Radio and Heath have something for everyone who

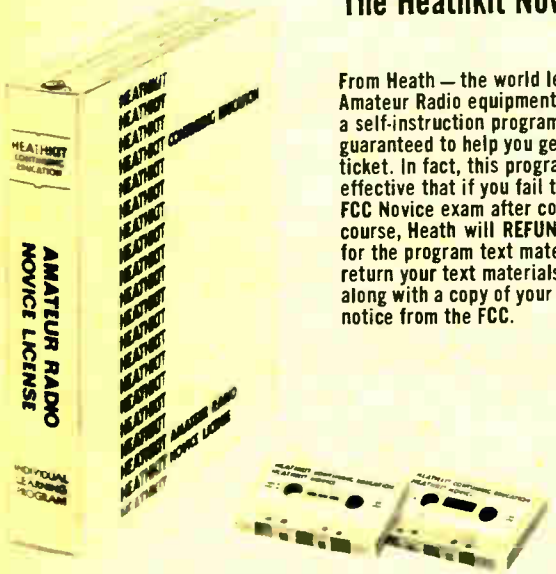
Amateur Radio is a hobby everyone can enjoy. Man, woman, child or senior citizen, there are no barriers to the two-way communication potential of Amateur Radio. And Ham Radio is versatile. You can communicate with the world right from your home, car or boat... or even on a back-pack trip into the wilderness. Everytime you "work" your equipment, transmitting and receiving, you are in for a new, exciting adventure. You make friends from different states, countries and cultures, and develop your technical and mechanical skills.

You can combine Amateur Radio with your other interests – get on the air and have a "QSO" with a group of Hams who share your love for boating, computers, fishing... or any other subject under the sun. And, speaking of the sun, perhaps experimenting with a solar-powered QRP rig is an area you'd like to explore. From these examples you can see there are virtually no limits to the ways you can enjoy the exciting world of Amateur Radio.

Besides giving pleasure to hundreds of thousands, Amateur Radio provides a valuable service in times of emergency. Often when normal means of communications have been disrupted by earthquake, blizzard, tornado or fire, Amateur Radio has provided the vital link that helps protect property and save lives.

In this exciting and worthwhile hobby, we naturally think that starting and pur-

The Heathkit Novice License Program makes it easier for you to get your ticket!



From Heath – the world leader in Amateur Radio equipment – here is a self-instruction program that's guaranteed to help you get your Novice ticket. In fact, this program is so effective that if you fail to pass your FCC Novice exam after completing the course, Heath will REFUND your money for the program text material. Simply return your text materials to Heath Co. along with a copy of your rejection notice from the FCC.

$34.95

Now – for CB'ers, electronic hobbyists, anyone interested in operating world-wide two-way Amateur radio equipment – Heath makes it easier than ever! This deluxe learning program prepares you for the Amateur Radio Novice FCC exam, and provides you with helpful guidelines for setting up and operating your own station once you pass the exam. When you have completed the Novice License program, you will be able to send and receive the Morse code accurately at the rate of five words per minute, and to pass a 20-question, multiple-choice written test from the Federal Communications Commission. The course is organized in 9 separate modules that correspond to the various areas covered by the FCC Novice exam as follows:

1. Rules and Regulations
2. Radio Phenomena
3. Operating Procedures
4. Emission Characteristics
5. Electrical Principles
6. Circuit Components
7. Practical Circuits
8. Antennas and Transmission Lines
9. Radio Communication Practices

At the end of each module a multiple choice examination checks your understanding and retention of the material covered by that module. Following Module 9 there are two practice examinations which contain questions from each of the nine modules. There is also a final exam, styled after the actual FCC exam you will be taking, to give you added experience that should make the real thing a breeze. Not only does it give you test-taking experience, but by successfully passing the optional final exam with a grade of 75% or better, you will earn 1.0 Continuing Education Unit and a Certificate of Achievement.

The Novice License Program includes two audio cassette tapes to aid in your Novice ticket. The first contains not only an introduction to Amateur Radio, but also an explanation of RST signal reporting, a review of circuit components, and a review of practical circuits. The tape is accompanied by a set of illustrations that help explain the material on the tape. The second tape teaches you the Morse code in letter groups and then helps you bring your code speed up to the five words per minute required to pass your FCC Novice code test. This tape simulates actual QSO's – the transmissions between Amateur Stations – so you can get a feel for the Q signals, call signs, signal reports and abbreviations that are commonly used in code transmission.

Also included with your Program is a set of Operating Aids. It includes:

1. Common abbreviations
2. Common Q Signals
3. Making Your Own Antenna
4. International Prefixes
5. Morse Code Characters
6. Time Zone Cross-Reference
7. States Check List
8. Part 97, FCC Rules & Regulations

In addition, you will receive an attractive 31" x 22" Frequency Spectrum chart and a matching U.S. Call Area Map, both designed for display on the walls of your Ham "shack." All materials in the Program are packaged in an attractive vinyl binder for convenient reference after you have received your license and are on the air.

ER-3701, Shpg. wt. 7 lbs. **34.95**

Assembled Cassette Recorder/Player. Ideal for playing the tapes supplied with ER-3701 (above). Features volume and tone controls, pushbuttons for record and play, rewind, fast forward, stop and eject. Has a built-in 3 digit counter to aid in locating specific information on a tape in a hurry. Factory wired, not a kit.

ECP-3801, Shpg. wt. 4 lbs. **60.00**

Practice for your FCC code exam with this Handy CW oscillator

This practice oscillator features telegraph key, phone jack, built-in speaker, volume and tone control. Once you get your license, the HD-1416 can serve as a sidetone oscillator for any transmitter using grid block keying. 2⅝" H x 4⅛" W x 4⅜" D. Operates on 9 V transistor battery (not supplied).

Kit HD-1416, Shpg. wt. 2 lbs. **12.95**

SAVE! Novice License Program and Oscillator package saves you $7.95

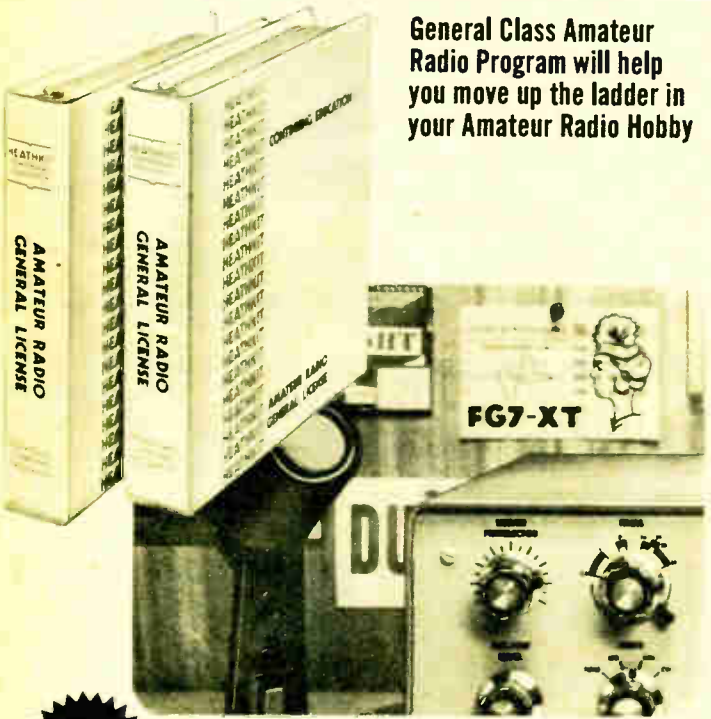
Heath helps you get started in Amateur Radio by saving money on the ER-3701 Novice License Program and the HD-1416 Code Practice Oscillator together. To save even more money, you also receive a certificate for a 10% discount on your next purchase of Amateur gear from the Heathkit catalog. If purchased separately the Oscillator and License Program would cost $47.90.

ERS-3701, Shpg. wt. 8 lbs. **39.95**

wants to talk to the world

suing your hobby with Heathkit equipment is the best way to go. That's because our complete line of Amateur Radio equipment can provide everything you need, from a basic Code Practice Oscillator all the way to a sophisticated station. It's easy and fun to build, you learn about circuitry and operation as you put your equipment together, you'll probably save money over comparable assembled units, and you'll even save by being able to perform your own maintenance and service. Read on to see what Heathkit Amateur Radio equipment has for you.

There's more for the HAM at Heath



General Class Amateur Radio Program will help you move up the ladder in your Amateur Radio Hobby

NEW

The Amateur Radio General License Self-instruction Program includes:

- Code practice workbook
- Amateur Radio log book
- FCC Form 610
- T.V.I. booklet
- Two code cassette tapes
- Simulated FCC exams
- World call area map
- 8.0 C.E.U.'s
- Certificate of Achievement
- Two vinyl binders
- FCC exam schedule

The new ER-3702 General Class Amateur Radio License Program helps you increase your technical knowledge and code skill so you can pass the FCC General Class License or the Technician Class License examination. If you have been putting off going for a higher class license, this is the program for you. It even carries the same money-back guarantee as the Novice Program. Move up to General Class and get all the added privileges it offers — more frequencies to operate on, plus voice transmission, radioteletype, Amateur television and more that you're missing by operating with just a Novice license.

This Program begins to prepare you by providing extra code practice to help you bring your code speed up to 15 words per minute. Since the FCC requires only 13 words per minute to pass the General exam, the extra "two-word edge" this program gives you helps eliminate examination day jitters by giving you the confidence you need to pass the code test with flying colors.

The written section of the License exam has been approached with the same concern for completeness and clarity. An informative text takes you through the subjects covered on the written exam. It is designed to concentrate on the information necessary to pass the exam, so you don't get bogged down by learning information that won't be covered by the FCC examination.

Just as the extra code builds your CW confidence, the program also includes a simulated FCC written exam. Not only does this exam give you the test-taking experience you need to build your confidence, but it also allows you to review any problem areas you might encounter so you will be more fully prepared for the actual exam. When you pass the FCC General exam, send us a copy of your new license or FCC notification of passing to receive 5.0 C.E.U.'s and a Certificate of Completion for the Program.

Your General License Program is a complete package. In addition to the program text and two code practice tapes, you will receive a code practice workbook, a booklet covering FCC rules and regulations governing the Amateur Radio service, FCC Form 610 required to apply for your General Class or Technician Class License, an FCC schedule listing the locations and dates that FCC Amateur exams will be given, an Amateur Radio log book for keeping the record of your transmissions, a comprehensive booklet describing radio television interference problems and ways to solve them, and an attractive, useful 31" x 41" great circle world map showing call area prefixes.

The General Class Amateur Radio Program is composed of 10 separate units arranged in the following manner:

1. Amateur Radio Operations
2. Direct Current
3. Alternating Current
4. Active Devices
5. Electronic Circuits
6. Measurements
7. Transmitters
8. Receivers and Station Operation
9. Antennas
10. Practice Exams

Your General Class License Program will retain its value even after you pass your exam and get on the air. You will want to keep the materials handy as a valuable reference resource. That's easy to do — all materials included in the program are contained in two attractive matching vinyl binders.

Heath offers you the new General Class License Program with the same money-back guarantee as the popular ER-3701 Novice Learning Program. So confident are we of this Program, that should you fail to pass the FCC Amateur Radio General Class or Technician Class License Exam after completing this program, Heath Company will refund your money for the text materials when you return them along with your FCC rejection notice.

ER-3702, Shpg. wt. 12 lbs. **49.95**

Assembled Cassette Recorder/Player. Extremely useful in listening to the code tapes supplied with ER-3702 (above). This recorder/player features separate volume and tone controls, pushbuttons for play and record, rewind, fast forward, stop and tape eject. The built-in 3 digit counter helps find specific information in a hurry. Factory wired, not a kit.

ECP-3801, Shpg. wt. 4 lbs. **60.00**

Reliable, money-saving accessories for your amateur station

HM-2140 Dual HF Wattmeter reads forward and reflected power to help you operate your station more efficiently

- Dual meters
- ±5% Forward power accuracy
- Reads PEP or average power
- Factory assembled and calibrated sensor
- Direct reading SWR

Handy wattmeter installs in your transmission line to measure forward and reflected power for frequencies between 1.8 and 30 MHz. It measures transmitter output up to 200/2000 watts PEP in the forward direction and up to 50/500 watts reflected. Has dual meters for forward and reflected power and SWR, ±5% forward power accuracy for precision measurements. High and low power ranges and a factory assembled and calibrated sensor insure accurate readings. Reads SWR directly from 1:1 to 3:1. Also reads PEP or Average power. Operates on 9-volt battery (not included) or 120 VAC with converter below.

Kit HM-2140, Shpg. wt. 3 lbs. **74.95**

Kit GRA-43-1, AC Adapter for HM-2140. Shpg. wt. 1 lb. **4.95**

HDP-3622, 3-ft. coax with connectors. Shpg. wt. 1 lb. **4.95**

HM-2140 SPECIFICATIONS: Frequency Range, 1.8 to 30 MHz. **Insertion SWR:** less than 1.05:1. **Accuracy (full scale):** 200 w and 2000 W (FWD), 500 W (REF), ±5%, 50 W (REF), ±7.5%. **Dimensions:** 4⅛" H x 7½" W x 6⅜" D. **Net Weight:** 4 lbs.

Solid-state Electronic Code Keyer with selectable word speed

Selectable 10-35 or 10-60 wpm Sending code's easy with the HD-1410 whether you're operating base or portable. The dot and dash paddles travel and tension are easily adjustable. When the two paddles are treated as one, the HD-1410 operates like a single-paddle keyer with dot and dash memories. Iambic operation forms most characters with reduced wrist movement. Dots and dashes are self-completing and always in proper proportion. During construction, you select the speed range you want — 10 to 35 words a minute or 10 to 60 words per minute. Operates on 120 VAC or 12 VDC. Adjustable sidetone frequency, built-in speaker, headphone jack. Styled to match our famous "SB" line. A special weighted cabinet helps keep the HD-1410 stable to prevent sliding or fumbling. Its low-profile styling and compact size won't block other knobs and controls.

Kit HD-1410, Shpg. wt. 4 lbs. **59.95**

Value-packed, solid-state Dip Meter covers 1.6 to 250 MHz

Another Heath value — a better dip meter at lower cost. The Colpitts oscillator covers 1.6 to 250 MHz in fundamentals with a MOSFET paraphase amplifier and hot-carrier diodes for more sensitivity and a better dip. It uses a Q-multiplier for greater detector sensitivity and a responsive 150 μA meter movement for positive resonance indications. It includes a phone jack for modulation monitoring. It's smaller and lighter than others, too. Whether you're checking resonant frequencies, adjusting traps, looking for parasitics, or using it as a signal generator, the HD-1250 is designed to go anywhere. It fits your hand and thanks to its solid-state design and 9-volt battery operation, it's ready to use instantly wherever you are. Custom molded gray carrying case.

Kit HD-1250, less battery, Shpg. wt. 4 lbs. **69.95**

Easy, self-learning code courses on records and cassettes

"Tune in the World with Ham Radio." A complete Amateur Radio Course with manual and code practice cassette. Everything you need to obtain your Novice Class Amateur Radio License: theory, rules and regulations, how to assemble a station, and operating practices. Produced by the American Radio Relay League.
HDP-1142, Shpg. wt. 2 lbs. **7.00**

Ameco Junior Cassette Code Course. Audio cassette tape with 10 lessons of code practice taking the beginner from an introduction to Morse code up to a speed of 8 words-per-minute. Gives you a 3-word edge over the 5 words-per-minute required to pass the Novice License exam. **HDP-432,** Shpg. wt. 1 lb. **4.95**

Ameco Senior Code Course. Two LP's with lessons for code practice to 18 words-per-minute. Allows you to pass the FCC GENERAL License code test with "room to spare." **HDP-332,** Shpg. wt. 2 lbs. **7.50**

Ameco Senior Cassette Code Course. As above, cassettes instead of LP's.
HDP-532, Shpg. wt. 1 lb. **8.95**

"By the Word" Code Course. A fast, simple and effective way to learn code. Two tape cassettes teach speed and comprehension using the famous "by the word" method. Teaches 13 words-per-minute starting with simple material and increasing its complexity. **HDP-132,** Shpg. wt. 1 lb. **9.95**

Informative Ham Radio Books to complete your library

Amateur Radio License Study Guides. Makes getting your license easy, also serves as convenient reference.
GENERAL, EDP-123 ..... **7.95**
ADVANCED, EDP-124 ..... **5.95**
EXTRA, EDP-125 ..... **5.95**

US Callbook. Complete listing of Radio Amateurs in all US call areas and territories, more. **EDP-126** **14.95**

DX Callbook. Complete listing of foreign Amateurs, addresses, postal rate charts, call zone maps and more. **EDP-127** **13.95**

ARRL Amateur's Handbook. Up to date electronics theory and application. Covers all facets of Amateur operations. **HDP-293** **9.75**

73 Dipole Antennas. Decriptions, construction of wire antennas from dipole to rhombic. Arranged from simple designs to more complex. Includes related math, but no special knowledge needed to build. 160 pages. **EDP-180** **4.95**

ARRL Antenna Handbook. Principles of antennas & transmission lines; specific designs for amateur use from HF through space communications; mechanical features of construction. **EDP-182** **5.00**

Useful accessories to complete your Amateur Radio Station

1 Heath Combination HF Wattmeter/SWR Bridge. This rugged in-line Wattmeter/SWR Bridge features dual power/SWR scales, easy calibration, and extra long interconnect cable to allow you to position the meter up to six feet from the detector/bridge. Operates over the 1.8 to 30 MHz range with minimal insertion loss and a nominal impedance of 50 ohms.
Kit HM-102, Shpg. wt. 3 lbs. 42.95

HM-102 SPECIFICATIONS: Frequency Range: 1.8 to 30 MHz. **Wattmeter Accuracy:** ±10% of full-scale reading. **Power Capability:** 10 to 2000 watts. **SWR Sensitivity:** Less than 10 watts. **Impedance:** 50 ohm nominal. **Connectors:** UHF type SO-239. **Dimensions:** 5¼" H x 2¼" W x 6½" D.

Kit HM-2102 (not shown), same as above, except 50-160 MHz and 25 to 250 watts. 4 lbs. 42.95
HDP-3622, 3-ft. RG8U jumper with PL259 connectors, 1 lb. 4.95

2 Famous Heathkit "Cantenna™" RF dummy load. Use the "Cantenna" to avoid unnecessary interference during tune ups or install it on your bench. Ideal for transmitter maintenance and alignment. Handles up to 1 kW of RF with VSWRs of less than 1.5:1 to 300 MHz and less than 2:1 to 400 MHz. 50 ohm impedance. Oil filled (oil not included).
Kit HN-31, Shpg. wt. 3 lbs. 19.95
HDP-3622, 3-ft. RG8U jumper with PL259 connectors, 1 lb. 4.95

3 Relative Field Strength Meter. Makes transmitter adjustments quicker and more precise. Provides visual indication that transmitter is radiating a signal and helps you tune transmitter for maximum output. Operates anywhere in the 1.8 to 250 MHz spectrum and is ideal for your HW-8. 2⅝" H x 4⅛" W x 4⅜" D.
Kit HD-1426, Shpg. wt. 2 lbs. 14.95

4 Hybrid Phone Patch. Add the versatility of phone patch capability to your shack with Heath's HD-15. Individual receiver/transmitter line gain controls simplify adjustment and the HD-15's VU meter continuously monitors the unit's output and lets you adjust for maximum null depth to produce maximum isolation between the telephone line and your station's equipment. Interfacing with your system is a simple matter. Matches 3-16 ohm speakers and hi-Z or 600 ohm inputs. PTT operation. 2⅝" H x 9¼" W x 3⅝" D.
Kit HD-15, Shpg. wt. 3 lbs. 42.95

5 Multiple Outlet Box for Station Equipment. Provides additional electrical outlets for your equipment, helps eliminate long wire runs and messy hookups. Has 12 three-hole outlets, 11 switched and one unswitched. Includes 12 ft. cord.
Kit HD-1274, Shpg. wt. 3 lbs. 16.95

6 Portable Twin Speaker ideal for mobile mounting. The HDP-1228 plugs directly into the external speaker jack of most transceivers, tape players, etc. It's ideal for visor mounting to overcome road and traffic noise, and it can be quickly unplugged and removed from the vehicle for theft protection. Constructed of tough, lightweight plastic. 5¾" W x 3¼" H x 1¼" D. Fully assembled.
HDP-1228, Shpg. wt. 1 lb. 9.95

7 Heathkit Micoder™ II Microphone/Auto Patch Encoder. Replace your old microphone with the Heathkit Micoder II — a real advance in Ham radio versatility and value. 300-3000 Hz response is tailored for clean voice transmission. Has up to 30 mV rms maximum output for full modulation and push-to-talk bar for conventional one-hand use. Accurate and stable tones for phone calls through repeaters equipped for auto-patch input. Operates on one 9-volt battery (not supplied). Can be used with any transceiver with a high-impedance input. Measures just 3¾" H x 2⅝" W x 1¾" D. Comes complete with 6-ft. coiled microphone cable and hanger clip.
Kit HD-1984, Shpg. wt. 1 lb. 44.95

8 Fully assembled Heathkit Desk Mike with VOX and PTT. This Hi-Z dynamic microphone features 70-10,000 Hz response, VOX and grip-to-talk operation, and has a rugged die-cast case, finished in grey and satin chrome. The PTT switch can be mounted on the base or handle of the microphone. Includes cables.
HDP-121A, Shpg. wt. 4 lbs. 54.95

9 NEW Fully assembled Heathkit Mobile PTT Mike. Features a high impedance piezo-ceramic element, with 200 to 5000 Hz response with a peak response frequency of 2300 Hz. Sensitivity: −55 ±3 dB below 1 volt per microbar at 1000 Hz. Comes complete with cable and mounting clip. Connector not included.
HDP-1340, Shpg. wt. 1 lb. 15.95

Frequency Spectrum Chart (not shown). Handy wall chart shows detailed breakdown of radio frequency spectrum. Colorful addition to any Ham shack. **HDP-1495,** Shpg. wt. 1 lb. in mailing tube 4.95

Low-cost, high-performance amps and power supplies

SAVE
$15.00

40 Watt 2M Amp for mobile transceivers

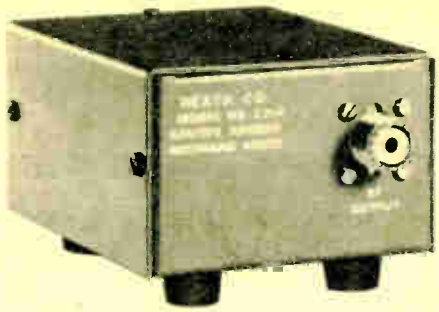
Meets FCC specifications for harmonic and spurious radiation

Delivers solid 40W minimum for 10 watts in. Draw just 7A max. from your car battery. Has antenna changeover relay and sensing circuitry for completely automatic T/R switching, tuned input/output circuits provide low spurious radiation. Special emitter ballasted configuration — withstands VSWR's of up to 3:1. Covers any 1.5 MHz portion of the 143-149 MHz band. Final alignment requires VTVM, wattmeter or SWR bridge. Now with SO-239 connectors for easy hookup!

Kit HA-202A, Shpg. wt. 4 lbs. ..... **Was $64.95, Now 49.95**

HDP-3622, 3-ft. RG8U jumper with PL259 connectors **4.95**

HA-202A SPECIFICATIONS: Power Output: 20W @ 5W in. 30W @ 7.5W in. 40W @ 10W in. 50W @ 15W in. **Impedance:** 50 ohms nom. **Input VSWR:** 1.5:1 maximum. **Maximum Stable VSWR:** 3:1 maximum. **Harmonic and Spurious Radiation:** −60 dB or better. **Standby Current:** 1 mA. **Power Requirement:** 12-16 VDC, 7 A max. **Dimensions:** 3" H x 4¼" W x 5½" D.



Meets FCC specifications for harmonic and spurious radiation

Get extra punch for your 2-meter hand-held transceiver

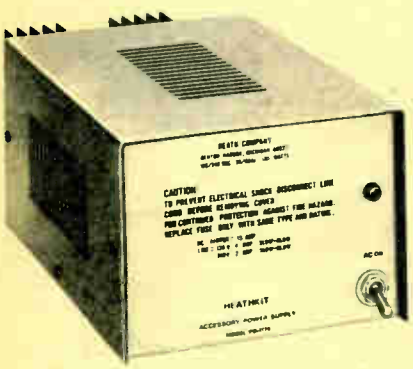
For anyone who wants extra output at low cost, the HA-201A delivers up to 10 watts for a 1½ watt input, 8 watts for a 1 watt input — ideal for use with any low-power 2-meter transceiver. Features fully automatic operation, solid-state transmit/receive switching, tuned input and output for maximum efficiency and reduced spurious emissions. Withstands infinite VSWS load without failure. Includes dummy load and RF detector. Easy 1 to 2 hour assembly. VTVM needed for tuneup. 12-16 VDC. Now with SO-239 connectors for easy hookup!

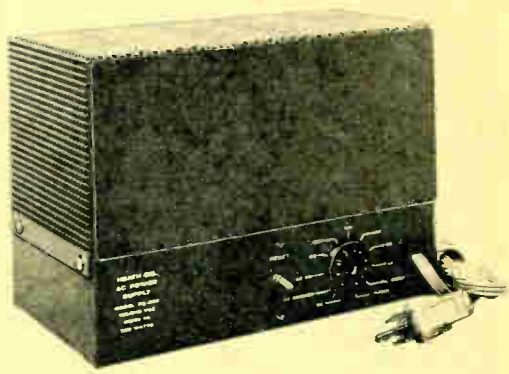
Kit HA-201A, Shpg. wt. 2 lbs. **39.95**

HDP-3622, 3-ft. RG8U jumper with PL259 connectors **4.95**

HA-201A SPECIFICATIONS: Power Output: (at 13.6 VDC input): 8 W @ 1 W in; 10 W @ 1.5 W in. **Power Input (rf drive):** 1-3 W. **Input/Output Impedance:** 50 ohms. **Power Requirement:** 12-16 VDC, 2.2 A maximum. **Dimensions:** 2¾" H x 5⅝" W x 5⅛" L.

Power Supplies for Heathkit Amateur Radio Gear





Power Supply for HW-2036A and HA-202A

The PS-1175 supplies the necessary voltage and current to power the HW-2036A transceiver and HA-202A 2-meter amplifier from standard 120 VAC or 240 VAC outlets for base station operation. Has 120/240 VAC wiring options, fused overload protection. With cables and 3-wire line cord.

Kit PS-1175, Shpg. wt. 15 lbs. **64.95**

PS-1175 SPECIFICATIONS: Output Voltage: 13.8 VDC regulated (internally adjustable from approx. 12 to 14.5 VDC). **Output Current:** 10 amperes intermittent, 10 minutes max. (5 amperes continuous). **Load Regulation:** less than 1% at 10 amperes. **Ripple:** less than 0.5% at 10 amperes. **Power Requirements:** 120 VAC, 50/60 Hz at 4 amperes, 240 VAC, 50/60 Hz at 2 amperes. Fuses 4-ampere, 3AG, slow-blow for 120 VAC primary. 2-ampere, 3AG, slow-blow for 240 VAC primary. 15-ampere, 3AG, output. **Dimensions:** 5 1/16" H x 6 3/16" W x 11" D.

Save $10 on AC Supply for the HW-2036A

Supplies the necessary voltage and current to power your HW-2036A 2-meter transceiver from a standard AC outlet for base station operation. Has 120/240 VAC wiring options, fused overload protection. With all cables for easy hookup and 3-wire line cord. Compact metal case matches the handsome styling of the Heathkit HW-2036. Easy printed circuit board kit assembly with minimal point-to-point wiring.

Kit HWA-2036-3, 7 lbs. .... **Was $42.95, Now 32.95**

HWA-2036-3 SPECIFICATIONS: Output Voltage: 13.8 VDC regulated (Adjustable internally from approx. 10 to 15 VDC). **Output Current:** 2.7 amps, intermittent, 20 minutes max. (1.8 amps continuous). **Regulation:** Better than 1% from no load to full load (2.7 amperes). **Ripple:** less than 0.1%. **Power Requirements:** 110 to 130 VAC or 220 to 260 VAC, 50/60 Hz at 75 watts (full load). **Dimensions:** 3" H x 7¼" W x 10" D.

AC Power Supply for your HW-101

Provides the operating voltages for the HW-101 as well as those necessary for the operation of many older Heath transceivers. Has high voltage and two internally selectable low B+ taps. Also provides fixed bias and 12.6 filament voltage. The PS-23 features excellent bias supply filtering and extremely low ripple content.

Kit PS-23, Shpg. wt. 19 lbs. **64.95**

PS-23 SPECIFICATIONS: High voltage output: 820 VDC no load; 700 VDC @ 250 mA ±10%. AC ripple. Less than 1% @ 250 mA. **Low voltage output:** (High tap) 350 VDC, no load; 300 VDC @ 150 mA ±10%, (Low tap) 275 VDC, no load, 250 VDC @ 100 mA; ±10%. Less than 0.05% AC ripple @ 150 mA, continuous duty to 175 mA. **Fixed bias:** −130 VDC ±10%, no load; −100 VDC @ 20 mA. **Power requirements:** 120/240 VAC, 60/50 Hz, 350 watts maximum. **Dimensions:** 6¾" H x 4¾" W x 9" L.

Amateur Antennas and Accessories

New Heathkit Remote Coax Switch makes antenna changing a snap!

$89.95

- Saves on expensive coax feedline
- Handles full legal power
- Erasable front panel label

New bargain-priced Remote Coax Switch replaces five coax feedlines from the shack to your antennas. Silver-plated contacts give this easy-to-build kit low SWR. A shielded switch box further lowers SWR and protects from the elements. Special ground position for lightning protection. 1.05:1 SWR below 30 MHz; 1.20:1 SWR below 150 MHz. Includes U-bolt for mast mounting.

Kit SA-1480, Shpg. wt. 8 lbs. **89.95**
IDA-1290-1, 50-ft. 8-wire coax, 2 lbs. **7.95**
IDA-1290-2, 100-ft. 8-wire coax, 4 lbs. **13.95**
IDA-1290-3, 150-ft. 8-wire coax, 6 lbs. **18.95**

[1] **Hustler 4-BTV fixed-station vertical HF antenna** covers 40-10 meters. Rated at full legal power on SSB & CW. Ground mount or tower mount with radials. SWR at resonance: 1.15 to 1 or better. Uses a single 50Ω feedline. Height: 21'5".
HDP-3850, Shpg. wt. 15 lbs. **89.95**

[2] **This 75 meter trap** for the 4-BTV installs directly on top of the antenna. Adjustable between 3775-4000 kHz. Full legal power.
HDP-3850-1, Shpg. wt. 3 lbs. **29.95**

(Not shown). **80 meter trap.** Same as above except covers 3500-3775 kHz. Full power.
HDP-3850-2, Shpg. wt. 2 lbs. **29.95**

[3] **Cushcraft 11 element yagi.** Features 13.2 dB front-to-back ratio, and gamma match tuning for minimum SWR. 146-148 MHz. Feeds directly with 52Ω coax. Assembly required.
HDP-1470, Shpg. wt. 6 lbs. **29.95**

[4] **Hustler standard gain 2M mobile antenna.** 5/8 wavelength rear deck whip. 3.4 dB gain, 1.1:1 SWR. Handles 100 watts. 47" radiator. 17' coax and connectors included.
HWA-202-3, Shpg. wt. 2 lbs. **23.95**

[5] **Cushcraft standard gain fixed antenna.** 135-175 MHz. Omnidirectional. 3.75 dB gain, 1.1:1 SWR. 100 watts. 52Ω feed with PL-259. Less coax. Mounts to 1¼" mast. Pre-assembled.
HWA-202-11, Shpg. wt. 2 lbs. **21.95**

[6] **Hustler super gain 2M mobile antenna.** Phased ¼ and 5/8 wavelength radiators. Provides 5.2 dB gain. 1.1:1 SWR; handles up to 200 watts; 6 MHz bandwidth. Height 85". 17' RG-58/U coax and connectors included.
HWA-202-9, Shpg. wt. 3 lbs. **39.95**

[7] **Hustler super gain fixed antenna.** Covers 140-150 MHz. 6 dB gain. 6 MHz bandwidth. 1.2:1 SWR. 1 kW. SO-239 connector. 117" tall. 4 radials of 21" alum. rod. For 1¾" mast. Less coax.
HWA-202-10, Shpg. wt. 7 lbs. **72.95**

Superflex RG-8/U 52Ω Coaxial Cables with PL-259 connectors

(Not shown). For use with antennas and accessories on this page. The finest rig and antenna system can't perform at top efficiency unless you use high quality coaxial cable. That's why Heath recommends maximum coverage superflex RG-8/U coax by Columbia Electronic Cable. 11-gage center foam polyethylene dielectric. 92% copper braided shielded flexlife jacket. PL-259 connectors.
HDP-3620, 100-ft. Shpg. wt. 11 lbs. **24.95**
HDP-3621, 50-ft. Shpg. wt. 6 lbs. **14.95**
HDP-3622, 3-ft. Shpg. wt. 1 lb. **4.95**

[8] **Cushcraft Tri-band Beam Antenna** (Cushcraft Model ATB-34). Equals a single-band yagi on 10, 15 and 20 meters. Rugged, state-of-the-art design features broad bandwidth and four active elements for super performance and outstanding front-to-back ratio all three bands. Comes complete with a low-loss, high performance 1:1 balun which mates with PL-259 connector. Factory adjusted for 50Ω coax feedline. SWR 1.5 to 1 or less at resonance. Full legal power. Boom length, 18'. Longest element, 32'8". Turning radius, 18'9". Wind area, 5.4 sq. ft. For masts to 2½". O.D. UPS shippable.
HDP-1471, Shpg. wt. 46 lbs. **239.95**

[9] **"W2AU" Balun.** This world-famous balun helps reduce TVI and improve F/B ratio. 2 kW PEP rating. Fully enclosed body with silver-plated SO-239 connector and hang-up hook, built-in lightning arrester. Weatherproof. Includes complete instructions and antenna length table.
HDP-3615, Shpg. wt. 2 lbs. **14.95**

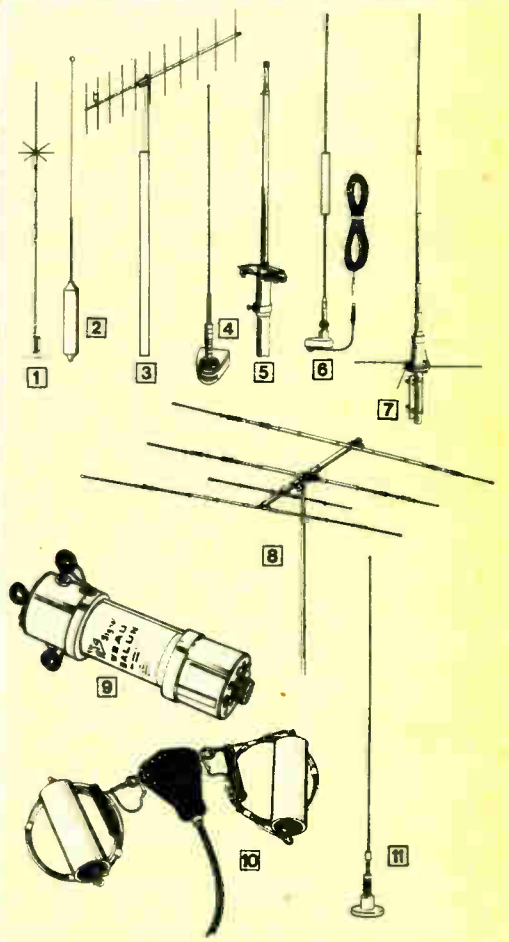
[10] **Barker and Williamson 5-Band Trap Dipole antenna.** Pre-assembled antenna covers 80 thru 10 meters. Only 2 trap adjustments and terminations. Ready to use. Includes wire, traps, 50-ft. RG-8/U coax and PL-259 connector, two end insulators, and dipole center connector. 52Ω impedance. Traps weigh approximately 9 ounces each. Antenna length is approximately 110 ft.
HDP-3500, Shpg. wt. 10 lbs. **64.95**

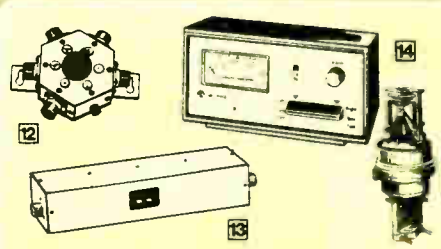
[11] **Cushcraft 2-Meter Mobile Magnetic-Mount Antenna.** 5/8 wave. 3 dB gain. Covers 145-148 MHz. Wind-tested in excess of 90 mph. Includes PL-259 connector, cable. Preassembled and ready to use. Provides excellent 2-meter reception and transmission. Magnetic feature makes it easily removable.
HDP-1472, Shpg. wt. 3 lbs. **29.95**

[12] **Save $3.00! Heath's HD-1234 Coax Switch** takes up to 4 different antennas. Handles 2 kW PEP, up to 250 MHz, 50Ω. Grounds all outputs not in use.
Kit HD-1234, 1 lb. ..... **Was $12.95, Now 9.95**
HDP-3622, 3-ft. coax with conn., 1 lb. **4.95**

[13] **Solve TVI problems** with this rugged low-pass Barker and Williamson filter. Provides a minimum of 70 dB attenuation. Cutoff frequency is 34 MHz. Less than 0.3 dB insertion loss at operating frequency. For 10-160 meters. 50Ω. Full legal power.
HDP-3700, Shpg. wt. 2 lbs. **29.95**
HDP-3622, 3-ft. coax with conn. 1 lb. **4.95**

[14] **Alliance HD73 Heavy-Duty, Dual Speed Rotator.** For antennas with up to 10.7 sq. ft. wind load area. Has positive no-slip drive, automatic brake action. For masts 1⅜" to 2½" O.D. For 117 VAC, 60 Hz. Use 6-cond. cable, or 8-cond. listed below.
HDP-1295, Shpg. wt. 19 lbs. **119.95**
IDA-1290-1, 50-ft. 8-cond. cable. 2 lbs. **7.95**
IDA-1290-2, 100-ft. 8-cond. cable. 4 lbs. **13.95**
IDA-1290-3, 150-ft. 8-cond. cable. 6 lbs. **18.95**

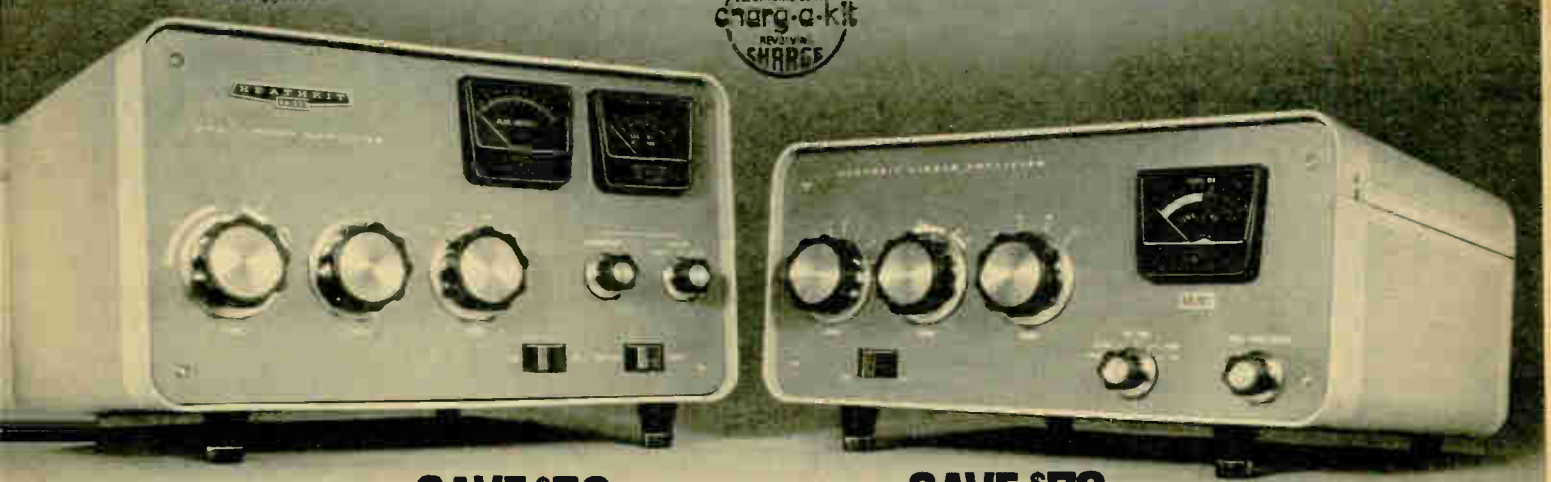




Heathkit Linears–The Power Packed Performers

Put a full 2 kW power in your station with the SB-221 — FCC Approved!

The Heathkit SB-201 has a 1 kW — great for SSB — FCC Approved!



SAVE $50

SAVE $70

Heathkit SB-221 2kW Linear Amplifier cuts through the QRM

$589.95

- Paralleled Eimac 3-500z's deliver top power
- 2kW PEP on phone, 1 kW in on CW and RTTY
- Heavy duty power supply for reliable operation

Heathkit SB-221 means power and performance. And when you look this amplifier over, you'll see why.

A pair of rugged Eimac 3-500z's deliver 2000 watts PEP in on Phone, or 1000 in on CW and RTTY. That's why a 221 in your shack guarantees you'll cut through the QRM and pile-ups with a signal that can always be heard.

There's dual front panel metering, easy operation and tune-up, a broad-band, pre-tuned pi-input for low distortion and high efficiency, and a hefty high-voltage supply that can stand up to years of tough operation.

With an SB-221, tune-up couldn't be easier! Just select the band you wish to operate, set the CW-tune/SSB rocker switch to the CW-tune position, adjust both tune and load controls for maximum relative power out — and you're ready to go. Ready with the kind of signal that always catches the new DX, gets your traffic through, and provides reliable year-after-year communications performance.

A lot more features, too, like fan cooling to stretch tube life, built-in circuit breakers, ALC overdrive protection, and tough construction. The list keeps on going. But then that's what you'd expect from an amplifier that carries the Heath name.

Kit SB-221, Shpg. wt. 66 lbs. ..... **Was $639.95, Now 589.95**

HDP-3622, 3 ft. RG8/U Jumper w/PL259 Connectors, Shpg. wt. 1 lb. **4.95**

SB-221 SPECIFICATIONS: Band coverage: 80, 40, 20 & 15 meters. **Driving power:** 100 W. **Max. power input:** SSB, 2000 W. PEP; CW, 1000 W.; RTTY, 1000 W. **Duty cycle:** SSB, Continuous voice modulation. CW, Continuous (maximum key-down 10 minutes). RTTY, 50% (maximum transmit time 10 minutes). **Third order distortion:** –30 dB or better. **Input impedance:** 52 ohm unbalanced. **Output impedance:** 50 ohm unbalanced; SWR 2:1 or less. **Front panel controls:** Tune, Load, Band, Sensitivity Meter Switch, Power, CW/Tune — SSB, Plate meter, Multi-meter (Grid mA, Relative Power and High Voltage) **Rear panel:** Line cord, circuit breakers (two 10 A). Antenna Relay (phono). ALC (phono). RF Input (SO-239). Ground post. RF Output (SO-239). **Tubes:** Two Eimac 3-500Z. **Power requirement:** 120 VAC, 50/60 Hz at 20 amp. max. 240 VAC, 50/60 Hz at 10 amp. max. **Cabinet size:** 8¼" H x 14⅞" W x 14½" D.

Heathkit SB-201 1kW Linear Amplifier gives you a 20 over 9 signal

$399.95

- Rugged 572B finals need just 100-watt exciter
- Forced air cooling is ideal for contesting
- Switchable multifunctional metering
- Pre-aligned cathode-input tank circuits

When it comes to economical performance, choose the Heathkit SB-201.

Just 100 watts is all it takes to drive the 201's pair of forced air cooled 572B's to a full 1200 watts PEP in on phone, and 1000 watts in on CW. There's an ALC output to prevent distortion producing overdrive. And for maximum efficiency, the 201's cathode-input tank circuits come pre-aligned and ready to go.

The SB-201 has a built-in solid-state power supply which features full circuit breaker protection. A switchable multi-function panel meter shows SWR, grid current, plate current, relative power and plate voltage. For extra operating convenience, an antenna relay automatically switches the antenna to the exciter input when the SB-201 is off.

The sturdy yet lightweight construction of the SB-201 is achieved by using a heavy-gauge one-piece aluminum chassis that is partitioned for extra strength and component isolation. The amplifier's clean open chassis layout assures easy assembly and provides maximum efficiency for year-after-year dependability.

From its front panel right on back to the rear apron, the SB-201 is packed with features that make this amplifier a bargain.

Kit SB-201, Shpg. wt. 47 lbs. ..... **Was 469.95, Now 399.95**

HDP-3622, 3-ft. RG8/U Jumper w/PL259 Connectors, Shpg. wt. 1 lb. **4.95**

SB-201 SPECIFICATIONS: Band coverage: 80, 40, 20 & 15 meters. **Maximum power input:** 1200 watts P.E.P. SSB, 1000 watts CW. **Driving power required.** 100 watts. **Duty cycle:** SSB, continuous voice modulation; CW, 50% (key down time not to exceed 5 min.). **Third order distortion:** –30 db or better at 1000 watts P.E.P. **Output impedance:** 50 to 75 ohm unbalanced; variable pi-output circuit. SWR not to exceed 2:1. **Input impedance:** 52 ohm unbalanced; broad-band pretuned input circuit requires no tuning. **Meter functions:** 0-100 ma grid current, 0-1000 ma plate current, 0-1000 relative power, 1:1 to 3:1 SWR, 1500 to 3000 volts high voltage. **Front panel controls:** Load; Tune; Band; Relative Power Sensitivity; Meter Switch, Grid-Plate-Rel. Power-SWR-HV; and Power Switch, on/off. **Tube complement:** Two 572B/T-160-L (in parallel). **Power requirement:** 120 volts AC @ 16 amperes (max.), 240 volts AC @ 8 amperes (max.). **Cabinet size:** 6⅝" H x 14⅞" W x 13⅜" D. **Net weight:** 35 lbs.

The VF-2031—your best buy in a hand-held 2M transceiver!

You've got instant 2-meter operation wherever you go with the convenient Heathkit VF-2031. And you get more for your money at a price that includes:

$199.95

HEATHKIT ELECTRONIC CENTER charg-a-kit REVOLVING CHARGE

- VF-2031 2-meter hand-held transceiver
- Rechargeable nickel-cadmium battery pack
- Convenient drop-in battery charger
- "Rubber duckie" antenna with BNC-type connector
- Built-in phone jack and earphone
- Minimum of 2 watts out
- 8 channel capability, duplex or simplex
- Everything you need, including 146.94 MHz crystal

The VF-2031 drops right into its battery charger for recharging of the built-in nickel-cadmium batteries. The VF-2031 will operate approx. 10 hours on a full charge and can be recharged in 14-24 hours. Charger is included in price.

The optional leather holster-style carrying case and external PTT microphone make your VF-2031 even more convenient and versatile!

The time is right for going 2-meter hand-held. The VF-2031 sports a price including features the others call "extras." It has everything you need to operate at one low price . . . plus build-it-yourself serviceability.

You get a minimum of 2 watts out anywhere in the 2031's 143.5 to 148.5 MHz of band coverage—more than enough to put you into your local repeater full quieting every time. The signal is clean too. Careful design and plenty of internal shielding insure stability and put spurs a full 60 dB down. With Heath's VF-2031, you'll never need to worry about accidentally accessing the wrong repeater or interfering with other services.

Single crystal transmit and receive circuitry covers 8 of your favorite channels. And for maximum versatility, you can choose simplex or duplex with a ±600 kHz split, all at the flick of a switch. Sensitivity? Less than 0.5 μV quiets the 2031's hot receiver section a full 20 dB. And with fully adjustable volume and squelch at your command, you can tailor your operation to match most any listening condition.

There's more: The VF-2031 comes complete with a "rubber duckie" antenna and a crystal for 146.94 operation. There's a built-in phone jack with earphone included. A universal BNC output connector to give you a wide choice in antenna selection. And to give your 2031 even more flexibility, add the optional VFA-2031-3 encoder and enjoy the versatility of instant auto-patch accessing.

The VF-2031 includes a long-life rechargeable nickel-cadmium battery pack that'll keep you on the air for up to 10 full hours. When the charge runs low, slip the 2031 into the drop-in charger, also included. and you'll soon be back in operation.

Kit VF-2031, Shpg. wt. 5 lbs. **199.95**

Fitted Holster-Style Carrying Case for VF-2031. See description above.

VFA-2031-2, Shpg. wt. 1 lb. **19.95**

Auto-Patch Encoder. Lets you access telephone lines from repeaters.

VFA-2031-3, Shpg. wt. 1 lb. **39.95**

Crystal Certificates for VF-2031. Fill out certificate, specify crystal frequency and send to manufacturer. You receive crystal postpaid by return mail. Order one certificate for each crystal you need.

VFA-2031-4, Postpaid **6.95**

Continuous Tone Encoder. Accesses most repeaters. Builds right in to VF-2031.

VFA-2031-5, Shpg. wt. 1 lb. **39.95**

External Microphone. PTT Mike with coiled cord will plug right into VF-2031 to let you transmit without removing unit from holster.

Kit VFA-2031-6, Shpg. wt. 1 lb. **34.95**

2-Meter Amplifier. Ideal for use with the VF-2031. Delivers up to 10 watts for a 1½ watt input. See page 20 for full description.

Kit HA-201A, Shpg. wt. 2 lbs. **39.95**

VF-2031 SPECIFICATIONS: Receiver — Sensitivity: 0.5 μV or less for 20 dB quieting; 0.35 μV for 12 dB SINAD. **Squelch Threshold:** 0.25 μV or less. **Audio Output:** 1 watt at less than 10% THD. **Operating Frequency Stability:** 0.005% or better. **Adjacent Channel Selectivity:** 40 dB or greater. **Image Rejection:** −45 dB or greater. **IF Frequency:** 10.7 MHz. **Usable Bandwidth:** 7 kHz. **TRANSMITTER: Power Output:** 2.0 watts or more at 12.5 VDC (nominal). **Deviation:** 5 kHz (adjustable). **Spurious Output:** −60 dB or greater referenced to carrier. **Stability:** 0.005% or better. **Oscillator Frequency:** approx. 15 MHz. **Multiplication Factor:** x9. **Type of Modulation:** Frequency. **Transmitter Offsets:** 0 (simplex), −600 kHz, +600 kHz with crystals supplied. **GENERAL: Frequency Coverage:** 143.5 to 148.5 MHz (unit will meet specs ±1 MHz from the alignment frequency within this range). **Operating Voltage:** 12.5 VDC nominal. **Antenna Impedance:** 50 ohms. **Speaker Impedance:** 8 ohms. **Size (Overall):** 9⅛" H x 3⅜" W x 1⅞" D. **Transceiver Weight:** Including batteries: 2 lbs.

Synthesized 2-meter operation is yours with the HW-2036A

$269.95
with standard microphone

- True digital frequency synthesis on 2 meters
- 0.5 μV receiver sensitivity gives up to 15 dB of quieting
- 8-pole crystal IF filter for outstanding selectivity

If you're still rock-bound by a 2-meter transceiver that can't take another crystal pair, the HW-2036A is the rig for you. It gives you the capability to take advantage of the ever-growing number of new repeaters, the enjoyment of more and more mobile activity, autopatching, plus fantastic band openings and the increased interest in 2-meter DX. All without a worry about crystals.

With Heath's HW-2036A in your car or station you haven't got a problem. You're ready for all the action because the 2036A's phase locked synthesizer/VCO loop lets you operate on any 4 MHz segment of the transceiver's 143.5 to 148.5 MHz operating range...with just the flip of a switch. That's right! When you want to QSY all you do is flip the convenient front panel lever switches and in less than the blink of an eye the synthesizer does the rest. With the HW-2036A you have your choice of simplex or standard ±600 kHz split operation. Or pick your own offset (1 MHz maximum) in the unit's auxiliary position.

The synthesizer is locked to a precision 10 MHz time base for outstanding accuracy, has crystal controlled offsets, IC divide chain, and a unique NAND gate logic system which displays locked/unlocked status and inhibits out of band transmissions by preventing transmitter key up.

The receiver features a double tuned front end with MOSFET RF amplification, dual-conversion, 8-pole crystal IF filtering for perfect bandpass shaping and outstanding adjacent channel selectivity, IC limiting, Quad detection, and excellent audio quality. Schmitt-trigger circuitry insures squelch action that's quick and sure, a front panel LED display alerts you instantly to channel activity, and just 0.5 microvolts in gives your HW-2036A up to 15 dB of quieting!

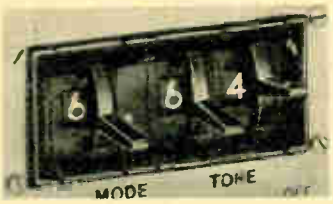
The HW-2036A's transmitter gives you a minimum of ten watts out. Signals are clean and harmonic and spurious components are 60 dB down within 20 MHz of carrier reference. Transmit audio quality is outstanding and deviation is continuously adjustable to 7.5 kHz maximum.

The HW-2036A also features sub-audible tone encoding (variable from 70 to 200 Hz), built in 5 and 11 VDC regulators, hash filter/regulator to eliminate ignition noise and alternator whine, and diode protection to prevent damage from connection to incorrect voltage polarity. Comes with gimbal-mount for mobile operation and may be ordered with the standard mike or you can add $20 and get it with our Reg. $44.95 Micoder II (see pg. 19) for auto-patch operation.

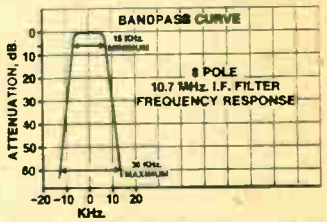
Kit HW-2036A-1, with reg. $44.95 Micoder II. 12 lbs. . . **Was $309.95, Now 289.95**
Kit HW-2036A-2, with standard PTT mike. 12 lbs. . . . . **Was $289.95, Now 269.95**
Kit HWA-2036-3, Power Supply. See pg. 20. 7 lbs. . . . . **Was $42.95, Now 32.95**

4 MHz of synthesized performance

The HW-2036A 2-meter transceiver has the same exciting features and specifications as the industry-leading HW-2036...with one very important difference. Our 2036A offers a full 4 MHz of synthesized operation over any portion of its 143.5 to 148.5 MHz range. And because of this significant improvement, you'll be enjoying additional performance and flexibility without the time consuming necessity of VCO retuning. Best of all, we've done it all at the same low price that made the HW-2036 such a value leader in the world of Amateur 2-meter communications.



Front panel lever switches select any frequency in any 4 MHz segment of the HW-2036A's 143.5 to 148.5 operating range.



An 8-pole IF crystal filter greatly reduces adjacent channel interference for clear, static-free FM transmission and reception.

HW-2036A SPECIFICATIONS: Receiver: Sensitivity: 0.5 μV for 12 dB SINAD (or 15 dB of Quieting). **Squelch Threshold:** 0.3 μV or less. **Audio Output:** 1.5 watts at 10% T.H.D. typically 2 watts. (5 kHz deviation). **Image Rejection:** −45 dB or greater. **Spurious Rejection:** −50 dB or greater. **IF Rejection:** −80 dB or greater. **Internally Generated Spurious:** Below 1 μV equivalent. **Bandwidth:** 6 dB at 15 kHz min. and 60 dB at 30 kHz max. **Modulation Acceptance:** 7.5 kHz, min. **Transmitter: Power Output:** 10 watts min. at 25°C and 13.8 VDC, into a 50 Ω load. **Harmonic & Spurious Output:** −60 dB. **Modulation:** FM, 0 to 7.5 kHz, adjustable. **Duty Cycle:** 100% with infinite VSWR. **Tone Encoder:** 3 tones, 70 to 200 Hz, approx. ±700 Hz deviation. **General: Frequency Coverage:** Any 4 MHz segment from 143.5 to 148.5 MHz. (Both receiver and transmitter must be aligned for the same 4 MHz segment.) **Frequency Increments:** 5 kHz. **Frequency Stability:** ±0.0015%. **Operating Temperature Range:** 15° to 125° F. (−10° to 50° C). **Operating Voltage Range:** 12.6 to 16 VDC (13.8 VDC nominal). **Current Consumption: RX:** 700 mA max. squelched. **TX:** 2.6 A max. at 13.8 volts. **Dimensions:** 2¾" H x 8¼" W x 9⅞" D.

For Novice or Extra, at home or in the great outdoors, the HW-8 is your passport to QRP's ultimate challenge

$139.95

- CW operation on 80, 40, 20 and 15 meters
- Receiver sensitivity is 0.2 μV
- Built-in, tunable preselector
- Semi break-in and adjustable T/R delay
- Two position active audio filter
- Front panel meter shows relative power

Put the fun back in a great hobby. Try QRP operation with the Heathkit HW-8. With your skill and this great little CW transceiver to back you up, you'll be amazed at what you can do. Power your HW-8 from a trail bike's battery to pump that QRP signal into the great outdoors through a dipole strung between two pines. Or join the growing number of Hams going to solar-powered QRP operation. You can do it with this great little performer.

Performance starts with a quiet, super-sensitive receiver section. Hum and noise figures are minimal and as little as 0.2 μV in at the antenna terminal gives you a usable signal.

There's a tunable preselector and selectable wide and narrow audio filtering to make cutting the QRM easy.

RF and AF gain controls? The HW-8 has them and they're both conveniently located, right where you can make adjustments at the flick of your fingertips.

The HW-8 covers the most popular bands too. Work the locals with a minimum of 3 watts in on 80 and 40, or go after the DX with a minimum of 2.5 watts in on 20 and 15. It's all just a matter of skill.

Want more features? There's semi break-in operation with adjustable T/R delay, a built-in relative power meter to make tune-up a snap, pushbutton bandswitching, and a stable temperature compensated VFO. The HW-8 is a great performer that gives you hours of fun in the shack or on a mountain top. Order today!

Runs on batteries (not supplied) or from an optional AC power supply.

Kit HW-8, Shpg. wt. 6 lbs. **139.95**

Kit HWA-7-1, AC Power Supply, Shpg. wt. 4 lbs. **19.95**

HW-8 SPECIFICATIONS: TRANSMITTER — DC Power Input: 3.5 watts (80 M); 3.0 watts (40 M); 3.0 watts (20 M); 2.5 watts (15 M). **Frequency Control:** built-in VFO. **Frequency Stability:** Less than 150 Hz/hour drift after 60 minute warm-up. **RECEIVER — Sensitivity:** 0.2 μV for readable signal; 1 μV or less for 10 dB S+N/N. **GENERAL — Frequency Coverage:** 3.5-3.75 (80 M); 7-7.25 (40 M); 14-14.25 (20 M); 21-21.25 MHz (15 M). **Power Requirement:** 12-16 VDC, 90 mA, receive; 430 mA, transmit. **Dimensions:** 9¼" H x 8½" W x 4¼" D. **Net Weight:** 4 lbs.

A great way to practice code — and a practical addition to your Ham shack, too!

Recommended for ER-3701 Amateur radio course. The unit operates from a single inexpensive 9-volt transistor battery (not supplied) and comes complete with telegraph key and phone jack. Has built-in speaker, volume and adjustable internal tone control. The tone frequency is adjustable from 200-800 Hz. Once you get your license, the HD-1416 can serve as a sidetone oscillator for any transmitter using grid block keying. Compact size, only 2⅝" H x 4⅛" W x 4⅜" D. Operates on 9-volt transistor battery (NEDA #1604) not supplied.

Kit HD-1416, Shpg. wt. 2 lbs. **12.95**

Whether you're just beginning to learn code or just sharpening your skills, the practice oscillator is the efficient way to do it.

$12.95

Heathkit HW-101—the best buy in Ham Radio today! —over 27,000 sold throughout the world

$399.95

- **Full 80 through 10 meter Amateur band coverage**
- **USB, LSB, CW, PTT and VOX operation on all bands**
- **0.35 μV receiver sensitivity digs out weak signals**
- **Reliable 6146 finals for a clean signal**
- **High quality crystal filtering keeps signals apart**
- **180 watts PEP input, 170 watts CW**
- **Built-in 100 kHz calibrator keeps you on frequency**

The Heathkit HW-101 is the economical, value packed way to put yourself on the bands. And with the kind of performance this rig has to offer, you'll find it hard to believe you're operating on a budget.

Full coverage of all the bands, 80 through 10, lets you enjoy the total spectrum of ham radio operation. Operate PTT or VOX on upper or lower sideband or select CW transceive — they're all there, the options you'd expect to find on a transceiver that's always top notch.

You get outstanding receiver performance. Whether your QSO's with a pal or chasing DX, the HW-101's 0.35 μV sensitivity for 10 dB S+N/N on SSB brings in weak stations loud and clear. The high quality crystal IF filter keeps signals separate with a selectivity of 2.1 kHz at 6 dB down, and 7 kHz at 60 dB down. Image and IF rejection of better than 50 dB help bring you world-wide receiving that's clean, clear and crisp. And when you add the optional 400 Hz CW filter to your 101, your copy will be arm chair all the way.

There are a lot more features. A fast acting AGC circuit prevents fading and blasting. There's front panel metering to show you signal strength, plate current, and relative power out. And to make sure you're always right on frequency and inside the band, the HW-101's built in 100 kHz calibrator is ready for reference at the flick of a switch.

The HW-101's transmitter section is a top performer too. Triple action level control prevents distortion producing overdrive to keep your signal clean. And power? With a rugged pair of reliable 6146s for finals, the HW-101 punches 180 watts PEP in on phone and 170 watts in on CW. Frequency stability is better than 100 Hz per hour after 45 minutes warmup, with less than 100 Hz variation for a 10% line voltage variation. An FET VFO provides excellent thermal stability for heavy-duty operating without excessive heat buildup. You'll have more than enough power out for hours of exciting barefoot operation. When you're ready to go the legal limit, by adding Heath's SB-201 or 221 to your shack, the HW-101 will make the perfect exciter.

Easy to assemble circuit boards and color coded wiring harnesses speed assembly. And when it comes time for alignment, you'll really appreciate the wide-open layout of the HW-101's rugged chassis design.

Look over the features and compare price with performance; it's easy to see the Heathkit HW-101 is ham radio's best buy. Requires Heathkit Model PS-23 power supply.

Kit HW-101, Shpg. wt. 22 lbs. **399.95**

SBA-301-2, 400 Hz CW crystal filter, Shpg. wt. 1 lb. **44.95**

Fixed Station AC Power Supply. See page 20 for details.
Kit PS-23, 19 lbs. **64.95**

Kit HS-1661, Matching Speaker, 5 lbs. **29.95**

HW-101 SPECIFICATIONS: RECEIVER: Sensitivity: <0.35 μV for 10 dB S+N/N for SSB operation. **SSB selectivity:** 2.1 kHz min. @ 6 dB down; 7 kHz max. @ 60 dB down; (3.395 MHz filter). **CW selectivity:** (optional SBA-301-2 CW crystal filter); 400 Hz min. @ 6 dB down; 2.0 kHz max. @ 60 dB down. **Output impedance:** 8 ohm speaker, and high impedance headphone. **Power output:** 2 watts with <10% distortion. **Spurious response:** image and IF rejection >50 dB. **TRANSMITTER: DC power input:** SSB 180 watt PEP (normal voice, continuous duty cycle). CW 170 watts (50% duty cycle). **RF power output:** 100 watts on 80 through 15 meters; 80 watts on 10 meters (50 ohm non-reactive load). **Output impedance:** 50 ohm to 75 ohm with <2:1 SWR. **Oscillator feed-through or mixer products:** 45 dB below rated output. **Harmonic radiation:** 40 dB below rated output. **Microphone input:** High impedance with a rating of −45 to −55 dB. **Carrier suppression:** 45 dB down from single-tone output. **Unwanted sideband suppression:** 45 dB down from single-tone output at 1000 Hz reference. **Third order distortion:** 30 dB from two-tone output. **RF compression (TALC*):** >10 dB at 0.1 mA final grid current. **GENERAL: Frequency coverage:** 80-10 M amateur bands. **Frequency stability:** <100 hertz per hour drift after 45 minutes warmup from normal ambient conditions. <100 Hz for ±10% line voltage variations. **Modes of operation:** Selectable upper or lower sideband (suppressed carrier) and CW. **Dial calibration:** 5 kHz. **Calibration:** 100 kHz crystal. **Audio frequency response:** 350 to 2460 Hz. **Power requirements:** 700 to 850 volts at 250 mA with 1% maximum ripple; 300 volts at 150 mA with 0.05% maximum ripple; −115 volts of 10 mA with 0.5% maximum ripple; 12 volts AC/DC at 4.76 amps. (see fixed & mobile power supplies on page 22). **Dimensions:** 6⅜" H x 14⅞" W x 13⅜" D.
*Triple Action Level Control.

HR-1680 Receiver & HX-1681 Transmitter...the unbeatable pair

New! Heathkit HX-1681 (QSK) Transmitter

NEW

$249.95

- Full break-in CW operation (QSK)
- Built-in VFO to change frequencies
- Covers 80 through 10 meters CW
- Rugged 6146 finals give you punch

Whether you're a novice or CW buff of long standing, the new Heathkit QSK transmitter is a top notch rig that will give you CW performance you can count on.

A perfect match for the HR-1680 receiver, the HX-1681 mixes solid-state technology and vacuum tube finals to give you a transmitter loaded with the features that Heath engineering is famous for.

You'll get full break-in operation and built-in solid-state TR switching. There's a sidetone output with adjustable tone arm level and receiver muting. We've even provided keying for easy addition of an external power amplifier.

Operation is easy too. A clean front panel layout puts everything at your fingertips. Sidetone and CW level controls, PA metering, and spot mode, bandswitching, and tuning – they're all right where you need them for quick, efficient operation.

Plenty of power out. A pair of rugged 6146As gives the HX-1681 all the power you need – 100 watts minimum on 80 through 15 meters, and 75 out up on 10. With the HX-1681 in your shack, you'll cut through the QRM for QSO after enjoyable QSO. Requires Heathkit Model PS-23 power supply featured on page 20.

Kit HX-1681, Shpg. wt. 16 lbs. **249.95**

Kit PS-23, Shpg. wt. 19 lbs. **64.95**

HX-1681 SPECIFICATIONS: Frequency Coverage (MHz): 3.5-4.0, 7.0-7.5, 14.0-14.5, 21.0-21.5, 28.0-28.5. **RF Power Output:** 100 watts min. 80-15 meters, 75 watts min. on 10 meters. **Mode of Operation:** CW. **Harmonic Radiation:** 50 dB down at rated output. **Spurious Radiation:** 60 dB down at rated output. **Power Requirements:** 700-850 VDC @ 250 mA with max. 1% ripple, 250 VDC @ 50 mA with max. 0.05% ripple, −115 VDC @ 10 mA with 0.5% max. ripple, 12.6 VAC/DC @ 2.5 A. **Dimensions:** 12.75" W x 6.75" H x 12" D. **Weight:** 12⅛ lbs.

HR-1680 — The First Choice for Your First Receiver

$219.95

- Dual conversion front end works 80 through 10
- Preselector filters out unwanted signals
- 4-Pole crystal filtering for sharp performance
- Active audio filtering delivers clearer CW
- No instrument alignment means easy maintenance

Low cost and high performance make the Heathkit HR-1680 the right choice for your first receiver. Just look at the features.

A hot dual-conversion front end and 0.5 μV sensitivity works them all – 80 through 10 meters. And selectivity? With a matched 4-pole crystal filter in the IF, you can count on your 1680 to be razor sharp.

Sideband reproduction is flawless, and the CW buff will appreciate the versatility of selectable wide and narrow active audio filtering.

With features like a tunable preselector to filter out unwanted signals, rugged solid-state circuitry for added reliability and a built-in 100 kHz calibrator for easier maintenance, you can count on Heath's HR-1680 for unparalleled performance, always.

Match the 1680 with the exciting new HX-1681 and you'll have an unbeatable pair. Can be aligned without instruments. Operates from 12 VDC or AC supply.

Kit HR-1680, Shpg. wt. 14 lbs. **219.95**

Kit HS-1661, Matching Speaker, 5 lbs. **29.95**

HR-1680 SPECIFICATIONS: Frequency Coverage (MHz): 3.5-4.0, 7.0-7.5, 14.0-14.5, 21.0-21.5, 28.0-28.5, 28.5-29.0. **Sensitivity:** Less than 0.5 μV for 10 dB S+N/N for SSB operation. **IF Selectivity:** 2.1 kHz minimum at 6 dB down, 7 kHz maximum at 60 dB down. **Dial Accuracy:** Within 2 kHz after calibration at nearest 100 kHz marker. **Power Requirement:** 120 or 240 volts AC (60/50 Hz) 27 watts maximum or 11.5 VDC to 15 VDC at 0.75 amperes maximum. **Dimensions:** 6¾" H x 12¾" W x 12" D. **Net Weight:** 9¾ lbs.

Great technology, great price—that's the completely solid-state

SAVE $20.00

If you could design your own solid-state rig with all the features you wanted — a clean 100 watts out on all bands, instant QSY, digital readout...even a backlighted display of your call on the front panel — you'd have the Heathkit SB-104A. It's the rig you have always dreamed of owning, because it was designed to meet the requirements of the most discriminating radio amateur. And for good reason! Because it was engineered by some of the more than 200 Amateur Radio license holders who work at Heath Company. That's why, for example, every switch and knob on the SB-104A is located for convenience of operation. And that's why its sophisticated solid-state design has taken the tedium out of tune-up. Think of the enjoyment and efficiency that one feature alone will add to your net or contest activities. The SB-104A is loaded with other features that make it the rig to start with...or the one to move up to. Even construction time has been minimized, thanks to factory-assembled and aligned front end and transmitter IF boards. Whether you build the whole package all at once...or add station aids one at a time, the SB-104A and matching accessories will transform your shack.

From the moment you power up you'll begin to experience the excitement and convenience of SB-104A operation. Apply power and almost instantly six red digits are ready to display your operating frequency to within ±200 Hz accuracy. Pushbutton select CW upper, or lower sideband transmission, plug in your key, or opt for PTT or VOX operation and you're ready to experience broadband solid-state excitement.

Spin the main tuning knob and appreciate its feel as you smoothly move the 104A's temperature-compensated FET Hartley VFO up or down the band. And as you QSY, you'll quickly discover that the SB-104A's completely re-engineered front end receiver board really means business! Its circuitry is factory preassembled and tested, incorporates individual preselector filters for each band, features balanced first and second mixers, and plays a large part in the 104A's less than 0.5 microvolt sensitivity figure.

The SB-104A's receiver features razor sharp filtering, excellent IF selectivity, individual crystal-controlled BFOs for USB, LSB and CW, and balanced mixer product detection. Received audio quality is outstanding, precisely tailored for SSB and CW reproduction. And to make your QSOs more enjoyable, by reducing the nuisance of QSB, you can switch select either fast or slow AGC action.

When it comes to innovation, the SB-104A's transmitter section is second to none. You have a choice of 100 watts out for "barefoot" operation or, with the touch of a button, select one watt out and turn your 104A into Ham radio's most sophisticated QRP rig. Transmitter circuitry features quad op-amp audio processing on both phone-patch and microphone inputs, filter sideband generation, crystal-controlled heterodyne oscillators for maximum frequency stability, and a unique ALC system to eliminate distortion-producing overdrive. Most importantly, the SB-104A utilizes driver and PAs in a broadband no tune push-pull configuration, diode biasing to prevent PA thermal runaway, and power regulating control circuitry to prevent damage under high SWR operating conditions.

For extra operating performance, add 400 Hz CW selectivity with the optional SBA-104-3 crystal filter or cut ignition noise by installing the SBA-104-1 noise blanker.

Add the matching SB-614 Station Monitor, SB-634 Five-Function Console, SB-604 Speaker and SB644A Remote VFO and your SB-104A becomes the center of your ultimate station — ready to give you years of great QSOs, exciting DX and all around performance! Operates from a charging 12 VDC auto electrical system or the PS-1144 Power Supply.

Kit SB-104A, Shpg. wt. 32 lbs. ..... **Was $749.95, Now 729.95**

SB-104A by Heath

Just some of the reasons the SB-104A is such an outstanding value

- Broadband technology eliminates time-consuming pre-tuning
- Digital frequency readout is accurate to within ±200 Hz
- Quick selection of 80 through 10 meter Amateur bands plus WWV
- Factory preassembled and tested front-end circuit boards
- 100 watts PEP on SSB or 100 watts CW out on all bands
- Low power position for 1 watt QRP operation, CW or SSB
- Chassis features slot insertion of boards for easy removal and replacement
- Smooth action drive for virtually backlash-free tuning
- Individual pre-selector filters for each band
- Crystal-controlled heterodyne oscillators for maximum frequency stability

$729.95

charg-a-kit

Noise Blanker for SB-104A.
Kit SBA-104-1, Shpg. wt. 1 lb. 32.95

400 Hz CW Crystal Filter for SB-104A.
Kit SBA-104-3, Shpg. wt. 1 lb. 44.95

Look At These Super SB-104A Specifications!

Frequency Coverage: 3.5 MHz through 29.7 MHz amateur bands, 15 MHz WWV receive only. **Frequency Stability:** Less than 100 Hz/30 min drift after 30-min. warmup; less than 100 Hz drift for ±10% change in primary voltage. **Readout Accuracy:** Within ±200 Hz ±1 count. **TRANSMITTER — RF Power Output: High Power** (50-ohm non-reactive load). SSB: 100 watts PEP ±1 dB; CW: 100 watts ±1 dB. **Low Power** SSB: 1 watt PEP (minimum); CW: 1 watt (min.). **Output Impedance:** 50 ohms, less than 2:1 SWR. **Carrier Suppression and Unwanted Sideband Suppression:** —50 dB down from 100 watt single-tone output at 1000 Hz reference. **RECEIVER — Sensitivity:** 0.5 for 10 dB S+N/N for SSB. **Selectivity:** 2.1 kHz minimum at —6 dB, 5 kHz max. at —60 dB. (2:1 nominal shape factor). **CW Selectivity:** (with accessory CW filter) Selectable 2.1 kHz/400 Hz. **IM Distortion:** —65 dB min.; —57 dB typ. with noise blanker. **Image Rejection:** —60 dB min. **Dimensions:** 5¾" H x 14 15/32" W x 13 7/8" D.

The SB-104A takes less assembly time

The front-end and transmitter IF boards of the SB-104A are factory preassembled and tested to insure excellent sensitivity, speed construction time and give a cleaner output signal.

Save on Remote VFO, Power Supply, Monitor and Console for the SB-104A

Matching Speaker and Power Supply

Designed to match the SB-104A Transceiver. Cabinet is large enough to house the PS-1144 Power Supply too. SSB response-tailored 5" x 7" oval speaker. 300-3000 Hz frequency response. Connector plug and cable included. Dimensions: 7⅛" H x 10⅛" W x 14" D.

Kit SB-604, Shpg. wt. 8 lbs. 44.95

Save $10.00 on the Power Supply

120/240 VAC-operated supply provides 13.8 VDC required by SB-104A. Full-wave bridge circuit has triple Darlington regulation with an IC which samples at the transceiver, compares and automatically maintains a fixed voltage. Has complete overvoltage protection too! Mounts inside SB-604 speaker cabinet.

Kit PS-1144, Wt. 27 lbs. . . .**Was $99.95, Now 89.95**

Save $40.00 on the Remote VFO

Designed for use with the SB-104A. Provides split transmit/receive capability so necessary for DX or net operation. Multi-mode capability allows transceiver operation with either the "644A" or the SB-104A. Use either of two crystal positions for fixed-frequency control. Use 644A tuning scale for reference; SB-104A displays exact frequency readout. Just three circuit boards to assemble.

Kit SB-644A, Wt. 10 lbs. . . .**Was $139.95, Now 99.95**

SB-644A SPECIFICATIONS: Frequency Coverage: 5.0-5.5 MHz allowing 80, 40, 20, 15, 10 meter operation in the SB-104A. **Frequency Stability:** Less than 100 Hz drift per 30 min. after thirty minute warmup. **Modes of Operation:** Remote VFO Main VFO; Receive Remote/Transmit Main; Receive Main/Transmit Remote; Crystal frequencies (2) (crystals not supplied). **Power Requirement:** 11V and 13.6V at 500 mA supplied by SB-104A. **Dimensions:** 7¼" H x 10¼" W x 15¼" D.

Save $20.00 on the Station Monitor

Monitors SSB, CW & AM signals up to 1 kW from 80-6 meters. Shows nonlinearity, insufficient or excessive drive, poor carrier or sideband suppression, regeneration parasitics, key clicks. Manual shows 21 transmit envelope patterns, 7 trapezoid patterns, 6 RTTY cross patterns and 6 CW patterns.

Kit SB-614, Wt. 17 lbs. . .**Was $189.95, Now 169.95**

HDP-3622, 3-ft. coax w/conn. 1 lb. 4.95

SB-614 SPECIFICATIONS: RF SAMPLING SECTION: Power Limits: Exciter input (50-75 ohm) 10 to 300 watts; Antenna input (50-75 ohm) 10 to 1000 watts. **Insertion Loss:** Negligible. **VERTICAL AMPLIFIER: Input Impedance:** 1 Megohm shunted by 75 pf. **Sensitivity:** 60 mV rms/¼" vertical deflection. **Attenuator:** 2-position; x1, 2 volts rms max. input; x10, 20 volts rms max. input. **HORIZONTAL AMPLIFIER: Input Impedance:** 1 Megohm shunted by 50 pf. **Sensitivity:** 50 mV rms/¼" horizontal deflection. **Power Requirement:** 110-130 or 220-260 VAC, 60/50 Hz. **DIMENSIONS:** 7¼" H x 10¼" W x 15¼" D.

Save $20.00 on the Station Console

Features 24-hour digital clock; 10-minute ID timer; RF wattmeter with 200/2000 watt full scale ranges; SWR bridge with sensitivity control; manual/VOX controlled phone patch. Phone patch provides at least 30 dB isolation. Input impedance is 600Ω. This Console adds real versatility to your SB-104.

Kit SB-634, Wt. 13 lbs. . .**Was $219.95, Now 199.95**

HDP-3622, 3-ft. coax w/conn. 1 lb. 4.95

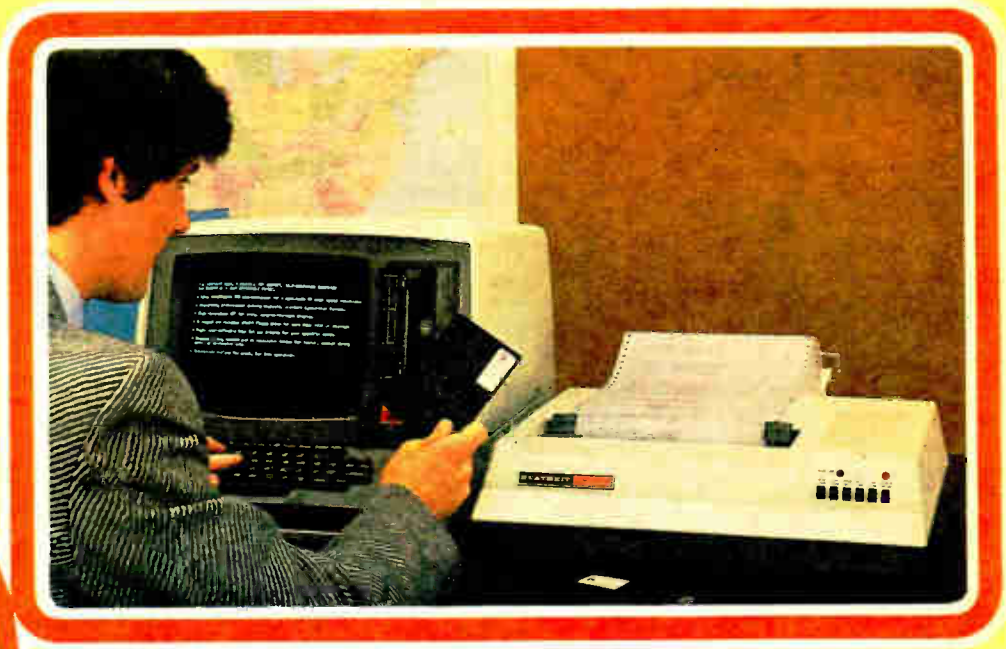
SB-634 SPECIFICATIONS: CLOCK — Display: Six digits. **Time Base:** 24 hours. **TIMER — Display:** Three full digits. **Time Interval:** 10 minutes with automatic reset. **Manual** reset at any portion of 10-minute period. **Signal:** Visual only or both visual and aural. **RF POWER/SWR METER — Frequency Range:** 1.8 to 30 MHz. **Wattmeter Accuracy:** ±10% of full-scale reading. **Power Handling Capability:** 2000 watts (maximum). **SWR Sensitivity:** Less than 10 watts. **Impedance:** 50 ohm nominal. **Connectors:** UHF type SO-239. **Power Requirement:** 120/240 VAC, 60/50 Hz. **DIMENSIONS:** 7¼" H x 10¼" W x 15¼" D.

Right now there are more exciting things you

Practical programs that can save you money.

Heath offers one of the most complete lines of computer products in easy-to-build kits or completely assembled.

- Three Computer Systems
- Video Terminals
- Printers
- Floppy Disk Systems
- Software
- Memory and Interfacing



Heath
Company
Benton Harbor, Michigan

You get 50 years of experience in every Heath electronic kit.

1957 Heathkit Analog Computer

In the past 53 years Heath has grown from a small mail order business with a single product to a multimillion dollar company employing more than a thousand people and offering nearly 400 electronic kits.

For 53 years Heath Company has been at the forefront of developments in consumer electronics, most recently in computers. Our first personal computer was introduced in 1957. By today's standards it doesn't look like much. But in its day it was an important breakthrough. Since that day, Heath Company has continued to develop one of the most complete and innovative lines of personal computers available anywhere.

Today Heath Company is the one-stop source for all computerites with new computer systems you can build yourself. There's no better way to learn about computers than to build one yourself the easy Heathkit way.

Heathkit. For 53 years we've made sense to a lot of people.

A Guide to Heathkit

What is a computer?

A computer is an extension of your brain. Like your brain, it is composed of numerous microcircuits over which information travels in the form of electrical impulses. Your brain holds more information, about ten thousand times more, than a typical computer, but a computer can manipulate information faster, about ten billion times faster, than your brain. So when it comes to simple manipulation of information — storing, selecting, sorting, compiling — a computer is more efficient than your brain.

What can a computer do for you?

On this question rests your decision to buy a computer. It is the uses you can make of a computer that justify its purchase. When a businessman decides that a computer can help him run his business more efficiently, it's time to invest in a computer. When a family decides that the practical and recreational uses of a computer can save money and enrich their lives, it's time to consider buying a computer.

Availability of software is the key to what a computer can do for you. Software is the programmed instructions that are fed into a computer to tell it what to do. A computer without software is like a car without gas. It can't go anywhere.

Today a proliferation of new software is being introduced by program writers all over the world. And the availability of new programs for business, schools and homes continues to grow rapidly.

The time to purchase a computer has never been better.

How to select a computer

If computers can be classified, it would be according to memory power. Memory power is the amount of space a computer has to store and process information. There are two types of memory.

ROM. Read Only Memory contains the instructions or fixed programs. It instructs the computer on what to do with the data.

can do with a computer than ever before.

Fun programs for you and your family

Save 5% when you purchase a complete system

Simply choose the H8 or H11A and one major peripheral plus any I/O devices and accessories you need for a complete custom computer system. Then you can deduct 5% from the total price (excluding shipping and handling charges). It's the ideal way to get the exact computer system you need!

Personal Computers

RAM. Random Access Memory carries out the instructions. It does the actual sorting, adding, compiling. Data coming into the computer from mass storage enters RAM.

ROM is the brains of the computer, **RAM** is the muscle.

There are other considerations in selecting a computer. Do you want built-in peripherals or the flexibility to configure your own system? Do you want the ability to expand your memory power as your skills grow? How good is the computer's operating software? How compatible is it with existing applications software? Will the manufacturer stand behind it?

These are questions you should ask when considering a computer. You can be sure of the answers when you consider Heathkit.

Three very different computers for very different people

Heath designs computers for people, and because people want very different things from computers, Heath has designed three different computers.

For convenience — the All-In-One H89. If you want a complete, balanced computer system in one convenient package, the H89 All-In-One Computer is your choice. It includes computer, terminal, floppy, 16K RAM, keyboard and keypad. Just add software and you're ready to run. (See page 32)

For flexibility — the H8. If you're an enthusiast who enjoys the ins and outs of a computer, the H8 is your choice. It has seven plug-in board positions for memory and I/O's, so you have the flexibility to configure exactly the system you wish. (See page 34)

For power — the 16-bit H11A. If you're an advanced computerite ready to step up to the big power needed to run your complex programs, the H11A is your choice. It features 16-bit power plus seven plug-in board positions for memory and I/O. (See page 37)

Some more reasons to select Heath

The components of Heathkit systems — computer, peripherals, interface and memory boards, and software — are designed to work together and to look like they belong together. All interfacing is Standard EIA RS-232. You can count on a balanced, harmonious computer system.

You get the convenience of one-stop shopping. The complete selection of Heathkit terminals, printers, computer accessories and software is available between the covers of the Heathkit Catalog.

Heath offers complete service support. From the factory or from 55 service centers around the country, technical assistance is just a phone call away.

HUG

Owners of Heathkit Computers can become members of a special group that shares an extensive program library. The **Heath Users' Group (HUG)** keeps you informed of new computer programs written by other members and available to you, and keeps you up to date on new developments in Heathkit Computer Products. (See page 43 for more details on HUG)

Kit or assembled

Heathkit Computers come in kit or assembled form. What better way to learn about computers than to build one yourself? Heath makes it easy with accurate, easy-to-follow assembly manuals that take you step-by-step from unpacking to final plug-in. You'll understand your computer inside out. You'll be able to perform much of the service yourself. And you'll take pride in knowing you built it yourself.

On the pages that follow you'll find details on the complete line of Heathkit Computer Products.

NEW Introducing the Heathkit All-In-One Computer

New personal computer brings everything together in one compact unit

- Floppy disk storage
- Smart video terminal
- Two Z80 microprocessors
- 16K RAM expandable to 48K
- Professional keyboard
- Numeric keypad

Now in one compact, desk-top computer, you can have all the power and built-in peripherals needed for any personal computing task. The new 8-bit All-In-One Computer makes it easy to computerize your home or business. It's loaded with convenience features that make it easy to program and operate.

Smart Video Terminal

The All-In-One Computer has one of the most sophisticated terminals ever designed. Both terminal and computer have their own Z80 microprocessors, so terminal never shares processor power with computer, as do most desk-top computers. That makes this terminal capable of a multitude of high-speed functions.

Heavy-duty professional keyboard

All terminal functions can be controlled by keyboard or software. Eight user-definable keys let you program your own special functions. Baud rates of up to 9,600 are keyboard selectable.

Direct cursor addressing lets you insert and delete characters and lines anywhere on the screen and gives you line graphics capability from keyboard or computer.

Sharp screen image

12-inch diagonal cathode ray tube produces clear, easy-to-read characters. The format of 25 lines by 80 characters includes upper and lower case letters, formed by a 5 by 7 dot matrix. Lower case letters with descenders use a 5 by 9 dot matrix.

Built-in Floppy Disk System

The floppy system makes this a true All-In-One Computer and gives you limitless storage capacity for programs and data. Each 5¼-inch diskette has more than 102K bytes of storage area, enough to hold entire files

The WANGCO 82 single-drive system gives you high-speed access to any piece of information. Programs can be loaded in seconds from the keyboard. Data can be accessed and updated instantly. This is the same H17-1 drive described on page 36.

Expand to meet your needs

The All-In-One Computer comes with 16K RAM and is expandable to 48K. Memory diagnostics are built in for fast, easy memory checks.

Accessory interfaces let you communicate with printers, cassettes or time-share systems. All communication is EIA RS-232 Standard.

Rugged construction

Convenient lift-off top gives you easy access to insides. Rugged structural foam cabinet withstands toughest working environment.

Order today

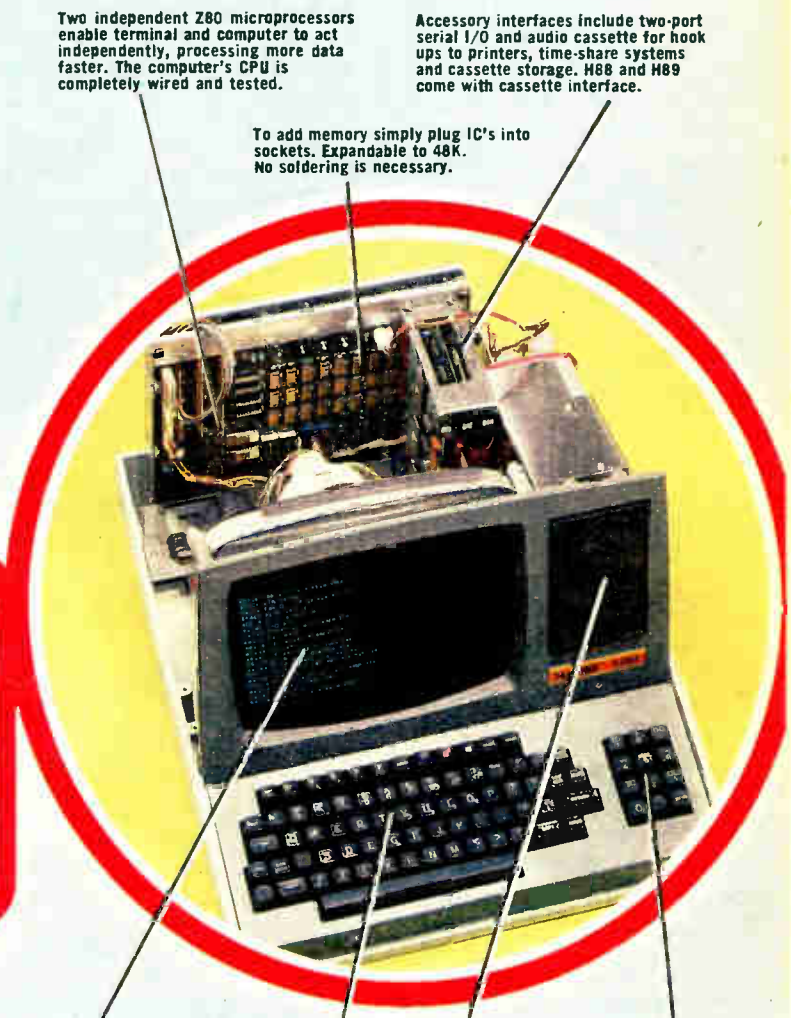
H88 All-In-One Computer, without floppy disk system. Includes audio cassette interface (H88-5). **Kit H88,** Shpg. wt. 59 lbs. **1250.00**

H89 All-In-One Computer with floppy disk system. Includes audio cassette interface (H88-5). **Kit H89,** Shpg. wt. 86 lbs. **1650.00**

WH89 Completely assembled H89 All-In-One Computer with floppy disk system. Does not include audio cassette interface. **WH89,** Shpg. wt. 50 lbs. **2295.00**

Come into your nearest Heathkit Electronic Center for a demonstration.

SPECIFICATIONS: Processor: Z-80. **Clock:** 2.048 MHz. **Memory:** 16K bytes user RAM (expandable to 48K). **Character Type:** 5 x 7 dot matrix (upper case); 5 x 9 dot matrix (lower case with descenders). **Keyboard:** 80 keys. **Cursor:** Blinking, nondestructive underline. **Cursor Controls:** Up, down, left, right, home, CR, LF, back space, and tab. **Cursor Addressing:** Relative and direct. **Tab:** Standard 8-column tab. **Refresh Rate:** 60 Hz at 60 Hz/50 Hz at 50 Hz line frequency. **Edit Functions:** Insert and delete character or line. **Erase Functions:** Erase page, erase to end of line, and erase to end of page. **Power Requirement:** 120/240 volts, 50/100 Hz at 90 watts max. **Size:** 13″ H x 17″ W x 20″ D. (33 x 43.2 x 50.8 cm).



Never before has so much been built into one computer for such a low price:

Only $1650.00 for H89

It speaks the language of today's most popular software

The All-In-One Computer runs programs written in MICROSOFT™ BASIC and ASSEMBLER Languages. That includes scores of practical programs for home and business.

Cassette Systems Software for the All-In-One Computer includes Extended Benton Harbor BASIC. Assembly Language (HASL-8), Text Editor (TED-8), and Console Debugger (BUG-8). **H88-18,** Shpg. wt. 13 lbs. **20.00**

Systems Software for All-In-One Floppy Disk. For complete description, see H8-17 on page 42. **H89-17,** Shpg. wt. 14 lbs. **100.00**

MICROSOFT™ BASIC for All-In-One. For complete description, see H8-21 on page 42. **H8-21,** Shpg. wt. 3 lbs. **100.00**

How much can you save by building it yourself?

Equipment	Heathkit	Pet	TRS-80	Apple
Computer with 16K RAM	$1295	$995	$988	$1195
Single-drive floppy	490	895	799	595
16K memory	150	295	200	110
Serial I/O	85	N/A	200	400
Terminal or monitor	standard	standard	standard	400
Combination discount	−100	N/A	N/A	N/A
Total	**$1920**	**$2185**	**$2187**	**$2700**

Estimated prices based on manufacturer's literature.

All-In-One Computer without floppy disk system. Order Model H88

Accessories

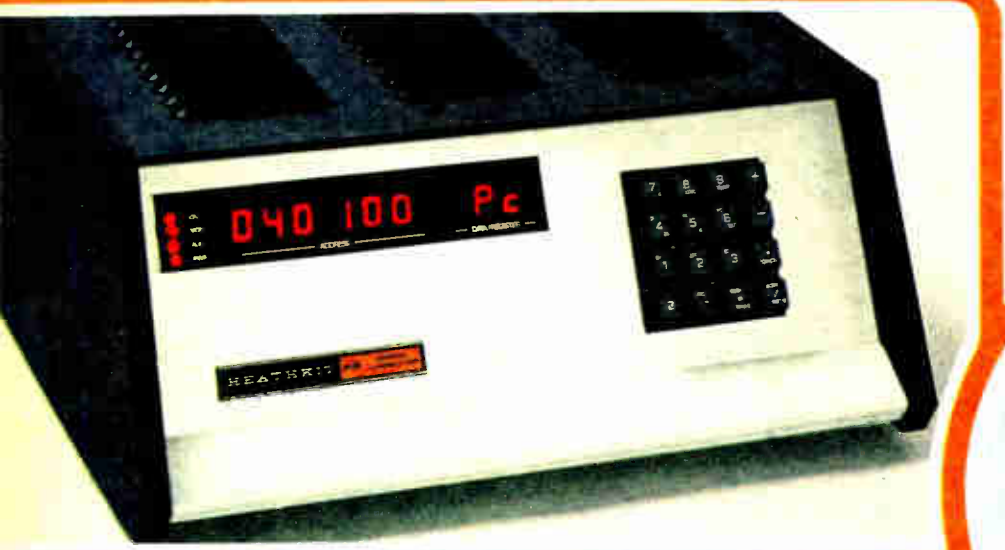
16K Memory Chip Set lets you expand RAM. **H88-2,** 1 lb. **150.00**

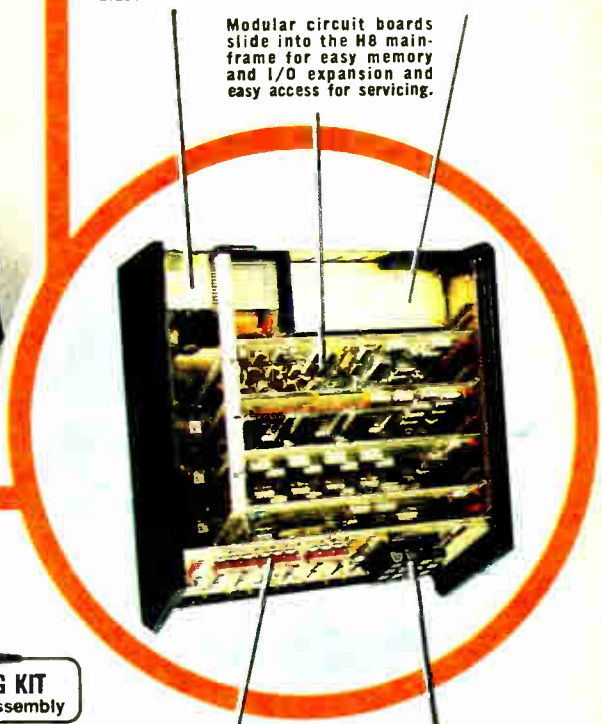
Two-port Serial I/O lets you communicate with H-14 Line Printer or any serial peripheral. **H88-3,** Shpg. wt. 2 lbs. **85.00**

Floppy Disk System, drive and interface for H88 Computer. 102K bytes. **H88-4,** Shpg. wt. 22 lbs. **490.00**

Audio Cassette Interface. Communicate with mass storage cassette recorder/player. Included in H88 and H89. **H88-5,** 2 lbs. **95.00**

Heathkit H8 Personal Computer with "plug-in" flexibility





8080A-based, with front panel keyboard, digital readout and 7 plug-in board positions

SAVE $110
Was $399.00
Now
$289.00 Kit
Requires at least one H8-1 Memory Board to operate

- Built-in extended ROM monitor controls front panel program
- Heavy-duty power supply handles to 65K memory
- Exclusive Heath 50 line fully-buffered bus has 7 plug-in board positions for memory and I/O's
- Built-in speaker provides audible feedback for keyboard entry
- Convection cooled power supply — no fan needed

6 EVENING KIT
Fast, Easy Assembly

HEATHKIT ELECTRONIC CENTER charg-a-kit REVOLVING CHARGE

The computer that grows as you grow. The Heathkit H8 Computer gives you the flexibility to configure your computer just the way you want it. 7 plug-in board positions let you put together any combination of memory and I/O's. The low initial cost, along with add-on flexibility won't strain your budget either. It's the ideal choice for both the novice and the advanced computerite.

The H8, with the addition of 4K of memory, makes an ideal computer trainer. Its 16-key front panel keyboard provides octal data entry and gives you direct access to registers and memory, one-button program load and dump, and input/output keys for direct communication with any port. Its 9-digit octal readout provides far more information than conventional computers — memory, registers and I/O port displays are updated even while programs are running for direct monitoring of program activity.

With the addition of more memory, peripherals and interfaces, the H8 can become even more powerful and versatile, allowing you to write highly sophisticated and practical programs. And because the H8 is based on the world-famous 8080A CPU, the amount of existing software (programs) from both Heath and other sources makes it one of the most immediately practical computers you can own.

Optional floppy disk system gives you vast storage capacity and instant access to data and programs. You'll be able to load programs and update files instantly. See the following pages for complete descriptions of H8 peripherals, accessories, and H17 Floppy Disk System.

The H8's optional software is supplied in 1200 baud audio cassette form to get you up and running fast. Benton Harbor BASIC, HASL-8 2-pass absolute assembler, TED-8 line-oriented text editor, and BUG-8 terminal console debug program let you begin communicating with the H8 right away. See next page for a run-down of this powerful software plus new Microsoft™ BASIC.

Other features of the H8 include: exclusive Heath-designed 50-pin fully buffered bus; built-in convection cooled power supply; built-in speaker for audible feedback and special effects; front panel status lights and more. The CPU board is fully wired and tested for easy system setup and kit assembly. It features the 8080A chip, clock, systems controller, ROM monitor and full bus buffering. Seven vectored interrupts are available for quick response to I/O requests.

The H8 is housed in a heavy-duty metal cabinet with modern, high-impact structural foam side panels 6½" H x 16¼" W x 17" D. Switch-selected 120/240 VAC, 50/60 Hz. Requires at least one H8-1 memory board to operate.

Kit H8, Shpg. wt. 31 lbs. ..... **Was $399.00, Now 289.00**

Factory Assembled and Tested H8.
WH8, Shpg. wt. 30 lbs. **349.00**

NOTE: To specify a complete computer system using the H8, you will need both memory and interface accessory cards. The type and number of memory and interface accessories that you need for the H8 will be determined by your particular applications. The memory and I/O accessories are offered separately so you have complete freedom to assemble the system that meets your specific computing needs.

Save on selected memory and interfacing for the H8

16K Wired Memory Board for H8:
Lets you expand your H8 to the full capacity of the 8080A CPU. Features low power consumption for cool operation, DIP switch for address setting without 450 nS access time. Fully assembled and tested.
WH8-16, Shpg. wt. 2 lbs. **395.00**

8K Memory Board:
8Kx8 card supplied with 4K memory. Plugs directly into H8 bus. Features maximum storage capacity of 8192 8-bit words. Access time, less than 450 nS. With on-board regulators, heat sinks and full buffering. Expandable to 8K with H8-3.
Kit H8-1, Shpg. wt. 2 lbs. ..... **Was $135.00, Now 95.00**

Chip Set for H8-1:
Kit of eight static memory IC's (4K). Expands H8-1 to full 8K storage. With sockets.
Kit H8-3, Shpg. wt. 1 lb. ..... **Was $90.00, Now 65.00**

Assembled and Tested 8K Memory Board:
Combination of H8-1 plus H8-3. Access time is better than 450 nS.
WH8-8, Shpg. wt. 2 lbs. ..... **Was $265.00, Now 175.00**

Parallel Interface:
Connects H8 computer to any parallel device such as a paper tape reader/punch. Three parallel ports. Compatible with all Heath software.
Kit H8-2, Shpg. wt. 3 lbs. **150.00**

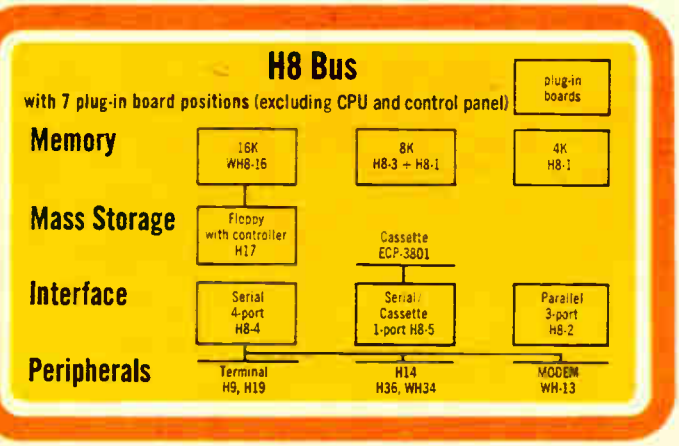
Four Port Serial Interface:
Required to interface H8 computer to H14 line printer. Has four serial I/O ports, all supporting standard RS-232-C interface including MODEM controls. One port is switch programmable. Includes one DH8-41 cable for connection to H14.
Kit H8-4, Shpg. wt. 2 lbs. **150.00**
Factory Assembled and Tested Version of Above.
WH8-4, Shpg. wt. 3 lbs. **250.00**

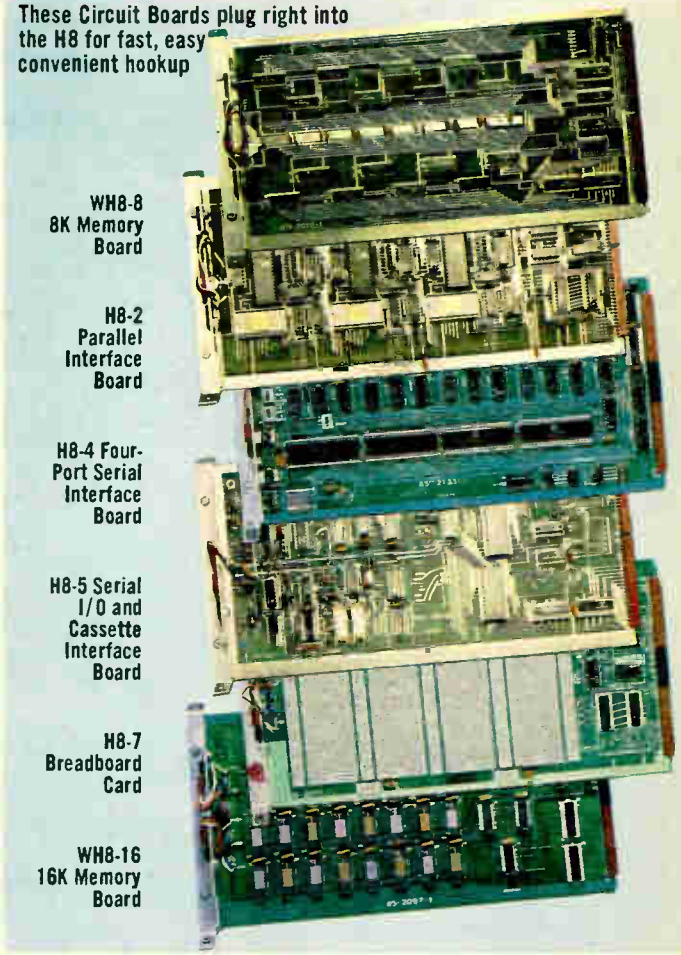
Adapter Cable for use with H8-4:
Provides EIA industry-standard electrical and mechanical interface between H8-4 and other peripherals. Factory assembled and tested.
WH8-41, Shpg. wt. 1 lb. **15.00**

Serial I/O and Cassette Interface:
Connects the H8 to serial devices such as the H9 video terminal (page 40) or the H36 DEC writer II (page 41). Data rate from 110-9600.
Kit H8-5, Shpg. wt. 3 lbs. ..... **Was $140.00, Now 95.00**
Factory assembled and tested version of above.
WH8-5, Shpg. wt. 2 lbs. ..... **Was $160.00, Now 120.00**

Adapter Cable for use with H8-5:
Provides EIA industry-standard electrical and mechanical interface between H8-5 and other peripherals. For use with H8 computer. Factory assembled and tested.
WH8-51, Shpg. wt. 1 lb. **15.00**

Circuit Design Breadboard Card:
Lets you custom design your own analog or digital circuits. Make additional interfacing or create your own memory boards. Uses solderless breadboard area. 5 VDC power supply for logic circuits is provided on the board.
Kit H8-7, Shpg. wt. 2 lbs. **90.00**





Save up to $129.00 on complete systems

HKS81 Hobbyist System
includes:
- H8 Computer
- H8-5 Serial I/O and Cassette Interface
- H8-1 8K Memory Board
- H8-3 4K Chip Set
- H9 CRT Terminal
- ECP-3801 Audio Cassette Recorder
- H8-18 Cassette Software

Purchased separately: $1123.00
Purchased together. $995.00
You save $128.00
HKS81, Shpg. wt. 94 lbs. . . . **$995.00**

HKS82 Advanced System
includes:
- H8 Computer
- H8-4 Four Port Serial I/O
- WH8-16 16K Memory
- H17 Floppy Disk
- H19 CRT Terminal
- H8-17 HDOS Software

Purchased separately: $2124.00
Purchased together: $1995.00
You save $129.00
HKS82, Shpg. wt. 143 lbs. . . **$1995.00**

Examine manuals before you buy.

Here's your chance to look before you buy, and with no risk! Manual set includes complete assembly and operations manuals for the H8, H8-1, H8-2, H8-3, H8-5, H19 and latest software. Deduct price of manual set when you buy H8.
HM800, Shpg. wt. 11 lbs. **25.00**
NOTE: Individual product manuals are included with each kit.

Floppy Disk Storage for instant data access with the H8

SAVE $100

Shown with optional second drive

Add floppy disk storage to your H8 Computer and get instant access to programs and data. Enjoy the full capability of your H8 Computer.

Vast storage. Instant access. Easy loading. You get it all with the H17 Floppy Disk

The H17 floppy disk system gives you the storage and programming capacity you need to load programs instantly. You can store hundreds of programs on a single disk and have immediate access to any one of them anytime you need it. And you can update your data instantly. Floppy disk storage is far more versatile and reliable than paper tape or cassette storage systems; it truly makes the H8 a "total versatility" computer system.

Designed exclusively for use with the H8, the H17 has been "systems" engineered to deliver a fully assembled package including: a disk drive, and interface disk/controller circuit board, and built in power supply. The controller circuit board plugs directly into the H8's mainframe and with the addition of the optional second drive you'll have optimum dual-drive versatility. Because the H17 is designed especially for the H8 Computer, you get a harmonious system that interfaces properly and runs smoothly.

The storage media for the H17 is the standard, hard-sectored 40-track diskette. Measuring just 5.25" in diameter, each disk offers access to better than 102K bytes of available program and data storage area. Disks are easy to handle and easy to load.

The drive system used in the H17 is the famous WANGCO Model 82, a performance-proven drive providing accurate high-speed data access. Specifications of this drive include a conservative 30 mS maximum track-step time and typical random sector access times of less than 250 mS. These figures are considerably better than most equivalent competitive drives.

The WANGCO 82 drive system is supplied fully assembled and tested. It's backed by extremely reliable mechanical and electrical operation. To use the H17 effectively with the H8 computer requires at least 16K of RAM for the H8 and H8-17 operating systems software, sold separately below. The H17 includes a single blank diskette.

Add the H17 Floppy Disk System to your H8 Computer and enjoy the full capability of your computer. Take advantage of all the practical and fun programs available to you.

Kit H17, Shpg. wt. 28 lbs. ..... **Was $595.00, Now 495.00**

WH17, Factory assembled and tested. Shpg. wt. 25 lbs. **550.00**

Optional Second Drive. Adds dual-drive versatility to H17 for a total of over 204K bytes of available program and data storage area.

H17-1, Shpg. wt. 5 lbs. **315.00**

Package of 5 Blank Diskettes.
H17-2, Shpg. wt. 1 lb. ..... **each 25.00**

H17 SPECIFICATIONS: Storage Media: 5.25" hard-sectored 40-track diskette. **Drive Type:** WANGCO Model 82. **Track Seek Time:** 30 ms maximum. **Random Sector Access Time:** Less than 250 milliseconds. **Power Requirement:** 120/240 VAC, 50/60 Hz. 75 watts. **Dimensions:** 6.25" H x 13.5" W x 13.5" D.

Kit with single drive

$495.00

Rugged fully assembled WANGCO model 82 disk drive offers total reliability for years of trouble-free service.

The H17 includes the Interface/ Disk Controller Circuit Board — an extra cost option with most other units.

Operating Software for H17 Floppy gets you up and running fast

Get your floppy system up and running fast with specially designed systems software. It's loaded with convenience features.

The Operating Systems Software for the H17 Floppy Disk System includes a diskette containing the standard H8 software. Includes extended Benton Harbor BASIC; a 2-pass absolute assembler; a text editor to prepare source code for BASIC and other languages; a console debugger for easy debugging of user machine language programs; and a full set of disk utility programs for convenient file manipulation.

Special features of this operating software include Dynamic File Allocation which automatically keeps free space available to permit unlimited file size and prevent squeezing of disks. Special facilities support running and backup of single-drive configurations to permit copying and transferring between disks even with a single-drive system.

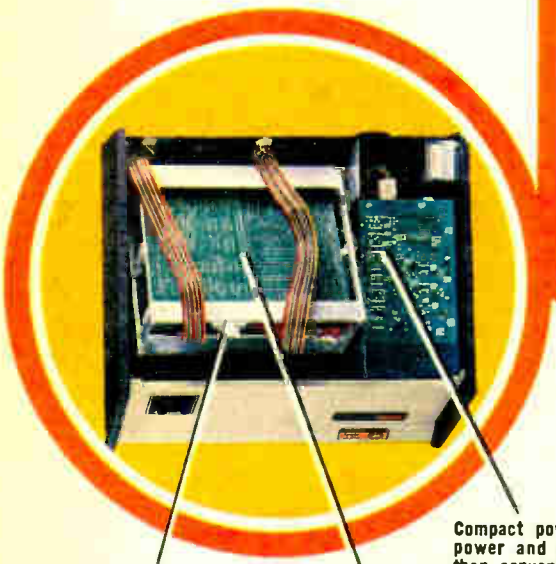
Device independence permits direct communication between any program and any device. A file utility program allows two kinds of wild cards for fast, easy bulk manipulation of files. The software is supplied on a standard diskette.

H8-17 Operating Software helps you get the most from your H17 Floppy Disk System and from your H8 Computer.

H8-17, Shpg. wt. 14 lbs. **100.00**

Most powerful Heathkit Computer for the advanced computerite

- 16-bit power
- DEC® KD11-HA CPU
- Plug-in flexibility
- DEC PDP-11/03 Compatible
- Up to 60K bytes memory



Rugged steel chassis and extra-thick backplane with heavy, solid connectors for added strength and years of reliable performance.

Compact power supply uses less power and generates less heat than conventional supplies. Overvoltage and overcurrent/short circuit protection, along with automatic power-up and power-down sequencing, give you long life operation of your system.

Card cage with backplane accommodates up to seven accessory cards in addition to LSI-11/2. The card cage swings up for easy access even while the H11A is operating. Accessory boards slide directly into card guides with all connectors supplied.

H11A Computer runs your most complex programs efficiently

$1195.00 Kit

The H11A gives you all the power speed and flexibility you'll ever need in a microcomputer. It uses the same powerful microprocessor and runs all software designed for the DEC® PDP-11/03. You can choose from scores of practical programs to run your home more efficiently, to reduce the clerical costs of your business and to process all types of data. If you've been around computers awhile and the complexity of your programs requires extra power, the H11A Computer is designed for you.

New Half-size LSI-11/2

The H11A features the new, smaller KD11-HA microcomputer (LSI-11/2). That makes the H11A identical to the DEC PDP-11/03, but at a fraction of the cost. The smaller-size CPU leaves more space for computing power or I/O's.

7 plug-in slots

The H11A gives you the flexibility to configure exactly the system you require. Seven plug-in slots let you add any combination of I/O's and a maximum of 60K bytes memory. The basic H11A Computer is supplied with handsome cabinet, heavy duty power supply, backplane that includes bus and fully assembled CPU board. To the mainframe you add your selection of optional memory and I/O's accessories (see page 38). Complete systems software is optionally available in paper tape or floppy disk form (see page 43).

Learn by building

What better way to know your computer than by building it yourself. Like all Heath electronic kits, the H11A comes with easy-to-follow assembly manual and a nationwide network of service centers to help you should a problem arise. And when you build it yourself, you can also perform more of the service steps yourself to keep it in top operating form.

Value priced

Compare the price of the H11A with comparable 16-bit computers. The combination of advanced design and quality components make it one of the best 16-bit values anywhere.

Kit H11A, Shpg. wt. 43 lbs. **1195.00**

WH11A, Factory Assembled and Tested version of above.
Shpg. wt. 43 lbs. **1895.00**

Fully Assembled and Tested KD11-HA Circuit Board

The "heart" of the new H11A is the 16-bit microcomputer module, the KD11-HA. It's only half the size of the LSI-11 (KD-11F), but gives you more flexibility when you configure your system.

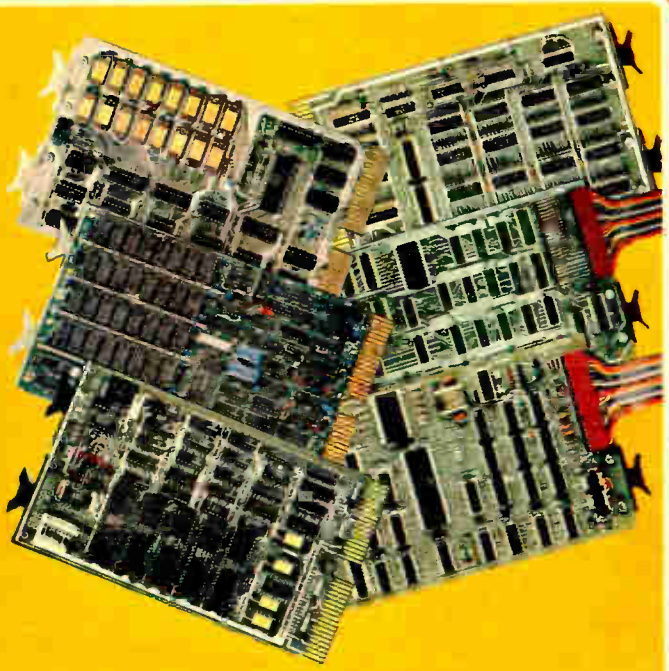
There is no on-board memory so you can match your RAM/ROM requirements to your particular needs. And full compatibility with the LSI-11 family means you can "mix or match" by combining components from both LSI-11 and LSI-11/2 families.

Features of the KD11-HA include: PDP-11/34 instruction set, raw computer speed of 380 nS microcycle time, resident firmware debugging (DDT) and ASCII console routines, and single and double operand instructions. The LSI-11/2 gives you the power and flexibility you need for virtually ANY system configuration you want!

DEC, DIGITAL and PDP are registered trademarks of Digital Equipment Corporation.

SPECIFICATIONS: Central Processing Unit: Uses DEC KD11-HA CPU. **Word Length:** 16 bits. **Instruction Set:** PDP-1103. **Memory:** Directly addresses 32 K. **I/O Addressed:** 28 K to 32 K. **RAM/ROM:** 0 to 28 K. **Backplane:** Eight 2-wide module slots. **Power Supply:** Overcurrent and overvoltage protected, switching regulator. Internal fan for cooling. **Inputs:** 120/240 VAC, 60/50 Hz, at 200 watts maximum. **Outputs:** +5 VDC at 15 amperes maximum and +12 VDC at 3 amperes maximum. **Cabinet Dimensions (overall):** 6½" H x 19" W x 17" D. (16.5 x 48.3 x 43.2 cm).

H11A accessories, memory boards and interfaces



Top to Bottom
16K Memory Board
32K Memory Board
KD11HA Microcomputer Board

Top to Bottom
4K Memory Board
Parallel Interface Board
Serial Interface Board

Look over the manuals before you buy. Complete manuals for H11A Computer, H11-1 4K Memory Board, H11-2 Parallel Interface, H11-5 Serial Interface, and H19 Terminal. Also software documentation. $25 is deducted on H11A purchase.

HM-1100 Manual Set, Shpg. wt. 12 lbs. **25.00**

Big Savings on 4K Memory Expansion Module. Plugs into H11A or H11 backplane, adds 4K x 16-bit word capacity to memory. Uses high-reliability 1K x 4 static MOS RAM chips. Access time is less than 500 nS. Has decode circuitry for operation on 4K address boundaries. Handle for easy removal and insertion.

Kit H11-1, Shpg. wt. 2 lbs. ..... **Was $245.00, Now 135.00**

WH11-1, Assembled and Tested version of above.
Shpg. wt. 2 lbs. ..... **Was $295.00, Now 160.00**

Parallel Interface. General-purpose parallel interface featuring 16 diode-clamped latched data input lines, 16 latched output lines, 16-bit word or 8-bit byte data transfers. Has LSI-11 bus interface and control logic for interrupt processing and vectored addressing; control status registers compatible with PDP-11 software routines. Maximum data transfer rate, 90K words per second under program control. Maximum drive capability, 25-ft. cable. Also compatible with TTL or DTL logic devices. The H11-2 is required to use H11A or H11 with the H10 Paper Tape Reader/Punch.

Kit H11-2, Shpg. wt. 2 lbs. **100.00**

WH11-2, Assembled and Tested version of above. Shpg. wt. 1 lb. **160.00**

Serial Interface: Universal asynchronous receiver/transmitter serial interface module for use between LSI-11 bus and serial devices such as the Heathkit H9 video terminal (page 40) or H36 DEC Writer II (page 41). Has optically isolated 20 mA current loop or EIA interfaces, selectable baud rates of 50 to 9600. Plugs into H11 backplane, fully compatible with PDP 11/03 and other LSI-11 backplane machines. With all mating connectors.

Kit H11-5, Shpg. wt. 2 lbs. **115.00**

WH11-5, Assembled and Tested version of above. Shpg. wt. 1 lb. **160.00**

Adapter Cable for H11-5. Provides EIA industry standard electrical and mechanical interface between H11-5 and other computer peripherals. For use with H11 or H11A computers. Fully assembled and tested.

WH11-51, 1 lb. **15.00**

16K Memory Module. Provides 16K words dynamic MOS random access memory on a 5x8½" board. Has on-board refresh, 570 nS cycle time and 250 nS access time. Fully assembled and tested. Max. memory capacity of H11A is 30K words.

WHA11-16, Shpg. wt. 2 lbs. **480.00**

32K Memory Module. Provides 32K words dynamic MOS random access memory. Specifications same as WHA11-16. Fully assembled and tested. Max. memory capacity of H11A is 30K words.

WHA11-32, Shpg. wt. 2 lbs. **995.00**

H11-6 Extended Arithmetic Chip: Adds powerful arithmetic instructions to the LSI-11, including fixed point multiply, divide and extended shifts plus full floating point add, subtract, multiply and divide. Helps minimize arithmetic sub-routines, speeds up program execution and development. Saves memory space too. 40-pin dual-inline package IC plugs into socket on H11A or H11 board.

H11-6, Shpg. wt. 1 lb. **165.00**

Join DECUS, get more from your computer

H11A and WH11A Owners are eligible for membership in the Digital Equipment Computer User's Society (DECUS). This organization provides useful symposia, newsletters, program library and other useful information to help you get the most from your LSI-11 computer.

CUSTOMER SOFTWARE SUBLICENSE GRANT

HEATH COMPANY ("HEATH") for itself and on behalf of the licensors listed below (referred to individually or together as "LICENSOR") grants to CUSTOMER a non-transferable and non-exclusive sublicense to use the software programs (referred to individually or together as "SOFTWARE") listed under the respective LICENSOR under the terms and conditions stated in this Sublicense Grant.

This form MUST accompany your SOFTWARE order for:

Digital Equipment Corporation

- ☐ **PTSP-11 Paper Tape System**
- ☐ **FOCAL/PTS Language Processor**
- ☐ **BASIC/PTS Language Processor**
- ☐ **HT-11 Operating System with BASIC**
- ☐ **HT-11-1 FORTRAN**

Retail Sciences, Inc. (RSI) — for use ONLY with Heath Model H8

- ☐ **H8-32 General Ledger**
- ☐ **H8-30 Accounts Receivable**
- ☐ **H8-31 Accounts Payable**
- ☐ **H8-33 Payroll**
- ☐ **H8-34 Inventory**

Check box for each software program purchased with this order only. Sign and send to HEATH another sublicense grant form with future SOFTWARE orders. Write in the blank your CPU make, model and serial number:

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(Fill in blank)

(If CPU is purchased with this order, HEATH will fill in the blank.)

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HEATH COMPANY
By William E. Johnson

CUSTOMER
By _____
Customer's Signature

Dual-Drive Floppy Disk Storage for H11A Computer

Get fast access to programs and data with DEC compatible floppy and 512K total capacity

$1945.00 Kit

Designed especially for the H11A Computer, the H27 Floppy System gives you dual-drive convenience: one drive for your operating system disk, one drive for your program disk. You get instant access to programs and data, and vast storage capacity — so your computer can serve you better.

The WH27 includes the interface/controller (and a bootstrap program) on a single-circuit card at no extra charge.

Now enjoy instant access to programs and data

- **Z80 Microprocessor-based Controller**
- **Full Compatibility with DEC RXD1® (PDP-11/03)**
- **Head Step Time of 6 mS**
- **Dual-drive for a total capacity of 512K bytes**

You get full compatibility with DEC® RXV11® (PDP-11/03 hardware and software) to give you the capability of using the hundreds of applications programs written by users of the DEC PDP-11/03, the world's most popular microcomputer. Performance-proven hardware and software base provides outstanding computing power.

Dual-drive versatility with a total of 512K bytes of program and data storage space gives you enough room for most all general-purpose application needs. And the Z80 micro-controller in the WH27 provides average access time of 252 mS. You'll have virtually immediate access to all your files and programs.

The H27, while maintaining full compatibility with the RX01 system, also gives you some special features you won't find on other RX01 systems:

1. A built-in self-test diagnostic on power-up that protects existing programs on your disks.
2. A mechanical interlock that prevents accidental media damage. (If floppy is not seated properly, the door will not close and the H27 will not operate.)
3. A write-protect function that protects important files and programs from being written over inadvertently.
4. A reformatting procedure that gives you the capability of writing in IBM 3740 standard format.

A single board interface/bootstrap uses one backplane slot leaving more space for memory and I/O devices. 8" H x 18" W x 20" D. For 100-135 or 200-270 V, 60 Hz AC.

The Operating System Software for the H27 (HT-11) described below requires at least 16K words of memory to use its full capabilities.

Kit H27, Shpg. wt. 93 lbs. **1945.00**

WH27 Dual-Drive Floppy Disk. Fully assembled and tested. Shpg. wt. 69 lbs. Motor Freight. **2595.00**

H27-2, Pkg. of 5 Blank Disks. IBM 3740 format. Shpg. wt. 2 lbs. **30.00**

Operating Systems Software for the H27 gets your floppy system operating quickly and efficiently

The HT-11 Systems Software lets you immediately enjoy the full benefits of a rapid access floppy disk system.

The HT-11 Operating system is a single-user, single task system for interactive program development and on-line applications for the H11 or H11A computers. Features of the HT-11 include: easy operation with NO system generation procedure; contiguous file structure for easy file manipulation; device-independent I/O programming; real-time interrupt capabilities to handle synchronous, asynchronous and event-driven I/O; low-overhead monitor with memory swapping functions for most efficient use of memory space. HT-11 Programs include:

EDIT — a text editor to create/modify files for programs and documentation.

EXPAND, ASMBLE and CREF — utilities for macro-expansion, assembly language processing and cross-reference listings. Supports several pseudo-operators in addition to the entire PDP-11 instruction set. Also offers the convenience of linkable object modules with global symbols.

LINKER — converts object modules produced by the assembler or the FORTRAN compiler into a run time format. Services include relocation of code; linking of global references and creation of a runable program file for use by the rest of the system. Allows any number of overlays in any number of memory areas, subject only to memory size. Also picks called modules automatically from system or user created libraries.

LIBRARIAN — creates and maintains libraries of subroutines for use by the linker.

PIP — the Peripheral Interchange Program is the file maintenance and transfer utility of the HT-11. It has commands for moving, copying and renaming files, plus other commonly used file operations.

ODT — On-line Debugging Technique aids in debugging user programs by providing commands to display and alter the state of a running program.

BASIC INTERPRETER — high-level conversational programming language. Offers access to the HT-11 I/O system and file structure through the BASIC language. Extensions to standard BASIC in this program include: variable-length strings, sequential files, "virtual memory" arrays, chaining and overlay capability, "desk calculator" mode for once-only calculations or to aid in debugging.

MISCELLANEOUS PROGRAMS — Dump program prints the contents of HT-11 files in any of several useful formats; SRCOM compares two files and prints a summary of their differences.

Minimum requirements for operation of the HT-11 include a Heathkit H11 or H11A computer with at least 16K words of main memory, a console terminal and interface, and a Heathkit floppy disk drive, controller and interface.

***HT-11 Operating System with BASIC.** Shpg. wt. 12 lbs. **350.00**

FORTRAN for HT-11 System. Binary software features complete ANSI standard 1966 FORTRAN IV with extensions for increased speed. Some of the extensions include: relaxation of statement ordering, use of expressions nearly anywhere, direct access I/O, TYPE, ACCEPT and PRINT I/O statements, ENCODE and DECODE statements, END and ERR parameters, random number generator, IMPLICIT statement, more.

***HT-11-1,** Shpg. wt. 9 lbs. **250.00**

*NOTE: The HT-11 Disk Operating System and HT-11-1 FORTRAN are compatible only with the Heath H27 or WH27 Floppy Disk Systems. To obtain this software, the Customer Software Sublicense Grant must be signed and you must include the make, model and serial number of your CPU in the blank provided on page 38.

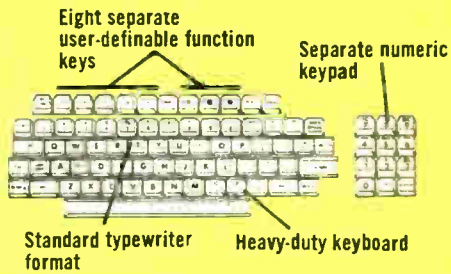
Introducing the Smart Video Terminal with professional keyboard and super-sharp display

NEW

$695.00 Kit

- Z80 microprocessor-based for fast, efficient data handling
- Full professional keyboard in familiar typewriter format
- Extremely wide bandwidth monitor for easy-to-read images
- Prints the complete ASCII set including upper and lower case characters, plus special graphic symbols

Look at these professional features



Powerful new Heathkit H19 microprocessor-based "Smart" Video Terminal

The H19 Video Terminal is a top-of-the-line general-purpose peripheral designed for use with the Heathkit H8 and H11A computers or with any EIA RS-232 Standard interface. Its powerful Z80 microprocessor makes it ideal for a variety of high-speed data handling tasks.

The familiar typewriter format enables you to start right in programming from the keyboard. The terminal's 32 separate functions can be controlled from keyboard or computer. A special 12-key numeric pad in calculator format lets you make fast, easy entry of arithmetic programs.

Baud rates of up to 19,200 are keyboard selectable for easy changes. Eight user-definable keys let you program your own special functions. The H19 prints the entire ASCII character set, including upper and lower case letters. The print format is 24 lines by 80 characters (with software controlled 25th line). Addressable blinking cursor lets you make corrections or edit anywhere on the screen. Reverse video lets you emphasize any portion of the screen by reversing white on black.

The big 12" diagonal CRT has outstanding resolution for a bright, clear readout. The terminal also displays 33 different graphic characters that can be arranged for a variety of graphic displays and effects.

Compact structural foam cabinet withstands the rigors of daily use. A removable top gives you quick access to circuitry for easy servicing. Convection cooled power supply assures quiet, fan-free operation.

Kit H19, Shpg. wt. 54 lbs. **695.00**

Factory Assembled and Tested Version of above.
WH19, Shpg. wt. 40 lbs. **995.00**

H19 SPECIFICATIONS: CRT: 12" Diagonal, P4 phosphor. **Display Size:** 6½" high x 8½" wide. **Character Size:** 0.2" high x 0.1" wide (approx.). **Character Set:** 128 characters (95 ASCII and 33 graphic). **Character Type:** 5x7 dot matrix (upper case), 5x9 dot matrix (lower case with descenders). **Keyboard:** 80 keys (60 alphanumeric, 12 function) plus a 12-key numeric pad. **Cursor:** Blinking, non-destructive underline. **Cursor Controls:** Up, down, left, right, home, CR, LF and tab. **Cursor Addressing:** relative and direct, **Tab:** standard 8-column tab. **Refresh Rate:** 60 Hz. **Erase Functions:** erase page, erase to end of line, erase to end of page. **Scroll:** auto or line/page freeze. **Bell:** audible alarm on receipt of control G. **Video:** normal and reverse using an escape sequence. **Interface:** EIA RS-232C at 110 to 19,200 baud. **Communications Mode:** full or half duplex. **Parity:** even, odd, stick or none. **Operating Temperature:** 0-40°C ambient. **Power Requirements:** 120/240 VAC, 60/50 Hz, 45 watts. **Dimensions:** 13" H x 17" W x 20" D. **Net Weight:** 45 lbs.

Bright 12" CRT displays twelve 80-character lines

$499.00

SAVE $81.00
Was $580.00

H9 CRT Video Terminal and Keyboard

For use with the Heathkit H8 or H11A computers. Has long-form display of twelve 80-character lines, short form display of forty-eight 20-character lines in four columns. Has auto-scrolling, plot and erase modes, automatic line carryover, cursor and built-in speaker. The serial interface provides EIA-RS-232C levels, 20 mA current loop and TTL levels. Parallel interfacing includes TTL levels, 8 bits input, 8 bits output and 4 handshaking lines. With fully assembled PC control board. 12½" H x 15⅝" W x 20¾" D. For 120/240 VAC, 60/50 Hz.

Kit H9, Shpg. wt. 50 lbs. **Was $580, Now only 499.00**

Adapter Cable for H9. Provides EIA industry standard electrical and mechanical interface between H9 and other devices. **WH9-1,** Shpg. wt. 1 lb. **15.00**

Assembled Cassette Recorder/Player

Ideal for data storage

$60.00

Has volume and tone controls, pushbuttons for record, play, rewind, fast forward, stop and eject, built-in 3 digit counter with reset button. Factory wired, not a kit. **ECP-3801,** Shpg. wt. 4 lbs. **60.00**

Heath recommended high output, low noise, premium grade audio recording tape. Pack of three 30-minute blank cassettes. **ECP-3802,** Shpg. wt. 1 lb. **per pack 6.00**

Printers: from low-cost matrix to letter quality font

Popular LA36 DEC Writer II Provides Sharp, Clear "Hard Copy" Printout

Compare our low price

$1550.00

Fully Assembled! Prepaid Shipment!

The H36 is an advanced technology teleprinter offering fast, reliable operation at one of the best price/performance ratios in the industry. It features a 7x7 dot matrix print head for crisp, clear character formation; switch selectable 10, 15 and 30 cps printing speeds; variable width forms handling from 3" to 14⅞" wide; adjustable left and right hand tractors half or full duplex operation; ANSI-standard multi-key rollover and a typewriter-like keyboard. It prints 10 characters per inch horizontal spacing and 6 lines per inch vertical spacing. Compatible with all Heathkit Computers, as well as most others. With connecting cable and integral stand. Overall size, 33¼" H x 27½" W x 24" D.

The H36 (LA36 DEC WRITER II) is shipped Motor Freight, prepaid to your nearest terminal in the Continental U.S.
H36 DEC Writer II, For 120 VAC, 60 Hz **1550.00**

H36-1 Fan-fold Paper for H36. Standard 14⅞" x 11" white and green, single-part, lined paper. 3200 sheets per carton. **H36-1,** Shpg. wt. 47 lbs. **35.00**

H36-2 EIA Interface. Provides EIA RS232-C Interface for LA36, 9-ft. cable with 25-pin data-set type connector.
H36-2, Shpg. wt. 1 lb. **70.00**

H36-3 Acoustic Coupler. Provides hookup to phone lines for time-sharing. **Kit H36-3,** 10 lbs. **260.00**
H36-4, Ribbon Accessory, Shpg. wt. 7 lbs. **15.00**

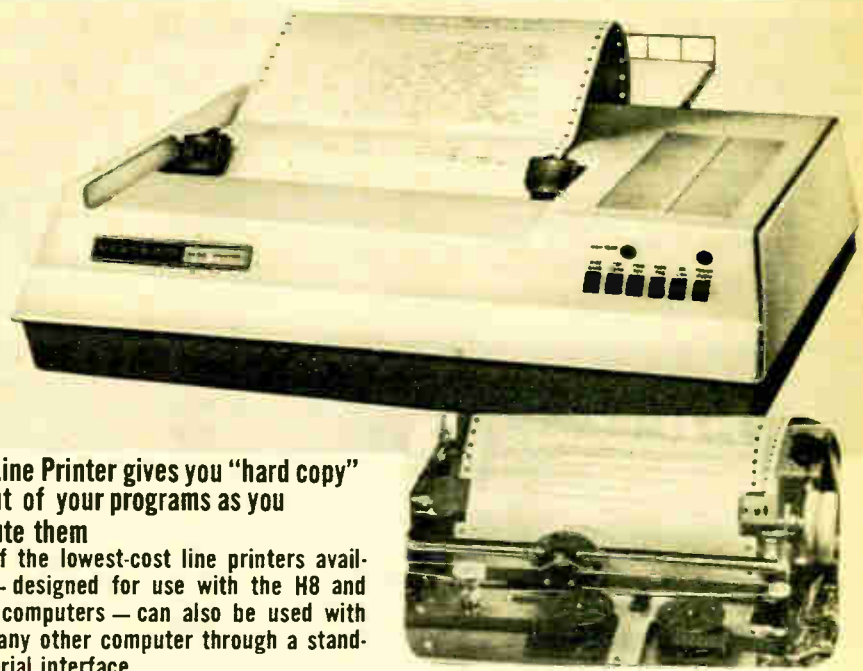
DEC is a registered trademark of Digital Equipment Corporation.

Compact, Versatile DEC Desktop Computer Teleprinter

Comes complete with cable, ribbon, and roll paper holder.

Desktop teleprinter prints the full 128 character ASCII set with switch selectable 110 and 300 baud rates. Offers true 30 cps print speed, adjustable character widths, adjustable line spacing, clear printing thru a 9x7 dot matrix head. Designed like a standard typewriter for operator ease and convenience, the LA34 features standard sculptured keyboard, cartridge ribbon change, friction feed and more. Includes EIA RS232C standard interface, cable, ribbon and roll paper holder. 7" H x 22" W x 15½" D. For 120 VAC, 60 Hz.

WH34 DEC Writer IV, Fully Assembled and Tested.
Shpg. wt. 30 lbs. **1295.00**
WHA-34-1, 3 ribbon cartridges. Wt. 7 lbs. **30.00**
WHA-34-2, Tractor feed accessory. Wt. 9 lbs. **120.00**



H14 Line Printer gives you "hard copy" output of your programs as you execute them

One of the lowest-cost line printers available — designed for use with the H8 and H11A computers — can also be used with most any other computer through a standard serial interface

The H14 is a versatile, **low-cost** microprocessor-controlled line printer designed to give you a "hard-copy" permanent printout of your computer programming. These copies provide added convenience in reading, editing, debugging and modifying your programs. It also provides handy printed copies of lists or other programming data you need for your hobby or business computer applications.

The H14 prints the standard 96-character ASCII set (upper and lower case) on a 5x7 dot matrix print head. The impact printer uses readily available 0.5" wide nylon inked ribbon on 2" diameter spools. Maximum instantaneous print speed is 165 characters per second with a selectable line length of 80, 96 or 132 characters. Line spacing is 6 lines per inch with 8 lines per inch software selectable. Baud rates are selectable from 110-4800. The adjustable width sprocket feed allows the use of edge-punched fanfold paper forms from 2.5" to 9.5" wide with a maximum thickness of 0.006".

The H14 connects to the H8 or H11A computer by the use of a standard (RS-232C) serial interface or 20 mA current loop. Handshaking is provided by a busy control signal. A 25-pin male EIA connector is provided for easy and convenient hookup. A convenient paper rack to keep printer output handy and organized is included.

The Heath H14 Line Printer is designed for use with the H8 and H11A, but it's ideal for use with any computer system where hard copy output is required and where the need is intermittent, rather than continuous, such as in small businesses or teaching applications. The low cost of the H14 belies the performance and versatility inherent in its microprocessor-based design. Top quality components and modern styling, along with ease of operation, make the H14 an outstanding value.

A rugged, two-part cabinet houses the H14. The ABS molded top can be easily removed to gain access to the mechanical and electronic components. Data is collected in a chrome-wire paper rack. Non-skid feet keep the H14 in place.

The H14 is designed for years of reliable trouble-free service. It is supplied in kit form or fully assembled and factory tested. 18⅓" W x 4⅘" H x 14⅓" D. For 100-135, 200-270 VAC, 50-60 Hz. Requires H8-17, H8-18 or HC8-14 software for H8; HT-11 or H11-18 software for H11 or H11A.
Kit H14, Shpg. wt. 33 lbs. **675.00**

WH14, Assembled version of above.
Shpg. wt. 27 lbs. **895.00**

H14-1, 3200 sheets 9½" x 11" Fan-Fold Paper for use with H14. 31 lbs. **32.00**

H14 SPECIFICATIONS: Printing Speed: Initial time per full line is approximately 1.75 seconds on 60 Hz power line and 2.1 seconds on 50 Hz power line. Print head temperature is monitored after each line and then limited by slowing the printing. The maximum throughput is determined by print density and ambient temperature. The maximum instantaneous printing rate is 165 c.p.s. **Characters:** 5 x 7 dot matrix, 96 character ASCII. Upper and lower case. Impact prints 0.11" high characters. **Format:** 6 or 8 lines per inch vertical. 10 characters/inch (80 columns). 12 characters/inch (96 columns). 16.5 characters/inch (132 columns). 10 and 16.5 characters/inch are both hardware and software selectable. 12 characters/inch are software selectable only. **Forms Handling:** Sprocket feed with adjustable widths, 2.5"/sec slew rate. Edge-punched fanfolded forms, 2.5" to 9.5" wide, maximum thickness 0.006". Form depth selectable from 0.021" to 1365". **Ribbon System:** Standard typewriter ribbon with automatic ribbon reversing mechanism. **Panel Indicators:** Power on/off light (LED). Printhead temperature monitor (LED). **Operator Controls:** Power on/off. On line/off line. Reverse feed. Forward feed. Top of form. Wide characters. **Internal Controls:** 50/60 Hz operation. 110/220 volt operation. Self test mode. Baud rate selection (110, 150, 300, 600, 1200, 2400 and 4800).

H8 Software for business and pleasure

Operating software for H8 Computer and H17 Floppy Disk for total performance from your computer system

Operating software designed especially for the H8 Computer gets you ready for programming quickly and easily. Easy-to-use features include: automatic command completion to simplify typing and dynamic syntax checking to spot errors. You get: Benton Harbor BASIC, using simple English statements and algebraic equations; ASSEMBLY (HASL-8), a two-pass absolute assembler using letters, numbers and symbols to generate efficient machine language code; TEXT EDITOR (TED-8) to convert your computer and terminal into a powerful typewriter for hard copy; and CONSOLE DEBUGGER (BUG-8) for entry and debugging of user machine language programs. H8-18 Operating Software enables your H8 Computer to deliver all the performance you want from a computer.

H8-18, Shpg. wt. 11 lbs. **20.00**

The **Operating Systems Software for the H17 Floppy Disk System** includes a diskette containing the standard H8 software. This software includes extended Benton Harbor BASIC; a 2-pass absolute assembler; a text editor to prepare source code for BASIC and other languages; a console debugger for easy debugging of user machine language programs; and a full set of disk utility programs for convenient file manipulation. Special features of this operating software include Dynamic File Allocation which automatically keeps free space available to permit unlimited file size and prevent squeezing of disks. Device independence permits direct communication between any program and any device. The software is supplied on a standard diskette.

H8-17, Shpg. wt. 14 lbs. **100.00**

Easy-to-use BASIC makes programming simple and understandable, enables you to make more use of your computer

MICROSOFT™ BASIC: the most popular computer language. Microsoft BASIC is one of the most versatile languages for the personal computer. Scores of programs are written in this BASIC. It features the following capabilities: Direct access to CPU ports and memory locations (INP, OUT, PEEK, POKE); IF — THEN — ELSE control structure for more highly-structured programming; Powerful program edit and file management facilities; Powerful string processing functions including LEFTS, RIGHTS, MIDS, ASC, CHRS and concatenation; Automatic line numbering and renumbering; Double precision floating point number; PRINT USING for control of output formats; Error control via ON ERROR command: Variety of mathematical and logical functions as well. Requires H8-17 (above) and a minimum of 32K memory.

H8-21, Shpg. wt. 3 lbs. **100.00**

Extended Benton Harbor BASIC: super-fast BASIC. Extended Benton Harbor BASIC is an easy-to-learn, easy-to-use conversational language. It features two different types of data: numeric data with over six digits of accuracy and Boolean values which permit logical operations. It also features free format programs, enhanced expression and conditional statement facilities. It provides even faster operation and includes character strings, additional convenience commands and math functions, dynamic storage allocation, access to real time clock, keyboard interrupt processing, expanded error messages and recovery ability, LED display control and key pad support. Requires a minimum of 12K memory to run this BASIC. 16K is preferred for full use. Supports WH-14 line printer and WH8-4 Interface Board. Supplied in 1200 baud audio cassette format.

HC8-14, Shpg. wt. 2 lbs. **20.00**

New business accounting software reduces your clerical costs and gives you immediate access to your records

This total business accounting system, designed for the H8 Computer and H17 Floppy Disk System, can save you money in lots of ways. It can significantly reduce your clerical costs, save filing space and provide faster, more efficient data retrieval. Each package can run independent of the others and each is supplied to you on standard H17 diskettes. To run these packages you require MICROSOFT™ BASIC (described above) a dual-drive H17 Floppy Disk System (see page 36), and an H19 Video Terminal (see page 40).

The business accounting software described here will be available for delivery late 1979.

The **GENERAL LEDGER** package is the heart of the total accounting system. It keeps a detailed record of all financial transactions and generates the balance sheet and income statement to provide timely information on the financial status of your company. Produces departmental and summary income statements showing current and year-to-date amounts, percentages by category and, optionally, comparative data with last year's ledger. Accepts data from all other software systems described below. 150 accounts. 450 transactions.

H8-32, Shpg. wt. 5 lbs. **350.00**

The **ACCOUNTS RECEIVABLE** package is a complete invoice and monthly statement generating package that keeps track of the current and aged accounts receivable. The current status of any account is instantly available. Permits sales or dun messages to be printed on statements, facilitates posting of payments and justifies amounts due. Debits and Credits can be passed automatically to the General Ledger software above. 250 customers, 750 transactions.

H8-30, Shpg. wt. 5 lbs. **350.00**

The **ACCOUNTS PAYABLE** package keeps track of current and aged accounts payable and incorporates a check writing feature. Maintains complete vendor file with information on purchase order and discount items as well as active account status. Vouchers regular monthly notes and payments, summarizes year-to-date purchases, prepares checks, compiles management reports. Passes debits and credits automatically to General Ledger. 220 vendors, 450 transactions.

H8-31, Shpg. wt. 5 lbs. **350.00**

The **PAYROLL** package prepares the payroll for hourly, salaried and commissioned employees while accumulating the necessary information for tax reporting. Generates the monthly, quarterly and annual returns to be filed with local, state and federal governments, prepares employee's W2 plus withholding for up to 50 states and 20 cities. Can automatically write payroll checks. 225 employees.

H8-33, Shpg. wt. 5 lbs. **350.00**

The **INVENTORY** system package helps you achieve effective inventory control. Provides a data base for complete inventory records to be kept on-line, permits custom structuring of files and reports, lists inventory balance and breakdown of events leading to balance, displays inventory status of any item, orovides stock counting.

H8-34, Shpg. wt. 5 lbs. **350.00**

Have fun with exciting H8 computer games

BIORHYTHM

Plot your body's biorhythm. An accurate biorhythm chart helps you see the patterns to your physical, emotional and intellectual condition. You can predict days of high-performance and low-performance, know when to take on the world and when to stay in bed. Runs under extended BASIC and requires 16K RAM.

PA-82, Shpg. wt. 1 lb. **10.00**

SPACE WAR

This is perhaps the most popular computer game available. It allows you to guide, control and command the Starship Enterprise in its travels through the galaxy, fighting Klingons and solving problems. A truly challenging computer game. Requires 24K RAM.

PA-83, 1 lb. **10.00**

GAME SET #1

This software package lets you play 8 popular computer games. These games include Craps, Orbit, Tic Tac Toe, Nim, Hexapawn, Hangman, Hamrabi, and Derby. 8K RAM or more is required. These games will provide hours of entertainment for you and your family.

PA-84, 1 lb. **10.00**

NOTE: Above applications software is in 1200 baud audio cassette form.

Accessories for more efficient use of your computer

New computer work station organizes your system for maximum efficiency

- A comfortable, more efficient place to work
- Easy access to all system components
- Attractive addition to any office decor

$295.00

The new Computer Work Station organizes your computer system for easy access and reduced space. Walnut formica top is 60" x 30" and places I/O's at a comfortable height for seated operators. Lower shelving holds horizontal components. First shelf is 8¼" H x 15¼" W x 20" D. Second shelf is 7" H x 15¼" W x 20" D.

Rugged black steel legs and black sheet metal shelving is designed to last under daily use. Lockable casters make it easy to roll desk from place to place. The PD-11 Computer Work Station is a handsome addition to any office. It maximizes the comfort and efficiency of your operator.

PD-11, Shpg. wt. 95 lbs. Motor Freight FOB El Segundo, CA **295.00**

Learn more about your computer

Start your own book library with these titles.

Introduction to Microprocessors, Vol I. The basic microprocessor and how it works. **EDP-224** **8.50**

8080 Software Gourmet Guide and Cookbook. Interesting new ideas you can cook up on your 8080. **EDP-228** **10.95**

101 Basic Computer Games. New computer game ideas. Fun for the whole family. **EDP-237** **7.50**

PDP-11 Programming. How to program your PDP-11 and get the most from it. **EDP-239** **10.00**

BASIC Software Library, Vol. I. Business and recreational programs you can run on your computer. **EDP-240** **24.95**

BASIC Software Library, Vol. II. Special programs in engineering and statistics. **EDP-241** **24.95**

BASIC Software Library, Vol. III. Advanced business programs that can reduce clerical costs. **EDP-242** **39.95**

BASIC Software Library, Vol. IV. General purpose programs with scores of practical applications. **EDP-243** **9.95**

BASIC Software Library, Vol. V. Programs for the experimenter who enjoys learning. **EDP-251** **9.95**

6800 Microprocessor Applications Manual. The Motorola edition. In-depth information on 6800. **EDP-244** **25.00**

8080 Machine Language Programming for Beginners. Comprehensive guide to programming. **EDP-272** **7.95**

Getting Acquainted with Microcomputers. Basic guide to microcomputers and what they can do for you. **EDP-275** **8.95**

FORTRAN IV. High level programming. **EDP-279** **5.95**

Multi-function calculator for computer hobbyist

Designed especially for the computer hobbyist, this Texas Instruments Programmer/Calculator features fast conversions between octal, decimal, and hexadecimal number systems; logic operations (AND, OR EXCLUSIVE OR, SHIFT); versatile 3-key independent memory and 15 levels of parentheses for complex problems; convenient constant mode to simplify repetitive calculations; 8-digit LED display; rechargeable battery and AC adapter/charger. It's lightweight and ideal for any computer application. Fully assembled and factory tested. 5½" H x 3" W x 1¼" D.

PC-11, Shpg. wt. 2 lbs. **59.95**

Acoustic Modem for any phone

NEW

$195.00

- Connects computers via phone line
- Up to 30 cps

Cat Modem by Novation features selectable original and answer modes. LED display of unit status, and special acoustic self-testing. Compact. Powerful. Plugs directly into wall sockets. Data exchange occurs at any speed up to 30 characters per second, via standard EIA RS-232C. The ideal computer communications link. Many practical and fun applications. Fully assembled.

WH13, Shpg. wt. 3 lbs. **195.00**

HUG — Heath Users' Group Keeps You Up to Date With The Heathkit Personal Computing World

Heath User's Group

The Heath Users' Group puts you in contact with other Heath computer owners and keeps you up to date on Heath products. There's an informative magazine, a complete program library and exchange, new product information and hardware/software ideas. Membership in HUG is a useful way to get the maximum benefit from your Heathkit Computer System. Here's what you get:

- 1 year subscription to the quarterly magazine
- An attractive 3-ring binder to hold magazines, software documentation and other materials
- Program submission forms • Official Identification Card
- Access to the software library which now contains over 400 user-submitted H8 programs including special utility routines, computer aided instruction, financial packages, Amateur Radio applications programs and games. These programs are described in the software catalog which is a part of the initial HUG membership package.

Membership application information and details are included with your Heath computer, or by writing HUG Membership, Hilltop Rd., St. Joseph, Michigan 49085. H11 owners are also eligible for membership in DECUS, see page 38 for details.

One of the biggest advantages you have in owning a Heathkit Computer System is membership in HUG — a worldwide organization.

Learn the programming languages that help you get more from your computer.

Heathkit Self-Instruction Program for Assembly Language

$49.95

- Use the full capacity of your computer
- Execute programs faster
- Store more in less space

Assembly Language lets you do everything your computer is capable of doing. It's the most versatile, most powerful language you can use.

Assembly includes a memonic for every machine operation. There is no need for programmed memory, no time wasted interpreting. So programs run much faster.

Assembly makes more efficient use of memory. It stores in less space because codes are shorter, more explicit. The Heathkit Self-Instruction Program teaches you to program in Assembly. You learn at your own pace through a special 400-page text designed for self-study. An exercise workbook provides hands-on experience with programming exercises performed by you on your computer. You learn in a way that's fast, fun and thorough.

The Heathkit Program is designed for computers using the popular 8080/8085 microprocessor series and the Heathkit Z80 CPU. This includes the Heathkit H8, H88 and H89 Computers.

Upon completion of the Assembly Program, you will be able to write your own programs to serve your specific needs. And you'll be able to do it in the most flexible, most functional of all languages. The only limit to what you can do will be the capacity of your CPU. And you'll be closer to the "heart" of your computer, to the machine operations that actually perform the tasks that you require in your hobby or business.

Along with text and workbook, the Program also includes a special Reference Placard containing all 244 Assembly Instructions for easy reference. The other side of this placard contains the ASCII code chart. Passing the Program's final exam (70% or better) earns you 6 CEU's.

With Heathkit Programs, computer languages have never been easier or more fun.

Now's the time to learn the language that puts you in total command of your computer's full potential. Send today for the Heathkit Self-Instruction Program for Assembly Language.

EC-1108, Shpg. wt. 7 lbs. **49.95**

Heathkit Self-Instruction Program for BASIC Language

$39.95

- Easiest of all languages to write
- Now easiest of all to learn
- Hundreds of programs available in BASIC

More programs are written in BASIC than any other language. Because it uses English words, it's the easiest to learn and the easiest to write.

When you know BASIC, you can adapt and run hundreds of existing programs. You can exchange programs with others. You can write your own programs for your specific needs. With BASIC your computer can express algebraic terms and automatically perform I/O operations.

The Program covers all formats, commands, statements and procedures, plus special creative problem-solving tips you can use when writing your own programs.

In 14 easy-to-follow segments, you learn BASIC words, decision making, numbers, statements, functions, loops, lists and arrays, strings, programming techniques, programming tools, how to define and plan a program, how to format and write a program, and how to adapt existing programs. Each segment has its own objectives, text and review test. A special workbook provides programming instructions and experiments performed by you on your computer.

Also included are handy reference cards for Benton Harbor BASIC Statements, ASCII number codes, BASIC direct command statements and a reference chart for math and Boolean algebra operations. Three appendices provide descriptions and playing rules for computer blackjack, a summary of microprocessor number systems and codes, and an introduction to Benton Harbor BASIC and extended Benton Harbor BASIC.

While the BASIC Program is keyed to Heathkit computers, it is equally applicable to any computer system using BASIC. Passing the Program's final exam (70% or better) earns you a certificate of achievement and 3 CEU's.

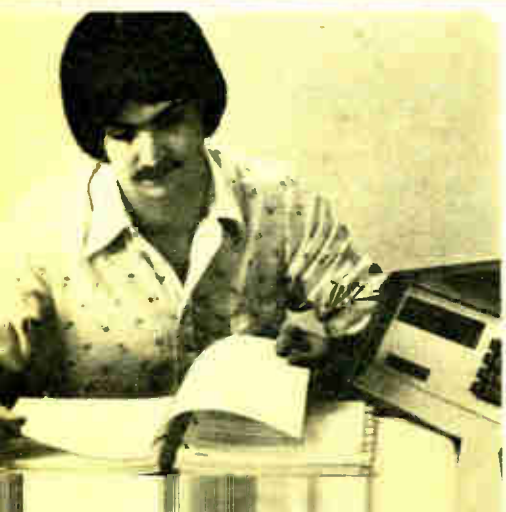
With Heathkit Programs, computer languages have never been easier or more fun.

Until you know BASIC, you're missing the full selection of programs available to you. Send today for the Heathkit Self-Instruction Program for BASIC Language.

EC-1100, Shpg. wt. 7 lbs. **39.95**

Money-back Guarantee

Programs on this page carry a complete refund of purchase price, if you're not satisfied.



Is your business ready for a computer? Here's an easy way to find out the answer.

Heath's new "Computer Concepts for Small Business" is designed to give you the information and understanding to intelligently evaluate the uses you can make of a computer in your business. Are the benefits worth the cost? Heath's new program helps you decide.

$49.95

Designed for the businessman who knows little or nothing about computers, Heath's new Computer Concepts for Small Business shows you how a computer can serve your business. The program covers:

The Computer and How It Works: Types of memory, types of storage media and I/O's and types of software. A detailed discussion of applications software covers the typical tasks a computer can perform for a small business.

The Data Processing Department and Personnel: Organization of a typical DP department, duties of personnel, advantages of permanent employees vs. free-lance people.

Alternatives in Computer Services: advantages of owning vs. time-sharing vs. service bureau, and the common problems of each.

How to Select a Computer: how to define your DP requirements, how to put together the right combination of hardware, peripherals and software.

The Program includes a 160-page text with 3 appendices and 3 cassettes. Completion of the final exam with a passing grade of 70% earns you 1 CEU. A computer is a big investment. Computer Concepts for Small Business is a small investment to acquire the understanding needed for an informed decision.

EC-1103, Shpg. wt. 5 lbs. **49.95**

Fill your home with big organ sound at a big dollar-saving price

Your family will love the "computerized" Heathkit/Thomas Troubadour Organ

- Microprocessor-based — one of the most realistic sounding organs you can buy!
- Preassembled sub-chassis for easy assembly
- Easy to play if you're a beginner, and truly enjoyable if you already play

SAVE $304.95
WAS $1799.95
Now only **$1495.00**

Imagine entertaining your family and friends with an organ you built yourself...and now at a savings you can't afford to pass up. The Troubadour Organ is Heath's easy-to-build version of the famous "computerized" Thomas Troubadour. In fact, it's the easiest-to-build organ kit we've ever offered — complete assembly in 30 hours or less. It's easy to play, too. Quick-learn features like Color-Glo keys, color-coordinated music, one-finger chords and chord memory make it easy to play for the beginner, and a real delight if you know piano or organ already. Voices and effects include flute, trombone, bassoon, diapason, clarinet, oboe, violin, mandolin and banjo. Rhythm accompaniment includes Waltz, Fox Trot, Swing, Rhythm and Blues, Rock, Polka, Samba, Bossa Nova and Rhumba. The sound system's powerful, solid-state stereo amplifier and two 12" heavy-duty speakers produce some of the best music you've ever heard. It's fun and easy to build, too, with nine preassembled and tested modular circuit boards, color-coded, precut wiring harnesses with built-in connectors, and no complex tuning procedures. Includes fully-assembled, furniture-grade cabinet, glass music rack and matching padded bench with storage. 37" H x 43½" W x 23" D.

TO-1860 SPECIFICATIONS: VOICES & EFFECTS: (Solo) — Flute 16′ Flute 8′, Flute 4′, Trombone 16′ (O), Trumpet 16′, Bassoon 16′, Diapason 8′ (O), Clarinet 8′ Oboe 8′, Violin 8′ (O), Mandolin (Preset), Banjo (Preset); Solo Sustain, Main Bright. **(Accomp.)** — Tuba Horn 8′ (O), English Horn 8′ (O), Cello 8′ (O), Flute 8′, Flute 4′. **(Pedal)** Bass Flute 8′—16′, Pedal Sustain. **(Accomp. Presets)** — Piano, Guitar, Banjo, Harpsichord, Presets Cancel. **Additional Features:** Fancy Fingers, Strum, Arpeggio, Fancy Foot, Walking Bass.

Kit TO-1860, Wt. 256 lbs. Motor Freight .....Was $1799.95, Now $1495.00
TOA-1860-1, Demo Record & Information Packet. Postpaid 1.50

Electronic Metronome helps you practice music with precision

Excellent repeatability and precision make it ideal for practicing "set pieces" at different tempos

Maintains a steady beat so you can practice more efficiently — ideal for music students and teachers. A front panel control adjusts the tempo from 40 to 210 beats per minute. A rear panel control adjusts the volume. A chart on the bottom of the cabinet relates the number of beats per minute to tempos in different time signatures. Handsome cherry finish birch cabinet with non-marring felt feet. Easy 1 evening assembly. Uses two 9-volt batteries (not supplied).

TD-1257, Shpg. wt. 2 lbs. 19.95

High-performance, solid-state portable 25-watt Guitar Amplifier

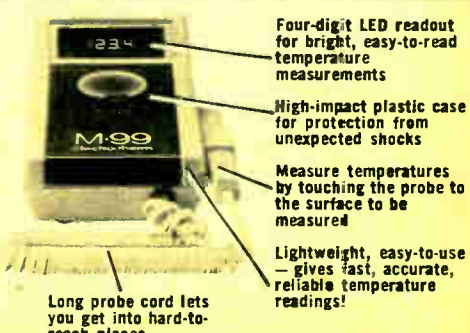
Full-control amplifier features two heavy-duty 12" woofers. Has two dual-input channels — one for accompaniment, microphone, etc.; the other for special effects. Features double-spring variable reverb and tremolo with variable rate and depth, a line reverse switch to minimize hum. Two footswitches permit hands-free control of reverb and tremolo. Black vinyl-covered wood cabinet measures 19¾" H x 28" W x 9" D. For 120/240 VAC, 60/50 Hz.

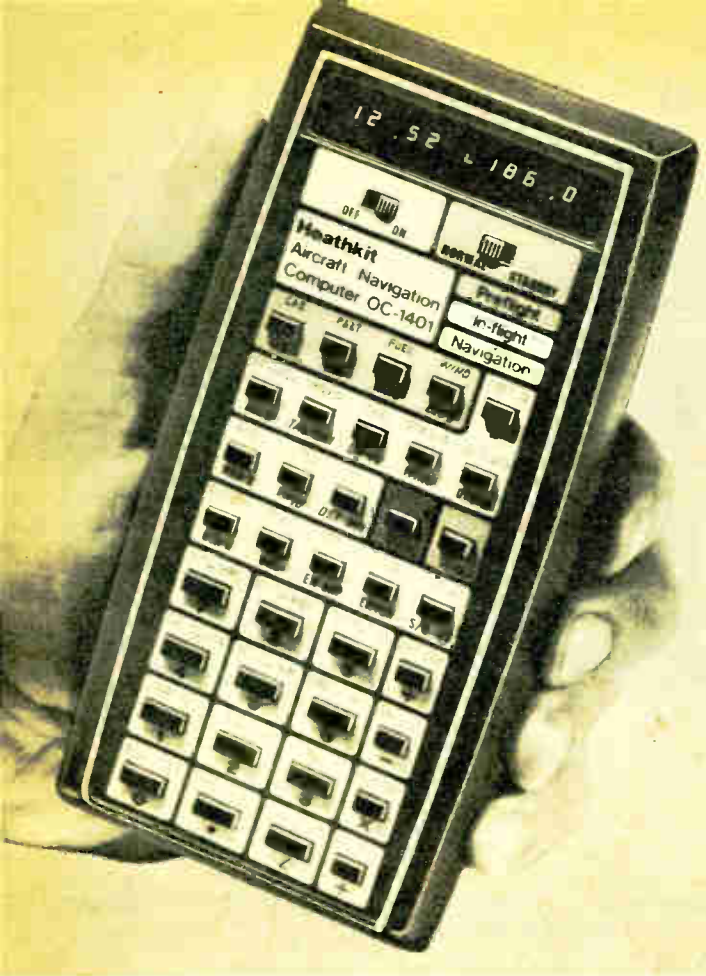
Kit TA-16, Shpg. wt. 61 lbs. 209.95

All-Purpose Digital Thermometer — laboratory accuracy at an affordable price

The GD-1226 Digital Readout Thermometer gives accurate temperature readings fast — wherever you need them! Take a child's body temperature in 40 seconds, without fear of glass breakage or mercury poisoning. Or make sure baby's bath water or baby's food is "just right". Photographers can use the GD-1226 to help maintain proper developer temperature, saving irreplaceable film from ruin. Homeowners and industrialists alike can carefully monitor heating and air-conditioning systems, saving energy and money. The GD-1226 can read temperatures from +32°F to +230°F (0° C to +110°C) with 0.5 percent accuracy, and never needs calibration! Solid-state microprocessor technology gives you accurate readings in as little as 10 seconds. Weighs just 5½ ounces and fits comfortably in your hand for maximum versatility. A shock-resistant high-impact plastic case protects the GD-1226 from damage. Operates from one 9-volt battery (not included) for up to one year under normal use conditions. Flashing decimal low battery warning. Fully assembled, not a kit. Dimensions, 2" H x 2½" W x 5" L. Resolution, 0.1°F or 0.1°C. Ambient temperature range, 0°F to +120°F (−18°C to+49°C). Battery life under continuous use, 25 hours maximum.

GD-1226, Shpg. wt. 2 lbs. 39.95





Navigational computations from convenient handheld computer

$179.95 Kit — **1 EVENING KIT** Fast. Easy Assembly

- Built-in clock and timer
- Countdown fuel indication
- Scientific calculator functions
- ETA to checkpoint and destination
- Automatically updates data
- Flight leg countdown
- Accepts preflight data and vectors for up to nine flight legs
- Automatically computes in-flight wind

Heath's engineering and design excellence combine to produce a true hand-held computer for anyone who flies (or is learning to) and for anyone who appreciates real precision and quality!

The Heath OC-1401 Navigation Computer accepts preflight data and vectors for up to nine flight legs. By single keystroke callups, it computes magnetic heading, true air speed, ground speed, time to next checkpoint, time to destination, clock time to next checkpoint, and clock time to destination. It's easier and faster to use, updates information in-flight for more current readings, and it's value-priced. You'd need an onboard computer to have more power.

The OC-1401 has a 36-key keyboard, 14-digit display, built-in clock and elapsed timer, special fuel warning indicator, "Quasi" RNAV function for heading to intermediate or non-VOR destination, and built-in diagnostic that checks to assure proper operation. It computes reciprocal headings for 180° turns and traffic pattern entry; converts statute miles to nautical miles, °F to °C, hours/minutes/seconds to decimal hours, miles to kilometers and gallons to liters and their reciprocals. It also operates as a versatile scientific calculator with additional 5 level stack and 9 addressable storage locations.

Four built-in rechargeable batteries (included) allows at-home programming and memory keep-alive to airport. AC and DC chargers are also included. During flight, unit is powered by aircraft's lighter socket (14V cord and converter included) or by optional OCA-1401-1 rechargeable battery pack/carrying case with built-in charger. Comes with comprehensive operating manual.

Kit OC-1401, Shpg. wt. 3 lbs. 179.95

OCW-1401, Assembled and Tested. Shpg. wt. 4 lbs. 284.95

The OC-1401 complies with FAA Advisory Circular No. 60-11 which describes guidelines for using Navigation Computers during airmen written tests.

Here's how the OC-1401 measures up!

FEATURES	Heathkit OC-1401	Commodore Navigator M60*	Navtronics 16*	Texas Instruments TI-58*
Flight Leg Entries	Up to 9	1	1	1
Continuous Data Update	YES	NO	NO	NO
Built-in Clock/Timer	YES	NO	NO	NO
Fuel Warning	YES	NO	NO	NO
Built-in Diagnostic	YES	NO	NO	NO
Scientific Functions	YES	YES	NO	YES
Internal Program Built-in	YES	YES	YES	NO
Price	$179.95 (KIT)	$99.95	$197.50	$116.90

*Source of competitive information is published literature and specifications as distributed and/or advertised by manufacturers as of January, 1979.

Deluxe Carrying Case for your Navigation Computer

Built-in power supply

Convenient custom carrying case is designed to carry your aircraft navigation computer and its accessories. It features a separate independent rechargeable battery power supply that recharges from a standard AC outlet from no charge to full charge in approximately 15 hours. Handy pocket for carrying your operation guide and fitted compartments for the 1401's AC and DC chargers and sunshield. 3⅛" H x 12¼" W x 8" D.

Kit OCA-1401-1, Shpg. wt. 5 lbs. 44.95

OCW-1401-1, Factory Assembled and Tested. Shpg. wt. 5 lbs. 79.95

OCA-1401-2, Leatherette Carrying Case for OC-1401 only. Shpg. wt. 1 lb. 5.95

COMPLETE THIS SPECIAL ORDER FORM AND BRING TO YOUR LOCAL HEATHKIT ELECTRONIC CENTER. PLEASE PRINT YOUR NAME PLAINLY IN CAPITAL LETTERS, USING A MAXIMUM 14 CHARACTERS (INCLUDING SPACES) IN THE BOXES PROVIDED BELOW.

Please enter my order for ___ GDP-1225 name plates. The price is $2.00 for one, $1.60 each for two or more (including postage and handling to your Heathkit Electronic Center).

Name_____

Address_____

City_____

State_____ Zip Code_____

CUT OUT ENTIRE FORM ON DOTTED LINE AND ATTACH TO YOUR KIT ORDER

Personalize your kits with this Engraved Brass Name Plate

$1.60 each for 2 or more

$2.00 for one

Personalize each Heathkit project you complete with one of these handsome, engraved name plates. Each is done in solid brass with brushed jeweler's finish and is self-adhesive backed for easy application. To order, simply complete form at left and give to the Heathkit Electronic Center clerk when you purchase any regular kit from this catalog.

Special kits from Heath make flying easier and safer

Interchangeable lenses provide added versatility

Circular base for easy mounting

Rugged case fits standard 3⅛" aircraft panel mount

Function selector with LED "moving dot" indicator.

Easy-access pencil-tip push-button clock controls.

4-digit red LED displays with automatic dimming.

Strobe Light for aircraft and emergency vehicles

$94.95 Meets Federal Air Regulation No. 23.1401 requirements for Anti-Collision Lighting

The OL-1155 is designed primarily as an aircraft strobe light for use as an anti-collision or supplemental beacon — and can be used as a direct replacement for standard 3¾" rotating beacons. It operates from a 12 VDC negative ground supply drawing a nominal current of 1.5 Amperes, and includes a built-in line filter. An internal adjustable trimmer lets you vary the flashing frequency from 40 to 60 flashes per minute. Can be used in any number of emergency applications. Mount it on your boat cabin-top or masthead for marine foul-weather anti-collision protection. Put it atop antennas, tall buildings, etc., for use as a highly visible marker light. Or, order your OL-1155 with the optional amber or red lens, below, for use in emergency vehicle applications.

Kit OL-1155, (with clear lens). Shpg. wt. 3 lbs. **94.95**
OLA-1155-2, Red lens. Shpg. wt. 1 lb. **8.95**
OLA-1155-3, Amber lens. Shpg. wt. 1 lb. **8.95**

NOTE: For the FAA PMA certification necessary for aircraft installation, return your completed OL-1155 to your local Heathkit Electronic Center or the Heath factory.

OL-1155 SPECIFICATIONS — FAA Design Approval: Under STC SA2719WE for all Cessna 182 aircraft prior to S/N 53599 & STC SA2720WE for all Cessna 210 aircraft prior to S/N 57481. **Power requirements:** 12 VDC negative ground only, 1.5A. **Dimensions:** 6" H x 3 1/16" diameter (mounting plate — 5½" diameter).

High-accuracy, low-priced Aircraft Clock/Timer

$139.95

- **FAA/PMA Approved, Meets DO-160 requirements**
- **Has GMT, local time, timer and alarm functions**

An important instrument for any pilot — at about half-the-cost of competitive models. All timing functions are quartz-crystal controlled for exceptional accuracy. The upper display shows 24-hour GMT/ZULU time; the lower shows local time, acts as a 24-min. timer (with minutes and seconds display), 24-hr. trip timer, and has alarm function for fuel management and check-point notification. Both clocks run continuously but trip timer runs only when plane's master power switch is on. Displays dim automatically for night flying.

Kit OI-1154, Shpg. wt. 3 lbs. **139.95**

Note: FAA approved for Cessna 172N, STC No. STC SA168GL (requires FAA Form 337). Field approval on FAA Form 337 required for other aircraft. Completed kit must be returned to a Heathkit Electronic Center or factory for DMIR inspection (at no additional charge), before installation by an A & P mechanic (or supervised pilot installation). Heath will also set adjustment for maximum accuracy. Meets DO-160 requirements.

OI-1154 SPECIFICATIONS: Display Functions: (Top), 24 hour Zulu or GMT; (Bottom), 24 hour local, 24 minute timer (in minutes and seconds); 24 hour total trip time; 24 hour trip time alarm. **Input Voltage:** 14 VDC or 28 VDC. **Input Current:** 0.5 A max. (bright display). **Standby Current:** 0.025 A. **Crystal Oscillator Accuracy:** Typical, less than ±1 minute per month. Initial, 0.004% at 25°C. Drift ±0.003% −20°C to +65°C. Aging, 0.002% per year. **Dimensions:** 3.3" H x 3.3" W x 6" D.

Transistorized Model Railroad Power Supply/Throttle puts you in control

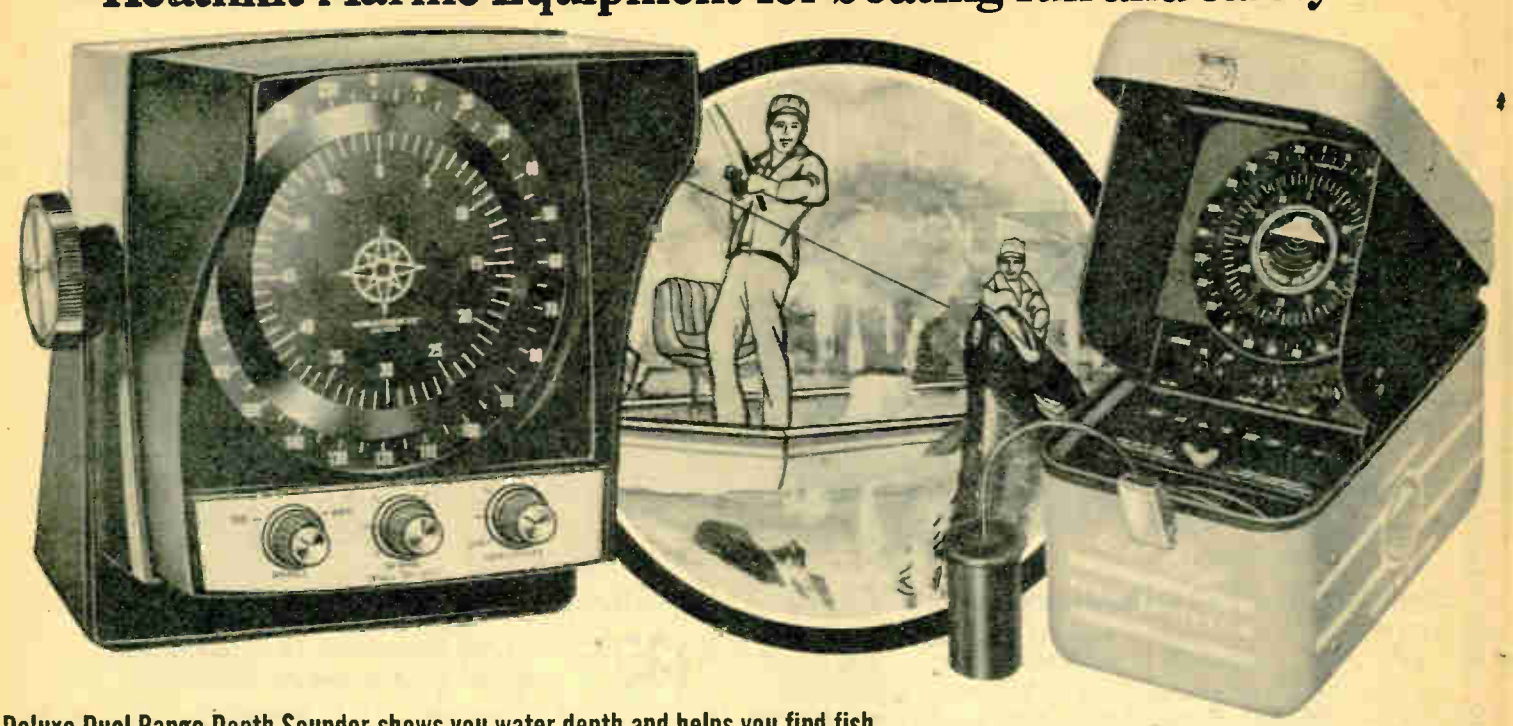
The Heathkit RP-1065 makes an HO or N-gauge layout dramatically more realistic! Just operate the slide throttle control to make your engines gradually build up speed just like a real train, at slow speeds, maintain realistic acceleration and braking.

Prevents stalling out when climbing grades, even lets you precisely simulate a real train, slowing as it climbs, then accelerating as it goes down. Helps overcome side rod and gear train binding, tight spots in wheel bearings, even tight sections of track. Easily powers two HO or N-gauge engines — has built-in short protection with an indicator light and a time delay to prevent false triggering. The transistorized power/throttle adds a new dimension of excitement to model railroading.

And this kit is one of our easiest to build. It goes together in just a couple of evenings, even if it's your first kit. There's just one circuit board to wire, and a plug-in IC simplifies assembly. Comes with complete, easy-to-follow manuals. Operates on 120 VAC. 4¾" H x 9½" W x 8½" D.

Kit RP-1065, Shpg. wt. 9 lbs. **64.95**
Kit RPA-1065-1, Remote Control for RP-1065. 3 lbs. **24.95**
RPA-1065-2, 10-ft. Extension Cable. 2 lbs. **8.95**
RPS-1065, RP-1065 and RPA-1065 Together. 19 lbs. **186.95**

Heathkit Marine Equipment for boating fun and safety



Deluxe Dual-Range Depth Sounder shows you water depth and helps you find fish

An important boating accessory for improved fishing and navigation! Shows depth, type of bottom, schools and individual fish, submerged objects. A high-pitched "beep" alerts you to shoals or objects projecting above any pre-selected depth from 5 to 240 ft. Has switch-selected 0-60 and 0-240 ft. ranges. Fixed noise rejection, polarity protection, super-bright neon indicator. Gimbal mount, quick-disconnect power and transducer leads. Easy kit assembly. Shpg. wt. 8 lbs. 6½" H x 5¾" W x 7¼" D.

Kit MI-1031-1, with thru-hull transducer, 15' coax **99.95**

Kit MI-1031-2, with transom transducer, 25' coax **99.95**

Heathkit Single-Range Depth Sounder. As above, single 0-240 ft. range, no alarm. Shpg. wt. 8 lbs.

Kit MI-1030-1, with thru-hull transducer and 15' coax .. **74.95**

Kit MI-1030-2, sounder with transom transducer and 25' coax for easy installation **74.95**

MI-1030 and MI-1031 SPECIFICATIONS: Frequency: approx. 200 kHz. **Accuracy:** Within 2% of actual depth. **Transducer:** Barium titanate ceramic element encased in waterproof housing. **Power Requirement:** 0-60' range, 225 mA @ 11-15 VDC (MI-1031 only), 0-240' range, 125 mA 11-15 VDC with one return pulse. **Dimensions:** 6½" H x 5¾" W x 7¼" D.

Heathkit portable Fish Spotter™ Sounder

Has adjustable audible alarm you set to sound off at any depth to 240 ft. Fish swimming between surface and preset depth will trigger alarm. Includes two switch-selected ranges (0-60' and 0-240') for sharper definition; noise rejection circuit; bright neon-flasher for precise depth reading. Rugged aluminum cabinet. Portable suction-cup transducer bracket. Powered by two 6-volt lantern batteries (not included). 7" H x 6" W x 11" D.

Kit MI-2901, Shpg. wt. 8 lbs. **99.95**

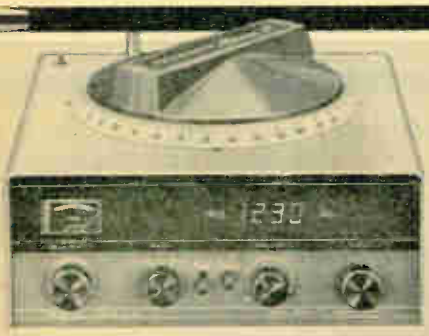
Economy Fish Spotter™ Sounder: Similar to MI-2901 above, but with single range to 120-ft. Reads 240' max. Has bright neon indicator. No audible alarm. **Kit MI-2900**, Shpg. wt. 8 lbs. **74.95**

Scanning Transducer Bracket: (Not shown.) Designed for use with MI-2901 and MI-2900 Fish Spotter™ sounders. "C" clamp mounting. For 1⅜" cylindrical transducer. **Kit MIA-2900-1**, Shpg. wt. 4 lbs. . . **24.95**

Thermo Spotter® Fishing Thermometer

Shows you the water temperature at any depth up to 100-ft. Completely self-contained with submersible sensing element on a 100-ft. cable. Kit includes operations manual with fish temperature preference charts. Uses 1.5-volt penlight battery (not included).

Kit MI-104, 3 lbs. . . . **39.95**

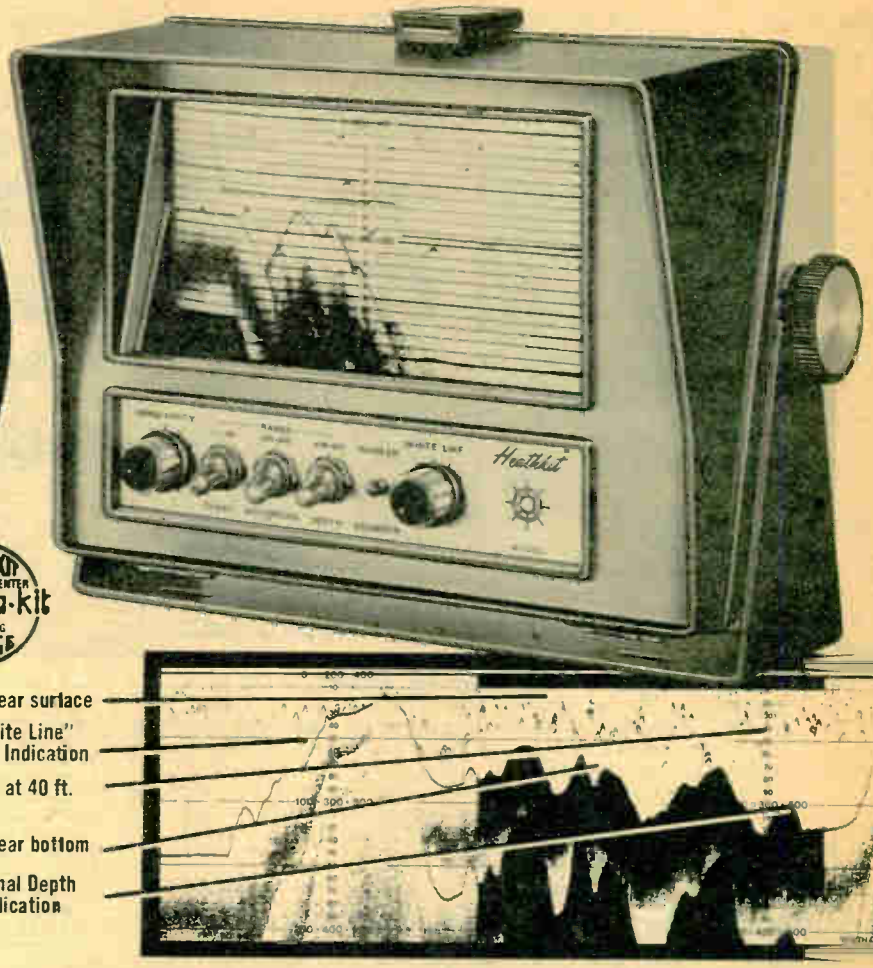


Navigation is safer, easier with your Heathkit Digital Radio Direction Finder

Keeps you informed on 190-410 kHz longwave and standard AM. The digital displays are easy to read even in direct sunlight. And for maximum safety and convenience, they dim automatically at night. Finding your bearings is easy, too, thanks to the big azimuth ring marked in 2° increments and a generous 7-inch rod antenna. A lighted meter provides accurate null indications and a control adjusts meter sensitivity for weak or strong stations. The telescoping sense antenna eliminates 180° ambiguity. Overall, bearing accuracy is an impressive ±3°. The MR-1010 is designed to be used with your boat's 12 VDC electrical system — or it becomes completely portable with its own built-in power source consisting of 6 "D" cell flashlight batteries (not included). To prolong battery life, the digital readout display automatically shuts off after approximately 20 seconds — but can be recalled instantly. 7¼" H x 11½" W x 12" D.

Kit MR-1010, Shpg. wt. 14 lbs. **239.95**

Heath helps you find and catch the big ones



HEATHKIT ELECTRONIC CENTER charg-a-kit REVOLVING CHARGE

Heathkit Seeker™ shows you where the fish are

The Seeker chart recording depth sounder helps you find fish, and provides a permanent record so you can find your favorite spots again.

An on-off sensitivity control adjusts to indicate differences in depth. The extra-wide beam transducer covers a larger area of water than most conventional units, so you get a better and wider "picture" of what's below you. Its three ranges (5' to 200', 200-400', and 400-600') make it useful for any area.

Straight line recording system gives you easier, more accurate chart reading and interpretation. A white line control lets you adjust the bottom indication to a fine line so objects or fish close to the bottom can be distinguished easily. A roll of paper lasts approx. 13 hours for continuous charting.

Two lamps light the chart for easy operation at night. The weather-resistant case with gasket seals helps keep recorder water-tight. Operates from boat's 12-volt battery system. 8" H x 11" W x 7" D. With one roll chart paper.

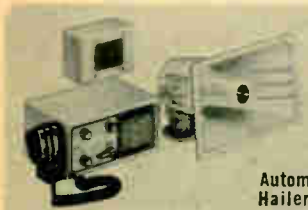
Kit MI-2910-1, recorder with through-the-hull transducer and 30' cable. Shpg. wt. 17 lbs. . . **299.95**

Kit MI-2910-2, recorder with transom mount transducer and 30' cable. Shpg. wt. 17 lbs. . . **299.95**

Factory assembled and calibrated version of above. **WI-2910-2,** Shpg. wt. 16 lbs. **424.95**

MIA-2910-1, Two Rolls Chart Paper. Shpg. wt. 2 lbs. **9.95**

SPECIAL OFFER — SAVE $9.75!
12 Rolls Chart Paper. If pur. sep., $59.70.
MIS-2910-1, Shpg. wt. 12 lbs. **49.95**



For safer boating

Automatic Foghorn/Hailer. Features a husky 55-watt amplifier, weather-resistant deck horn, 20 ft. speaker cable, gimbal mount. 12 VDC pos. or neg. ground.

Kit MD-19A, Shpg. wt. 15 lbs. **139.95**

Kit MDA-19-1, Optional remote speaker for intercom use. Shpg. wt. 2 lbs. **14.95**

Economy Power Inverter (not shown). Operates small appliances from 6 or 12-volt input. Up to 175 watts power rating. Not for high starting current or sine wave AC equipment. 25-amp fuse.

Kit MP-10, Shpg. wt. 8 lbs. **54.95**

Heathkit Digital Depth Sounder with "Shallow-Water" Indicator tells you water depth to 199 feet at a glance

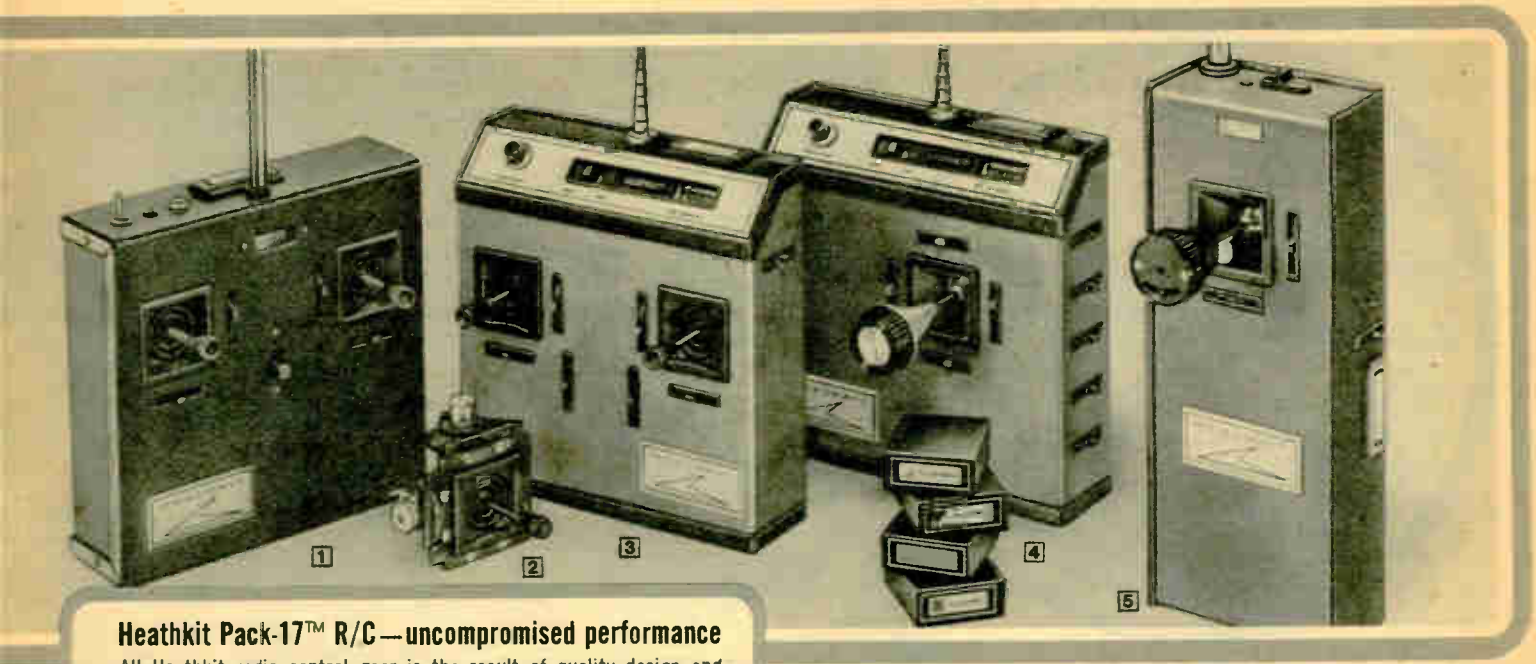
Accurate depth readings at a glance. Dual-range digital display automatically reads depth in 0.1 foot increments from 2.5 to 19.9 feet and in 1 foot increments from 20 to 199 feet. A red light signals clearance of 10 feet or less. Single knob controls power on/off and brightness control. Rugged Cycolac® case; gimbal mounting bracket; 15 feet cable for through-hull installation, 25 feet for transom mount.

With through-hull transducer, **Kit MI-101-1,** Shpg. wt. 7 lbs. **159.95**

With transom transducer, **Kit MI-101-2,** Shpg. wt. 6 lbs. **159.95**

MI-101 SPECIFICATIONS: Accuracy: ±2%, ±1 digit. Current drain: 300-500 mA. Power requirements: 10-17 VDC @ 500 mA. Dimensions: 2¼" H x 6⅝" W x 8½" D (less gimbal hardware).

Custom-build an R/C system to meet your own special flying



Heathkit Pack-17™ R/C—uncompromised performance

All Heathkit radio control gear is the result of quality design and engineering by people who care about R/C. We were the first to use ceramic filters to help eliminate drift; the first to put 8 channels in a single, versatile unit; the first to give you the convenience of instant plug-in frequency change. Compare Heathkit R/C with top-of-the-line assembled models and you'll see why it's your smartest buy — whether you're into radio controlled airplanes...or R/C cars or boats. Heathkit R/C is easy and fun to build too — with a thorough and complete instruction manual that even shows you how to solder. Heathkit R/C gear — the winning way to fly!

Latest design 5- and 8-channel transmitters feature open gimbals

1 Exciting 5-Channel Dual Open-Gimbal Stick R/C Transmitter, now FCC approved. You won't find the value, reliability and performance of this transmitter in any other unit in this price range! Here's dual-stick control of four R/C channels (one with ratchet) plus switch-activated aux. channel for retracts or other switched functions. Open-gimbal sticks provide smoothness and control you'll appreciate. Plug-in module capability and step-by-step instruction manual for easy kitbuilding and do-it-yourself service make this your best R/C value. Transmitter includes your choice of one plug-in frequency module. Order your GDA-1919-1 in a complete system from next page.

Kit GDA-1919-1, Shpg. wt. 4 lbs. 129.95

2 Open-Gimbal Stick Conversion Kit. Owners of Heathkit GD-1205-D and GD-505-D R/C transmitters can now get the convenience and control of open-gimbal stick R/C with this easy to install conversion kit. Includes two sticks.

Kit GD-1419, Shpg. wt. 1 lb. 39.95

3 8-Channel Dual Open-Gimbal R/C Transmitter. Our top-of-the-line R/C line R/C transmitter now gives you Open-Gimbal stick convenience too! Has the same fine specifications as the GDA-1919-1 above, but provides dual-stick control of 4 channels and aux., plus landing gear switch and 2 additional channels. It's one of the most versatile R/C transmitters you'll find anywhere! Includes your choice of one-plug-in frequency module. Order your 8-Channel Dual Open-Gimbal R/C Transmitter as part of a complete system from the next page.

Kit GDA-1205-OG. Shpg. wt. 5 lbs. 149.95

4 8-Channel Single-Stick Transmitter & 1 module, now FCC approved. Stick control of 3 channels, throttle with trim and aux., plus landing gear switch & 2 additional channels.

Kit GDA-1205-S, Shpg. wt. 6 lbs. 174.95

GDA-1205 AND GDA-1919-1 SERIES SPECIFICATIONS: TRANS. — RF Frequency: crystal controlled, all bands. **Frequency stability:** within ±.005% on 27 MHz; within ±.002% on 53 MHz; 72 MHz. **Temp. Range:** 0 to 160°F. **RF Output Circuit:** pi network. **RF Input Power:** at least 500 mW. **Modulation:** on-off carrier keying. **Approx. Current Drain:** 100 mA on all bands. **Controls:** GDA-1205, 8 channels (4 with trim), on/off, trainer button; GDA-505, 5 channels (4 with trim), on/off switch, trainer button. **Power Supply:** Internal 9.6V 500 mAH Ni-Cad. battery. Rechargeable simultaneously with receiver battery at 35 to 40 mA from 120 volt power line. **Dimensions:** 7" H x 7" W x 2" D. **Net Weight:** 2½ lbs., with battery. **GDA-1205-2 SPECIFICATIONS: RECEIVER — Local Oscillator Operating Frequency:** crystal-controlled, all bands. **Temperature Range:** 0 to +160°F. **Sensitivity:** 5 μV or better. **Selectivity:** 6 dB down at ±4 kHz; 30 dB down at ±9 kHz. **Current Drain:** 10 mA. **Intermediate Frequency:** 453 kHz. **Power Supply:** 4.8 V battery pack (GDA-1205-3). **Controls:** On/off switch. **Dimensions:** 5⅛" H x 1¾" W x 1¾" D. **Net Weight:** 2 ozs.

5 3-Channel Pack-17™. Has the convenience and versatility of plug-in frequency change and it's the only 3-channel system we know of that includes rechargeable batteries and an external charger so you fly with full power and uncompromised performance. Has 2-axis stick assembly, easy to handle transmitter with convenient strap for one-hand operation. An optional conversion pack lets you go 4-channel by adding another channel to the stick. All three stick channels have trim control, the 4th channel is controlled by a thumb tab. Compatible with all Heathkit servos. Specify frequency when ordering (see specs below).

Kit GDA-1405-1, 3-ch. transmitter with 1 Module. 5 lbs. 89.95

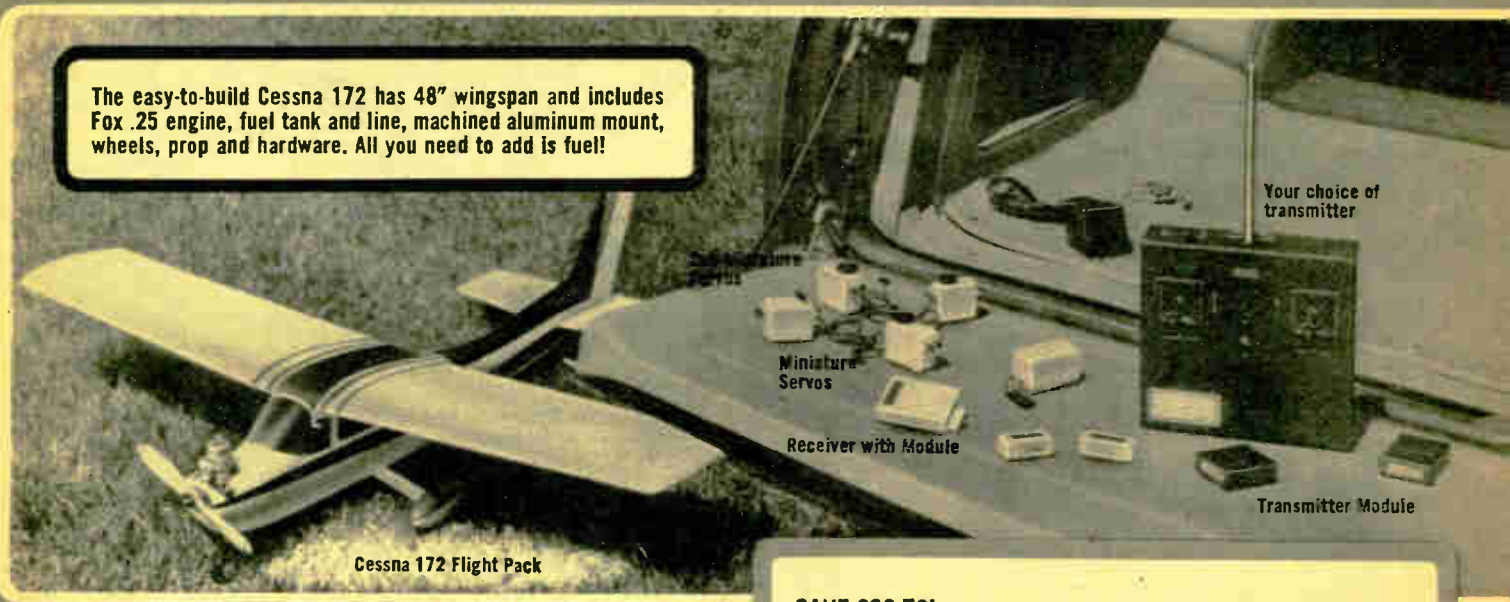
Kit GDA-1405-3, 4-ch. conversion. 1 lb. 14.95

GDA-1405-1 SPECIFICATIONS: TRANSMITTER — RF Carrier Frequency: One frequency, crystal-controlled on 27 MHz, 53 MHz or 72 MHz bands. **Operating Temperature:** 0°-160°F. **Controls:** 3 channels (two with trim); ON-OFF switch. Optional fourth channel. **Power Supply:** Internal 9.6V, 500 mA hours, nickel-cadmium battery. Rechargeable simultaneously with receiver battery at 35-40 mA from external charger. **Frequencies Available:** 27 MHz (11 meters) — 26.995, 26.045, 27.095, 27.145 & 27.195. 53 MHz (6 meters) — 53.100, 53.200, 53.300, 53.400, 53.500. 72 MHz (4 meters) for R/C planes only — 72.080, 72.240, 72.400, 75.640. (All Models — 72.160, 72.320, 72.960.) **Dimensions:** 9½" H x 3 1/16" W x 2¼" D.

Advanced Radio Control. This book tells how to use R/C to make model planes, boats, etc., perform complicated maneuvers. Ideal introduction to rocket and robot automation, proportional control servomechanisms. **EDP-158 ..... 4.95**

Radio Control Handbook. Explains the basics of radio control, covering most conventional control systems. A must for the RCer's library. **EDP-159 ..... 6.95**

needs and save money, too, with Heathkit Pack-17™ R/C



Convenient modules let you add more frequencies

NOTE: Amateur Radio License required for operation on 53 MHz band. Class C License required for operation on 27 and 72 MHz bands.

When ordering specify frequency desired (see list below).

Transmit Module, 1 lb. . . . . **21.95** **Receive Module,** 1 lb. **14.95**

FREQUENCIES AVAILABLE (MHz): 26.95, 27.045, 27.095, 27.145, 27.195, 53.1, 53.2, 53.3, 53.4, 53.5, 72.08, 72.24, 72.16, 72.32, 72.40, 72.96, 75.640 MHz. **(When ordering, specify transmit or receive.)**

SPECIAL 5-MODULE OFFER — SAVE $30.00!

5 Transmit and 5 Receive Modules of your choice. 2 lbs. . . . . **Only $154.50**

High-quality Heathkit Servos, Receivers and Batteries

SERVO COMPARISON CHART	Min. 1205-4	Sub-Min. 1205-5	Hi-Torque 1205-8
Idle Current (max.)	15 mA	15 mA	20 mA
No Load Current	80 mA	80 mA	150 mA
Stall Current (nom.)	450 mA	450 mA	1000 mA
Thrust	4 lb.	4 lb.	6 lb.
Travel Time	0.5 sec	0.5 sec	0.4 sec
Rotary Travel	90°	90°	90° or 180°
Dimensions (HxWxL*)	1⅝"x1⅝"x2⅜"	1"x¾"x2⅜"	1⅝"x1⅝"x2⅜"
Net Weight	1.75 oz.	1.25 oz.	1.75 oz.

All servos: Power Requirement: 4.8 VDC. **Position Accuracy:** 1%. **Output:** 1 rotary arm, 1 rotary wheel. **Input Signal:** Pulse, 1-2 msec, 4V P-P. **Temperature Range:** 0° to 160° F. **Backlash:** <0.002". *H includes outputs, L includes mtg. ears.

Kit GDA-1205-5, Sub Min. Servo. Shpg. wt. 1 lb. **29.95**
Kit GDA-1205-4, Miniature Servo. Shpg. wt. 1 lb. **29.95**
Kit GDA-1205-8, Hi-Torque Servo. Shpg. wt. 1 lb. **34.95**
Kit GDA-1205-2, Receiver with 1 Frequency Module. 1 lb. **64.95**
Kit GDA-1205-3, Receiver Battery Pack. 1 lb. **13.95**

Trainer Link Accessory. Lets you hook up two 1205 transmitters for flight instruction. **GDA-1205-6,** Shpg. wt. 1 lb. **11.95**

Thumb Tach® measures rpm without physical connection to engine. 0-5000 & 0-25,000 ranges. Ideal for needle valve adjustment, selection of glow plugs, etc. **Kit GD-69,** wt. 1 lb. **29.95**

R/C Battery Monitor. Expanded scale voltmeter checks capacity (under load) of batteries. Has meter, connector for all Heathkit battery packs, clips, case.

Kit GD-1188, Shpg. wt. 1 lb. **17.95**

SAVE $98.70! Complete system outfits your model for R/C

5-Channel Open-gimbal Stick System: includes the GDA-1919-1 open gimbal stick transmitter described on the opposite page, plus one plug-in frequency module, receiver and one plug-in frequency module, receiver battery pack, and four servos (choose miniature, subminiature or both). If purchased separately, this system would cost you up to $328.65. Save nearly $100 when you get the complete system!

GDS-1919, Shpg. wt. 9 lbs. **229.95**

SAVE $113.70 on the Cessna 172 and a complete R/C system

Same as system GDS-1919 (above) plus the Cessna Skyhawk Flight Pack.

RPS-1919, Shpg. wt. 30 lbs. **289.90**

Save when you get one of these complete R/C systems

The following systems include transmitter and one frequency module, receiver and one frequency module, receiver battery pack and batteries, and four servos (choose miniature, subminiature or both) — except GDS-1405-1 and GDS-1405-2 include 2 servos.

8-Channel Dual Open-Gimbal Stick System. If purchased separately up to $348.95. **GDS-1205-0G,** Shpg. wt. 11 lbs. **274.95**

8-Channel Single Stick. If purchased separately, up to $373.65.

GDS-1205-S, Shpg. wt. 11 lbs. **289.95**

3-Channel System. (Includes two servos). If purchased separately, $228.65.

GDS-1405-1, with miniature servos, wt. 8 lbs. **189.95**

GDS-1405-2, with subminiature servos, wt. 8 lbs. **189.95**

RP-1172, Cessna 172 Skyhawk Flight Pack only, Shpg. wt. 8 lbs. . . . **74.95**

SAVE $88.70! Same as system GDS-1205-0G plus Cessna 172 Flight Pack.

RPS-1205-0G, Shpg. wt. 32 lbs. **334.90**

SAVE $98.70! Same as system GDS-1205-S plus Cessna 172 Flight Pack.

RPS-1205-S, Shpg. wt. 32 lbs. **349.90**

SAVE $53.80! Same as system GDS-1405-1 plus Cessna 172 Flight Pack.

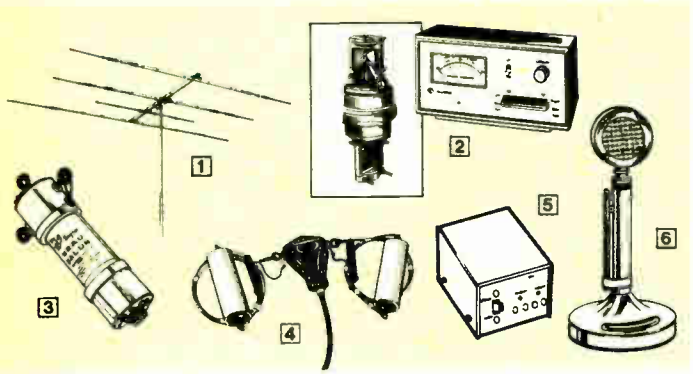
RPS-1405-2, Shpg. wt. 29 lbs. **249.90**

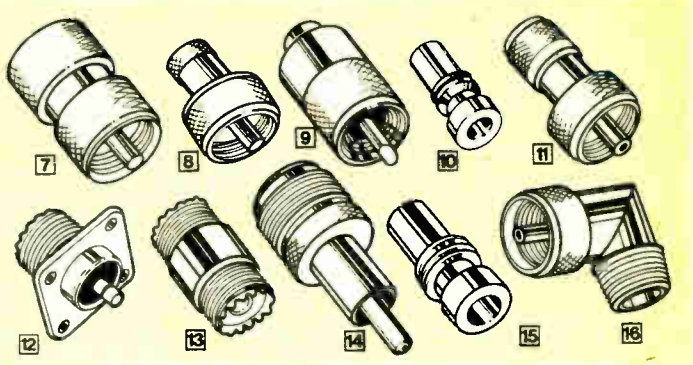
SAVE $60.90! Same as system GDS-1405-1 plus Cessna 172 Flight Pack and additional servo for complete 3-channel control.

RPS-1405-3, Shpg. wt. 29 lbs. **272.85**

BONUS: Receive free the R/C Handbook with the purchase of any system above. Specify GDA-1205-7 on your order.

Outstanding Amateur Radio Accessories





1 Cushcraft Tri-Band Beam Antenna. Offers the performance of a single-band Yagi on 10, 15 and 20 meters. Broad bandwidth and four active elements for super performance and outstanding front-to-back ratio on all three bands. Has low-loss, high-performance 1:1 baluns which take PL-259 connectors. Factory adjusted for 50-ohm coax feedline. Boom length, 18-ft. Longest element 32'8". For masts to 2½" O.D.
Model HDP-1471 ..... **239.95**

2 Alliance HD73 Heavy-Duty Rotator with Dual Speed Control. For antennas with up to 10.7 sq. ft. of wind load area. Has positive no-slip drive, automatic brake action. For masts 1⅜" to 2½" O.D. For 117 VAC, 60 Hz. Require 6-cond. cable (use 8-cond. cable, page 3).
Model HDP-1295 ..... **119.95**

3 "W2AU" Balun. This world-famous balun helps you reduce TVI and improve F B ratio. 2 kW PEP tested. Fully enclosed body with silver-plated SO-239 connector and hang-up hook, built-in lightning arrester. 600= pull — no insulator needed. Weatherproof. With complete instructions including an antenna length table.
Model HDP-3615 ..... **14.95**

4 5-Band Trap Dipole Antenna. Pre-assembled antenna cover 80 thru 10 meters. Only 2 trap adjustments and terminations. Ready to use. Includes antenna wire, traps, 50-ft. RG-8 U coaxial cable and PL-250 connector, two end insulators, and dipole center connector. Traps weigh approx. 9 oz. each. Approx. length 110 ft. 52 ohms impedance.
Model HDP-3500 ..... **64.95**
Model 370-12, same as above, except assembly of wire terminations required **54.95**

5 2-Meter Antenna Matcher. This mobile antenna matcher lets you use your auto's AM/FM Antenna for your mobile 2-meter rig. Eliminates theft due to "give-away" second antennas. Tunes 144 to 148 MHz, has front panel tuning and loading adjustments and LED output indicator. Input impedance 50 ohms. 50 watt power capacity. Has universal mounting bracket.
Model AT-200 ..... **29.95**

6 Base Station Microphone. This chrome-plated beauty features both grip-to-talk and push-to-talk operation and a side lock clamp for "no-hands" transmission for the ultimate in easy operation. Has built-in two stage transistor amplifier, excellent response and high gain for clear modulation. Universal hookup capability.
Model GD-104 ..... **39.95**

7 PL-259 Double Male Adaptor. Two PL-259 type plugs "back-to-back" for easy connection of SWR meters, antenna tuners, switches, many other applications.
Model S-622 ..... **3.38**

8 PL-259 Male Connector. The standard antenna connector for RG-8/U (and RG-58 U using UG-175 U adaptor) coax cable.
Model S-602 ..... **2.20**

9 RG-58/U Male Connector. New low-loss solderless connector for RG-58/U coax cable. Possesses better RF characteristics than the standard PL-259. Easy to assemble.
Model S-630 ..... **2.28**

10 UG-175/U Adaptor. For use with PL-259 Male Connectors when using RG-58/U coax cable.
Model S-603 ..... **0.70**

11 RG-8/U Male Connector. New low-loss one piece connector for RG-8/U coax cable. Possesses better RF characteristics than the standard PL-259. Easy to assemble.
Model S-629 ..... **2.28**

12 SO-239 Type Receptacle. Standard antenna connector replacement on transceivers. Also useful for project building.
Model S-605 ..... **1.14**

13 PL-258 Double Female Adaptor. For coupling coax cable. Both ends accept standard PL-259 type antenna plug.
Model S-604 ..... **1.30**

14 PL-259/Motorola Plug Adaptor. Use your standard antenna system with most walkie-talkies. One end accepts PL-259 connector — the other is a standard Motorola plug.
Model S-606 ..... **2.12**

15 UG-176/U Adaptor. For use with PL-259 male connectors when using RG-59/U coax for co-phase harnesses, Ham Rigs and other applications. Commonly used for "Scanner" cables when RG-59 U is used.
Model S-609 ..... **0.70**

16 R.F. "L" Adaptor. Type M-359. SO-239 connector one end, PL-259 plug on the other. Ideal for use in tight places or where space is at a minimum; such as behind mobile units or with awkwardly located connectors on SWR meters.
Model S-621 ..... **3.06**

Maximum coverage superflex RG-8/U coax by Columbia Electronic Cable (not shown). 11-gauge center foam polyethylene dielectric. 92% copper braided shielded flexlife jacket with PL-259 connectors both ends.
Model HDP-3620, 100-ft. with conn. **24.95**
Model HDP-3621, 50-ft. with conn. **14.95**
Model HDP-3622, 3-ft. with conn. **4.95**

FREE Frequency Spectrum Chart ($3.95 value) with every purchase of $10.00 or more of amateur radio products or accessories!

Your Heathkit Electronic Center carries these amateur radio books and magazines

(Selection varies from store to store. Some stores carry additional volumes too!)

Books

Amateur Radio License Study Guides — make getting any radio license easy. **NOVICE** **5.95**
GENERAL **7.95**
ADVANCED **5.95**
EXTRA **5.95**
Radio Handbook. Comprehensive radio theory and practice for hams. **19.50**
Amateur Tests and Measurements **5.50**
US Callbook. Complete listing of Amateurs in all US call areas and territories. More. **EDP-126** **14.95**
DX Callbook. Complete listing of foreign Amateurs, addresses, postal rate charts, call zone maps. **EDP-127** **13.95**
73 Dipole Antennas **4.95**
73 Vertical and Beam Antennas **5.50**
The Radio Amateur's Handbook (1979 Edition) **9.75**
ARRL Antenna Book **5.00**
Solid State Basics **5.00**
Understanding Amateur Radio **5.00**
The Radio Amateur's V.H.F. Manual **4.00**
FM and Repeaters **4.00**
ARRL Electronics Data Book **4.00**
Single Sideband **4.00**
ARRL Ham Radio Operating Guide **4.00**
Specialized Communications Techniques For The Radio Amateur **4.00**
Hints and Kinks **4.00**
A Course in Radio Fundamentals **4.00**
Radio Amateur's License Manual **3.00**
Getting to Know Oscar **3.00**
Radio Frequency Interference **3.00**
Solid State Design **7.00**
Tune in The World With Ham Radio. Packages sold as a unit consisting of Workbook and Tape Cassette **7.00**
ARRL Map **3.50**
Log Book **1.75**

Magazines

QST
"73"
Ham Radio
Ham Radio Horizons

Unique ways to increase your home's security and convenience

High-quality alarm system protects homes, small offices or stores

$199.95

- Ear-jarring alarm drives thief out of your home
- Operates on own power to protect when blackouts occur
- Inputs to add door, window contacts or smoke detectors
- Professional quality burglar alarm you can afford now!

[1] Now a professional quality security system you can install quickly and privately, and at a price you can afford. The Midex System 55 is engineered to detect the motion of an intruder and to activate one or more loud speakers/sirens on your premises. When intruder walks into the microwave transceiver's signal area alarm signal is triggered. A range control allows adjustment of the size of the pattern up to a maximum of 20 feet by 50 feet. The system is immune to false alarms and is fail safe — it operates on its own power during brown outs or black outs. Use two Blasthorns (order separately below) — one inside the home to startle the intruder and drive him out of your home; the other outside to alert neighbors to call police. The all-weather Blasthorn is specially designed to provide maximum alarms up to 120 dB — the threshold of pain.

[1] **System 55,** Alarm System 199.95
[2] **SP5,** Loud, 5-watt, Blasthorn Speaker 39.95
[3] **SP30,** Extra-loud, 30-watt Blasthorn speaker 44.95

Tiny digital time clock fits in your palm

Bright liquid crystal display for high visibility

So tiny you can hide it in your hand, yet its digital numbers are so large (.6 inches high) you can read it from across the room. Housed in a sturdy aluminum body, the Mity Time runs on two tiny batteries that keep it running quietly for nearly two years. Can be programmed to display hours and minutes continuously, or alternately with month and date, changing each second.

Mity Time Clock 29.95

Multi-Outlet Boxes let you put outlets anywhere you need them

This convenient kit eliminates dangerous, messy "octopus outlets"

Put an end to those unsafe multi-plug adapters and tangles of extension cords with this versatile accessory. It's a must for the workshop, test or hobby bench, ham shack, just about anywhere. Gives you additional electrical outlets for real versatility in setting up equipment. Outlets are fuse-protected, grounded and individually-switched. Available in four and six outlet versions. Convenient mounting tangs make possible semi-permanent wall or floor mounting.

Use subject to local electrical zoning codes.

[4] **Six Outlet Box. Model JB-60G** 12.95
[5] **Four Outlet Box. Model JB-40G** 12.95

Theft Warning System tells you when your auto is tampered with

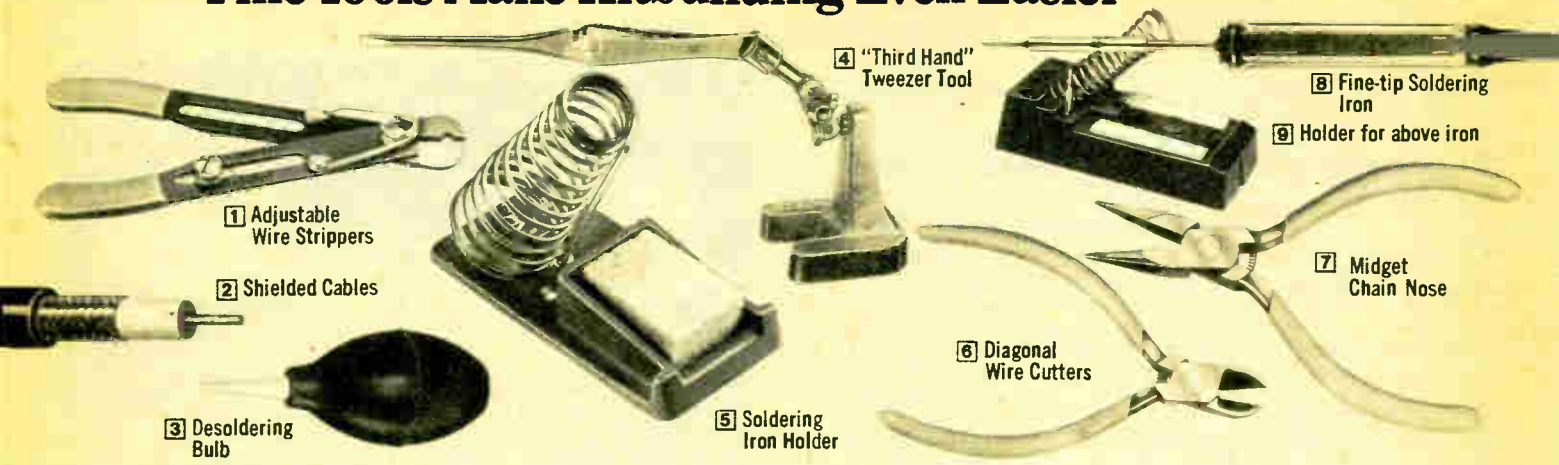
$99.95

- Thief cannot hear alarm...but you alert police
- Transmitter's .5 watt signal penetrates buildings
- Installs easily in your car, camper, truck or boat

The moment someone tries to tamper with your car, the Page Alert™ 500 pocket pager alerts you...no matter where you are. A .5 watt transmitter hidden in your vehicle sends a silent signal to the pocket pager you carry with you. When your pocket pager begins beeping, you can call the police. Many times they can catch the thief in the act, or in the nearby area, because he has heard no alarm and is caught off guard, feeling no need to hurry. This "silent edge" greatly increases the chances of recovering your valuables. The Page Alert 500 transmitter has an effective range of greater than one-half mile, and will transmit its .5 watt signal through buildings and other obstacles. You can install it easily in any car, truck, camper or boat. Complete instructions and self-contained batteries are included with the system.

Model 500 Page Alert System 99.95

Fine Tools Make Kitbuilding Even Easier



1 Adjustable Wire Strippers — Honed cutting edges cut and strip stranded or solid insulated wire. Positive adjustment can be preset for any wire size from #10 to #20 gauge. Overall length 5¼". **Model 3195** **2.49**

2 Shielded Cables — Shielded transmission cable for all amateur radio, citizens band and television needs. From Columbia Cable.

COL-198 RG 8/U Superflex ..... 29¢ per ft.

COL-188 RG 58 A/U Superflex ..... 09¢ per ft.

COL-755 RG 59 Superflex ..... 07¢ per ft.

COL-508 5 Wire Round Rotor ..... 11¢ per ft.

3 Desoldering Bulb — Place tip near melted solder, squeeze and release bulb. Zip — excess solder is removed. **Model ACP-303** **3.50**

Replacement Soldering Iron Tips (not shown) For your Heathkit/Weller Pencil-type iron (shown on page 83). Screwdriver tip design.

Model ST-1	1/16" Wide	2.50
Model ST-2	3/32" Wide	2.50
Model ST-3	1/8" Wide	2.50
Model ST-4	3/16" Wide	2.50

4 "Third-Hand" Tweezer. Self-locking tweezer mounted in double ball joints connected to heavy base. Lets you hold work at any angle for soldering, gluing, positioning. A great kitbuilder's helper! **Model H200** **5.95**

5 Soldering Iron Holder — By Weller. Designed for the Heathkit/Weller pencil-type irons on page 83. Heavy base prevents tipping. Includes built-in sponge tray and sponge. **Model PH-60** **6.95**

6 Diagonal Wire Cutters. Slim roundnose design. Will cut #20 gauge and smaller soft copper wire. For fine work. Overall length 4"; blue handles. **Model 98CG** **6.95**

7 Midget Chain Nose. Slim streamlined pliers with fine serrations. For precision pick up, looping, twisting, bending of finest wire. Overall length 4½"; blue handles. **Model 77CG** **6.95**

8 Fine-Tip Soldering Iron. 15 watts with extremely small chisel tip. Perfect for closest work. Safe for C MOS circuitry. 45 seconds heat-up time, grounded 3-prong plug. **Model C** ..... **Now only 9.95**

9 Holder for above iron. Insulated stand for soldering safety. Has two replaceable tip-cleaning sponges and holders for spare tips. **Model ST-3** **5.95**
Save! Model C Iron and ST-3 Holder **14.95**

1 **$9.95**

2 **$5.95**

1 Get the power you need to drive screws in securely

Shelton Super Versatool™ — ideal for hundreds of repair and maintenance tasks in your home, office, car, boat or camper. This rugged ratchet screwdriver has 3 times the power of an ordinary screwdriver and cuts the time required for screwdriving by over 50%. The universal ratchet head works left, right or locked, and changes direction at the flip of a finger. Includes driver head, 5½" extension adapter and 4 tool-steel bits for slotted and recessed screws.
Model 504 ..... **9.95**

2 Jeweler's Screwdriver helps place tiny screws in tiny places

Jeweler's Screwdriver Set. This is the perfect screwdriver set for small, small jobs when regular screwdrivers are too big. It's ideal for everything from eyeglasses to watch bands to typewriters ... any precision screwdriving. It's a must for every home, workshop or office. The compact kit includes a handy holder and cover, knurled handle with swivel knob and 5 precision-ground driver bits — 3 for slotted screws, 1 for recessed screws, and 1 awl. Manufactured of high quality, heat-treated tool steel.
Model 707 ..... **5.95**

Writes on woods, metals, glass, plastics to protect your possessions

Help protect your valuables with personalized identification

$7.95

- Tungsten carbide tip
- Variable stroke adjust
- 7,200 strokes per minute
- Sturdy 12-watt motor
- Durable hi-impact case
- Lightweight and contoured

Wen Electric Pencil Engraver. Discourage theft and assure the return of your valuables in the event of theft when you personalize your belongings with this Electric Pencil Engraver. You use it like a pencil to write, draw, monogram or engrave on woods, metals, plastics, glass and other hard surfaces. Features a super-hard tungsten carbide tip to scribe clean lines. The sturdy 12-watt motor produces up to 7,200 strokes per minute, and a variable stroke adjustment allows you to make heavy or fine line engraving. The Engraver is housed in a durable hi-impact case, and comes complete with on-off slide switch. The lightweight unit is contoured to fit your hand for extra ease of marking.
Model 21C **7.95**

MONEY-BACK MANUAL PREVIEW

MONEY-BACK MANUAL OFFER. All kits come with manuals, but if you'd like to see how easy kitbuilding is, you can order the manual first. And we'll deduct the price of the manual when you buy the kit. Simply include manual invoice with your order.

Be sure to send manual orders on a separate sheet of paper. Manuals are $4 each except for the following: color TV's, organs, H9, H10, H8-18, WH8, WH11A, SB-104A, HW-101, AN-2016A, AR-1515, AA-1515, AJ-1600, AP-1800, AA-1640, AJ-1510A, AR-1500A, SO-4105, SO-4235, IP-2711, and ET series, which are $7 each. Add 50¢ postage and handling for each manual ordered. Write Heath Company, Parts Dept., Benton Harbor, MI 49022.

Copies of the Heathkit warranty or warranties for any other consumer product in this catalog costing more than $15 may be obtained free of charge by writing the Manager of Marketing Services, Heath Company, Benton Harbor, MI 49022.

CAREER OPPORTUNITIES AT HEATH. Heath Company has several challenging positions open in the areas of Electrical Design Service. If your expertise is in instrumentation, audio, communications or computer equipment, please feel free to send resumes and salary requirements to:

Heath Company, Personnel Department, Benton Harbor, MI 49022
We are an Equal Opportunity Employer M/F

COME SEE OUR EXHIBIT AT THE FOLLOWING SHOW:

Oct. 5-7, 1979 PC-79 (Computer) Show ..... Philadelphia, PA

Modification Kit for H11/WH11 and H11A/WH11A Computers

Special modification kit places line time clock switch on the front panel for easy access. It's easy to assemble and it includes a whole new front panel. Kit H11M, $50 plus $3.50 shipping and handling.

Save Gasoline! Open a Heathkit Revolving Charge

That's right, save gasoline. When you have a Heathkit Revolving Charge, it's easy to get the Heathkit products you need at our stores. But ordering by phone can save gasoline, too. Just call the Heathkit Electronic Center nearest you during regular store hours and place your order by phone. We will be glad to ship your selection out to you the same day you call. See page 101 for the address and phone number of the Heathkit Electronic Center nearest you...and remember, parts and service are available, too.

The President's Corner

Dear Friends,

The demand for high-value, low-cost microcomputers continues to increase. As software has become available for use in small business enterprises, and as educators have recognized the advantages in using computers as a teaching aid, the requests we receive for factory assembled and tested products have grown substantially.

Accordingly, we have announced a line of microcomputers fully assembled. They will be sold as H/S Data Systems. These products will appear in a network of specialized computer dealers in some 60 countries including the United States, Canada and Europe. You will also find them in our catalogs.

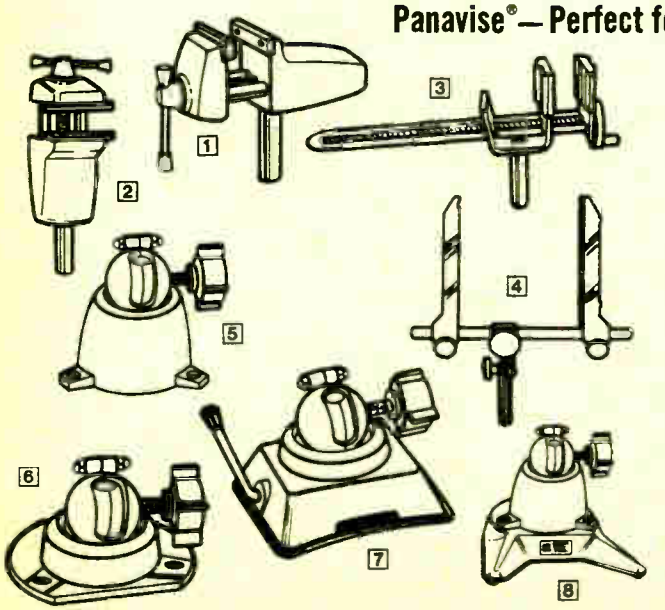
This does not mean we will slacken our efforts in bringing you the best in the way of kits, be they computers or other products. However, if you have a friend who has a requirement for our assembled microcomputer, we would certainly appreciate your giving him our name.

Our educational product line is substantially broadened by the introduction of many new programs included in this catalog. Some of our courses are now available in French, German and Spanish, as the interest in adult education is growing world-wide. This, in part, is due to the impact of personal computers and the widening use of microprocessors in a variety of products.

D. W. Heath President, Heath Company

NOTE: From time to time we make our mailing lists available to reputable businesses with offers we think would be of interest to you. If you do not wish to receive such offers, please send us the address label from your catalog with your request to: Heath Company, Dept. 597-999, Benton Harbor, MI 49022.

Panavise®—Perfect for the Kitbuilder!



[1] **Vertical Jaw Vise Head**—All purpose vise head suitable for most hobby applications. Nylon Jaws won't mar work and open to 2¼". **Model 303 Vise Head** **12.95**

[2] **Low Profile Vise Head**—Functions and features similar to above but straight front edge allows pivoting out and away from workbench. **Model 304 Vise Head** **12.95**

[3] **Wide Opening Vise Head**—Opens to a full 6 inches. Neoprene jaws provide firm non-marring grip. Fine thread screw permits precise adjustment. **Model 366 Vise Head** **12.95**

[4] **Circuit Board Holder**—Just what you need to hold just about any size or shape circuit board. Tilts 220 degrees. Spring loaded for quick insertion and removal. **Model 315 Circuit Board Holder** **16.95**

[5] **Panavise Base**—Holds all the above vise heads. Three mounting lugs attach to bench. Variable load control adjusts position of work as you desire. **Model 300 Base** **11.95**

[6] **Low Profile Base**—All the features of the above base but only 2½ inches high. For working close to bench. Will mount flush with edge of bench. **Model 305 Base** **11.95**

[7] **Vacuum Base**—Similar to above bases but with lever-actuated vacuum base for attachment to smooth, non-porous surfaces. Holds without marring. **Model 380 Base** **16.95**

[8] **Weighted Base Mount**—Drilled to accept Model 300 and 305 Bases above. Cast iron base weighs 5 lbs. and has non-marring, anti-skid feet. Mounting screws included. **Model 308 Base Mount** **14.95**

NEW

Learn about your car's electrical system Fix it yourself and save

WINNER
AWARD OF DISTINCTION

Highest award of the Society for Technical Communicators

SAVE TIME AND MONEY

Avoid costly repairs. Save time and money. Learn to spot and fix electrical problems yourself with the new Heath Automotive Electrical Self-Learning Program. Keep your car running more reliably and reduce your dependence on mechanics.

It's complete

This new 4-module program gives you a complete understanding of the principles of automotive electrical systems, as well as a practical guide to diagnosing and correcting common problems. You'll learn how to care for your battery, how to test each part in your starting and charging systems, how to trace the circuitry throughout your car and repair all lights and accessories. You'll learn how to read schematics, how to use a multimeter, and how to perform preventive maintenance that keeps your electrical system in peak condition and assures you of miles of trouble-free driving.

It's easy

This award-winning program uses proven audio-visual techniques for easy, thorough learning. Clear, color visuals are combined with audio cassette tapes, so you see and hear each step. This is reinforced by written text and test questions and by optional experiments and projects which you perform on your own car.

It's fast

This program is carefully organized and professionally designed for efficient learning. You move at your own pace, as fast or as slow as you choose. Anyone can do it. And your new skill will be just as useful on your boat or plane as on your car. For experienced mechanics, the Automotive Electrical Self-Learning Program is a valuable reference work.

Money-back guarantee. If you're not completely satisfied with your Automotive Electrical Self-Learning Program...or if, after completion of the program, you fail to pass the electrical systems exam given by the National Institute for Automotive Servicing Excellence...Heath Co. will refund the purchase price of the program.

Upon passing the final exam with a grade of 70% or better, you will receive 4.0 Continuing Education Units — a nationally-recognized way of acknowledging participation in non-credit adult education — and a Certificate of Achievement. The Heathkit Automotive Electrical Systems Program includes all four modules, cassette holder, binder, clip leads, parts for experiments and hydrometer.

Heath's Educational Program makes it easy

Electrical Principles of the Automobile:

In Module 1 you learn basic electrical principles, including an understanding of positive and negative charges, the relationship between voltage, current and resistance (Ohm's Law) and the difference between series and parallel circuits. You'll learn how to:

- Use the principles of electricity to understand your car's electrical system.
- Check and correct your battery's electrolyte level.
- Examine a lead-acid battery for correct operation.
- Maintain your battery.
- Check for battery drain.
- Measure headlamp current and battery leakage.
- Protect against short circuits.
- Locate high resistance connections.
- Diagnose and troubleshoot basic circuit problems.
- Locate and repair open circuits, shorts and defective components.
- Locate and replace defective bulbs and fuses.
- Use a VOM to measure voltage, current and resistance.
- Use preventative maintenance procedures to stop trouble before it starts.

The Starting System:

In Module 2 you learn about the major components of your starting system, how each component helps start your car, how to keep your starting system in good working order and how to identify and correct common starting problems. You'll learn how to:

- Identify and understand the function of the starter relay, neutral safety switch, starter solenoid and starter motor.
- Trace the current through your starter system.
- Examine the starter relay for correct operation.
- Examine the neutral safety switch for correct operation.
- Examine the starter solenoid for correct operation.
- Examine the starter motor components for correct operation.
- Describe the relationship between battery voltage and starter motor current.
- Measure starter current draw.
- Perform a voltage drop test on your starter motor.
- Repair or replace starter components.
- Locate open or short circuits.
- Troubleshoot a "no-cranking" condition.
- Avoid cold weather starting problems.
- Periodically examine your car's starting system for any early signs of trouble.

The Charging System:

In Module 3 you learn about the components of your car's charging system, including the alternator and regulator. You'll learn how to:

- Identify and test the components of your alternator.
- Examine the alternator for correct operation.
- Energize the alternator field.
- Identify the advantages of the alternator vs. the DC generator.
- Identify and test your voltage regulator.
- Identify the difference between electro-mechanical and solid-state voltage regulators.
- Examine the voltage regulator for correct operation.
- Trace the wiring of your charging system.
- Measure your system's charging voltage.
- Identify symptoms of common charging system problems.
- Take the necessary safety precautions when working on your charging system.
- Use an engine analyzer (such as the CM-1050 Engine Analyzer on page 59) to test your system.
- Determine engine switch positions for varying engine conditions:
- Repair or replace components.
- Examine both standard and electronic charging systems.

Body and Accessory Electrical Circuits:

In Module 4 you learn about the circuitry that powers the lights and accessories of your car. You'll learn how to:

- Read wiring diagrams and apply them to your own car.
- Test and correct circuitry defects.
- Test and replace bulbs in all lights.
- Test and repair brake lights.
- Isolate shorts in a lighting circuit.
- Test and repair your horn system.
- Test and repair a seat belt warning system.
- Test and repair hazard and turn-signal flashers.
- Diagnose and repair power window malfunctions.
- Determine if charging system capacity is adequate for adding on accessories.
- Use the correct types of replacement wires.
- Identify symptoms of common electrical problems.
- Troubleshoot to pinpoint causes of problems.
- Identify common problems of thermoelectric and electromagnetic gauge systems.
- Test and replace the instrument voltage regulator.

After completing the Heathkit Automotive Electrical Systems Program (Modules 1 through 4), you should have a thorough understanding of your car's electrical system, along with the experience and confidence to correct almost any auto electrical system problem that arises. You'll have all the know-how you need to keep yourself in charge and out of the garage. Simple problems that once required towing service and a big repair bill can be solved by you with the skills you gain in this educational program. And if you pass the final exam with a score of 70% or more, you'll earn 4.0 CEU's and a Certificate of Achievement.

Modules 1 through 4 include cassette holder, binder, clip leads, electrical parts for experiments and a professional hydrometer.

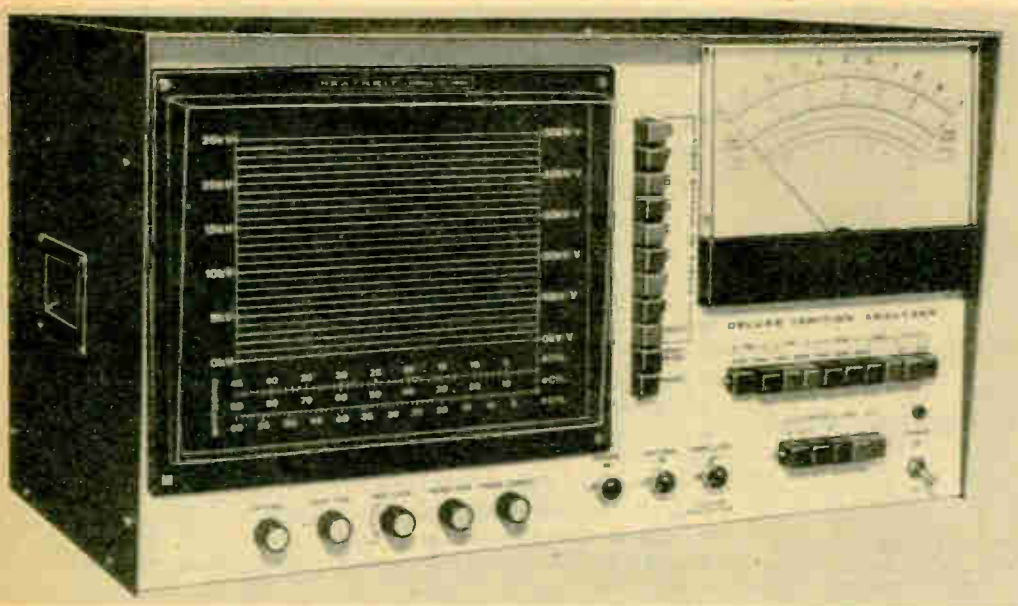
EAC-1, Shpg. wt. 23 lbs. **79.95**

New classroom format for instructor-led group learning

The Heathkit Automotive Electrical Systems Program is now available in a new format designed for classroom use. The student text is the core of the learning material. The student workbook ties into the student text, complete with its examinations and experiments. Using the instructor's guide, the teacher can add his own experience and ideas to the information in the learning material, giving the student a comprehensive learning experience. Separate parts packages contain the electronic parts necessary to complete the workbook experiments. Filmstrips and cassette tapes are also available. The classroom format is ideal for most instructor-led learning situations. For quantity discounts contact Heath Company's Contract Sales Department at (616) 982-3519. Also available from distributors serving the vocational education market in most states (see the distributor list on page 71).

EB-10, Auto Textbook, Shpg. wt. 3 lbs. **12.95**
EB-10-30, Parts Pack, Shpg. wt. 2 lbs. **17.95**
EB-10-40, Student Workbook, Shpg. wt. 2 lbs. **9.95**
EB-10-50, Instructor's Guide, Shpg. wt. 1 lb. **8.95**
EB-10-60, Cassette Tapes, Shpg. wt. 1 lb. **17.95**
EB-10-70, Filmstrips, Shpg. wt. 1 lb. **29.95**

Save more with Heathkit professional-quality auto test equipment



Heath's finest ignition analyzer can pay for itself with the time and money it saves you. Helps you keep your cars running at top efficiency!

Professional-quality Ignition Analyzer assures you of precision auto tuneup and maintenance

Provides the most asked for features in an ignition analyzer of this quality. Rock steady parade patterns are made possible by the latest design in inductive pick-up circuitry and switch selection of number of cylinders — four, six or eight. Dwell measurements are indicated on the big eight-inch meter. Has two voltage ranges — 0-2 V for corroded connections and points measurements and 0-20 V for battery condition and general distribution checks. Cylinder selection buttons can be pushed in multiple numbers so that banks of cylinders can be shorted for carburetor balance and for display of one or more cylinders. Both parade and super-imposed displays or primary or secondary waveforms at two different amplitudes are available on the 12" diagonal CRT. Rugged high-temperature oil and gas resistant neoprene cables provide easy, positive connections to engine. Includes adaptor for GM HEI ignition systems. For use with 4, 6, or 8-cylinder (4-cycle) or 2-rotor Wankel engines and standard, transistorized or C-D ignition systems. Use with optional timing light below for a complete, economical home tuneup center.

Kit CO-2600, Shpg. wt. 83 lbs. **469.95**

COA-2600-2, Alternator Test Adaptor. Shpg. wt. 1 lb. **9.95**

$469.95
With leads and cables

Deluxe Scope Cart
Keeps CO-2600 at ideal viewing angle for easy reading.
COA-2600-3, Shpg. wt. 25 lbs. **39.95**

Kit COA-2600-4, Timing Light/Advance Meter for CO-2600. 3 lbs. **49.95**

CO-2600 SPECIFICATIONS: For Use With: Standard, transistorized, or C-D ignition systems. 4, 6, or 8-cylinder (4-cycle), or 2-rotor Wankel engines. **Signal Pickup:** Direct for primary, inductive for parade trigger, and capacitive for secondary. **Tachometer and Voltmeter Accuracy:** ±3% of full scale on any range. **Scope Vertical Expand:** Minimum 2 to 1. **Operating Temperature Range:** 32°F to 104°F. **Tachometer:** 1000 rpm, 3000 rpm, or 6000 rpm. **Voltmeter:** 2 or 20 VDC. **Power Requirements:** 110/130 or 220/260 VAC, 50/60 Hz. **Weight:** 53 lbs. **Dimensions:** 12⅞" H x 25¼" W x 14⅛" D.

$64.95

Operates on its own rechargeable batteries for safety, convenience and portability

The only self-powered timing light & tachometer available, operates without need for battery connections or clumsy wires

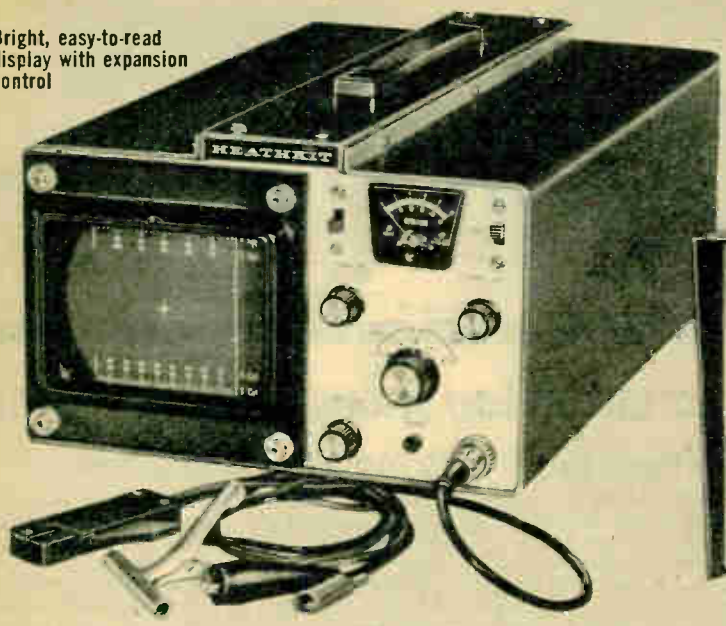
The first professional-quality timing light powered by its own rechargeable battery pack. A single inductive pick-up connection to the #1 spark plug is all that's required. It's the fastest, easiest way yet to make timing and idle adjustments. No more battery connections, no more clumsy wires to get in your way as you work under the hood. It's ideal for use on boats, motorcycles, snowmobiles, as well as any car. For new cars with electronic ignitions, this light is all you need for tune-ups. Special xenon flash tube gives you a big, bright reading. Built-in tach has 2000 RPM and 6000 RPM full-scale ranges. Price includes rechargeable battery and battery pack.

Kit CI-1098, Shpg. wt. 5 lbs. **64.95**

CI-1098 SPECIFICATIONS: Triggering: spark current inductive pickup. **Tachometer Ranges:** 0-2000 RPM and 0-6000 RPM. **Meter:** 2⅛", 500 μA, 250° movement. **Meter Accuracy:** ±5% of full scale. **Power Sources:** Internal, rechargeable 6-volt, 0.6 ampere-hour nickel cadmium battery and 120/240 volt charger. **Dimensions:** 7¼" H x 2⅝" W x 11¼" D.

Get the best from your car with Heathkit Auto Instruments

Bright, easy-to-read display with expansion control



HEATHKIT ELECTRONIC CENTER charg-a-kit REVOLVING CHARGE

Large meter with color-coded scales

Versatile Heathkit Ignition Analyzer makes car-tuneups easier

$179.95

- Easier-to-use than meter analyzers
- Built-in rpm indicator for easy measurements

Detects shorted spark plugs, bad ignition points, defective wiring, worn distributor parts, incorrect dwell angle, plus coil or condenser defects and transistor or capacitive discharge circuitry problems. Can be used with any standard, transistorized or capacitive discharge ignition system on four, six or eight-cylinder engines with distributors. You select one of four different patterns — primary or secondary, in either parade or superimposed display. For detailed analysis, the horizontal sweep can be expanded 10 to 1, vertical sweep 2 to 1. Includes adapter for use with General Motors High Energy Ignition systems.

Kit CO-1015, Shpg. wt. 22 lbs. 179.95

Kit COA-1015-1, 12-Volt Inverter. Lets you operate CO-1015 from your car's 12-volt lighter socket. Shpg. wt. 3 lbs. 37.95

CO-1015 SPECIFICATIONS: Power Requirement: 120/240 VAC, 60/50 Hz, 16 W. **RPM Range:** 400-5000. **Cylinders:** 3, 4, 6 or 8. **Connection Cables:** 12′ pick-up clamp; ground and secondary clip leads extend 2′ beyond pick-up clamp. **Tachometer:** 0-1000 RPM, 0-5000 RPM ±5% of full scale. **Dimensions:** 7″ H x 10½″ W x 17½″ D.

Low-cost professional-grade Engine Analyzer tests batteries, too

$84.95

- Works with any voltage, any 3, 4, 6 or 8 cylinder engine
- With all leads and accessories for complete tuneups

This professional-grade instrument tests conventional, magneto, transistorized, and most capacitive discharge ignition systems — both positive and negative ground, any voltage, on any 3, 4, 6 or 8-cylinder engine. Also tests storage battery, generator or alternator, voltage regulator, starter, distributor, ignition circuit (points, condenser and coil), accessories and all the electrical wiring. Operates on 3 standard "C" batteries (not supplied).

Kit CM-1050, Shpg. wt. 8 lbs. 84.95

CM-1050 SPECIFICATIONS: Voltmeter Ranges: 0-3.2 V DC, 0-32 V DC, ±3% of full scale. **Ohm-meter:** Two ranges: R x 1 (100 Ω center scale). R x 100 (10 Ω center scale), ±3° arc. **Tachometer: Two ranges:** 0-1200 rpm, 0-6000 rpm, ±3% of full scale. **Dwell Meter:** Two ranges: 0-45° (on 0-60° scale). 0-60°, ±3% of full scale. **Amperes:** −5 to +90 amperes DC, ±3% of full scale. **Spark Output:** 0-50. **Point Resistance:** Good/Bad. **Alternator:** Good/Bad. **Condenser:** 0.22 μF, 10%. **Accuracy:** ±3% of full scale. **Cables:** Two 8″ test cables. One 2′ alligator/alligator lead. One 2′ alligator/push-on connector lead. One calibration cable. **Accessories:** 90-amp shunt. 0.25 Ω resistor assembly. One alligator clip. Two #10 solder lugs. **Dimensions:** 7½″ H x 10½″ W x 8¾″ D.

Value-priced Timing Light provides bright flash, even in daylight

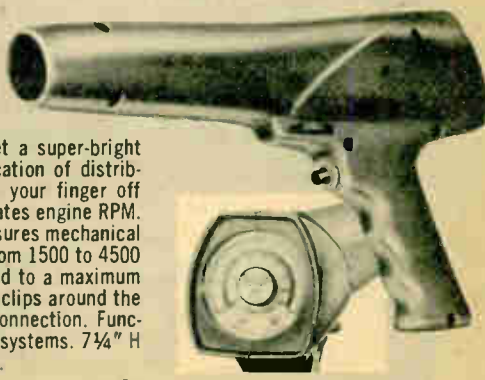
Inductive pickup for easy hookup to your engine

Features a handy inductive pickup that clips directly around the #1 sparkplug wire. (Recommended for GM-HEI and other systems.) Has a super-bright xenon flash bulb that can be seen easily even outdoors. Useful light range is up to 2 ft. in daylight. Comfortable pistol-grip handle for easy operation, insulated blue-plastic housing for shock protection. Polarity protected. Powered by your car's battery or a separate 12-volt supply. With all cables, pickup and clips. Compact size, only 6½″ H x 2″ W x 10″ L.

Kit CI-1040, Shpg. wt. 3 lbs. 34.95

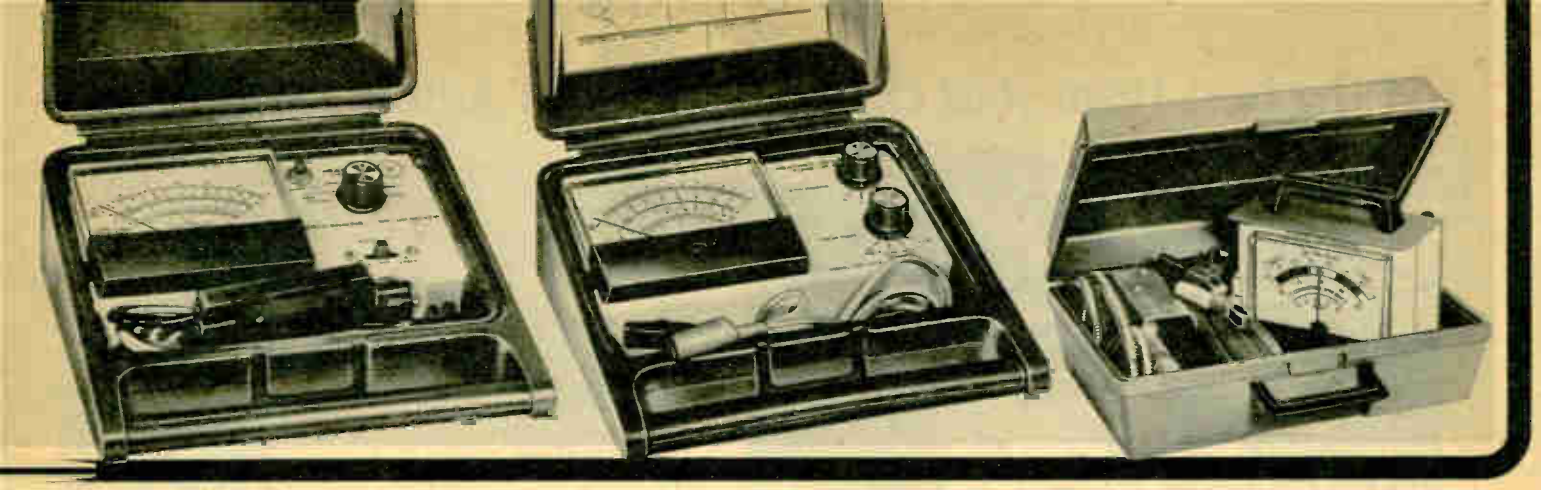
Extra-versatile Timing Light with advance meter and tachometer

Built-in meter measures distributor advance or engine RPM



Merely press the trigger to get a super-bright timing flash and a meter indication of distributor advance in degrees. Take your finger off the trigger and the meter indicates engine RPM. The 250° meter movement measures mechanical or vacuum advance up to 60° from 1500 to 4500 RPM and indicates engine speed to a maximum of 4500 RPM. Inductive pickup clips around the #1 sparkplug wire for quick connection. Functions with all types of ignition systems. 7¼″ H x 2⅝″ W x 11½″ L. For 12 VDC.

Kit CI-1096, Shpg. wt. 4 lbs. 69.95



Heathkit tune up meters keep your car in top shape all year 'round

Universal Small Engine Tune-up Meter

Handy, easy-to-operate meter helps you keep all your small engines running at top efficiency. Ideal for garden tractor, lawn mower, motorcycle, snowmobile, outboard motors, small cars, etc. Can be used with all small engines including Briggs and Stratton. Tests volts, ohms, dwell & continuity on 1 to 4 cylinder, 2 & 4 cycle engines. Built-in tach and snap-on pickup for easy and convenient use and setup. Uses three 1.5 volt "C" batteries (not included). Has large easy-to-read color-coded meter and self-contained carrying case for easy portability and storage.

Kit CM-2045, Shpg. wt. 4 lbs. **49.95**

CM-2045 SPECIFICATIONS: Voltmeter: 0-20 V DC. **Ohmmeter:** 0 to 100 kΩ (10 kΩ center scale). **Tachometer:** Two ranges: 0-3000 rpm, 0-15000 rpm. **Dwell Meter:** Four scales: 1 cylinder. 90°-360°; 2 cylinder, 40°-180°; 3 cylinder, 30°-120°; 4 cylinder, 20°-90°. **Power:** three 1.5 V "C" batteries. **Dimensions:** 9⅛" H x 9⅜" W x 5¼" D.

Economy Three-In-One Tune-up Meter

Combines a distributor cam dwell meter, an electronic tachometer and a direct-current voltmeter in a single, compact unit. Can be used with both 6 and 12-volt electrical systems with positive or negative ground, and with solid-state and high-energy ignition systems. It has just two leads to connect to the engine and draws its power from car battery. Complete with leads, instructions and high-impact case for easy portability and storage.

Kit CM-1073, Shpg. wt. 5 lbs. **32.95**

CM-1073 SPECIFICATIONS: Dwellmeter: Three dwell scales: 8 cyl., 10-45 degrees; 4 cyl., 20-90 degrees; 6 cyl. & 3 cyl. x 2, 25-60 degrees. **Tachometer:** Two RPM ranges; Low range — 0-1500 RPM; High range — 0-2500 RPM. **Voltmeter:** Direct reading scale, 0-20 VDC. **Power Requirement:** 10 mA approximate average current. **Meter:** 4½", 1 mA (100 degree movement). **Accuracy:** ±3% of full scale. **Dimensions:** 4¼" H x 8½" W x 7¼" D.

Exhaust Analyzer For Better Tune-ups

The CI-1080 monitors your car's exhaust for minimum air pollution and maximum efficiency by measuring thermal conductivity of the exhaust gases. Shows the air-fuel ratio, combustion efficiency and the percentage of carbon monoxide in the exhaust. Ideal for checking a car which must meet specific requirements for exhaust emissions. Comes with all cables and tubing for easy connection.

Kit CI-1080, Shpg. wt. 6 lbs. **79.95**

CI-1080 SPECIFICATIONS: Meter Scales (3): 11.5-15.0 Air-Fuel Ratio. 70%-90% Combustion Efficiency. 0-8% Carbon Monoxide. **Exhaust Type:** From 4-cycle gasoline engines. Not for use with catalytic converters. **Accuracy:** Within 1 Air-Fuel Ratio depending on fuel used. **Meter:** 4½", 100-0-100 μA. **Connectors:** Battery cord, 7 feet. Sensor cord, 21 feet. Exhaust flexible tube, 30 inches. **Power Requirement:** 6-volt or 12-volt car battery, less than 150 mA. **Weight:** 4 lbs., 12 oz.

These Automatic Battery Chargers give your battery instant starting power when the mercury plunges

Deluxe 15-Amp Automatic Battery Charger with safety turn-off and battery-boost

$79.95

Charges 12-volt car batteries at 15-ampere rate, provides a 50-ampere boost charge to quickly charge dead batteries for fast starts.

Don't let a dead battery make you miss important work and social commitments when freezing temperatures hit. The GP-1044's front panel meter monitors the battery and indicates charge rate, current and full charge, or if boost charge is required. When the battery is fully charged, the GP-1044 turns itself off. Complete circuit breaker protection prevents damage to charger or battery. For use on positive or negative ground batteries. All solid-state. Comes with all cables for fast, easy hookup. 6⅛" H x 11½" W x 7¾" D. For 110-130 VAC, 60 Hz.

Kit GP-1044, Shpg. wt. 22 lbs. **79.95**

Low-Priced 10-Amp Automatic Battery Charger with safety turn-off

$49.95

Won't overcharge your battery, even if you leave it hooked up for long periods of time!

Old Man Winter can't kill your battery with a freezing blast of cold mercury when you have the Heathkit 10-amp Automatic Battery Charger. It charges 12-volt car batteries at 10-ampere rate, turns off automatically when battery is fully charged. A front panel meter monitors battery condition to indicate rate of charge and full charge. Easy to use — just connect the battery cables (included) to your car battery terminals and plug charger into AC outlet. Safety circuit prevents sparking until charger "senses" proper hookup. Case with non-scratch feet. 5½" H x 9" W x 6⅜" D. For 110-130 VAC, 60 Hz.

Kit GP-21, Shpg. wt. 13 lbs. **49.95**

Heathkit Car Burglar Alarm prevents the theft of your car and its valuable contents

Protect your car and its contents. The Heathkit Car Burglar Alarm sounds your car's horn if break-in occurs. Scares thieves away. Protect your car radio, CB, stereo, cassettes. Easy assembly and installation. Also can be used for any small enclosed area where 12V supply is available.

Kit GO-1558, Shpg. wt. 2 lbs. **54.95**

Kit GOA-1558-1, Horn Relay Kit, Shpg. wt. 1 lb. **2.95**

Heathkit Auto Accessories make driving safer and more economical

$79.95 Heath/Dana Speed Control increases gas mileage and reduces driving fatigue on long car trips

Just accelerate to your desired speed, set the control and the CS-2048 automatically maintains your desired speed uphill or downhill, around curves and on straightaways! You can take your foot off the gas pedal, relax, and pay attention to the road! A touch of the brake pedal releases control and a resume control lets you slow down or pass cars without affecting the set speed, a set button lets you set a new cruise speed as you desire. The CS-2048 can be used with both automatic and manual transmission, with most domestic cars, trucks and light vans. It can be used with many foreign cars with appropriate adaptor kits sold below. For 12 VDC negative ground only.

CS-2048, Shpg. wt. 6 lbs. **79.95**

CSA-2048-1, Kit contains magnet pair, adhesive and filament tape along with instructions for front-wheel-drive cars or for parts replacement use. For parts replacement or front wheel drive cars not specifically covered in kits below. Shpg. wt. 1 lb. **6.95**

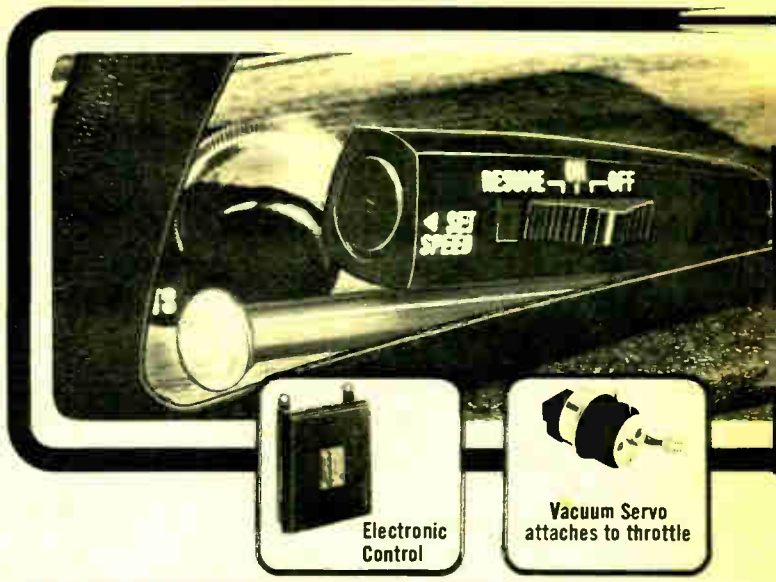
CSA-2048-2, Contains servo cable, throttle linkage adaptor hardware and magnet pair for '73-75 Honda Civic, '75-'77 Honda CVCC and '77 Honda Accord. Shpg. wt. 2 lbs. **15.95**

CSA-2048-3, Kit contains servo cable, throttle linkage adaptor hardware and vacuum tee for '75-'77 Toyota Corollas. Shpg. wt. 1 lb. **15.95**

CSA-2048-4, Kit contains throttle linkage adaptor hardware and vacuum tee for '73-'75 Toyota Corona (2000 cc), '75-'78 Toyota Corona (2189 cc), and '73-'74 Toyota Celica. '75-'78 Toyota Celica, '74-'75 Toyota Crown, '75-'76 Toyota Mark II, '76-'78 Toyota Pickup, '74-'77 Datsun 610/710, '77 Datsun 810, '74-'77 Datsun 280Z. Shpg. wt. 1 lb. **5.95**

CSA-2048-5, Kit contains servo cable, magnet pair, throttle linkage, adaptor hardware, vacuum tee and engagement switch mounting post for the following fuel-injected cars: '76-'77 Volkswagen Dasher, '76-'77 Volkswagen Scirroco, '76 Volkswagen Rabbit, '76-'77 Audi Fox. Shpg. wt. 2 lbs. **15.95**

CSA-2048-6, Kit contains servo cable, magnet pair, and throttle linkage adaptor hardware for '75-'77 Datsun B210, '77 Datsun F10. Shpg. wt. 2 lbs. **15.95**



Electronic Control

Vacuum Servo attaches to throttle

IMPORTANT INSTALLATION NOTE: While the CS-2048 comes fully assembled and tested, and with a fully detailed manual, installation requires a certain amount of mechanical knowledge and proficiency. Modifications must be made to the throttle linkage and work must be performed under the vehicle to install the speed transducer unit. If you are uncertain of your abilities, you may wish to employ the services of a qualified auto mechanic.

Save gas with Heathkit Capacitive-Discharge Ignition System

- **Helps you get longer life from plugs and points**
- **Improves gas mileage to save you money**

Get up to 50,000 miles between tune-ups on cars, trucks, inboards, I/O & outboard marine engines with 12V battery/distributor/coil negative ground systems. Delivers a larger, more precisely-controlled spark to the plugs to better burn the air-fuel mixture. Reduces problems caused by point bounce and wear. External override button switches to conventional system. 3⅛" H x 3¾" W x 6" D.

Kit CP-1060. Shpg. wt. 3 lbs. **39.95**

Heathkit Cab-to-Camper Intercom 3-position switch on Master selects "Standby", "Monitor" or "Talk" modes. Remote can initiate calls and has "Radio" position to bring music into camper from cab radio. Requires 12 volt, 250 mA power source.

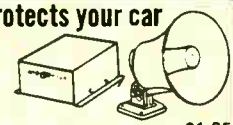
Kit GD-160, Master, Remote & Cable. Shpg. wt. 5 lbs. **39.95**

GDA-160-1, Accessory Plug. For quick disconnect. 1 lb. **4.95**

The Heathkit Car Security System protects your car

Car security system sounds your horn if thieves break in. Optional siren for extra "scare power."

Kit GD-1157, Shpg. wt. 3 lbs. **32.95**



Kit GDA-1157-1, Optional Siren Accessory, 2 lbs. **21.95**

GDS-1157, GD-1157 and Siren Together, 12 lbs. If pur. sep., $54.90 ... **42.95**

Kit GDA-1157-2, Optional Horn Relay. For cars without horn relay. 1 lb. **2.95**

Build-it-yourself Emergency Siren/PA can save cash for your community's volunteer emergency units

It's a 55 watt siren with automatic or manual "wail," a 20 watt PA to amplify your voice, or a radio call alert when you're away from your vehicle. Has push-to-talk microphone for clear voice reproduction. NOTE: Please check standards for mobile sirens in your area.

Kit GD-18, Shpg. wt. 6 lbs. **74.95**

Assembled WD-5130, siren/PA amp, Shpg. wt. 6 lbs. **139.95**

Assembled GDA-18-1, exterior horn, Shpg. wt. 10 lbs. **79.95**

Kit GDA-18-2, concealed horn (requires 4½" x 4½" x 13" behind grille), Shpg. wt. 10 lbs. **79.95**

Assembled WDA-5130-2, concealed horn, Shpg. wt. 10 lbs. **99.95**

SAVE $19.95 On these Siren/PA systems! If purchased separately, 154.90

GD-18A (Kit GD-18 and Exterior Horn) Shpg. wt. 21 lbs. **134.95**

GD-18B (Kit GD-18 and Concealed Horn) Shpg. wt. 21 lbs. ... **134.95**

Digital readout car accessories from Heath

1 Car Thermometer shows inside and outside temperatures

$99.95 Easy-to-read digital display shows temperatures as you drive

It's ideal for R-V's, campers, motor homes, any 12-volt vehicles. Two temperature sensors, one for outside your vehicle and one for inside. give you outside and inside temperatures. Outside sensor can alert you to frozen roads. You can even use it in your boat with a sensor placed outside at water level to indicate the surface temperature of the water. The 2½-digit readout indicates temperatures from −20°F to 140°F (−30°C to +60°C). Special IC sensors and a dual-slope A/D converter combine to give you a readout accuracy of ±3%. A button automatically changes the readout from Farenheit to Celsius, and you can alternate inside or outside readings or hold either one. Has automatic brightness adjustment for easy reading in any ambient light.

Includes inside and outside temperature sensors, each with 9½-ft. cable. Easy mounting with sticky-backed tape or with special gimbal bracket, both included. You also get solid-state design for long, reliable performance. 3.12" H x 4.71" W x 3.12" D. For 12 VDC negative ground.

Kit CI-1525, Shpg. wt. 2 lbs. **99.95**

2 Car clock/timer with digital quartz precision

$39.95 Clock for accurate time in your car
Timer keeps track of driving time

SAVE $10.00

It turns off with the car ignition to preserve battery power, but clock continues to keep accurate time. It's compact enough for easy mounting on or under the dash of your car, boat, camper or motorcycle — anywhere a source of 12 VDC negative ground is available (not approved for aircraft use).

GC-1415 Digital Quartz Clock/Timer displays the time to the minute in easy-to-read fluorescent digits, also includes switch-selectable timing ranges for 0-24 hours for timing trips in hours and minutes and 0-10 minutes for timing minutes and seconds for use as a stopwatch. Timer accumulates for 24 hours and can be stopped to allow actual driving time to be calculated without including stops. Clock and timer functions can be switched back and forth without affecting accuracy of either function. 1.80" H x 4.71" W x 3.12" D.

It's a handsome addition to any car, as well as a useful driving aid.

Kit GC-1415, Shpg. wt. 2 lbs. ..... **Was $49.95, Now 39.95**

GC-1406 Digital Readout Quartz Clock (Not Shown). Same as GC-1415, but does not include timing functions.

Kit GC-1406, Shpg. wt. 1 lb. **29.95**

3 Tachometer/Speedometer shows speed and engine rpm

As low as $49.95 Now get instant digital readout of your car's speed and engine RPM as you drive. Styled to match CI-1525

As a digital readout speedometer, the CI-1265 instantly and continuously monitors your car's speed. The continuous digital readout provides a better degree of accuracy than most conventional speedometers and maintains its accuracy over its entire speed range. Push a front panel button, and the CI-1265 instantly switches to show your engine rpm. The CI-1265 is sensitive enough to indicate changes in speed or rpm as little as 1 mph (or 1 kmph) and rpm variations of 100. A single calibration control on either mph or kmph ranges automatically calibrates the other control, so conversion between English and metric speed units is unnecessary. Features an automatic dimming circuit which adjusts display to ambient light, front panel speed/tach switches. For use with any 4, 6, or 8-cylinder, 4-cycle engine with spark ignition. With hardware and mounting bracket for installation in or on your car's dash. For 12 VDC negative ground. Easy kit assembly.

Kit CI-1265-1, For cars without CS-2048 Cruise Control. Shpg. wt. 3 lbs. . . **59.95**

Kit CI-1265-2, For cars with CS-2048 Cruise Control. Shpg. wt. 3 lbs. **49.95**

Save on Fully Assembled Clarion Car Stereo Components

4 Clarion In-Dash Cassette Stereo. Features a combination AM/FM stereo receiver and cassette tape system. Has fast forward/rewind controls, automatic reverse for continuous play, and a sensitive FET front end. 7⅛" W x 2" H x 5½" D. Mfr's suggested list price, $239.95.

CRP-1267, Shpg. wt. 6 lbs. **199.95**

Clarion In-Dash 8-Track Stereo. As above, 8-track instead of cassette. Features digital track selector and FM stereo indicator display. 7⅛" W x 2" H x 4¾" D. Mfr's suggested list price, $161.95. **CRP-1266,** Shpg. wt. 5 lbs. **129.95**

5 Clarion Graphic Equalizer/Power Booster. Hooks up to most tuners and tape players, features 15 watts RMS output per channel and five indivdiual slider controls for 30 through 15,000 Hz. Also has front/rear fader control 6¾" W x 2½" H x 6" D. Mfr's suggested list price, $109.95. **CAP-1264,** Shpg. wt. 4 lbs. **109.95**

6 Clarion Three-Way Car Stereo Speakers. Features a 5" woofer, 2½" mid-range, and 1" tweeter for beautifully transparent 3-way sound. Includes open mesh grill covers. For the finest sound in car stereo add Clarion's "Six Pack" to the rear deck of your car! Mfr's suggested list price $126.95.

CSP-1262, SK-99 & grill, Shpg. wt. 10 lbs. ..... **Pair 109.95**

7 Clarion Two-Way Car Stereo Speakers. 6" x 9" woofer and 3" center mounted tweeter. Speakers install flush in the rear deck of your car and have handsome open mesh grills. Mfr's suggested list price, $67.95.

CSP-1261, SK-89 & grill, Shpg. wt. 10 lbs. ..... **Pair 64.95**

Windshield Wiper Delay for safer driving in rain or mist (not shown)

Varies the number of wiper sweeps to prevent wiper "slapping" in light rain or mist. Mounts on or under dash with adhesive strip or bracket. Can be used with most single and two-speed electric wiper systems on GM cars. Most small and intermediate Ford cars (Not for '72-'76 Torino, Montego or '74-'76 Cougar). Single and two-speed Chrysler cars which do not use a motor reversing parking system. Single and two-speed AMC systems. Also compatible with electric wipers which do not use a motor reversing parking system. **Note:** Heath does not supply automotive wiring diagrams with this unit. For 12 VDC positive or negative ground.

Kit CH-1068, Shpg. wt. 2 lbs. **17.95**

At last there's an easy way to teach yourself electronics!

Open new opportunities for yourself in electronics

The Heathkit Continuing Education Series of individual learning programs is designed to take you step-by-step through a variety of electronics-related subjects — basic electronics, automotive maintenance, computer programming and test equipment. Understanding these subjects can open up new opportunities for you.

These programs use effective multimedia self-instruction techniques that make learning fast, fun and effective. They're in use by the thousands — by individuals, in school and industry training programs — and they've been proven effective!

Programmed Learning Texts: Each program in the Heathkit Continuing Education Series features a programmed learning text. You can read at your own pace in easy-to-understand, step-by-step segments. Almost before you know it, you've digested a portion of material. After a few of these portions, a self-test review lets you check your progress. The chapters and units are arranged in a clear, easy-to-understand order for quick progress.

Get "Hands-on" experience for a better understanding of electronics: Our optional Electronic Trainers give you actual "hands-on" experience with electronic components and circuitry. You learn best by doing and the trainers let you do exactly that. You get a better grasp of circuit concepts and perform the program projects quicker and easier as well. After you complete the programs, the trainers serve as ideal circuit experimental units so you can do your own breadboarding and circuit design.

Audio Records "reinforce" the text material: Text material is accompanied by audio aids, plus large illustrated visual materials that help you to learn faster and more effectively. They help to make the text material more interesting and learning easier. And all you need to use them is a record player or a standard cassette recorder/player.

If you elect to take the optional final exam and score 70% or better, you will receive a Certificate of Achievement and be awarded Continuing Education Units (CEUs). **If for any reason you are dissatisfied with these programs, Heath Company will refund the full purchase price of the text material (less trainer).**

Subscribe to Self-Learning Newsletter: We publish a newsletter about continuing education called PERSONAL LEARNING and it keeps you informed about the many developments going on in adult Continuing Education. It features stories about people who have benefitted from the Heath Continuing Education Programs and profiles of companies using Heath Continuing Education Programs for their in-company training programs. **For your one-year subscription to PERSONAL LEARNING, send $5.00 to PERSONAL LEARNING, Heathkit Continuing Education, Benton Harbor, MI 49022.**

IMPORTANT TAX NOTE: All the Continuing Education Programs and trainers may qualify you for a Federal Tax Deduction. Treasury Regulation 162-5 permits an income tax deduction for educational expenses undertaken to: (1) maintain or improve skills required in one's employment or other trade or business, or (2) meet express requirements of an employer or a law imposed as a condition to retention of employment, job status or rate of compensation.

Learn about Op Amps, one of today's most important integrated circuits

The new Operational Amplifier Program makes it easy to gain in-depth understanding of one of the most commonly used integrated circuits. Because op amps are being used more and more, you will be working with them more. This program gives you the experience to know how they work and how they can work for you.

A 385-page self-instruction text, with test questions at the end of each unit, takes you step-by-step through the design and operation of operational-amp circuits. At the end of each unit, a series of experiments are outlined for you to perform. The experiments require circuit parts, like resistors, capacitors, diodes, transistors, indicator lights and IC's — all of which are included in the program. Also needed for the experiments is the ET-3300 Heathkit Lab Bread Board (listed below), and an oscilloscope like the Heathkit IO-4105 (see page 97), a multimeter like the IM-1104 (see page 90) and a frequency generator like the IG-1271 (see page 91).

The text, reinforced by test questions and experiments, teaches you how to measure and compute common op-amp parameters, how to design basic op-amp linear circuits, how to design integrator and differential circuits, and how to design and predict the performance of op-amp constant current sources, current-to-voltage convertors and voltage-to-current convertors — and much more. Even the popular Norton and BiFET op amps are covered. Upon completion of the optional final exam, you will be awarded 3 CEU's.

EE-101, Shpg. wt. 5 lbs. **39.95**

Kit ET-3300, Shpg. wt. 6 lbs. **94.95**

Assembled ETW-3300, Shpg. wt. 6 lbs. **159.95**

New Active Filters Program makes in-depth learning of this new design easy

This new program provides a complete understanding of a very critical element in circuit design — the active filter. The significant advantages of active filters over passive LC networks are making them more and more common in electronic devices. This new program is designed to give you a thorough grasp of the subject.

The new Active Filters Program includes a 300-page self-instruction text describing the design, operation and uses of active filters. Test questions at the end of each unit assure thorough understanding. Also, at the end of each unit, a series of experiments give you hands-on experience with active filters. A complete package of parts is included for use in the experiments.

With this program you teach yourself how to design active filters with op amps, how to plot and predict frequency responses, how to design and breadboard first-order low-pass, and high-pass filters. Later units teach how to design and build second-order and high-order filters, as well as bandpass and state variable filters. Prerequisite for the Active Filters Program is EE-101 Op Amp or its equivalent.

To complete the experiments you need the ET-3300 Lab Breadboard (listed below), an oscilloscope like the IO-4105 (see page 97), a multimeter like the IM-1104 (see page 90) and a frequency generator like the IG-1271 (see page 91). Upon completion of the optional final exam, 3 CEU's will be awarded.

EE-102, Shpg. wt. 5 lbs. **29.95**

Kit ET-3300, Shpg. wt. 6 lbs. **94.95**

Assembled ETW-3300, Shpg. wt. 6 lbs. **159.95**

Heathkit Test Instrument Self-Instruction Program

Analog and Digital Meters

This first learning unit consists of two comprehensive texts, the first describing analog meters and the other digital meters. The unit on analog meters covers the types of movements and how each is used to measure voltage, current and resistance; the operation of the volt-ohm-milliammeter (VOM) and the electronic volt-ohm-milliammeter. The unit on digital meters covers the conversion from analog to digital; compares analog meters to digital meters and discusses factors to consider when you select your own meter. When you complete both of these units, you will be able to:

1. Use both analog meters and digital meters to make electrical measurements.
2. Explain how to determine the sensitivity of a meter.
3. Explain how high input impedance is achieved in an electronic meter.
4. Describe the uses of the high and low-voltage ohms positions of an ohmmeter.
5. Explain the advantages of a digital meter over an analog meter.
6. Give the advantages of an integrating meter over a non-integrating meter.
7. Explain the operation of both integrating meters and non-integrating meters.
8. Describe how electrical current and resistance are measured with a digital multimeter.
9. Explain what is meant by resolution, sensitivity and accuracy.
10. Understand the types of probes used with meters and explain what each type of probe does.

The ET-3100 Electronic Trainer (see page 65), a digital meter and an analog meter should be used to get the most out of Unit 1. Unit 1 includes parts for hands-on experiments, using the ET-3100 Electronic Trainer. Upon completion of this module, you progress to:

Oscilloscopes

The second unit covers oscilloscopes which are essential for designing, testing and servicing electronic equipment. There are an almost infinite number of wave-shapes that can exist with electrical signals, and you can actually see and interpret these wave-shapes with an oscilloscope. Unit 2 discusses the components and circuits which become part of the oscilloscope. It also discusses the function and operation of various controls and how to interpret various scope displays. When you complete Unit 2, you will be able to:

1. Identify the various parts of a Cathode Ray Tube (CRT), using a drawing of the CRT.
2. Explain deflection sensitivity and bandwidth.
3. Identify the difference between a horizontal deflection circuit and a vertical deflection circuit.
4. Explain the purpose of blanking and unblanking.
5. Explain the difference between triggered and free-running sweeps.
6. Describe the operation of a delayed sweep.
7. Identify the ways a dual-trace presentation can be obtained.
8. Explain the chop and alternate methods of dual-trace development.
9. Explain the operation and various applications of both storage and sampling oscilloscopes.
10. Identify various oscilloscope controls, and explain the uses of each controls.
11. Describe the use of lissajous figures for making phase and frequency measurements.

An oscilloscope is required to make various measurements throughout Unit 2. The ET-3100 Electronic Trainer (see page 65) is recommended for the hands-on experiments in this module. Parts used in those experiments are included with the module. Once you've learned about Analog and Digital Meters, and Oscilloscopes, you're ready to go on to the next unit.

Frequency Generation and Measurements

This unit covers frequency generation, measurement and counting. A knowledge of frequency characteristics is essential for performing virtually any electronic circuit troubleshooting and repair. When you complete Unit 3, you will be able to:

1. Express frequency values in Hertz (Hz), powers of ten and wavelength.
2. Calculate the Q bandwidth and bandpass of a resonant circuit.
3. Calculate the value of an unknown inductor.
4. Select the frequency meter that most nearly fits your requirements.
5. Calculate an unknown frequency value, using harmonics.
6. Calculate an unknown frequency value, using null point frequencies.
7. Understand the advantages of electronic counters.
8. Understand the potential sources of counter error.
9. List five sections of a general-purpose electronic counter.
10. Understand the basic modes of counter operation.
11. Increase the frequency range of electronic counters.
12. Describe the methods of calibrating electronic counters.

Various frequency generators and a frequency counter are required for this unit (see page 83). The ET-3100 Electronic Trainer (see page 65) is also recommended, for use with experiments throughout the module. The program includes parts for use in the experiments of Unit 3. After finishing Frequency Generation and Measurements, you proceed to the last module in this series,

Special Measuring Instruments

This unit covers some of the more specialized test instrumentation available for making measurements on solid-state devices, digital circuitry and other electronic equipment. You'll learn what these special measuring devices can read, and some basic techniques for using and interpreting these measurements. When you complete this module, you will be able to:

1. Describe the operation of a balanced bridge.
2. Perform the tests that can be made with a transistor tester.
3. Explain the purpose of a curve tracer.
4. Explain how a spectrum analyzer displays a signal.
5. List the two basic types of spectrum analyzers.
6. List the requirements for a useable spectrum analyzer.
7. Interpret the presentation of a spectrum analyzer.
8. List the primary applications of a spectrum analyzer.
9. State the purpose of a logic probe.
10. Explain the use of a logic pulser.

Special purpose test instruments mentioned above are required. The ET-3100 Electronic Trainer (see page 65) is recommended for use with this module. Parts for conducting hands-on experiments in Unit 4 are included with the program. This unit completes the Heathkit Test Instrument Self-Instruction Program.

NOTE: Various test instruments are required to complete this learning program. The specific types of instruments required are discussed in each module. See pages 81-97 for our quality test equipment.

The complete Heathkit Test Instrument Self-Instruction Program series includes a final examination. **When you pass the final examination, you will earn 6.0 Continuing Education Units (CEU's).**

EE-3105, Shpg. wt. 18 lbs. ..... **Was $64.95, Now 59.95**

Learn how to get the most benefit from your test equipment.

This program teaches you what test equipment is, how it works, how to specify it and how to use it. The complete program consists of four separate modules, with each module containing all the parts and text materials to implement the experiments relating to that module. The Modules consist of: 1. Electronic Meters Analog and Digital; 2. Oscilloscopes; 3. Frequency Generation and Measurements; 4. Special Measuring Instruments. An optional exam covering the material learned in the four modules is also offered. It is included when you order the complete package (see description on previous page). Upon completion of this final exam (passing grade 70% or better), you will receive a Certificate of Achievement and 6.0 Continuing Education Units.

Completion of the first four programs — AC and DC Electronics, Semiconductor Devices and Electronic Circuits — or equivalent knowledge is required for understanding and completing this program. The instruments discussed in the text material for each of the four Modules are also required for completion of the experiments.

Experimenter/Trainer provides hands-on learning experience during experiments

For use with the DC, AC, Semiconductor, Electronic Circuits and Instruments programs — helps you perform each experiment quickly and easily. Has solderless breadboarding sockets, 2-range variable sine and square wave (200-20,000 Hz) signal source, dual-variable power supplies for positive and negative voltages (both variable over 1.2 to 16 volts, 120 mA, both regulated and short-circuit protected), 1k and 100k linear potentiometers. Center tapped transformer provides 30 V rms, 60 Hz for line experiments. For 120/240 VAC, 60/50 Hz.

Kit ET-3100, Shpg. wt. 5 lbs. **69.95**

ETW-3100, Factory Assembled Trainer, 6 lbs. **129.95**

ET-3100/ETW-3100 SPECIFICATIONS: POWER SUPPLIES: Positive Supply Output: 1.2 to 15 volt DC, continuously variable. **Load Regulation:** Better than 1%, no load to full load. **Current Output:** 100 mA with short circuit protection. **Negative Supply Output:** −1.2 to −15 volts DC, continuously variable. **Load Regulation:** Better than 1%, no load to full load. **Current Output:** 100 mA with short circuit protection. **GENERAL: Power Requirement:** 120/240 VAC, 60/50 Hz, 7 watts maximum. **Dimensions:** 3½" H x 12⅛" W x 11¾" D. **Net Weight:** 4 lbs.

Heath makes it easy to learn about the basics of electronics

Professionally designed programs make learning fast, easy and very affordable.

Open new opportunities for yourself when you learn electronics. You can perform your own tests and repairs. Save money and have fun. Gain the knowledge to supplement your income or start a second career in the interesting and useful world of electronics.

Learning electronics could be the most important step you'll ever take. There are many factors to consider. If you're like most people, you don't have the time for conventional learning institutions. They cost a lot in time, travel and tuition. The Heathkit Continuing Education Series makes learning electronics more convenient and affordable for everyone.

Each learning program is simply and logically arranged for easy, step-by-step "programmed" learning. Each program includes everything you need for a thorough understanding. Audio records (or optional cassettes) reinforce the text material and an optional final exam lets you test your overall comprehension. Truly, there's never been a learning method like it. We're so confident you'll be pleased by these programs, we offer a money-back guarantee. If for any reason you are dissatisfied, Heath Company will refund the full purchase price of the text material (less trainer).

Basic Electronics Education Programs are economical. They all use the same trainer so you can get a complete education in fundamental electronics at a price you can afford, usually much less than courses offered at night schools, community colleges or technical institutes. And you save energy, too...you don't have to drive to a campus for classes or to perform lab work.

The AC and DC Electronics Programs are designed for beginners. They're ideal for training field service personnel, or maintenance and production technicians in the basics of electronic equipment. They can provide fundamental information for those peripherally involved with electronics processes, too. For example, a chemical engineer who requires a basic background in the electronics systems used in chemical processing can find these programs very useful.

The Semiconductor Devices Program is designed for the engineer or technician who is already familiar with basic electronics. It gives you the opportunity to refresh your knowledge of semiconductors and solid-state electronics, and to learn the newest electronic technologies, including integrated circuits and optoelectronics.

The Electronics Circuits Program is ideally suited for design engineers or technicians who wish to learn the most efficient or easiest way to design actual circuits, using the latest developments in electronic technologies and the newest electronic components. This program assumes that the first three programs have been completed, or that equivalent knowledge has been attained.

Get "Hands-On" experience and a better understanding of electronic theories and practices with Heathkit Practical Electronic Trainers. Specifically designed for use with each program, these electronic trainers give you actual "Hands-On" experience with electronic components and electronic circuitry. It's an acknowledged fact that you learn more by doing, and the electronic trainers let you do exactly that. The trainers help you gain a better grasp of circuit concepts and perform the program projects quicker and easier as well. Solderless connectors on the trainer panel make hook up of the components supplied with the program quick and neat. Built-in power supplies and signal sources provide convenient operation. Practical Electronic Trainers are available in both kit and assembled forms. The Basic Electronics Education Programs use the ET-3100 trainer (see page 65 for complete description). The advanced programs on the following pages use their own trainers.

Special 4-module design gives you thorough understanding

DC Electronics Learning Program

Covers current, voltage, resistance, magnetism, Ohm's Law, electrical measurements, DC circuits, inductance and capacitance. In short, a complete foundation in basic electronics. Included are texts, records, and electronic components for 20 different experiments. Cassette tapes that duplicate the material on the records are optionally available. The average completion time for DC Electronics is 30 hours. A knowledge of high school math is assumed and an appropriate review of such material is included. When you have successfully completed DC Electronics, you will be able to accomplish the following:

1. Solve problems of current, voltage, resistance, and power.
2. Explain current, voltage, resistance, and power.
3. Discuss the relationship between electricity and magnetism.
4. Using a schematic diagram as a guide, construct DC circuits with resistors, relays, switches, lamps, batteries, and capacitors.
5. Given a wiring diagram of a circuit, draw an equivalent schematic.
6. Use a multimeter to measure current, voltage and resistance.
7. Convert metric prefixes and work with powers of ten.
8. Explain the construction, operation, and purpose of resistors, potentiometers, switches, fuses, relays, capacitors, inductors, and batteries.
9. Use safety procedures for you and your test equipment.
10. Build and experiment with basic DC circuits of your own design.

EE-3101, Shpg. wt. 7 lbs. **44.95**
EEA-3101, Optional Cassettes*, Shpg. wt. 1 lb. **9.95**
ECP-3801, Cassette Record/Player, (not shown, see p. 40) Shpg. wt. 4 lbs. **60.00**

AC Electronics Learning Program

Covers the fundamentals and basic theory of alternating current in a simple, straight-forward manner that can be easily understood. Included is everything you need for thorough, no-compromise learning. Included are texts, records and 16 electronic components for 8 different experiments. If you choose to take the optional final exam and score 70% or better, you will receive a Certificate of Achievement and 1.5 Continuing Education Units. Upon completion of AC Electronics, you will be able to:

1. Explain the difference between AC and DC.
2. Describe the operation of a simple AC generator.
3. Determine average value of an AC sine wave.
4. Determine the frequency of an AC waveform if its period is known.
5. Use AC meters to measure current, voltage, and power.
6. Analyze simple AC circuits which contain resistance.
7. Describe the electrical property of capacitance.
8. Analyze AC circuits with capacitance or capacitance/resistance.
9. Describe the electrical property of inductance.
10. Analyze AC circuits with inductance or inductance and resistance.
11. Explain the basic transformer action.
12. Determine the current, voltage, and power relationships at the inputs and outputs of both ideal and practical transformer circuits.
13. Analyze circuits with resistance, capacitance, and inductance.
14. Explain the operation of series and parallel resonant circuits.

EE-3102, Shpg. wt. 7 lbs. **44.95**
EEA-3102, Optional Cassettes*, Shpg. wt. 1 lb. **9.95**
ECP-3801, Cassette Recorder/Player, (not shown, see p. 40) Shpg. wt. 4 lbs. **60.00**

Semiconductor Devices Learning Program

No education in electronics would be complete without including solid-state technology. Semiconductor Devices teaches you all about this comparatively-recent development. Audio aids help emphasize the text material and you get hands-on experience with the interesting experiments. An optional final exam tests comprehension. Covers fundamentals, diodes, zeners, bi-polar transistor operation and characteristics, FET's thyristors, IC's and opto-electronics. Included are texts, records and 27 electronic components for 11 different experiments. Prerequisites are the first two Heathkit Continuing Education Programs (DC and AC Electronics) or equivalent knowledge. If you choose to take the optional final exam and score a passing grade of 70% or better, you will receive a Certificate of Achievement and 3.0 Continuing Education Units. Upon completion of the Semiconductor Program, you will be able to:

1. Describe the electrical characteristics of semiconductors.
2. Name the primary advantages of semiconductor devices over vacuum tubes.
3. Explain how the most important semiconductor devices operate.
4. Describe how semiconductor devices are constructed.
5. Use semiconductor components properly without damage.
6. Recognize semiconductor packages and their schematic symbols.
7. Design your own circuits using semiconductor devices.
8. Test various semiconductor devices for proper operation.

EE-3103, Shpg. wt. 6 lbs. **44.95**
EEA-3103. Optional Cassettes*, Shpg. wt. 1 lb. **9.95**
ECP-3801, Cassette Recorder/Player, (not shown, see p. 40) Shpg. wt. 4 lbs. **60.00**

Electronic Circuits Learning Program

This program brings all the theory of your first programs together and shows you how it applies in actual circuit operation. Prerequisites are AC and DC Electronics and Semiconductor Devices (or equivalent knowledge). Included are texts, records, and 110 electronic components for 18 different experiments. If you choose to take the optional final exam and score 70% or better, you will receive a Certificate of Achievement and 4.0 Continuing Education Units. When you have completed this course, you will be able to:

1. Identify basic amplifier circuits and describe their operation.
2. Discuss direct current amplifiers, audio amplifiers, video amplifiers, intermediate frequency amplifiers, and RF amplifiers.
3. Fxplain differential amplifiers, comparators, filters.
4. Analyze and design simple inverting and non-inverting amplifiers.
5. Explain power supply rectifiers, filters, and regulation circuits.
6. Identify commonly used LC, RC, and crystal oscillators.
7. Explain shapers, multivibrators, Schmitt triggers, generators.
8. Explain AM, FM, heterodynes, modulation and detection.
9. Construct many transistor and IC circuits.
10. Use voltmeter and oscilloscope to analyze electronic circuits.

EE-3104, Shpg. wt. 7 lbs. **54.95**
EEA-3104, Optional Cassettes*, Shpg. wt. 1 lb. **9.95**
ECP-3801, Cassette Recorder/Player, (not shown, see p. 40) Shpg. wt. 4 lbs. **60.00**

These programs use the optional ET-3100 Electronic Trainer for completion of the experiments. See page 65 for description.

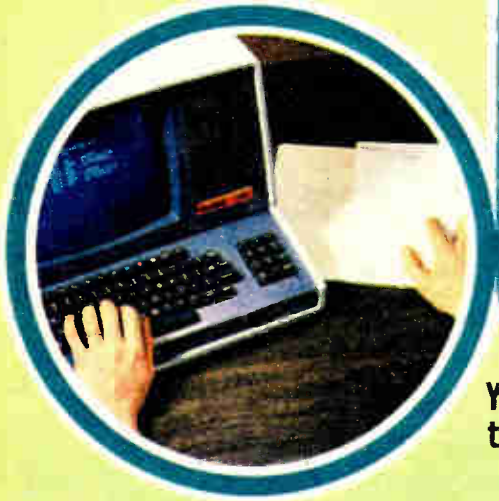
***Optional cassettes duplicate material on records, but in convenient, easy-to-use cassette form.**

Get into Personal Computing the easy, effective Heathkit way

Microprocessor Self-Instruction Program helps you learn about computers and programming

You'll learn microprocessor basics, computer arithmetic, programming, interfacing and much more. It assumes a knowledge of electronics equivalent to Heath's Digital Techniques Program.

Now available in classroom format for instructor-led group learning. See page 71.



You can teach yourself all about computers and programming with this easy-to-use program and the ET-3400 Trainer for program experiments

If you're involved in scientific or electronic pursuits, microprocessors are becoming a way of life and a dominant factor in your success or failure. The EE-3401/ET-3400 self-learning program and accompanying computer trainer is the easy, effective way to learn about these powerful devices. The program uses Heath's proven self-instructional techniques including programmed instructions and audio-visual aids to teach computer programming, microprocessor operation, interfacing and related topics. The microprocessor program is organized into 10 learning units as follows:

UNIT 1: NUMBER SYSTEMS AND CODES. Covers decimal, binary, octal, hexadecimal number systems; conversions and binary codes, positional notation.

UNIT 2: MICROCOMPUTER BASICS. Covers terms and conventions, computer words, executing a program, addressing.

UNIT 3: COMPUTER ARITHMETIC: Covers Binary addition, subtraction, multiplication and division; two's complement arithmetic; Boolean operations — AND, OR, Exclusive-OR, INVERT.

UNIT 4: INTRODUCTION TO PROGRAMMING: Covers branching, conditional branching, algorithms, additional instructions.

UNIT 5: THE 6800 MICROPROCESSOR — PART 1. Covers architecture, instruction set and addressing modes.

UNIT 6: THE 6800 MICROPROCESSOR — PART 2. Covers stack operations, subroutines, input-output (I/O) operations and interrupts.

UNIT 7: INTERFACING — PART 1. Covers interfacing fundamentals; interfacing with random access memory (RAM); interfacing with displays.

UNIT 8: INTERFACING — PART 2. Covers interfacing with switches; the Peripheral Interface Adapter (PIA); Using the PIA.

UNIT 9: PROGRAMMING EXPERIMENTS. Covers experiments with binary/decimal, hexadecimal/decimal, and straight line programs; arithmetic and logic instructions, branches, additional instructions, new addressing modes, arithmetic operations, stack operations and subroutines.

UNIT 10: INTERFACING EXPERIMENTS. Covers memory circuits, clock, address decoding, data output, data input, peripheral interface adapter, audio output, key matrix and parallel-to-serial conversion, digital-to-analog and analog-to-digital conversion.

The EE-3401 is complete with 62 electronic components required to complete the experiments. These components include two 2112 256x4-bit RAM's, 6820 PIA interface chip, 1406 digital to analog converter, 741 and 301 op amps and a variety of other microprocessor-oriented devices. The ET-3400 Computer Trainer, on page 69, is required for the experiments in the Program.

If you choose to take the optional final exam, a passing grade of 70% or better earns you 8.0 Continuing Education Units and a Certificate of Achievement.

EE-3401, Shpg. wt. 12 lbs. **89.95**

EE-3401-1 Slides. Optional 35 mm Slides duplicate the audio-visual flip charts in the EE-3401 program. Shpg. wt. 2 lbs. **60.00**

EE-3401-2 Filmstrip. Optional 35 mm Filmstrip duplicates the audio-visual flip charts in the EE-3401 Program. 1 lb. **20.00**

Get SPECIAL SAVINGS on the Dukane 35 mm Filmstrip/Slide Projector

only **$80.00**

Highly efficient silent slide/filmstrip projector ideal for classroom or individual use. Has color-coded focus, advance and framing levers, lamp and lenses. 110V only.

AV-101, Shpg. wt. 11 lbs. **80.00**

AV-101-2, Molded and Fitted Carrying Case for AV-101. Shpg. wt. 5 lbs. **17.00**

AV-101-1, 2x2 Stack Load Slide Changer, Shpg. wt. 1 lb. **13.00**

Learn microcomputer programming and interfacing the fun way

Trainer
ET-3400

Accessory
ETA-3400

Learn to do your own computer programming with these two versatile units. Join the fun of personal computing.

The ET-3400 Computer Trainer is designed for use with the EE-3401 Microprocessor self-instruction program. It provides all the necessary tools for you to learn the fundamentals of microprocessors, programming and interfacing, and it enables you to perform the experiments described in the EE-3401 program. After you complete the experiments in the EE-3401 program, add the Trainer accessory and a terminal such as the H9, and you'll have a complete low-cost computer system. Order from listings below.

Microprocessor Trainer for EE-3401 Program lets you get "hands-on" computer experience

$209.95 Kit

- Uses the popular 6800 microprocessor
- Built-in 1K ROM Monitor Program
- Breadboarding Socket for Prototyping
- 17-Key Hexadecimal keyboard and LED display

The Trainer and its accessory provide complete, low-cost computing power ideal for practice or practical programming!

Functioning as a miniature digital computer, the ET-3400 Microprocessor trainer is essential for the experiments in the EE-3401 self-instruction program. After completing the program, the ET-3400 is ideal for breadboarding, prototyping and system design. The ET-3400 features a built-in 1K ROM monitor program for controlling unit operation; 6-digit hexadecimal 7-segment LED display for address and data readout; 17-key hexadecimal keyboard for entering programs and data. Has 256 bytes of random access memory (RAM) built-in expandable to 512 bytes with the RAM's supplied in the EE-3401 program. Also has 8 buffered binary LED'S for display of breadboard logic states, 8 SPST DIP switches for binary input to breadboard circuits, a breadboarding socket for prototyping, interfacing and memory circuits. All microprocessor address, control and data busses are buffered and terminated on the front panel for ease of connection to prototyped circuits. There's also provision for a 40-pin external connector to extend memory and I/O capacity, Built-in +5, +12 and −12 volt power supplies. Order trainer and accessory from listings at right.

Microprocessor Trainer Accessory

Makes the Microprocessor Trainer into a complete, low-priced personal computer system. It provides an audio cassette interface so you can store programs on convenient cassettes, it also provides an additional 1K bytes of memory so you can run longer and more sophisticated programs through the ET-3400. The memory can be expanded to 4K bytes with the optional 3K chip set (ETA-3400-1, order from listing below). A serial I/O with EIA or 20 mA loop format in the accessory lets you hook up a terminal such as the H9. The ROM monitor/debugger program lets you implement the standard trainer monitor functions through the external terminal. Memory locations can be examined or changed, break points can be initiated, and program debugging can be accomplished with a single instruction step feature. A tiny BASIC interpreter is provided in ROM to let you program using BASIC. Connects to the trainer by means of a 40-pin ribbon cable supplied. Parts required to modify Trainer are included. Since this modification changes the clock frequency of the Trainer, the experiments in the Microprocessor Program using timing loops will be changed. It is recommended that all the EE-3401 program experiments be completed before adding this modification kit. The accessory cabinet measures 3" H x 11" W x 12" D. For 110/220 VAC, 60 Hz. Order from listing at right.

Microprocessor Trainer.
Kit ET-3400, Shpg. wt. 7 lbs. **209.95**

Factory Assembled and Tested.
ETW-3400, Shpg. wt. 6 lbs. **280.00**

Microprocessor Trainer Accessory.
Kit ETA-3400, Shpg. wt. 8 lbs. **160.00**

Factory Assembled and Tested.
EWA-3400, Shpg. wt. 9 lbs. **250.00**

Optional 3K Chip Set.
ETA-3400-1, Shpg. wt. 1 lb. **50.00**

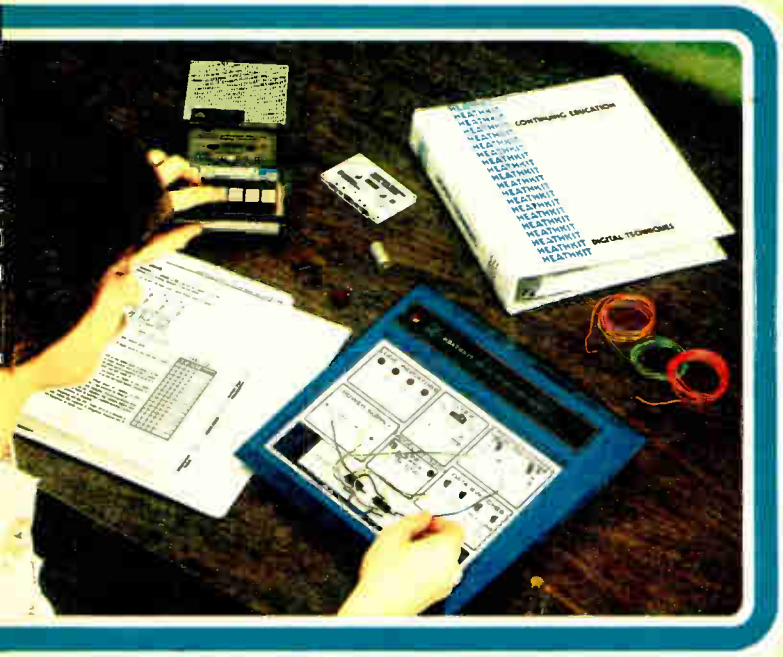
SAVE $120.95 on this complete computer system

For ET-3400 owners only, consists of H9 Video Terminal, Trainer Accessory, 3K Chip Set and BASIC Programming. If purchased separately, $748.95.

ETS-349, Shpg. wt. 58 lbs. **628.00**

NOTE: A terminal such as the H9 is required to use the BASIC and monitor software with the trainer accessory. See page 40 for details on the H9.

Advanced Digital Techniques Self-Learning Program



Learn the operation of digital logic circuits and the major applications of digital techniques in electronics. Covers everything from TTL and CMOS to ROM's, PLA, microprocessors and computers.

When you have successfully completed the Digital Techniques Program, you will be able to:

1. Understand the advantages and benefits of using digital techniques in electronic equipment.
2. Name the major applications of digital techniques in electronics.
3. Convert between the binary and decimal number systems and recognize the most commonly used binary codes.
4. Name the major components used in implementing digital circuits and explain how they operate.
5. Understand the operation of digital logic gates.
6. Identify the more commonly used integrated circuit families used in digital equipment and discuss their operation, characteristics, and features.
7. Use Boolean Algebra to express logic operations and minimize logic circuits in design.
8. Understand the operation of flip-flops.
9. Understand the operation and application of binary and BCD counters, shift registers and other sequential logic circuits.
10. Name the most frequently used combinational logic circuits and explain their operation.
11. Design both combinational and sequential logic circuits for a given application from definition and concept to the selection of the integrated circuits.
12. Understand the operation and application of digital counters in time and frequency measurements.
13. Understand how a digital computer is organized and how it operates.
14. Understand microprocessors, explain their operation and give examples of their applications.

EE-3201, Shpg. wt. 9 lbs. **59.95**

EEA-3201, Optional Cassettes*, Shpg. wt. 1 lb. **9.95**

ECP-3801, Fully assembled Cassette Recorder/Player, (not shown, see p. 40) Shpg. wt. 4 lbs. **60.00**

*Optional cassettes duplicate material on records.

Teaches fundamentals, logic circuits, design applications, more

The Digital Techniques program covers fundamentals and theory, digital logic circuits, digital integrated circuits, Boolean algebra, flip-flops and registers, sequential logic circuits, combinational logic circuitry and digital design. It shows you how to design digital circuitry for virtually any modern electronic application. The program assumes a prior knowledge of electronics, (either the four basic Heathkit programs or equivalent). Includes text, records and 44 electronic components for 24 experiments. The ET-3200 Digital Trainer is required to perform the experiments. Heath also recommends the IM-5284 multimeter (page 89) and an oscilloscope such as the IO-4105 (page 97), is necessary for some experiments. If you choose to take the final exam, a passing grade of 70% or better earns you 4.0 Continuing Education Units and a Certificate of Achievement.

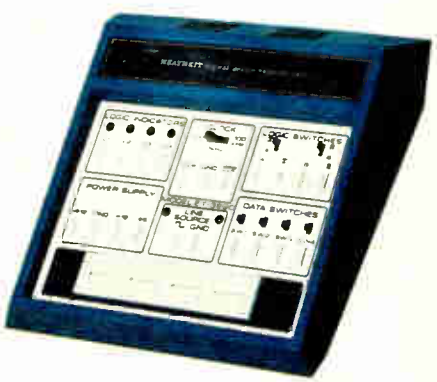
This versatile electronic trainer lets you learn by doing. Use it to get maximum benefit from the Digital Techniques Program.

The Heathkit Electronic Trainer is the way to learn by doing. Use it to perform all the experiments in the Digital Techniques Program, develop projects, build and test prototypes, verify circuit operation and check digital IC's. Has solderless breadboard sockets for experimentation and design, four binary data switches, 2 "no-bounce" switches to pulse logic circuits, 3-frequency pulse clock generator and 4 LED's for visual indication of logic states. The ET-3200 also contains three regulated power supplies with outputs of +12 VDC @ 100 mA, −12 VDC @ 100 mA and +5 VDC @ 500 mA. Each output features current limiting and is overload protected for safe operation. Breadboard sockets accommodate up to eight 14 or 16-pin dual-in-line ICs, also 24, 28, and 40-pin DIPs. The power supplies and circuitry of the ET-3200 are compatible with most of today's commonly-used integrated circuit logic families including: RTL; DTL; TTL; CMOS; ECL; NMOS; PMOS; Linear. For 120/240 VAC, 60/50 Hz.

Kit ET-3200, Shpg. wt. 5 lbs. **84.95**

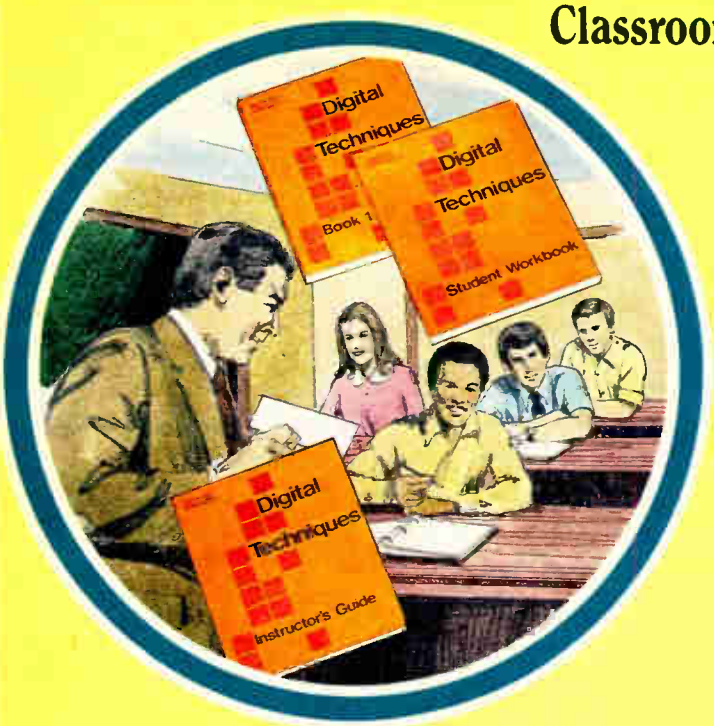
ETW-3200, Assembled and tested version of above, Shpg. wt. 6 lbs. **149.95**

ET-3200 SPECIFICATIONS: DATA SWITCHES: States: +5 volts or 0 volts. **Maximum Current:** 10 mA, each switch. **Outputs:** 4 terminals, one for each switch. **LOGIC SWITCHES: Type:** Momentary contact, spring loaded. **Circuit:** Two flip-flop latches for contact bounce buffering. **Output States:** Complementary, +5 volts and +0.2 volts. **CLOCK: Output Frequency:** 1 Hz, 1 kHz, 100 kHz; ±20%. **Duty Cycle:** 45%. **Output Voltage:** 5 volts peak-to-peak. **POWER REQUIREMENT:** 120/240 VAC, 60/50 Hz, 15 watts maximum. **Fuse:** 3/16-ampere, slow-blow. **DIMENSIONS:** 3½" H x 12⅛" W x 11¾" D.



Use for the experiments in the program, and for circuit design and experimentation after you complete it.

Classroom versions of our Educational Programs Ideal for schools and industrial training



The famous Heathkit electronics learning programs have been completely reformatted for classroom use. Using the instructor's guide, the teacher can add to the information in the program material his own experience and guidance to give the student a fully rounded learning experience. The programs are ideal for classroom use in schools, industry seminars or adult education classes. They provide a very economical method of developing professional materials for classroom use.

The programs are broken down into three separate publications for student and teacher convenience. The student text is the core of the learning material. The student workbook with its exams and laboratory experiments, is keyed to the text. The instructor's guide presents the material in an orderly fashion.

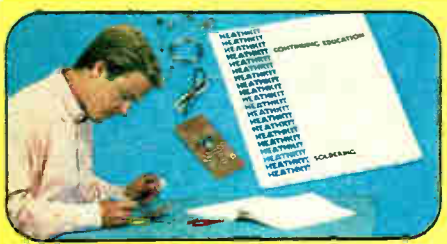
Along with the publications, separate parts packages contain the electronic components needed to implement the workbook experiments. These parts are required for the experiments in the learning programs. To complete the experiments in DC and AC Electronics, Semiconductor Devices and Electronic Programs, the ET-3100 Trainer is required. For the Digital Techniques Program, the ET-3200 Trainer is required. For the Microprocessor Program, the ET-3400 Trainer is required to complete the experiments.

Quantity discounts are available on the programs below. Free brochures are also available detailing the course objectives and outlines. Contact Heath Company Contract Sales Dept. (616) 982-3519 for information and discount schedule.

ATTENTION EDUCATORS: Heath products for education in fully assembled form are available from distributors serving the vo-ed market in the following states. More information and assistance is available at the telephone number listed for your area.

Alabama	205-822-1326	Missouri	913-268-8838
Alaska	907-456-1872	Montana	503-635-3544
Arkansas	205-822-1326	New Hampshire	603-893-4586
California (So.)	714-493-8040	New Jersey	203-762-7043
Connecticut	603-893-4586	New York	516-354-2983
District of Columbia	804-276-9291	North Carolina	919-776-8161
Florida	305-647-5373	North Dakota	612-533-2133
Georgia	305-647-5373	Ohio	216-478-0547
Hawaii	808-536-0243	Oklahoma	214-361-8665
Idaho	503-635-3544	Oregon	503-635-3544
Illinois	312-960-0363	Pennsylvania	717-533-4038
Iowa	612-533-2133	Rhode Island	603-893-4586
Kansas	913-268-8838	South Carolina	704-366-4824
Kentucky	615-682-2509	South Dakota	612-533-2133
Louisiana	205-822-1326	Tennessee	615-682-2509
Maine	603-893-4586	Texas	214-361-8665
Maryland	804-741-2580	Virginia	804-741-2580
Massachusetts	603-893-4586	Washington	503-635-3544
Michigan	313-585-2300	West Virginia	804-741-2580
Minnesota	612-533-2133	Wisconsin	612-533-2133
Mississippi	205-822-1326		

Program	Text Shpg wt 2 lbs.	Price	Workbook Shpg wt 2 lbs	Price	Instructors' Guide Shpg wt 1 lb	Price	Parts Shpg wt 1 lb	Price	Cassettes Shpg wt 1 lb	Price
DC Electronics	EB-6101	17.95	EB-6101-40	7.95	EB-6101-50	8.95	EB-6101-30	15.95	EEA-3101	9.95
AC Electronics	EB-6102	17.95	EB-6102-40	7.95	EB-6102-50	8.95	EB-6102-30	9.95	EEA-3102	9.95
Semiconductor Devices	EB-6103	17.95	EB-6103-40	7.95	EB-6103-50	8.95	EB-6103-30	9.95	EEA-3103	9.95
Electronic Circuits	EB-6104	19.95	EB-6104-40	8.95	EB-6104-50	8.95	EB-6104-30	21.95	EEA-3104	9.95
Digital Techniques	EB-6201 (3 lbs.)	24.95	EB-6201-40	10.95	EB-6201-50	8.95	EB-6201-30	19.95	EEA-3201	9.95
Microprocessor	EB-6401 (4 lbs.)	19.95	EB-6401-40	8.95	EB-6401-50	8.95	EB-6401-30	49.95	EB-6401-60	12.95



Invaluable for Novice Kitbuilders

ONLY $14.95

Learn to solder the correct way with this low cost programmed instruction format

Heath's EI-3133 Soldering Manual and Kit teaches you the techniques necessary for high reliability soldering in all electronics applications. Whether you're a kitbuilder, hobbyist or experimenter, it's the perfect way to learn or brush up on this skill. Using a proven programmed instruction format, the text covers mechanical connection, tinning, temperature control and much more. And to give you "hands-on" experience for really effective learning, a handy practice kit has been included. Requires soldering iron and small hand tools (see p. 14).

EI-3133, Shpg. wt. 2 lbs. **14.95**

Design circuits, test components quickly, easily

Kit only $89.95

The Heathkit Circuit Breadboard is a great convenience tool. Design and test circuits. Test components. Perform your own experiments. Breadboard features solderless sockets for fast, easy connections and teardowns. Plus reliable built-in power supply.

Kit ET-3300, Shpg. wt. 6 lbs. **89.95**

Assembled ETW-3300, Shpg. wt. 6 lbs. **149.95**

ET-3300 SPECIFICATIONS: OUTPUT: +5 VDC @ 1.5 amps; +12 VDC @ 100 mA; −12 VDC @ 100 mA. **REGULATION: Load:** Less than 2% variation from no load to full load on all supplies. **CURRENT LIMITING:** Fixed current limiting of each supply at rated current provides short-circuit protection. **POWER REQUIREMENT:** 120/240 VAC 60/50 Hz 30 watts at full load. **SIZE:** 3½" H x 12" W x 12" D.

Practical math programs for the math skills you need every day

NEW

Unique new learning method makes it easy to learn the basic math skills

The new learning method — audio tutorial — uses cassette tapes to guide you through simplified text material. You hear the instructions as you read and carry them out. Learning is faster, easier and more fun. Now, you can teach yourself the metric system, soon to become the official system in the U.S. You can review the math you learned in high school and first-year college. And you can relearn those important algebraic concepts on which so much of modern engineering is based.

Math Tutorials for Science and Technology

Now you can get a quick review of tne fundamental math skills that you have need for every day in your work. In twelve self-contained programmed workbooks you get a complete review of the math you learned in high school and college. It's an ideal way to refresh your use of these important skills. The tutorials cover:

1. Review: Arithmetic and Signed Numbers
2. Powers and Roots
3. Scientific Notation
4. Arithmetic in Scientific Notation
5. Units and Rounding
6. Graphs
7. Ratio and Proportion
8. Introduction to Algebra
9. Solving Equations
10. Triangle Trigonometry
11. Vectors
12. Probability and Statistics

Upon completion of the program and passing the optional exam (passing grade 70%), you will receive 4.0 Continuing Education Units and a Certificate of Achievement.

EM-1, Shpg. wt. 9 lbs. **39.95**

Think Metric, U.S.A. Now it's easy

Now you can learn the fundamentals of the metric system in a way that's fun and easy. Metric is the most common system of weights and measures used throughout the world. Soon it will become the official system in the U.S. and every American will need to know it. This program introduces you to the most commonly used metric terms, provides examples of what you will be measuring when you use the new units, helps you compare metric sizes to familiar terms, and provides practical examples of using the metric system. Topics include:

1. Metric Vocabulary
2. Linear Measure
3. Liquid Measure
4. Metric Mass
5. Temperature
6. Area and Volume

The material is presented in a three-ring binder and includes an audio cassette to reinforce the printed text material. Upon completion of the program and passing the optional exam (passing grade 70%), you will receive 1.0 Continuing Education Units and a Certificate of Achievement.

EM-2, Shpg. wt. 4 lbs. **19.95**

Algebra for today

Use these three self-instruction programs to gain a complete and thorough background in algebra. The programs include self-review quizzes as you go along, and audio cassettes to further explain and reinforce text material.

Algebra Fundamentals reviews basic algebraic skills. A three-ring binder for the text material and seven cassette tapes are included. Subjects covered include: integer arithmetic, substance of algebra, proportional reasoning, graphs, divisions and multiples, fractions, roots and real numbers. Upon completion of this program and passing the optional exam, you will receive 2.5 Continuing Education Units and a Certificate of Achievement.

EM-3, Shpg. wt. 6 lbs. **49.95**

Algebra provides a working knowledge of algebra. Eight modular sections, plus a workbook and audio cassettes cover: polynomial arithmetic, factoring (I and II), algebraic fractions (I and II), exponents and radicals, linear equations and inequalities in one variable, quadratic equations and inequalities in one variable; probability; sets and operations. Upon completion of this program and passing the optional exam, you will receive 3.0 Continuing Education Units and a Certificate of Achievement.

EM-4, Shpg. wt. 7 lbs. **49.95**

Intermediate Algebra. Eight modules covering advanced problems and theories. Text material and nine audio cassettes. Subjects covered: functions, relations and inverses; graphs and variation; linear relations; quadratic relations; systems of equations and inequalities; determinants; logarithms; sequences and series. Upon completion of this program and passing the optional exam, you will receive 3.5 Continuing Education Units and a Certificate of Achievement.

EM-5, Shpg. wt. 6 lbs. **49.95**

The Heath Self-Instruction Math Series is a great way to prepare for CLEP (College-Level Examination Program). For details write the College Board, Box 1822, Princeton, N.J. 08541.

Texas Instruments TI-50 Slimline Scientific Calculator. Advanced capability and quality with attractive slimline styling. Sixty functions perform all standard scientific and algebraic functions. Scientific notation lets you work with large and small numbers quickly and accurately. Unique algebraic operating system eliminates the need to rearrange formulas or equations. Ideal for use with above math programs. In handy pocket case, fully assembled and tested.

EMA-10, Shpg. wt. 1 lb. **39.95**

Assembled Cassette Recorder/Player. For use with programs above containing audio cassettes. Pushbuttons control play, rewind, fast forward, stop, eject and record functions. Tone and volume controls provided. Built-in three-digit counter. Fully assembled and tested, not a kit. See page 40 for further description and blank cassettes.

ECP-3801, Shpg. wt. 4 lbs. **60.00**

Convenient kits for your health and your home

Now get this digital scale for your home at a reduced price!

SAVE $10.00

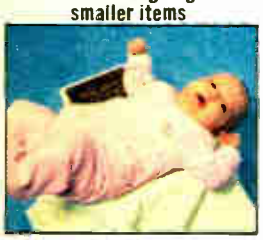
Has electronic strain-gage mechanism that eliminates the mechanical weights and springs that can go out of adjustment. And with the custom mounting option you can place the readout at eye level. It's battery operated so it's safe to use, even after a shower.

Kit GD-1186, 9 lbs. . . . . **Was $109.95 Now 99.95**

SAVE $10! Factory assembled and adjusted GD-1186. Readout non-detachable. Reads in pounds only in increments of 1/10 of a pound.

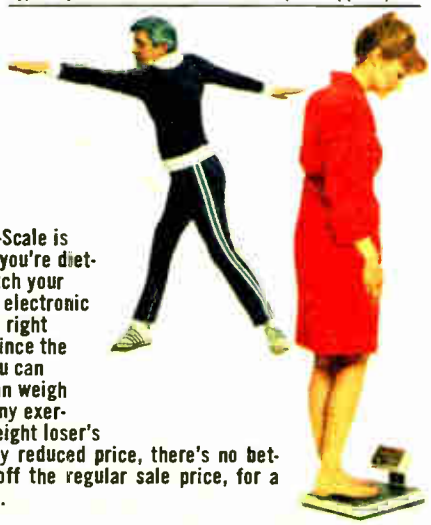
GDW-1186, 9 lbs. . . . . **Was $139.95 Now 129.95**

Manual adjustment for accurate weighing of smaller items



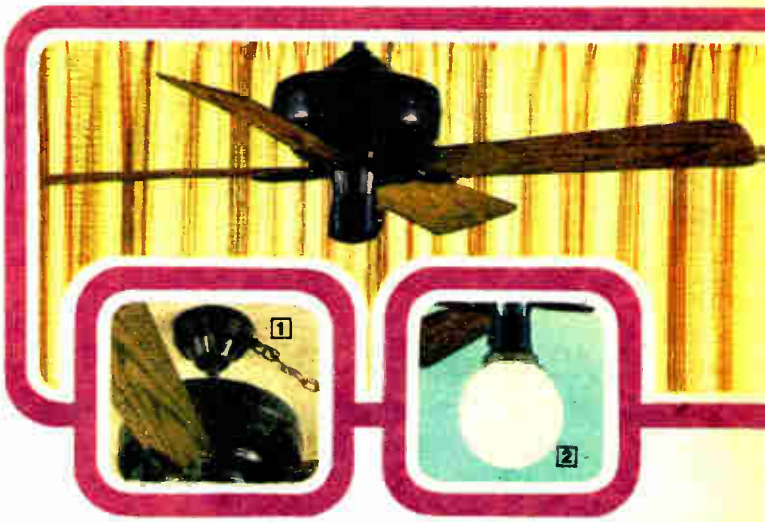
Weigh the baby without weighing the blanket

GD-1186 SPECIFICATIONS: Resolution: 1 part in 3000. **Accuracy:** 1% or 1 count, whichever is greater. **Repeatability:** 0.5% of reading or 1 count. **Overload Capacity:** 50% of full capacity. (Not damaged by weight up to 450 lbs.) **Power Requirement:** 6 "C" type dry cell or alkaline batteries (not supplied).



The GD-1186 Electronic Digi-Scale is an ideal "companion" when you're dieting. As you exercise and watch your calories, the digital readout electronic scale shows you your weight right to 2/10ths of a pound. And since the scale is battery operated, you can even bring it along so you can weigh yourself immediately after any exercise or activity. It's a real weight loser's helper! Now at this specially reduced price, there's no better time to buy. Save $10 off the regular sale price, for a limited time only. Order now.

Authentic Casablanca Fan operates on pennies a day



The decorative way to keep heating costs down, and assure your comfort for all seasons. Brings whisper-quiet cooling to your home for just pennies a day. Can also be used to bring heat down from high ceiling areas during heating season. With its fan motor done in a warm baked bronze enamel, the GD-1238 features chain pull switch operation, variable speed adjustment from 145 to 180 rpm, and 52 inch blades (tip to tip). For an even more charming effect add the optional Lamp or Swag-Chain kits. (Not for ceilings under 8-ft. high.)

Kit GD-1238, Shpg. wt. 24 lbs. **119.95**

Slow-Speed Accessory. Lowers fan speed to 50-100 rpm. Ideal for smaller rooms, lower ceilings. **GDA-1238-3,** 1 lb. **15.95**

[1] **Swag-Chain Kit.** Mount your Casablanca fan most anywhere. Includes: 18′ antique brass swag chain, gold electrical cord, hardware. **GDA-1238-1,** 4 lbs. **14.95**

[2] **Light Kit.** Adds old world charm and dual purpose to your fan. Includes glassware, glassware holder and mounting accessories. **GDA-1238-2,** 3 lbs. **16.95**

Deluxe FM Wireless Intercom brings you clear voice communications

- PLL circuit for quiet operation
- Automatic Squelch
- Call, Talk and Dictate Switches
- Uses your present house wiring so there's no bothersome wiring hookups

Here's a two-way intercom you can use anywhere indoors — as long as the units are on the same AC power transformer. After assembly simply plug each unit into an AC outlet and you're ready to communicate. Order as many as you like for complete communications — solid-state circuitry consumes so little power you can even leave them on all the time at very low cost. Phase locked loop circuitry provides quiet, clear operation. Automatic squelch assures noise-free operation; a pleasant call tone alerts other units. A dictate switch locks the intercom in the "talk" mode for hands-free operation. A transmit indicator lights when the unit is in the talk mode. 3" speaker. The GD-1114 is a power miser, too. Power consumption on standby is less than 2 watts, and it uses less than 5 watts when you are talking. You can operate it for just pennies a month. Plastic cabinet, 3" H x 8⅝" W x 5¾" D, may be wall mounted. For 120 VAC, 60 Hz.

Kit GD-1114, Shpg. wt. 3 lbs. **49.95**

Kits you build yourself for a lifetime of pride and pleasure

Versatile digital alarm clock with rich AM/FM sound and beautiful styling that brighten any room

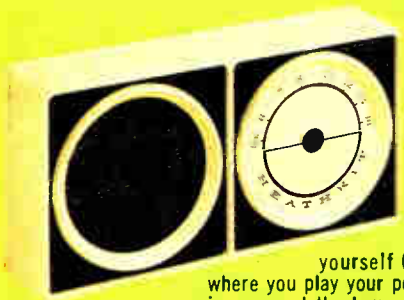
$149.95

- Stay "on time" even if AC power fails thanks to the built-in "fail safe" circuit
- "Catnap" with the 7-minute snooze button

Loaded with convenient features: 24 hour set'n forget alarm, built in 3" x 5" oval speaker for truly fine sound, and style that fits anywhere. The GR-1075 displays time in the conventional 12-hour format. Shows AM and PM too. A lighted decimal pulsates to indicate seconds and also shows that the alarm is properly set. The 24-hour alarm cycle can wake you with a gentle pulsating, electronic "beep" or with soft music from the FM or AM radio station of your choice. High quality electronics and 5 μV FM and 300 μV/M AM sensitivities make sure you'll "pull-in" a large selection of stations day-or-night. And for the sleepyhead, the clock's 7-minute snooze cycle will give you up to an hour of relaxing catnaps. Two 9-volt batteries (not supplied) take over during power interruptions and keep the clock counting. Black plastic cabinet with brushed aluminum trim strip, and simulated walnut-grain end panels. For 120/240 VAC, 50/60 Hz. 4½" H x 13⅜" W x 8⅛" D.

Kit GR-1075, Shpg. wt. 10 lbs. **149.95**

Take along your favorite radio programs wherever you go



AM Pocket Radio brings you news, music and sports programs anywhere

only $14.95 SAVE $3.00

A Great First-Time Kit

An ideal way to introduce yourself (or a friend) to kitbuilding. Anywhere you play your pocket radio — at the beach, camping, around the house — you get first rate performance and good sound from the big built-in 3½" speaker. High-impact black and white case. 4" H x 7⅞" W x 2" D. Operates on a single 9-volt battery (not supplied).

Kit GR-1008, Shpg. wt. 2 lbs. ..... **Was $17.95, Now 14.95**

Handy Heathkit Intercom in your home saves time and steps

2-station Master

This master station lets you talk and listen to two remotes located anywhere in your home. Price includes one indoor remote (GD-120).

GD-140, Master and Remote, 5 lbs. **49.95**

6-station Master

This master station lets you talk and listen to six remotes located anywhere in your home. All remotes must be ordered separately.

GD-110, 6-station Master, 5 lbs. **57.95**

Accessories

GD-120, Indoor Remote, 2 lbs. **19.95**

GD-130, Outdoor Remote. Not for use with GD-140. 2 lbs. **14.95**

GDA-110-2, 100-ft. 4-conductor cable. For GD-110, 140. 3 lbs. **9.95**

GDA-110-4, 100-ft. 2-conductor outdoor cable. For GD-130. 1 lb. **5.95**

Talk and listen with hands free

$54.95

Phone amplifier lets you answer phone by pressing a button, without lifting receiver.

To answer the phone, just press the Power Button; to hang up, press it again. Voice-activated circuitry instantly switches from talk to listen. An easy-to-use slide control adjusts the listening volume. The built-in microphone lets you talk from up to 10-ft. away. The GD-1112 requires an external phone for operation and includes a ¼" diameter phone plug and a 1¾" square four-pin phone plug for easy installation. Operates one 9-volt battery (not supplied) and comes with 6' of 4-conductor cable. 2½" H x 8½" W x 5¾" D. Good-looking plastic cabinet.

Kit GD-1112, Amplifier, Shpg. wt. 4 lbs. **54.95**

Kit GRA-43-1, AC Converter, Shpg. wt. 1 lb. **4.95**

Customer-owned equipment connected to telephone lines may be subject to local tariff.

Turn on with your own dazzling musical light show

$99.95

The Heathkit Light Show adds exciting sights to your sound system. Just enough to the speaker leads of any sound source (except AM radio). Without affecting the sound, active filters separate the audio signal into four frequency bands, each with 35 brilliantly colored lights — red for bass, blue for low-midrange, green for upper-midrange and amber for treble (140 lights total). It's wild. The lights pulsate in time to the music creating spokes of swirling color. 22¾" H x 22¾" W x 4½" D, can even be wall mounted. For 120/240 VAC. Input is 1 volt RMS min. to 22 volts RMS max. Line isolation provides protection. Add visual excitement to your sound system with the Heathkit Light Show.

Kit TD-1006, Shpg. wt. 37 lbs. **99.95**

Special kits for a safer, more convenient home environment

Don't let power loss ruin a freezer full of valuable food!

$15.95

Sensor installs easily in any freezer

Freezer Alarm signals if the freezer door is left open or if freezer temperature rises to 20°F even with door closed. Operates on two standard "C" cells (not supplied). Alarm box mounts anywhere with 20-ft. cable supplied.

Kit GD-1183, Shpg. wt. 2 lbs. **15.95**

Automatic Telephone Answerer

The Record-a-Call VOX 70 uses standard cassette tape. Voice actuation allows caller to speak without time limit on the recorder. Use it for dictation, too. 120 VAC powered. 9" x 11⅞" x 3⅞". Fully assembled.

GDP-1227, Shpg. wt. 12 lbs. **199.95**

Automatic Lamp Switch is low-cost "insurance"

$5.95 **Turn lamps on at dusk, off at dawn**

Easy one-evening kit turns lights on at sundown, off at dawn to give your home a "lived-in" look while you and your family are away. Use with lamps up to 150 watts.

Kit GD-600, Shpg. wt. 2 lbs. **5.95**

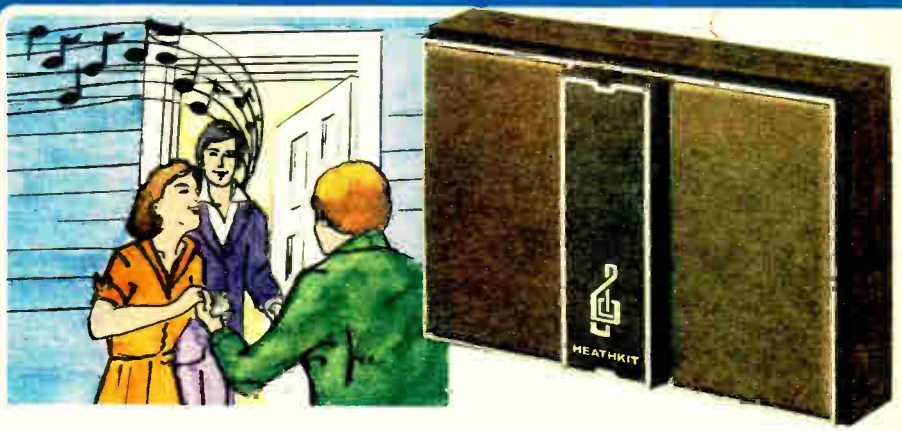
Easy-to-build Tabletop Lamp Dimmer saves energy and bulbs

$8.95

You can even add more lights up to 300 watts

A great first-time kit. It adjusts brightness of lamps up to 300 watts, giving your home a decorator touch. Also saves energy and extends bulb life. Makes a great heat control for pencil-type soldering irons.

Kit GD-1018, Shpg. wt. 2 lbs. **8.95**



The "Programmable" Electronic Doorbell plays your favorite 16-beat tune

$49.95

- **Now including song book with over 50 pre-programmed tunes**
- **Program it for any tune up to 16 beats**
- **Change tunes easily, for special occasions**

What a fun way for guests to announce themselves...your favorite melody (or theirs) plays when they touch the door button. Use as many as 16 beats to program your favorite tune. Change it whenever you wish...program to celebrate a season, an anniversary, a birthday, even a special party. New song book contains fifty pre-programmed tunes including many college fight songs.

Changing your tune is easy. Just rearrange the programming leads in the connectors of the C through C' "keyboard" located behind the front-panel access door. The assembly manual includes programming instructions for a variety of tunes, or you can compose your own. Controls for tuning, volume, speed, and decay characteristics of the electronically synthesized sound also are located inside the front-panel door.

Single circuit board construction makes it easy-to-build even if you're a first-time kit builder. Installation is easy too, just wire between existing transformer and TD-1089.

Kit TD-1089, Shpg. wt. 3 lbs. **49.95**

TD-1089 SPECIFICATIONS: Power Requirement: 16 volts, 50/60 Hz, from standard doorbell transformer (not supplied) with 10 VA Rating. **Speaker Size:** 3" x 5" oval – 16 Ohm. Extra speakers can be added for a total of not less than 16 Ohms. **Programming Matrix:** 13 notes x 16 beats – same note up to 9 beats. **Dimensions:** 5¾" H x 8⅝" W x 2⅝" D. **Power Drain:** idle, 6 watts; Maximum 12 watts.

Heathkit Touch Control Switches give you remote control of lights or small appliances

$16.95

- **Sensor Plate mounts anywhere for instant on-off control**
- **Touch-Control light switch features half-brightness position**
- **Add multiple touch plates to the same lamp or appliance**

Turn lights and appliances on and off with a touch. Place Heathkit touch-control switches throughout your home, without adding extra outlets, wall boxes, or rewiring. They consist of a control unit and a touch plate. Simply plug the lamp or appliance into the control unit, and plug the control unit into an AC outlet. The remote-touch plate mounts anywhere and connects to the control unit by an easily concealed wire. We supply 20-ft. of wire, or you can use your own for longer runs. You can use more than one touch-plate, too – or use door knob, rail or any other metal as a touch plate. For 105-135 VAC, 60 Hz. Both switches feature fast, easy single-board construction.

Touch-Control Light Switch for incandescent lamps up to 150 watts. On, off, half-brightness.

Kit GD-1187, Shpg. wt. 1 lb. **16.95**

Touch-Control Appliance Switch for TVs to 225 W, fans to 180 W. lamps and heaters to 300 W.

Kit GD-1287, Shpg. wt. 2 lbs. **16.95**

The convenience clock...with digital accuracy

Loaded with convenient features

- Snooze alarm
- Automatic brightness adjustment
- Power failure alert
- Value priced

You can say: "I built it myself."

Now a pleasant electronic tone can start your day out right — and at a very low price! The clock features a pleasant blue-green display that automatically adjusts to ambient light conditions and is easily wired to give you the time in either a 12- or 24-hour format. Also, in addition to hours and minutes, the GC-1107 indicates AM and PM, tells you when the alarm is set, and alerts you if the clock has been shut off during power interruptions. The alarm on/off switch is easily accessible at the rear of the cabinet. And a "snooze" button lets you take 9-minute catnaps for up to an hour! A Slow switch and Fast switch let you advance the time for easy, accurate setting. The GC-1107 has a built in speaker and is styled in a handsome simulated woodgrain finish. 2¼" H x 7" W x 4¾" D.

Kit GC-1107, Shpg. wt. 3 lbs. **29.95**

Digital Electronic "Super-Clocks" for floor or shelf display in your own home

- Automatic dimming circuit adjusts to room light for a charming pleasant glow
- Hour and minute readout can be seen from anywhere in the room
- Handsome glass shelves provide nice display for flowers, knick-knacks, etc.

Add elegance with a "space-age" touch anywhere in your home! The "super-clock" is housed in a stylish cabinet with four smoked glass shelves for plants, books or knick-knacks — and the cabinet is finished in handsome simulated walnut-veneer, laminate with anodized aluminum corner pieces.

The 3¼" high clock digits glow brightly enough to be read even in daylight, and an automatic dimming feature adjusts them to diminishing room light for a charming, subtle display in dim or darkened rooms.

The clock displays hours and minutes, with the center colon pulsing each second. A special power failure indicator circuit pulses the display brightness to show that power has been interrupted and clock must be reset. Time setting is accomplished by easy-to-use fast and slow time advance switches located on the bottom of the clock chassis.

The GC-1195 is an excellent and truly useful selection for the first time kit builder. The manual is clearly written and guides you step-by-step through construction in a manner which is both easy to understand and easy to follow.

The GC-1195 is a handsome addition to most any decor, and a great conversation piece. For even more charm and "Old World" distinction, add our electronic clock chimes accessory (described at right).

Kit GC-1195, Shpg. wt. 58 lbs. **199.95**

GC-1195 SPECIFICATIONS: Format: 3½-digit (12-hour) time readout. **Power requirement:** 108-132 VAC, 50/60 Hz, 30 watts. 216-264 VAC, 50/60 Hz, 30 watts. **Dimensions:** 6½" H x 14" W x 9½" D.

Our "Super-Clock" in a shelf case

Uses the same electronics and display as the GC-1195 floor clock, but is housed in a good-looking walnut-veneer cabinet suitable for shelf, table or desk-top use. Accepts optional GCA-1195-1 electronic chimes. 6½" H x 12½" W x 6¼" D.

Kit GC-1197, Shpg. wt. 18 lbs. **99.95**

Add a Super Sound to your Super Clock with these Synthesized Chimes that give you an Authentic "Big Ben" Chimes Sound

Builds into the GC-1195 or GC-1197 to provide rich, electronically synthesized "Big Ben" chimes: 4 notes on the ¼-hour, 8 notes on the ½-hour; 12 notes on the ¾-hour and the full 16-note passage and hour annunciation on the hour. And you can even turn on a reassuring electronic "tick-tock". This easy-to-build addition to your Super Clock features volume and pitch adjustment, sound-delay control, "tick-tock" volume control, built-in speaker.

Kit GCA-1195-1, Shpg. wt. 3 lbs. **79.95**

Easy-to-build kits for your safety, health and convenience

The Informer®: ultrasonic intrusion alarm at an affordable price

$59.95

- "Sees" intruders up to 25 feet away from the unit
- Built-in time delay lets you deactivate alarm
- Use anywhere — fits in with any collection of books

Looks like a book — provides reliable, low-cost security

The GD-39 book-size alarm provides good protection. It alerts you to the presence of an intruder up to 25 feet away from the unit. When the GD-39's field of coverage is broken, the unit activates indoor lights, buzzers, bells, etc. A built-in time delay allows you to deactivate the alarm when you enter the room. You can also use the GD-39 as an automatic light switch for your garage, basement or attic. Use it when you want a light or buzzer to alert you to another's entry or to alert you to a child getting out of bed. Solid-state circuitry assures you of many years of reliable, trouble-free operation. Easy-to-build kit.

NOTE: Since the GD-39 operates in the same frequency range as some ultrasonic TV remote controls, interference between the two is possible. 10⅞" H x 2⅜" W x 7½" D. For 120/240 VAC, 50/60 Hz.

Kit GD-39, Shpg. wt. 5 lbs. **59.95**

GDA-39-1, Indoor Buzzer Alarm, Shpg. wt. 1 lb. **11.95**

GDA-39-2, Outdoor Bell, Shpg. wt. 5 lbs. **29.95**

Eye Spy™ Photobeam for low-priced security

Consists of light source, mirror assembly and a photocell-controlled relay. When beam is broken, warning devices or lamps plugged into the photocell are activated. Works up to 25 ft. from reflecting mirror. Electronics, 5⅜" H x 4⅜" W x 5¼" D.

Kit GD-1021, Shpg. wt. 3 lbs **16.95**

Heath-Recommended Home Smoke and Gas Detectors

First-Alert™ Smoke Detector. Easy to mount, has built-in 85 dB horn, 100% solid-state circuit. U.L. Listed.

GD-1414, Assembled Shpg. wt. 2 lbs. **17.95**

First-Alert™ Smoke Alarm with Remote Detector. Radio receiver center accepts alarm signals from remote detectors. Wireless.

GDP-1423, Center, 1 Detector. Assembled 6 lbs. **79.95**

GDP-1424, Wireless Remote Detector. Assembled 2 lbs. **39.95**

First-Alert™ Gas Detector with Electronic Horn. Gives early warning of propane or natural gas leaks. U.L. listed.

GDP-1425, Assembled Shpg. wt. 3 lbs. **39.95**

Useful Heathkit Automatic Telephone Security Dialer

$179.95

Automatically calls a friend, relative or neighbor when alarm is triggered

When you can't reach the phone or don't have time to dial a complete number, press a button and the Security Dialer dials a preselected number. Has automatic redial if line is busy, three-digit location code and separate microphone. Battery-powered if AC fails (Batteries included). 4¾" H x 11" W x 6" D. Check with telephone company for any installation requirements.

Kit GD-1156, Shpg. wt. 8 lbs. **179.95**

Digital Stopwatch lets you time any event, anywhere!

Quartz crystal accuracy with seven functions and bright readout

Reads hours, minutes, tenths and hundredths of seconds in a bright red digital readout that's easy to see in any light. Accurate to ±0.006%. Seven functions time any event, and special instructions let you convert the GB-1201 to read- hundredths of minutes — perfect for time studies or car rallies. Includes AC adapter/charger, rechargeable batteries, sunscreen and lanyard. 5⅓" H x 2¼" W x 2" D.

Kit GB-1201, Shpg. wt. 2 lbs. **89.95**

ICA-2009-1, Felt-lined Naugahyde® carrying case, Shpg. wt. 1 lb. **4.95**

Electronic Flying Insect Killer keeps the bugs from bugging you

NEW

$74.95

- Self-cleaning grid
- Protects up to ⅓ acre from pesky flying insects

Mounts anywhere outdoors and looks handsome near your pool, perch or patio. Ten-watt black light attracts flying insects and electronically charged self-cleaning grid instantly, safely disposes of them. Protective outer screen keeps hands off grid. Attractive flat black and brass-colored housing is corrosion-proof. Operates for only pennies a day. For 120 VAC. 16" H x 11" W x 11" D.

Kit GD-2007, Shpg. wt. 10 lbs. **74.95**

GDA-2007-1, Mounting Bracket, Shpg. wt. 2 lbs. **3.95**

Kits to keep your family healthy and comfortable

Electronic Air Cleaner eliminates 99% of airborne pollen, 94% of all airborne particles in any room

- Easy to assemble — absolutely no soldering!
- For rooms to 25' x 30'
- Adjusts to "quick-clean" a room
- Portable — use anywhere you need it!
- Room-sized unit works for pennies a day

$189.95

The Heathkit GD-1247 Electronic Air Cleaner is the ideal way to keep air fresh and clean, especially after parties, smoking, etc. Adjusts from approximately 100 cfm (cubic feet per minute) to 250 cfm — lets you "quick-clean" a room, then turn back the speed to maintain a fresh air level. The removable charcoal filter needs periodic replacement (order below). The other filters are removable and easy to clean. There's no soldering — the power supply and variable speed fan control are fully assembled. The assembled particle board cabinet has a Southern Pecan vinyl finish. The GD-1247 saves you money. Cleaner air reduces the need for cleaning, painting and redecorating caused by airborne pollution that stains and soils your furniture, rugs, walls and drapes. 26½" H x 17¼" W x 13½" D. For 120 VAC, 60 Hz.

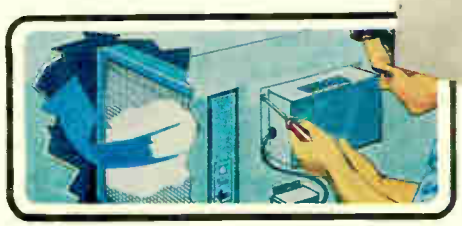
Kit GD-1247, Shpg. wt. 59 lbs. **189.95**

GDA-1247-1, 4 Deluxe Casters, Shpg. wt. 1 lb. **9.95**

GDA-1247-2, Replacement Charcoal Filter, Shpg. wt. 2 lbs. **6.95**

Electronic Air Cleaner keeps your air fresh and clean, installs easily in any furnace

- Simple installation without changing ductwork
- Traps particles as small as 2.5 millionths of an inch
- Completely automatic — works with your heating/air conditioning system



$199.95

Removes most dust, dirt, pollen and other allergenic contaminants so your family can breathe fresh, clean air. Helps remove smoke and reduce odors, too. Filter is removable and easy to clean; pads are easy to replace. **Note: Installation may require service by a qualified electrician. Check local building codes. Kits below differ in size of filter panel. Check your furnace filter size/capacity before ordering.** Installs on standard furnaces or air conditioners directly in place of present filters, usually without cutting or altering ductwork. For two-zone homes, two filters may be used with a single power supply. Air cleaning efficiency, 70%, nominal. Power supply, 8" H x 12" W x 4" D. For 120 VAC, 25 watts max. Shpg. wt. 24 lbs. each.

Kit GD-1196-1, 20" x 25" x 2", 1000 cfm **199.95**

Kit GD-1196-2, 20" x 20" x 2", 800 cfm **199.95**

Kit GD-1196-3, 16" x 25" x 2", 800 cfm **199.95**

Kit GD-1196-4, 16" x 20" x 2", 640 cfm **199.95**

Extra filters, use order nos. above, with GDA prefix (i.e., GDA-1196-1, 20" x 25" x 2", filter only), avg. shpg. wt. 11 lbs. ..... **each 109.95**

Accessory Air Flow Switch, allows air flow to automatically start air cleaner. For 120 VAC outlet, required with 24 VAC systems.

Kit GDA-1196-5, Shpg. wt. 2 lbs. **26.95**

Programmable clock controls energy costs

Save on both heating and cooling costs with automatically controlled Setback Thermostat

$47.95 Saves you up to 20% on heating and cooling bills. Pays for itself in no time. Provides automatic control and savings for air conditioners, too.

A programmable clock provides up to 12 different setback periods each day. In the heating control, setback temperatures range from 2° to 15°F, and the higher the setback, the greater your savings. A switch lets you override the setback. The cooling portion shuts off your cooling system when your home is unoccupied and turns it on at a preset time. For use with electric cooling systems in combination with gas or oil furnaces. Works with either four- or five-wire furnace control systems. Thermostat, 5⅜" H x 3⅝" W x 2" D. Controller, 4⅜" H x 6½" W x 2¾" D. Transformer, 2⅜" H x 2¼" W x 1¾" D. Not for heat pumps.

Kit GD-1269, Shpg. wt. 3 lbs. **47.95**

Home Heat Control saves up to 20%

A low-cost way to keep fuel bills down!

Reduces room temperature once or twice a day

$37.95

Automatically reduces room temperature during one or two preprogrammed periods. **NOTE: For use with single-stage heating systems only. Some systems may require service by a licensed electrician. Check building codes.**

Kit GD-1776, Shpg. wt. 5 lbs. **37.95**

Add build-it-yourself security and convenience to your home

Deluxe Garage Door Opener puts an end to leaving your car in nasty weather to open a heavy garage door

$194.95

- **For extra security, your garage door can't be opened by hand from outside the garage once it is closed**
- **For extra safety, clutch and safety switch return door to open position if it becomes obstructed during closing**

The Heathkit Deluxe Garage Door Opener GD-3309 is an investment that pays off in convenience and security. Is the weather bad? Or is it dark as you pull into your drive late at night? Simply touch the button on the wireless transmitter in your car — your garage door opens automatically and a light turns on in the garage. Touch the button again, and the garage door closes behind you. The GD-3309 features a quiet but powerful ⅓ hp motor that opens the heaviest residential garage doors (up to 7½' maximum height). When the door is closing, the important adjustable slip clutch safety reverse feature takes over. If the door encounters any obstruction it stops and reverses instantly, and returns to full open position. A separate doorbell-type switch and 20 ft. of cable let you operate the unit from inside the garage or anywhere you choose. Both the transmitter and receiver are FCC-approved and fully assembled. Use with standard NEC 3-wire systems.

Kit GD-3309C, Transmitter, Receiver, Mechanism.
Shpg. wt. 57 lbs. Motor Freight 194.95

Kit GD-3309D, Two Transmitters, Receiver, Mechanism.
Shpg. wt. 57 lbs. Motor Freight 209.95

Kit GDA-3309-1, Mechanism only. Shpg. wt. 44 lbs. Motor Frt. 159.95

Kit GDA-3209-2, Adaptor for jamb and pivot doors. 3 lbs. 11.95

GDP-3309A, 1 Transmitter only. Shpg. wt. 1 lb. 24.95

GDP-3319A, Transmitter, 1 Receiver. (3-wire system) 1 lb. 54.95

GDP-3329A, 2 Transmitters, 1 Receiver. (3-wire system) 2 lbs. 69.95

GDA-3309-3, Power Transformer. Allows use of new transmitter and receiver with 2-wire system door openers. 1 lb. 5.95

GD-3309 SPECIFICATIONS: Overall Size: 12" H x 9" W x 120" L. **Motor:** 117 VAC ⅓ HP. **Open and Close Time:** Approx. 12 seconds. **Mounting Clearance:** 3" above highest point of door travel. **Safety Lamp:** Delay circuit keeps lamp on 1 to 3 minutes. **UHF TRANSMITTER:** Powered by standard 9-volt battery. **RF Frequency:** 310 MHz. **Useful Temperature Range:** −50°F. to +140°F. **UHF Receiver:** Powered by 24 VAC from opener mechanism. Usable on any 3-wire mechanism or 2-wire with addition of GDA-3309-3.

Features powerful ⅓ hp motor plus automatic 75 watt dome light

Easy, no-solder assembly

Use separate switch from inside garage or transmitter unit from within the car

Portable Rechargeable Fluorescent Light provides illumination anywhere you go

- **Provides a wide "flood of light" to help you see what you're doing**
- **Eliminate the fire hazard of gasoline-fueled lanterns or lamps**

Fishing, hunting, camping...or working in the yard, garden, attic or basement — wherever you need bright, portable illumination without troublesome cords, the GD-1246 Portable Rechargeable Fluorescent Light will provide it for you. Its floodlighting characteristic allows light to disperse widely (as opposed to the beam from a flashlight), so you can illuminate much more of the surrounding area. The built-in rechargeable battery and separate preassembled battery charger let you use the GD-1246 for hours, then simply plug it into an AC outlet in your home (or into your car's lighter socket using the optional adapter listed below) to restore full power. Besides being convenient, the Rechargeable Light eliminates the fire hazard and mess of gasoline-fueled lanterns, kerosene lamps or candles. The GD-1246 is great for emergencies, too — it's a good idea to keep one in each of your family's cars. The GD-1246 features a bright, non-glare fluorescent tube, and is housed in a rugged but attractive, lightweight portable case with carrying handle. Dimensions: 9⅜" H x 3⅛" W x 4⅝" D. Recommended for use above 40 F.

Kit GD-1246, Shpg. wt. 6 lbs. 29.95

12-volt adapter/charger. Kit GDA-1246-1, Shpg. wt. 1 lb. 4.95

$29.95

With the Portable Rechargeable Fluorescent Light you eliminate the time-consuming inconvenience of running to the store to buy expensive replacement batteries every time your light goes dim just when you need it most.

Simply plug the GD-1246 into any AC outlet, or use the handy optional 12-volt adapter/charger after each use, and always have a fresh, full-strength battery ready to go!

Join in the fun and excitement of Treasure Hunting!

1 Groundtrack™ Metal Locator features VLF for accuracy in almost any kind of soil!

The new Heathkit "Groundtrack™" metal locator is the finest we've ever offered! It will provide you with hours of fun-filled excitement every time you use it — searching for old coins, artifacts and treasure. It features a VLF (very low frequency) Ground Balance Mode for use in highly mineralized soil and adjustable discrimination for use in areas where high "junk" content makes the use of conventional locators all but impossible. Pushbutton tuning maintains maximum sensitivity. Fully shielded search coil prevents false signals and is waterproof for shallow water searching. Lightweight, adjustable shaft telescopes for easy storage. Uses a sophisticated induction balance search system — you don't hear anything until a piece of metal enters the search field, then the tone grows louder as you approach the metal. Operates on six "AA" cells (not included), or the optional GDA-1190-1 Rechargeable Battery Pack (order below).

Kit GD-1290, Shpg. wt. 5 lbs. **199.95**

GD-1290 SPECIFICATIONS: Sensitivity: Locates dime at 4" to 6" typical, may be less depending on soil conditions, mode of operation and amount of discrimination selected. **Method of Detection:** Induction-balance circuit. **Detector Output:** Meter, speaker, phone jack. **Dimensions:** Search Coil: 6" diameter. Extended Height: 45½". Collapsed height: 22½". **Power Requirement:** Six AA dry cells or alkaline, or rechargeable Nickel-Cadmium Battery Pack (GDA-1190-1). **Net Weight:** 3.4 lbs.

2 Cointrack™ Metal Locator designed for "coinshooting"

The GD-1190 is the locator to have when you're interested in coins and more coins. It features a search coil optimized for coin locating, and adjustable discrimination so incredibly good you'll be finding "treasure" in areas where high "junk" content makes operation with other locators all but impossible! Pushbutton tuning maintains maximum sensitivity — effortlessly. And for shallow water searching, the 1190's waterproof head won't leave you out of the action. Weight is minimal and to cut fatigue even more, an adjustable shaft is provided for maximum comfort.

The 1190 collapses for easy storage and transportation. And with its optional GDA-1190-1 Nickel-Cadmium battery pack installed, you can recharge the 1190 at home, or in the field from the cigarette lighter of your car! Or it operates on six ordinary AA cells (not included). An outstanding value, and an easy and fun kitbuilding experience too.

Kit GD-1190, Shpg. wt. 5 lbs. **159.95**

Rechargeable Nickel-Cadmium Battery Pack. For GD-1190 or GD-1290. Lets you recharge the GD-1190 or GD-1290 at home from an AC outlet or in the field from the cigarette lighter of your car.

GDA-1190-1 Shpg. wt. 2 lbs. **19.95**

GDA-1190-2, Headphones. For GD-1190, 1290. 2 lbs. **13.95**

GDA-1190-3, Carrying Case. For GD-1190, 1290. 1 lb. **13.95**

GD-1190 SPECIFICATIONS: Sensitivity: Typically 4" to 6", may be less depending on coin size, amount of discrimination and soil material. **Method Of Detection:** Off resonance type. **Output:** Meter, Speaker, Phone Jack. **Dimensions:** Search-Coil: 6" diameter. Overall length: Shaft extended 45½", collapsed 22½". **Power Requirement:** Six—AA Dry Cells or Alkaline, or rechargeable Nickel-Cadmium battery pack (GDA-1190-1). **Weight:** 3.4 lbs.

3 Low-priced induction balance locator finds any metal

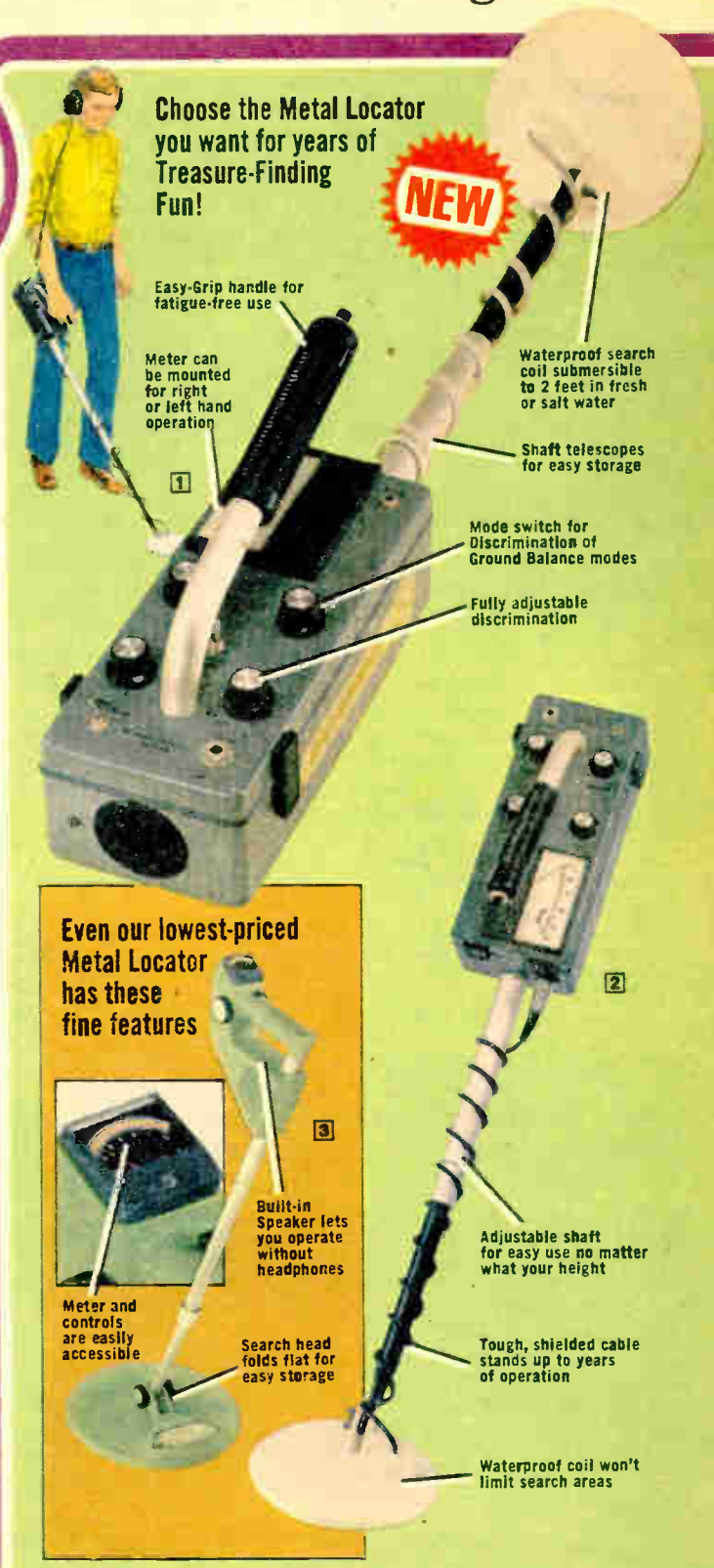
The GD-348 uses a sophisticated "induction-balance" system so you don't hear anything until a piece of metal enters the search field. Then the tone grows louder as you get closer to your quarry. You may listen through its built-in speaker, optional headphones or use the front-panel meter to pinpoint your find. The GD-348 has null and ten-turn sensitivity controls that let you adjust it to find smaller or larger objects, overcome ground effects, etc. These controls are conveniently located near the pistol grip handle. The shaft telescopes and the search coil folds flat for easy storage.

Kit GD-348, Shpg. wt. 5 lbs. **89.95**

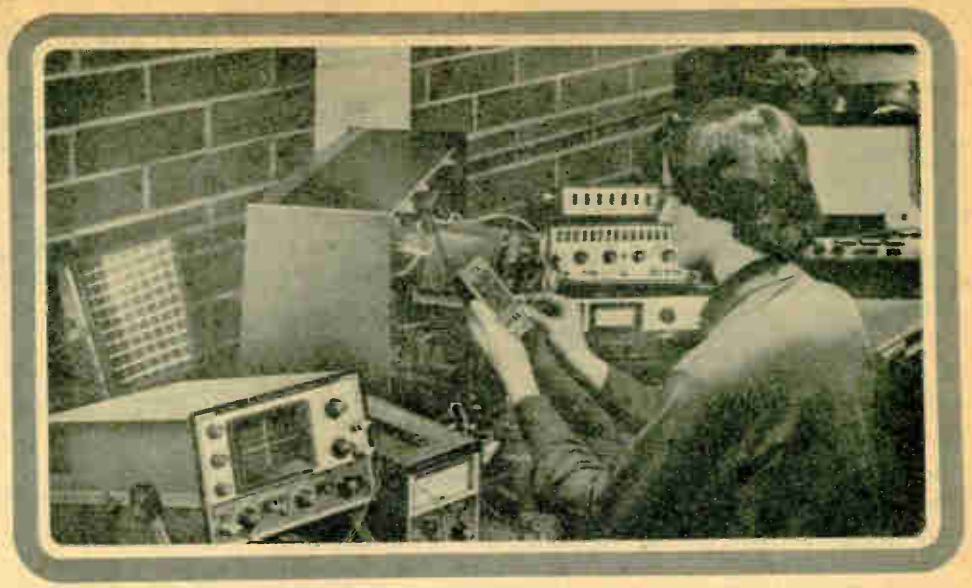
GDA-48-1, 9-volt battery, Shpg. wt. 1 lb. **3.25**

GD-396, 600-ohm Superex headphones, Shpg. wt. 2 lbs. **6.95**

GDA-348-1, Carrying case, Shpg. wt. 2 lbs. **14.95**



Get great value and performance with Heathkit Test Equipment



Heathkit test equipment is among the best you can buy anywhere at any price. From our new economy, solid-state IM-5217 VOM to our top of the line dual-trace delayed sweep IO-4235 oscilloscope the quality remains constant. Care in engineering and top quality materials mean that the test equipment you purchase from Heath will perform up to the highest standards for years to come. Thousands of amateur and professional technicians across the country can attest to Heath reliability. And we know that specifications play no small part in your buying decision, so the specifications we quote for our test instruments are as accurate and as detailed as possible.

And Heathkit test instruments are more than just a purchase; they are an investment in your future. If you make a career in electronics your kit building experience can become an invaluable aid. Not only will you be adding the reliability of a Heathkit instrument to your bench but each project provides an excellent opportunity to better define and expand your knowledge of electronics.

You can count on a Heathkit instrument for unparalleled performance under the toughest conditions. Another advantage that only a Heathkit instrument can give you is self-serviceability. What could be more economical than performing your own troubleshooting and repair should the need ever arise? It's easy with a Heathkit product. Our simple easy-to-follow instruction manuals make service a breeze even if you have little knowledge of electronics.

The engineering care that goes into each Heathkit test instrument is state-of-the-art design. So the complete array of Heathkit test gear on the following pages allows you to choose a complete selection of instruments to meet your needs and provide your test bench with the versatility to perform work on the complex electronic circuitry being produced today. You'll also find cables, probes and other accessories to go with your quality Heath equipment.

We think that Heathkit test instruments make good sense from both a practical and economical standpoint. When you purchase a Heathkit instrument you purchase years of engineering expertise in the field of test equipment design. If you want equipment that's designed to last, order your first piece of test gear from Heath and you'll agree; Heath is truly the best there is.

FM Deviation Meter helps you check and service FM transmitters

$169.95 Kit

- Measures peak deviation of transmitters and signal generators
- Two front-panel jacks for easy oscilloscope hookup

Measure the peak deviation (frequency modulation) of transmitters and signal generators whose carrier frequencies are between 25 and 1000 MHz. Easy-to-operate pushbutton switches let you select any of four ranges of modulation deviation from 2 kHz to 75 kHz. Other switches let you tune carrier signals, check internal battery condition, and select the correct de-emphasis for audio signals. Has easy-to-read meter, IF and audio level controls, and a fine-tune control ideal for UHF FM signals. Battery operated (batteries not included). You can also connect it to a transmission line for continuous monitoring. (Shown with optional antenna.)

Kit IM-4180, Shpg. wt. 7 lbs. 169.95
SM-4180, Assembled and Tested. 6 lbs. 260.00

Battery Eliminator/Charger for IM-4180.
Kit IMA-4180-1, Shpg. wt. 2 lbs. 32.95
SMA-4180-1, Assembled and Tested. Shpg. wt. 2 lbs. 45.00

Telescoping Antenna for IM-4180.
SU-510. Shpg. wt. 1 lb. 9.95

IM/SM-4180 SPECIFICATIONS: Deviation Ranges, 0-2, 0-7.5, 0-20 and 0-75 kHz peak. Accuracy: ±3% of full scale. Input Impedance: 50 ohms. Maximum Safe Input: 5 volts. Scope Output: 13 mV/kHz peak. Power Supply: Ten AA cells (not supplied). NEDA Type 15, zinc-carbon, alkaline or nickel-cadmium. Dimensions: 5" H x 10 5/16" W x 7 3/16" D.

Rugged Bi-Directional Wattmeter

$114.95 Kit

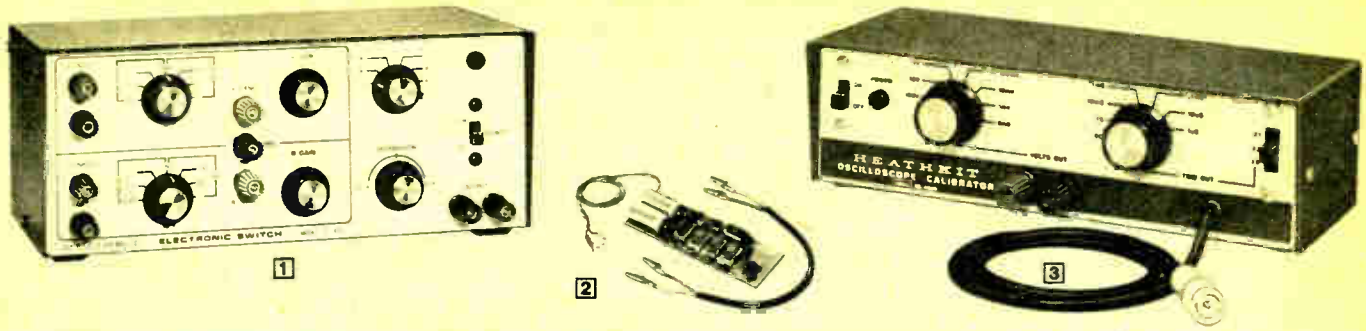
Covers 100 MHz to 1 GHz without costly "slugs" or elements

The IM-4190 is a professional quality bi-directional wattmeter designed to meet the RF technician's needs.

Ideal for use in two-way radio service and repair and for VHF and UHF communications equipment. Has easy-to-read front panel meter, N-type coax connectors for easy hookup, N to PL-259 adapters. Requires 9-volt battery (not supplied).

Kit IM-4190, Shpg. wt. 3 lbs. ... 114.95
Factory Assembled and Tested.
SM-4190, Shpg. wt. 3 lbs. 150.00

Quality Accessories, Probes and Cables for your oscilloscope



1 2 3

1 Top-value Scope Switch for dual-trace capability

Gives any single beam scope with external trigger input dual-trace versatility! Provides simultaneous display of two separate input signals for comparison, observing phase relationships, etc. Also can be used as impedance coupler, preamp or square wave generator in experimental circuits. A sync output on each channel permits scope sweep to be locked to either input signal. DC coupling adds versatility. Frequency response — DC-5 MHz + 1½ dB, –3 dB.

Kit ID-4101, Shpg. wt. 5 lbs. **54.95**

ID-4101 SPECIFICATIONS: Signal Gain: >10 times. **Maximum input signal:** 600 VDC or 600 VAC p-p. **Input impedance:** 1 megohm/50 pF. **Maximum signal output:** 8 V p-p. **Output loading:** 1C00 ohm minimum. **Hum and noise:** (single channel only). <40 mV p-p **Chopping rates:** Approx. 100, 500, 1000 and 5000 Hz. **Power requirement:** 120/240 V, 60/50 Hz, 6 W. **Dimensions:** 4¼" H x 10⅜" W x 5⅛" D.

2 Low-priced Scope Calibrator for IO-4510, IO-4530

The Heathkit IOA-4510-1 is an easy-to-build, easy-to-use crystal-controlled time base designed by Heath's 'scope engineers for oscilloscope calibration. It provides everything you need to accurately calibrate your IO-4510 or IO-4530. It generates a square wave signal with selected ranges from 1 MHz to 1 kHz at TTL output levels. The 1 kHz output level can be adjusted from 0 to 4.7 volts peak. Draws operating power from IO-4510 or IO-4530.

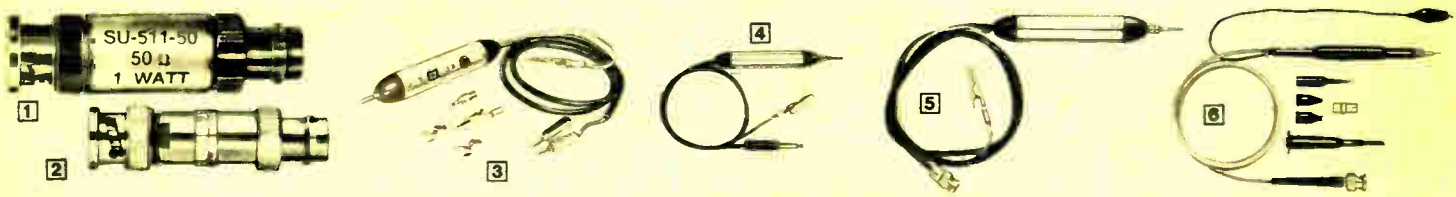
Kit IOA-4510-1, Shpg. wt. 1 lb. **18.95**

3 Deluxe Calibrator for scopes to 35 MHz bandwidth

The IG-4505 is a practical oscilloscope calibrator at a sensible price. It provides all the waveforms necessary to adjust sweep speeds, vertical calibration, delay line terminations, high frequency compensation and attenuator compensation for oscilloscopes with bandwidths up to 35 MHz. Round out your test bench today...order the IG-4505.

Kit IG-4505, Shpg. wt. 4 lbs. **49.95**

IG-4505 SPECIFICATIONS: TIME CALIBRATION: Range: 0.5 sec. to 1 μs square wave in 1-2-5 sequence, accurate to within .01%. **Amplitude:** ≈200 mV peak. **Rise Time:** ≤4 ns. **Overshoot:** ≤3%. **Output:** 50 ohms terminated cable. **VOLTAGE CALIBRATION: Ranges:** 1 mV to 100 V peak square wave in decade sequence. **Accuracy:** To within 2% with IMΩ load referenced to 1 V position. **Rise Time:** ≤2 μs. **Frequency:** DC, 2 Hz to 10 kHz in 1-2-5 sequence. **Accuracy of Internal Voltage Standard:** Within 1%. **Power Requirement:** 120-240 Volts AC, 60/50 Hz, 12 watts.



1 2 3 4 5 6

Get more versatility and convenience from your Heathkit Instrument with these Probes and Accessories

1 50-Ohm Termination. Used to eliminate improperly terminated cables which can cause incorrect display in frequency counters and distorted waveforms in scopes. DC to 1 GHz; power rating, 1 watt. VSWR; 250 MHz, 1.2:1, 600 MHz, 2:1.

Assembled SU-511-50, Shpg. wt. 1 lb. **21.50**

2 RF Fuse in UHF BNC-to-BNC connector. Prevents burnout. DC to 500 MHz range; 50 ohms; 1.2:1 VSWR (max.); insertion loss 1.80 dB max. at 500 MHz. With spare fuses.

Assembled SU-512-50, Shpg. wt. 1 lb. **55.00**

3 Low capacitance scope probe provides direct or X10 attenuated operation; options for 3.3 or 1 megohm input resistance.

Kit PK-1, Shpg. wt. 1 lb. **8.95**

4 Scope demodulator probe for distortion checks, RF & IF display. 30 V rms max., 500 VDC max. Banana plug/BNC wiring option.

Kit 337-C, Shpg. wt. 1 lb. **6.95**

5 RF Probe provides RF voltage measurement capability for any 11 megohm DC input voltmeter. Frequency response is linear from 1000 Hz to over 100 MHz. RF voltages of 90 volts rms or less can be easily measured, as well as RF voltages superimposed on DC potentials of 1000 V or less.

Kit PK-3, Shpg. wt. 1 lb. **7.95**

Assembled PKW-3, Shpg. wt. 1 lb. **13.95**

6 Combination X1, X10 Scope Probe. Has 2-position multiplier for X1 and X10 probe tip. DC to 15 MHz (X1) and DC to 80 MHz (X10) bandwidths. X10 risetime, 4.0 nS. Compensation range of 15-50 pF. Includes probe with 3-position slide switch, 4½ ft. cable.

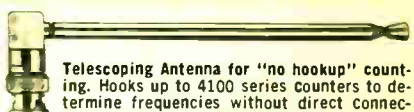
Assembled PKW-105, Shpg. wt. 1 lb. **29.95**

Accessory cables...for inter-connecting scopes, counters, etc. All cable is RG-58/U, 50 ohm impedance. Shpg. wt. (each), 1 lb.

Assembled SU-501-3, 3 ft., BNC/BNC **10.00**

Assembled SU-501-6, 6 ft., BNC/BNC **10.00**

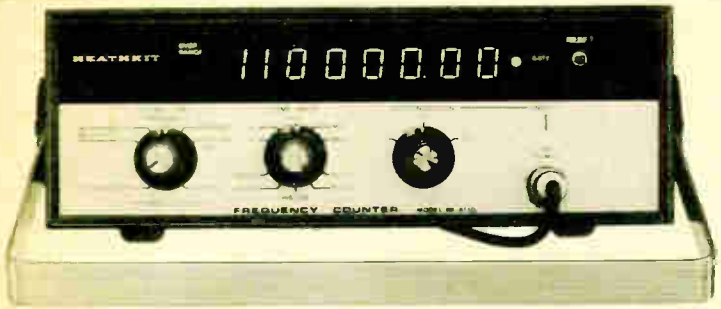
Assembled SU-503-3, 3 ft., BNC/Banana **10.00**



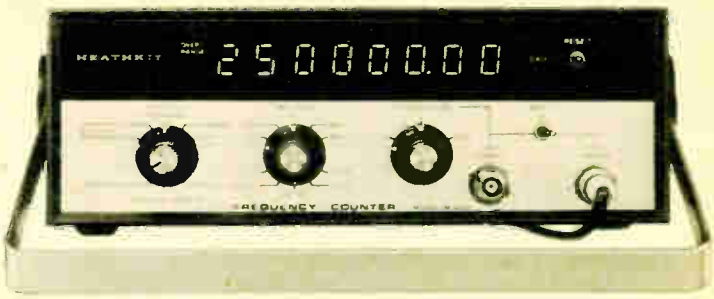
Telescoping Antenna for "no hookup" counting. Hooks up to 4100 series counters to determine frequencies without direct connections to units being tested. For any devices where direct connection of a counter is inconvenient or inaccessible.

SU-510, Shpg. wt. 1 lb. **9.95**

Heathkit Frequency Counters meet your needs and budget



IM-4110 — 5 Hz to 110 MHz



IM-4120 — 5 Hz to 250 MHz

Heathkit deluxe high-performance Frequency Counters

These Heathkit counters give you the accuracy and reliability you need...plus features you simply won't find on others in this price range. A switchable attenuator on the 110 MHz input divides the input signal x1, x10 or x100 to facilitate accurate measurements of large amplitude signals. The time base switch selects the gate time and the resolution of the display. The 4120 and 4130 time bases are controlled by a high quality TCXO (temperature-compensated crystal oscillator) with a temperature stability of ±1 ppm and an aging rate of <5 ppm/yr for excellent stability. (The 4110's crystal oscillator has stability of ±10 ppm and an aging rate of <10 ppm/yr.) Separate 50-ohm inputs are used for frequency ranges above 110 MHz to maintain low VSWR, while inputs below 110 MHz are 1 mg shunted by less than 25 pF. There's also rear panel oscillator input/output jack for an external time base. The counters feature rugged metal cases with non-marring front panels and a 12-position handle which rotates a full 360° for easy storage and mounting. The counter circuitry operates completely free of the case for easy service too. Easy kit assembly and NO-INSTRUMENT calibration. Counters operate on 120/240 VAC (switch-selected), 12 VDC with IMA-4130-1 accessory below, or portable battery operation with IMA-4130-1 and SMA-4130-2 batteries. Cables not included.

5 Hz to 110 MHz Counter. Applications include CB, low-band AM and FM, AM and FM broadcast bands, musical instruments, video tape systems, crystals, etc. Has single 110 MHz input.

Kit IM-4110, Shpg. wt. 12 lbs. **219.95**

SM-4110, Assembled and tested. Shpg. wt. 10 lbs. **350.00**

12-volt Converter. Mounts inside counter cabinet, permits 12-volt mobile operation. Can also be fitted with 12 rechargeable nickel-cadmium batteries (not included, order below) to allow portable operation.

Kit IMA-4130-1, Shpg. wt. 3 lbs. **34.95**

SMA-4130-1, Assembled. 3 lbs. **60.00**

Set of 12 rechargeable nickel-cadmium batteries.

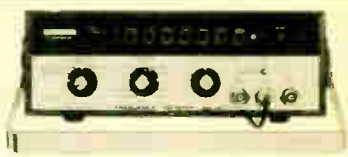
SMA-4130-2, Shpg. wt. 4 lbs. **99.95**

5 Hz to 250 MHz Counter. Same as IM-4110, plus marine and aircraft radios, 2-meter and 220 FM, general lab and research work, more. Has 5 Hz to 110 MHz and 5 MHz to 250 MHz inputs. **Kit IM-4120,** Shpg. wt. 12 lbs. **319.95**

SM-4120, Assembled and tested. Shpg. wt. 10 lbs. **490.00**

5 Hz to 1 GHz Counter. For virtually every counting application including 450 FM, Military uses and land mobile. Has three separate inputs — 5 Hz to 110 MHz, 5 MHz to 250 MHz and 100 MHz to 1 GHz.

SM-4130, Assembled and tested. Shpg. wt. 10 lbs. **895.00**



SM-4130 — 5 Hz to 1 GHz

	IM-4110	IM-4120	SM-4130
Frequency Range	5 Hz to 110 MHz	5 Hz to 250 MHz	5 Hz to 1 GHz
Inputs	5 Hz to 110 MHz	5 Hz to 110 MHz, 5 MHz to 250 MHz	5 Hz to 110 MHz, 5 MHz to 250 MHz, 100 MHz to 1 GHz
Input Sensitivity	25 mV RMS	25 mV RMS	25 mV RMS
Input Impedance	1 meg shunted by 25 pF	50 ohms, VSWR less than 1.5:1 110 MHz, same as 4110	50 ohms, VSWR, less than 2:1 110 MHz, same as 4110 250 MHz, same as 4120
Protection	250 V (DC + peak AC to 100 kHz	5 Vrms	5 Vrms
Time Base Freq	10 MHz	4 MHz TCXO	4 MHz TCXO
Aging Rate	< 10 ppm/yr	< 5 ppm/yr	< 5 ppm/yr
Temp. Stability (0 to 40°C ambient)	±10 ppm	±1 ppm	±1 ppm

OTHER SPECIFICATIONS: FUNCTIONS: Events: 1 to 99,999,999. **Period Resolution,** 0.1 μS. **Period Average,** 1000 periods. **Period Pulse Width,** 100 nsec min. **Low Frequency Signal Risetime,** 1 msec to signals less than 10 Hz. **OSCILLATOR CONNECTION: External Input Frequency,** 1 MHz. **Sensitivity,** TTL or 2.5 Vrms for 50-ohm source. **Protection,** −5 V peak to +10 V peak. **Internal Output,** >1.5 V p-p into 50 ohms at 1 MHz. **GATE INTERVAL: Frequency,** 1 mS to 10 S. **Period,** determined by period of input frequency. **Power Requirements:** 105-130 VAC or 210-260 VAC (switch-selected), 50-60 Hz at 35 watts; or 9-14 VDC at 2.5 A max. **Dimensions:** 4" H x 10¼" W x 13¼" D (less handle).

Our compact, lowest-priced Frequency Counter gives you top value and performance

The Heathkit IM-4100 is an almost unbelievable counter value. It's a full five-digit frequency counter which also functions in period and totalize modes. It provides built-in input attenuation and 12-volt operation all in one compact package. The front panel attenuator switch allows the amplitude of input signals to be divided by 1, 10 or 100. The pushbutton Reset switch quickly resets the display to zero in any mode. Display includes overrange indicator and a gate lamp. A rear panel switch easily selects internal or external time base. The rear panel connector can be used as an input for an external time base signal and for frequency ratio measurements. The IM-4100 operates on 120/240 VAC, or 12-volt DC (mating connector supplied). Cables not included.

Kit IM-4100, Shpg. wt. 6 lbs. **109.95**

SM-4100, Factory assembled and tested. Wt. 6 lbs. ...Was $220.00, **Now 190.00**

SAVE $30.00

Now Only **$190.00** assembled

Counts Frequency to 30 MHz, period to 99.999 seconds and events to 99,999. Bright, easy-to-read 5-digit display

IM-4100 SPECIFICATIONS: Sensitivity: 20 mV rms (50 mV, 5 Hz to 50 Hz). **Risetime:** 1 msec for signals less than 10 Hz. **Input Impedance:** 1 megohm shunted by less than 35 pF. **Protection:** 240 volts rms at 60 Hz. **TIME BASE — Frequency:** 10 MHz. **Setability:** ±10 ppm, maximum 0° to 40°C ambient. Aging rate, 10 ppm per year. **OSCILLATOR CONNECTION — External Input Frequency:** DC to 20 MHz. **Sensitivity:** TTL or 2.5 V rms from 50-ohm source. **Power Requirement:** 105-130 or 210-260 VAC (switch-selected). 60/50 Hz, (at 25 watts); or 9-14 VDC at 1.25 amperes. **Dimensions:** 2¾" H x 7¼" W x 10½" D (less handle).

Quality Heathkit Test Instruments make service fast and easy

High-performance logic probe for TTL/CMOS digital circuits

The Heathkit IT-7410 detects and indicates both high and low logic levels in TTL or CMOS digital circuitry. It also indicates the polarity and presence of signal pulses as short as 10 nsec duration, and shows intermediate or "bad" logic levels.

Simply touch the probe tip to an IC pin to observe the following conditions. Both indicators off shows open circuit or abnormal level (between thresholds). The low (white) indicator on shows constant logic zero. The high (red) indicator on shows constant logic one. Both indicators flash at a 5 Hz or lower rate to show signal pulses. One indicator flashing shows normal to abnormal logic levels. A separate manually reset memory indicator is lit whenever any transition in logic levels occurs.

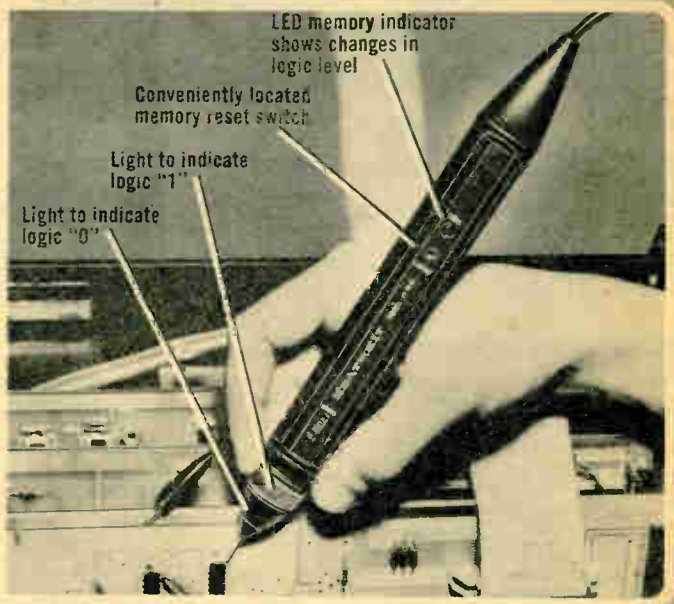
The probe is equipped with 34" power leads with strain relief and color-coded mini-clips; detachable high-frequency ground clip. The unit is powered by the circuit under test, or a separate regulated DC power supply.

Kit IT-7410, Shpg. wt. 1 lb. **44.95**

Factory assembled and tested version of above.

ST-7410, Shpg. wt. 1 lb. **69.95**

IT-7410 SPECIFICATIONS: DC Threshold Levels: switch-selected, TTL logic "zero", .8V ±.15, logic "one", 2.1V ±.25 @ 5VDC. CMOS logic "zero", 30% ± 10% of supply voltage, logic "one", 70% ± 10% of supply voltage. **Input Impedance:** 400k ohms, parallel with 10pF. **Response Limits:** TTL or CMOS at 5VDC — single pulse or pulse train, 10 nS min. Square wave, 100 MHz max. CMOS at 15 VDC — single pulse or pulse train, 10 nS min. Square wave, 80 MHz max. **Power Requirement:** TTL — 4.75 to 5.5VDC @ 75 mA max. CMOS — 4.75 to 15VDC @ 115 mA max. **Dimensions:** ¾" H x 1" W x 9¼" L.



General-Purpose RF Generator for fast and easy audio testing

The IG-5242 provides accurate and stable radio frequencies for precision testing of RF and IF stages, measuring gain and image rejection and determining sensitivity. Frequency coverage is from 100 kHz to 30 MHz with ±3% adjustable frequency calibration. RF output voltage adjusts from 5 to 100,000 μV in five attenuated steps with 5:1 variable attenuation. Output can be modulated from 0-50% with 5% accuracy. Easy kit assembly.

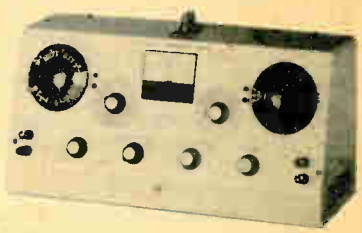
Kit IG-5242, Shpg. wt. 14 lbs. **129.95**

IG-5242 SPECIFICATIONS: RF OUTPUT. Frequency Range: 100 kHz to 30 MHz in five bands. **Accuracy:** ±5%. **Output Impedance:** 50 ohms. **Output Voltage:** variable from .005 to 100 mV. **INTERNAL MODULATION. Frequency:** 400 Hz. **Depth:** variable from 0-50%. **Front Panel Controls:** Modulation, variable frequency and level controls; function, meter and millivolts F.S. switches. **Power Requirement:** 120/240 VAC, 50/60 Hz, 30 watts. **Dimensions:** 10" H x 13" W x 7¾" D.

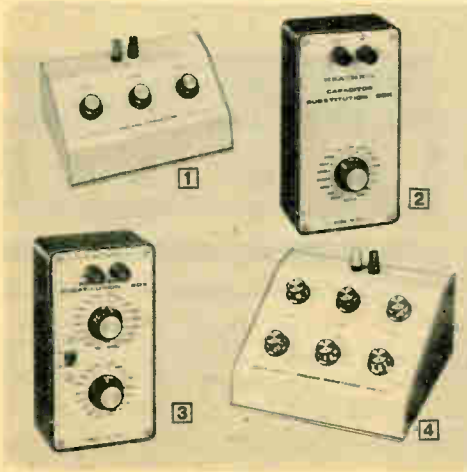
High-accuracy Impedance Bridge for easy measurements

Has four separate bridge circuits for accurate measurement of resistance, capacitance, and low & high inductance, dissipation factor of capacitors and storage factor of inductors. Direct reading 100-0-100 microammeter. Requires headphones or scope for alignment.

Kit IB-3128, Shpg. wt. 11 lbs. **169.95**



IB-3128 SPECIFICATIONS: DC Measurements: Built-in power supply. Binding posts for external supply. Meter: 100-0-100 microampere meter. **AC Measurements:** Built-in 1000 Hz generator. Terminals for external generator. **Detector:** Vacuum tube detector and amplifier, using built-in meter. Terminals for external detector. **Resistance:** 0.1 ohm to 10 megohm. **Capacitance:** 100 pF to 100 μF. **Inductance:** 0.1 mH to 100 H. **Dissipation Factor:** (D) 0.002 to 1. **Storage Factor:** (Q) 0.1 to 1000. **Accuracy:** ½% decade resistors used. **Power Supply:** Transformer and silicon rectifier. **Power Requirement:** 120/240 VAC, 60/50 Hz, 10 watts. **Dimensions:** 8" H x 17" W x 6" D.



Instruments simplify testing

1 **Decade Capacitance Box.** Functions as a wide-range variable capacitor for design work, helps you determine unknown capacitance values without involved calculations. Covers 100 pF to 0.111 μF in 100 pF increments. 400 VDC rating.
Kit IN-3127, Shpg. wt. 2 lbs. **29.95**

2 **Capacitor Substitution Box.** Provides switch selection of 18 EIA standard capacitors from 100 pF to 0.22 μF. All are rated at 600 V, except 3 lowest and 2 highest values. 500 and 400 V respectively. **Kit IN-3147, Shpg.** wt. 2 lbs. .. **15.95**

3 **Resistor Substitution Box.** Provides switch selection of 36 standard 10% 1-watt resistors from 15 ohms to 10 meg.
Kit IN-3137, Shpg. wt. 2 lbs. **15.95**

4 **Decade Resistance Box.** Covers 1 ohm to 999,999 ohms in 1 ohm steps. Use with IN-3127 to solve complex resistance and capacitance network problems. Resistors are 1-watt, 0.5% tolerance. **Kit IN-3117, Shpg.** wt. 3 lbs. **47.95**

Heathkit Instrument Test Probes

IMA-100-10 Probe multiplies DC ranges of any 10-megohm meter by 100. 1000 megohm input measures voltages as low as 1 V in high impedance circuits.

Kit IMA-100-10, Shpg. wt. 1 lb. **12.95**

IMA-100-11 Probe provides X100 measurement for meters with 11-megohm input impedance. (Incl. probe resistance). Phone plug, ground clip.

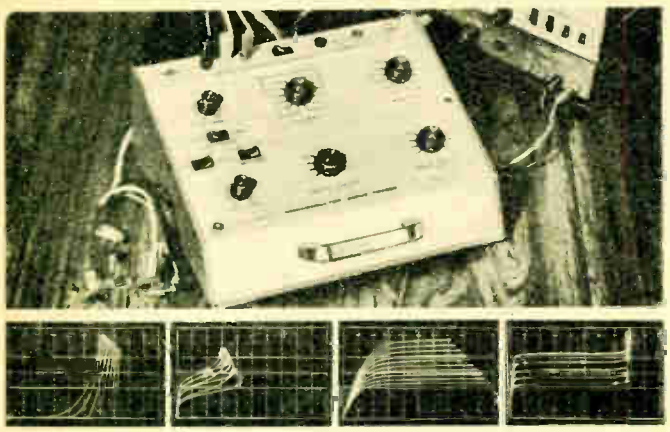
Kit IMA-100-11, Shpg. wt. 1 lb. **12.95**

Assembled SMA-100-11, Shpg. wt. 1 lb. **19.95**

IMA-1000-1 Probe provides X1000 attenuation for meters with 1-megohm input impedance. Banana plug connector.

Kit IMA-1000-1, Shpg. wt. 1 lb. **12.95**

High-Performance Test Equipment for Semiconductors & IC's



Negative resistance and interbase resistance (Rbb) for unijunction transistors.

Thermal runaway, leakage, linearity, beta, output admittance, saturation for bipolar transistors.

Typical field effect transistor display showing drain current versus drain voltage.

Field effect transistor breakdown.

Curve Tracer makes semiconductor testing faster and simpler

Take the guesswork out of semiconductor testing with the Heathkit IT-3121 Curve Tracer. An invaluable tool for the designer, technician or the serious electronic hobbyist. Just connect the IT-3121 to any oscilloscope with horizontal sensitivity of 0.5 V/div. and vertical sensitivity of 1 V/div. and adjustable horizontal gain. Devices such as bipolar transistors, diodes, SCRs, triacs, FETs, etc. can be inspected or tested for specific applications. Plug-in cables are supplied for fast, easy scope hookup. A calibration switch permits fast and accurate scope calibration. You can display most fundamental parameters (see insets for typical displays). The extensive manual included in each kit tells how to interpret each display. Low profile styling and the sloped front panel permit the Curve Tracer to sit in front of most oscilloscopes without blocking the CRT. Extra leads (included) allow you to test large devices or make in-circuit tests.

Kit IT-3121, Shpg. wt. 10 lbs. **109.95**

IT-3121 SPECIFICATIONS: Sweep Voltage Ranges: 0-40 volts at 1 ampere max. 0-200 volts at 200 mA max. **Sweep Voltage Sampling:** .1, .2, .5, 1, 2, 5, 10, 20 and 50 V/div. ±3%. **Sweep Current Sampling:** .5, 1, 2, 5, 10, 50, 100 and 200 mA/div. ±%. **Sweep Dissipation Resistors:** 0, 10, 50, 100, 500, 1000, 5000, 10k, 50k, 100k, 500k, 1 meg ±10%. **Step Currents:** .002, .005, .01, .02, .1, .2, 2, 5, and 10 mA/step, ±3%, ±250 nA offset current max. **Step Voltages:** .05, .1, .2, .5, and 1 volt/step, +3%, −5% mA maximum offset voltage. **Calibration Source:** 9 volts ±2%. in 1 volt steps. **Polarity:** PNP and NPN (P Channel - N Channel). **Oscilloscope Requirements:** Bandwidth to 20 kHz or greater. (DC-coupled oscilloscope is recommended). **Power Requirement:** 110 to 130 or 220 to 260 VAC. **Dimensions:** 4½" H x 11¼" W x 10" D.

Low-cost testers add versatility to your bench

1 Deluxe Digital IC Tester for fast, easy IC checks

A 'must for anyone working with digital integrated circuits. Lets you determine functions of IC's, check operation against your own data sheets. Features a special high-quality "zero-force" insertion socket — the same as used in expensive production-line testers — that lets you make thousands of insertions and extractions without worrying about bent pins. Exclusive "bounce-free," mercury stepping switch allows safe and easy "exercising" of multi-function IC's such as flip-flops. Has input-output jacks for each pin; neon indicators. Exceptionally easy to operate — 14- or 16-pin IC's can be installed in any position. Ideal for use with the Digital Techniques Program (page 70).

Kit IT-7400, Shpg. wt. 6 lbs. **79.95**

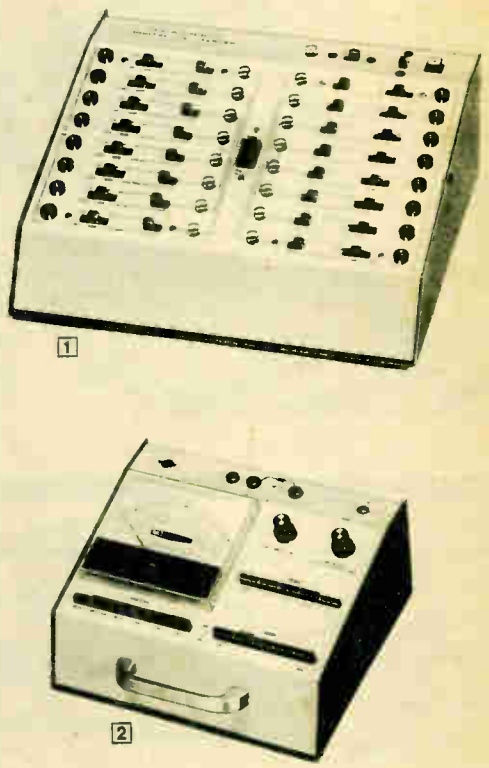
IT-7400 SPECIFICATIONS: Pull-up Resistors: externally connected, with patch terminals. **Patch Terminals:** one at each pin. **Selector Switches:** two at each terminal, one for +5V, step, or off; the other for gas discharge or ground. **Gas Discharge:** allows direct driving of neon indicator lamp for high voltage decoder driver. **Power Supply:** 5 VDC regulated, ±5%, 300 mA and 3.6 VDC, switch selected. **Power Requirement:** 100-135/200-270 VAC, 60/50 Hz. **Dimensions:** 4⅝" H x 11⅜" W x 9¼" D.

2 High-accuracy FET/Transistor Tester for in or out-of-circuit tests

For quick, accurate tests of conventional (bi-polar) transistors, diodes, FETs. SCRs, triacs and unijunction transistors. Tests components either in-circuit using color-coded test leads supplied or out-of-circuit using built-in sockets. Shows gain (DC Beta), trans-conductance (Gm) and leakage directly on the large easy-to-read meter. Five current ranges permit leakage measurements as low as 1 μA and collector currents as high as 1 ampere. Has easy-to-use push-button function switches, special battery testing circuit that shows the condition of batteries' power supply, two-color front panel design with black lettering for conventional (bipolar) transistors and red lettering for FET's. Batteries not included.

Kit IT-3120, Shpg. wt. 5 lbs. **67.95**

IT-3120 SPECIFICATIONS: Out-of-Circuit Accuracy: ±5% for DC beta and leakage. **In-Circuit Accuracy:** Indicates good or bad transistor, FET, diode, SCR or triac. **Diode Test:** Tests for forward conduction and blocking. **Unijunction Transistor Test:** Measures I_{eb_2}s, $I_{b_2b_1}$s and emitter current. **Power Requirement:** Two 1½" V cells, (alkaline for best performance, not supplied). **Dimensions:** 5" H x 9¾₆" W x 8⅛" D.

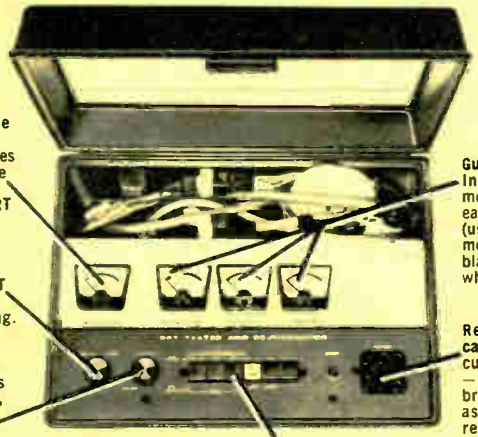


Take this portable Transistor/Diode Checker with you anywhere for field checks

Transistor/Diode Checker. (Not shown). Checks high and low power transistors (NPN and PNP) for shorts, opens, leakage and current gain. Checks diodes for forward and reverse current; also can be used as a continuity tester. Has switches for FOR-REV/PNP-NPN, DIODE/HI-LO, LEAKAGE-GAIN. Easy-to-read calibrated meter. Metal cabinet can be placed so that switches are on top or either side for most convenient operation. Uses two 1.5-volt "C" cells for easy portability. 3⅛" H x 3⅛" W x 3¾" D. Less batteries.

Kit IT-3127, Shpg. wt. 2 lbs. **13.95**

Heathkit TV Service Instruments save you time and money



Low-Cost CRT Tester/Rejuvenator brings your old and worn TV picture tubes back to life — even in-line gun types!

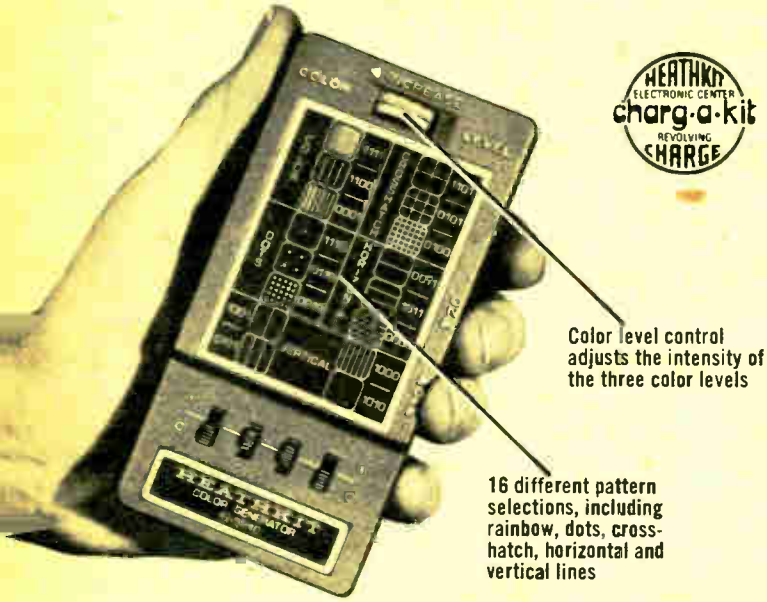
Test, clean and rejuvenate almost all current CRT's including in-line-gun types. Positive action pushbuttons control all tests and processes for easy operation. Individual guns can be cleaned, tested and rejuvenated by using the front panel pushbuttons. And separate meters for each gun allow easy tracking of the individual grid currents. The main power control also sets control grid voltage level. A separate heater voltage meter allows monitoring of the heater voltage supplied to the cathode of the CRT. An indicator lamp gives visual confirmation of CRT short-circuits and the visual display restore indicator glows brighter as the rejuvenating current is increased. A separate cleaning process is applied after rejuvenation to assure proper tube operation. With 4' heavy-duty test cable.

Kit IT-5230, Shpg. wt. 9 lbs. **99.95**

Factory assembled version of above.

ST-5230, Shpg. wt. 9 lbs. **150.00**

IT-5230 SPECIFICATIONS: Sockets Supplied: 14-pin for 90° color tubes; 13-pin for in-line color tubes; 8-pin for black-and-white tubes; 7-pin for black-and-white tubes. **Heater Supply Voltage:** Variable from 2 volts to 12 volts at 1 ampere. **Power Requirement:** 120/240 VAC (ST-5230: 120 VAC.) **Dimensions:** 5.12" H x 13.5" W x 10" D.



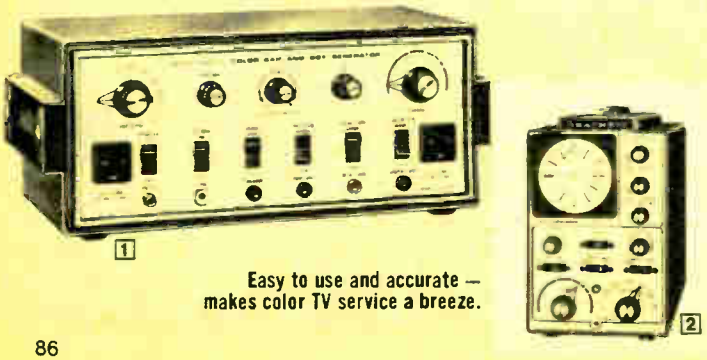
Portable Color Alignment Generator for in-the-field service

The IG-5240 offers outstanding performance, with crystal-controlled carrier and color oscillator for real precision, accuracy and stability. Its convenient "shirt-pocket" size makes it the one to take along for in-the-field service calls every time. It's a versatile, low-cost service tool for hobbyists, too. The IG-5240 is really easy to operate. Simply connect its output cable to the VHF terminals of any color TV. The RF carrier frequency is calibrated for channel 4. An "on" pushbutton turns the IG-5240 on, four program slide switches select any of the 16 displays available. A color level control adjusts the color intensity of the three color patterns. A special "battery saver" timing circuit turns the display "off" automatically after a minimum of five minutes "on". This conserves battery power and lets you get the most efficient operation from your batteries. The unit uses two inexpensive 9-volt transistor batteries for a minimum of 8 hours continuous operation. For features, convenience and versatility, we don't think you can find a better color alignment generator than the IG-5240. Put this **truly** portable color alignment generator in your service shop today!

Kit IG-5240, Shpg. wt. 2 lbs. **69.95**

SG-5240, Factory assembled version of above. Shpg. wt. 1 lb. **100.00**

IG/SG-5240 SPECIFICATIONS: Chroma Carrier: 3563.795 kHz ±0.005% crystal-controlled. **Master Timer:** 377.616 kHz ±0.005% crystal-controlled. **RF Carrier: Channel 4,** 67.250 MHz ±0.01% crystal-controlled. **RF Output Level:** 5000 μV min. into 300 ohms. **Video Modulation:** 50% (approx.) **On-Time Interval:** 5 minutes min. OFF pushbutton can override time out. **Power Requirement:** Two 9-volt transistor batteries; with 180 mAH capacity (NEDA #1604). **Dimensions:** 5.4" L x 2.75" W x 1.15" D.



Easy to use and accurate — makes color TV service a breeze.

1 Color Bar and Dot Pattern Generator for easy service

Provides 12 patterns plus a clear raster for purity adjustments, and patterns are available in the exclusive Heath 3x3 display or the familiar 9x9. Has RF output for channels 2 through 6, variable up to 50,000 μV, variable plus and minus going video, front panel gun shorting switches and lead piercing grid jacks, front panel sync output, 4.5 MHz sound carrier oscillator, two 500W AC receptacles. For 120/240 VAC, 50/60 Hz. 5½" H x 13½" W x 8" D.

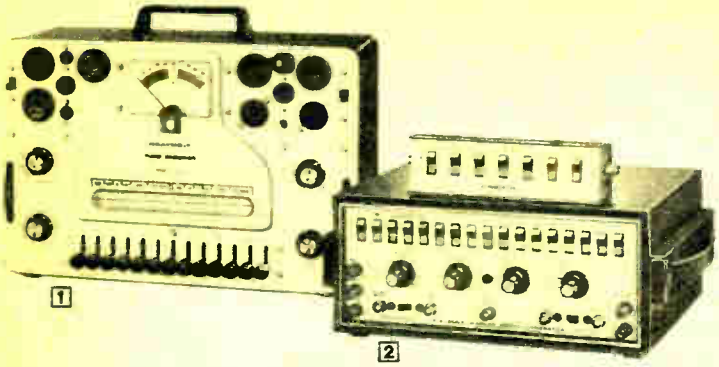
Kit IG-5228, Shpg. wt. 8 lbs. **129.95**

2 Versatile combination Vectorscope/Color Generator

Accurately shows the chroma signal being fed to the CRT to indicate missing or weak colors, proper adjustment of the burst phase transformer, 3.58 MHz oscillator, reactance coil, bandpass transformer, color demodulation angle. Provides 12 patterns plus a raster for purity adjustments in 9x9 or 3x3.

Kit IO-4101, Shpg. wt. 13 lbs. **199.95**

Outfit your bench with quality Heathkit Test Equipment



[1] **Low-Cost Heathkit Tube Checker.** Essential for radio-TV servicing! Tests tubes on the basis of total emission, for shorts, leakage, open elements, and filament continuity. Has good-?-bad indicator to show relative quality, neon bulb indicator for filament continuity and leakage or shorts between elements. Easy-to-operate roll chart.

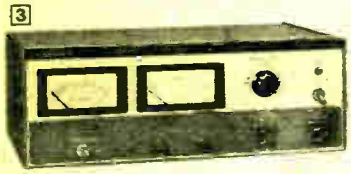
Kit IT-3117, Shpg. wt. 12 lbs. **149.95**

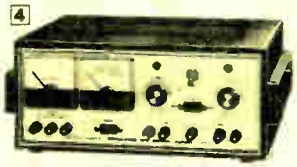
IT-3117 SPECIFICATIONS: Sockets: 4-pin, 5-pin, 6-pin combination and pilot light. 7-pin miniature, octal, loctal. 10-pin miniature, 9-pin novar, 9-pin miniature, 12-pin compactron. 5-pin nuvistor, 7-pin nuvistor. **Filament Voltage:** 0.63, 1.4, 2, 2.35, 2.5, 3.15, 4.2, 4.7, 5, 6.3, 7.5, 9.45, 12.6, 19.6, 25, 32, 50, 70, 110 VAC. **Power Requirement:** 120 VAC, 50/60 Hz. **Dimensions:** 8½" H x 13" W x 5½" D.

[2] **Deluxe Post Marker/Sweep Generator.** The IG-5257 makes receiver alignment fast and easy. It features 15 selectable markers, video and audio carrier markers for channels 4 and 10, and a diode modulator for Video Sweep Modulation. Other features include a 400 Hz tone for FM receiver alignment, and a multi-step attenuator pad to assure proper impedance match and to avoid overload. Compatible with NTSC system only

Kit IG-5257, Shpg. wt. 16 lbs. **199.95**

IG-5257 SPECIFICATIONS: Marker frequency: 100 kHz. **Marker frequencies, crystal-controlled:** 3.08, 3.68, 4.08, and 4.50 MHz ±0.01%. 10.7, 39.75, 41.25, 42.17, 42.50, 42.75, 45.00, 45.75, 47.25, ±0.005%; 67.25 and 193.25 MHz ±0.01%. **Modulation frequency:** 400 Hz. **Input impedance:** External Marker/Sweep, and Attenuator — 75 ohms. Trace in — 220 k ohms. **Output impedance:** Marker Output, Sweep Output, and Attenuator — 75 ohms. Scope Vert. — 1 k ohms. **Bias voltage:** Two individually adjustable supplies: Positive or negative polarity. **Sweep frequency ranges:** LO Band — 2.5 to 5.5 MHz ±1 dB. IF Band — 39 to 49 MHz ±1 dB. RF band — 64 to 72 MHz ±1 dB. **Attenuator:** Total of 70 dB in seven steps. **Power requirement:** 120 V, 60 Hz AC at 4.5 watts.





[3] **Easy-to-use General-Purpose Power Supply.** Provides 0-400 VDC output at 0-100 mA continuous (125 mA intermittent). The front panel voltmeter measures from 0-400 or 0-150 volts, the front panel ammeter from 0-150 mA. For 120/240 VAC, 50/60 Hz. 5⅛" H x 13¼" W x 11" D.

Kit IP-2717, Shpg. wt. 19 lbs. **129.95**

SP-2717, Assembled and Tested. 19 lbs. **230.00**

[4] **Variable Isolated AC Power Supply.** Provides continuously variable 0-140 VAC output, with complete isolation from AC power line. Input voltage is 120 VAC, 60 Hz. The output voltage is 0-140 Volts at 60 Hz. Has front panel ammeter and voltmeter. Output current is 3 A max. 5½" H x 15" W x 10½" D.

Kit IP-5220, Shpg. wt. 28 lbs. **139.95**

Reliable General-Purpose Power Supplies

Kit IP-2710, 30V @ 3A analog. Shpg. wt. 34 lbs. **189.95**

Assembled SP-2710, 30V analog. Shpg. wt. 34 lbs. **290.00**

Kit IP-2711, 30V @ 3A digital. Shpg. wt. 36 lbs. **249.95**

Assembled SP-2711, 30V digital. Shpg. wt. 35 lbs. **370.00**

Kit IP-2728, 1-15 VDC regulated. Shpg. wt. 5 lbs. **29.95**

Tri-Output Power Supply ideal for digital circuits

Combines fixed 5 VDC output with two continuously adjustable 0-20 VDC outputs for circuit designs requiring more than one voltage supply. The outputs of the two 20 VDC variable supplies and the fixed 5 VDC output can be interconnected in any combination to provide both positive and negative voltages with a fixed reference, or they can be allowed to "float" at no reference level. A clutch-coupled control allows the two 20 VDC supplies to "track" each other at any specified voltage difference. The 20-volt supplies can provide up to 0.5 amperes each. All outputs are short-circuit proof, with automatic current limiting. They can be operated independently, in series or in parallel.

Kit IP-2718, Shpg. wt. 12 lbs. **99.95**

Assembled SP-2718, Shpg. wt. 12 lbs. **195.00**

IP-2718 SPECIFICATIONS: Regulation: Load: less than 0.1% variation from no load to full load on 20-volt supplies; less than 2% variation from no load to full load on 5-volt supply. **Line:** less than 0.2% variation for line voltage change of 10 volts on 20 volt supplies; less than 0.15% variation for line voltage change of 10 volts on 5-volt supply. **Power Requirement:** 100-135 or 200-270 VAC, 60/50 Hz, 100 watts full load. **Dimensions:** 4½" H x 10¾" W x 9" D.

Reliable Power Supply/ Battery Eliminator

Provides variable 9-15 volt output capable of 12 amps continuous, 20 amps intermittent

$149.95

Provides clean, accurate voltage source necessary for the reliable service of Ham, Marine, and CB communications gear. Features include two easy-to-read front panel meters which continuously monitor both current and voltage. Front panel adjustment allows continuously variable voltage selection from 9 to 15 VDC and a two position norm/standby switch.

Kit IP-2715, Shpg. wt. 31 lbs. **149.95**

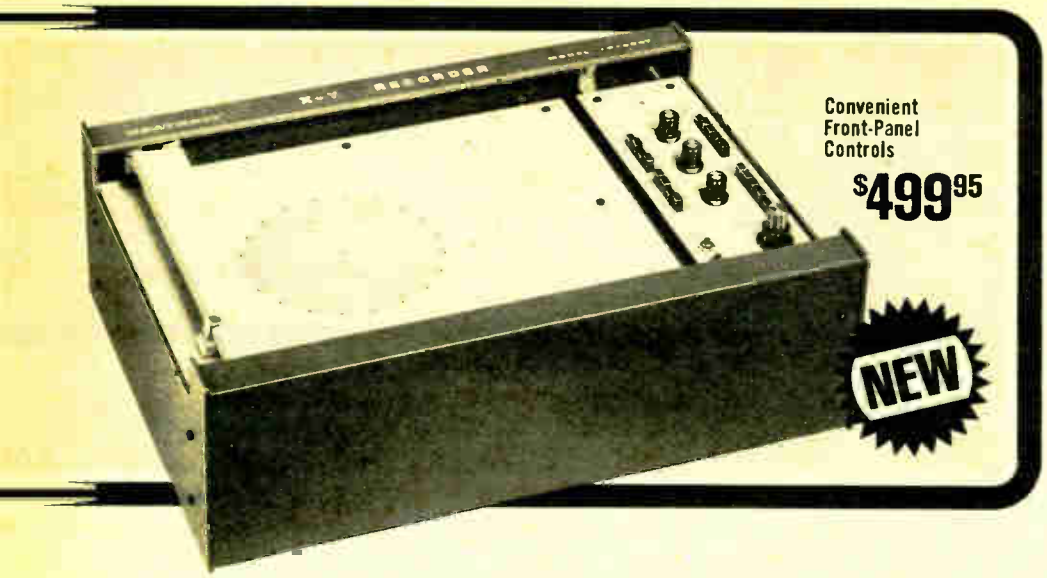
IP-2715 SPECIFICATIONS: Output Voltage: variable from 9-15 VDC. **Output Current:** 12 amps continuous, 20 amps intermittent (per derating curve in manual). **Ripple:** less than 1% at full load. **Regulation:** less than 2% variation from no load to full load. **Fuses:** 7A, 3 AG slow-blow primary; 20A, 3 AG output. **Power Requirement:** 110-130 VAC, 7A or 220-260 VAC, 3.5 A, 60/50 Hz. **Dimensions:** 5¼" H x 11" W x 11" D.

High-Voltage Probe Meter for fast, easy TV Tube Measurements

Makes TV tube voltage measurements fast and convenient. Easy kit assembly. Lightweight, portable and measures DC voltages up to 40 kV with ±3% accuracy. Compatible with NTSC system, PAL and SCAM. 1½" H x 1⅞" W x 15" D.

Kit IM-5210, Shpg. wt. 2 lbs. **21.95**

Accurate, easy-to-use Heathkit Test Equipment



Precision X-Y Chart Recorder features two channels for real versatility

The IR-5207 is precise enough for your most demanding measurements. It's easy to use and set up. And it's ideal for use in such applications as charting frequency response.

Complete front panel controls for all the functions assure you of easy-operating convenience no matter what your application. Front panel input filters with pushbutton controls let you tailor the filtering to your own exact requirements. Up to 60 dB of line frequency filtration in 20 dB increments is available to both coordinates.

The integral paper holdown can be used in both horizontal and vertical position without modification. Although normally used with standard 8½ x 11" graph paper, it can also use any type of special application paper that fits the graph table.

The calibrated ranges of 1, 10, 100 mV and 1 V per inch are pushbutton selectable from the front panel. You can go from 1 mV per inch to 10 volts per inch in the variable mode.

Electric pen lift lets you place pen anywhere on the chart with zero input on both coordinates. This makes it simple to retrace any specific portions of a trace. Disposable nylon tipped pens (see listing below) eliminate the need for bothersome pen filling and cleaning.

The overall limit of error is 0.5% of full scale. Dead band and non-linearity error is less than 0.25% of full scale. (See specs at right.)

Metric convertibility is also provided. The IR-5207 is a versatile, easy-to-use two channel chart recorder that can help you in almost any high-precision chart recording application.

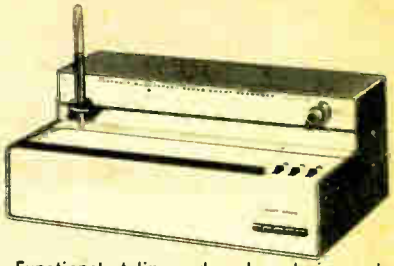
Kit IR-5207, Shpg. wt. 28 lbs. **499.95**

SU-205-6, Disposable Red Nylon Tip Pen for chart speeds under 1 in/min. Shpg. wt. 1 lb. **3.75**

SU-205-7, Disposable Blue Nylon Tip Pen for chart speeds over 1 in/min. Shpg. wt. 1 lb. **3.75**

Factory assembled and tested version of above.
SR-207, Shpg. wt. 30 lbs. **995.00**

Budget-priced Strip Chart Recorder



Functional styling and modern design make the IR-18M easy to use and operate.

Features 1 mV or 10 mV full-scale input (selected during assembly; twelve chart speeds from 5 sec./in. to 200 min./in. Zener regulated voltage supply. Less than 1% error, full scale. For 120/240 VAC, 60/50 Hz. 6" H x 15" W x 9⅛" D.

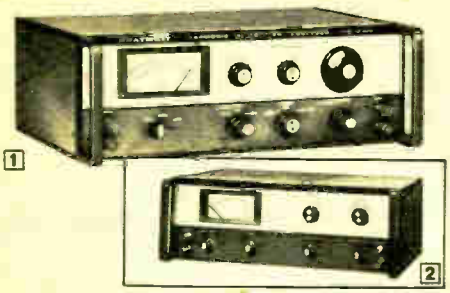
Kit IR-18M, Shpg. wt. 15 lbs. **239.95**

3 rolls chart paper (140 ft./roll).
IRA-18-1, Shpg. wt. 5 lbs. **13.95**

120 ft. roll chart paper. (For slow speeds.)
SU-445-17, 2 lbs. **4.75**

SPECIFICATIONS: MECHANICAL: Chart Size: 8½" x 11". (21.59 cm x 27.94 cm). **Sweep Speeds:** 0.02, 0.1, 0.2, 1, 2 inches/second. (0.04, 0.2, 0.4, 2, 4 cm/second). **Overshoot:** <1% of full scale. **LIMITS OF ERROR (both coordinates): Overall Limit of Error:** ±0.5% of full scale maximum. **Dead Band:** <0.25% of full scale. **Non-Linearity:** <±0.25% of full scale. **Sweep Speed:** ±3%. **Line Frequency Rejection:** Normal mode, 20, 40, 60, 80 dB (minimum) selected by front panel switch. Common mode, 80 dB (minimum) with filter OFF, 100 dB (minimum) with maximum filtering ON, with 1000Ω unbalance. **Normal Mode Input Voltage (maximum):** 100 volts on 1, 10, and 100 mV ranges. 200 volts on 1-volt range. **Common Mode Input Voltage (maximum):** 400 volts. **GENERAL: Power Requirement:** 100-135 or 200-270 volts. 50-60 Hz, 35 watts maximum. **Overall Dimensions:** 5.656" H x 17.562" W x 12.25" D. **Net Weight:** 24 lbs.

Professional-quality Harmonic and Intermodulation Distortion Analyzers



1 Harmonic Distortion Analyzer. The Heathkit IM-5258 is a professional-grade total harmonic distortion (THD) analyzer. Its outstanding sensitivity and bandwidth permit measurement of THD levels as low as 0.03%, from 5 Hz to 100 kHz. (Not for use in strong RF fields.)

Kit IM-5258, Shpg. wt. 17 lbs. **239.95**

SM-5258, Assembled. 16 lbs. **350.00**

2 Intermodulation Distortion Analyzer. Similar to IM-5258, measures IMD instead of THD.

Kit IM-5248, 14 lbs. **129.95**

SM-5248, Assembled. 15 lbs. **200.00**

IM/SM-5258 SPECIFICATIONS: Frequency Range: 5 Hz to 100 kHz in 5 rtnges. **Distortion Range:** reads from 0.3% to 100% full scale in 6 ranges. **Residual Distortion:** 0.03% or less. **Input Impedance:** 1 megohm/70 pF maximum. **Required Input Level:** 316 mV for distortion measurements. **Voltmeter:** 1 mV to 300 V in 12 ranges. **Accuracy:** 5% of full scale. **Output:** 100 mV for full scale meter deflection. **Power Requirement:** 100-135 VAC or 200-270 VAC, 60/50 Hz. 12 watts. **Dimensions:** 5⅜" H x 15" W x 11½" D.

Versatile FM Stereo Generator

Provides stereo signals for multiplex adapter adjustments...RF carrier for tuner & receiver adjustments...phase test function for subcarrier transformer adjustment...a 19 kHz pilot signal for receiver lock-in ranges...plus built-in sweep and marker signals. With test leads. For 120/240 VAC.

Kit IG-5237, Shpg. wt. 11 lbs. **129.95**

Heathkit Audio Load (Not Shown.) Provides audio loads of 2, 4, 8, 16 or 32 ohms for audio amplifiers. 4" H x 9" W x 9" D.

Kit ID-5252, Shpg. wt. 6 lbs. **47.95**

Build your own test bench

Perform tests in your own shop with versatile, value-priced Heathkit test equipment

Here's REAL Value!

Heath's 5280 Series of test instruments is an excellent low-cost way to assemble a truly versatile test bench. Whether you're doing hi-fi servicing, working on television equipment, or just experimenting, each 5280 Series instrument represents real value.

1 Sine/Square Wave Audio Oscillator

The IG-5282 Audio Oscillator is an instrument that you'll find useful in many audio test applications. Frequency output is in four ranges, from 10 Hz to 100 kHz, in either sine or square wave modes. Use the IG-5282 as an audio signal source during signal tracing or, with the appropriate associated equipment, use the sine wave output for audio stage gain and distortion analysis. Square wave output is ideal for determining frequency response (with appropriate associated equipment). Construction is rugged and assembly time is greatly reduced by single circuit board assembly.

Kit IG-5282, Shpg. wt. 5 lbs. **39.95**

IG-5282 SPECIFICATIONS: Frequency Output: 10 Hz to 100 kHz in four ranges. **Sine Wave Output Voltage:** 0-3 volts rms. **Square Wave Output Voltage:** 0-3 volts peak. **Power Requirements:** Two 9-volt batteries or the optional IPA-5280-1 Power Supply. **Dimensions:** 11" H x 5¾" W x 7¾" D. **Net weight:** 3¼ lbs.

2 RF Oscillator for radio/TV alignment

This unit, which includes probes, is suitable for use in alignment of tuned stages in AM, FM, and television receivers. Output is divided into five bands, from 310 kHz to 110 MHz, and features an extra 100 to 220 MHz band of calibrated harmonics. An added feature of the IG-5280 is its 1000 Hz audio output. This signal, available at a front panel jack, is ideal for tracing and isolation of circuit defects in receiver audio stages and also serves as a source of internal AM modulation.

Kit IG-5280, Shpg. wt. 5 lbs. **39.95**

IG-5280 SPECIFICATIONS: RF Output: Frequency Range: 310 kHz to 110 MHz in five bands, 100 MHz to 220 MHz on harmonics. **Output voltage:** 100 mV approx. **Internal Modulation:** 1000 Hz. **AF Output: Frequency:** 1000 Hz. **Output Voltage:** 2.0 volts rms (open circuit). **Power Requirements:** Two 9-volt batteries of IPA-5280-1 power supply. **Dimensions:** 5¾" H x 11" W x 7¾" D. **Weight:** 3¼ lbs.

3 Multimeter for volts/ohms/DC current

High performance solid state multimeter gives you 4 different functions and a large easy-to-read panel meter. Features include AC and DC voltage measurement to 1000 volts and DC current measurement to 1000 mA full scale. The ohmmeter function is divided into four ranges, X1, X100, X10k, and X1MΩ. Power requirements are met by internal batteries or by the optional IPA-5280-1 power supply and 1 "C" cell. Includes test probes.

Kit IM-5284, Shpg. wt. 5 lbs. **39.95**

IM-5284 SPECIFICATIONS: DC Voltmeter: Ranges: 0-1, 0-10, 0-100, 0-1000 volts full scale. **Accuracy:** ±3% of full scale. **AC Voltmeter: Ranges:** 0-1, 0-10, 0-100, 0-1000 volts full scale. **Accuracy:** ±5% of full scale. **DC Milliammeter: Ranges:** 0-1, 0-10, 0-100, 0-1000 mA full scale. **DC Input Resistance:** 10 megohms. **AC Input Resistance:** 1 megohm. **Ohmmeter: Ranges:** X1, X100, X1k, X1MΩ. **Power requirements:** Two 9-volt batteries and 1 "C" cell or IPA-5280-1 Power Supply and 1 "C" cell. **Dimensions:** 5¾" H x 11" W x 7¾" D. **Weight:** 3¼ lbs.

4 RCL Bridge ideal for design work

The Heath IB-5281 RCL Bridge is priced right for your pocket book and has the features that you can appreciate. Solid-state circuitry lets you easily determine unknown values of resistance, inductance and capacitance. Resistance is indicated in three ranges from 10Ω to 10MΩ, inductance in three ranges from 10 μH to 10H and capacitance, also in three ranges, from 10 pF to 10 μF. Easy single circuit board construction speeds assembly. With component clips.

Kit IB-5281, Shpg. wt. 5 lbs. **39.95**

IB-5281 SPECIFICATIONS: Resistance Ranges: 10Ω to 10MΩ in three ranges. **Inductance Ranges:** 10 μH to 10H in three ranges. **Capacitance Ranges:** 10 pF to 10 μF in three ranges. **Oscillator Frequencies:** 1 kHz, 10 kHz, 100 kHz. **External Standard Range:** 1:1 to 10:1. **Power Requirements:** two 9-volt batteries, or IPA-5280-1 power supply. **Dimensions:** 5¾" H x 11" W x 7¾" D. **Weight:** 3½ lbs.

5 Signal Tracer for audio circuits

If you have been waiting to add an audio signal tracer to your bench because the price was just too high...look again. The IT-5283 Signal Tracer makes a great, low-priced addition to your trouble-shooting arsenal. A diode-equipped RF probe (furnished with the kit) lets you quickly trace radio and television receiver and transmitter circuits to reveal component and stage failures. When you flip the probe to its straight through (DC) position, you are able to locate defective circuitry in all types of audio components and systems with ease. By placing the IT-5283 in the audible position, the Signal Tracer emits a tone that changes in frequency depending on the test point voltage or resistance, thereby allowing you to easily trace signal flow through logic circuits to isolate problems. Turn the IT-5283 Signal Tracer off and its 3" permanent magnet speaker is connected to two front-panel jacks which allow you to use it as a handy bench test speaker.

Kit IT-5283, Shpg. wt. 5 lbs. **39.95**

IT-5283 SPECIFICATIONS: Functions: Substitute speaker, AF signal tracing, RF signal tracing, Audible volt/ohmmeter. **Speaker:** 3" permanent magnet. **Power Requirements:** Two 9-volt batteries and/or IPA-6280 power supply. **Cabinet Dimensions:** 5¾" H x 11" W x 7¾" D. **Weight:** 3¼ lbs.

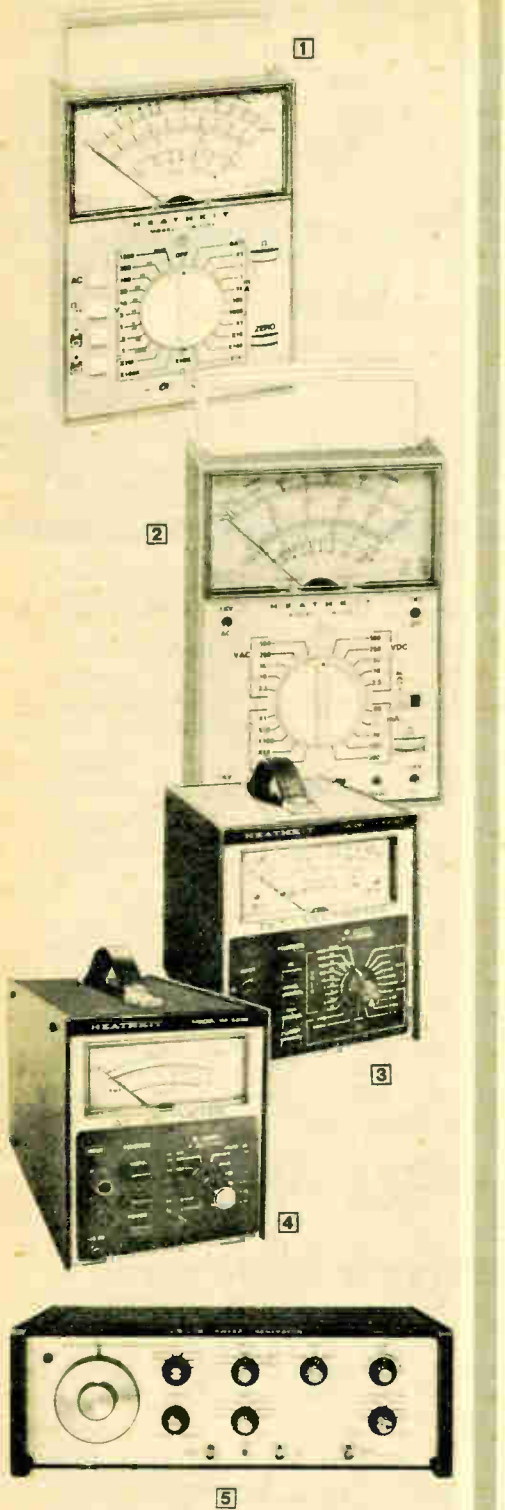
5280 Series 120/240 V Power Supply

(Not Shown.) Provides all voltages required by 5280 series equipment. Features full wave rectification, capacitor filtering and dual integrated circuit regulators to insure correct voltage output. Powers all five instruments simultaneously and has handy switch which allows operation from either 110 or 220 VAC outlets without rewiring.

Kit IPA-5280-1, Shpg. wt. 3 lbs. **27.95**

IPA-5280-1 SPECIFICATIONS: Output Voltage: +9 and −9 VDC ±9%. **Maximum Output Current:** 100 milliamps. **Power Requirements:** 100 to 135 VAC or 200 to 270 VAC, 50/60 Hz, 7 watts maximum. **Dimensions:** 6" H x 3¾" W x 3" D. **Fuse:** 1/16-amp, 3AG, slow-blow.

Heathkit Test Instruments offer to



1 Solid-state Taut-Band FET VOM. Provides the input characteristics and measuring capabilities of a VTVM with the versatility and portability of a VOM. The 4½" taut-band meter is diode-protected for outstanding ruggedness and reliability. Has 9 AC and DC voltage ranges; 6 current ranges; seven resistance ranges and 9 dB ranges. Extra-wide frequency response is useful for audio measurements.

Kit IM-1104, Shpg. wt. 4 lbs. **109.95**

Assembled SM-666. Has 1μA current range, less 100 mA and 1000 mA ranges. Shpg. wt. 3 lbs. **195.00**

IM-1104 SPECIFICATIONS: Frequency Response: 0.1 to 30 volt ranges, ±3%, 20 Hz to 20 kHz, ±5%, 20 Hz to 50 kHz. 100-300 volt ranges, ±3%, 20 Hz to 10 kHz, ±5%, 20-Hz to 20 kHz. 1000 volt range, ±3%, 20 Hz to 1 kHz. **DC VOLTAGE RANGES:** 0.1, 0.3, 1, 3, 10, 30, 100, 300, 1000 V. **Accuracy:** ±2% of full scale. **AC VOLTAGE RANGES:** 0-0.1, 0.3, 1, 3, 10, 30, 100, 300, 1000 V. **Accuracy:** ±3% full scale. **DC MILLIAMETER:** 0-0.1, 0.1, 1, 10, 100, 1000 mA. **Accuracy:** ±2% to 100 mA, ±3% to 1000 mA. **AC MILLIAMETER:** Same as DC mA; accuracy, ±3% to 100 mA; ±4% to 1000 mA. **OHMMETER:** Rx10, Rx100, Rx1000, Rx10K, Rx100K, (10 ohm center scale). Rx1M (10 megohm center scale) dB: (0 dB = 1 mW into 600 ohms) −40 to −18, −30 to −8, −20 to +2, −10 to +12, 0 to +22, +10 to +22, +20 to +42, +30 to +52, +40 to +62. **Operating Temperature:** 0 to 50°C. **Batteries** (not supplied): one 1.5 V D-cell (NEDA =13); four 1.5 V AA cells (NEDA =15). **Dimensions:** 6.95" H x 4.95" W x 2.25" D.

2 General-purpose VOM for easy service. The IM-105 is a high-accuracy VOM that's really designed to take it. Features low-friction, taut-band meter with diode & fuse protected movement. Less batteries.

Kit IM-105, Shpg. wt. 3 lbs. **89.95**

Assembled SM-660, (less 5 KV ranges), 3 lbs. **100.00**

IM-105 SPECIFICATIONS: DC VOLTAGE RANGES: −0.25, 2.5, 10, 50, 250, 500, 1000 & 5000 V full scale. **Accuracy:** ±3% of full scale. **Input resistance:** 20,000 ohms/V full scale. **AC VOLTAGE RANGES:** −2.5, 10, 50, 250, 500 V, 1 kV & 5 kV full scale. **Accuracy:** ±4% of full scale. **Input resistance:** 5000 ohms/V. **Input capacity:** Less than 20 pF. **Frequency response:** 2.5, 10, and 50 V ranges. ±5%, 10 Hz to 100 kHz; 250, 500 V ranges: ±5%, 10 Hz. **DC CURRENT RANGES:** −0.05, 1.0, 10, 100, 500 mA & 10 A full scale. **Accuracy:** ±3% of full scale. **RESISTANCE RANGES:** −x1 (20 center scale), x10, x100, x1k, x10k. **Accuracy:** ±3 degrees of arc. **DECIBEL RANGES:** (0 dB = 1 mW in 600 ohms). −10 to +56 dB. **Dimensions:** 7" H x 5" W x 2¼" D.

3 Quality FET Multimeter. Measures AC and DC volts, current and resistance. Features auto-polarity for added convenience, high and low voltage/ohms functions for in and out of circuit checks of semiconductor devices and resistance measurements.

Kit IM-5225, Shpg. wt. 8 lbs. **99.95**

Assembled SM-5225, 8 lbs. **150.00**

IM/SM-5225 SPECIFICATIONS: DC Volts: nine ranges 0-0.1, 0.3, 1, 3, 10, 30, 100, 300, and 1000 full-scale. **AC Volts:** nine ranges 0-0.1, 0.3, 1, 3, 10, 30, 100, 300, and 1000 volts full-scale. **DC Current:** six ranges 0-.01, 0.1, 1, 10, 100, 1000 milliamperes full-scale. **AC Current:** six ranges 0-.01, 0.1, 1, 10, 100, 1000 milliamperes full-scale. **Ohms:** seven ranges X1, X10, X100, X10k, X100k, X1M. **Power Requirement:** 120/240 VAC, 50/60 Hz, 5 watts. **Dimensions:** 6⅞" H x 5¾" W x 11¼" D. **Weight:** 5¾ lbs.

4 Deluxe AC Voltmeter. Has excellent frequency response and sensitivity high-accuracy measurements. And it's one of the only instruments around to feature linear scales for both volts and decibels!

Kit IM-5238, Shpg. wt. 8 lbs. **99.95**

Assembled SM-5238, Shpg. wt. 8 lbs. **170.00**

IM/SM-5238 SPECIFICATIONS: Voltage Range (full scale): 1 millivolt to 300 volts AC, 12 ranges. **Decibel Range:** −70 dB to +40 dB, 12 ranges in 10 dB steps with variable offset. **Input:** 10 megohms, 30 pF, negative input grounded to chassis. **Frequency Response:** Voltage Range, 10 Hz to 1 MHz, ±2 dB. 10 Hz to 500 kHz ±1 dB, dB range, 10 Hz to 250 kHz ±1 dB. **Outputs:** DC (proportional to input volts), 1 volt full scale. DC (proportional to log of input volts), 3 volts full scale. AC (amplified output), 1 volt peak, full scale. **Scales:** 0-10 volts; 0-3.16 volts; −20 to +10 dB. **Accuracy:** Voltage Ranges, 4% of full scale at 1 kHz plus accuracy of calibration standard. dB ranges, ±0.5 dB at 1 kHz plus accuracy of calibration standard. **Power Requirement:** 100-135 VAC, 200-270 VAC, 50/60 Hz, 20 watts. **Dimensions:** 6¾" H x 5⅜" W x 10⅞" D.

5 Lin/Log Swept Function Generator. Provides sine, square and triangle waveforms PLUS swept-function waveforms for convenient frequency response tests. Also has pen lift and chart control signals for use with Heath chart recorders and others. Has 50 dB switch attenuator variable between ranges; adjustable symmetry from 5% to 95%; analog, sweep and sweep gate outputs for convenient system control. Start and stop frequencies are set independently; sweep modes can also be triggered externally.

Kit IG-1275, 15 lbs. **339.95**

Assembled SG-1275, 16 lbs. **450.00**

IG-1273 Function Generator. (Not shown). Same as IG-1275 above but no swept-function capability.

Kit IG-1273, 15 lbs. **199.95**

Assembled SG-1273, 11 lbs. **250.00**

IG/SG-1275 SPECIFICATIONS: Output: 50-ohm source — short circuit protected. ±10 volts open circuit. ±5 volts into 50-ohm load. **Output Flatness:** ±0.1 dB to 300 kHz. ±0.5 dB to 3 MHz. **Frequency:** 0.003 Hz through 3 MHz in 6 range steps on primary decade. **Sine Distortion:** Less than 1%, $\times 10^1$. Less than 0.5%, $\times 10^2$, 10^3, 10^4. Less than 0.75%, $\times 10^5$. Harmonics 30 dB down $\times 10^4$. **Triangle Linearity:** No deviation greater than 1% to 300 kHz. **Square-Wave Rise and Fall:** Less than 60 nS. **Sweep Generator:** 6 ranges, 10 μs through 100 sec. **Sweep Output:** Supplies 0 to 4.5-volt linear ramp at sweep generator rate from a 1000-ohm source. **Power Requirement:** 100 to 135 volts, 50-60 Hz, 20 watts maximum. (200 to 270 volts, 50-60 Hz, switch selectable.) **Dimensions:** 5⅜" H x 15" W x 11⅞" D.

*Applicable only on top decade of each frequency range. The IG-1275 and IG-1273 require a triggered sweep oscilloscope for calibration.

- **Easy to Operate front panel controls**
- **Short-circuit-proof output amplifie**
- **Rugged case with carrying handle**

erformance, high reliability and build-it-yourself value!

1 Popular, low cost VTVM. A single test probe that makes all measurements; seven practical AC, DC volts and ohms ranges; a precision 4½" color-coded 200 μA meter. 1% precision network resistors provide excellent accuracy; wide ±1 db, 25 Hz to 1 MHz frequency response permits a variety of AC measurements. Measures both rms and p-p AC volts. Separate full-scale ranges for 1.5 and 5 volts makes low-voltage readings really easy, ideal for work with solid-state and latest digital equipment. Can be wired for 120 or 240 VAC.

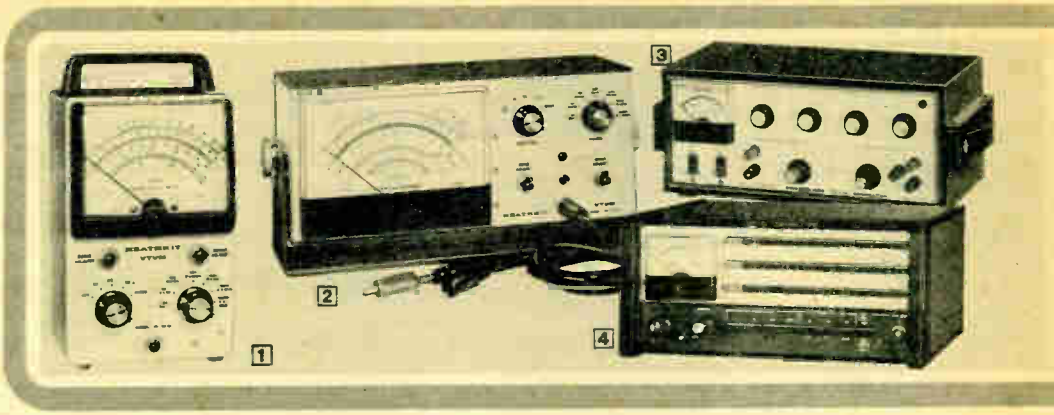
Kit IM-5218, Shpg. wt. 5 lbs. **54.95**
Assembled SM-5218, Shpg. wt. 5 lbs. **100.00**

IM/SM-5218 SPECIFICATIONS: Meter Scales: DC & AC (rms): 0-1.5, 15, 50, 150, 500, 1500 V full scale. **AC peak-to-peak:** 0.4, 14, 40, 140, 1400, 4000 V full scale. **Resistance:** 10 ohm center scale x1, x10, x100, x1000, x10k, x100k, x1 meg. Measures 1 ohm to 100 megohms. **Meter:** 4½", 200 μA movement. **Input resistance:** 11 megohms (1 megohm in probe) on all DC ranges; 1 megohm shunted by 35 pF on all AC ranges. **Circuit:** Balanced bridge (push-pull) using twin triode. **Accuracy:** DC ±3%, AC ±5% of full scale. **Frequency response:** ±1 dB, 25 Hz to 1 MHz (600 ohm source). **Battery Requirements:** 1.5 V, size "C" cell (not supplied). **Power Requirement:** 120/240 VAC, 50/60 Hz. **Dimensions:** 7⅜" H x 4¹¹⁄₁₆" W x 4¼" D.

2 Pro-feature bench VTVM. Bench-type version of IM-5218. All calibration controls are conveniently adjustable from the front panel. 120 or 240 VAC.

Kit IM-5228, Shpg. wt. 6 lbs. **64.95**
Assembled SM-5228, Shpg. wt. 7 lbs. **130.00**

IM/SM-5228 SPECIFICATIONS: DC VOLTMETER — Ranges: 0-1.5, 5, 15, 50, 150, 500, 1500 V full scale; up to 30,000 V with accessory probe. **Input Resistance:** 11 megohm (1 megohm in probe) on all ranges; 1100 megohms with accessory probe. **Circuit:** Balanced bridge (push-pull) using twin triode. **Accuracy:** ±3% of full scale. **AC VOLTMETER — Ranges:** 0-1.5, 5, 15, 50, 150, 500, 1500 rms scales. **Frequency Response (5 V range):** ±1 dB 25 Hz to 1 MHz (800 ohm source, referred to 60 Hz). **Accuracy:** 5% of full scale. **Input Resistance & Capacitance:** 1 megohm shunted by 40 pF measured at input terminals (200 pF at probe tip). **OHMMETER — Ranges:** Scale with 10 ohm center, X1, X10, X100, X1000, X10k, X1 meg. Measures 0.1 ohm to 1000 megohms with internal battery. **Meter:** 6", 200 μA movement, polystyrene case. **Battery:** 1½V, "C" cell (not supplied). **Power Requirement:** 120/240 VAC, 60/50 Hz, 10 W. **Dimensions:** 5" H x 12¹¹⁄₁₆" W x 4¾" D.



3 Sine-square wave Audio Generator. Ideal for gain and frequency response measurements in audio amplifiers, as a signal source for harmonic distortion measurements or as an external modulator for RF signal generators. A meter, calibrated in both volts and dB, monitors the sine wave output.

Kit IG-5218, Shpg. wt. 10 lbs. **99.95**
Assembled SG-5218, 10 lbs. **195.00**

IG/SG-5218 SPECIFICATIONS: Frequency Range: 1 Hz to 100 kHz. **Sine Wave Output: Output voltage:** 8 ranges, 0.003 to 10 V rms (full-scale) with 10 k ohm or higher external load. 6 ranges, 0.003 to 1 V (full-scale) with 600 ohm internal or external load. **dB ranges:** −62 dB to +22 dB, −12 dB to +20 dB on amplitude switch in 10 dB steps. +2 dB max. into 600 ohm load. (0 dB = 1 mW in 600 ohm). **Output variation:** +1 dB 10 Hz to 100 Hz. **Output impedance:** 10 V range: 0-1000 ohm, 3 V range: 800-1000 ohm; 1 V range and lower; 600 ohm. **Square Wave Output:** Output voltage (peak-to-peak). 0-1; 1, 10 V into 2000 ohm load or higher. **Output impedance:** 0.1 and 1 V ranges: 52 ohm; 10 range: up to 220 ohm. **Power Requirement: 105-125 or 210-250 VAC,** 60/50 Hz, 6 watts. **Dimensions:** 5⅛" H x 13¼" W x 7" D.

PKW-4, Wired Replacement Probe for IM-5228, 5218, 18 or 28. Wt. 1 lb. **8.95**
Convert your IM-5228, 5218, 18 or 28 to instant-on solid-state operation.
IMA-18-1, Wt. 1 lb. **19.95**

4 IG-1272 Audio Frequency Generator. The Heathkit IG-1272 provides a low-distortion sine wave output over a frequency range from less than 5 Hz to 100 kHz. Pushbutton select first 3 significant digits of desired frequency; also control frequency multiplier. Perfect for the serious audiophile, audio service shop or audio designer.

Kit IG-1272, Shpg. wt. 11 lbs. **149.95**
Assembled SG-1272, 10 lbs. **180.00**

IG/SG-1272 SPECIFICATIONS: Output Voltage: 0.003 to 10 volts RMS. **Output Load:** 600 ohms. **Hum and Noise:** 0.01% or less. **Frequency Accuracy:** Pushbuttons; ±4%, ±1 Hz, typical ±1.5%. Variable; Depends on accuracy of counter being used. **Attenuation:** 10 to 70 dB. **Power Requirement:** 120 VAC or 240 VAC, 50 or 60 Hz. 10 watts maximum. **Dimensions:** 5½" H x 11" W x 12⅓" D.

Solid-State portable VOM is ideal for fast, in-the-field checks

$47.95

- Value-priced
- Easy-to-build

Our lowest-priced portable VOM is ideal for car buffs, boaters, campers — any away-from-the-bench situation. Has four AC, DC and ohms ranges for most common measurements, high impedance to minimize circuit loading, wide frequency response for audio measurements. A special 1½-volt ohmmeter is ideal for checking semiconductors. Function switch gives you both AC and DC readings without changing test lead connections. Less batteries.

Kit IM-5217, Shpg. wt. 4 lbs. **47.95**

IM-5217 SPECIFICATIONS. DC VOLTMETER: Ranges: 0-1.5, 0-15, 0-150, 0-500 volts full scale. **Input Resistance:** 10 megohms on all ranges. **Accuracy:** ±3% full scale. **AC VOLTMETER: Ranges:** 0-1.7, 0-15, 0-150, 0-500 volts full scale. **Input Resistance:** 1 megohm on all ranges. **Input Capacitance:** approx. 100 pF (40 pF on 500-volt range. **Accuracy:** ±5% full scale. **Frequency Response:** 1 dB, 10 Hz to 1 MHz. **OHMMETER:** Rx1, Rx100, Rx10K, Rx1M (10 ohms center scale). **Meter:** 4½", 100 μA, 100 degree movement. **Batteries:** (not supplied): two 9-volt, one 1.5 V "C" cell. **Dimensions:** 5⅜" H x 9⅜" W x 9" D.

Versatile, low-cost Heathkit 1 Hz-1 MHz Function Generator

Generates highly accurate sine, square or triangle waveforms over a frequency range of 1 Hz to 1 MHz. The frequency multiplier and front panel tuning control set any frequency fast and easy. The output amplifier supplies a 10 volt (p-p) signal into a 50 ohm load. A calibrated step attenuator adjusts from 0 to 50 dB (10V p-p to 30 mV p-p) in 10 dB steps. An attenuator control provides up to 20 dB additional attenuation. A trigged scope is necessary for calibration.

Kit IG-1271, Shpg. wt. 7 lbs. **129.95**
Assembled SG-1271, wired version of the IG-1271 in same attractive blue & white styling (not shown), Shpg. wt. 7 lbs. **195.00**

IG-1271 SPECIFICATIONS: Frequency range: 1 Hz to 1 MHz. **Frequency accuracy:** ±3% of full scale on dial. **Functions: Triangle waveform: Nonlinearity,** 5% maximum. Symmetry within 10% of 50% duty cycle. **Square waveform:** 100 nanosecond maximum rise or fall time. Symmetry within 10% of 50% duty cycle. **Sine waveform:** Harmonic distortion; 3% max., 5 Hz to 100 kHz. **Attenuator:** 0 to 50 dB in 10 dB steps. 0 to 20 dB minimum variable, ±1 dB accuracy. **Output:** 10 volts peak-to-peak into 50 ohms. ±1.5 dB flatness from 0.1 Hz to 1 MHz. 50 ohms impedance ±5%. **Power requirement:** 105-130 volts or 210-260 volts, rms, 60/50 Hz. 15 watts max. **Operating temperature:** 0 to 40°C. **Dimensions:** 3" H x 7¼" W x 8⅞" D (with handle removed). **Net weight:** 4.2 lbs.

NEW High-Accuracy 3½-digit auto-ranging Multimeter

$299.95

- **Automatically selects proper voltage, current or resistance range for easier, more accurate measurements**
- **Bright, easy-to-read 3½-digit display**
- **Input protection on all functions prevents overloads**

The IM-2212 is a laboratory-grade instrument featuring automatic range selection along with exceptionally high accuracy. It features five AC and DC voltage ranges to 1000 volts; five AC and DC current ranges to 2000 mA; and ten resistance ranges (low-voltage and high-voltage) up to 20 megohm. Basic DC accuracy is ±0.2%; Basic AC accuracy is ±0.4% when calibrated to laboratory standards. Has automatic polarity indication, automatic decimal point placement, automatic k-ohms or megohms indication. Normal mode rejection of 80 dB assures highly stable DC readings. A hold switch inhibits the auto-ranging function when measuring one range. Operates on 120/240 VAC, or with optional battery pack (order below). Compact low-profile cabinet with detent positions to hold the IM-2212 at the best viewing angle.

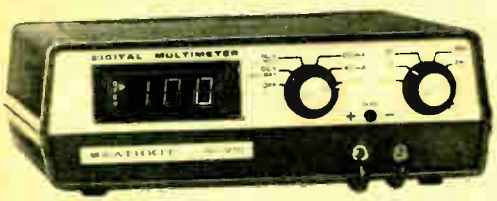
Kit IM-2212, Shpg. wt. 10 lbs. **299.95**

IMA-2212-1, Optional Rechargeable Battery Pack for in-field use.
Shpg. wt. 4 lbs. **42.95**

IM-2212 SPECIFICATIONS: DC Voltage Ranges: 0-0.2-2.0-20-200-2000. **Maximum Input:** 1000 VDC on any range. **Input Resistance:** 10 megohm on all ranges. **Accuracy:** ±[0.05% (.50%*) of reading, +0.10% of range]. **AC Voltage Ranges:** 0.2-2.0-20-200-2000. **Maximum Input:** 700 VAC (1000 volts peak) on any range. **Accuracy (40 Hz to 10 kHz):** ±[0.25% (1.0%*) of reading, +0.15% of range]. **Input Impedance:** 10 meg shunted by 90 pF on all ranges. **DC mA Ranges:** 0.2-2.0-20-200-2000. **Accuracy:** ±[0.15% (.50%*) of reading +0.10% of range]. **AC mA Ranges:** 0.2-2.0-20-200-2000. **Accuracy (40 Hz to 10 kHz):** ±[0.30% (1.0%*) of reading +0.15% of range]. **Ohmmeter Ranges:** Low-voltage, 0.2K-2.0K-20K-200K-2 meg. High-voltage 2.0K-20K-200K-2.0 meg-20 meg. **Overvoltage protection:** 350 VDC (250 VAC) on all ranges. **Accuracy:** ±[0.10% (.50%*) of reading +0.10% of range]. **Display:** 3½-digit (1999 maximum count), 0.5", 7-segment planar LED. **Polarity Indication:** Automatic + or − on VDC and mA DC range only. **Display Rate:** 3½ per second. **Overrange Indication:** flashing display on highest range, or when using RANGE HOLD switch. **Power Line Isolation:** COM input may be floated 500 VDC/350 VAC from ground. **Battery Operating Time:** (with optional IMA-2212-1 battery pack) 5 hours typ., 4 hours minimum after 16-hour charge period with unit off. **Operating Temperature Range:** Line operation, 10° C to 40° C (50° F to 104° F). Portable Operation: 20° C to 40° C (68° F to 104° F). **Power Requirement:** 100-135 VAC or 200-270 VAC (internally selectable); 50/60 Hz, 10 watts. **Dimensions:** 3.1" H x 7.5" W x 11" D. **Net Weight:** 6 lbs., 8 lbs. with battery pack installed.

*Numbers in parentheses indicate built-in specifications. Other numbers indicate laboratory standard specifications.

Our low cost, high performance Digital Multimeter



- **Overload protection on all ranges**
- **120 or 240 VAC operation**

$69.95 Kit

Here's a low-cost, high performance DMM for hams, hobbyists and service techs. Its full-function capability includes AC voltage measurements up to 700 volts. Has four overlapping AC & DC voltage & current ranges and five resistance ranges. Features overload protection on all ranges, 120 or 240 VAC operation, isolated floating ground, attractive heavy-duty case to withstand rugged use, universal banana jack inputs for easy testing of electronic equipment.

Kit IM-1210, Shpg. wt. 5 lbs. **69.95**

SM-1210, Factory assembled and calibrated, 5 lbs. **130.00**

IM-1210 SPECIFICATIONS: Ranges (Full-Scale): DC volts: 0-2, 20, 200, 1,000 V; DC current: 0-2, 20, 200, 2,000 mA; AC volts: 0-2, 20, 200, 700 V rms (50 Hz to 10 kHz). AC current: 0-2, 20, 200, 2,000 mA rms (60 Hz to 10 kHz). Ohms: 0-200, 2K, 20K, 200K, 2M ohms. **Overrange:** 25% on all functions, within maximum input limits. **Maximum Input:** 3 amperes into AC or DC mA, and Ohms (fuse protected.) 700 VAC rms into Volts (except 2V range: 250 VAC rms). 1000 VDC into Volts (except 2V range: 350 VDC). "−" input may be floated 1000 VDC (700 VAC) above earth ground. **Resolution (Low Range):** Volts: 10 mV. Current: 10 μA. Ohms: 1 ohm. **Accuracy (Full Scale, ±1 Digit):** DC volts: ±1%. DC current: ±1.5%. AC volts: ±1.5%. AC current: ±2%. Ohms: ±1.5%. **Input Impedance:** 1 megohm on all voltage ranges. **Power Requirement:** 100-135 VAC, 200-270 VAC 50/60 Hz. 8 watts. **Dimensions (overall):** 3.00" H x 8.69" W x 10.54" D. **Weight:** 3.3 pounds (1.5 kg). **NOTE:** Specifications are based on 30-minute warmup.

Portable Digital Multimeter — ideal for in-the-field uses

$199.95

Lightweight, compact, highly accurate. Features 26 ranges — measures AC and DC volts, DC current and resistance. Has 100% overrange capability, separate voltage and current inputs for circuit protection. 2-volt full scale measurement on 1k, 10k and 1 meg ranges allow forward biased junction testing of semi-conductor devices. Has 3½-digit display with leading zero suppression, automatic polarity indication and decimal placement.

Kit IM-2202, Shpg. wt. 8 lbs. **199.95**

IM-2202 SPECIFICATIONS: DC VOLTAGE — Overload Capability: 300 V on 100 mV & 1V ranges; 1000 V on 10 V & 1000 V ranges: **Accuracy:** ±0.5%, ±1 digit. **AC VOLTAGE — Overload Capability:** 250 V on 100 mV & 1 V ranges; 750 V on 10 V, 100 V & 750 V ranges. **Accuracy:** ±1.5%, ±3 digits; 50 Hz to 1 kHz (except 50 Hz to 10 kHz on 100 mV and 1 V ranges). **DC CURRENT — Range/Voltage Drop:** 100.0 μA/100 mV, 1.000 mA/100 mV, 10.00 mA/100 mA/150 mV, 1000 mA/300 mV. **Accuracy:** ±0.5%, ±1 digit (except ±1%, ±1 digit on 1000 mA range). **AC CURRENT — Range/Voltage Drop:** 100 μA/100 mV, 1.000 mA/100 mV, 10.00 mA/100 mV, 100.0 mA/150 mV, 1000 mA/300 mV. **Accuracy:** ±1.0%, ±3 digits except ±1.5%, ±3 digits on 1000 mA range); 40 Hz to 10 kHz. **RESISTANCE — Range/Test Current:** 100.0 Ω/1.0 mA, 1.000 kΩ/1.0 mA, 10.00 kΩ/0.1 mA, 100.0 kΩ/1.0 μA, 1000 kΩ/10. μA. **Accuracy:** ±2%. ±1 digit. **GENERAL — Normal Mode Rejection:** 35 dB. **Common Mode Rejection:** 80 dB. **Power Requirement:** 110 to 130 VAC, or 220 to 260 VAC (internal selectable); 60/50 Hz; (Accuracy specs use built-in references.) Size 3" H x 8¼" W x 8" D .

Portable hand-held Multimeter with LCD digital readout

One of the lowest-priced hand-held DMM's available — offers top performance and easy one-hand operation

$99.95

- Measures AC and DC voltage, current and resistance
- Big, easy-to-read Liquid Crystal Display (LCD)
- Built-in references for easy in-the-field calibration
- Low-current drain circuit for long-life battery operation

The new IM-2215 brings you the features you need in a hand-held DMM at a great low price. Measurement functions include AC and DC volts, AC and DC current, and resistance. Special alternating high-to-low resistance test voltage makes it ideal for measuring semiconductors and in-circuit resistance. Easy one-hand operation and built-in calibration references make it ideal for in-the-field use. The 3½-digit liquid crystal display features large, easy to read digits and automatic decimal point placement. Battery condition is continuously monitored and a "Lo-Bat" is displayed for the last 20% of battery life. The special low-current drain circuit provides long battery life – a typical alkaline 9-volt battery provides up to 200 hours of operation.

Pushbutton switches permit easy one-hand operation, leaving your other hand free for probe placement. A pivoting stand is included to place the display at a convenient angle for bench use. Easy one-evening kit assembly. Operates on 9-volt battery (not supplied), 120 or 220 VAC with optional cords (order below).

Kit IM-2215, Shpg. wt. 2 lbs. **99.95**

Rugged Leather Carrying Case with Belt Loop.
IMA-2215-1, Shpg. wt. 1 lb. **14.95**

PS-2350, 120-volt AC outlet cord. Shpg. wt. 1 lb. **4.95**

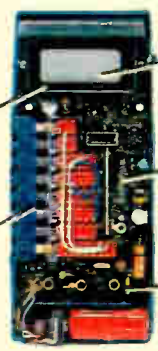
PS-2450, 220-volt AC outlet cord. Shpg. wt. 1 lb. **14.95**

IM-2215 SPECIFICATIONS: DC VOLTAGE: Ranges: ±200 mV, ±2 V, ±20 V, ±200 V, ±1000 V. **Accuracy:** Lab standards ±(.25% of reading +1 count). Built-in standards: ±(.35% or reading +1 count). **Input Impedance:** 10 megohms on all DC voltage ranges. **Overvoltage Protection:** 1000 VDC, 750 VAC on all DC ranges. **AC VOLTAGE: Ranges:** 200 mV, 2 V, 20 V, 200 V, 750 Vrms. **Accuracy** (50 and 60 Hz): Laboratory standards: ±(.5% of reading +3 counts). Built-in standards: ±(.6% or reading +3 counts). Frequency Response (25°C ±10°C): 200 mV, 2 V, 20 V, 200 V ranges ±(1% of reading +3 counts), 40 Hz to 1 kHz. 750 V range, ±(1% of reading +3 counts), 40 to 450 Hz. **Input Impedance:** 10 megohm shunted by approx. 100 pF on all AC ranges. **Overvoltage Protection:** 2 V, 20 V, 200 V, 750 V ranges, 1000 VDC, 750 VAC. 200 mV range, 1000 VDC, 15 seconds maximum over 300 VAC. **DC CURRENT: Ranges:** ±2 mA, ±20 mA, ±200 mA, ±2000 mA. **Accuracy:** ±(.75% of reading +1 count) on all DC ranges. **Voltage Drop:** 2 mA, 20 mA, 200 mA ranges, .25 VDC maximum at maximum display. 2000 mA range: .7 VDC at maximum display. **Overcurrent Protection:** 2000 mA maximum on all ranges in circuits with open circuit voltage less than 250 volts. **AC CURRENT: Ranges:** 2 mA, 20 mA, 200 mA, 2000 mA. Accuracy: 20 mA, 200 mA, 2000 mA ranges, ±(1.5% of reading +3 counts), 40 to 1 kHz. 2 mA range, ±(1.5% of reading +3 counts), 40 to 200 Hz. **Voltage Drop:** 2 mA, 20 mA, 200 mA ranges: .25 VAC maximum at maximum display. 2000 mA range: .7 VAC maximum at maximum display. **Overcurrent Protection:** 2000 mA maximum on all ranges in circuits with open circuit voltage less than 250 volts. **RESISTANCE:** 200 ohms, 2 kilohms, 20,000 ohms, 200 kilohms, 2 megohms, 20 megohms. **Accuracy:** 200 ohm range, ±(.3% of reading +3 counts). 2 kilohm, 20 kilohm, 200 kilohm, 2000 kilohm ranges, ±(.25% of reading, +1 count). 20 megohms range, ±(2% of reading +1 count). **Voltage at max. display:** 200 ohms, 20 kilohms, 2000 kilohms ranges, less than .25% VDC (low-test voltage). 2 kilohm, 200 kilohm and 2000 kilohm ranges, greater than .7 VDC (high-test voltage). **Overvoltage Protection:** 300 volts DC or AC on all ranges. **GENERAL: Operating Temperature Range:** 0°C to 50°C (32°F to 122°F). Storage Temperature: −20°C to 60°C. **Temperature Coefficient:** ±(.1 x applicable accuracy)/°C. **Power Requirements:** 9-volt battery (NEDA 1604) or equivalent or battery eliminator. **Polarity Indication:** automatic negative, implied positive. **Overrange indication:** all digits except most significant digit blanked. **Maximum Resolution: voltage,** 100 μV, **current,** 1 μA, resistance, 1 ohm. **Display Rate,** approx. 2½ per second. **Display:** 3½ digit (maximum count 1999) liquid crystal. **Dimensions:** 2" H x 3¼" W x 7½" L. **Weight:** 14 oz. (with battery.)

Loaded with convenience features, the IM-2215 is your best buy in a hand-held, solid-state multimeter!

All dual-slope and analog-to-digital conversion circuitry is contained on a single MOS/LSI IC for simplicity and stability

Pushbutton range and function switches allow easy one-hand operation



3½-digit liquid-crystal display is easy-to-read in any light

A single printed circuit board makes kit assembly easy and fast

Separate voltage and current inputs provide good circuit protection for the units under test

These informative books will help you get even more value from your test instruments

Understanding and Using the Oscilloscope. Covers oscilloscope functions, circuits, inputs, waveforms and more. A helpful guide to this most essential test instrument.
EDP-139 ..... **5.95**

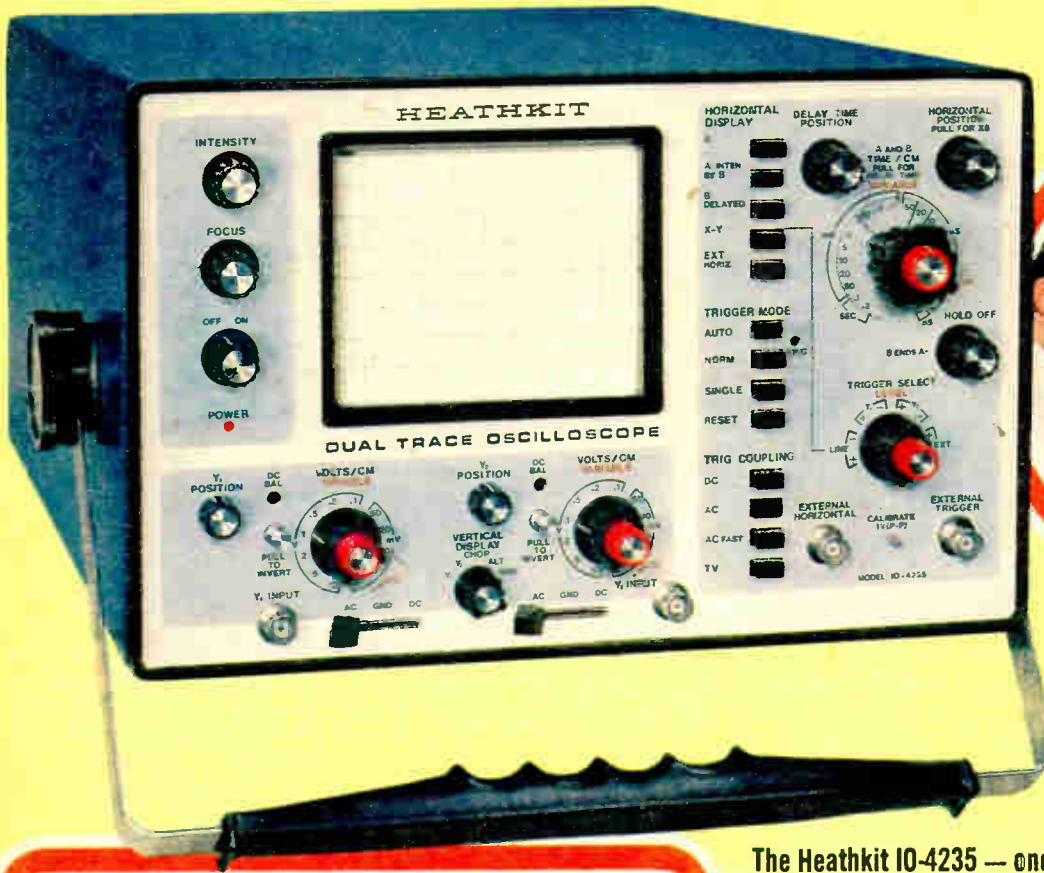
101 Ways to Use Your Oscilloscope. Practical applications in troubleshooting and design work with the oscilloscope. Clearly written, easy to understand text.
EDP-149 ..... **5.50**

101 Ways to use your VOM/VTVM. Practical applications in service and troubleshooting with vacuum tube voltmeters and portable volt-ohm-milliameters. Easy to understand text.
EDP-150 ..... **4.95**

How to use Color TV Test Instruments. Practical information on servicing color TV's using sweep-marker generators, color bar/pattern generators, etc. **EDP-138** **5.95**

Deluxe DC-35 MHz Delayed-Sweep Dual-Trace Oscilloscope—

Fulfills the requirements of the service technician, electronics designer and serious hobbyist — at an affordable price!



The perfect addition to your service bench — ideal for any testing use.

$899.95 Kit

NO OTHER MANUFACTURER OFFERS ALL THESE TOP PERFORMANCE FEATURES AT A PRICE THIS LOW!

- Smooth rolloff allows observation of signals beyond 50 MHz
- Less than 10 nS rise time for complex fast-rise signals
- Vertical delay lines for observing the leading edge of signals
- 2 mV vertical deflection sensitivity at full bandwidth
- Dual-trace for simultaneous observation of two separate signals
- Algebraic ADD with the ability to invert either channel for observing differential signals
- Sweep speeds from 50 nS/cm to 0.2 sec/cm, plus 5 times expansion, for an effective sweep speed of 10 nS/cm at the highest sweep rate
- Triggering to greater than twice the specified vertical bandwidth
- Single-sweep function for observing random signals
- A full complement of trigger sources, couplings and modes including a unique TV coupling which triggers on alternate fields for a steady display of VITS
- 8x10 cm mesh CRT with internal graticule for parallax-free measurements
- 10 kV post acceleration voltage for the brightest display we have ever offered in an oscilloscope

The Heathkit IO-4235 — one of the most sophisticated and versatile oscilloscopes available anywhere!

This deluxe oscilloscope is ideal for measuring and observing virtually any kind of waveform — from the simple sine wave signals of hi-fi components and television to the highly complex waveforms produced by the latest solid-state devices including computers.

The IO-4235 laboratory-quality oscilloscope offers true professional performance at an affordable Heath price! It's the oscilloscope you'll want on your bench for years to come.

The IO-4235's delayed sweep circuit uses a separate time base to generate a faster sweep which displays a selected portion of the normal waveform. Because the start and length of the delayed sweep are user controlled, any given portion of the normal waveform can be displayed at a much higher rate. In fact, using a 1000 times expansion the displayed jitter will be less than ½ cm.

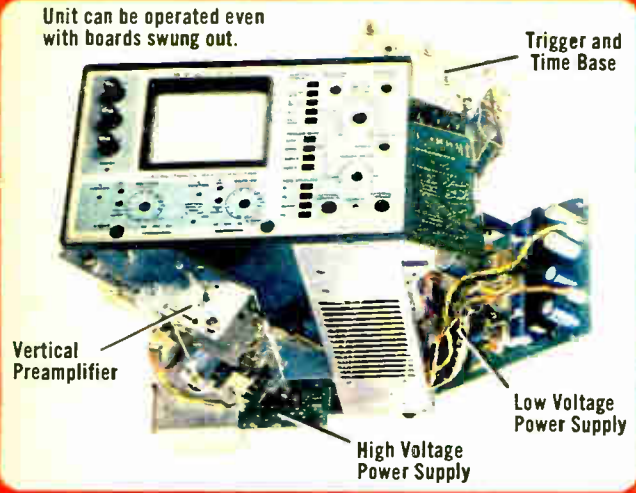
The 8x10 cm mesh CRT features 10 kV post acceleration voltage — 2½ times greater than any oscilloscope we've ever offered — to give you truly outstanding brightness and greater writing speeds. In fact, the IO-4235 is bright enough to pick up the fast, narrow signals other scopes might miss. This CRT is among the finest available for this application.

The IO-4235 also has fully regulated power supplies, variable hold off control, front panel 1-volt square wave output, more. Calibration requires a precise source of square waves such as the IG-4505 on page 82, and a DC voltmeter.

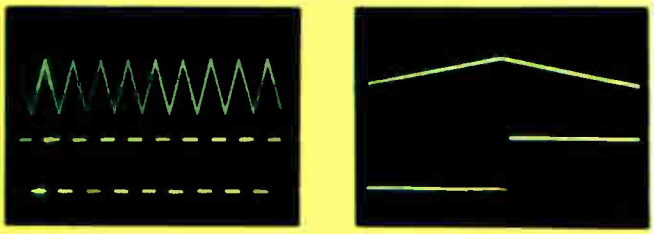
Kit IO-4235, Shpg. wt. 52 lbs. 899.95

Factory assembled and tested version of above.
SO-4235, Shpg. wt. 38 lbs. 1295.00

the finest scope we offer!



The Heathkit IO-4235 is the most advanced oscilloscope Heath has ever developed! We started with the same team who designed our superb IO-4510, surrounded them with additional designers, technicians, engineers, writers, draftsmen and illustrators — invested nearly 10-man-years and came up with a product which is unmatched in performance, quality and features at its price! This oscilloscope can be directly compared with other oscilloscopes costing literally hundreds of dollars more — i.e., the Tektronix T935A.



The delayed sweep takes the user selected portion of the waveform (intensified portion in the left picture) and magnifies it the desired number of times for closer examination (right picture).

IO-4235 SPECIFICATIONS: Vertical. Deflection Factor: Sensitivity: 2 mV/cm to 10 V/cm, 12 steps in 1-2-5 sequence. **Variable:** continuous between steps to approx. 30 V/cm. **Accuracy:** within 3% (20°C to 30°C); 5% (10°C to 50°C), referred to 1 V/cm. **Vertical Response:** DC coupling, DC to 35 MHz (–3 dB). AC Coupling, 1 Hz to 35 MHz. **Rise Time:** 10 nS. **Overshoot,** less than 3%. **Delay Line,** allows display of at least 20 nS of pre-triggered waveform. **Vertical Input: Impedance,** 1 meg shunted by 30 pF. Maximum Input, 400 volts peak combined AC and DC. **Connector,** BNC. **Vertical Modes:** Y_1, Y_2, Y_1 and Y_2 chopped, Y_1 and Y_2 alternate, algebraic add ($\pm Y_1 \pm Y_2$). **HORIZONTAL:** Time Bases. **Ranges,** 0.2 S/cm to 50 nS/cm. **Positions,** 21 steps in 1-2-5 sequence. **Variable:** continuous between ranges to approx. 0.6 S/cm. **Accuracy,** within 3% (20°C to 30°C); 5% (10°C to 40°C) referred to 1 mS/cm. **Magnifier,** X5, accurate to within 5%, 20°C to 50°C; 7%, 10°C to 40°C. **HORIZONTAL DISPLAY: Modes:** "A", "A" intensified by "B", "B" delayed by "A", X-Y and EXT X. **Delay Time Position:** 1 cm to 10 cm. **Jitter:** greater than 10,000 to 1, typically 20,000 to 1 at 5 cm. **EXTERNAL: Sensitivity:** approx. 0.1 V/cm. **Impedance:** 1 meg. **Polarity:** positive input causes right hand deflection. **Frequency Response:** DC to greater than 2 MHz (–3 dB). **Connector:** BNC. **TRIGGER: Source,** ± channel Y_1, ± channel Y_2, ± line, ± external. **Coupling:** AC, DC, AC Fast, TV (flip-flop). **Modes:** automatic baseline, normal, single-sweep. **Hold Off:** variable, including an "A" ends "B" position. **External Trigger: Sensitivity:** 100 mV at 50 MHz. **Input Z:** 1 megohm paralleled with 30 pF. **X-Y: Y Channel,** same as vertical. **X Channel,** same as vertical, except response limited to 2 MHz and no delay line. **Phase Shift:** less than 8° at 100 kHz. **Voltage Range:** 120/240 VAC switch selected. 85 watts. **Temperature Range:** 10°C to 40°C. **Dimensions:** 7¾" H x 13¾" W x 19¾" D (without handle).

Lab Quality Oscilloscope — Dual-Trace, DC-15 MHz with vertical delay lines

$669.95 Kit

Vertical input sensitivity of 1 mV/cm is provided over the entire bandwidth so that a x10 probe, waveforms to 10 mV can be read.

The IO-4510 will typically trigger on signals up to 45 MHz and is guaranteed to 30 MHz with only 1 cm deflection. And, there is no stability control needed with the digitally controlled triggering circuits. In the automatic mode, a reference baseline is generated even when the trigger signal is absent. Complete triggering controls are provided with choice of AC, ACF or DC coupling. The ACF (coupling) mode is provided to reject low-frequency components of the trigger waveform for accurate scope triggering. A trigger select allows triggering at any point on the vertical signal, or from either channel Y_1 or Y_2.

You have a choice of normal or automatic sweep, and can use any one of 20 time bases from 0.2 sec/cm to 0.1 μsec/cm. Any sweep speed can be magnified five times. You can also select an externally generated horizontal signal.

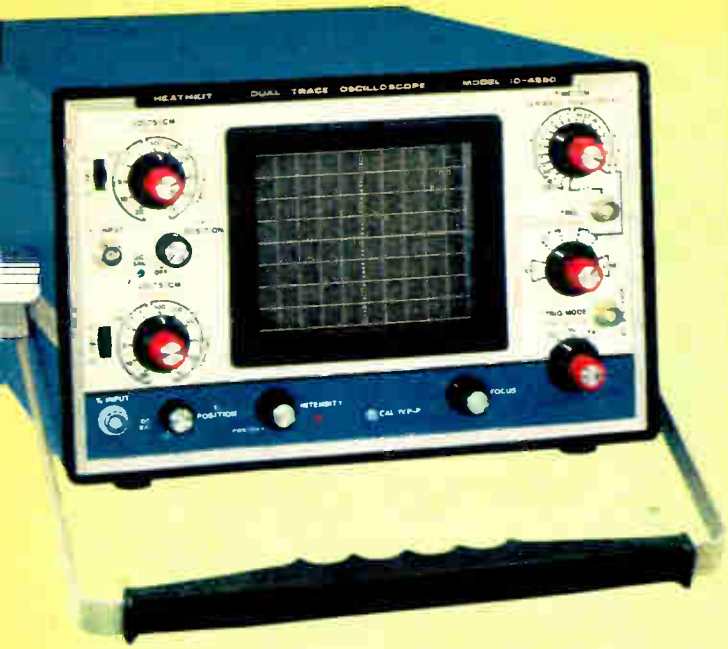
Internal delay lines insure the start of a horizontal sweep prior to the beginning of the vertical signal. The IO-4510 guarantees display of at least 20 nanoseconds of the pre-triggered waveform, insuring complete waveform display.

Fully regulated power supplies provide stable voltages regardless of the varying line voltage conditions. The 4 kV regulated post-acceleration potential of the CRT insures display brightness. IO-4510 calibration requires a precise source of square waves such as IOA-4510-1 or IG-4505 on page 82.

Kit IO-4510, Shpg. wt. 36 lbs. **669.95**

SO-4510, factory assembled & calibrated, Shpg. wt. 28 lbs. **870.00**

IO/SO-4510 SPECIFICATIONS — VERTICAL: Deflection Factor: Sensitivity: 1 mV/cm to 5 V/cm in 12 steps. **Variable:** Continuous between steps to approx. 15 V/cm. **Accuracy:** Within 3% (20°C to 30°C), 5% (10°C to 40°C) referenced to 0.2 V/cm @ 25°C. **Vertical Response: DC Coupling:** DC to 15 MHz (–3 dB). **AC Coupling:** 2 Hz to 15 MHz (–3 dB). **Rise Time:** 24 nanoseconds. **Overshoot:** Less than 3%. **Delay Line:** Allows display of at least 20 ns of pretriggered waveform. **Vertical Input: Impedance:** 1 megohm shunted by approx. 40 pF. **Maximum Input:** 400 volts peak combined AC & DC. **Vertical Modes:** Y_1 or Y_2 selected by vertical position controls. **Dual:** Chopped (200 kHz) or alternate automatically selected by Time Base switch. **HORIZONTAL: Time Base: Ramp:** 0.2 sec/cm to 0.1 μsec/cm in 20 steps. **Variable: Continuous** between ranges to approx. 0.6 sec/cm. **Accuracy:** Within 3% (20°C to 30°C), 5% (10°C to 40°C) referenced to 1 ms/cm @ 25°C. **Magnifier:** X5 (adds additional 2% to sweep accuracy). **External: Sensitivity:** 0.2 V/cm (approx.) **Impedance:** 200 kilohms (approx.). **Frequency Response:** DC to 1 MHz (–3 dB). **TRIGGER: Internal: Automatic:** Zero crossing ±0.5 volts. **Normal:** Adjustable over 8 divisions. **Slope Selection:** + or –. **External: Automatic: Zero crossing** ±0.2 volts. **Normal:** Adjustable over ±5 volts. **Slope Selection:** + or –. **Impedance:** 1 megohm shunted by approx. 30 pF. **X-Y: Y Channel:** Same as Vertical. **X Channel:** Same as Vertical, except response limited to 1 MHz and no delay line. **X-Y Phase Shift:** Less than 3° @ 100 kHz. **Power: Voltage Range:** 120/240 VAC, switch selected, 75 watts. **Dimensions:** 6.4" H x 12.9" W x 19.3" D (handle extended). **Net Weight:** 24 lbs.



$419.95 Kit — Dual-Trace DC-10 MHz Oscilloscope is ideal for TV service and electronics design work

The **IO-4550 is an excellent choice for TV service**, electronics experimentation and design. Its extra-bright trace allows easy reading even in high ambient light; its two vertical input channels have a maximum sensitivity of 10 mV/cm for accurate measurements.

Input channels are displayed, chopped or alternate, as selected by the time base switch. A trigger select switch and level control allow the time base to be precisely triggered at any point along the positive or negative slope of the signal. The digitally controlled time base provides automatic triggering, so no stability control is necessary and fewer adjustments are required.

The fully regulated high voltage power supply assures operation to specifications on standard line voltages from 100 to 270 volts. Complete mu-metal shielding helps prevent interference from stray magnetic fields.

Improved circuitry and just 4 printed circuit boards make the IO-4550 an easy kit to assemble. Calibration requires a precise source of square waves such as IOA-4510-1 (with additional 6 volt power source) or IG-4505 on page 38.

Kit IO-4550, Shpg. wt. 27 lbs. **419.95**

Factory assembled and calibrated version of above.

SO-4550, Shpg. wt. 25 lbs. **615.00**

IO/SO-4550 SPECIFICATIONS: VERTICAL: Deflection Factor: Sensitivity: 10 mV/cm to 20 V/cm. **Attenuator:** 11 steps in 1-2-5 sequence. **Variable:** Continuous between steps to approximately 60 V/cm. **Accuracy:** Within 3%. **Vertical Response: DC Coupling:** DC to 10 MHz. **AC Coupling:** 2 Hz to 10 MHz. **Rise Time:** 35 ns. **Overshoot:** Less than 5%. **VERTICAL: Deflection Factor: Sensitivity:** 10 mV/cm to 20 V/cm. **Attenuator: Vertical Input: Impedance:** 1 MΩ shunted by 38 pF. **Maximum Input:** 400 V. **HORIZONTAL: Time Base: Ramp:** 0.2 s/cm to 200 ns/cm. **Positions:** 19 steps in 1-2-5 sequence. **Variable:** Continuous between ranges to approximately 0.6 s/cm. **Accuracy:** Within 3%. **Magnifier:** X5 (adds additional 2% to sweep accuracy). **External: Sensitivity:** 0.1 V/cm (approx.). **Impedance:** 100 kΩ (approx.). **Frequency Response:** DC to 1 MHz. **Connector:** BNC. **TRIGGER: Internal: Automatic:** Adjustable over 10 divisions. **Normal:** Adjustable over 10 divisions. **Slope Selection:** + or −. **External: Automatic:** Adjustable over 0.8 V. **Normal:** Adjustable over 0.8 V. **Slope Selection:** + or−. **Impedance:** 1MΩ shunted by 40 pF. **Connector:** BNC. **X-Y: Y Channel:** Same as vertical. **X Channel:** Same as vertical except response is limited to 1 MHz. **Phase Shift:** Less than 8° @ 100 kHz. **Power: Voltage Range:** 100-135 VAC/200-275 VAC switch selected, 70 watts at 120 VAC (240 VAC). 6.9″ H x 12.9″ W x 19.3″ D (without handle).

IO-4555 Single Trace DC-10 MHz Oscilloscope. Has the same fine features as above, but single-trace operation only. Has X-Y capability; AC, DC and trigger modes, extra-bright trace and fully regulated power supplies. Easy kit assembly too.

Kit IO-4555, Shpg. wt. 29 lbs. **369.95**

$299.95 Kit — DC to 5 MHz Oscilloscope offers dual-trace versatility at a single-trace price!

The Heathkit IO-4205 brings you controls and features not usually found in other scopes in this price range, plus dual-trace versatility! The dual-trace feature is essential for the sophisticated servicing required by many of today's modern electronic devices. It lets you compare two signals simultaneously for input-output comparisons, checking phase relationships and other timing functions. This dual-trace feature combined with the IO-4205's DC to 5 MHz bandwidth and excellent vertical input sensitivity of 10 mV/cm let you use it for nearly all waveform applications.

A stable triggering circuit is used for solid waveform displays (not the recurrent type sweep usually found on other scopes in this price range). Trigger controls include selection of normal or automatic modes, switch controlled AC or DC coupling and front panel input of external triggering signals. A special TV position on the trigger selector control allows low frequencies to pass while rejecting the high frequencies, so the IO-4205 will easily trigger on the vertical component of a complex TV signal.

Any one of seven calibrated time bases, from 200 ms/cm to 0.2 μS/cm can be selected by the time/cm switch. A variable control provides for precise settings between steps. The horizontal amplifier accepts external inputs from DC to 1 MHz.

The vertical input sensitivity is 10 mV/cm and eleven calibrated attenuator positions, up to 20 V/cm, will accommodate a wide range of input signals. A variable gain control provides accurate control between settings.

Accurate measurements can be easily made on the bright, easy-to-read 8 x 10 cm CRT screen. The lightweight and durable cabinet combines professional appearance with easy-to-carry portability. The flush-mounted-handle allows stacking to avoid an instrument-crowded bench.

The fully regulated low-voltage power supply supplies accurate voltage and current even under varying line and load conditions. Partial mu-metal shielding helps eliminate display errors caused by stray magnetic fields. The IO-4205 operates from 110-130 VAC, or 220-260 VAC, 50/60 Hz. Power consumption is a low 50 watts.

The Dual-Trace Capability of the IO-4205 makes it ideal for any comparison or timing functions on solid-state digital equipment. Its easy-to-operate controls and front panel inputs make it one of the most versatile oscilloscopes you'll find anywhere.

Kit IO-4205, Shpg. wt. 29 lbs. **299.95**

SO-4205, Assembled and Tested. 20 lbs. **480.00**

IO-4205 SPECIFICATIONS: VERTICAL: Bandwidth: DC to 5 MHz, −3 dB. **Sensitivity:** 10 mV/cm. **Attenuator:** 1-2-5 sequence, calibrated and variable. **Rise Time:** 70 nS. **Overshoot:** <5% at 1 kHz. **Impedance:** 1 megohm/38 pF. **SWEEP: Type:** Triggered. **Range:** 200 mS to 0.2 μS in 7 steps, plus variable. **Trigger Source:** Y_1/Y_2 External/Line. **Trigger Modes:** AC/DC/TV/+/− Slope/Auto/Normal. **HORIZONTAL: Sensitivity:** 0.1 V/cm. **Bandwidth:** DC to 1 MHz. **Impedance:** 1 megohm/50 pF. **External Horizontal Input:** X1 and X10 attenuator and variable. **GENERAL: CRT:** 5DEP31F, 8 x 10 cm viewing area, blue-green medium persistance phosphor, 5″ round flat-face tube. **Accelerating Potential:** approximately 1.6 kV. **Graticule:** screened, 8 x 10 centimeters. **Power Requirement:** 110-130 VAC, or 220-260 VAC, 50/60 Hz, 50 watts. **Dimensions:** 8″ H x 13″ W x 17″ D.

NEW

A DC-5 MHz Single-Trace Oscilloscope that's priced for the hobbyist and offers professional features!

$219.95 Kit

IO-4105 DC-5 MHz Oscilloscope puts professional capabilities on your bench at a price you can afford!

- Vertical input sensitivity of 10 mV/cm makes it ideal for virtually all waveform applications
- Built-in calibration circuitry lets you set up for proper operation easily
- High-brightness CRT for easy reading of trace even on complex signals
- Partial mu-shielding to reduce display errors caused by stray magnetic fields
- Fully regulated low-voltage power supply for stable operation even when line voltage varies

The new DC-5 MHz single trace oscilloscope gives you a host of features not found on other scopes in this price range. It lets you put one of the most essential pieces of test equipment on your shop or hobby bench at a price that's really low! Its performance and features compare with units costing considerably more, and its complete controls and efficient design make it a pleasure to operate.

A stable triggering circuit is used for solid waveform displays (not the recurrent type sweep usually found on other scopes in this price range). Trigger controls include selection of normal or automatic modes, switch controlled AC or DC coupling and front panel input of external triggering signals. A special TV position on the trigger selector control allows low frequencies to pass while rejecting the high frequencies, so it easily triggers on the vertical component of a complex TV signal.

Any one of seven calibrated time bases, from 200 mS/cm to 0.2 μS/cm can be selected by the time/cm switch. A variable control provides for precise settings between steps. The horizontal amplifier accepts external inputs from DC to 1 MHz.

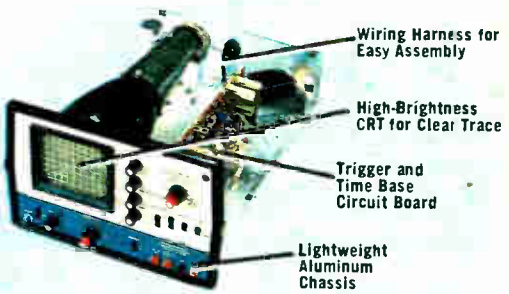
The vertical input sensitivity is 10 mV/cm and eleven calibrated attenuator positions, up to 20 V/cm, will accommodate a wide range of input signals. A variable gain control provides accurate control between settings.

Accurate measurements can be easily made on the bright, easy-to-read 8 x 10 cm CRT screen. The lightweight and durable cabinet combines professional appearance with easy-to-carry portability. The flush-mounted-handle allows stacking to avoid an instrument-crowded bench.

The fully regulated low-voltage power supply supplies accurate voltage and current even under varying line and load conditions. Partial mu-metal shielding helps eliminate display errors caused by stray magnetic fields. It operates from 110-130 VAC, or 220-260 VAC, 50/60 Hz. Power consumption is a low 50 watts.

The versatility and professional design of this new scope make it ideal for virtually any single-trace scope application. Its easy-to-operate controls and front panel inputs make it one of the most useful oscilloscopes you'll find anywhere. Shop and compare. We don't think you'll find an oscilloscope with these features and performance capabilities at anywhere near this price!

The IO-4105 is one of our easiest-to-build kits too—it's great for the first-time builder! Printed circuit board construction and a precut wiring harness speed assembly.



Kit IO-4105, Shpg. wt. 31 lbs. **219.95**

Factory Assembled and Tested Version of above.
SO-4105, Shpg. wt. 19 lbs. **395.00**

IO-4105 SPECIFICATIONS: VERTICAL: Bandwidth: DC to 5 MHz, −3 dB. **Sensitivity:** 10 mV/cm. **Attenuator:** 1-2-5 sequence, calibrated and variable. **Rise Time:** 70 nS. **Overshoot:** <5% at 1 kHz. **Impedance:** 1 megohm/38 pF. **SWEEP: Type:** Triggered. **Range:** 200 mS to 0.2 μS in 7 steps, plus variable. **Trigger Source:** Y_1/Y_2, External/Line. **Trigger Modes:** AC/DC/TV/+/− Slope/Auto/Normal. **HORIZONTAL: Sensitivity:** 0.1 V/cm. **Bandwidth:** DC to 1 MHz. **Impedance:** 1 megohm/50 pF. **External Horizontal Input:** X1 and X10 attenuator and variable. **GENERAL: CRT:** 5DEP31F, 8x10 cm viewing area, blue-green medium persistance phosphor, 5" round flat-face tube. **Accelerating Potential:** approximately 1.6 kV. **Graticule:** screened, 8x10 centimeters. **Power Requirement:** 110-130 VAC, or 220-260 VAC, 50/60 Hz, 50 watts. **Dimensions:** 8" H x 13" W x 17" D.

Beautiful big-screen color—you program

It's a completely automatic total home viewing system—a fully computerized programmable color TV.

This computer TV system allows you to program your set for an entire evening's viewing, then just sit back and relax.

The GD-1185 programmer then automatically changes to the right channel at the right time. You can even program the set to return to manual operation at a preselected time, then resume automatic operation at another time. And programming is easy too—the top bank of 8 keys accesses the memory and turns the on-screen clock display into a readout which lets you "see" your program as you enter it. The selected time appears in the first four digits of the clock display, the channel number in the last two. Simply enter the time at which you want the set to change channels, then enter the channel number you want. You can program up to 32 channel changes within two 12/24 hour periods!

The fully automatic antenna rotor system adds even more automated convenience—you can program the set to turn your antenna to the correct heading each time the GR-2001 changes channels!

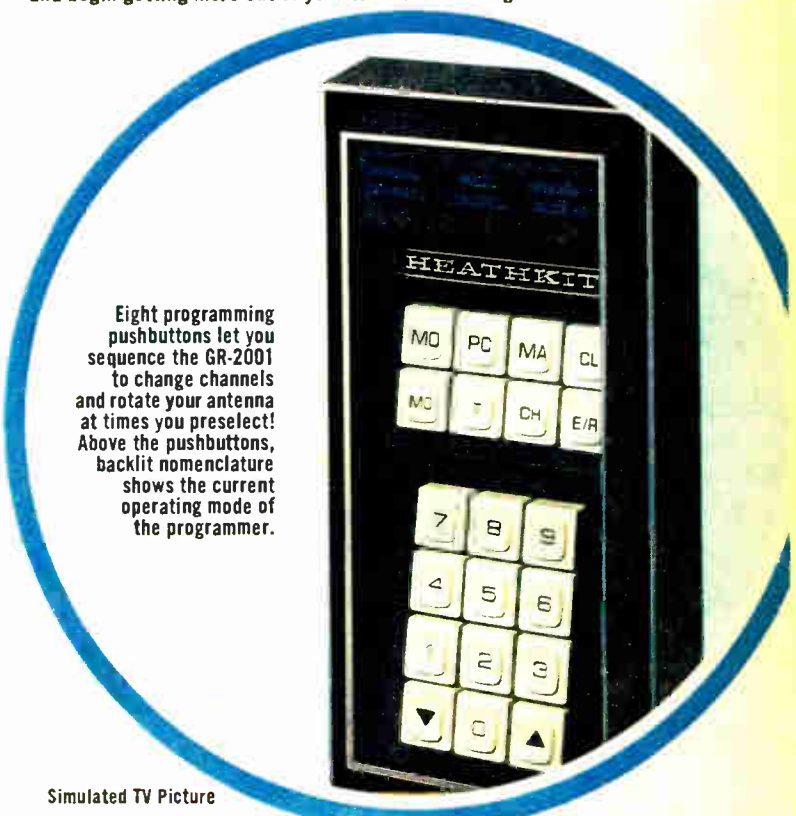
To further automate the GR-2001 system, the GD-1184 antenna rotator control lets you rotate your antenna for the best reception on each channel—it's perfect for areas where stations are in widely separate locations. You can select up to 8 separate antenna headings with up to three stations per heading. It's the most convenient antenna-rotor system ever!

With all this programming convenience, you also get a color TV that features our best color picture ever!

While the programmer and antenna-rotor make the GR-2001 system unique, the color TV itself really makes the GR-2001 system worthwhile! The GR-2001 is simply one of the best-performing color TV's you'll find anywhere. Dozens of circuit refinements and improvements combine for a picture that's vivid, accurate, bright and ultra-sharp. The 25" (diagonal) rectangular picture tube uses a black matrix screen for one of the best pictures ever. It's fully shielded to maintain outstanding color purity by eliminating stray magnetic fields. The phase-locked loop horizontal and vertical oscillators provide a picture so rock steady and adjustment-free we've eliminated conventional horizontal and vertical hold controls!

Even the audio circuitry has been improved to provide excellent sound.

Have you ever watched a televised musical special or concert, wishing your set had the audio capability to provide you with room-filling high fidelity sound to match the richness of the color picture? Your wishing days are over! The GR-2001 gives you the outstanding audio reception you've been searching for—outstanding audio to match the GR-2001's outstanding picture. The sound signal has its own IF stage to provide a difference you can really hear—through the GR-2001's wide-range speaker...or even more dramatically when you use the audio output jack to connect the GR-2001 to your stereo system. It's one of the first sets ever to give you real "hi-fi" sound from a TV! How good is the sound of the Heathkit GR-2001? Just ask yourself, "How many television manufacturers even publish audio specifications for the general public?" Ours are listed on the next page. Check them out; compare our set with the others—**we think you'll find the GR-2001 color TV one of the finest television values around. Order yours today and begin getting more out of your television viewing.**



Eight programming pushbuttons let you sequence the GR-2001 to change channels and rotate your antenna at times you preselect! Above the pushbuttons, backlit nomenclature shows the current operating mode of the programmer.

Simulated TV Picture

Easy step-by-step kit assembly

Comprehensive, fully illustrated assembly manuals take you step-by-step from unpacking your kit to plug-in. Check-off blanks by each step let you keep your place and follow the instructions for easy, organized kit assembly. There's even a section on proper soldering so you can be sure your solder connections are correct.

Built-in service features

Famous Heath built-in self-service features let you keep the GR-2001 in perfect shape for years to come. A dot generator, centering and convergence circuits and a test meter help you do your own service, should the need arise. You can really save money on service over the life of your set.

Custom-installation for good looks

Our custom-installation option lets you build the GR-2001 into a wall, mount it in your own custom cabinet, or order one of our beautifully constructed cabinets on page 100. Any way you do it, you'll find the GR-2001 returns your investment with year after year of beautiful, trouble-free performance.

and never leave your easy chair.

Simulated TV Picture

GR-2001 SPECIFICATIONS: Deflection: Magnetic, 90°. **Focus:** Electrostatic. **Convergence:** Magnetic. **Antenna Input Impedance:** VHF: 300Ω balanced or 75Ω unbalanced. UHF: 300Ω balanced. **Picture IF Carrier:** 45.74 MHz. **Sound IF Carrier:** 41.25 MHz. **Color IF Subcarrier:** 42.17 MHz. **Sound IF Frequency:** 4.5 MHz. **Video IF Bandwidth:** 4.08 MHz, at 6 dB down. **HI-FI Output:** Frequency response: ±1 dB, 50 Hz to 15 kHz. **Output voltage:** Greater than 1.0 V RMS. **Audio Output:** 4Ω or 8Ω. 2 watts. **Power Requirement:** 110 to 130 volts AC, 60 Hz, 200 watts. **Net weight:** 112 lbs.

Heathkit GR-2001 25" (diagonal) Color TV Kit

Even if you order it without the options below, it's still one of the finest sets you can buy anywhere! Less cabinet, order your choice of fine-furniture cabinets at right. Includes chassis, picture tube, one speaker.
Kit GR-2001, Shpg. wt. 146 lbs. **759.95**

Second Speaker for GR-2001. Fits in space on GR-2001 cabinets where indicated. Includes all cables. **GRA-2000-7,** Shpg. wt. 2 lbs. **10.95**

8-Channel Accessory for your GR-2001

Adds 8 more channels to the GR-2001's random-access tuning system (a total of 24 channels) for even greater versatility.
Kit GRA-2001-9, Shpg. wt. 1 lb. **10.95**

GD-1185 TV Programmer

Automatically changes channels at any time you select — up to 16 changes in either of two switch-selected 12/24-hour periods. Front-panel keyboard and on-screen readout make it easy to enter any time or channel you want. It's the ultimate in convenience — and a Heathkit exclusive! Requires GRA-601 Clock below for operation. **Kit GD-1185,** Shpg. wt. 9 lbs. **179.95**

Hand-held Remote Control for the GR-2001

(Not shown). Lets you adjust volume, turn the set on or off, adjust tint, scan up or down, even turn the optional programmer on or off — all from the comfort of your easy chair. Operates to 20-ft. away from set.
Kit GRA-2001-6, 4 lbs. **99.95**

"The programmer puts you into the real avant garde of TV fanciers. Add this option and you will never again miss a desired program because you forget to turn the channel on in time. The computer memory does all your remembering and automatically chooses the right channel at the right time."
Budget Electronics

"The programmable automatic channel selection feature really caught our eye. This one feature sets this set aside from all the others on the market."
Radio Electronics

The on-screen digital clock displays the programming sequence in bright, easy-to-see 1" high digits. After programming, it functions as a clock displaying hours, minutes and seconds in 12 or 24-hour format. Time and channel digits can be positioned anywhere on the screen.

Easy-to-build On-Screen Digital Clock

Displays the time on your TV screen. Time in hours, minutes and, if desired, seconds in 12/24 hour format below the channel number. Easy-to-read white digits can be adjusted with the channel numbers to remain on permanently or automatically reappear at approximately selected intervals.
Kit GRA-601, Shpg. wt. 1 lb. **35.95**

Automatic Antenna Rotor Control for Better Reception

Automatically rotates your antenna to preselected directions for the best reception on each channel. Accepts up to 3 channels for each of 8 directions. Operates with or without GD-1185 above. For use only with existing Cornell Dubilier AR-40 rotor system (Heath GDP-1176 or GDP-258) or optional motor below.
Kit GD-1184, Shpg. wt. 6 lbs. **69.95**
GDA-1184-1, Rotor Motor. Requires 5-wire cable (not supplied). 11 lbs. **39.95**

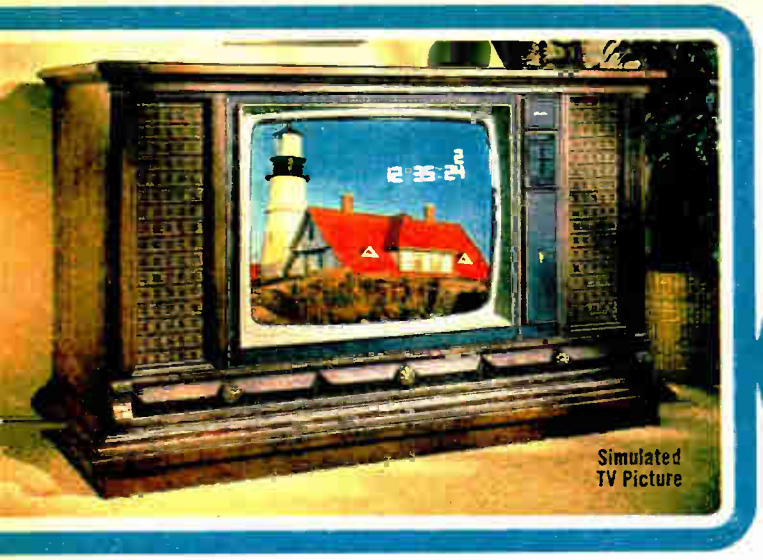
SAVE $55.90 on GR-2001 System with Programmer and Clock

Consists of GR-2001 Color TV, GD-1185 Programmer and GRA-601 On-Screen Digital Clock. If purchased separately, $975.85. Optional cabinet on pg. 100.
GRS-2001, Shpg. wt. 175 lbs. Motor Freight **919.95**

SAVE $65.85 on GR-2001 with Programmer, Clock, Rotor Control

Same as above system plus GD-1184 Automatic Rotor Control (less motor). If purchased separately, $1045.80. Order optional cabinet on page 100.
GRS-2002, Shpg. wt. 187 lbs. Motor Freight **979.95**

Heathkit GR-2000 25" Diagonal Color TV Offers Outstanding Performance and Value



$659.95

The set that brought color TV into the digital age — with on-screen channel display and an optional digital clock

One of the best value color TV's you'll find anywhere — with a host of state-of-the-art features! Has electronic tuning which scans through the preset channels; negative matrix picture screen for extra bright and sharp pictures; fixed IF filter which virtually eliminates adjacent channel interference and never needs alignment; automatic gain control and lots more.

It has famous Heathkit built-in service circuits too — dot generator, purity and convergence circuits, vertical and horizontal centering circuits and a test meter. Easy kit assembly too — with most circuits mounted on plug-in printed circuit boards and factory-assembled wiring harnesses to minimize point-to-point wiring. You can custom-mount your GR-2000 in a wall or your own installation, or you can order one of our fine furniture cabinets below.

And remember, when you build it yourself, you can service it yourself. That can save you big money over the years.

Kit GR-2000, Shpg. wt. 147 lbs. Motor Freight **659.95**

Second Speaker for GR-2000. Fits in space on GR-2000 cabinets (where indicated). Includes all cables. **GRA-2000-7,** Shpg. wt. 2 lbs. **10.95**

On-Screen Digital Clock for GR-2000

Shows the time in hours, minutes and seconds in bright 1" high white digits right below the on-screen digital channel display. The clock can be set for four-or-six digit readout and 12 or 24-hour format.

Kit GRA-601, Shpg. wt. 1 lb. **35.95**

Ultrasonic Remote Control for GR-2000

Lets you watch and control your GR-2000 right from your easy chair. Gives you arm-chair control of on/off, color controls, digital readout and channels. Includes receiver for in-chassis mounting, hand-held transmitter. Operates up to 20 ft. from set.

Kit GRA-2000-6, Shpg. wt. 4 lbs. **99.95**

GR-2000 SPECIFICATIONS: Picture Tube: 25" (diagonal). **Viewing Area:** 315 sq. in. **Deflection:** Magnetic, 90 degrees. **Antenna Input Impedance: VHF:** 300 Ω balanced or 75 Ω unbalanced. **UHF:** 300 Ω balanced. **Tuning Range: TV** channels 2 through 83. (Preset any 16). **Hi-Fi Output: Output Impedance:** 2000 Ω. **Frequency Response:** ±1 dB, 50 to 15 kHz. **Harmonic Distortion:** Less than 1% at 1 kHz. **Output Voltage:** greater than 1.0 V rms. **Audio Output: Output Impedance:** 4 Ω or 8 Ω **Output Power:** 2 watts. **Dimensions:** 20⅛" H x 29⅛" W x 21¾" D. **Power Requirement:** 110 to 130 volts AC, 60 Hz, 200 watts. **Net Weight:** 112 lbs.

Fine-Furniture Cabinets for your GR-2001 or GR-2000 Color TV

1 2 3 4 5

Simulated TV Pictures

1 **Contemporary cabinet.** Dual speaker capability. Comes completely assembled and finished. Constructed of solids and veneers; oiled walnut finish. 28⅜" H x 46¹³⁄₁₆" W x 20¾" D (23⅝" D including cup).
GRA-602-25, Shpg. wt. 66 lbs. Motor Freight **219.95**

2 **Compact contemporary cabinet.** Solidly constructed of wood solids and veneers, beautifully finished in luxurious oiled walnut finish. Comes fully assembled with cutout for one speaker. Measures 34⅜" H x 33⅞" W x 20⅝" D (24⅛" D including cup.) Shpg. wt. 65 lbs.
GRA-608-25, Motor Freight **169.95**

3 **Mediterranean cabinet with doors.** Accepts 2 speakers. Constructed of solids & veneers; simulated wood-grain base & trim. Dark oak finish. Hardware finished in Windsor Antique Gold tone. Fully assembled, finished. 29¾" H x 48¹³⁄₁₆" W x 23" D. (26¹⁄₁₆" D including cup). Shpg. wt. 108 lbs.
GRA-605-25, Motor Freight **319.95**

4 **Early American cabinet.** Twin speaker capability. Distressed maple finished wood solids & veneers; simulated wood-grain trim. Hardware has Windsor Antique Gold finish. Fully assembled & finished. 31¾" H x 47¹³⁄₁₆" W x 20½" D. (23⅝" D including cup). Shpg. wt. 83 lbs.
GRA-603-25, Motor Freight **229.95**

5 **Mediterranean cabinet.** Accepts 2 speakers. Crafted of solids & veneers; simulated wood-grain trim. Dark oak finish. Hardware features Antique Gold finish. Fully assembled and finished. 30¾" H x 49¹³⁄₁₆" W x 20⅞" D. (23¹³⁄₁₆" D including cup.) Shpg. wt. 82 lbs.
GRA-604-25, Motor Freight **229.95**

Heathkit Small-Screen Color TV and Accessories

Simulated TV pictures

GR-500 19" Diagonal Measure Color TV Kit

Has in-line gun color TV tube with negative matrix screen for excellent contrast and brightness, on-screen channel display, automatic fine-tune, instant-on, hi-fi output and speaker defeat switch.

Kit GR-500, less cabinet. 99 lbs. UPS 539.95

GRA-500-1 walnut veneer table model cabinet (shown), 17¾" H x 25½" W x 14" D (17" D including cup), Shpg. wt. 28 lbs., UPS 51.95

GRA-403-18, roll-around cart. 22" H x 27" W x 15⅝" D, Shpg. wt. 17 lbs., UPS 24.95

GRA-601, Digital Clock Accessory, 1 lb. 35.95

GR-2050 21" Diagonal Measure Color TV Kit has a host of fine features

The GR-2050 brings you all the technical excellence and quality design of our famous GR-2000, but in the popular 21" diagonal size. It uses the same optional on-screen clock and remote control as the GR-2000, and it has the same bright, accurate color picture. And the GR-2050 is an exciting kitbuilding experience too. Modular circuit boards and color-coded wiring harnesses keep point-to-point wiring to a minimum. Built-in service features and adjustment circuits include dot generator, service circuit board, centering and pincushion circuits — so you can save money on service costs.

Kit GR-2050, with chassis, picture tube, one speaker. Shpg. wt. 122 lbs. Motor Freight 599.95

GRA-2050-1, Contemporary Cabinet. Shpg. wt. 74 lbs. Motor Freight 189.95

Kit GRA-2000-6, Optional Remote Control, Shpg. wt. 4 lbs. 99.95

Kit GRA-601, Optional On-Screen Digital Clock. Shpg. wt. 1 lb. 35.95

Antennas and Accessories for improved reception

"Super Antenna." 60-element VHF-UHF-FM has 171" boom and 109" turning radius. Includes removable FM blocking elements. Less mast and cable. Motor Freight. **GD-1461, 300 ohms,** Shpg. wt. 17 lbs. **84.95**
GDS-1461, 75 ohms, Shpg. wt. 34 lbs. **89.95**

"Deluxe Fringe Antenna." Not shown. As above, but 131" boom, 80" turning radius. Less mast and cable.
GD-1441, 300 ohms, Shpg. wt. 10 lbs. **39.95**
GDS-1441, 75 ohms, Shpg. wt. 34 lbs. **44.95**

Cornell-Dubilier Rotor System. Consists of control box and rugged outdoor rotor. Supports antennas to 150 lbs. Lower mast clamp accepts ⅞" to 2" dia. masts. Requires 5-wire cable (not supplied).
GDP-1176, Shpg. wt. 14 lbs. 64.95

75/300 Ohm Transformer-Splitter. Matches one 75 ohm coax cable to separate 300 ohm VHF and UHF leads. 82 channel. Has no-strip pre-attached leads.
GD-298, Shpg. wt. 1 lb. 4.95

CB Trap Filter. Cuts out unwanted CB interference. 300 ohm impedance. No assembly is required.
GD-1239, Shpg. wt. 1 lb. 6.95

Matching Transformer. Converts 300 ohms to 75 ohms for coax. 82 channel. **GD-1054,** Shpg. wt. 1 lb. **3.95**

Coax Cable. 100 feet of high quality coax cable with antenna boot and connectors (installed). Needs matching transformers at both ends.
GD-328, Shpg. wt. 4 lbs. 12.95

Fully Assembled Videorecorder, Camera and Monitor

[1] **Fully Assembled Sony Betamax Video Cassette Recorder with Three-Hour Recording Capability.** You can record shows as you watch them, record from a different channel than the one you're watching, or with the built-in timer, even record a show while you're away! It even includes a remote pause/start control so you can hold recording during commercials or pauses and restart it right from your easy-chair. Uses the new 3-hour as well as standard 2-hour video cassettes which can be erased and used over and over again.
GDP-8600, Fully Assembled. 45 lbs. UPS 960.00
GDA-1230-2, 2-Hour Videocassettes. 1 lb. ..each 16.95
GDP-8601, 3-Hour Videocassettes. 1 lb. ..each 20.95

[2] **Sanyo VC-1600X High-Sensitivity Video Camera.** High-resolution black-and-white TV picture ideal for security and surveillance uses. Can also make tapes when used with a VCR with video input. Excellent in businesses, stores, anywhere remote monitoring is effective. With 50 ft. cable and connectors. For 117 VAC, 50 Hz.
GDP-1850, Fully Assembled. Shpg. wt. 10 lbs. ..259.95
GDP-1852, Mounting Bracket for Camera. 2 lbs. 19.95

[3] **Sanyo VM-4209 High-Performance Video Monitor.** Use with camera above for an outstanding monitoring and security system. Has 9" diagonal viewing area, high-resolution black-and white picture. Rugged steel cabinet, 8⅝" W x 9¾" H x 9¾" D. For 117 VAC, 60 Hz. **GDP-1851, Fully Assembled.**
Shpg. wt. 17 lbs. 189.95

COMBO OFFER — SAVE $49.95! Camera and Monitor Together. With all cables and connectors. If purchased separately, $449.90. **GDS-1850,** 37 lbs. 399.95

Visit your Heathkit Electronic Center (Units of Schlumberger Products Corporation) and see our Complete Product Line.

Parts and service available.

ARIZONA — Phoenix, 85017
2727 W. Indian School Rd. 602-279-6247
CALIFORNIA — Anaheim, 92805
330 E. Ball Rd. 714-776-9420
El Cerrito, 94530
6000 Potrero Ave. 415-236-8870
Los Angeles, 90007
2309 S. Flower St. 213-749-0261
Pomona, 91767
1555 N. Orange Grove Ave. 714-623-3543
Redwood City, 94063
2001 Middlefield Rd. 415-365-8155
Sacramento, 95825
1860 Fulton Ave. 916-486-1575
San Diego (La Mesa, 92041)
8363 Center Dr. 714-461-0110
San Jose (Campbell, 95008)
2350 S. Bascom Ave. 408-377-8920
Woodland Hills, 91364
22504 Ventura Blvd. 213-883-0531
COLORADO — Denver, 80212
5940 W. 38th Ave. 303-422-3408
CONNECTICUT — Hartford (Avon, 06001)
395 W. Main St. (Rte. 44) 203-678-0323
FLORIDA — Miami (Hialeah, 33012)
4705 W. 16th Ave. 305-823-2280
Tampa, 33614
4019 West Hillsborough Ave. 813-886-2541
GEORGIA — Atlanta, 30342
5285 Roswell Rd. 404-252-4341
ILLINOIS — Chicago, 60645
3462-66 W. Devon Ave. 312-583-3920
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Rockville, 20852
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Boston (Wellesley, 02181)
165 Worcester Ave.
(Rt. 9 just west of Rt. 128) 617-237-1510
MICHIGAN — Detroit, 48219
18645 W. Eight Mile Rd. 313-535-6480
E. Detroit, 48021
18149 E. Eight Mile Rd. 313-772-0416
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9207 Maple St. 402-391-2071
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Ocean, 07712
1013 State Hwy. 35, 201-775-1231
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(North White Plains, 10603)
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Norfolk (Virginia Beach, 23455)
1055 Independence Blvd. 804-460-0997
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505 8th Ave., N. 206-682-2172
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5215 W. Fond du Lac 414-873-8250

You'll enjoy these easy-to-build kits designed to give you

1 Easy-to-build Alarm Clock kit gives you digital accuracy

This convenient clock makes an ideal first-time kit, and a practical gift, too. It not only shows hours and minutes, but also AM and PM, tells if the alarm is set, and alerts you to power interruptions. See GC-1107 on page 76 for details.

2 This Musical Doorbell plays your favorite tune

Be the hit of your neighborhood when your Heathkit Musical Doorbell begins playing the tune you programmed into it. Easy to build, and install, it welcomes your friends with a favorite melody. The manual includes tunes, or program your own. See TD-1089 on page 75 for complete details on the Musical Doorbell.

3 Dual Wattmeter raises your station efficiency

Handy Amateur Radio Dual HF Wattmeter reads forward and reflected power between 1.8 and 30 MHz. Has dual meters for forward and reflected power. Reads SWR directly; also reads PEP or Average power. See HM-2140 on page 18.

4 The Multi-Outlet Box has dozens of uses

Plug in the soldering iron; plug in the lamp; plug in the...oops! You ran out of outlets? Not any more! The versatile Multi-Outlet Box has 11 switched outlets, one unswitched outlet to power your equipment. Helps keep your shop or bench organized. See Kit HD-1274 on page 14 of this catalog.

5 DC-5 MHz Single-Trace Oscilloscope

This scope puts professional capabilities on your test bench at a hobbyist price. You'll want to check its features. It's available in kit or assembled form on page 97. See IO-4235.

6 Handy new Portable Digital Multimeter

This compact, hand-held Digital Multimeter can be yours at an affordable price. Its compact design makes it ideal for both field and laboratory use. Turn to IM-2215 on page 93.

7 Test Instrument Self-Instruction Program

This Self-Instruction Program consists of four modules teaching you what test equipment is, how it works, how to specify it and how to use it. Modules consist of:

1. Electronic Meters—Analog and Digital; 2. Oscilloscopes; 3. Frequency Generation and Measurement; 4. Special Measuring Instruments. Each module contains all the parts and text materials to implement the experiments relating to that module. Various test instruments are required to perform the experiments and problems in the program. See pages 64 and 65 for complete details on the Program.

and your family pleasure, convenience and dependability

With these quality electronics kits you will say proudly, "I built it myself!"

1 Four-band Shortwave Receiver is the perfect choice for beginning builders

This low-priced Shortwave Receiver is an ideal introduction to the fun and fascination of electronic kit construction. It tunes in foreign broadcasts from all over the globe — amateur and CB radio bands — local and marine weather reports — ships at sea — plus standard AM broadcasts. It covers 550 kHz to 30 MHz in four bands, and features a wide slide-rule tuning dial, bandspread tuning, variable BFO for code reception, built-in speaker, built-in AM rod antenna plus connection for SWL antenna. See page 15 for complete information on the SW-717 Shortwave Receiver and accessories.

2 Give your system precise tone control with this 5-band, 2-channel Equalizer

This Audio Equalizer lets you control the entire audio frequency spectrum with five slide controls for each stereo channel. It is designed for use with any receiver or amplifier having a preamp output and power amp input or tape monitor. It compensates for room acoustics, differences in cartridges and speakers, even deficiencies in program sources. Can also be used to filter old or scratchy records before recording. See the AD-1305 Audio Equalizer on page 7 for a fun-to-build kit, even for first-time builders.

3 Steady driving saves you gasoline with the Heath/Dana Speed Control

Slowing down and speeding up can cut your gasoline mileage drastically when you travel long highway distances. The Heath/Dana Speed Control boosts mileage by maintaining a constant speed. Just accelerate to the desired speed, set the control and your speed is maintained automatically uphill or downhill, around curves or on straightaways! You can take your foot off the gas pedal, relax, and concentrate on the road. A touch of the brake pedal releases the control; resume control lets you slow down or pass cars without affecting the set speed. Set button lets you set a new cruise speed. Reduces driving fatigue so you stay alert enroute and arrive fresh. It makes those long hours in the car a lot easier. The CS-2048 can be used with both automatic and manual transmissions, with most domestic cars, trucks and light vans, as well as many foreign cars. See the CS-2048 on page 61.

4 The Heathkit Weather Computer gives you instant weather reports right in your own living room

The Heathkit Weather Computer is a microprocessor-based instrument. It displays wind speed, barometric pressure and indoor/outdoor temperatures. But better yet, its memories store the highs and lows by date and time for instant reference at the touch of a button. Even if you're away from home, you can gauge the severity of the weather while you were away. You'll be able to tell the exact time of day or night the highest or lowest temperature, wind speed and barometric pressure were reached.

The memory recording the rate of change of barometric pressure serves as a good indicator of weather fronts. The computer reads the barometric pressure at four-minute intervals during a one-hour period. The readings are stored and a rate is determined from the cumulative readings. The lowest and highest barometric pressures can be recalled with their exact dates and times of occurrences at the touch of a button.

In addition to these memory capabilities, the Heathkit Weather Computer calculates the windchill factor by computing a function using outside temperature and average wind velocity. The average wind velocity gives you a more stable indication of wind speeds on days when winds are gusty and erratic. Switches on the computer's rear panel let you select wind velocity in either knots, kilometers- or miles-per-hour and barometric pressure in either inches of mercury or millibars.

The display panel utilizes bright red LEDs to tell you current weather conditions at a glance. The 6-digit time/date display shows time in hours, minutes and seconds; and date in month and day. You can alternate time/date displays, or display either continuously. Has AM/PM indicator for 12-hour format. 2-digit wind vector display shows wind speed in mi/h, km/h or knots. Wind direction is identified by compass points and radial degrees. The thermometer display shows indoor or outdoor temperature with + or − signs, °F or °C indicators. Further details on the Weather Computer on page 3.

One-Button Phone Dialer: saves time when speed counts!

One-Button Phone Dialer helps you respond fast, especially in an emergency

Converts your standard phone to a push-button model

$89.95

HEATHKIT ELECTRONIC CENTERS charg-a-kit NEW LOW CHARGE

- Microprocessor-based unit stores up to 16 numbers for quick, one-button dialing
- Automatic re-dial lets you call last number dialed when you get a busy signal
- Connects easily to any standard modular phone jack
- Memory-save feature maintains stored numbers during electric power failures

A fire or emergency is no time to be looking for the fire department or police phone number. The new Heathkit One-Button Phone Dialer comes to the rescue by dialing a vital number with the push of one button. And if the number is busy, the automatic re-dial feature lets you call the last number dialed with the push of a button. The One-Button Phone Dialer stores up to 16 full 15-digit phone numbers (enough for all access codes). So you can program emergency numbers and still have memory for numbers of frequently-called businesses, friends and relatives. Easy programming lets you change telephone numbers quickly. A special memory-save circuit maintains stored numbers during power failures. The GT-1217 converts your standard dial phone to a push-button model for all phone numbers, and connects easily to any modular phone jack. Complies with all FCC interconnect regulations. Easy to assemble and operate. Housed in an attractive, sturdy vinyl case. A convenient two-color, heavy-duty label allows you to record the numbers you have programmed into your unit and is easily eraseable for changing numbers. For 120 VAC, 60 Hz. (less 9V battery).

Kit GT-1217, Shpg. wt. 3 lbs. 89.95

GT-1217 SPECIFICATIONS: Capacity: 16 telephone numbers; maximum of 15 digits each (pause counts as a digit). **Telephone Line Type:** for hookup to private telephone line (pushbutton or dial type). Modular type plug-in connector supplied. Not for connection to party lines or coin-operated lines. **Touch Buttons:** 16 directory buttons; 0-9 dial numbers; re-dial; pause; store. **LED Indicators:** ready; pulse, store. **Power Requirements:** 120 VAC at approx. 2 watts; 9 V transistor battery to save memory for stored phone numbers in event of power failure. **Dimensions:** 2" H x 8¾" W x 5¾" D.

Specifications subject to change without notice.

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