

HEATHKIT®



1



The Pioneer Spirit made America Great. Self-reliance, independence, individual participation. You get a taste of that spirit when you build a Heathkit product. Declare your independence, now.



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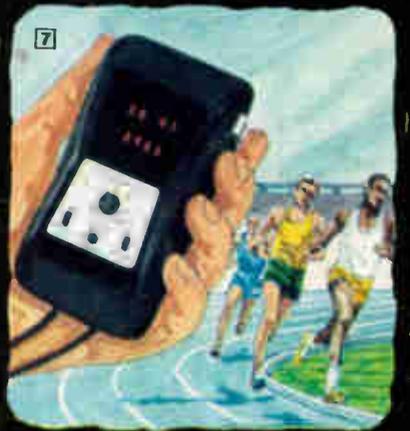
SPRING 1976



2



4



7



3



5

- 1 NEW — R/C Glider
- 2 NEW — CRT Tester/ Rejuvenator
- 3 Deluxe Fish Spotter/ Depth Sounder
- 4 NEW — Precision Power Supply
- 5 NEW — Digital Miles-per-Gallon Monitor/ Speedometer
- 6 Handheld 2-Meter Transceiver
- 7 Programmable Stopwatch

PLUS... over 400 other electronic kits you can build and service yourself

A new standard for versatility & value— Heathkit Digital Stopwatch—

\$99⁹⁵



Used by
coaches and
timers of the
United States
International
Skating
Association.



Shown
Actual Size

Rally Modification

In just a few minutes you can easily convert your GB-1201 into a six-digit stopwatch with readout in hours, minutes and *hundredths of minutes*—perfect for rallies and time studies!

Instructions are included in all new kits. If you already own a GB-1201, send a stamped, self-addressed envelope to: Technical Consultants, Heath Company, Benton Harbor, Michigan 49022.



A removable sunshield makes the GB-1201 easy to read even in sunlight. Includes an AC adapter/charger, rechargeable batteries and lanyard. Jacks let you start & stop the GB-1201 electronically by remote control.

7 functions, 8 digits, 1/100th of a second resolution & typical accuracy to $\pm 0.003\%$!

All the range and accuracy you'll probably ever need — from just 1/100th of a second all the way up to 99 hours, 59 minutes, 59.99 seconds, with quartz-crystal precision. Two exclusive, Heath-designed PMOS IC counters give it versatility never before achieved. Its wide range of functions makes it ideal for almost any timing job — from navigating an airplane to timing a race. And you'll find dozens of every day uses for each function.

Function 1 — Start/Stop Elapsed Time — times any number of individual events while also counting total elapsed time from beginning of first event to the end of the last. Like two stopwatches in one — times two participants in the same event. Ideal for races.

Function 2 — Sequential — times and displays

each part of an event (i.e., each lap) while also timing overall event. Compare lap times of any participants while still timing overall event. Ideal for multilap races, navigation.

Function 3 — Total Activity Time — accumulates elapsed time for series of events. Also maintains separate count of total elapsed time including down time or breaks. Perfect for auto or plane trips, efficiency studies.

Function 4 — Split — displays cumulative time to each "split" point while continuing to time overall event. Useful in ski races, swim meets, sailboat race committees, etc.

Function 5 — Start/Stop Activity Time — shows separate times for each event or "leg", then totals all individual times. Great for trips, races, rallies.

Function 6 — Upcount — counts to programmed or "learned" time then sends a trigger pulse to the alarm jack. Same number can be used repeatedly without reprogramming and count can be interrupted and resumed at any point. Perfect for tests, officiating, etc.

Function 7 — Downcount — counts from programmed number to zero, then sends trigger

pulse to alarm jack. Count can be interrupted and resumed at any point. Ideal for yacht races, testing, officiating and helps athletes pace themselves in training.

Functions 6 and 7 are unique. The stopwatch can "learn" a time in one of the other functions, then transfer it to Function 6 or 7. Or program any time up to 9 hours, 59 minutes, 59 seconds using a clever digit-set method.

Start/stop jacks for photoelectric and relay circuits. Display switch turns the readouts off in functions 1-5 to conserve batteries and, in functions 2 and 4, switching off, then on, "unlatches" display to show counting process. After an event is finished, pressing the start/stop button alternately displays time in each counter. High-impact plastic case.

With care, even a novice kitbuilder can assemble the GB-1201 in two evenings or less. And in the value-conscious Heath tradition, its price is about half that of much less versatile electronic stopwatches.

Kit GB-1201, Shpg. wt. 3 lbs. **99.95**
ICA-2009-1, Felt-lined Naugahyde® carrying case, Shpg. wt. 1 lb. **3.95**

GB-1201 SPECIFICATIONS
Accuracy: $\pm 0.006\%$, typically better than 0.003%. Instrument alignment provides higher accuracy.
Battery Life: approx. 40 hrs. between charges with displays most off; approx. 4 hrs. with displays continuously on. Recharging: approx. 14 hours with power off. Temperature Range: -10° to $+120^{\circ}$ F.
Dimensions: $5\frac{1}{2}''$ H x $2\frac{1}{4}''$ W x $2''$ D. Net Weight: approx. 8 oz.

Heathkit Telephone Amplifiers for convenient "hands free" conversations



Great for business and family "conference" calls

These two fine telephone amplifiers make phone calls easier, more convenient than ever. And you can select one with or without a built-in dialer. In performance, features and value, they equal the best telephone amplifiers you can buy or rent.

To answer the phone, just press the Power button; to hang up, press it again. Voice-activated circuitry instantly and silently switches the GD-1112 and GD-1162 from talk to listen — without "clipping" words. An easy-to-use slide control adjusts the listening volume. Pressing the Listen button disables the built-in microphone, but still lets you monitor the line. That makes it a perfect "hold" button and more. When you talk through the handset of an external phone, pressing the Listen button allows others in the room to hear both

sides of the conversation. To return your phone to normal operation, just turn the amplifier off.

The GD-1112 requires an external phone to place calls while the GD-1162's built-in dial and electronic ringer let you use it with or without a regular telephone. Compact plastic case looks beautiful whether it's hung on a wall or placed on a desk.

And you can build either model in just a couple of evenings. The GD-1162's dial mechanism comes completely preassembled. The manual includes detailed information on installation. Requirements and rates vary, so check with your local phone company for details.

Kit GD-1112, Amplifier, Shpg. wt. 4 lbs., 49.95

Kit GD-1162, Amplifier with dialer, Shpg. wt. 5 lbs. 69.95

Kit GRA-43-1, AC converter, Shpg. wt. 1 lb. 4.95

GD-1112/1162 Specifications

Microphone Range: up to 10 ft. Power Requirement: 9-volt battery or GRA-43-1 (not included). Battery Life: approx. 700 three minute calls. Ringer: GD-1162 only; may be disconnected for party line use. Connectors Supplied: GD-1112, 1/4" phone plug and 4-pin telephone plug; GD-1162, 4-pin telephone plug and 15-pin dataphone connector. Recommended Couplers: OKT coupler for GD-1112; STC coupler for GD-1162. Cable: 6', 4-conductor. Dimensions: 2 1/2" H x 8 1/2" W x 5 3/4" D. Net Weight: 2 lbs.

Note: Customer-owned equipment connected to telephone company lines may be subject to local tariff.

AIRCRAFT: aircraft strobe light	15
AMATEUR RADIO: digital, ssb, cw, 2-meter fm, novice gear, accessories	70-83
AUTOMOTIVE: digital car clock/timer, exhaust gas analyzer, ignition analyzer, cd ignition system, battery chargers, tachometer, intercom, kit & assembled tune-up gear, timing lights, siren PA system, stereo tuner, wiper delay, emergency strobe, digital miles-per-gallon monitor/speedometer	8-15
BOOKS: do-it-yourself reference library	84
BATTERY ELIMINATOR	57
BREADBOARD, electronic	68
CALCULATORS: slide rule, desktop & pocket models	17
CITIZEN'S BAND RADIOS	69
CLOCKS: digital electronic	7
CLOCK-RADIO	4
COLOR ORGAN	36
CHART RECORDER	62
CRT TESTER	63
DEPTH SOUNDERS	18-20
DIGITAL IC TESTER	60
DIGITAL TRAINER	87
DDOR CHIMES, programmable	16
EDUCATIONAL: Heathkit Jr.® electronic workshop, basic electricity, radio & transistor courses, "how-to-use" vtm, signal generator, scopes; individual learning programs	84-87
ELECTRONIC TRAINERS	85-87
FISH SPOTTERS® SOUNDERS, THERMOMETER	20
FREQUENCY COUNTERS	55
FUNCTION GENERATOR: kit & assembled	58
GARAGE DOOR OPENERS	13
GENERATORS: kit & assembled	58-59, 62-63

GUITAR AMPLIFIERS & accessories	94
HEATH/SCHLUMBERGER INSTRUMENTS: assembled instrumentation catalog	68
HEATHKIT ELECTRONIC CENTERS	68
HOME APPLIANCES: air purifier, ultrasonic cleaner, intercoms	47
INDIVIDUAL LEARNING PROGRAMS	85-87
INTERCOMS: indoor/outdoor	47
Cab-to-camper	15
MARINE: depth sounders, foghorn/hailer, vapor detector, power inverter, radio direction finder	18-20
METAL LOCATORS	96
MUSIC: electronic organs, guitar amps, accessories, metronome	94, 95
METERS: vtm, vom, digital, fet, kit & assembled	52-54
MODEL RAILROAD CONTROL CENTER	24
ORGANS, electronic	95
OSCILLOSCOPES: kit & assembled	64-66
OSCILLOSCOPE CALIBRATORS	67
PA/SOUND REINFORCEMENT SYSTEM	41
PHOTOGRAPHY: photo timer	17
POWER SUPPLIES: kit & assembled	56-57
PRESIDENT'S LETTER	51
PROBES & CABLES	67
RADIO: direction finder	19
RADIOS, GENERAL: digital am/fm clock, am & fm table radios, portables	4-5
R/C MODELING: single & dual stick systems, servos, tach, accessories, R/C glider	21-24
SECURITY SYSTEMS	44-46
home	44-46
auto	8

See pages 48-51 for ordering information

handy index

SHORTWAVE LISTENING: stationary & portable short-wave, police & aircraft monitors, accessories	82-83
STEREO & 4-CHANNEL HI-FIDELITY:	
audio equalizer	29
audio scope	30
automotive stereo tuner, amp	14
cabinet	33
changers & turntable	42-43
microphone mixer, stereo	40
power amplifiers, stereo	27, 28, 34
preamplifiers	25, 26, 29
separate speakers, speaker systems	37-39
tape decks, stereo cassette	40
tuner, preamp	25-26
2 & 4-channel receivers, amplifiers, tuners	25-36
valu-components	36
STOPWATCH, digital	2
TELEPHONE AMPLIFIER/DIALER	3
TELEVISION: solid-state color, B&W portable, antennas, accessories	88-94
TESTERS & CHECKERS	60-61
THERMOMETERS: digital, weather station	6-7
TODLS: soldering irons, de-solder sets, hand tools, accessories	16
WEATHER MONITORS	6-7



Heathkit do-it-yourself radios keep

AM/FM Digital Electronic Alarm Clock-Radio

Here's everything you could want in a quality clock-radio... at an affordable kit price. And the GR-1075 is truly unique... the only product of its kind.

Setting the pace for convenience in the GR-1075 is the all-electronic digital clock. It reads out the time in conventional 12-hour format with bright orange 7-segment Beckman planar gas discharge tubes. Displays AM or PM, too.

A lighted decimal pulsates to indicate sec-

onds and also shows that the alarm is properly set. Readout features automatic brightness control.

The GR-1075's 24-hour alarm cycle offers convenience you just won't find on conventional alarm clocks. Go to bed at 9 and set the alarm for 10, without being awakened in an hour. The alarm can be set to wake you with a gentle pulsating, electronic "beep" (which can be changed in volume by the radio volume control)... or by the soft music from the FM or AM radio station of your choice. The 7-minute snooze cycle feature is repeatable for up to an hour.

Two 9-volt batteries (not supplied) take over during power interruptions and keep the clock counting, without the display — when power is restored the clock is "on time" and the alarm will go off at the set time.

On the front panel are finger-flip switches for on/off; AM/FM selection; radio or electronic alarm; "wake-up" alarm set; "Snooze" cycle; plus volume and AM/FM tuning controls.

Black plastic cabinet with simulated brushed aluminum front panel trim strip, and simulated walnut-grain vinyl end panels.

Kit GR-1075, Shpg. wt. 10 lbs. 129.95

GR-1075 SPECIFICATIONS

FM: Tuning Range: 87.5 MHz - 108.5 MHz. IF: 10.7 MHz. Sensitivity: 5 μ V @ 30 dB quieting. AM: Tuning Range: 525 kHz - 1650 kHz. IF: 455 kHz. Sensitivity: 300 μ V/M @ 20 dB quieting. GENERAL: Dial: 4 1/2" backlighted neon arc orange; 4" pointer travel. AUDIO: Output: 1 watt. Speaker: 3" x 5" oval, 40 ohm. Power Input: 120/240 VAC, 50/60 Hz; 17 watts max.; clock, 7 watts. Dimensions: 4 1/4" H x 13 3/8" W x 8 1/8" D.

Budget-Priced, Solid-State AM/FM Table Radio

Your search for a good value in table radios should start right here... in fact, the GR-48 is a great radio to get you started in kit building, too.

You'll have the obvious enjoyment of both AM and FM listening, plus a list of features to assure you of quality radio entertainment. An Automatic Frequency Control eliminates signal drifting and keeps your GR-48 tuned to the station you select. The Automatic Gain Control maintains the AM volume level you select. Built-in AM and FM antennas and an easy-to-read, backlighted tuning dial round out the GR-48's feature package. 5 1/4" H x 10" W x 4 7/8" D.

Kit GR-48, Shpg. wt. 5 lbs. 43.95



The Heathkit AM/FM Table Radio with Component Quality Performance

The entertaining GR-1085 puts top performance and sophisticated system-type circuitry into a unitary table radio package...to deliver a roomful of clean, clear monophonic sound of the quality you expect from a high fidelity system. A sensitive tuner, ceramic filters and separate tone controls, assure you of a clean, tailored sound from your favorite station. A simplified circuit design makes the GR-1085 a joy to build, with only minimal adjustments. Luxurious cabinet covered with simulated teak-grained vinyl.

Kit GR-1085, Shpg. wt. 19 lbs. 99.95

POWER OUTPUT: 5 WATTS, MINIMUM RMS, INTO 8 OHMS AT LESS THAN 1.0% TOTAL HARMONIC DISTORTION FROM 60 HZ to 15 KHZ.

GR-1085 SPECIFICATIONS

AM: Sensitivity: 300 μ V/M for 20 dB S+N/N. Selectivity: 40 dB alternate channel. Hum & Noise: 30 dB below 1 watt. FM: Sensitivity: 5 μ V. Selectivity: 60 dB. Hum & Noise: 50 dB below 1 watt. GENERAL: Power Requirement: 120/240 VAC, 50/60 Hz, 25 watts. Speaker: 4 1/2", 8 Ohm. Dimensions: 7" H x 13" W x 7 1/2" D.



you entertained at home or on the go

Heathkit Solid-State AM/FM Portable Radio \$46⁹⁵



Taking your own entertainment with you has never been easier than with the GR-17 Portable Radio. It's a great kit to build...just right for someone starting out because of its clean, open circuit design. And because we've packed so many quality features into the GR-17, it delivers the kind of listening enjoyment you just won't find in some other portables. The Automatic Gain Control keeps the AM volume level where you set it. And the Automatic Frequency Control locks onto the FM station you select.

The GR-17 is powered by six "D" cell batteries (not included) to give you hours of on-the-go entertainment. An optional AC converter lets you plug the GR-17 into any standard AC outlet. 6 3/4" H x 8 3/4" W x 4" D.

Kit GR-17, Shpg. wt. 6 lbs. 46.95

GRA-43-1, Converter/Charger, 1 lb. 4.95

Solid-State AM Portable Radio anyone can build \$15⁹⁵

A great kit for beginners. Goes together in a couple of evenings, and sings up a storm with big 3 1/2" speaker & RF amplifier stage — unusual at this low kit price. Has AGC for constant volume, fixed ceramic filters for easy alignment. White & black plastic case measures a compact 4" H x 7 7/8" W x 2" D. Operates on 9-V battery (not supplied). Get a youngster started in kit-building with this fun-to-build personal portable.

Kit GR-1008, 2 lbs. 15.95



Solid-State AM Portable \$32⁹⁵

Make this quality portable your constant companion when you're on the go. Attention to design detail will assure you of years of listening enjoyment. GR-24 operates on six "D" cell batteries (not included). Brown vinyl-coated fibreboard case. Anodized aluminum grill. 7" H x 8 3/4" W x 3 3/4" D.

Kit GR-24, Shpg. wt. 5 lbs. 32.95

Solid-State AM Table Radio \$26⁹⁵

The GR-28 is an ideal radio to start a kit-building career. Low kit-form price combined with all solid-state circuitry. Wide open design and simple step-by-step instructions make the GR-28 a joy to build. Gold plastic cabinet with brown grill. 5 1/4" H x 10" W x 4 7/8" D. For 120 VAC.

Kit GR-28, Shpg. wt. 5 lbs. 26.95



With Heathkit products, American craftsmanship starts at home...your home.



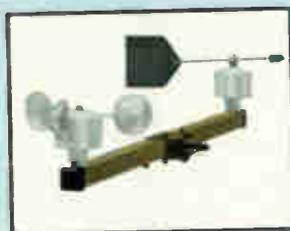
Heath helps you make

1 Versatile, five-function weather station

Get yourself into the spirit of the new year with this elegant, informative weather monitor for your home. The Heathkit ID-1290 Weather Station monitors indoor and outdoor temperatures, barometric pressure, wind speed and direction — all with electronic accuracy and reliability. Uni/Mag barometer lets you observe changes as small as 0.02 inches of mercury. The thermometer is calibrated in two degree increments from -40 to +120° F and a switch selects indoor or outdoor readings. The windspeed indicator has two ranges — 0-30 mph or 0-90 mph and 8 wind direction lights offer true 16-point resolution.

ID-1290's walnut-grained plastic cabinet can be hung vertically or horizontally; or use as a desk set with the stands included with the kit. The remote transmitter assembly (wind-cups, weather vane and outdoor temperature sensor) clamps onto any TV antenna mast and is connected to the plaque with optional 8-wire cable (below). Includes comprehensive weather book.

- Kit ID-1290, Shpg. wt. 8 lbs. 89.95
- IDA-1290-1, 50 ft. cable, Shpg. wt. 2 lbs. 7.50
- IDA-1290-2, 100 ft. cable, Shpg. wt. 4 lbs. 13.50
- IDA-1290-3, 150 ft. cable, Shpg. wt. 5 lbs. 18.50



The remote transmitter assembly for the ID-1290 and ID-1590 clamps easily to any TV antenna mast.

1 Five-Function Weather Station



Digital Electronic Wind Speed and Direction Indicator

The Heathkit ID-1590 takes the guesswork out of knowing the wind speed and direction. Its outstanding accuracy and easy-to-read digital display makes this kit a "must" for pilots, boaters — anyone whose activities are affected by the wind. During construction, you pick the two readout modes you need from three available modes: miles, knots or kilometers per hour. Switches select mode and front-panel lights show which mode is in use. Incandescent bulbs mark the 8 principal compass points. Two adjacent bulbs can light simultaneously, providing 16-point resolution. The transmitter boom clamps onto any 1 to 1½" rooftop TV antenna mast and is connected to the receiver with optional cable. The rugged Cyclac® plastic case with teak-grain vinyl insert matches our GC-1094 Digital Clock and ID-1390 Digital Thermometer.

- Kit ID-1590, Shpg. wt. 6 lbs. 69.95
- IDA-1290-1, 50 ft. cable, Shpg. wt. 2 lbs. 7.50
- IDA-1290-2, 100 ft. cable, Shpg. wt. 4 lbs. 13.50
- IDA-1290-3, 150 ft. cable, Shpg. wt. 5 lbs. 18.50

ID-1590 SPECIFICATIONS

Wind Speed: 0-99 in miles per hour, knots or kilometers per hour (choice of two). Response Threshold: 3 mph. Accuracy: ±1 digit or ±10%, whichever is greater. Direction Response Threshold: approx. 2 mph. Operating Temperature: Remote transmitter, -40 to +120°F; Receiver, 0 to +150°F. Power Requirement: 120 VAC, 50/60 Hz, 6.5 watts. Dimensions: Receiver, 2½" H x 7" W x 5" D; Remote transmitter, 30" boom.



it easy to keep tabs on time and weather



Digital Electronic Indoor/Outdoor Thermometer

You'll never have to "gauge-guess" again when it comes to reading a thermometer. The ID-1390 monitors indoor/outdoor (or any two temperatures) with big, bright, easy-to-read digital readout. Switches select either Fahrenheit or Celsius readings and let you choose continuous readings of one temperature or alternate readings of both. The 85' of cable included with the sensors permits a variety of custom applications — home freezer, hot house, garage, basement, pump house, swimming pool, aquarium, almost any temperature. Black Cycolac® plastic case with teak-grain vinyl inserts matches the GC-1094 digital clock and ID-1590 digital wind speed/direction monitor.

Kit ID-1390, Shpg. wt. 5 lbs. 59.95

ID-1390 SPECIFICATIONS

Temperature Range: Fahrenheit -40 to +120°; Celsius, -40 to +50°. Accuracy: Celsius, ±1°C from -15° to +50°C, ±2°C from -30° to -15°C. Fahrenheit, ±1°F from +20° to +120°F, ±2° from -30° to +20°F. Power Requirement: 110-130 VAC, 60 Hz, 4 to 6 watts approx. Dimensions: 2½" H x 7" W x 5" D.



Budget-Priced Digital Electronic Clock

The GC-1094 makes waking up a little easier with a gentle electronic "beep." Take additional 7-minute catnaps, up to an hour. Should the power be interrupted for more than a few seconds, the display shows all "eights" until the clock is reset. An easy kit to build — most parts mount on two circuit boards. Can be wired for 12 or 24-hour readout.

Kit GC-1094, Shpg. wt. 4 lbs. 49.95

GC-1094 SPECIFICATIONS

Accuracy: determined by line frequency. Power Requirement: 120/240 VAC, 60/50 Hz. Dimensions: 2½" H x 7" W x 4¾" D.



1 Deluxe Digital Electronic Calendar/Clock

It won't take long for you to see that the GC-1092D is truly a quality digital timepiece. It not only brings you the time in hours, minutes and seconds in bright orange ½"-high 7-segment Beckman planar gas discharge tube digits — it also, automatically or at a touch, brings you the date in four digits for the month and day. Displays time continuously, or automatically displays the date two seconds out of every ten. Or, simply touch the case-top control to call up the date display for approximately five seconds any time you want it. 12 or 24 hour time format.

Stand-by battery supply takes over instantly in case of a power interruption. It also features automatic control of display brightness — bright in brightly lit areas, dim in dimly lit areas — and a switch is provided for a continuously bright display if desired.

A "hold" switch on the bottom panel makes it easy to time intervals or set the clock. A battery-save switch position disconnects the battery when clock is unplugged. A built-in charging circuit keeps nickel-cadmium batteries at full charge or you can wire the GC-1092D for non-rechargeable standard batteries. Whether you use it at the office, in the ham shack, or around your home, you'll find the GC-1092D the easiest way ever to keep on time and up to date. Easy-to-assemble, even if you've never built a kit before. Batteries not included.

Kit GC-1092D, Shpg. wt. 5 lbs. 79.95

Learn more about these fascinating electronic clocks



Electronic Clocks and Watches — a complete guide to electronic time-keeping with sections on digital circuits, time-bases and more. Includes instructions for two projects.

EDP-201 6.50

See page 48 for book ordering information.

2 Deluxe Digital Electronic Alarm Clock with standby battery power

You'll realize the GC-1092A is one of the world's finest digital timepieces the minute it wakes you with a gentle intermittent "beep." There are no switches or buttons to fumble for. Just touch the Heathkit "logo" on top of the case to turn off the alarm...electronically. The GC-1092A snooze alarm will let you enjoy up to an hour of 7-minute catnaps. Even if the power is interrupted during the night, a built-in battery power supply keeps the alarm — and you — on time, without the display. When AC power is restored, the correct time will once again be displayed, no need to reset the clock. If you wire the GC-1092A for nickel-cadmium batteries, a built-in circuit keeps them at full charge.

Its long list of timely features and low kit price make the GC-1092A an exceptionally good value. A convenient switch lets you select 12 or 24-hour (military) time format; an AM indicator light lets you set the alarm for either 9 AM or 9 PM; an automatic light sensor dims the display in dark rooms so it won't keep you awake at night and a battery-saver switch disconnects the batteries when the clock is unplugged for extended periods. Hours, minutes and seconds are displayed on big, ½"-high 7-segment Beckman planar gas discharge tubes for easy visibility. The handsome low-profile case in luxurious brown tones sits atop a removable pedestal base which swivels for easy viewing from any angle. Plug-in ICs and color-coded wiring make it an enjoyable kitbuilding experience. Less batteries.

Kit GC-1092A, Shpg. wt. 5 lbs. 79.95

GC-1092A & GC-1092D SPECIFICATIONS

Power requirement: 120 VAC, 60 Hz, 7 watts. Accuracy with AC line: Determined by accuracy of power line frequency. Accuracy with battery: Depending on care in initial calibration, battery discharge curve, and temperature. Dimensions: 8¾" W x 4¾" D x 2½" H (4" H with pedestal). Display: 6 digits, 7 segment neon planar.

Do-it-yourself accessories for your car



Heathkit Digital Tachometer

The Heathkit CI-1079 is more responsive and accurate than ordinary meter-type tachometers. The 2-digit electronic Beckman readouts sweep up to your engine's peak performance level. 1/2"-tall displays can be easily read even in direct sunlight. Dimmer control adjusts brightness for safe nighttime driving.

The CI-1079 helps you find the best operating RPM for just about every engine you own: the best cruising RPM for your car, your boat engine's most efficient speed, best prop selection, etc.

With 10 integrated circuits, you can build the CI-1079 in just two evenings. The black die-cast case with burl-grained vinyl insert matches the Heathkit Digital Car Clock and mounts on or under the dash. With conventional, CD or factory electronic ignitions, connect it directly to the primary side of the ignition coil. Optional inductive pickup for engines with magnetos or without access to the primary of the coil.

Kit CI-1079, Shpg. wt. 3 lbs. 49.95

Kit CIA-1079-1, inductive pickup, Shpg. wt. 1 lb. 5.95

CI-1079 SPECIFICATIONS

Power Requirements: 12 V, neg. gnd. only. Readout Accuracy: ±4% of reading, ±1 count. Update Time: 0.3, 0.2 or 0.15 seconds, depending on calibration point. Applications: 4, 6, 8-cyl. 4-cycle engines, 2, 3, 4-cyl. 2-cycle engines; 2, 3, 4-rotor Wankel engines. Dimensions: 1 1/2" H x 4 3/4" W x 4 3/4" D.



Tachometer

Clock/Timer

Use 'em together or separately to bring your car into the "Digital Age"

Digital Car Clock with 20-hour rally timer

The GC-1093 is totally electronic with a quartz-crystal timebase that insures high accuracy — typically within one minute per month. Hours and minutes are displayed on big 1/2" Beckman readouts bright enough to be read in direct sunlight, yet they dim automatically at night.

To start the GC-1093's elapsed timer, just press the reset button. For the first 20 minutes the readout displays the time in minutes and seconds and after that the readout is in hours and minutes up to 19:59. Pressing a button lets you display either clock time or elapsed time, while the other function continues counting in the memory. An AM or PM indicator lights up to show you're looking at clock time, rather than elapsed time.

To reduce the drain on your battery, the display fades out when you turn the ignition off, but the clock and timer continue counting. You can "recall" the display instantly even when the ignition is off by simply pressing a button. The splashproof, die-cast case with burl-grain vinyl insert includes hardware to mount the GC-1093 on or under the dash of your car, boat, camper, or motorcycle.

Kit GC-1093, Shpg. wt. 2 lbs. 64.95

GC-1093 SPECIFICATIONS

Power Requirements: 10-17 VDC, neg. ground only. 300 mA max., display on. 30 mA max., display off. 4.5 volts minimum for clock memory. Accuracy: one min. per month, typical. Temp. Range: -30 to +60°C. Format: 12 hrs. with AM, PM and 20-hour rally timer. Dimensions: 1 1/2" H x 4 3/4" W x 4 3/4" D. Weight: 3 lbs.

Heathkit Auto Intrusion Alarm lets you build security into your car



The GD-1157 protects your entire car — engine, trunk and passenger compartment — from would-be thieves by sounding your car's horn intermittently or triggering the optional siren.

Alarm Unit mounts almost anywhere on car. System can be armed or disabled by a convenient underdash switch. Controls let you enter or leave the car without triggering alarm. With system armed, alarm sounds instantly whenever hood or trunk is opened. Alarm sounds for approximately two minutes, then resets and repeats the two-minute alarm cycle. Once the alarm sounds, the only way to disable the system is to flip Set/Reset Switch on concealed Alarm Unit. And once the passenger compartment alarm has sounded, the entry delay is defeated — further attempts to enter the car will instantly trigger the alarm. So, when you return to your car, you'll know it's been tampered with.

The optional GDA-1157-2 Horn Relay adapts the GD-1157 to cars whose horns do not use a relay or use a plug-in relay. The optional GDA-1157-1 Siren Adapter provides an attention-getting "yelping" sound louder than an ordinary car horn. Complete installation instructions included.

1 Kit GD-1157, Shpg. wt. 3 lbs. 24.95

2 Kit GDA-1157-1, Optional Siren Adapter, Shpg. wt. 2 lbs. 19.95

Kit GDA-1157-2, Optional Horn Relay (not shown), Shpg. wt. 1 lb. . . 2.95

GD-1157 SPECIFICATIONS

Exit and Entry Delay Times: adjustable from 5 to 15 seconds. Alarm Device: auto horn or optional siren. Temperature Range: -4° to +140°F. off. Power Requirement: 12 VDC, negative ground only. Current Drain: negligible when system is armed but not triggered. Dimensions: 2 1/2" H x 4 3/4" W x 5" D.

An important new driving FIRST from Heath!

DIGITAL ELECTRONIC MILES-PER-GALLON METER AND DIGITAL SPEEDOMETER



Digital Speedometer — Reads 0-99 miles per hour on amber-orange digital readout

**HELPS YOU
SAVE GAS—
SAVE
MONEY!**

Only **\$99⁹⁵**

**Digital Miles per Gallon Monitor
— Indicates mpg from 0-99.9
AS YOU DRIVE**



This is the years ahead of Detroit kit so many of you have requested and anyone who drives should be looking for! Provides a continuous, instantaneous readout of the relative mpg your car gets, EVERY MINUTE YOU DRIVE! You'll find yourself, automatically, adjusting your driving habits for maximum efficiency ... and that means money in your pocket and energy saved.

AS A MILES PER GALLON METER:

The CI-1078 really helps anyone who drives — especially sales people, truckers, cabbies, deliverymen — it's like having a 24-hour "efficiency expert". It continuously monitors your fuel efficiency, alerting you to poor driving habits which eat up expensive gas. It can even serve as a general overall engine condition indicator — many choke and transmission problems, and other malfunctions, show up first as a significant decrease in gas mileage.

AS A DIGITAL SPEEDOMETER:

At the flip of the front panel switch, the CI-1078 becomes an electronic speedometer with continuous digital readout, providing a better degree of accuracy than most ordinary speedometers. This is a useful feature for constant speed driving, checking acceleration times and determining your car's speed/efficiency/performance ratio.

The CI-1078 digitally reads 0-99.9 mpg or 0-99 mph on bright amber-orange ½" high gas discharge tubes that are easy to see in any light. There's even a dimmer control to adjust the display for comfortable night driving. Good-looking die-cast case with burly-grain vinyl insert. Includes hardware and brackets for mounting in or under dash, or on car's floor "hump".

IMPORTANT NOTICE

Transducer installation requires good mechanical skill and in some instances a certain amount of ingenuity — since every make and model car is different. We cannot supply exact installation information for every car. In some cases you may

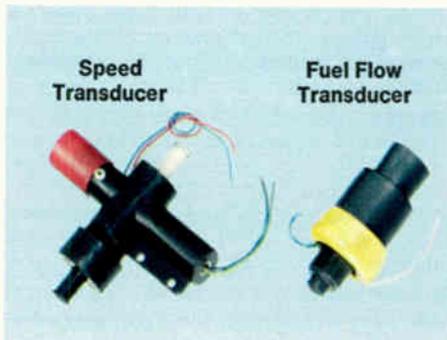
choose to have a qualified mechanic install the speed and fuel flow transducers for you. Heath cannot be responsible for damages, labor charges or replacement parts associated with transducer installation.

FUEL FLOW TRANSDUCER

Mounts in fuel line between fuel pump and carburetor (requires cutting and removal of a section of fuel line).

SPEED TRANSDUCERS

Depending on the make and model of your car, mounts on speedometer (or cruise control on cars so equipped) or at transmission. Includes associated cables, connectors and extensions where necessary. See list below to determine which speed transducer model fits your car. Information not available for car models not listed.



Note: These kits differ only in the speedometer transducer supplied. Order the one below that fits your car.

CI-1078-1. For speedometer cable mounting on: '55-'68 Chrysler Corp. Cars. '55-'71 Chrysler Corp. trucks; '55-'68 GM cars (except Opel); '55-'71 GM trucks (except LUV); '55-'68 Ford cars; '55-'72 Ford Trucks (except Courier); '55-'71 American Motors Cars; '72-'75 Gremlin, Sportabout and Hornet; '55-'66 Studebaker; '55-'75 Jeep; '55-'75 English Ford. For Cruise Control mounting on '69-'75 Chrysler Corp. cars; '69-'75 GM cars (except Opel); '55-'75 Ford cars.

(except LUV); '69-'75 Chrysler Cars; '72-'75 Chrysler trucks.

Kit CI-1078-2, Shpg. wt. 5 lbs. 99.95

CI-1078-3. For transmission mounting on: All Opel cars; '72-'75 Audi; '55-'75 BMW; '55-'75 Mercedes; '55-'75 Fiat; '55-'72 Saab; '55-'75 Volvo. For speedometer mounting on '55-'75 Porsche and VW.

Kit CI-1078-3, Shpg. wt. 5 lbs. 99.95

CI-1078-4. For speedometer mounting on: '69-'75 Ford cars; '73-'75 Ford trucks (except Courier).

Kit CI-1078-4, Shpg. wt. 5 lbs. 99.95

CI-1078-2. For transmission mounting on: '69-'75 GM cars (except Opel); '72-'75 GM trucks

Kit CI-1078-1, Shpg. wt. 5 lbs. 99.95

Charge a kit — no money down on any kit — see page 50 for details.

CALIBRATION

You calibrate the mpg function of the CI-1078 to the characteristics and actual performance of your own car. This is done by manually calculating the average mpg of your car while driving over flat roads. The unit is then set to the known average while operating the car under the same conditions. The CI-1078 will continuously monitor mpg from that reference figure. Readout is always as accurate as your initial calibration.

Speedometer calibration is done in much the same manner. While driving at a constant, known speed, the speedometer calibration control is set to reflect that speed.

CI-1078 SPECIFICATIONS

Display: 3 digits, gas discharge. 0-99.9 miles per gallon. 0-99 miles per hour. Controls: Front — mpg/mph pushbutton switch, display dimmer. Rear — update control, mph calibration, mpg calibration. Speed transducer: DC generator, 0-1.5 volt output with accuracy of 3% of 1 volt. Fuel flow transducer: Photo resistor sensor measures fuel flow, 1.5 to 12 gallons per hour with accuracy ±3% of maximum flow rate. Electronics: Accuracy, ±2% of maximum reading. Temperature Range: 0-60° C operating, -40° to +70° C storage. Power requirements: 10 to 17 VDC at 500 mA; 13.5 to 17 volts required to meet specifications. Display unit dimensions: 1 7/8" H x 5/8" W x 4 3/4" D. Display unit weight: 2 lbs.

ORDERING INFORMATION

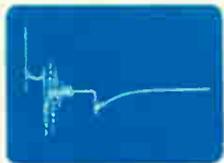
WHEN ORDERING, PLEASE SPECIFY MAKE, MODEL AND YEAR OF YOUR CAR. BE SURE YOUR CAR IS COVERED IN THE SPEED TRANSDUCER LISTINGS. HEATH CANNOT PROVIDE INFORMATION ON OTHER MODELS AT THIS TIME.

12" screen Professional Ignition Analyzer

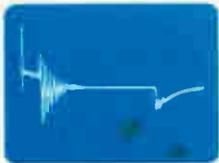


Heathkit CO-2500 puts professional analyzer performance in your shop at up to \$1000 less...kit or assembled

Please allow up to 8 weeks for delivery



Defective coil or condenser



Incorrect dwell time



Distributor cam wobble



Low firing voltage



The CO-2500 requires only four simple connections to an operating engine. Included with the kit is an easily assembled cable with three clamps and a handy inductive pickup for easy connections.

The new Heathkit CO-2500 Ignition Analyzer has everything you need to professionally tune your car's ignition. It does everything any other professional analyzer can do — and more. And it costs up to \$1000 less! It's a complete large screen analyzer in a compact package with all controls Heath-engineered for maximum ease of operation. It will provide all the information you need to tune standard (Kettering) transistorized or capacitive discharge ignition systems — even the high energy systems in new cars. Included are features like automatic cylinder selec-

tion (a Heath exclusive) for correct tachometer readings and Power Balance testing to isolate single cylinder performance. You can test your car's engine for plug and breaker point gaps, defective coil, condenser and plugs...indicate cam wobble and distributor problems...measure dwell angle for easy adjustment...find fouled or shorted plugs...find faulty spark plug wires...indicate incorrect primary or secondary ignition voltage...incorrect power balance...and identify many other ignition electrical problems. Included is an adaptor for use with the new high energy GM ignition systems. The optional timing light allows you to check and adjust ignition timing for maximum performance and economy. The optional alternator adaptor will help identify faulty alternator diodes, windings or stator.

The large 12-inch screen provides a bright trace that can easily be seen from a distance. The screen graticule has easy readability with two calibrated primary and secondary voltage grids and dwell indication for 3, 4, 6 and 8 cylinder or 2-rotor Wankel engines.

Cylinder selection is automatic with the CO-2500. The tach always reads correctly because there's no need to adjust for number of cylinders. The SUPERIMPOSE pushbutton produces a display that represents all of the cylinder patterns simultaneously—one on top of the other. When one of the SINGLE CYLINDER pushbuttons is pressed, the CO-2500 will display only the dwell pattern for that cylinder. The Power Balance feature of the

CO-2500 can quickly pinpoint poor individual cylinder performance due to faulty valves or rings. A complete introduction to ignition analysis is described in the CO-2500 operating manual.

Kit CO-2500, 66 lbs., Exp./Frt. **379.95**
Assembled WO-2500, 63 lbs., Exp./Frt. **695.00**

Timing Light for your "2500"



The COA-2500-1 solid-state timing light plugs into the CO-2500 and provides a flash that is many times brighter than the flash from timing lights

that operate from only the spark plug voltage. Available kit or assembled.

Kit COA-2500-1, Shpg. wt. 3 lbs. **19.95**
Assembled WOA-2500-1, Shpg. wt. 3 lbs. **29.95**

"2500" Alternator Test Adaptor

Adaptor permits display of alternator charging system outputs to determine if the alternator has faulty diodes, shorted windings or shorted stator.

Kit COA-2500-2, Shpg. wt. 1 lb. **5.95**



"2500" Scope Cart

Keeps your CO-2500 mobile. Holds analyzer at just the right height for easy viewing when you're working under the hood. Rugged particle board steel tubing construction bolts together easily.

Kit COA-2500-3, 25 lbs., Exp./Frt. **34.95**

CO-2500 SPECIFICATIONS

Front Panel Controls: Scope: Intensity, Vertical Position, Vertical Gain, Horizontal Position, Trace Length. Secondary volts: 20 kV or 40 kV. Primary Volts: 40 V or 400 V. Parade or Superimpose. Power Balance or Single Cylinder (8 pushbuttons, plus "Cancel"). Tachometer: 1000 rpm, 3000 rpm, or 6000 rpm. Voltmeter: 18 VDC or 36 VDC. General: For Use With: Standard, transistorized, or C-D ignition systems. 3, 4, 6, or 8-cylinder (4 cycle), or 2-rotor Wankel engines. Preset Controls: Focus, Gain, Balance, Hi-Voltage, Tac Cal (Tachometer Calibration). Cables: Inductive pickup for parade and Timing Light Trigger. Direct connection to ground and primary. Calibrated capacitive secondary pick-up. Signal Pickup: Direct for primary, inductive for parade trigger, and capacitive for secondary. Tachometer and Voltmeter Accuracy: $\pm 3\%$ of full scale on any range. Scope Vertical Expand: Minimum 2 to 1. Scope Horizontal Expand: Sufficient to display a single cylinder full screen. Power Requirements: 110/130 or 220/260 VAC, 50/60 Hz. Dimensions: 12 1/2" H x 22 3/4" W x 14 1/2" D.

Heathkit helps you keep the going great



\$159⁹⁵

Optional adapter allows you to use the CO-1015 with GM High Energy Ignitions.



\$64⁹⁵

Diagnose ignition problems on this 5" scope

• Built-in rpm indicator • Clamp-on inductive pickup

The Heathkit CO-1015 Ignition Analyzer detects shorted spark plugs, bad points, defective wiring, worn distributor parts, incorrect dwell time, coil, condenser or transistor or CD circuitry problems. Can be used with any standard, transistorized or capacitive discharge system on three, four, six or eight-cylinder engines. Shows four different patterns — primary or secondary, in either parade or superimposed displays. For detailed analyses, horizontal sweep can be expanded 10 to 1, vertical sweep 2 to 1. With operation handbook.

Kit CO-1015 Shpg. wt. 21 lbs. 159.95
 Kit COA-1015-1, 12V Inverter, Shpg. wt. 4 lbs. 32.95
 Kit COA-1015-2, G.M. HEI adapter, Shpg. wt. 1 lb. 3.00

CO-1015 SPECIFICATIONS

Power Requirement: 120/240 VAC, 60/50 Hz, 16 W. RPM Range: 400-5000. Cylinders: 3, 4, 6 or 8. Vertical Expand: Approx. 2 to 1. Horizontal Expand: Approx. 10 to 1. Sweep Length: $\pm 5\%$ over entire RPM range. Intensity: Fixed. Presets: Focus, Astigmatism, Trigger Adjust, Tac Cal. Connection Cables: 12' pick-up clamp; ground and secondary clip leads extend 2' beyond pick-up clamp. Tachometer: 0-1000 RPM, 0-5000 RPM $\pm 5\%$ of full scale. Dimensions: 7" H x 10 $\frac{1}{2}$ " W x 17 $\frac{1}{2}$ " D.

WO-5104, Wired version of above. 209.95

Deluxe Timing Light flashes brighter than daylight

Handy inductive pickup snaps around #1 plug wire. Bright Xenon bulb. Insulated blue plastic housing. Polarity protected. Comes with all cables, pickup, and clips.

Kit CI-1040, Shpg. wt. 4 lbs. 29.95



CI-1040 SPECIFICATIONS

Useful Light Range: Up to 2 ft. in daylight. Engine Speed Range: Full flash brightness up to 2000 rpm. Triggering: Current pickup coil. Power Requirement: 12 VDC battery or separate 15 VDC power supply. Dimensions: 6 $\frac{1}{2}$ " H x 2" W x 10" L.

Economy Timing Light

Flash can be seen in direct sunlight. Easy to use; connect one cable to battery, the other to spark plug or distributor cap. Insulated housing, polarity protected. With all cables.

Kit CI-1020, Shpg. wt. 3 lbs. 19.95



only
\$19⁹⁵

CI-1020 SPECIFICATIONS

Useful Light Range: Up to 2 feet in daylight. Engine Speed Range: Full flash brightness up to 2000 rpm. Triggering Requirement: Direct connection to number one spark plug of engine ignition system. Power Requirement: 12 VDC battery or 15 volt DC power supply. Size: 6 $\frac{1}{2}$ " H x 2" W x 10" L.

Exhaust Gas Analyzer checks fuel efficiency

Monitors exhaust for minimum pollution & maximum efficiency by measuring thermal conductivity of gases. Shows air-fuel ratio combustion efficiency and percent carbon monoxide.

Kit CI-1080, Shpg. wt. 6 lbs. 64.95

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: 4 $\frac{1}{2}$ ", 100-0-100 μ A. 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.

15-Amp Automatic Battery Charger

Has 50-amp boost. Use on negative or positive ground. Circuit breaker protection.

Kit GP-1044, Shpg. wt. 22 lbs. 57.95



GP-1044 SPECIFICATIONS

Charge Rate at 120 VAC (primary): Boost; 50 amperes (maximum 1 minute). Normal; 15 amperes, decreasing to less than 2 amperes at full charge. Output Voltage: 14.5 volts. Power Requirement: 110 to 130 VAC, 60 Hz. Dimensions: 6 $\frac{1}{2}$ " H x 11 $\frac{1}{2}$ " W x 7 $\frac{1}{4}$ " D.

10-Amp Automatic Charger

Won't start unless correctly connected. Won't overcharge.

Kit GP-21, Shpg. wt. 13 lbs. 36.95



GP-21 SPECIFICATIONS

Charge Rate: 10 amperes maximum at 120 VAC line. Output Voltage: Between 13.2 VDC and 13.6 VDC. Power Requirement: 105-130 VAC, 60 Hz. Dimensions: 5 $\frac{1}{2}$ " H x 9" W x 6 $\frac{1}{4}$ " D.

Save on maintenance with "Can-Do Tune-Up" guides — step-by-step instruction book & cassette tape

A completely new way to handle tuneups — an illustrated booklet gives you all the information you need and a cassette actually "talks you through" the important steps. Each book also includes information on periodic maintenance and a complete troubleshooting chart. For 1964-1974 6 and 8-cylinder engines.

EDP-204, GM vehicles 7.95
 EDP-205, Ford, Lincoln, Mercury vehicles 7.95
 EDP-206, Chrysler, Plymouth, Dodge vehicles 7.95
 EDP-207, VW vehicles 7.95

Automotive Electronics — a look at the state-of-the-art, plus a complete explanation of your car's electrical & ignition system. EDP-162 7.95
 Auto Engine Tune-Up — a complete how-to-do-it guide to car engine tune-up, including carburetion & ignition. EDP-163 6.75

See page 48 for book ordering information.



Want faster service? Order by phone — call (616) 982-3411 day or night.

Cure your car with Heathkit Auto Test Gear



\$42⁹⁵

**Do Your Own
Tuneups and
SAVE**

\$69⁹⁵
Kit



Small Engine Tune-up Meter

Tests volts, ohms, dwell & continuity on 1 to 4 cylinder 2 & 4 cycle engines. Built-in tach, snap-on pickup. Less batteries.

Kit CM-1045, Shpg. wt. 5 lbs. **42.95**

CM-1045 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°. Continuity: Lamp indicator. Operating Temperature Range: 0°F-140°F with alkaline batteries. 32°F-140°F with zinc-carbon batteries. Meter Accuracy: Ohmmeter: ±3 degrees arc at 76°F, ±5 degrees arc at 0°F and 140°F. Other functions: ±3% at 76°F, ±5% at 0°F and 140°F. Power Source: Three 1.5 V C batteries. Dimensions: 9 1/2" H x 9 3/4" W x 5 1/4" D.

Deluxe low-cost Engine Analyzer

This professional-grade instrument tests conventional, magneto, transistor, and most capacitive discharge ignition systems, regardless of voltage or grounding, on any 3, 4, 6 or 8-cylinder engine. It permits rapid servicing of storage battery, generator or alternator, voltage regulator, starter, distributor, ignition circuit (points, condenser and coil), accessories and all electrical wiring. The large 6" meter is color coded for easy-reading. Unlike most other analyzers, there is no need to recalibrate between functions. Accuracy is ±3% on all ranges over a wide temperature range. Operates on 3 "C" cells (not supplied). With leads, accessories.

Kit CM-1050, Shpg. wt. 8 lbs. **69.95**

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 kΩ 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 Supplied: Two 8' two-conductor test cables. One 2' alligator to alligator lead. One 2' alligator to push-on connector lead. One calibration cable. Accessories Supplied: 90-ampere shunt. 0.25 Ω resistor assembly. One insulation-piercing alligator clip. Two #10 solder lugs. (#14). Dimensions: 7 1/2" H x 10 1/2" W x 8 3/4" D.

GM Voltage Regulator-Tester

Shows condition of all 4 circuits in the GM Integral Charging System regulator. Optional test leads for under-hood testing.

CTW-1170, assembled form, 15 lbs. . . **99.95**

CTW-1170-2, optional external leads, Shpg. wt. 1 lb. **6.00**



CTW-1170 SPECIFICATIONS

Test Voltage: 16.5 VDC. Sense Voltage: Adjustable 0-17 VDC. Voltmeter: 0-20 VDC ±3%. Short Circuit Current: 0.1A. Power Requirement: 120 VAC, 60 Hz, 150W. Case: Aluminum. Dimensions: 7" H x 11" W x 7" D.

Hanson Basic Tester Set

Helps you keep your car in top shape! Includes Model 714 Remote Starter Switch, Model 715 Deluxe Compression Tester, Model 709 Vacuum & Fuel Pump Tester. "Must" tools for every professional and amateur.

CGP-1036, Assembled. Shpg. wt. 3 lbs. **11.95**



\$29⁹⁵

Three-In-One Tuneup Meter

Three automotive test instruments in one. Measures dwell on most 4-cycle 3, 4, 6 and 8-cylinder engines having conventional (Kettering) ignitions. Shows RPM on two scales — 0-1500 and 0-4500. Checks voltage from 0 to 15 volts. It can be used with

both 6 and 12-volt systems having either positive or negative ground. It has just two leads and uses no batteries.

Kit CM-1073, Shpg. wt. 5 lbs. **29.95**

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: 4 1/2". 1 mA (100 degree movement). Accuracy: ±3% of full scale. Dimensions: 4 1/4" H x 8 1/2" W x 7 1/4" D.

Using Electronic Testers for Automotive Tune-Up — ideal companion to Heathkit electronic tune-up tools. **EDP-165** **4.95**

Modern Guide to Auto Tune-Up and Emission Control Servicing — tells in plain language how to tune your car for best gas mileage and lowest emissions. **EDP-166** **5.95**

Auto Repair Manual — Chilton's famous classic, covers U.S. cars 1967 to 1975. **EDP-168** **11.95**

Small Gasoline Engines Training Manual — theory, design & operation of every domestic & foreign made engine — 2 & 4 stroke plus rotary (Wankel). **EDP-169** **7.50**

Small Engines Service Manual — has all info needed to service small engines. All popular makes covered. **EDP-170** **7.95**

How to Repair Small Gasoline Engines. Covers lawn mowers, chain saws, motorcycles, etc. **EDP-188** **5.95**

See page 48 for book-ordering information.



Garage Door Openers Are Year 'Round Work-Savers

Build the best!... Heathkit deluxe Garage Door Opener

Touch the button on the wireless transmitter in your car — your garage door opens and the light turns on. Touch the button again, the door closes, and the light stays on long enough to see you safely inside your house. Door travel reverses, returns to full open if it is obstructed while closing. Adjustable slip clutch provides opening safety. Self lubricating screw drive & husky 1/3 hp motor assure quiet dependable operation.

Assembly couldn't be easier, most of the work is already done for you. The transmitter and receiver are fully wired, so there's absolutely no soldering! The connecting leads are cut to the proper length with push-on connectors already installed. A doorbell-type button and connecting wire are included for manual use.

- Kit GD-3209A, System with 1 transmitter, Shpg. wt. 49 lbs. **149.95**
- Kit GD-3209B, System with 2 transmitters, Shpg. wt. 49 lbs. **164.95**
- Kit GDA-3209-1, Mechanism only, Shpg. wt. 47 lbs. **114.95**
- Kit GDA-3209-2, Adaptor for jamb & pivot doors, Shpg. wt. 3 lbs. **9.95**
- GDP-99, Transmitter, specify frequency, Shpg. wt. 1 lb. **19.95**
- GDP-119, 1 transmitter, 1 receiver, Shpg. wt. 1 lb. **39.95**
- GDP-129, 2 transmitters, 1 receiver, Shpg. wt. 2 lbs. **54.95**

\$149⁹⁵



- **Stop Fighting Heavy Garage Doors in Bad Weather**
- **Extra Safety Too — Stay in your car until you're safely in the garage**
- **75-Watt light stays on until you're safely in the house — then turns itself off — automatically**
- **Easy to install — transmitter and receiver are completely pre-wired**
- **Safety-Reverse Feature — Door instantly reverses and returns to full open if obstructed**



Permanently-installed up/down limiters — no special tools needed.



Rugged plastic case with built-in time-delay safety light.



Powerful 1/3 hp motor easily opens the heaviest residential doors.



Self-lubricating screw drive for reliable, maintenance-free operation.

GD-3209A SPECIFICATIONS

Overall size: 120" L x 12" H x 9" W. Motor: 117 VAC 1/3 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 Frequencies: 290 to 320 MHz. Useful Temperature Range: -50°F. to +140°F. UHF RECEIVER: Powered by 24 VAC from opener mechanism. Usable on any mechanism having 24 volt AC NEC class II circuit. RF Frequencies: 290 to 320 MHz. Temperature Range: -55°F. to +140°F.

Build and install this "economy" chain-drive opener over the weekend



\$119⁹⁵

- **For standard 7 1/2' track doors**
- **Optional adaptors available for jamb and pivot doors or "California" style doors**
- **Safety-Reverse Feature — Door instantly reverses and returns to full open if obstructed**
- **Factory-assembled transmitter and receiver**

A powerful quarter-horsepower chain-drive opener at a great kit price! The GD-309 operates standard 7 1/2' track doors or jamb and pivot doors with GDA-309-2 adaptor, or "California" style doors with GDA-309-3 Speed Reducer Adaptor. Self-locking, automatic reversing, Quick-release pin. Factory-assembled receiver has adjustable tone encoding to prevent interference from neighboring units. Includes "doorbell" button & wire for manual door operation.

- Kit GD-309A, System with 1 transmitter, Shpg. wt. 51 lbs. **119.95**
- Kit GD-309-B, System with 2 transmitters, Shpg. wt. 51 lbs. **134.95**



Portable transmitter comes factory-assembled with a range of up to 150'. (For use with Heathkit systems only.)



Solid-state UHF Receiver comes factory assembled & adjusted.

- Kit GDA-309-1, Mechanism only, Shpg. wt. 52 lbs. **89.95**
 - Kit GDA-309-2, Adaptor for jamb & pivot door, Shpg. wt. 3 lbs. **4.95**
 - Kit GDA-309-3, Adaptor for vertical-opening 1-pc. "California" style doors, Shpg. wt. 4 lbs. **9.95**
- (To order additional transmitters & receivers, see listing under GD-3209A above.)

GD-309A SPECIFICATIONS

Overall Sizes: 123" L x 10" H x 8 1/2" W. Motor: 120 VAC 1/4 HP. Open and Closing Time: Approx. 9 sec. for 7' door. Control: Wall-mounted, doorbell-type push-button switch, or optional devices (transmitter-receiver, key switch, etc.). Safety: Door travel reverses instantly and returns to full open position when obstructed. Overhead Mounting Clearance: 2 1/2" above highest point of door travel. Safety Lamp: 60 watts. Automatically turns on when the door is fully open and stays on until door starts to close. Transmitter and Receiver Specifications: Same as GD-3209A above.

Make Your Car, Boat or Plane Safer

\$39⁹⁵

Build them both for a top-performing, totally electronic ignition system!

\$44⁹⁵



Heathkit CD Ignition System

Gives improved performance, saves plugs, points, delivers up to 50,000 miles between tune-ups on cars, trucks, inboard I/O & out-board marine engines with conventional 12V battery/distributor/coil negative ground systems. Assures fast, sure starts in any weather, improved gas mileage! External override button switches to conventional system. Build it in a couple of hours, install in less than that. Mounts in wheel well or other convenient spots. Measures 3 1/8" H x 3 3/4" W x 6" D. Not recommended for 1974 and 1975 cars in the state of California.

Kit CP-1060, Shpg. wt. 3 lbs. 39.95

Breakerless Ignition Adaptor

Develops a timing signal that isn't subject to mechanical problems of point wear and bounce, maintains timing correctly at all speeds and for longer periods. Designed for use with capacitive-discharge ignition systems only (such as Heathkit CP-1060) the CP-1051 replaces the points of all pre-1975 GM V-8 and V-6 engines, and all AMC V-8s with external dwell adjustment (not for other models). The easy-to-build unit mounts inside engine compartment; sensor mounts inside the distributor, without removing points. Switch returns engine to normal.

Kit CP-1051, Shpg. wt. 2 lbs. 44.95



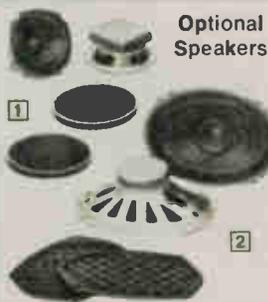
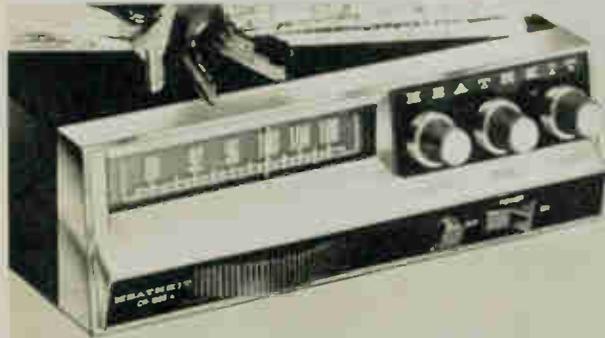
Heathkit Windshield Wiper Delay

Eliminates turning wipers on and off while driving in fog, mist, or light rain. A front panel control gives you selection of "normal" and "delay" modes. A preset control varies the number of sweeps, the front panel control varies delay time. An easy kit to build. The handsome one-piece molded plastic case mounts on or under the dash with adhesive strip or bracket. See compatibility specifications below.

Kit CH-1068, Shpg. wt. 2 lbs. 15.95

CH-1068 SPECIFICATIONS

Delay interval: 5 to 30 seconds minimum. Sweeps interval: 5 to 10 seconds minimum. Input voltage: 13.8 volts DC, ±20%. Positive or negative ground. Temperature range: -30°C. to 65°C. -22°F. to 149°F. Wiper System Compatibility: (Electric Only) GM All single and two speed systems. Ford. Most small and intermediate models. Not compatible with full size models or '72-'75 Torino, or Montego, '74-'75 Cougar. Chrysler. Single and two speed systems on small and intermediate models which do not use a motor reversing parking system. Ask dealer about your car's system. AMC Single and two speed systems. Other models. Electric wipers which do not use a motor reversing parking system.



Optional Speakers

Build this "Better" Heathkit Car Stereo FM Tuner

Enjoy stereo FM entertainment as you drive, with excellent fidelity. The improved Heathkit CR-1000A FM Stereo Tuner features a new Phase Lock Loop demodulator and improved circuit layout to bring you greater stability and separation, better AM rejection, and easier kitbuilding through simplified alignment procedures. Great specs too—less than 1% THD; frequency response ±1 dB, 30 to 15,000 Hz; 3 μV sensitivity; 60 dB selectivity; 40 dB nominal separation. Other features are: muting circuit for noise quieting between stations; AFC; Tuning, Volume, Tone & Balance controls; on-off switch; stereo indicator light. Requires power amp. (right) for operation.

Kit CR-1000A, Shpg. wt. 7 lbs. 69.95

Kit CRA-1000-1, Power amp., fits back of tuner, for 12V battery. Shpg. wt. 3 lbs. 29.95

1 CRA-1000-2, 4 1/2", 4-ohm door-mount hi-fi speakers (including grilles, adapter plates for most speaker size openings and 24' speaker lead). Shpg. wt. 6 lbs. (pair) 14.95

2 CRA-1000-5, 6"x9" 4-ohm rear deck mount hi-fi speakers (including grilles and 24' speaker lead). Shpg. wt. 7 lbs. (pair) 21.95



With Case



Panel Mount

Solid-State Tachometer Kit

Indicates engine rpm, helps you determine shift points for best engine performance and efficiency. Build it for 6000 or 9000 rpm range, use it on 1-6 cyl., 2 cycle or 2-8 cyl. 4 cycle engines; 12V conventional, magneto, transistor or capacitive discharge ignition. Triggers from points or inductive pickup supplied. Wide angle 250° edge-lighted dial with white indicator, adjustable pointer, non-scratch glass face, black & chrome case or panel mount (panel mount requires 3 1/4" hole, 2 1/4" deep.)

Kit MI-18-1, panel model, Shpg. wt. 3 lbs. 34.95

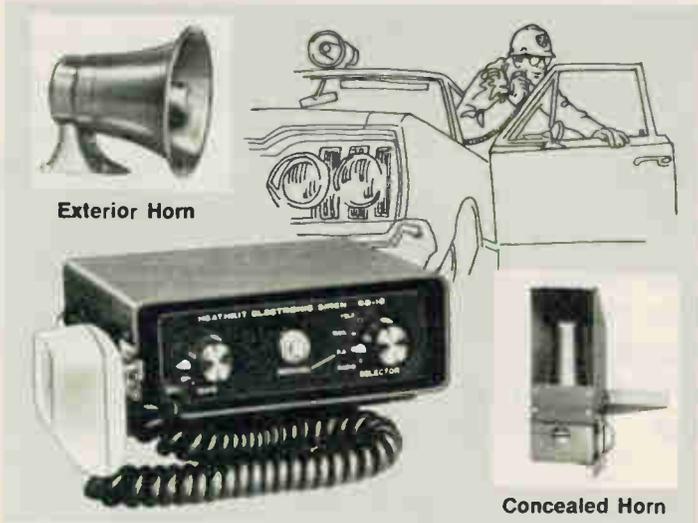
Kit MI-18-2, with case, Shpg. wt. 3 lbs. 39.95

Find out about the latest in Ignition Systems

Solid-State Ignition Systems — explores all known commercially available methods, including Capacitive Discharge and breakerless systems; covers servicing and troubleshooting techniques. EDP-185 4.50

See page 48 for book-ordering information.

and More Enjoyable with These Heathkit Accessories



Exterior Horn

Concealed Horn



Optional lenses offer added versatility to the OL-1155.



Kit or Assembled Siren/PA System

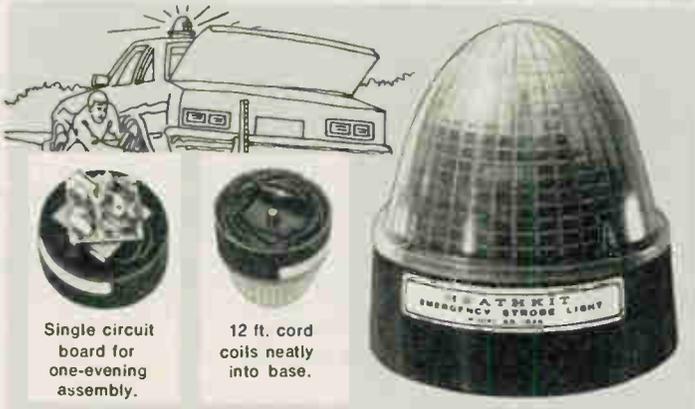
Heathkit Siren/PA System works as electronic siren at 55 watts; adjustable pitch. Packs 20 watts into a booming PA system; lets you hear radio calls away from your vehicle. Choice of speakers, concealed or exposed horn. Concealed speaker requires 4½" x 4½" x 13" behind grille. NOTE: Please check the required standards for mobile sirens in your area.

Kit GD-18, Shpg. wt. 6 lbs.	64.95
Assembled WD-5130, siren/PA amp, Shpg. wt. 6 lbs.	89.95
Assembled GDA-18-1, exterior horn, Shpg. wt. 10 lbs.	62.95
Kit GDA-18-2, concealed horn, Shpg. wt. 10 lbs.	62.95
Assembled WDA-5130-2, concealed horn, Shpg. wt. 10 lbs.	74.95

Buy a complete system and SAVE \$7.95

If purchased separately, \$127.90 Shpg. wt. 16 lbs.

GD-18A (GD-18 & Exterior Horn)	119.95
GD-18B (GD-18 & Concealed Horn)	119.95



Single circuit board for one-evening assembly.

12 ft. cord coils neatly into base.

Heathkit Emergency Strobe Light provides extra safety for nighttime driving

The Heathkit GD-1026 Emergency Strobe Light is a portable high-intensity arc discharge flasher specifically designed as a highway emergency warning or signal light. Just insert the adaptor plug provided into your car's cigarette lighter. A 12 ft. cord lets you place the flashing light in any spot on the car. Has non-marring magnetic base plate, highly visible flashing strobe with amber dome lens. The entire unit is constructed of high impact plastic that is both moisture and corrosion resistant. And the cord coils neatly into the base so that the unit can be stored away in the trunk, ready for instant use.

Kit GD-1026, Shpg. wt. 3 lbs.	29.95
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GD-1026 SPECIFICATIONS

Supply voltage range: 13.8 VDC ±20%. Power consumption: 5 watts nominal. Flash voltage range: 450 VDC ±20%. Flash repetition rate: greater than 1 per sec. Operational temperature range: -30°C to +60°C.

Heathkit Aircraft Strobe Light for aircraft, emergency vehicles, boats, markers

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 3¼" rotating beacons. As an aircraft strobe light, the OL-1155 meets all requirements set forth in the Federal Air Regulation No. 23.1401 regarding Aircraft Anti-Collision Lighting. It operates from a 12 VDC negative ground supply. Average light output: 225 effective candle power. An internal adjustable trimmer lets you vary the flashing frequency of the strobe.

Ideal for marine foul-weather anti-collision protection; atop antennas and tall buildings; a highly visible marker light. Optional amber, red or blue lenses, below, for emergency vehicles or special applications.

Kit OL-1155, (with clear lens), Shpg. wt. 3 lbs.	64.95
*OLA-1155-1, Red/clear lens, Shpg. wt. 1 lb.	11.95
*OLA-1155-2, Red lens, Shpg. wt. 1 lb.	8.95
*OLA-1155-3, Amber lens, Shpg. wt. 1 lb.	8.95
*OLA-1155-4, Blue lens, Shpg. wt. 1 lb.	8.95

*Does not meet FAA requirements for Aircraft Anti-collision use.

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.

NEW! OLA-1155-5 Strobe Light Filter

Necessary accessory for the OL-1155! Reduces interference to aircraft radios caused when OL-1155 is operating. Present OL-1155 owners can incorporate it in their units with just a few simple connections.

OLA-1155-5, Shpg. wt. 2 lbs.	12.95
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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 requirement: 12 VDC negative ground only, 1.5A. Dimensions: 6" H x 3¼" diameter (mounting plate — 5½" diameter).



Heathkit Cab-to-Camper Intercom

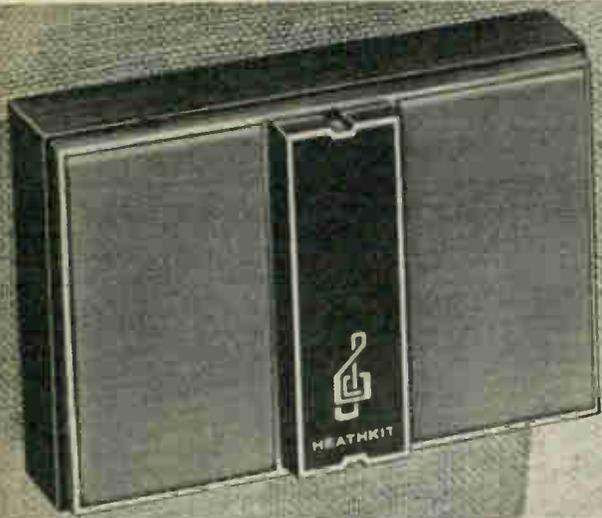
3-position switch on Master selects "Stand-By", "Monitor", "Talk" modes. Remote has "Radio" position to bring music into camper from cab radio. Both Master and Remote can initiate calls. Requires 12-volt, 250 milliamp DC power source.

Kit GD-160, Master, Remote and cable, Shpg. wt. 5 lbs.	29.95
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GDA-160-1, Accessory Plug, Shpg. wt. 1 lb.	4.50
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Find out how easy it is to build a kit — order the manual. See page 49.

Welcome friends with their favorite tune



Heathkit Electronic "Doorbell" is one of our most unique kits... you program it to play your favorite tune

\$44⁹⁵

What an exciting way for visitors to announce themselves...your favorite melody plays when they touch the door button. Use as many as 16 notes to program your favorite tune. Change it whenever you wish...program to celebrate a season, an anniversary, a birthday, even a special party. And the TD-1089 tells you whether a visitor is at the front or rear door by the length of the tune.

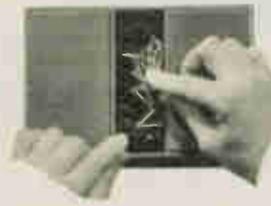
Changing your tune is easy. Just rearrange the programming leads in the connectors of the C through C' "keyboard" located behind the front-panel access door. The assembly manual includes programming instructions for a variety of tunes, or you can compose your own. Controls for tuning, volume, speed,

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. And installation is easy too, just wire between existing bell transformer and TD-1089. The attractive brown plastic cabinet with dull-gold color trim and tan fabric panels is included in the kit.

The TD-1089 is loud enough to be heard throughout normal size homes, but you can add extra 16-ohm speakers to the "extension" terminals and spread the sound to other areas.

Kit TD-1089, Shpg. wt. 3 lbs. 44.95



The TD-1089 is easy to program. Just remove the decorative front panel to change programming leads and make adjustments.

TD-1089 SPECIFICATIONS

Power Requirement: 16 Volts AC, 50/60 Hz, from standard doorbell transformer (not supplied) with 10 VA Rating. Tone Characteristics: Decaying, mellow. Maximum Power Into Speaker: 1 watt. Speaker Size: 3" x 5" oval - 16 Ohm. Actuating Inputs: Two, for front and rear doors. Programming Matrix: 13 notes x 16 beats - same note up to 9 beats. Dimensions: 5 1/4" H x 8 3/8" W x 2 3/8" D. Net Weight: Approx. 1 1/2 lbs. Power Drain: Idle, 6 watts, Maximum Output, 12 watts.

Heath-approved tools for easy building



1 Heathkit 3-heat soldering iron kit. Handy stand with metal cage keeps iron safe and secure. 3 heat ranges for all types of circuit work. Comes with six foot cord. Operates on 120 VAC. Kit GH-17A, Shpg. wt. 4 lbs. 22.95

2 Weller W-PS 25-watt pencil soldering iron. Lightweight and convenient. 1/8" chisel tip develops 860° heat fast, ready to work in seconds. U.L. and C.S.A. Approved. Model GDP-207, Shg. wt. 1 lb. 7.95

3 New Illuminated Magnifier. Fluorescent lighting & 5" dia. 3 diopter lens take the strain out of close work at your bench. Clamps to horizontal surface; 360° movement; 45" reach. Requires 22-watt T-9 Circline Fluorescent tube (not included). Gray color. Kit GDP-200, Shpg. wt. 7 lbs. 39.95

4 Heath solder/de-solder set. Weller W-PS 25-watt pencil soldering iron that develops 860°. Includes de-solder squeeze bulb with heat and solder-resistant nozzle. GDP-1009, Shpg. wt. 1 lb. 9.95

5 Kitbuilders' tool set. Includes combination wire stripper and diagonal side cutter; small long-nose pliers; three screwdrivers (3/8", 1/4", 3/16"); Weller W-PS soldering iron; five nut drivers (3/16", 1/4", 5/16", 3/8", 1/2"); nut-starter; soldering aid; solder, and information-packed "Kitbuilders Guide." Model GH-25, Shpg. wt. 3 lbs. 27.95

6 Heathkit motor speed control. Saves power, blades, bits, saws, etc. You can use a large drill to cut through steel at slow speed without overheating the motor. Ideal for use with any universal motor with nameplate rating of 15 amps or less. (Not for use with Dremel tools.) Kit GD-973A, Shpg. wt. 2 lbs. 19.95

7 Nut driver set. Seven drivers for most commonly used nut sizes; 3/8", 1/4", 5/16", 3/8", 1/2", 5/8" and 3/4". Plastic handles are color-coded for quick identification. Model GDP-204, Shpg. wt. 2 lbs. 10.95

8 Workbench extension lamp kit. The extension arm comes already assembled. All you do is attach the socket, shade and cord. Lamp features a 34" reach and 360° sweep; vented shade, and movable base clamp. Incandescent bulb not included. Kit GDP-202, Shpg. wt. 4 lbs. 16.95

The basic kitbuilding tool is the soldering iron — this book tells you how to use it like a pro.

ABCs of Electrical Soldering — a how-to book for the beginner, a review for the technician; tells what soldering is and does, how to solder and how to make solder repairs.

EDP-178 3.95

See page 48 for book-ordering information.

Build yourself value you can count on!

1 8-digit desktop slide-rule calculator

\$79⁹⁵

Performs all these functions:

sine	powers of e	pi
arc sine	common logarithms	addition
tangent	natural logarithms	subtraction
arc tangent	exponential powers	multiplication
cosine	square roots	division
arc cosine	inverses	

The IC-2100 fits where most people use a slide-rule calculator—on a desk. Easy to use with sloped keyboard and contoured, well-spaced keys. Beckman planar gas discharge digits are specially angled to reduce glare and provide maximum visibility. 12 white keys perform two functions. Normally they enter numbers, but, press the Function key and they trigger the transcendental functions. Forget to press the Function key? —DR key removes inadvertent entered digit without erasing entire entry. Four memory keys allow you to enter or add to a number already in the memory, recall the memory to the working display, interchange the memory and working displays or clear the memory. Single entries can be carried through a long series of calculations as a constant. Operates on 120 or 240 VAC.

Kit IC-2100, Shpg. wt. 4 lbs. Originally 119.95, NOW ONLY 79.95

2 Four-function Heathkit desktop calculator

\$29⁹⁵

Easy-to-read, 1/2"-high Beckman planar gas-discharge tubes in an 8-digit display. Sloped keyboard to let you rest your entire arm while operating the calculator. Constant key (K) simplifies repetitive problem solving. Separate equal key (=) permits entering computations as you would write them out, totaling up as you go, or working in a chain manner. Display has individual lighted indicators for entry and result overflow. A negative number sign provides credit-balance capability. Reciprocals (1/x) are quickly found using the constant, divide and equal keys. Floating decimal. IC-2108 lights up instantly. The kit is easy to build, single LSI related and only 3 circuit boards. Can be wired for 120/240 VAC. Measures 2 1/4" H x 7" W x 9 5/8" D.

Kit IC-2108, Shpg. wt. 4 lbs. was 64.95, NOW ONLY 29.95

3 Calculator "package" goes with you

\$49⁹⁵

Lowest price ever on this calculator "package"; IC-2009 calculator originally 92.50; carrying case originally 3.95; desk set originally 12.95 — original total value of 109.40 now "package-priced" at only 49.95 complete. Operates on internal rechargeable ni-cad battery; or plugs into charger; or use it with desk set's built-in charger. Calculator adds, subtracts, multiplies, divides. Floating decimal; chain operation; credit balance with plus & minus results; constant key (K). Battery saver circuit turns off display after 15 seconds...recall display by depressing recall key (D) or by entering new information. Calculator measures 5 1/2" H x 3 3/4" W x 1 3/4" D. Executive Desk Set measures 2 1/8" H x 8 1/2" W x 8 3/4" D. Naugahyde® carrying case with felt lining and zipper closure. Battery is supplied.

ICL-2009, includes calculator kit & charger, Executive Desk Set with charger, and carrying case, Shpg. wt. 7 lbs. NOW ONLY 49.95

SAVE \$40



SAVE \$35



SAVE \$59⁴⁵

Electronic Calculators — memories, displays, design, fabrication, selection, interfacing with hard-copy equipment, servicing. EDP-179, 5.95

99 Ways to Know & Use Your Calculator — compute complex functions and solve complicated problems with a 4-function calculator. EDP-208 5.95

Getting the Most Out of Your Electronic Calculator — a calculator math course with dozens of practical examples. EDP-132 4.95

See page 48 for book-ordering information.

Heathkit Electronic Darkroom Timer helps you develop better pictures

A "must" for every well-equipped darkroom — a true electronic timer with no moving parts to reduce reliability or accuracy. The PT-15 provides accurate exposure for all contact printers and enlargers with two switch-selected ranges — up to 99 seconds in 1 second steps or up to 9.9 seconds in 0.1 second steps. A time/focus switch turns the safelight off when focusing and printing. Repeatable exposure with 2% accuracy.

Kit PT-15, Shpg. wt. 4 lbs. 36.95



No moving parts — **\$36⁹⁵**
high accuracy

Find out how easy it is to build a kit — order the manual. See page 49.

Build MORE FUN into your boating with

These useful accessories will assure you of



Heathkit Digital Depth Sounder

\$149⁹⁵

Prevents running aground — lets you know depth of water below you from 2-199 ft.

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. A single knob controls power on/off and brightness of the readout digits. Regulated power supply maintains accuracy over wide range of DC voltages. Cyclocac[®] case; gimbal mounting bracket; 15 feet cable for through-hull installation, 25 feet for transom mount.

- Kit MI-101-1, With through-hull transducer,**
Shpg. wt. 7 lbs. **149.95**
- Kit MI-101-2, With high speed transom transducer,**
Shpg. wt. 6 lbs. **149.95**

MI-101 SPECIFICATIONS

Sounding frequency: 200 kHz. Sounding rate: Maximum of 11/sec. on both ranges for a total of 22/sec. Normal rate of approx. 1/sec. Accuracy: $\pm 2\%$, ± 1 digit. Current drain: 300-500 mA. Power requirements: 10-17 VDC @ 500 mA. Transducer: Barium titanate ceramic element encased in splashproof housing. Dimensions: 2 1/4" H x 6 5/8" W x 8 1/2" D (less gimbal hardware).



Heathkit Dual-Range Depth Sounder

\$99⁹⁵

Switch selected 0-60 ft. and 0-240 ft. readings for extra accuracy and precision.

Shows depth, type of bottom, even schools and individual fish, submerged objects. A high-pitched "beep" alerts you to shoals or objects projecting above any preselected depth from 5 to 240 ft.

Electronically controlled silent-running motor; fixed noise rejection circuit to eliminate ignition interference; diode protection against accidental polarity reversal. Water-resistant Cyclocac[®] cabinet has a glare-free bezel and integral sun shield. Super-bright neon indicator light stands out even in bright sunlight. The gimbal mount and quick-disconnect power and transducer leads allow for easy removal when your boat is not in use. Kit goes together easily in about four evenings.

- Kit MI-1031-1, sounder with thru-hull transducer & 15' cord,**
Shpg. wt. 8 lbs. **99.95**
- Kit MI-1031-2, sounder with transom transducer & 25' cord,**
Shpg. wt. 7 lbs. **99.95**

MI-1031 SPECIFICATIONS

Frequency: approx. 200 kHz. Accuracy: Within 2% of actual depth. Transducer: Barium titanate ceramic element encased in splashproof housing. Power requirements: 0-60' range, 225 mA @ 11-15 VDC; 0-240' range, 125 mA 11-15 VDC with one return pulse. Dimensions: 6 1/2" H x 5 3/4" W x 7 1/4" D.

Make your presence known with this 4-function Foghorn/Hailer



\$99⁹⁵

Combines a foghorn, hailer, boathorn and intercom in a single, inexpensive package.

The Heathkit MD-19A features a husky 55-watt amplifier; foghorn rate and duration controls; separate "listen" & "hail" gain controls; optional remote speaker for ship's intercom use. Kit is easy to assemble, and includes low-profile weather-resistant deck horn, 20 ft. speaker cable, gimbal mount. Styled in marine white with blue trim. Operates on your

ship's 12 VDC power system, positive or negative ground.

- Kit MD-19A, with horn speaker,**
Shpg. wt. 15 lbs. **99.95**
- Kit MDA-19-1, remote speaker,**
Shpg. wt. 2 lbs. **11.95**

MD-19A SPECIFICATIONS

Boathorn frequency: Approx. 530 Hz. Foghorn frequency: Approx. 390 Hz. Foghorn rate: Approx. 2-90 sec., variable. Foghorn duration: Approx. 2-20 sec., variable. Microphone: Ceramic with push-to-talk switch. Power requirements: 12 VDC nominal, 4.5 A max. Dimensions: 4 3/4" H x 9 3/4" W x 9 3/4" D. Color: White wrinkle and dark blue.

Heathkit marine Electronics

a safer, more rewarding boating season!



Heathkit economy Depth Sounder

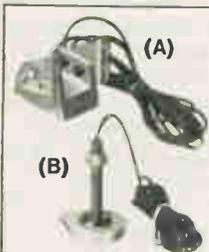
\$69⁹⁵

Has the same advanced circuit as the MI-1031, but with single range (to 240 ft.), no alarm.

Same features as MI-1031, but single range and no alarm.

Kit MI-1030-1, sounder with thru-hull transducer & 15' cord, Shpg. wt. 8 lbs. **69.95**

Kit MI-1030-2, sounder with transom transducer & 25' cord, Shpg. wt. 7 lbs. **69.95**



Your Choice of Transducers

These depth sounders are available with either through-the-hull or transom-mount transducers. The transom mount unit (A) is recommended for high-speed craft with planing hulls. The through-the-hull transducer (B) is ideal for a permanent mount on large boats with displacement hulls.

Heathkit Digital Radio/Direction Finder

Originally **\$239⁹⁵** NEW LOW PRICE! **\$199⁹⁵**

Digital readout pin-points AM or beacon stations — no more waiting for station identification.

Find your way with the versatile Heathkit MR-1010! It keeps you informed on the 190-410 kHz LW band and standard AM. It identifies stations with a digital frequency readout, and gives you a heading from its big easy-read azimuth ring marked in 2° increments! Has excellent sensitivity, lighted meter for accurate null indications, telescoping sense antenna for an impressive bearing accuracy of ±3°. Operates from your boat's 12 VDC system, or its own built-in power source (6 "D" cells; not included). Battery-saver display cuts off after 20 seconds, can be recalled instantly.

Kit MR-1010, Shpg. wt. 14 lbs. **199.95**

MR-1010 SPECIFICATIONS

Bands: 190-410 kHz (LW); 535-1605 kHz (AM). Sensitivity: Typically 30 μV/m (LW) for 10 dB S+N/N. IF Frequency: 453 kHz. Selectivity (6 dB points): 3 kHz (LW); 5 kHz (AM). Readout Accuracy: ±2 kHz. Audio Output: 1 watt. Speaker: built-in 3x5". Current Drain: 450 mA (with display & meter); 140 mA (meter only); 30 mA (radio at typical listening level). Dimensions: 7¼" H x 11½" W x 12" D.



\$39⁹⁵

Economy power inverter

Operates many small appliances from 12-volt input. Supplies 117 VAC square wave, up to 175 watts continuous. Not for equipment with high starting current or sine wave AC. 25-amp fuse.

Kit MP-10, Shpg. wt. 8 lbs. **39.95**

Heathkit Fuel Vapor Detector... detects deadly gas fumes in your bilge



With enclosed sensing element, 15' cable.

\$74⁹⁵

Gives a meter indication of safe-dangerous — explosive conditions in your bilge, sounds an audible alarm when gasoline fumes are present. Solid-state circuit has fail-safe provision that triggers alarm should any component fail. Built-in relay circuits control bilge blower or additional warning devices.

Kit MI-25, Shpg. wt. 3 lbs. **74.95**

MI-25 SPECIFICATIONS

Voltage: 12 VDC, ±10%. Current: 1.0 A nominal. Panel size: 2¼" H x 5¼" W. Depth: 5". Detector head size: 1½" round x 2½" long. Length of interconnecting cable supplied: 15'. Color: Marine white & black. Material: Aluminum. Temp. range: -30°C. Audio alarm: 2500 Hz.



An important safety accessory for EVERY powered craft!

Charge a kit — no money down on any kit — see page 50 for details.

Winning Anglers Demand Heathkit Gear



Heathkit Dual-Range Spotter sounds off when they're below

\$99⁹⁵

All solid-state circuitry for improved sensitivity, dependability and minimum battery drain

The Heathkit MI-2901 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; bright neon-flasher for precise depth reading; noise rejection circuitry to eliminate engine ignition interference. Rugged aluminum cabinet. The transducer features a barium titanate ceramic element encased in a durable waterproof housing for good protection. Portable suction-cup transducer bracket. Powered by two 6-volt lantern batteries (not supplied).

Kit MI-2901, Shpg. wt. 9 lbs. 99.95
 Kit MIA-2900-1, Scanning Transducer Bracket, Shpg. wt. 4 lbs. 19.95

\$19⁹⁵

Heathkit Scanning Transducer Bracket

Designed for use with Heathkit MI-2901 and MI-2900 Fish Spotter® sounders. "C" clamp mounting. Scans 360°, locks in any position. Accepts any 1 1/2" cylindrical transducers. Kit MIA-2900-1, Shpg. wt. 4 lbs. 19.95

MI-2901 SPECIFICATIONS

Accuracy: ±2% with motor speed of 2400 rpm in the 0-60' range and with motor speed of 600 rpm in the 0-240' range. Sounding: Rate: 40 times per second on the 0-60' range. 10 times per second on the 0-240' range. Frequency: 200 kHz, ±5%. Noise Rejection: Fixed at approximately 500 microseconds integration time. Receiver Sensitivity: 75 μV nominal at 200 kHz. Depth Indication: Neon lamp flashes at zero and again at the indicated depth from the object. Alarm: 5-59' on the 0-60' range. 5-239' on the 0-240' range. Transducer Cable Length: 15'. Power Requirements: 12 VDC. Dimensions: (Less Handle): 7" H x 6" W x 11" D.

MI-2900 SPECIFICATIONS

Accuracy: ±2% @ 240 rpm. Sounding: Rate: 20 times per second. Frequency: 200 kHz ±5%. Noise Rejection: Fixed at approximately 500 microseconds integration time. Receiver Sensitivity: 75 μV nominal at 200 kHz. Transducer: Barium titanate ceramic element encased in a durable waterproof housing. Transducer Cable Length: 15'. Power Requirements: 12 VDC, 2 6V lantern batteries. Dimensions: 7" H x 6" W x 11" D.

The Economy Fish Spotter® Sounder gives you professional tackle for less

\$69⁹⁵

Simplified circuit design makes assembly easy

The Heathkit MI-2900 Fish Spotter® Sounder should be standard tackle for any serious angler. It finds individual and schools of fish to depths of 240 ft.; and it will stand duty as a reliable depth sounder on any cruise. Solid-state circuitry assures you of accuracy, dependability and minimal battery drain. Noise-rejection circuitry eliminates ignition interference. Improved disk and slip-ring assembly for quieter operation. Has on-off sensitivity control. Bright neon indicator lamp that won't wash out, even in direct sunlight. Portable suction-cup transducer mount, or order scanning transducer mount, below. Powered by 2 6-volt lantern batteries (not supplied).

Kit MI-2900, Shpg. wt. 8 lbs. 69.95
 Kit MIA-2900-1, Scanning Transducer Bracket, Shpg. wt. 4 lbs. 19.95

The Thermo Spotter® thermometer finds the depth where your fish feed



\$27⁹⁵

Completely self-contained with submersible sensing element on a 100-ft. cable. Battery-powered meter circuitry in high-impact plastic take-up reel case. Simply lower the line, press spring-loaded meter button for temp. readout, check depth on cable. Kit includes operations manual with fish temp. preference charts. Uses 1.5-volt penlight battery (not supplied).

Kit MI-104, Shpg. wt. 2 lbs. 27.95

MI-104 SPECIFICATIONS

ELECTRICAL: Circuit: Bridge type with thermistor sensor in one arm. Indicator: 50μA meter. Temperature scale: 32°-86°F. (0°-30°C). Accuracy: within ±3°F. Current drain: Less than 3 mA when in use. Battery: Size AA penlight cell NEDA 15.
PHYSICAL: Case: Molded high-impact plastic. Cable length: 100 ft. Reeling speed: 1 ft. per turn (approx.). Dimensions: 10 1/4" x 5 3/4" x 3 1/4".

FISH TEMPERATURE PREFERENCE CHART

Species	Range	Pref.
Alewife	48-72	54
Bluegill	64-72	69
Brook Trout	48-64	58
Brown Trout	50-65	60
Chinook Salmon	44-58	54
Coho Salmon	44-58	54
Crappie	65-74	71
Lake Trout	44-53	51
Largemouth Bass	60-76	73
Muskellunge	55-72	63
Northern Pike	55-74	66
Rainbow Trout	50-65	60
Smallmouth Bass	60-73	68
Smelt	43-56	50
Walleye	55-74	67
Yellow Perch	58-73	68



Handy Boating Books

Marine Electronics Handbook — covers radios, codes, antennas, direction finders; clearly written. EDP-134 4.95

Easi-Guide to Boat Radio — how to select, install & maintain a boat radio; FCC rules governing marine radio; a real asset to boating safety. EDP-133 3.50

See page 48 for book-ordering information

Heathkit R/C gets you up and away from the crowd!

SAVE UP TO \$61⁸⁰ on Heath's R/C System Spring Specials!

Order a complete system from specials below and save like never before!

Budget-priced 3-ch/4-ch R/C systems

Here's R/C versatility at its best. The basic 3-channel system converts to 4 channels whenever you're ready. The 3-channel transmitter comes with a 2-axis stick assembly. The conversion pack (below) lets you go four channels by putting 3 channels on the stick with the fourth channel controlled by a convenient thumb tab.

Top-flight features include all nickel-cadmium battery packs with external charging unit, vinyl-covered front panel, telescoping whip antenna, and relative power output meter that doubles as a battery charging indicator. The compact 3-channel Receiver has molded nylon case and connector block for servos and receiver battery pack. It's compatible with all Heathkit servos, and the conversion kit converts it to 4-channel also.

SPECIFY FREQUENCY WHEN ORDERING

- Kit GDA-1057-1, 3-channel transmitter, Shpg. wt. 4 lbs. 84.95
- Kit GDA-1057-4, 4-channel conversion pack for both transmitter and receiver, Shpg. wt. 1 lb. 21.95
- Kit GDA-1057-2, 3-channel receiver, Shpg. wt. 1 lb. 36.95
- Kit GDA-1205-3, Receiver battery pack, Shpg. wt. 1 lb. 9.95
- Kit GDA-19-4, standard servo, Shpg. wt. 1 lb. 21.95
- Kit GDA-405-44, miniature servo, Shpg. wt. 1 lb. 29.95
- Kit GDA-505-44, sub-miniature servo, Shpg. wt. 1 lb. 29.95

GDA-1057-1 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 50 mA from external charger. Frequencies Available: 27 MHz (11 meters) — 26.995, 27.045, 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 3¼" W x 2¼" D.

GDA-1057-2 SPECIFICATIONS

RECEIVER—RF Carrier Frequency: One frequency, crystal-controlled on 27 MHz, 53 MHz, 72 MHz. Operating Temperature: 0°-160°F. Power Supply: 4.8V; Battery Pack GDA-405-3. Dimensions: 1½" H x 1¼" W x 2¼" D. Net Receiver Weight: 2.5 oz. Servo Channels: 3 (4 with option). **GENERAL**—Complete airborne system weight: with GDA-505-44 servos: 8.8 ozs.

Heath R/C System Spring Specials!

- 3-Chnl. Trans., Rec., Rec. Batt. Pk., 2 GDA-19-4 Servos, Shpg. wt. 9 lbs. 119.95
(If purchased separately, 175.75.) **SAVE 55.80!**
- 3-Chnl. Trans., Rec., Rec. Batt. Pk., 2 GDA-405-44 Servos, Shpg. wt. 9 lbs. 129.95
(If purchased separately, 191.75.) **SAVE 61.80!**
- 3-Chnl. Trans., Rec., Rec. Batt. Pk., 2 GDA-505-44 Servos, Shpg. wt. 9 lbs. 129.95
(If purchased separately, 191.75.) **SAVE 61.80!**

Servo Centering Standard

Calibrates all Heath servos with variable pots to the 1.4 millisecond pulse width standard. Eliminates recentering when you switch from one transmitter or receiver to another. Included in all Pack-17 transmitters!

Kit GD-1189, Shpg. wt. 1 lb. 9.95



Heathkit R/C Maintenance Manual

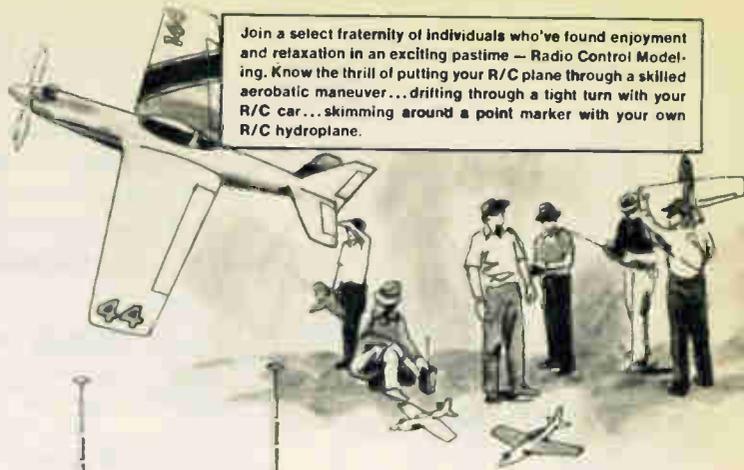


Comprehensive, detailed information on the use and maintenance of Heathkit R/C gear. Shows you how to get the most from your R/C gear. Helpful hints for owners of non-Heath R/C gear too. GDA-1205-7. 1.00

See page 48 for book ordering information

With Heathkit products, American craftsmanship starts at home...your home.

Join a select fraternity of individuals who've found enjoyment and relaxation in an exciting pastime — Radio Control Modeling. Know the thrill of putting your R/C plane through a skilled aerobic maneuver...drifting through a tight turn with your R/C car...skimming around a point marker with your own R/C hydroplane.





3-Channel System

Systems include rechargeable batteries worth over \$30

Complete systems as low as \$119⁹⁵

3-Channel System with 4th Channel option installed



Rugged servos for years of dependable performance



Heathkit Servo Simulator for easy servo adjustment

Takes the place of both transmitter and receiver for making adjustments on all Heathkit servos, and a wide variety of others. Operates servos from 120 VAC line or from the optional internal battery pack. Charges receiver and glo-plug batteries when plugged into 120 VAC. Bulb shows battery condition. Kit includes adaptor cable for Heathkit GD-405 series servos.

Kit GD-1053, Shpg. wt. 3 lbs. 24.95

Kit GDA-19-3, optional battery pack, Shpg. wt. 1 lb. 4.95

Heathkit Pack-17™ R/C Systems put

Radio Control is a growing, fun-filled hobby for youngsters of all ages — and building the Heathkit Pack-17 system is the best way to get in on the fun and excitement — take control of model aircraft, boats and cars.

- 17 plug-in frequency modules let you change frequencies instantly...no more delays
- Slim-line transmitter case is easy to hold
- Compatible 5 or 8-channel transmitters with single or dual-stick control...for smaller models to the big ones
- Compact receiver slips easily into tightly-spaced fuselages...complete airborne system weighs just 13¼ oz.

The Heathkit Pack-17 R/C System is the perfect start to a richly rewarding hobby. Transmit, receive and servo units come to you in easy-to-assemble kit form...so you know your equipment when it's time to start operating. Heathkit R/C Systems have the rugged reliability serious R/Cers want...tough glass epoxy circuit boards; reinforced transmitter cases with scuff-resistant brown vinyl covering; servos with heavy-duty gears and built-to-take-it cases.

5-Channel Dual-Stick Transmitter & 1 module. 2-stick control of 4 channels, plus 1 aux. channel.

Kit GDA-505-D, Shpg. wt. 6 lbs. 129.95

5-Channel Single-Stick Transmitter & 1 module. 1-hand control of 3 channels (2 through gimbal couplings & 1 with return-to-center-knob), throttle control with trim & 1 aux. channel.

Kit GDA-505-S, Shpg. wt. 5 lbs. 139.95

8-Channel Dual-Stick Transmitter & 1 module. Same as GDA-505-D, plus landing gear switch & 2 additional channels.

Kit GDA-1205-D, Shpg. wt. 6 lbs. 139.95

8-Channel Single-Stick Transmitter & 1 module. Same as GDA-505-S, plus landing gear switch & 2 additional channels.

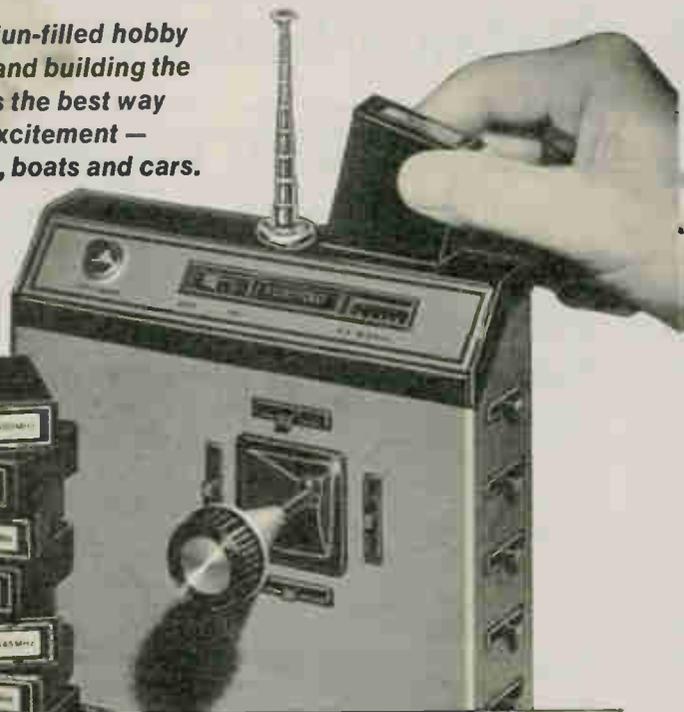
Kit GDA-1205-S, Shpg. wt. 5 lbs. 159.95

Receiver & 1 module (less batteries).

Kit GDA-1205-2, Shpg. wt.. 1 lb. 59.95

Receiver battery pack.

Kit GDA-1205-3, Shpg. wt.. 1 lb. 9.95



FIVE-PACK SPECIAL!—SAVE \$20
Choose five transmit and receive frequency modules — specify frequencies.
only **\$129.50**
If bought separately, \$149.50

Additional Frequency Modules

When ordering specify frequency desired (see list below).

Transmit Module, Shpg. wt. 1 lb. 17.95

Receive Module, Shpg. wt. 1 lb. 11.95

FREQUENCIES AVAILABLE (MHz): 26.995, 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.)

GDA-1205 AND GDA 505 SERIES SPECIFICATIONS

TRANS. — RF Frequency: crystal controlled, all bands. Frequency stability: within ±.005% on 27 MHz; within ±.002% 53 MHz and 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 mA 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: 1½" H x 1¼" W x 2¼" D. Net Weight: 2 ozs.



Low-cost servos with tough cases and heavy gearing

1 Miniature Servo. For use with GD-1205 and 505 systems only.

Kit GDA-1205-4, Shpg. wt. 1 lb. 29.95

2 Sub-Miniature Servo. For use with GD-1205 and 505 systems only.

Kit GDA-1205-5, Shpg. wt. 1 lb. 29.95

GDA-1205-4 SPECIFICATIONS

Input Signal: Pulse 1-2 msec. wide, 4 V P-P. Thrusts: 4 lbs. min. at rotor. Travel Time: 0.5 sec. Rotary Output Travel: 90° rotation. Temperature Range: 0°-160°F. Power Requirements: Battery — 4.8 VDC. Idle current — 15 mA. Stall current — 450 mA; no load current, 80 mA. Gear Train Backlash: Less than .002". Mechanical Output: 1 rotary arm. 1 rotary wheel. Position Accuracy: 1.0%. Dimensions: 1½" H x 1¼" W x 2½" L. (length includes mounting ears; height includes outputs). Net Weight: 1.75 ozs.

GDA-1205-5 SPECIFICATIONS

Input Signal: Pulse 1-2 msec. wide, 4 V P-P. Thrust: 4 lbs. min. at rotor. Travel Time: 0.5 sec. Rotary Output Travel: 90° rotation. Temperature Range: 0°-160°F. Power Requirements: Battery — 4.8 VDC. Idle current, 15 mA maximum. Stall current, 450 mA nominal, no load current, 80 mA. Mechanical Output: 1 large rotary arm, 1 small rotary arm, 1 offset rotary arm, 1 rotary wheel. Position Accuracy: 1.0%. Dimensions: 1½" H x 1¼" W x 2½" L. (length includes mounting ears, height includes the outputs.) Net Weight: 1.25 ozs.

R/C "power" in your hands...save you money too!

SAVE! ON FLEXIBLE 5-CHANNEL SYSTEMS

5-channel Dual Stick Transmitter GDA-505D



5-channel Single Stick Transmitter GDA-505S

SAVE! ON RELIABLE 8-CHANNEL SYSTEMS

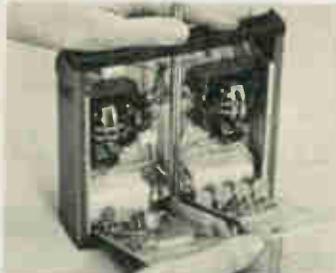
8-channel Dual Stick Transmitter GDA-1205D



8-channel Single Stick Transmitter GDA-1205S



A Heath exclusive — plug-in transmitter modules let you pick any of 17 frequencies. And you can add new modules any time. You'll probably never have to wait for a frequency to open up when you go to the flying field!



Easy to build and service. The hinged transmitter circuit board folds out for easy access. The chassis layout is exceptionally open and uncluttered. A factory-fabricated wiring harness greatly simplifies assembly.



Low current drain. The new lightweight receiver draws less than 10 mA from its optional rechargeable nickel-cadmium batteries. A convenient plug on the on/off switch lets you recharge the battery without unplugging it from the receiver.



Lightweight receiver maintains the same outstanding performance with any of the 17 plug-in frequency modules. Since full-house and 8-channel systems use the same receiver, it's easy to change from 5 to 8 channels whenever you're ready.

SAVE on Heathkit R/C Systems!

5-Chnl. Dual-Stick Syst. • GDA-505-D Trans. & 1 module • GDA-1205-2 Rec. & 1 module • GDA-1205-3 Rec. Batt. Pk. • 4 GDA-1205-4 or GDA-1205-5 Servos (or any combo totalling 4). (Shpg. wt. 19 lbs.) If pur. sep. 319.65
System Price 274.95

5-Chnl. Single-Stick Syst. • GDA-505-S Trans. & 1 module • GDA-1205-2 Rec. & 1 module • GDA-1205-3 Rec. Batt. Pk. • 4 GDA-1205-4 or GDA-1205-5 Servos (or any combo totalling 4). (Shpg. wt. 19 lbs.) If pur. sep. 329.65
System Price 284.95

SAVE \$4470

8-Chnl. Dual-Stick Syst. • GDA-1205-D Trans. & 2 modules • GDA-1205-2 Rec. & 2 modules • GDA-1205-3 Rec. Batt. Pk. • 4 GDA-1205-4 or 1205-5 Servos (or any combo totalling 4). (Shpg. wt. 19 lbs.) If pur. sep. 359.55
System Price 309.95

8-Chnl. Single-Stick Syst. • GDA-1205-S Trans. & 2 modules • GDA-1205-2 Rec. & 2 modules • GDA-1205-3 Rec. Batt. Pk. • 4 GDA-1205-4 or 1205-5 Servos (or any combo totalling 4). (Shpg. wt. 18 lbs.) If pur. sep. 379.55
System Price 329.95

SAVE \$4960

Please specify frequency when ordering R/C transmitters and/or receivers. All systems include batteries — a value worth up to \$39!



Trainer link accessory. Six-foot coiled cord connects two GDA-1205 or 505 Transmitters for in-flight instruction...makes one unit "master" with override capability...the other, a "slave."
GDA-1205-6, Shpg. wt. 1 lb. 9.95



Learn more about your R/C hobby

Radio Control Manual — guide to systems & circuits from simple 1 & 2 channel types to digital & pulse code designs. EDP-157 . . 4.95

Advanced Radio Control — "how-to" book for planes, boats, robots, trucks, tractors, autos — introduction to automation in rockets & robots at the hobby level. EDP-158 4.95

Radio Control Handbook — covers entire range of control systems. EDP-159 6.95

Model Radio Control — concepts of building simple control projects in R/C. EDP-160 4.95

NEW! Radio Control for Models! Up-to-date handbook for planes, cars and boats. Emphasis on solid-state step and proportional controllers. EDP-219 6.95

See page 48 for book ordering information

Want faster service? Order by phone — call (616) 982-3411 day or night.

Famous Hobie Hawk Specially Priced at Heath



New

Heath Low Price **\$89⁹⁵**
Kit

Heath Low Price **\$134⁹⁵**
Semi-Kit

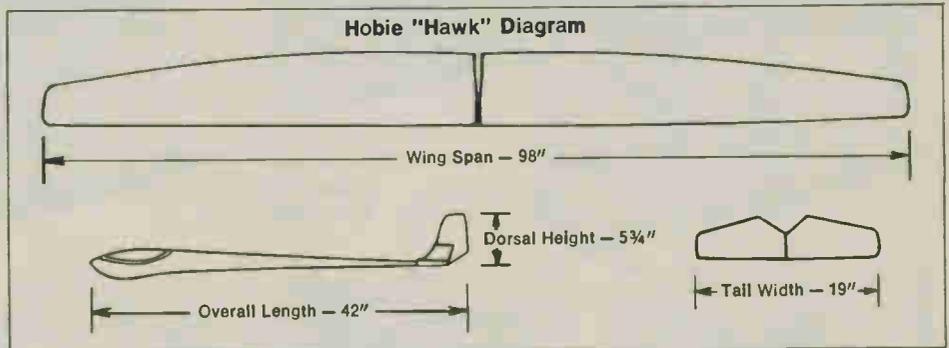
- Great for use with Heathkit 3-Channel Radio Control Systems (page 21)
- Rugged cross-linked polyethylene Nose Cone
- Precision two-point control for smooth turning and lifting

Build and fly the Hobie Hawk and you'll find out what the excitement of R/C is all about. Has strong $\frac{1}{32}$ " plywood main wing sheeting; $\frac{1}{4}$ " plywood stabilizer sheeting; ABS plastic

root rib and tips. The wing span is a full 98" for excellent soaring and graceful turning; the 590 sq. in. wing area provides plenty of lift to get you up and going! Kit includes all parts and hardware needed for complete construction, you use your own covering materials and paints to "custom design" the Hawk to your preference. The Hobie Hawk is ideal for use with Heathkit R/C control systems, especially the 3-channel systems described on page 21. It's a great way to begin a fun-filled R/C hobby.

Kit RP-1206, Shpg. wt. 8 lbs. 89.95
Semi-Kit RP-1207, just connect wings and tail, add R/C gear, and you're ready to fly. Shpg. wt. 8 lbs. 134.95

Because of the nature of these two products, the standard Heath warranty does not apply.



Heathkit Power Supply/Transistorized Throttle

Makes model railroading even more realistic

\$79⁹⁵

- Has controls for pulse width and frequency, starting voltage — provides optimum performance with every engine in your line
- Outputs for main and loop voltages, two sets of accessories

The Heathkit RP-1065 makes any HO or N-gauge layout dramatically more realistic — and at a low price that'll leave the competition waiting at the station!

For maximum realism, set the mode switch to "momentum". Then just pull the slide-control throttle toward you and watch the engine gradually build up speed just like a real train. Even at a crawl, the RP-1065's sophisticated pulse circuitry assures smooth, realistic acceleration and braking — great for switching. Braking is independent of the throttle and controlled by a five-position knob. "Run" allows the train to gradually gather speed until it reaches the throttle setting. "Release" maintains its speed without accelerating or braking. Momentarily turning the knob to "normal" puts a short "burst of air" on the brakes. "Quick service" and "emergency" brake the train more rapidly, while still maintaining a realistic momentum effect.

Other circuitry solves many common problems. With ordinary power supplies, an engine climbing a grade may slow down or even stop. But the RP-1065 compensates by raising the output voltage. An internal control selects exactly the compensation you want — maintain a constant speed or even precisely simulate the way a real train slows as it climbs, then speeds up as it descends. AC load compensation automatically helps overcome side rod and gear train binding, tight spots in wheel bearings — even tight sections of track!

The RP-1065 easily powers two HO or N-gauge engines. An overload sensor disconnects the output if there is a short circuit or an excessive load, then signals you with a light on the front panel. After cor-



recting the problem, just flip the brake knob to reset. And the protection circuit's built-in time delay prevents false triggering. Another warning light alerts you to breaks in the circuit. Versatile controls let you use the RP-1065 any way you want. The pulses can be used three ways — on continuously, off or automatically. In automatic, the RP-1065 monitors track voltage and switches the pulses on at any preset level. You can even override the momentum effect by switching to the "direct" mode, allowing you to control both acceleration and braking with the throttle. Other features include — starting voltage control, main and loop switches to reverse track polarity instantly, a forward/reverse switch for engine direction and two low-voltage AC accessory outputs, one with front-panel on/off switch.

You can build the RP-1065 easily 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 integrated circuit simplifies construction. 120 VAC. 4 $\frac{3}{4}$ " x 9 $\frac{1}{2}$ " x 8 $\frac{1}{2}$ ".

Kit RP-1065, Shpg. wt. 8 lbs. 79.95

Find out how easy it is to build a kit — order the manual. See page 49.

Heathkit Modulus™—a new era in hi-fi

In performance, features, versatility and styling, the MODULUS™ system is destined to become the standard by which other hi-fi systems will be judged.

See what the experts say!
Read the Modulus review in
March Radio Electronics.



The AN-2016 is the "heart"...

Modulus™... designed to give you "total control" of your musical environment. Create exactly the system you want—stereo or 4-channel—with your choice of capability and power. Stereo... use the AN-2016 and either of its matching stereo amplifiers... even use it with our AA-1640 "super-amp"! Discrete 4-channel... use the AN-2016 with two stereo amplifiers. Dolbyized FM... the AD-1504 plug-in Dolby FM module. 4-channel SQ... the AM-1503 SQ module. Discrete disc CD-4... the AD-1507 CD-4 module. Each of the components in the Modulus system rivals the finest separate components available, yet they're far more convenient to use. And, because of their modular design, you can change power or add capability when YOU want to, without "black box" adapters and yards of cable!

...of a quality stereo system



The heart of the MODULUS system is the AN-2016 Digital AM/FM Stereo/Quadraphonic Tuner/Preamplifier. It incorporates a superb AM/FM tuner with digital readout, an exceptional stereo/quadraphonic preamplifier, headphone amplifiers, and an unusually versatile control center. In performance, convenience and reliability, we believe the AN-2016 is unmatched.

On either AM or FM, four ½"-tall LED digits display the frequency far more accurately than an ordinary dial, and the AN-2016 displays only those frequencies which are actual broadcast channels. A signal-strength meter helps you fine tune and a center-channel meter accurately locates the point of lowest FM distortion. Scope outputs help align your FM antenna for minimum multipath distortion. The FM interstation muting is fully adjustable and can be switched on or off from the front panel. Finally, the phase-locked loop multiplex demodulator assures excellent stereo separation—over 40 dB at 1000 Hz.



...of a complete 4-channel system

Even the AM section is the finest we've ever offered—dual-gate MOSFET's in the front-end and mixer combine excellent sensitivity with extremely high resistance to overload. A computer-designed 9-pole LC filter maintains outstanding selectivity with absolutely no alignment.

With the introduction of the AN-2016, Heath engineers have reduced distortion and noise to what we believe are completely inaudible levels. Overload distortion is almost nonexistent since the AN-2016 reaches full output with a 170 mV signal, yet doesn't overload until the high-level input reaches at least 3 volts!

Our special attention to the phono amplifier has resulted in a design which can drive the preamplifier to full output with as little as 2 mV, yet does not overload until the input

reaches 60 mV. This provides a dynamic range of over 94 dB—considerably better than most records. This extra margin minimizes overload distortion—even crescendos can be heard with excellent definition. And in the softest musical passages, the AN-2016 maintains the same superb definition because hum and noise are 75 dB below a 10 mV input.

A muting circuit in the AN-2016 protects your speakers from power on/off surges. In addition, four lighted level meters constantly monitor the output. The meters feature a wide 40 dB dynamic range, to follow the softest and loudest passages without switching ranges.

The meters use "peak-responding" circuitry to display instantaneous peaks as short as a record click, making them extremely useful as overload indicators. The meters are calibrated in both decibels and volts of output, so you can easily see whether the AN-2016 or an associated power amplifier is being driven to clipping.



...of one of the world's finest high-power music systems

The separate bass and treble controls for the front and rear channels utilize Baxandall circuitry. The turnover points for the tone controls have been moved toward the frequency extremes, allowing you to effectively make corrections with a minimum effect on the mid-range. The Tone-Flat button bypasses the tone controls; loudness, high and low filters provide additional versatility.



The AN-2016's FM muting is fully adjustable — you can block out only those stations you consider too noisy for listening. Direct planetary drive tuning is smooth and positive with absolutely no backlash. And, of course, there is a complete range of inputs and outputs — including separate CD-4 and stereo phono inputs and inputs and outputs for a stereo or discrete 4-channel tape recorder — even front-panel dubbing jacks which let you play or record tapes without disturbing the permanent connections.

Panel lighting is functional as well as beautiful. Whenever the AN-2016 is switched on, the four output meters and the legends above the pushbuttons light. The digital display and

meters appear only when you are listening to AM or FM. And only the meters you need light — signal-strength for AM; signal-strength and center-tune for FM. The tips of the push-buttons light when they are pressed in, so you can see exactly what functions are engaged, even from across the room.

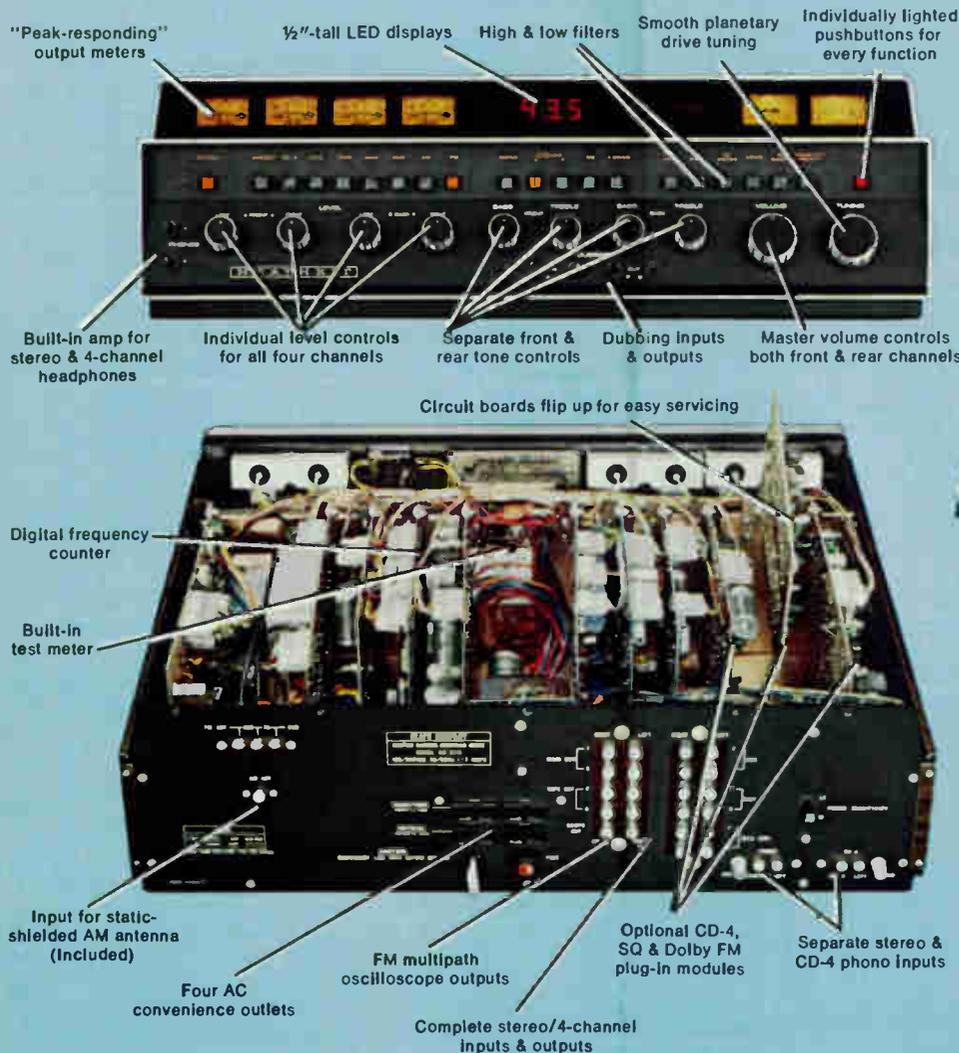
The AN-2016's massive diecast front-panel puts an impressive array of controls at your fingertips — all logically grouped for easy use. And the cabinet is accented by a black textured metal cover and simulated walnut-grained metal end panels. The total impression is tastefully luxurious. Truly, an AN-2016 flanked by its matching amplifiers is an impressive addition to any room.

With 28 IC's, 134 transistors and 55 diodes, obviously some kitbuilding experience would be helpful in assembling the AN-2016. But it is not a difficult kit. Most parts mount on one of the 14 printed circuit boards and 4 wiring harnesses minimize point-to-point wiring. Eight of the boards and the three optional plug-in modules can be flipped up while the AN-2016 is operating, greatly simplifying alignment and servicing. A built-in test meter lets you double-check each circuit board as you finish it.

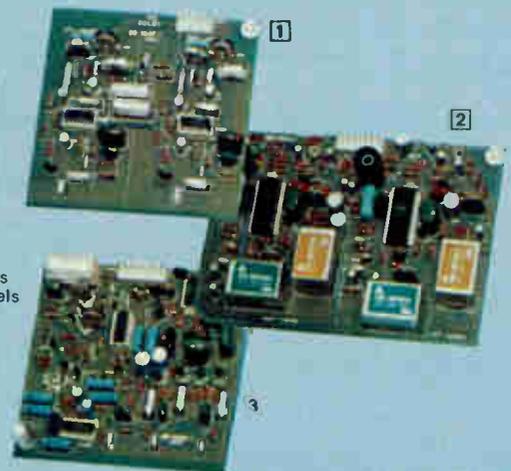
Kit AN-2016, Shpg. wt. 38 lbs. 599.95

See matching power amplifiers (at right) and modules (below).

Here's why we think the AN-2016 is the world's most versatile control center



Plug-in modules make your AN-2016 more versatile



1 Dolby FM Module

Enjoy the reduced noise and increased dynamic range of specially-encoded 25 μ sec. de-emphasis Dolby FM broadcasts. Assemble and install it in less than an evening.

Kit AD-1504, Shpg. wt. 2 lbs. 39.95

2 CD-4 Demodulator Module

Enjoy the spacious quadraphonic sound of CD-4 discrete 4-channel records. Easy one-evening assembly. Includes calibration record. For use with discrete 4-channel cartridge.

Kit AD-1507, Shpg. wt. 3 lbs. 79.95

3 SQ Decoder Module

Sophisticated circuitry with full-logic and variable blend enhancement provides excellent quadraphonic separation from matrixed records, tapes and FM. Assemble and install it in just one evening.

Kit AM-1503, Shpg. wt. 1 lb. 49.95

AN-2016 SPECIFICATIONS

PREAMPLIFIER—Frequency Response: -0.5 dB at 10 Hz and 30 kHz. Total Harmonic Distortion: less than 0.05% at 1.5 V into 20K ohms. IM Distortion: less than 0.05%. Hum & Noise (unweighted): phono, -75 dB ref. to 10 mV; high-level, -80 dB ref. to 25V. Bass Control: ± 15 dB at 20 Hz nominal. Treble Control: ± 12 dB at 20 kHz nominal. HI Filter: -3 dB at 7 kHz ± 1 kHz, 12 dB/octave slope. Lo Filter: -3 dB at 30 Hz ± 2 Hz, 12 dB/octave slope. Input Sensitivity (for 1.5 V output): phono, 2/6 mV ± 1 dB (switch selected). Phono Equalization: ± 0.5 dB of RIAA standard from 20-20,000 Hz. 100 K ohms shunted by 300 picofarads. Output Voltage:

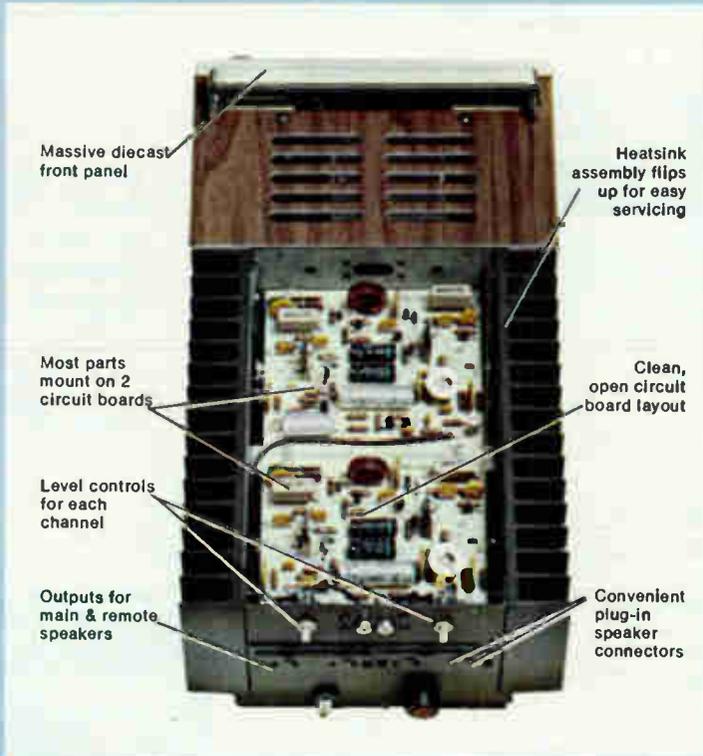
1.5 V RMS. FM (Monophonic)—Sensitivity: 1.7 μ V (IHF); 3.5 μ V for 50 dB S/N. Signal-to-Noise Ratio: 68 dB at 1000 μ V. Selectivity: greater than 100 dB. Capture Ratio: 1.3 dB. Spurious Rejection: greater than 90 dB. IF Rejection: greater than 100 dB. Image Rejection: greater than 90 dB. Total Harmonic Distortion: 0.3% at 1 kHz. IM Distortion: less than 0.1%. AM Suppression: 68 dB at 1000 μ V. Antenna Inputs: 300 Ω balanced; 75 Ω unbalanced. —FM (Stereo/Phonic)—Stereo Sensitivity: 35 μ V for 50 dB S/N, 1% THD. Total Harmonic Distortion: 1 kHz, .35%. Stereo Separation: 40 dB at 1 kHz; 20 dB at 15 kHz. SCA Rejection: 65 dB. —AM —

Sensitivity: 6 μ V for 20 dB S+N/N. Selectivity: more than 60 dB. Signal-to-Noise Ratio: more than 48 dB. Harmonic Distortion at 1000 μ V, 30% mod.: less than 1.0% at 400 Hz. Antenna: external static-shielded loop. GENERAL—Power Requirement: 120/240 VAC, 60/50 Hz. AC Convenience Outlets: 2 switched, 2 unswitched (500 watts max.). Dimensions: approx. 6 1/2" H x 19" W x 14 1/2" D.

"SQ" is a trademark of CBS, Inc.; "Dolby" is a trademark of Dolby Labs and "CD-4" is a trademark of the Japan Victor Company.

Pick the power you need for your MODULUS System

35 Watts (AA-1505) or 60 Watts (AA-1506) minimum rms, per channel into 8 ohms at less than 0.1% total harmonic distortion from 20-20,000 Hz.



Feature-packed power amplifiers... exceptional performance at a budget price

- Exciting styling to match the incomparable AN-2016
- Simplified design for easy assembly

A perfect match for the AN-2016 in styling and performance — and you should also consider using them with most other quality preamps. Just compare the specs — intermodulation distortion is less than 0.1% at full power and drops to a mere 0.05% at 0.1 watt. Frequency response is exceptionally wide and flat — down just 0.5 dB at 8 Hz and 45,000 Hz. And, with a damping factor of over 60, you can count on the AA-1505 and 1506 to provide high definition bass response.

Pushbutton main and remote speaker switching, lighted power button, and Heath's unique polarized speaker connectors which help eliminate phasing problems. Unlike many other power amps — the AA-1505 and 1506 look so good, you'll want people to see them — massive side-mounted black heat sinks and walnut-grained metal side panels. Sophisticated functionalism.

Remarkably easy to build — even for first-time kitbuilders. The two printed circuit boards mount directly on the heat sinks, minimizing point-to-point wiring.

Kit AA-1505, Shpg. wt. 24 lbs. **159.95**
 Kit AA-1506, Shpg. wt. 26 lbs. **179.95**

OTHER AA-1506/1505 SPECIFICATIONS

Hum and Noise: 95 dB (referred to rated power, inputs shorted). Separation: 60 dB. Input Sensitivity: 1.5 volts for rated output. Input Impedance: more than 15K ohms. Power Requirement: 120/240 VAC, 60/50 Hz. Dimensions: 8" W x 5 1/2" H x 14 3/4" D. Net Weight: approx. 21 lbs.

Kit-building convenience you'll appreciate

A built-in test meter lets you check out your work before turning on the amplifier. The circuit board/heat sink assembly can be flipped up or unplugged and removed to simplify trouble-shooting and servicing.

Complete Modulus System — Sensational Performance and Sound at a Money-Saving Price

Save up to **\$154⁸⁹**

- Heathkit AN-2016 Modulus AM/FM Control Center
- Heathkit AA-1506 Stereo Power Amplifier
- Two Heathkit AS-1373 Speakers
- Dual 1249 Turntable with base and your choice of Empire 2000E/III or Shure M91ED Stereo Cartridge

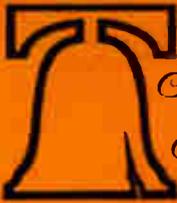
If purchased separately, up to **\$1446⁶⁵**

Heath Price **\$1291⁷⁶**

ARS-110, Shpg. wt. 207 lbs., Exp./Frt. **1291.76**

For a quadraphonic system, order an additional amplifier and pair of speakers. These additional items qualify for the Heath 5% system discount (see page 43) when ordered with the system above.





Declare
Your
Independence

Heathkit "Superamp" for superior sound

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



\$439⁹⁵

less meters

**SAVE
\$19⁹⁵**

**WHEN AMP
AND METERS
ARE ORDERED
TOGETHER**

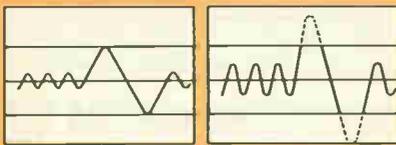
Optional meters
shown installed

Who needs all that power?

Many hi-fi systems need a "super-amp" like the AA-1640 for good scientific and musical reasons. As sounds become louder, the ear becomes less sensitive. For one sound to seem twice as loud as another (10 dB louder), requires 10 times as much power. A 3 dB change is barely audible, 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 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 amp can't deliver that much power, it clips off the peaks as shown.



unclipped

clipped

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

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 music...solid bass free of "boom" and distinct note for note...accurate treble clearly defined and open.

If your music system uses low-efficiency acoustic suspension speakers, only a super-amp like the Heathkit AA-1640 can help them deliver their finest sound.

Heathkit AA-1640 — one of the world's finest stereo power amplifiers. It helps your system sound its best.

In sheer power and exceptionally low distortion, the Heathkit AA-1640 is an extraordinary amplifier. As Julian Hirsch said in the May issue of *Stereo Review*: "The electrical performance of the Heath AA-1640 makes comment superfluous. In every respect it ranks with the finest high-power amplifiers on the market. We were constantly impressed with the conservatism of its construction and ratings." That's quite a tribute to the AA-1640's performance.

Despite its enormous power, the AA-1640 is also an exceptionally quiet amplifier. Hum and noise are an inaudible 100 dB below full output, so you can hear music over a velvety background of silence. And you can enjoy all that quiet because there's no noisy fan. Even if it is used as a PA amplifier, the AA-1640 requires only normal ventilation and that kind of rugged, conservative design pays off in increased reliability.

Automatic circuitry helps protect your speakers. A 10-second delay protects your speakers from turn-on thumps and instantly disconnects them when you turn the power off. This delay circuit also disconnects the speakers if it detects DC or extremely low-frequency AC at the outputs. Automatic thermal shutdown helps prevent damage from overheating. Finally, speaker fuses are located in the primary feedback loop — an exclusive Heath design which maintains a high damping factor for excellent bass definition.

The optional peak-responding meters continuously monitor the output, accurately showing how much power is reaching your speakers. The backlighted scales are calibrated from -30 to +3 dB and from 0.2 to 200 watts into 8 ohms. Special circuitry allows them to respond to peaks as short as a record click, making them useful as overload indicators. The meters can be installed when the ampli-



Optional peak-responding meters are calibrated in both decibels and watts. Order them with the amp and save.



Sixteen output transistors and 12 lbs. of heat-sink assure adequate heat dissipation without noisy fans!

fier is built, or later. However, if you buy the meters at the same time you buy the amplifier, you'll save \$19.95.

Front-panel controls include pushbutton power on/off, left and right channel gain controls, and LED power and high temperature indicators. Exclusive plug-in speaker connectors simplify hookup and help insure correct speaker phasing.

To appreciate its real quality, the AA-1640 should be used with only the finest preamplifiers such as the Heathkit AP-1615 (facing page) or AN-2016 (see pages 25-26). Hear music as you've never heard it before — add the AA-1640 to your system. It's an experience in superior sound.

Kit AA-1640, less meters,
Shpg. wt. 72 lbs. **439.95**

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

Kit AA-1640 & Kit AAA-1640-1,
Shpg. wt. 72 & 3 lbs. **489.95**

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 .25 to 200 watts. Damping Factor: greater than 50. Hum and Noise: Less than 400 μ V or 100 dB below full output. Channel Separation: 50 dB, min. Input Impedance: 50k ohms, min. Input Sensitivity: 1.5 V. Net Weight: 58 lbs. Dimensions: 19" W x 7 1/4" H x 18" D. Power Requirement: 120/240 VAC, 60/50 Hz.

NEW Heathkit Stereo Preamp and Equalizer

1 AP-1615 Stereo Preamplifier

A truly outstanding preamplifier with performance and specifications comparable to units costing twice or even three times as much.

\$129⁹⁵



\$119⁹⁵

2 AD-1305 Audio Equalizer

Use with the AP-1615 or any quality component with tape monitor input for accurate and complete tone control versatility.

1 Heathkit AP-1615 Stereo Preamplifier/Control Center

The new Heathkit AP-1615 Stereo Preamplifier offers the kind of specifications and features normally found on preamps costing much more. While it can be used with any high quality power amplifier, it's a perfect match for the AA-1640 "Superamp".

Harmonic and IM distortion are insignificant, less than 0.05%. Hum and noise are an extremely quiet -65 dB on phono and -85 dB on high-level sources; frequency response is a ruler-flat +0, -0.2 dB from 20-20,000 Hz. The extremely wide dynamic range of the AP-1615, 100 dB for all inputs, means that even the loudest and most complex musical passages come through with minimum distortion. In fact, the sound quality of the AP-1615 is limited only by the quality of the associated equipment and the program source.

As a "flat response" stereo preamplifier, the AP-1615 provides outstanding fidelity from any sound source. And, if you need tone controls, the optional AD-1305 (below) offers far more versatility and precise tone adjust-

ment than ordinary bass and treble controls. Has the features required for a truly superlative stereo system: a relay instantly mutes the output when power is turned on or off to prevent "thumps." A special sub-sonic filter (always on in phono mode) eliminates the noise from turntable rumble, record warp and room vibrations which causes wasted power and IM distortion at the speaker (especially important with high power amplifiers).

Has high-frequency filter, two phono inputs, aux. and tuner inputs, tape monitor, center-detent balance control, mono switch, headphone jack and LED power indicator. Front panel dubbing inputs and outputs for easy temporary recording setups without displacing permanent rear-panel connections.

Handsome styling too, with pewter-anodized front panel, black metal top and solid walnut end panels.

The AP-1615 is an exceptionally easy kit to build. Most parts mount on a single printed

circuit board, and point-to-point wiring is kept to a minimum. Even if you're a first-time kit builder, you can build a better preamp than you probably thought you could afford. It's just one more way Heath offers you more for your money.

Kit AP-1615, Shpg. wt. 12 lbs. **129.95**

AP-1615 SPECIFICATIONS

Input Sensitivity: Phono, 2 mV. Hi-Level (Tuner, Tape, Aux., Tape Mon and Tape Dub), 180 mV. Input Overload: Phono, over 100 mV. Hi-Level, over 10 V. Hum and Noise: Phono, -65 dB (2 mV input); Hi-Level, -85 dB (180 mV input). Input Impedance: Phono, 47 k ohms. Hi-Level, 50 k ohms. Frequency Response: Phono, ± 0.5 dB, 30 Hz to 15 kHz. Hi-Level, ± 2 dB, 20 Hz to 20 kHz. Rated Output: 1.5 V at rated sensitivity. Output Impedance: 500 ohms. Tape Output: 180 mV. Harmonic Distortion: less than .05% from 20 Hz to 20 kHz at 1.5 V output. Channel Separation: 50 dB at 1 kHz. Filters: Low, -3 dB at 15 Hz, -12 dB octave/slope. High, -3 dB at 7 kHz, -12 dB octave/slope. Headphone Amplifier: Harmonic Distortion: 0.1% (4 V min. into 100 ohms). Dimensions: 4 1/2" H x 17 1/2" W x 8 1/2" D. Power Requirement: 120/240 VAC, 60/50 Hz.

2 Heathkit AD-1305 5-band, 2-channel Audio Equalizer

The AD-1305 is an audio equalizer offering complete tone control versatility with five slide controls for each stereo channel, each control handling its own portion of the frequency spectrum. It is designed for use with the AP-1615 above, or any receiver or amplifier having a preamp output and power amp input, or tape monitor.

Each control provides a 12 dB per octave slope, for precise corrections in each portion of the frequency spectrum, without overlapping. You can highlight instruments, create special sound effects, "engineer" your music the way YOU want to hear it! A center detent allows exact "0" dB setting bypassing each band; a tone flat switch bypasses the equalizer entirely, returning the system to flat response.

Adjusts response to allow precise corrections for room acoustics, differences in cart-

ridges and speakers, even deficiencies in program sources. Can also be used with tape recorders to filter old or scratchy records or broadcasts before recording; and with PA and musical instrument amplifiers for anti-feedback control or special effects.

The active bandpass filters in the AD-1305 use large, fully-shielded coils, ensuring extremely low distortion even at full boost and cut. Excellent overload characteristics too. Rated output is 1.5 V, overload does not occur until output is at least 5 volts. The complementary symmetry output circuit permits the AD-1305 to be used with virtually any preamp and amplifier. Harmonic distortion is a mere 0.05% from 20 Hz to 20 kHz; hum and noise are a full 90 dB below rated output (1.5 volts).

The AD-1035's own tape monitor lets it be used in a receiver's tape monitor circuit with-

out losing monitor capability. Has tape monitor, tone flat and power-on switches, switched and unswitched AC outlets for associated equipment. Matched in size and style to the AP-1615 above.

Kit AD-1305, Shpg. wt. 11 lbs. **119.95**

AD-1305 SPECIFICATIONS

Input Impedance: 100 k 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 Ranges: (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. Power Requirement: 120/240 VAC, 60/50 Hz. Dimensions: 4 1/2" H x 17 1/2" W x 8" D.



The Famous Heathkit AR-1500A—one



These AR-1500A systems are carefully selected to provide the best sound for the money in each price category—choose the one you like

Save up to 129.14



- Heathkit AR-1500A AM/FM Stereo Receiver and walnut veneer case
- Two AS-104 Speakers (See pg. 38)
- B-I-C 980 Automatic Turntable with base and your choice of Shure M91ED or Empire 2000E/III Cartridge (See page 42)

ARS-107, Shpg. wt. 187 lbs.,
Exp./Frt. 802.51

If purchased separately, up to **\$931⁶⁵**

System **\$802⁵¹**
Price

Please Specify Cartridge When Ordering

Save up to 132.14



- Heathkit AR-1500A AM/FM Stereo Receiver and walnut veneer case
- Two AS-1373 Speakers (See pg. 37)
- Dual 1228 Automatic Turntable with Base and Choice of Shure M91ED or Empire 2000E/111 Cartridge (see page 43)

ARS-108, Shpg. wt. 209 lbs.,
Exp./Frt. 878.51

If purchased separately, up to **\$1010⁶⁵**

System **\$878⁵¹**
Price

Please Specify Cartridge When Ordering

Save up to 156.14



- Heathkit AR-1500A AM/FM Stereo Receiver with walnut veneer case
- Two AS-101 Speakers (See pg. 39)
- Dual 1249 Automatic Turntable with Base and choice of Shure M91ED or Empire 2000E/111 Cartridge (see page 43)

ARS-109, Shpg. wt. 338 lbs.,
Exp./Frt. 1315.51

If purchased separately, up to **\$1471⁶⁵**

System **\$1315⁵¹**
Price

Please Specify Cartridge When Ordering

Audio-Scope visually monitors stereo and 4-channel systems



\$219⁹⁵ Shown with optional walnut veneer case

AD-1013 SPECIFICATIONS

FRONT PANEL—Scope Input: Vertical Sensitivity: 25 millivolts P-P/cm. Input Impedance: 100 kΩ. Frequency Response: 5 Hz to 200 kHz ±3 dB. Audio Oscillator Output: Range 20 Hz to 20 kHz. Voltage Level: 2 mV to 3 volts (rms) (variable). Output Variation: .25 dB 20 Hz to 20 kHz. Output Impedance (front panel jack): Approximately 600Ω. Callibrator Voltage: 1.0 volt P-P ±5%. Total Harmonic Distortion: 1% or less. REAR PANEL—Oscillator Output Impedance: 6000Ω. Multipath Input (Scope Horizontal and Scope Vertical): Sensitivity: 25 mV P-P/cm. Input Impedance: 100 kΩ. Left Front, Right Front, Left Back and Right Back Inputs: Sensitivity: 25 mV P-P/cm. Input Impedance: 100 kΩ. Frequency Response: 5 Hz to 200 kHz, ±3 dB. 4-Channel Input: Sensitivity: 1 volt P-P/cm. Input Impedance: 5000 Ω. GENERAL—Triggered Sweep Generator: Range: 10 Hz to 100 kHz. Power Requirement: 120 or 240 volts AC, 60/50 Hz, 15 watts. AC Outlet (on rear panel): Unswitched. Dimensions (overall): 5 1/8" H x 18 1/2" W x 13 1/2" D.

Professional-quality audio oscilloscope lets you measure phasing, response and channel separation on all stereo and quad systems; even indicates signal-strength, FM center tune, FM multipath distortion on Heathkit AN-2016, AR-1500A and other receivers with multipath scope outputs. Has built-in audio oscillator for frequency response checks; rear panel inputs for left-front, left-back, right-front and right-back or FM multipath. A front panel input lets you use the AD-1013 as a conventional oscilloscope and there's also a front panel audio oscillator output. With black metal cabinet, optional case below.

Kit AD-1013, Shpg. wt. 20 lbs. 219.95

Walnut veneer case.

ARA-1500-1, Shpg. wt. 7 lbs. 24.95

ATTENTION: AR-15 and AJ-15 OWNERS: Add multipath provision in less than an evening. Makes AR-15 and AJ-15 compatible with AD-1013 or any DC coupled oscilloscope.

Kit ARA-15-1, Shpg. wt. 1 lb. 24.95

of the world's superior Stereo Receivers



Shown in optional Walnut Veneer Case.

60 WATTS, MINIMUM RMS, PER CHANNEL INTO 8 OHMS WITH LESS THAN 0.25% TOTAL HARMONIC DISTORTION FROM 20-20,000 Hz.

The AR-1500A delivers the kind of clean, low-distortion power and excellent AM and FM performance others only talk about. To see for yourself, compare our specifications with any other receiver—kit or assembled. The numbers speak for themselves. 60 watts, minimum RMS, per channel into 8 ohms with less than 0.25% total harmonic distortion from 20-20,000 Hz. Intermodulation distortion is an infinitesimal 0.1% at full power or at one watt. Frequency response extends from 9 Hz to 80,000 Hz, +0, -1dB. And if those numbers sound pretty impressive, remember that they're guaranteed *minimum* specifications!

A factory-assembled FET front-end provides

high sensitivity and excellent resistance to overload. IHF sensitivity is just 1.8 μ V, so you hear more stations and less noise. And fixed LC IF filters help keep stations separate. A phase-locked multiplex demodulator provides over 40 dB of midband FM stereo separation. Signal-strength and center-channel meters make tuning easy and accurate. There's even a front-panel control so you can set the FM muting threshold to suit reception conditions in your area.

Pushbuttons instantly select tape, tape monitor, auxiliary, phono, AM, FM stereo stations only, or FM with automatic stereo/mono switching. Pushbuttons also control main and remote speakers and, for private listening, there are two front-panel stereo headphone jacks. Has multipath scope outputs, switchable loudness compensation, a tone flat button to bypass the tone controls for "flat" response, a blend button to reduce noise on weak stereo stations and individually adjustable level controls for each channel of every input.

The AR-1500A is one of our easiest kits to build. A clearly illustrated manual shows you everything you need to know—even how to

solder and, after assembly, troubleshoot. You start by building a simple test meter which then allows you to test each completed circuit board. Most of the circuitry fits on 10 circuit board modules, nine of which plug into the chassis. Two factory-fabricated wiring harnesses eliminate most point-to-point wiring. The plug-in boards can be flipped up or extended from the chassis while the receiver is operating. From start to finish, the large fully-illustrated assembly manual guides you step by step, even if you're a first-time kitbuilder.

Build-it-yourself, service-it-yourself savings. Because you build the AR-1500A yourself, you can also make necessary repairs—and that lets you keep your receiver "tuned up" and in top condition for years to come.

Beautifully styled too. A blackout dial accents the massive, diecast front panel. And you can custom mount the receiver or order the optional walnut veneer case. Either way, it's one beautiful receiver at a beautiful, build-it-yourself price. Less case.

Kit AR-1500A, Shpg. wt. 53 lbs. 399.95

Walnut veneer case.

ARA-1500-1, Shpg. wt. 7 lbs. 24.95

Get the most out of your Heathkit System with these valuable books



Dictionary of Audio and Hi-Fi—non-technical definitions of over 2000 hi-fi terms.

EDP-200 5.95

Audio Cyclopeda—the most comprehensive & authoritative work on audio available—3650 entries in all.

EDP-113 34.00

99 Ways to Improve Your Hi-Fi—Projects that enhance your hi-fi enjoyment.

EDP-105 3.50

Guide to High Fidelity—non-technical presentation of stereo and 4-channel components, how they work, how to maintain, understanding specs, how to select, and a glossary of terms.

EDP-194 4.50

See page 48 for book ordering information.

AR-1500A SPECIFICATIONS

AMPLIFIER—Frequency Response (1 watt level): -1 dB, 9 Hz to 80 kHz; -3 dB, from less than 5 Hz to 120 kHz. Intermodulation Distortion: Less than 0.1% at full power; less than 0.1% at 1 watt. Damping Factor: Greater than 60. Input Sensitivity: Phono, 1.8 millivolts; Tape, 140 millivolts; Aux, 140 millivolts; Tape Mon, 140 millivolts. Hum & Noise: Phono (10 millivolt reference), -63 dB. Tape and Aux (0.25 volt reference), 75 dB.—**FM (Monophonic)**—Frequency Response: ± 1 dB, 20 to 15,000 Hz. Antenna: 75 or 300-ohm. Sensitivity: 1.8 μ V.* Selectivity: 90 dB.* Image Rejection: 100 dB.* IF Rejection: 100 dB.* Capture Ratio: 1.5 dB.* AM Suppression: 50 dB.* Harmonic Distortion: 0.5% or less.* Intermodulation Distortion: 0.1% or less.* Hum & Noise: 60 dB.* Spurious Rejection: 100 dB.*—**FM (Stereo)**—Channel Separation: 40 dB or greater at midfrequencies; 35 dB at 50 Hz; 25 dB at 10 kHz; 20 dB at 15 kHz. Harmonic Distortion: 0.5% at 1000 Hz with 100% modulation. 19 kHz and 38 kHz Suppression: 55 dB or greater. SCA Suppression: 55 dB.—**AM**—Sensitivity: 50 μ V with external input; 300 μ V per meter with radiated input. Selectivity: 20 dB at 10 kHz. AM Antenna: Built-in rod type; connections for external antenna and ground. Image Rejection: 70 dB at 600 kHz; 50 dB at 1400 kHz. IF Rejection: 70 dB at 1000 kHz. Harmonic Distortion: Less than 2%.* Hum and Noise: 40 dB.* **GENERAL**—Accessory AC Outlets: Two. One switched and one unswitched (240 watts). Power Requirement: 120 or 240 volts 60/50 Hz AC. 40 watts idling (zero output) and 356 watts at full output. Dimensions: Overall—18½" W x 5½" H x 13½" D.

*Rated IHF (Institute of High Fidelity) Standards.

Stereo or 4-Channel, Components or Systems,

Shown in Optional
Pecan Veneer Case



\$339⁹⁵

Heathkit AR-29 AM/FM Stereo Receiver for cost-conscious connoisseurs

35 WATTS, MINIMUM RMS, PER CHANNEL INTO 8 OHMS AT LESS THAN 0.25% TOTAL HARMONIC DISTORTION FROM 20-20,000 Hz

The AR-29 AM/FM stereo receiver is a best-seller that offers you no-compromise performance at a low build-it-yourself kit price. Its overall quality design, along with conservative specifications, assure a level of performance normally associated with far more expensive units. Has pushbutton function selectors, slide controls, FM muting and stereo blend, tape monitor and main/remote speaker switching. Tuning is as easy and accurate as you could want, with a wide, clearly marked slide-rule tuning dial and two meters; signal strength for both AM and FM, center channel for FM. Special level controls for each channel of all inputs let you switch from phono to tuner to tape without changing volume. The AR-29 provides as much power as you're likely to need for most listening areas with about half the distortion of many com-

petitive models. Intermodulation distortion is extremely low too; less than 0.2% at full power and less than 0.1% at 1 watt. As the audio experts have noted, the AR-29's sound is solid, clean and well-defined, which is what hi-fi is all about. Kit assembly is easy and fun — most parts mount on printed circuit boards that simply plug into the unit, and a pre-assembled harness with individual wires stripped and cut to length further simplifies construction. A built-in meter, with test probes and function switch, lets you check yourself every step of the way during assembly, and aids in servicing. With black metal cabinet, order wood case below.

Kit AR-29, Shpg. wt. 34 lbs. 339.95
Pecan-Stained Veneer Case.
AE-19, Shpg. wt. 9 lbs. 21.95

\$279⁹⁵

The Top Performing Heathkit AR-1302 AM/FM Stereo Receiver

20 WATTS, MINIMUM RMS, PER CHANNEL INTO 8 OHMS WITH LESS THAN 0.25% TOTAL HARMONIC DISTORTION FROM 20-20,000 Hz



Shown in Optional Case

AR-1302 SPECIFICATIONS

IM Distortion: 0.25%. FM Sensitivity: 1.9 μ V*. Selectivity: 60 dB*. Capture Ratio: 1.8 dB*. AM Suppression: 45 dB*. Spurious Rejection: -90 dB*. Channel Separation: 40 dB at mid-frequencies. Antenna Inputs: 75 or 300-ohm. — AM SECTION — Antenna: Adjustable rod. Sensitivity: Rod Antenna, 300 μ V/M*. Power Requirements: 120/240 VAC 60/50 Hz. Dimensions: 5 1/8" H x 16 3/4" W x 14 1/2" D.
*Rated IHF (Institute of High Fidelity) Standards.

The AR-1302 is a quality stereo receiver with enough low-distortion power for most any listening area — so you don't pay for more power than you really need. Its features include: FM interstation mute, tape monitor, signal-strength and center-channel tuning meters, main/remote speaker switching, pushbutton function selectors and much more. The AM/FM tuner section has the kind of station-pulling performance you ordinarily find on more expensive receivers. And the AR-1302's elegant, functional styling adds a touch of quality to any decor. With black metal cabinet, order wood case below.

Kit AR-1302, Shpg. wt. 32 lbs. 279.95
Pecan-Stained Veneer Case.
AE-19, Shpg. wt. 9 lbs. 21.95

Save up to 127.99



If purchased separately, up to **\$908⁶⁵** Heathkit Price **\$780⁶⁶**

- AR-29 AM/FM Stereo Receiver & Case
- Two Heathkit AS-1373 Speakers
- B-1-C 960 Automatic Turntable with Base and choice of Shure M91ED or Empire 2000E/III Cartridge

ARS-106, Shpg. wt. 184 lbs.
Exp./Frt. 780.66
Please specify cartridge when ordering

AR-29 SPECIFICATIONS

AMPLIFIER — Frequency Response: -1 dB, 7 Hz to 60 kHz. IM Distortion: 0.2% at 35 W, 0.1% at 1 W. Input Sensitivity: Phono: 2.2 mV. Tape, Aux. and Tape Mon., 180 mV. Hum and Noise: Phono (10 mV ref.), -65 dB. Tape & Aux. (0.25 V ref.), -75 dB. — FM Sensitivity: 1.8 μ V*. Selectivity: 70 dB*. Image Rejection: 90 dB*. Capture Ratio: 1.5 dB*. AM Suppression: 50 dB*. Harmonic Distortion: 0.5%*. Spurious Rejection: -90 dB*. Antenna: 75 or 300-ohm. Channel Separation: Typically 45 dB at mid-frequencies. SCA Suppression: 55 dB. — AM SECTION — AM Antenna: Adjustable rod. Connections for external ant., gnd. Sensitivity: External antenna, 20 μ V at 1000 kHz for 20 dB S+N/N. Selectivity: 40 dB at 20 kHz. Image Rejection: 60 dB at 600 kHz*. 45 dB at 1400 kHz*. Power Requirement: 120/240 VAC 60/50 Hz. Dimensions: 5 1/8" H x 16 3/4" W x 14 1/2" D.
*Rated IHF (Institute of High Fidelity) Standards.

Save up to 144.94



Original Value to **\$678⁶⁵** System Price **\$533⁷¹**

- AR-1302 AM/FM Stereo Receiver & Case
- Two Heathkit AS-105W Speakers
- B-1-C 940 Automatic Turntable with Base and choice of Shure M91ED or Empire 2000E/III Cartridge

ARS-105, Shpg. wt. 161 lbs. 533.71
Please specify cartridge when ordering

Heathkit hi-fi is your "Better Buy"



Heathkit AR-1214 AM/FM Stereo Receiver — Affordable Hi-Fi

\$199⁹⁵

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

Outstanding performance/price combination! Has power enough for good solid bass, even from inefficient speakers; an FM tuner with two integrated circuits and ceramic filters in the IF; advanced phase-lock-loop FM stereo circuit for enhanced separation with minimum distortion, and factory-assembled and aligned FM front end assures 2 μ V sensitivity and excellent 2 dB capture ratio. Features include: tape monitor, pushbutton input se-

lection, speaker on-off button and stereo headphone jack, easy and accurate flywheel tuning, inputs for 75 or 300 ohm antenna plus a swivel-mounted AM antenna. It's an easy to build kit too. The famous Heathkit manual makes it easy even for first-time kit builders. Stylish front panel and case with wood veneer end panels.

Kit AR-1214, Shpg. wt. 18 lbs. 199.95

AR-1214 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. Hum and Noise: -65 dB. FM SECTION — Sensitivity: 2 μ V*. Selectivity: 60 dB*. Image Rejection: 50 dB*. Stereo Separation:

40 dB typ., 35 dB minimum. — AM SECTION — Sensitivity: 100 μ V per meter*. Selectivity: 40 dB. Power Requirement: 120/240 VAC, 60/50 Hz. Dimensions: 3 $\frac{1}{2}$ " H x 17" W x 13" D. *Rated IHF (Institute of High Fidelity) Standards.

Heathkit AR-2020 AM/FM 4-Channel Receiver

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

The AR-2020 is a delight to build and operate! The low-distortion amplifier puts out plenty of power; the AM and FM tuner sections pull in stations far and near with outstanding clarity. Features a pre-assembled and aligned FM front end with ceramic IF filters for excellent amplifying and limiting characteristics. The built-in matrix decoder is optimized for SQ†, also has inputs for both stereo and discrete 4-channel aux. sources. Even has discrete 4-channel tape inputs and outputs. Case with handsome vinyl-clad top and walnut veneer end panels.

Kit AR-2020, Shpg. wt. 31 lbs. 269.95



\$269⁹⁵

AR-2020 SPECIFICATIONS

AMPLIFIER — Frequency Response: ± 1 dB, 7 Hz to 50 kHz. IM Distortion: less than .5% at full output; less than .25% at 1 watt. — FM SECTION — Sensitivity: 2 μ V*. Selectivity: 60 dB*. Image Rejection: 50 dB*. Capture Ratio: 2 dB*. Power Requirement: 120/240 VAC, 60/50 Hz. Dimensions: 5" H x 20" W x 14" D.

*Rated IHF (Institute of High Fidelity) Standards. †SQ is a registered trademark of CBS, Inc.



Save up to 122.35

If purchased separately, up to \$492⁷⁰

System Price **\$370³⁵**

- Heathkit AR-1214 AM/FM Stereo Receiver
- Two Heathkit AS-1042 Speakers
- B-I-C 940 Automatic Turntable with Base and Choice of Shure M91ED or Empire 200E/III Cartridge.

ARS-104, Shpg. wt. 110 lbs.

Exp./Frt. 370.35

Please specify cartridge when ordering



Save 75.40

If purchased separately, \$388⁸⁰

System Price **\$313⁴⁰**

- Heathkit AR-1214 AM/FM Stereo Receiver
- Two Heathkit AS-106 Speakers
- Garrard 440M Record Changer with Base, Dust Cover, Pickering Magnetic Stereo Cartridge

ARS-113, Shpg. wt. 68 lbs.

Exp./Frt. 313.40

Save 85.39



If purchased separately, \$512⁶⁰

System Price **\$427²¹**

- Heathkit AR-2020 4-Channel Receiver
- Four Heathkit AS-106 Speakers
- Garrard 440M 3-Speed Record Changer with Base, Dust Cover, Pickering Magnetic Stereo Cartridge

ARS-112, Shpg. wt. 108 lbs.

Exp./Frt. 427.21

Four Channel Sound — presents a clear picture of how various 4-channel systems work. EDP-102 4.50

How to Select and Use Hi-Fi and Stereo Equipment — a two volume comprehensive information source.

EDP-190, Vol. 1 4.55

EDP-191, Vol. 2 4.55

Hi Fi Stereo Handbook — All the information you want on hi-fi & stereo, including new 4-channel systems.

EDP-104 6.95

4-Channel Stereo — From Source to Sound — Everything you ever wanted to know about the exciting new subject of 4-channel stereo. EDP-109 4.95

See page 48 for book-ordering information

Fully assembled Mediterranean equipment cabinet

Houses your entire stereo system, including the speakers! One-piece, 5 $\frac{1}{2}$ -ft. credenza is crafted of hickory veneers with solid oak trim finished in pecan stain. Has built-in ducted port speaker enclosures with precut 12" openings. Overall cabinet: 26 $\frac{1}{2}$ " H x 66" W x 19 $\frac{1}{4}$ " D. Shelf compartment: 35 $\frac{3}{8}$ " W x 17 $\frac{1}{2}$ " D overall, shelf 15" D. Adjustable shelf height: 5 $\frac{1}{2}$ ", 6 $\frac{1}{2}$ ", 7 $\frac{1}{2}$ ", 8 $\frac{1}{2}$ ". Lower compartment: 35 $\frac{3}{8}$ " W x 17 $\frac{1}{2}$ " D x 12 $\frac{1}{4}$ " H min. (shelf at 8 $\frac{1}{2}$ " $\frac{1}{2}$). Speaker cabinet volume: 2.3 cu.



ft. Changer Base: 5 $\frac{1}{2}$ " H x 18" W x 14" D. Shpg. wt. 193 lbs.

AE-101, Exp./Frt. 259.95

Charge a kit — no money down on any kit — see page 50 for details.

Buy a fine-sounding Heathkit Amplifier today...



\$114⁹⁵

Our AA-1214 Stereo Amplifier gives you top performance at a price lower than you'd expect

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

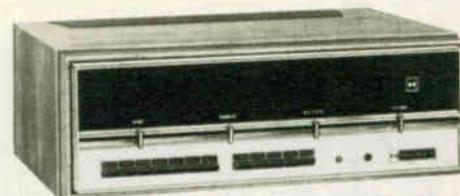
Offers the same excellent performance as the amplifier section of our famous AR-1214 receiver. And the AA-1214 has a host of "top of the line features" for operating convenience and versatility. Input level controls match the amplifier to your phono cartridge's output; tape monitor lets you listen as you record (with 3-head decks), positive push-button input selection, front panel stereo

headphone jack, bass and treble controls, and much more. The kit building is fun and easy too, with most parts mounted on two printed circuit boards and a wiring harness which eliminates most point-to-point connections. Stacks nicely with the matching AJ-1214 tuner, page 35. Case with walnut-stained veneer end panels.

Kit AA-1214, Shpg. wt. 13 lbs. **114.95**

AA-1214 SPECIFICATIONS

Frequency Response: ± 1 dB, 7 Hz to 100 kHz.
 IM Distortion: less than 0.5%. Hum and Noise: -65 dB.* Power Requirement: 120/240 VAC, 60/50 Hz. Dimensions: 3 $\frac{7}{8}$ " H x 12 $\frac{3}{4}$ " W x 12" D.
 *Rated IHF (Institute of High Fidelity) Standards



Shown in optional case **\$189⁹⁵**

AA-29 Stereo Amplifier

POWER OUTPUT: 35 WATTS, MINIMUM RMS, PER CHANNEL INTO 8 OHMS, WITH LESS THAN 0.25% TOTAL HARMONIC DISTORTION FROM 20-20,000 HZ.

The amplifier section from our AR-29 receiver, for those who prefer the convenience of "separates". Has power enough for most speaker systems, complete input level controls including tape monitor, slide controls, pushbutton selectors including two for main or remote speakers. Has aux. and tuner inputs, front panel headphone jack. Easy kit assembly too. Compare specs, features with any amp in this price range and you'll build the AA-29. Metal cabinet, order case below.

Kit AA-29, Shpg. wt. 27 lbs. **189.95**

Oiled Pecan Veneer Case.

AE-19, Shpg. wt. 9 lbs. **21.95**

AA-29 SPECIFICATIONS

Frequency Response: ± 1 dB, 7 Hz to 60 kHz.
 IM Distortion: 0.2% at full power; 0.1% at 1 watt.
 Hum and Noise: Phono, -65 dB. Tape & Aux., -70 dB. Power Requirement: 120/240 VAC, 60/50 Hz. Dimensions: 5 $\frac{1}{2}$ " H x 16 $\frac{3}{4}$ " W x 14 $\frac{1}{2}$ " D.

Now's a great time to choose your "SEPARATES" SYSTEM from Heath and get even MORE SAVINGS!

Combine an amplifier and tuner, turntable or tape deck, and be sure to select our **SALE-PRICED AS-1042 or AS-105W speaker systems.** (see pages 38-39).

You save on the speakers, you also get our famous Heath 5% system discount!



AA-18 Solid-State Mono Amplifier \$24⁹⁵

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

Music on a budget that's fun to build and fun to listen to. Use it anywhere for a roomful of monophonic sound. Inputs may be used for phono with ceramic cartridge, mono AM or FM tuner, or tape recorder. Drives efficient 8-ohm speakers to surprising sound levels... also can be used as a good headphone amplifier. Ideal beginner kit with open chassis layout, simplified PC board construction. Goes together in just a couple of evenings. With metal case.

Kit AA-18, Shpg. wt. 4 lbs. **24.95**

AA-18 SPECIFICATIONS

Power Requirement: 120/240 VAC, 60/50 Hz. Dimensions: 2 $\frac{1}{2}$ " H x 7 $\frac{3}{4}$ " W x 5 $\frac{1}{4}$ " D.

AA-2005A deluxe Stereo/Quadraphonic Amplifier



\$139⁹⁵

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

Enjoy the spacious sound of 4-channel at a price lower than many comparable stereo amplifiers. The AA-2005A's built-in matrix decoder is optimized for SQ1-encoded records, tape and FM. And it has inputs for discrete 4-channel tuner, tape and aux. as well as outputs for a discrete tape recorder. Four level controls adjust the volume of each channel, and once the correct balance is established, a master volume control takes over. Has separate bass and treble controls for front and rear channels, front-panel jacks for stereo or 4-channel headphones. Luxurious champagne gold front panel accented by black vinyl-clad top and walnut veneer end panels.

Kit AA-2005A, Shpg. wt. 28 lbs. **139.95**

Add a matching stereo tuner when you're ready



\$114⁹⁵

AJ-1214 AM/FM Stereo Tuner

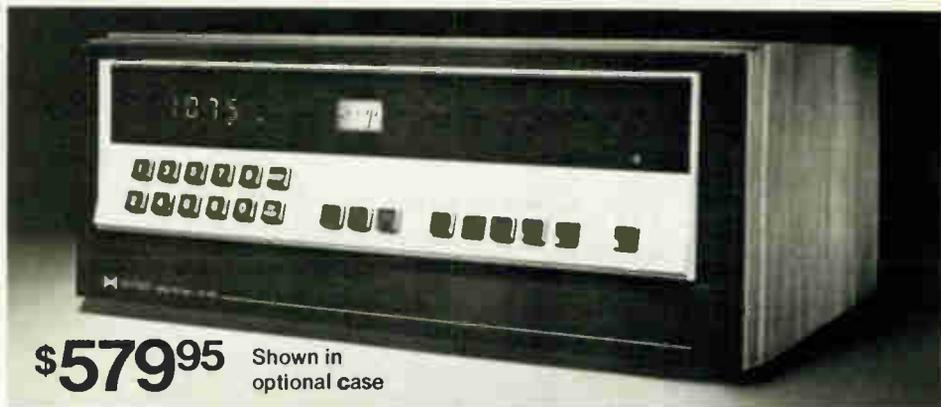
The perfect "system mate" for the AA-1214 amplifier. Has the same features and specs as the tuner section of our famous AR-1214 receiver. Pre-assembled and aligned FM front end provides 2 μ V sensitivity with extremely low cross modulation and virtually no overload, even on strong signals. The FM IF uses two IC's and ceramic filters for over 60 dB selectivity. A phase-lock-loop multiplex circuit provides excellent stereo separation. Pushbutton band selection, flywheel tuning, inputs for 75 or 300-ohm antenna. Handsome vinyl clad metal case with walnut-stained veneer end panels.

Kit AJ-1214, Shpg. wt. 11 lbs. **114.95**

AJ-1214 SPECIFICATIONS

FM Sensitivity: 2 μ V*. Selectivity: 60 dB*. Image Rejection: 50 dB*. Capture Ratio: 2 dB*. AM Suppression: 50 dB*. Stereo Channel Separation: 40 dB typ., 35 dB min. AM Sensitivity: 100 μ V per meter*. Selectivity: 40 dB. Power Requirement: 120/240 VAC, 60/50 Hz. Dimensions: 3 $\frac{1}{8}$ " H x 17" W x 13" D.

*Rated IHF (Institute of High Fidelity Standards)



\$579⁹⁵ Shown in optional case

Our best FM Stereo Tuner with advanced computer technology

Incorporates the most precise and accurate tuning system available today — digital read-out and digital frequency synthesis — for an incredible 0.005% tuning accuracy that virtually eliminates interference as well as many other problems of conventional tuners. Features convenient three-way tuning — enter a station's frequency through the front panel keyboard; use the Auto-Sweep to count down from the top of the FM band and stop automatically at each listenable station, or program it to stop only at stereo stations; or use the A, B and C buttons to select any of three stations programmed with computer-type punch cards. We even supply extra cards so you'll have one for each of your favorite stations. Has multipath outputs for DC coupled scopes (like the AD-1013), adjustable AGC and squelch, much more. Truly one of the world's finest

tuners. With metal cabinet, order case below.

Kit AJ-1510A, Shpg. wt. 25 lbs. **579.95**
Pecan Veneer Case.

AJA-1510-1, Shpg. wt. 8 lbs. **26.95**

AJ-1510 SPECIFICATIONS

MONOPHONIC: Tuning: Digitally synthesized. Antenna: 75 or 300 ohm. Sensitivity: Less than 1.8 μ V. Selectivity (alternate channel):* Greater than 95 dB. Capture ratio: Less than 1.5 dB. Harmonic distortion:* Less than 90 dB. IF rejection:* Greater than 95 dB. Spurious rejection: Greater than 90 dB. Channel frequency accuracy: Better than .005%. STEREO PHONIC—Channel separation: 1,000 Hz, 40 dB; 80 Hz, 25 dB; 10 kHz, 25 dB; 15 kHz, 20 dB. Harmonic distortion:* 0.35%. AUDIO OUTPUT—Audio output level: (fixed): 1.2 V rms nominal (with 100% mod.). Output impedance: (fixed): Approx. 4,700 ohms. GENERAL—Power Requirement: 120/240 VAC, 60/50 Hz, 50 W. AC convenience outlet: Unswitched 350 W Max. Dimensions: 6" H x 16 $\frac{1}{2}$ " W x 14 $\frac{1}{2}$ " D.

*Rated IHF (Institute of High Fidelity Standards).



Save
41%

Original Value **\$390⁷⁰**
to

System Price **\$229⁹⁵**

- Heathkit AA-2005A 4-Channel Amplifier
- Four Heathkit AS-1140 Speakers (See page 36)
- Garrard 440M 3-Speed Record Changer with Base, Dust Cover, Picking Magnetic Stereo Cartridge (See page 42)

AA-2005A SPECIFICATIONS

Frequency Response: ± 1 dB, 7 Hz to 50 kHz. IM distortion: less than .5% full power, less than .25% at 1 watt. Hum and Noise: phono, -60 dB; tuner, aux., tape, -70 dB. Power Requirement: 120/240 VAC, 60/50 Hz. Dimensions: 4 $\frac{1}{8}$ " H x 19 $\frac{3}{8}$ " W x 12" D.

†SQ is a trademark of CBS, Inc.



Shown in optional case

Our AJ-15 FM Stereo Tuner — the one that made the industry envious

The tuner section from our critically acclaimed AR-15 stereo receiver, the one that was the first to use integrated circuits, the first to use crystal filters, the first to have super specs. It's a top performing tuner with full controls, two tuning meters, front panel phone outputs, output level controls for each channel. Its excellent operation and performance make it a tuner you'll appreciate. With metal cabinet, order case below.

Kit AJ-15, Shpg. wt. 17 lbs. **259.95**

Walnut Veneer Case.

AE-18, Shpg. wt. 8 lbs. **21.95**

AJ-15 SPECIFICATIONS

Sensitivity: 1.8 μ V*. Selectivity: 70 dB*. Image Rejection: 90dB*. IF Rejection: 30 dB*. Capture Ratio: 1.5 dB*. AM Suppression: 50 dB*. Harmonic Distortion: 0.5% or less*. Hum & Noise: 65 dB*. Spurious Rejection: 100 dB*. Channel Separation: 40 dB or greater at mid-frequencies. Power Requirement: 120/240 VAC, 60/50 Hz. Dimensions: 4 $\frac{1}{8}$ " H x 16 $\frac{1}{2}$ " W x 12 $\frac{1}{2}$ " D.

*Rated IHF (Institute of High Fidelity Standards).



Shown in optional case

AJ-29 AM/FM Stereo Tuner — an outstanding price/performance combination

The tuner section of the AR-29 stereo receiver, styled and sized to match the AA-29 amplifier. Has pre-assembled FET FM front end with an integrated circuit multiplex, 3 IC's and a 9-pole filter in the IF for an ideally shaped bandpass with 70 dB selectivity for excellent adjacent channel rejection and no alignment problems. Wideband AM too. With metal cabinet, order case below.

Kit AJ-29, Shpg. wt. 19 lbs. **199.95**

Oiled Pecan Veneer Case.

AE-19, Shpg. wt. 9 lbs. **21.95**

AJ-29 SPECIFICATIONS

FM Sensitivity: 1.8 μ V*. Selectivity*, 70 dB. Image Rejection, 90 dB*. Capture Ratio: 1.5 dB*. Harmonic Distortion: 0.5%*. Separation: 45 typ. at mid frequencies. AM Sensitivity: 20 μ V for 20 dB S + N/N*. Selectivity: 40 dB at 20 kHz.* Power Requirement: 120/240 VAC, 60/50 Hz. Dimensions: 5 $\frac{1}{8}$ " H x 16 $\frac{1}{4}$ " W x 14 $\frac{1}{2}$ " D.

*Rated IHF (Institute of High Fidelity Standards).

Charge a kit — no money down on any kit — see page 50 for details.

Low-Cost Stereo and 4-Channel Performers



\$139⁹⁵

AC-1118 AM/FM Stereo Receiver

Feature packed — direct-coupled amplifier; inputs for ceramic cartridge changer and tape player; slide volume and balance controls; smooth slide-rule tuning dial and stereo light. Easy construction too — most parts mount on five circuit boards and a few simple adjustments bring it to rated performance.

Kit AC-1118, Shpg. wt. 15 lbs. 139.95
 Kit AS-1140, Speakers 15 lbs. Pair 29.95
 ACP-1138, Ceramic Cart. Changer 15 lbs. 44.95



\$179⁹⁵

AM/FM 8-Track Stereo Receiver

Has the same fine features as AC-1118 plus built-in 8-track stereo tape player with automatic or manual program change and lighted program indicators. The tape player is completely factory assembled and aligned, just drop it into place, connect the input and output. It's an enjoyable kit-building experience, a fine performer too.

Kit AC-1120, Shpg. wt. 22 lbs. 179.95
 Kit AS-1140, Speakers 15 lbs. Pair 29.95
 ACP-1138, Ceramic Cart. Changer 15 lbs. 44.95



\$199⁹⁵

AC-1122 AM/FM/8-Track 4-Channel Receiver

Functions as discrete 4-channel amplifier; also has built-in SQ* decoder for matrixed and SQ* 4-channel records and broadcasts. Assembled 8-track tape player is compatible with all stereo and 4-channel tapes. Has full controls, stereo and 4-channel headphone jacks.

Kit AC-1122, Shpg. wt. 25 lbs. 199.95
 Kit AS-1140, Speakers 15 lbs. Pair 29.95
 ACP-1138, Ceramic Cart. Changer 15 lbs. 44.95

*SQ is a trademark of CBS, Inc.



\$99⁹⁵

AT-1124 8-Track 4-Channel Player/Amplifier

Plays all discrete 4-channel and stereo 8-track tapes; has SQ* decoder for matrixed 4-channel material or enhanced stereo; inputs for ceramic cartridge changer and high-level stereo or 4-channel source. Fully assembled and aligned 8-track player is ready to connect.

Kit AT-1124, Shpg. wt. 21 lbs. 99.95
 Kit AS-1140, Speakers 15 lbs. Pair 29.95
 ACP-1138, Ceramic Cart. Changer 15 lbs. 44.95

SAVE 21% ON THESE MATCHING

HIGH EFFICIENCY SPEAKERS

SPEAKER PAIR SPECIAL

Were **\$37⁹⁵** NOW ONLY **\$29⁹⁵**

4½" foam suspension speakers for use with units on this page, other small systems. 70-16,000 Hz response. Walnut-grain vinyl clad enclosures. 12" H x 7" W x 6" D. Shpg. wt. 15 lbs.
 Kit AS-1140 Pair 29.95

These specifications apply to all components on this page.

POWER OUTPUT: 4.5 WATTS, MINIMUM RMS, PER CHANNEL INTO 8 OHMS AT LESS THAN 1.0% TOTAL HARMONIC DISTORTION FROM 50-15,000 HZ.

AMPLIFIER — Frequency Response: 30-15,000 Hz, ±3 dB Input Sensitivity: ceramic phono, 140 mV; high level inputs, 120 mV. Hum & Noise: -60 dB. FM Sensitivity*: 5 µV. Selectivity*: 60 dB. Harmonic Distortion*: 1%. Hum & Noise: -55 dB. Stereo Channel Separation: 35 dB. FM Antenna: 300-ohm, external. AM — Sensitivity: 300 µV/m for 20 dB S+N/N. Selectivity: 40 dB, alternate channel. Hum & Noise: -35 dB. **TAPE PLAYER** — Motor: Synchronous. Frequency Response: 50-10,000 Hz, +3, -5 dB. Separation: 30 dB at 1 kHz. Harmonic Distortion: 3% at 1 kHz S.R.L., max. Hum & Noise: -40 dB. Wow & Flutter: less than 0.3%. **GENERAL** — Power Requirement: 120/240 VAC, 60/50 Hz. Dimensions: All units are 4" high and 15" deep; units with 8-track players are 22" wide, others are 17" wide. Cases: walnut-grained, vinyl clad metal and plastic.
 *Rated IHF (Institute of High Fidelity) standards.

Ceramic Cartridge Changer

ONLY \$44⁹⁵

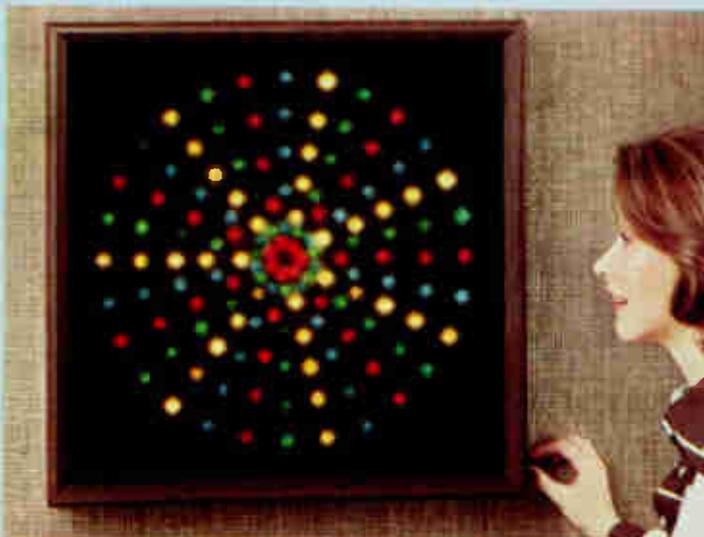
3-speed changer with molded vinyl base, dust cover, 45-rpm adapter, low-mass tonearm. Ceramic cartridge with diamond stylus. 7¼" H x 15¼" W x 14¼" D. Shpg. wt. 15 lbs.
 ACP-1138 44.95

Order any above units with speakers and changer listed, and save 5% with system discount.

Turn your music into a dazzling light show

\$79⁹⁵

Make music "come alive" with vibrant, pulsating color



The TD-1006 Color Organ adds exciting sights to your sound system. With its extra wide dynamic range, it translates any kind of music into pulsing, whirling starbursts of color. Just connect the TD-1006 to the speaker leads of any sound source (except AM radio). Without effecting 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). The lights pulsate in time to the music creating spokes of color that seem to swirl.

Just wire the two circuit boards and install the pre-strung lights in the factory-assembled cabinet. A single knob on the side controls sensitivity and turns power on or off. Just 4½" deep — even hang it on the wall. Walnut-grained vinyl-clad case, black-out front panel. We think you'll agree music has never looked better.

Kit TD-1006, Shpg. Wt. 32 lbs. 79.95

TD-1006 Specifications

Dynamic Range: 25 dB, minimum. Input Signal: 1 volt RMS min. to 22 volts RMS max. Source Protection: line isolation. Power Requirement: 120/240 VAC, 50-60 Hz, 80 watts max. Dimensions: 22¾" W x 22¾" H x 4½" D. Net Weight: 20 lbs.

An exciting new 3-way speaker value

Excellent power handling and superb definition in the 1" dome tweeter. Even at 12 kHz, horizontal dispersion is 120°.

Crossover network controls and fuses are conveniently located on the front of the enclosure for easy accessibility.

A special subenclosure surrounds the 4½" mid-range speaker to prevent woofer-vibration distortion and reflection.

Gutsy 10" woofer delivers the kind of solid, well-defined bass every audiophile wants.

Removing the foam grille reveals the beautiful walnut veneer baffle with the 3 speakers and switch/fuse panel.

\$149⁹⁵ EACH

Heathkit AS-1373 rivals the performance of speakers costing much, much more

Here's a superb, build-it-yourself addition to our speaker line...with guaranteed specifications you won't find on comparably priced speakers. The 10" woofer provides solid, well-defined bass. And the woofer-to-midrange crossover frequency is 500 Hz to minimize intermodulation distortion and insure smoothness. The natural-sounding midrange is due in large part to two design features normally found only in speakers costing over \$300. First, a special subenclosure isolates the 4½" midrange speaker from distortion caused by woofer vibrations (most bookshelf systems use a less effective plastic back behind the midrange cone). Second, the subenclosure is filled with a polyester damping material which prevents reflections — a primary cause of midrange coloration. The 1" dome tweeter is one of the finest made — excellent power handling and superb definition. Even at 12,000 Hz its horizontal dispersion is 120°!

Innovative design makes it an even better

speaker. Poor imaging (a constantly-shifting blur of sound) is a common problem in bookshelf speakers. To create a sharply focused sound "image", all three of the AS-1373's drivers are flush-mounted. And there are no "rails" around the edges of the cabinet to limit treble dispersion or cause peaks and dips in tweeter response. For optimum imaging, the tweeter should be located directly above the midrange. The AS-1373 is the only speaker that permits this whether you position the system horizontally or vertically — simply interchange the positions of the tweeter and switch plate. Finally, the handsome foam grille contributes to superior imaging because it is more acoustically transparent than ordinary grille cloth — especially at high frequencies.

The AS-1373 is a great combination of efficiency and power handling characteristics. Although it can be driven by as little as 10 watts, it's rated at 200 watts max. (the woofer can withstand up to 400 watts of pulse power). So, 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 the AS-1373 is the only bookshelf system which provides maximum

protection by individually fusing each driver, virtually eliminating expensive burn outs. The sophisticated crossover circuit (a weak link in many systems) is every bit as rugged as the drivers. Two subtle but effective controls match the mid- and high-frequency response to your room's acoustics. Shpg. wt. 62 lbs.

Kit AS-1373, Exp./Frt. each 149.95

AS-1373 SPECIFICATIONS

Frequency Response: ±3 dB from 40 Hz to 20,000 Hz, in a typical listening room; -10 dB at 30 Hz and 22k Hz. Impedance: 8 ohms, nominal; 6 ohms, minimum. Recommended Amplifier Power: 10 watts minimum, 200 watts, maximum (fused for larger amps) Crossover Frequencies: 500 Hz and 3000 Hz, 12 dB/octave. Controls: 3 kHz shelf/flat; 10 kHz rolloff/flat. Fuses: Woofer, 1¼A slow-blow; midrange, ¾A slow-blow; tweeter, ½A regular. WOOFER Diameter: 10", nominal. Magnet Weight: 2 lbs. Power Handling: 400 watts, pulse (if not excursion limited); 40 watts continuous. MID-RANGE Diameter: 4½", nominal. Magnet Weight: 10 ounces. Power Handling: 250 watts, pulse; 25 watts continuous. TWEETER Diameter: 1" dome. Magnet Weight: 8 ounces. Power Handling: 140 watts, pulse; 14 watts continuous. ENCLOSURE Size: 26" H x 14½" W x 11¾" D, without 1¼" grille. Net Weight: 47 lbs.

New high-performance headphones...for stereo enjoyment on a budget

New Koss High Velocity Stereoheadphones with Decilite™ driver elements
AHP-1168, Shpg. wt. 2 lbs. Assembled 44.95

AHP-1168 SPECIFICATIONS
Frequency Response: 15-20,000 Hz. Total Harmonic Distortion: Less than 0.5%. Source Impedance: 3.2-600 ohm. Cord: Coiled, 10' extended. Weight: 9.3 oz., less cord.

New Sennheiser Stereo Headphones with patented Open-Air Design
AHP-1193, Shpg. wt. 2 lbs. Assembled. . . 64.95

AHP-1193 SPECIFICATIONS
Frequency Response: 15-20,000 Hz. Total Harmonic Distortion: Less than 1.0%. Impedance: 2,000 ohms per channel — can be connected directly to either hi or lo impedance outputs. Weight: 6.5 oz., less cord. Cord: 10' extended.

New Koss High Velocity Stereoheadphones with individual gain controls
AHP-1169, Shpg. wt. 3 lbs. Assembled. 54.95

AHP-1169 SPECIFICATIONS
Frequency Response: 10-20,000 Hz. Total Harmonic Distortion: Less than 1.0%. Source Impedance: 3.2-600 ohm. Cord: Coiled, 10' extended. Weight: 24 oz., less cord.

Stereo Headphone Control Unit
Box on 20-foot cable provides jacks for two sets of headphones, volume control and speaker on/off switch. A great kit for first-time builders.
Kit AC-17, Shpg. wt. 3 lbs. 14.95

Find out how easy it is to build a kit — order the manual. See page 49.

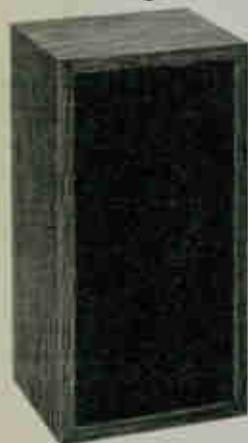
Get More VALUE for your audio dollar with

PAIR SPECIAL!

SAVE \$15⁹⁵

Reg. \$95.90 Pair

NOW \$79⁹⁵ Pair



1 **\$47⁹⁵**
EACH



2 **\$57⁹⁵**
EACH



3 **\$109⁹⁵**
EACH



4 **\$219⁹⁵**
EACH



5 **\$239⁹⁵**
EACH

Heathkit Bookshelf Speaker Systems put the sound where you want it — and they look great too, with factory assembled and finished cabinets

1 This 2-way system handles 10-50 watts for medium-power amplifiers and receivers

Good sound on a low budget. A high compliance, long throw 8" woofer and 3½" shallow cone/dome tweeter deliver response from 40 to 18,000 Hz. The cross-over system operates at 1500 Hz to distribute frequencies evenly for smooth overall response. System resonance at 65 Hz. A rear panel level control contours high frequency response to your listening room. The woofer has an 8.5-oz. magnet. The tweeter uses a 1.3-oz. magnet. Ten watts is all that's needed to power the AS-1042, yet it can handle up to 50 watts. Impedance is 8 ohms nominal, 6 ohms minimum. Cabinet comes fully assembled and covered with handsome walnut-toned vinyl. 19"H x 10"W x 8¼"D. Kit AS-1042, Shpg. wt. 27 lbs. each 47.95 PAIR SPECIAL, Shpg. wt. 54 lbs. pair 79.95

2 High efficiency 2-way system ideal for "budget" music systems

Designed for use with low power amplifiers. It can be driven by as little as 5 watts yet can handle up to 25 watts. The system uses an exponential rectangular horn tweeter and an 8-inch woofer in a vented bass-reflex enclosure. A level control knob for the tweeter is mounted on the rear panel. Magnets are 10 ounces for the woofer and 1.47 ounces on the tweeter. Frequency response is 70 to 15,000 Hz with crossover at 3,500 Hz. 8-ohm nominal impedance. The walnut toned vinyl-clad cabinet comes fully assembled. 21½" H x 12" W x 10½" D. Kit AS-1039, Shpg. wt. 36 lbs. each 57.95

3 High performance 3-way system with midrange speaker for added presence

The Heathkit AS-104 has the 100 watt power-handling capacity and features of the AS-105 but adds a low resonance, high compliance 4½-in. midrange speaker in a sealed and acoustically lined sub-enclosure. 8 ohm impedance. RLC crossover at 500 Hz and 4500 Hz. Individual mid-frequency and high-frequency controls are provided to allow "tailoring" the AS-104's frequency response so it sounds its best in any listening area. The assembled oiled walnut veneer cabinet has a removable front grille for easy access to speaker elements. Dimensions are 24" H x 13½" W x 11½" D. Kit AS-104, Shpg. wt. 54 lbs., Express/Frt. each 109.95

4 Heathkit/AR combine for super sound

The speaker that can show how good the rest of your system is. It delivers clean, natural response with extremely low distortion from 30 Hz to 20,000 Hz. Three Acoustic Research AR-3A drivers are mounted in an oiled walnut veneer enclosure. The 12-in. acoustic suspension woofer provides solid bass down to 30 Hz. The special hemispherical dome midrange and tweeter, combined with a precisely-engineered crossover network, deliver natural transparent sound. Individual midrange and tweeter level controls allow you to tailor the sound to the listening area. Requires min. 25 W rms. 25" H x 14" W x 11¾" D.

Kit AS-103A, Shpg. wt. 64 lbs., Express/Frt. each 219.95

5 Heathkit/JBL ultra-efficient system

Handles up to 50 watts, yet it's so efficient it can be driven by almost any low power amplifier. Frequency response is smooth from 40 Hz to 20 kHz. The 14-in. woofer uses an inert, self damping cone suspension and 11½-lb. magnet for clear, full bass. The JBL 2-in. direct radiator produces sharp, lifelike highs. System impedance is 8 ohms. The crossover network operates at 2000 Hz and is not affected by the 3-position high-frequency level control. The damped reflex enclosure is factory assembled from oak veneer and furniture grade hardwoods. Measures 14" H x 23½" W x 12" D.

Kit AS-48, Shpg. wt. 57 lbs. Was 249.95, Now 239.95

Helpful hints for the audiophile

How to Wire Hi-Fi Extension Speakers — includes instructions, schematics & photos for installing systems to meet specific needs.

EDP-103, 3.95

Acoustic Techniques for Home & Studio — covers listening room design & what test equipment to use in determining acoustic performance; for hi-fi buff & professional.

EDP-111, 5.95

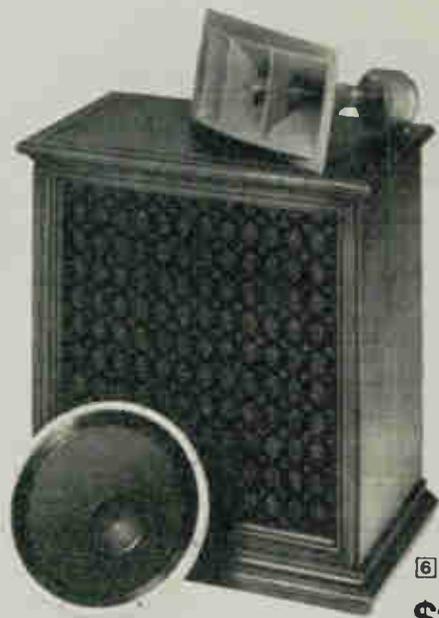
Hi-Fi Loudspeakers and Enclosure — design, construction, placement.

EDP-192, 6.85

See page 48 for book-ordering information



Heathkit Speaker Systems



6

\$339⁹⁵
EACH

6 Incomparable Heath/Altec-Lansing Sound

Combines Heathkit engineering with Altec-Lansing speakers for real audio excellence. The AS-101 is a bass reflex design with a high compliance 15-in. woofer. The woofer has a 10½-lb. magnet with a 3-in. edge-wound copper ribbon voice coil. The mid and high-frequency sectoral horn's driver uses a 13-oz. magnet and 1¾-in. voice coil. The AS-101 can be driven with as little as 10 watts, and will handle up to 50 watts. Impedance is 8 ohms. The two-way crossover system operates at 800 Hz and is compatible with bi-amplification. The high frequency level control allows balancing output to your taste. The factory assembled cabinet features pecan veneers, hardwood trim and gold and black grille cloth. 29½" H x 27¾" W x 19¾" D.

Kit AS-101, Shpg. wt. 128 lbs. Exp./Frt. each 339.95

Big-sound systems at surprisingly low prices

PAIR SPECIAL!
SAVE \$29⁹⁵
Reg. \$179.90 Pair
NOW \$149⁹⁵ Pair



7



8

7 Our lowest-priced acoustic suspension speaker system

Clean, well-balanced sound, the kind you'd expect from larger, more expensive speakers. A high-compliance 4½" speaker provides useful response from 70 Hz to 16 kHz. The factory-assembled walnut veneer enclosure measures just 12" H x 7" W x 6" D. For use with 4 to 20-watt amplifiers. 8 ohms. Build a pair in just an evening for stereo sound you appreciate and enjoy for years.

Kit AS-106, Shpg. wt. 9 lbs. each 26.95

Kit AS-106-2, Shpg. wt. 25 lbs. 49.90 pair

8 Great little 2-way bookshelf system

Superb sound with almost any amplifier with 10 to 100 watts per channel. Useful response from 30 Hz to 18 kHz with extremely low distortion below 50 Hz. Factory-assembled walnut-veneer enclosure houses 10" high-compliance woofer and 3½" cone/dome tweeter. A high-frequency level control lets you "tune" the sound to your listening area. 24" H x 13½" W x 11½" D. 8 ohms.

Kit AS-105W, Shpg. wt. 52 lbs. each 89.95

PAIR SPECIAL, Shpg. wt. 104 lbs. pair 149.95

Design your own sound system with Heath Separate Speakers

12" Two-way High Compliance...woofer with re-entrant horn tweeter; high frequency level control; 1-yr. guarantee.

Model AS-183, Shpg. wt. 15 lbs. 69.95

Pair (AS-183-2), Shpg. wt. 39 lbs. 133.00

AS-183 SPECIFICATIONS — Impedance: 8 ohms. Power Rating: 30 watts. Frequency Response: 20-15,000 Hz. Cone Resonance: 25 Hz. Magnet Weights: 1¾ lbs., 4.65 oz. Voice Coil Sizes: 1½" and 1".

12" Three-way Coaxial...woofer, midrange cone & special design horn tweeter; handles up to 20 W; electrical & mechanical crossovers; high frequency level control; 1-yr. guarantee.

Model AS-163, Shpg. wt. 12 lbs. 44.95

Pair (AS-163-2), Shpg. wt. 32 lbs. 85.00

AS-163 SPECIFICATIONS — Impedance: 8 ohms. Frequency Response: 40-15,000 Hz. Cone Resonance: 60 Hz. Magnet Weights: 13 oz., 1 oz. Voice Coil Sizes: 1½" and 1".

8" Two-way Coaxial...separate woofer & tweeter; 50-14,000 Hz response; handles up to 12 W; high frequency level control; 1-yr. guarantee.

Model AS-133, Shpg. wt. 6 lbs. 24.95

Pair (AS-133-2), Shpg. wt. 18 lbs. 47.00

AS-133 SPECIFICATIONS — Impedance: 8 ohms. Cone Resonance: 70 Hz. Magnet Weights: 10 oz., 0.68 oz. Voice Coil Sizes: 1" and ¾".



12" three-way with 80-watt capacity

12" Three-way High Compliance... unitary speaker with woofer, compression mid-range & horn-loaded compression super tweeter; 80 W peak power capability; 600 & 4000 Hz crossovers; mid & high frequency level control; 1-yr. guarantee.

Model AS-27, Shpg. wt. 15 lbs. 89.95

Pair (AS-27-2), Sh. wt. 33 lbs. 170.00

AS-27 SPECIFICATIONS — Impedance: 8 ohms. Frequency Response: 20-20,000 Hz. Cone Resonance: 30 Hz. Magnet Weights: 1 lb., 6.4 oz., 4.6 oz. Voice Coil Sizes: 1½" and 1".



\$89⁹⁵

12" Two-way Coaxial...separate woofer & tweeter; capacitive crossover; handles up to 15 W; high frequency level control; 1-yr. guarantee.

Model AS-153, Shpg. wt. 10 lbs. 26.95

Pair (AS-153-2), Shpg. wt. 28 lbs. 49.00

AS-153 SPECIFICATIONS: Impedance: 8 ohms. Frequency Response: 50-15,000 Hz. Cone Resonance: 60 Hz. Magnet Weights: 10 oz., 1.47 oz. Voice Coil Sizes: 1" and ¾".



Build Your Way To Better Recording



\$279⁹⁵

We think that dollar for dollar, the AD-1530 is the best cassette deck you can buy. The guaranteed specifications clearly show that this deck is serious about quality and performance. It could be the best addition to your system you can make...and you can build it yourself.

Stereo Cassette Deck with Dolby®

- Built-in test circuitry
- Lighted VU level meters
- Individual record level controls
- Pause control for easy editing
- Easy modular circuit board assembly

The Heathkit AD-1530, in easy-to-assemble kit form, lets you enjoy the finest tape entertainment the cassette format has to offer — a performance-proven domestic tape transport, combined with the famous Dolby noise reduction system and Heath electronics. The famous tape transport comes preassembled, ready to wire into the kit. Has play, stop, fast-forward, rewind, and eject controls; safety interlock; automatic shutoff at end of tape in both "play" and "record" modes; piano-key control of play-record-stop; lever control of fast-forward, rewind, eject, stereo/mono input, Dolby on-off, selector for iron oxide or chromium dioxide tapes.

Other features include individual bias adjust controls for regular and CrO₂ tape; individual record level controls with separate VU meters; large three-digit resettable counter; input selector switch for microphone or high-level source input (any low impedance microphone with standard 1/4" phone jack can be used); walnut-stained veneer base. Modular plug-in circuit board design in the amplifier and Dolby circuits simplify kit construction and servicing. Built-in test circuitry and free test cassette aid in checkout and adjustment. Blank 60 minute cassette included.

Kit AD-1530, Shpg. wt. 20 lbs. 279.95
 ADA-1530-1, Dust cover, Shpg. wt. 1 lb. 6.95

AD-1530 SPECIFICATIONS

Frequency Response: Regular (iron oxide) tape; ±3 dB from 40 Hz to 12 kHz typical. CrO₂ (chromium dioxide) tape; ±3 dB from 40 Hz to 14 kHz typical. Distortion: Tape dependent; electronics less than 0.2%. Hum and Noise: Dolby Switch OFF, -48 dB Dolby Switch ON-Provides Additional Noise Reduction as Follows: -10 dB @ 4000 Hz and up. -9 dB @ 2400 Hz. -6 dB @ 1200 Hz. -3 dB @ 600 Hz. Wow and Flutter: Less than 0.25% rms. Inputs: Microphone: Lo-Z, 0.2 mV to 10 mV. Auxiliary: Hi-Z, 50 mV to 10V. Bias Oscillator Frequency: Approximately 100 kHz. Tape Speed: 1 1/2" in/s or 4.76 cm/s. Fast Forward/Rewind Time: Approximately 45 sec. for C-60 cassette. Solid-State Devices: 37 transistors and 2 JFET's. Output: Greater than 0.5 volts from low impedance source. Dimensions: 5 1/2" H x 9 1/2" D x 14" W. Power Requirements: 120 volts, 60 Hz, 15 W. Dolby is a Trademark of Dolby labs.

Matched Dynamic Microphones

\$22⁹⁵

High-quality, low-priced dynamic microphones get your material on tape, on a budget. Especially suited for use with the Heathkit AD-110 Stereo Tape Player/Recorder. Includes two mikes, connector cables and rugged, padded carrying case.

ADA-110-1, Shpg. wt. 2 lbs. . . . 22.95



Charge a kit — no money down on any kit — see page 50 for details.

\$129⁹⁵

Heathkit Stereo Mike Mixer console

The Heathkit TM-1626 is an absolute must for your own quality taping system.

The wide response (40-20,000 Hz, ±1 dB) and low distortion (0.5%) of the solid-state TM-1626 will give you clean, life-like mixing capability. Each of the two outputs has its own master level control and meter and they can be switched for use in stereo or mono. The six inputs include two high-level auxiliary inputs for disc or tape sources, and four mike inputs which are switchable to high impedance or balanced or unbalanced low impedance, for use with any type of microphone. The fourth microphone input has a "pan" control to adjust its apparent location from left to right or anywhere in between. All six inputs can be individually switched to left, off, or right channel. Access to "Mix-Bus" permits paralleling added mixers for extra inputs and outputs. A pair of backlighted meters with two switch-selected ranges plus a pair of LED's with adjustable threshold show instantaneous peaks faster than any meter. Handsome cabinet in black with walnut stained veneer end panels.

Kit TM-1626, Shpg. wt. 12 lbs. 129.95

TM-1626 SPECIFICATIONS

Frequency Response: 40-20,000 Hz, ±1 dB. Distortion: 0.5% maximum at outputs from 50 mV to 6.5 volts. Hum: -80 dB at minimum volume. Hum & Noise: -60 dBV from 300-20,000 Hz, -50 dB from 20-20,000 Hz, all controls set at maximum. Minimum Input Overload: Mike - 60 mV (low-Z), 900 mV (high-Z). Auxiliary - 3.0 V. Mixer Bus - 200 mV. Input Impedance: Mike - 1100 ohms (low-Z), 170k ohms (high-Z). Auxiliary: 100k ohms. Mixer Bus: 3000 ohms. Output Impedance: 150 ohms. LED Peak Detectors: adjustable from 80 mV to 6.5 volts output. Power Requirement: 120/240 VAC, 60/50 Hz, 15 watts maximum. Dimensions: 5 1/2" H x 16" W x 9 3/4" D.

Stereo cassette record/play deck

Internally adjustable bias for standard or CrO₂ tapes

A low cost way to play and record stereo or mono cassettes through your system. The AD-110 has features normally found on more expensive decks — regulated DC motor for stable speed; level meters; pushbutton transport. Transport is factory assembled. Blank C-60 cassette included.

Kit AD-110, Shpg. wt. 12 lbs. 154.95

AD-110 SPECIFICATIONS

Frequency Response (record play): ±3 dB from 30 Hz to 12 kHz typical. Inputs: Aux. 70 mV to 10 V. Mike 0.2-6 mV. Hum and Noise: -45 dB. Bias and Erase Frequency: 110 kHz. Wow and Flutter: Less than .25% WRMS record and playback. Motor: Solid-state regulated DC. Fast Forward-Rewind Time: Less than 120 sec. for C-60 cassette. Tape: C-30, C-60, C-90 cassettes. Control: Power switch, record level (left and right channel), record, rewind, stop-eject, play, fast forward, pause. Output: Greater than 1/2 volt from low impedance amplifier stage. Finish: Walnut-stained veneer end panels. Dimensions (over-all): 3 1/2" H x 13 1/2" W x 11" D. Power: 120/240 VAC, 60/50 Hz, 7 watts.

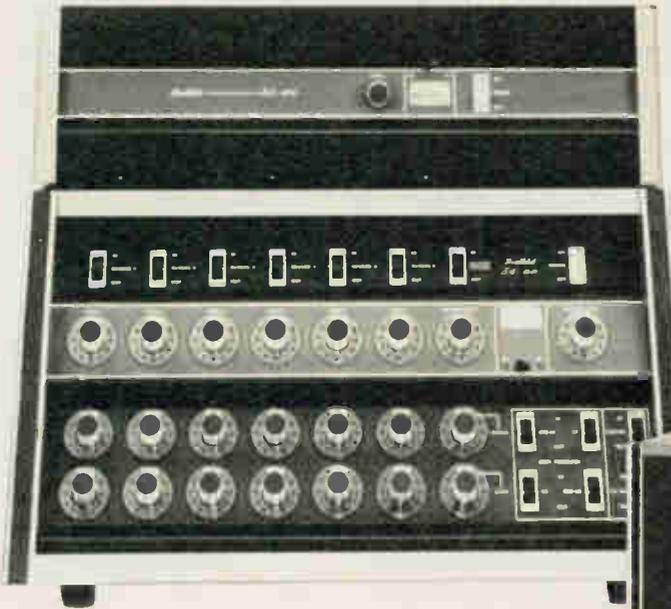
Questions & Answers About Tape Recording — everything from "accessories" to "weak sound." EDP-107 5.95
 How to Select/Use/Troubleshoot Cassette and Cartridge Recorders. EDP-195 4.55

See page 48 for book-ordering information



Build a quality PA System for your club or organization and SAVE

- **SCHOOLS** Auditoriums, Quadrangles, Lecture Halls, Football Fields
- **CHURCHES** Meeting Halls, Chapels, Parking Lots, Outdoor Events
- **BUSINESSES** Conference Rooms, Trade Shows, Display Areas
- **PERFORMERS** Supply Your Own Sound System for Clubs and Halls



1 TA-1620 PA Control Amplifier

Offers complete control and system flexibility — add as many booster amplifiers and speakers as you need for the power and coverage you want

The TA-1620 PA Control Amplifier has the versatility and flexibility you need for virtually any audience coverage situation—church, fraternal hall, auditorium, school, outdoors—it's ideal for portable or permanent installation. And it's about HALF the cost of comparable assembled units! Six fully mixable low-impedance inputs, each with bass, treble, reverb on-off and attenuation controls handle anything from individual lecturers to groups of performers. Special filtering circuits optimize response for both voice and music. The complete reverb system even allows special musical effects from any or all of the inputs. Switchable filters for low, mid-low, mid-high and high frequencies minimize feedback, and exclusive Heath bass filter virtually eliminates the "boominess" of cardioid mikes used close up. The built-in amplifier delivers 100 watts continuous power to two speaker columns. You can add as many booster amplifiers and speakers as you need for complete area coverage—even interconnect more control amplifiers for additional inputs. The well-lighted, "human-engineered" control panel, and heavy-duty conservative design make this a PA amplifier you'll use and appreciate for years to come. Rugged particle board case covered with gray high-pressure laminate with protective aluminum edge guard strips and convenient recessed handles. A level/test meter checks your work during assembly.

Kit TA-1620, Shpg. wt. 53 lbs. 449.95

Save \$49⁹⁰

Complete PA System

- TA-1620 Control Amplifier
- Two TS-1630 Speaker Columns

If purchased separately, \$849⁸⁵

Heath Price \$799⁹⁵

2 Low-Distortion Booster Amplifier

The same amplifier circuitry as the TA-1620—100 watts continuous into two TS-1630 Speaker Columns. And we think it's the quietest, lowest-distortion booster amp you can buy. Takes its signal from the Control Amplifier or, to eliminate long cable runs, it can take its signal from the extra rear-panel jack on a speaker column—a Heath exclusive. A lighted meter monitors the output, a level control adjusts the volume. Includes particle board end panels covered with gray high-pressure laminate.

Kit TA-1625, Shpg. wt. 22 lbs. 179.95

3 Hi-Fi Speaker Column

One of the world's best PA speakers. Six 8" full-range speakers are response-tailored for clean voice reproduction with excellent dispersion. An output jack lets you drive a TA-1625 Booster Amp or connect two Speaker Columns in parallel. Particle board enclosure covered with gray high-pressure laminate includes side-mounted handle and aluminum edge guard strips. With 50' cable, storage compartment. Removable dark brown grille cloth.

Kit TS-1630, Shpg. wt. 112 lbs., Exp./Frt. each 199.95

TAA-1620-3 Distribution Transformer. Minimizes signal loss in long runs of speaker cable. Provides 100W, 70.7 V balanced line from TA-1620 or TA-1625. 6 ohms. Shpg. wt. 8 lbs. 26.95

Learn About Electronic Music

- Experimenting with Electronic Music — from sine-wave generators to synthesizers. EDP-209 (Tab) .. 4.95
 - Electronic Music Production — how to use ring modulators, multivibrators, etc. For special effects. EDP-210 (Tab) 3.95
 - Electronic Musical Instruments — from amplification to synthesizers. Includes troubleshooting guide. EDP-211 (Tab) 4.95
- See page 48 for book ordering information.

COMPLETE SYSTEM SPECIFICATIONS

TA-1620 SPECIFICATIONS — Frequency Response: 40-15,000 Hz, ± 2 dB. Power Output: 100 watts continuous at 6 ohms (two columns) before clipping. Total Harmonic Distortion: 2% or less. Hum and Noise: -60 dB. Sensitivity: Mike, 2.5 mV rms (20 mV rms, attenuator in); high-level 250 mV rms. Input Impedance: Microphone, balanced 600 ohms (nominal); Hi-Level unbalanced 1 megohm. Gain: Microphone, 80 dB (62 dB with attenuator in); Hi-Level, 40 dB. Mike Inputs: Switchcraft QG jacks, compatible with Cannon plugs. Power Requirement: 120/240 VAC, 60/50 Hz. Dimensions: 11 $\frac{1}{4}$ " H x 21 $\frac{1}{2}$ " W x 12" D. Net Weight: 36 lbs.

TA-1625 SPECIFICATIONS — Frequency Response: 20-20,000 Hz, +1 dB. Power Output: 100 watts continuous at 6 ohms (two speaker columns) before clipping. Input Sensitivity: 650 mV rms for rated output. Total Harmonic Distortion: less than 0.5% at full output. Hum and Noise: -80 dB referred to full output. Input Impedance: 30 K ohms; 1 K ohm when switched to speaker input. Gain: 30 dB. Power Requirement: 120/240 VAC, 60/50 Hz. Dimensions: 6 $\frac{1}{2}$ " H x 21" W x 7" D. Net Weight: 25 lbs.

TS-1630 SPECIFICATIONS — Frequency Response: 70-8000 Hz. Power Handling: 60 watts continuous. Nominal Impedance: 12 ohms. Dimensions: 62" H x 14" W x 10 $\frac{1}{4}$ " D. Net Weight: 85 lbs.

Order one of these Heath-recommended



SAVE UP TO \$86.90

\$199⁹⁵

With Base and Cartridge

If purchased separately, up to \$286.85

1 B-I-C 980 with electronic rpm control

Direct belt drive and electronic speed control give you the performance and reliability of studio-quality turntables. The unique "programming panel" gives you the convenience of a changer. Permits automatic play of a single disc once or up to six times, or plays a six record stack. Has 24-pole synchronous motor, pitch control, strobe, 33 $\frac{1}{3}$ and 45 rpm operation. Includes base, specify Shure M91ED or Empire 2000/III cartridge. For premium performance, add \$45 for Shure V-15 Type III or \$35 for Audio-Technica AT-14S. 15 $\frac{7}{8}$ " W x 12 $\frac{1}{8}$ " D x 4 $\frac{1}{8}$ " above mounting board, 1 $\frac{1}{8}$ " below.

ACP-1167, Shpg. wt. 13 lbs. 199.95



SAVE UP TO \$86.90

\$159⁹⁵

With Base and Cartridge

If purchased separately, up to \$246.85

2 B-I-C 960 belt-drive automatic turntable

The same ultra-reliable design found on the B-I-C 980 minus the electronic speed control, adjustable pitch and strobe light. The 960 has the trouble-free operation only a true belt-drive turntable can provide, coupled with B-I-C's unique "programming panel" that lets you repeat a record up to six times, or play six records in a stack. Offers 33 $\frac{1}{3}$ and 45 rpm operation. Includes base and your choice of Shure M91ED or Empire 2000E/111 cartridge at no additional cost. 15 $\frac{7}{8}$ " W x 12 $\frac{1}{8}$ " D x 4 $\frac{1}{8}$ " above mounting board, 1 $\frac{1}{8}$ " below.

ACP-1166, Shpg. wt. 12 lbs. 159.95



SAVE UP TO \$86.90

\$109⁹⁵

With Base and Cartridge

If purchased separately, up to \$196.85

3 B-I-C 940 budget-priced belt-drive

A true B-I-C automatic turntable — with belt drive, low speed 24-pole synchronous motor, up to six record continuous play. Extremely low-friction bearings and an isolated counterweight allow the tonearm to track even the highest quality cartridges. Has viscous-damped cueing, full-size 12" platter, 33 $\frac{1}{3}$ and 45 rpm operation, and CD-4 capability. Price includes base and your choice of Shure M91ED or Empire 2000E/111 cartridge. Specify cartridge with order. 15 $\frac{7}{8}$ " W x 12 $\frac{1}{8}$ " D x 4 $\frac{1}{8}$ " above mounting board, 1 $\frac{1}{8}$ " below.

ACP-1161, Shpg. wt. 11 lbs. 109.95

ACCESSORIES FOR ALL B-I-C TURNTABLES

ADP-1163, Solid oiled walnut base, Shpg. wt. 4 lbs. 16.95

ADP-1164, Hinged dustcover, Shpg. wt. 4 lbs. 9.95

ADP-1165, 45-rpm spindle, Shpg. wt. 1 lb. 3.95

Garrard®



SAVE UP TO \$34.90

\$79⁹⁵

With Base, Dust Cover and Cartridge

If purchased separately, up to \$114.85

4 Garrard 440M 3-Speed Turntable System

Precise record playing system ideal for lower priced stereo setups. Has heavy-duty 4-pole induction surge motor, viscous damped pause/cue control, adjustable anti-skate. Low-mass aluminum tonearm, swing-away overarm for easy single-play operation. With Pickering V 15/ATE-4 elliptical diamond stylus magnetic stereo cartridge, base and dust cover. Fully assembled and balanced in factory. 14 $\frac{3}{8}$ " W x 12 $\frac{1}{2}$ " D x 8 $\frac{1}{2}$ " H, including base and dust cover.

ACP-1119, Shpg. wt. 17 lbs. 79.95

NOTE: When ordering turntable, please specify cartridge and base model numbers on order blank.



5 Shure V-15 Type III Stereo Cartridge

Famous for its excellent tracking ability and smooth, uncolored sound. For tonearms capable of tracking at $\frac{3}{4}$ to 1 $\frac{1}{4}$ grams. See specs at right.

AD-1059, Shpg. wt. 1 lb. 85.00
With turntable purchase 45.00



6 Audio-Technica AT-14S Cartridge

Features specially shaped and polished Shibata stylus for unparalleled quadraphonic CD-4 and stereo response. Stylus lasts twice as long as ellipticals! Specs at right.

ADP-1139, Shpg. wt. 1-lb. 69.95
With turntable purchase 35.00

Heath-Approved High-Performance Cartridges

Model	Frequency Response (Hz)	Output	Separation	Elliptical Stylus	Tracking	Price	
						Separately	With Turntable
ADP-1062, Wt. 1 lb. Shure M91 ED	20-20,000	5.0 mV	25 dB	0.2 x 0.7	$\frac{3}{4}$ to 1 $\frac{1}{2}$ gr.	59.95	FREE
ADP-1147, Wt. 1 lb. Empire 2000E/111	5-35,000	5.0 mV	35 dB	0.2 x 0.7	$\frac{1}{2}$ to 1 $\frac{1}{2}$ gr.	69.95	FREE
AD-1059, Wt. 1 lb. Shure V-15 Type III	10-25,000	3.5 mV	28 dB	0.2 x 0.7	$\frac{3}{4}$ to 1 $\frac{1}{4}$ gr.	85.00	45.00
ADP-1139, Wt. 1 lb. Audio-Technica AT-14S	5-45,000	2.7 mV	25 dB	Shibata	1-2	69.95	35.00

Save 5% with Heath's hi-fi system discount — see page 43.

Turntable packages and save up to \$86⁹⁰

7 The belt-drive automatic from Dual

The incredible Dual 1249. Features include: Belt drive. Gimbal-mounted tonearm with selectable tracking angles for automatic and manual play. Strobe, variable pitch, CD-4 compatibility, 33 $\frac{1}{3}$ and 45 rpm operation. Includes base and choice of Shure M91ED or Empire 2000E/111 cartridge. Or, add \$45 for Shure V-15 Type III or \$35 for Audio-Technica AT-14S cartridge. 4 $\frac{1}{2}$ " H x 14 $\frac{3}{4}$ " W x 12 $\frac{1}{2}$ " D, less base.

- ACP-1148, Shpg. wt. 16 lbs. 279.95
- ADA-49-1, Walnut-stained wood base, Shpg. wt. 5 lbs. 16.95
- ADA-49-4, Dustcover, Shpg. wt. 5 lbs. 15.95
- ADA-39-2, 45-rpm spindle, Shpg. wt. 1 lb. 9.95

SAVE UP TO \$86.90

\$279⁹⁵

With Base and Cartridge

If purchased separately, up to \$366.85



8 Popular Dual 1228 Automatic Turntable

Superb performance and reliability — 0.5 gram tracking; pitch control, illuminated strobe, damped cueing; synchronous motor; 4 lb. platter; anti-skating, 33 $\frac{1}{3}$ and 45-rpm operation, CD-4 compatible. Includes base and your choice of a Shure M91 ED or Empire 2000E/111 cartridge. 13" W x 10 $\frac{3}{4}$ " D x 5" above motor board, 2 $\frac{5}{8}$ " below.

- ACP-1142, Shpg. wt. 18 lbs. 199.95
- ADA-39-1, Walnut-stained wood base, Shpg. wt. 5 lbs. 15.95
- ADA-1218-1, Dustcover, Shpg. wt. 3 lbs. 12.95
- ADA-39-2, 45-rpm spindle, Shpg. wt. 1 lb. 9.95

SAVE UP TO \$85.90

\$199⁹⁵

With Base and Cartridge

If purchased separately, up to \$285.85



9 Garrard Belt-Drive Automatic Turntable

The Garrard Z 2000B combines the famous Zero Tracking Error tonearm with the reliability of a belt-drive mechanism. Has damped cueing, magnetic anti-skating, strobe, 33 $\frac{1}{3}$ and 45 rpm operation. Compatible with CD-4. Includes base and Shure M91ED or Empire 2000E/111 cartridge. 15 $\frac{5}{8}$ " W x 14 $\frac{1}{8}$ " D x 4 $\frac{3}{8}$ " above mounting board, 2 $\frac{1}{8}$ " below.

- ACP-1179, Shpg. wt. 18 lbs. 229.95
- ADP-1178, Walnut-grained vinyl-clad base, Shpg. wt. 7 lbs. 15.95
- ADP-1177, Dustcover, Shpg. wt. 3 lbs. 9.95
- ADA-100-2, 45-rpm spindle, Shpg. wt. 1 lb. 5.95

SAVE UP TO \$85.90

\$229⁹⁵

With Base and Cartridge

If purchased separately, up to \$315.85



10 Thorens TD-160C Belt-Drive Manual Turntable

High performance combined with the simplicity and reliability of a manual turntable. A 16-pole synchronous motor, belt-drive and a massive 7 lb. platter virtually eliminate rumble, wow and flutter. Precision gimbal suspension and magnetic anti-skating let you use the finest cartridges. Viscous-damped cueing; 33 $\frac{1}{3}$ and 45-rpm speeds. Includes walnut-stained wood base and hinged dustcover, your choice of a Shure M91 ED or Empire 2000E/111 cartridge. Or, add \$45 for Shure V-15 Type III or \$35 for Audio-Technica AT-14S cartridge. 7 $\frac{3}{4}$ " H x 17" W x 13 $\frac{1}{2}$ " D.

- ACP-1099, Shpg. wt. 26 lbs. 230.00

SAVE UP TO \$69.95

\$230⁰⁰

With Base and Cartridge

If purchased separately, up to \$299.95



SAVE 5% when you order a complete audio system from Heath

Here's another way Heath helps you get more good sound for your money. You can select exactly the components you want using the blank at right. Here's how — 1) order a receiver and a pair of speakers or 2) order an amplifier, a pair of speakers and a program source (tuner, turntable or tape deck). Add the costs of the individual components, then deduct 5%. That's the low Heathkit system price.

The same 5% discount applies to any audio accessories you ordered with your system — remote or rear-channel speakers, an equipment cabinet, tape deck, turntable, audio 'scope or head-phone control box. The only exception is the CR-1000A automotive FM tuner.

	Price
Receiver	
Amplifier	
Tuner or Tape Deck	
Speakers	
Changer & Cartridge	
Other Accessories	
Total Price	
Less 5% Discount	
Heath System Price	

This Heathkit Wireless Security System gives

Heathkit FM Wireless Security System — priceless peace of mind at a price you can afford

Protect your family and home — even your business — from thieves, fire, vandals — almost any kind of emergency. Our GD-1158 Security System provides the kind of protection and peace of mind you expect from expensive commercial systems — but at a fraction of their cost.

The GD-1158 System is wireless — just plug the modules into any AC outlet, no other connecting wires necessary. All signals are frequency modulated (FM) to prevent false triggering caused by power line noise. And "wireless" design means your system can easily be moved to a new home or expanded to meet your changing needs.

The "heart" of the GD-1158 System is the Central Processor which sounds the alarm whenever it receives a signal from one of the remote modules. This "modular" design provides exactly the protection you need, when you need it — an Ultrasonic Detector protects large areas from intrusion; an Auxiliary Transmitter handles optional heat and smoke detectors as well as contact and pressure switches, and the Emergency Transmitter is a "panic button" so you can sound the alarm. For added convenience and security, only the On/Off Transmitter can disable the Central Processor and turn the system off.

Don't leave your family unprotected. The GD-1158 Security System can prevent an emergency from becoming a tragedy.



1 Central Processor Module

The Central Processor responds to signals from any of the optional modules. To protect against intruders, it sounds the alarm if it receives a signal from an ultrasonic detector or auxiliary transmitter module. As an emergency alarm, it monitors optional heat and fire detectors and can also be triggered by the optional "panic button." And the Central Processor is protected from tampering by a circuit that sounds the alarm if AC power is lost. The Central Processor is designed for your convenience as well as security. A time delay lets you enter or leave the protected area without triggering the alarm. The Central Processor also automatically resets itself within two minutes after the cause of the alarm has been removed. Includes built-in siren and outputs for an external speaker (such as GDA-1158-7) and telephone dialer. Less batteries.

Kit GDA-1158-1, Shpg. wt. 8 lbs. 159.95



GDA-1158-1 SPECIFICATIONS

Power requirement: 115 VAC, 60 Hz Carrier frequencies: emergency, 40 kHz; intrusion, 56 kHz Range: any point on same power distribution transmits secondary Exit time: 2 minutes Entry time: 20 seconds Emergency activation time: 2 seconds Disable time: 1 1/2 sec Outputs: external speaker, relay contacts, telephone dialer Sound source: portable internal speaker, or optional external speaker (12 watts into 8 ohms) Sound level at 10 ft.: internal speaker, +88 dB Dimensions: 4 1/2" H x 10 1/2" W x 5" D

2 Emergency Transmitter Module

No security system is complete without a dependable "panic button." So to provide that extra peace-of-mind and security, we've included this Emergency Transmitter Module in the design of the Heathkit Home Security System. The GDA-1184-4 sounds the alarm instantly, at the touch of a button. In any emergency situation, all you have to do is push the button and the unit transmits a signal to the Central Processor for an alarm. Put one in the bedroom, kitchen, den — anyplace where needed. Then just plug it into the nearest AC outlet. It's one of the extras that we feel makes the big difference between an "adequate" security system and one that gives you the added margin of protection your family deserves. 1 3/4" H x 5" W x 3 3/4" D.

Kit GDA-1158-4, Shpg. wt. 2 lbs. 29.95



your home and family the protection they deserve



3 Monitors an area up to 300 sq. ft. with safe, silent, effective protection



4 Use with Central Processor or by itself for reliable fire protection

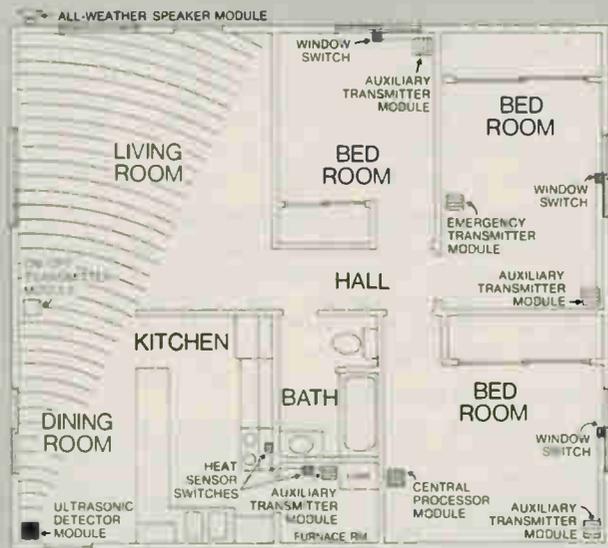
New

3 Ultrasonic Detector Module

You can place any number of these ultrasonic detectors within your customized security system. Each unit plugs directly into an AC outlet and monitors an area of up to 300 sq. ft. The range of each unit is up to 20 feet. The detectors use harmless, inaudible high frequency sound waves to detect movement within the protected area. If an intruder enters the area, the detector will transmit a signal to the Central Processor which sounds the alarm. 10 $\frac{5}{8}$ " H x 3 $\frac{1}{4}$ " W x 3 $\frac{1}{4}$ " D. Kit GDA-1158-2, Shpg. wt. 3 lbs. 74.95

4 Early Warning Fire Detector

An important new addition to this complete security system. A sensitive semiconductor detector detects gases generated in early stages of combustion — *sounds the alarm before the point of flames or intense heat*. Hooks up to Central Processor, or can be used alone with its built-in speaker. Also has thermal switch which actuates alarm when temperature exceeds 133° F (56° C). 3 $\frac{1}{4}$ " H x 7 $\frac{1}{4}$ " W x 3 $\frac{1}{4}$ " D. Kit GDA-1158-5, Shpg. wt. 4 lbs. 74.95



Typical installation for complete home security

Our Heathkit Security System is designed for maximum versatility in your home. You can locate modules wherever you need them... even move them from room to room, to create a total home protection system. Use it to protect your business, too.

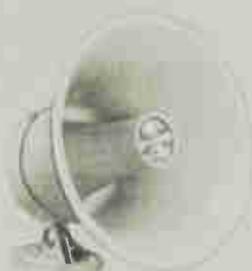
The unique modular design of the Heathkit Security System means you can start with a modest investment, then add components to fit your requirements... and your budget.

Easy, step-by-step instructions guide you through the complete assembly of your new security system. And installation couldn't be easier. All components plug into regular wall sockets and use your home or building's AC power line to transmit signals to the Central Processor.

Act today. Get this dependable security system into your home or business... for the protection you want and need.



5



7



6

5 On/Off Transmitter Module

The only way in which the intrusion part of your security system can be deactivated. Just plug the unit into an AC outlet in any convenient location, then push the button in to disable the intrusion circuits of the Central Processor. To turn the Central Processor back on again, just release the button, or unplug the transmitter. 1 $\frac{3}{4}$ " H x 5" W x 3 $\frac{3}{4}$ " D. Kit GDA-1158-3, Shpg. wt. 2 lbs. 29.95

6 Auxiliary Transmitter Module

Lets you add door and window switches, mat pressure switches and any other switches to the system. Switches must be either all normally open (N.O.) or all normally closed (N.C.) types. The transmitter then relays signals from the connected devices to the Central Processor. Plugs into any convenient AC outlet. 3 $\frac{1}{4}$ " H x 7 $\frac{1}{4}$ " W x 3 $\frac{1}{4}$ " D. Kit GDA-1158-6, Shpg. wt. 2 lbs. 39.95

7 Outdoor Speaker

The GDA-1158-7 Speaker provides more than enough volume to be heard throughout your neighborhood...loud enough to frighten any would-be intruders and summon help. The speaker's all-weather design lets you mount it indoors or out. All necessary mounting hardware is included. Attaches to the Central Processor. GDA-1158-7, Shpg. wt. 3 lbs. 19.95

Want faster service? Order by phone — call (616) 982-3411 day or night.

Heath Security—protection that works full-time



Uses the same ultrasonic detection system widely used in banks and commercial establishments.

\$59⁹⁵



1

Alarm devices 1, 2 and 3 are designed for use together to provide a very effective wireless protection system for your entire house. Simply plug each unit into existing AC outlet, **NO OTHER WIRING** needed for signals!

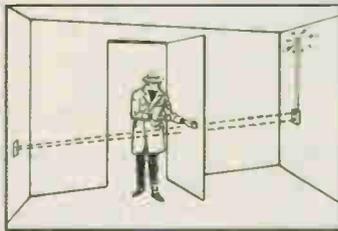


2

3



4



Sounds alarm when light beam is broken!



Photoelectric Lamp Switch

Turns lights on in the evening, off in the morning — automatically. Helps discourage burglars while you're away from home. Just plug it in to any wall outlet, adjust the sensitivity and the GD-600 does the rest. For incandescent lamps up to 150 watts. A great 1-evening get-acquainted kit. Kit GD-600, Shpg. wt. 1 lb. . . . 5.95

"The Informer" Ultrasonic Alarm

The Heathkit GD-39 Ultrasonic Intrusion Alarm sits quietly on bookshelf or table until something or someone invades its field of surveillance. Then "The Informer" can activate indoor buzzer alarms, outdoor bells, table or floor lamps... to alert you to the possible presence of an intruder as far as 25 ft. from the unit. Any movement that interrupts that transmitted signal in the room is perceived by the receiver, and the lamp outlet is triggered, turning on table or floor lamps. Approximately 30 seconds later, the alarm outlet is triggered, activating indoor or outdoor alarms. Built-in time delay between light and alarm allows you to enter room and deactivate the "Informer" without triggering the audible alarm. You can set the lamp and alarm for automatic reset after 25 seconds or have audible alarm continue to sound until the unit is manually reset.

NOTE: As the GD-39 Ultrasonic Alarm operates in the same frequency range as Ultrasonic TV Remote Controls, interference between the two is possible.

- Kit GD-39, Shpg. wt. 5 lbs. 59.95
- GDA-39-1, indoor buzzer alarm, Shpg. wt. 3 lbs. 9.95
- GDA-39-2, outdoor bell, Shpg. wt. 6 lbs. 26.95

GD-39 SPECIFICATIONS

Operating range: Varies with installation. Typical maximum range is 25 ft. Operating times: Turn-on delay: approximately 10 sec. Alarm delay: 20 to 30 sec. (lamp-on time). Automatic reset delay: 20 to 30 sec. (alarm-on time). Power outlets: Two AC sockets: One for Lamp, one for Alarm. Power outlet current: Three amperes total for both. Power requirement: 120/240 VAC, 60/50 Hz, 1½ watts. Dimensions: Chassis only, 2" W x 9¼" H x 7½" D (approximately). In book-style cover, 2½" W x 10½" H x 7½" D (approximately).

1 Early-Warning Receiver Alarm

For use with the Heathkit Fire Detector/Transmitter and Utility Transmitter to alert your family to intrusion, fire, freezing, power failure, etc. Emits piercing tone to raise the soundest sleeper. Has continuously charged nickel-cadmium battery to trigger Receiver Alarm in case of power failure. Just plug into 110 VAC, no other wiring needed to receive signals.

- Kit GD-77, Shpg. wt. 3 lbs. 56.95

2 Fire detector/transmitter

The Heathkit fire detector/transmitter triggers the Receiver Alarm upon detecting very low density smoke or 133°F. heat. Photocell smoke detector. Adjustable sensitivity. Remote heat sensors can be added. Uses AC line to transmit signal to GD-77 receiver.

- Kit GD-87A, Shpg. wt. 4 lbs. 56.95

3 Utility transmitter

The Heathkit Utility transmitter accepts any switch or sensor that produces a closed circuit, such as Heathkit GDA-97-1 miniature magnetic-reed switch or GDA-97-2 miniature micro switch for doors and windows, or new, improved easily-mounted heat sensor switch GDA-97-4 (135°F). Uses AC line to transmit signal to GD-77 receiver.

- Kit GD-97, Shpg. wt. 3 lbs. 42.95
- GDA-97-1, Mini reed switch, Shpg. wt. 1 lb. 2.75
- GDA-97-2, Micro switch, Shpg. wt. 1 lb. 3.00
- GDA-97-4, Heat sensor, Shpg. wt. 1 lb. 3.50

4 Heathkit Eye Spy™ photobeam relay

The kit consists of a light source, a mirror assembly, and a photo-cell controlled relay which is activated whenever the reflected light beam is broken, thereby energizing the AC socket on the light source unit. Any warning devices or lamps plugged into this socket are then activated. When light beam is no longer obstructed, the photo relay shuts off power to the alarm. Unit operates at distances of up to 25 ft. from reflecting mirror. Electronic package measures 5¾" H x 4¾" W x 5¼" D. Mirror assembly measures 5" H x 4" W x 2¾" D.

- Kit GD-1021, Shpg. wt. 2 lbs. 14.95

Start your own profitable security system career — these books show you how:

Building & Installing Electronic Intrusion Alarms — covers construction, installation & maintenance of all types of alarms & sensors for home & auto. EDP-135. . . . 4.50

Installing & Servicing Electronic Protective Systems. Covers virtually every electronic fire & theft security system. EDP-136 5.95

See page 48 for book ordering information.

Build yourself Heathkit electronic convenience

1 Ultra-convenient ultrasonic Cleaner

Get the benefits of ultrasonic cleaning for those almost impossible cleaning chores. The Heathkit GD-1150 makes fast work of deep-cleaning watch parts, most jewelry, glass and contact lenses (except plastic), dentures, and even decorator paint brushes. Great for phono cartridge stylus too! Simply fill the stainless steel tank with any safe detergent or solvent for the item to be cleaned. Place the object or objects in the tank, set the timer and that's it! You'll be amazed how quickly and easily your possessions come clean. Professional artists, jewelers and watchmakers have known about and used ultrasonic cleaning equipment for years. Now this low cost kit-form cleaner lets everyone take advantage of this scientific clean-up process. Tank measures 6" L x 4" W x 2 3/8" D. Overall, 11" L x 5 3/4" W x 3 1/8" H.

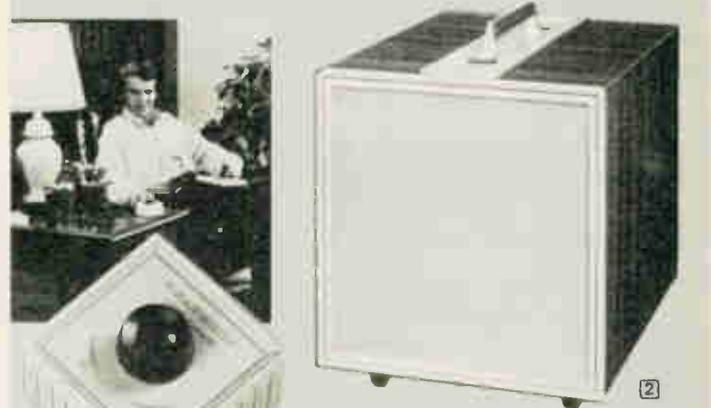
Kit GD-1150, Shpg. wt. 4 lbs. 64.95



2 Room-size electronic Air Cleaner

Clean air is important in maintaining the overall good health of your family. And the Heathkit GD-1003 cleans the air of 99% of airborne pollen and 95% of other contaminants...regardless of size or concentration. Plugs into any 120 VAC electrical outlet. A two-speed fan moves large volumes of air — fast — in the "high" position, and provides whisper quiet continuous operation in the "low" position. The big, efficient 5-bladed fan is lifetime lubricated for trouble-free operation. Everything's accessible for easy cleaning, too. A built-in safety interlock switch offers positive shock-hazard protection while cleaning (should you forget to unplug the unit), and against the prying fingers of small children. Cabinet of wood-grained vinyl-coated steel measures 15" H x 13 1/2" W x 17 3/4" D.

Kit GD-1003, Shpg. wt. 55 lbs. 149.95



3 Heathkit Tabletop Lamp Dimmer

A great kit for first-time builders! Set the mood for any activity with just the right amount of light — reading, watching TV. The GD-1018 smoothly adjusts the brightness of table or floor lamps up to 300 watts. Eliminates annoying burned out elements in 3-way bulbs. It'll save energy, too, by giving you just the light you need — it even helps bulbs last longer. Just plug the lamp into the dimmer, then plug the dimmer into any standard household outlet. It's easy to assemble too — goes together in a single evening. For 120 VAC. Makes a great heat-control, too, for pencil-type soldering irons used in circuit board work, installing ICs, etc. Measures 3 1/4" H x 3 3/4" W x 3 3/4" D.

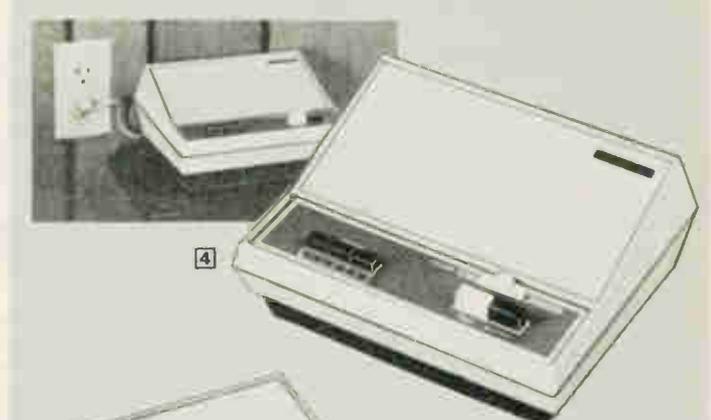
Kit GD-1018, Shpg. wt. 2 bs. 7.95



FREE SERVICE OFFER: During the normal 90-day warranty period we will service your Heathkit Lamp Dimmer at no charge — regardless of the nature of the problem. Simply return the kit to the factory or any Heathkit Electronic Center.

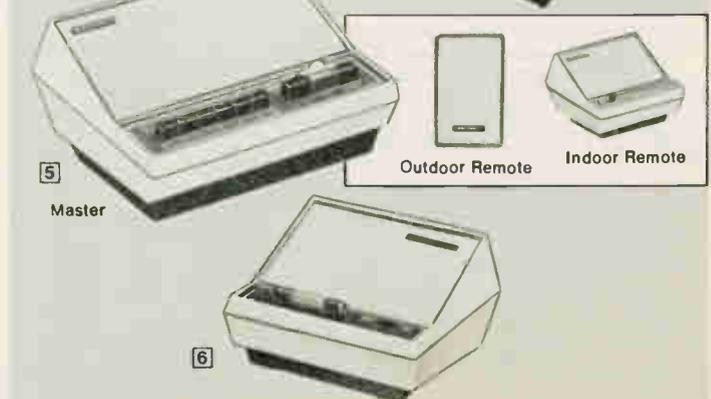
4 Heathkit "Wireless" 3-Channel AM Intercom

Just build the intercoms you need, plug them into wall outlets — that's all there is to it. They use your home electric wiring for transmissions — and you can move units from room to room at will. Versatile 3-channel operation — ideal for multi-unit setups. Pushbuttons provide channel selection, "Talk" mode, and "Dictate" position. Volume control, internal squelch. Each GD-113 uses about as much current as an electric clock. Attractive light green cabinet 4 1/8" H x 8 1/2" W x 6 3/4" D. Kit GD-113, Shpg. wt. 4 lbs. 34.95



5 Indoor/Outdoor Intercom System

Master functions include "All Call," "Talk," "Dictate"...plus monitoring of up to four Remotes. Indoor Remotes can be rendered private to prevent monitoring. GD-110 and GD-120 are light green and measure respectively 4 1/2" H x 8 1/2" W x 6 3/4" D and 3 3/4" H x 6" W x 5 3/4" D. GD-130 has weatherproof crinkle finish. 5 3/8" H x 3 5/8" W x 2 5/8" D. Kit GD-110, Master Station, Shpg. wt. 5 lbs. 44.95
Kit GD-120, Indoor Remote, Shpg. wt. 2 lbs. 12.95
Kit GD-130, Outdoor Remote, Shpg. wt. 2 lbs. 9.95
GDA-110-2, 100' 4-conductor cable, Shpg. wt. 2 lbs. 8.95
GDA-110-4, 100' 2-conductor outdoor cable, Shpg. wt. 2 lbs. 4.95



6 Heathkit 2-Station Intercom System

Master station accommodates up to two remotes. Remotes can initiate "private" calls to Master. Master can call either or both remote stations. Master controls include Sta. 1, Sta. 2, Talk, Dictate, & Volume. Remotes have Talk & Dictate controls. 3" x 5" microphone-speakers for crisp, clear sound. Low-profile cabinets with plastic feet for surface use, holes for wall mounting. 3 3/4" H x 6" W x 5 3/4" D. Kit GD-140, one Master, one Remote, Shpg. wt. 4 lbs. 32.95
Kit GD-120, one extra Remote, Shpg. wt. 2 lbs. 12.95
GDA-110-2, 100' 4-conductor cable, Shpg. wt. 2 lbs. 8.95

Find out how easy it is to build a kit — order the manual. See page 49.

Here's how to order your Heathkit Equipment



BY PHONE:

Use the Heath "Hotline",
Call

(616) 982-3411



BY MAIL:

- Fill out the order blank completely. Print your name exactly the same each time you order. When you print an address, please give full details including your Zip Code and phone number.



Heath has a phone order desk open 24 hours a day, 7 days a week. You can call in your order at minimum cost from most areas in the country, and after-hour rates are a bargain.

Replacement Parts Orders: 616-982-3571. Use this number for parts orders, weekdays only, from 8 A.M. to 4:30 P.M., EST.

Other Important Heath Company Phone Numbers:

International Sales: 616-982-3512

General Office: 616-982-3200

USE THESE NUMBERS FOR TECHNICAL HELP

8 A.M. to 4:30 P.M., EST, weekdays only

- R/C, Audio and Electronic Organs (616) 982-3310
- Amateur Radio (616) 982-3296
- Test Equipment, Strobe Lights, Calculators, Clocks, Weather Instruments (616) 982-3315
- Television (616) 982-3307
- Automotive, Marine, Metal Locators, Appliances, Security, Shortwave and General Products (616) 982-3496

Book Ordering Information

There is a \$10 minimum order for a BOOK ONLY purchase. No minimum on books purchased with kits. Do not calculate postage on book orders, just add 35¢ for each book to the postage column on the order blank. Do not use the zone chart for book orders.

Discounts on Heathkit

Continuing Education Programs
Enjoy a 15% discount on the purchase price of 10 or more of any one item from our Continuing Education product line. For information on quantities greater than 100 of an individual item, contact our Contract Sales Dept., Mr. Richard Shadler, Mgr. (616) 982-3519.

- Please give full ordering information. Be sure to give model number, description and price, exactly as shown in the catalog.
- Total up your order. Please refer to the chart and calculate shipping charges of each item separately, and total up amount. All items are mailable unless indicated "Exp./Frt.". These items sent transportation charges, collect.
- Insurance for mailable items: The 1st \$100 value of insurance is free. Insurance rates for orders over \$100: add 25¢ for each additional \$100 value or fraction thereof.
- Cash Orders: Do not send currency or stamps. Send personal check, money order, etc. NOTE: If the charge for merchandise and transportation is less than the amount you send us, we will refund the difference.
- Heath Revolving Charge Plan: No money down. Up to two years to pay. Two convenient payment plans. Follow instructions on the reverse side of order blank. Be sure to sign charge agreement.
- C.O.D. - 20% deposit is required on C.O.D. orders placed by mail. Balance will be collected at time of delivery, and payment must be made in cash, as carriers usually will not accept personal checks. (C.O.D. fee for mailable items must be included with your remittance.)
- ROUTING YOUR ORDER: Heath will find the fastest service to your area by surface transportation. If you have a routing preference, please indicate on the order blank. West Coast customers should mention their choice of UPS Blue Label Service over regular UPS.
- NON-MAILABLE ITEMS: The Heathkit products shown as "Exp./Frt." are shipped by truck because these exceed weight and/or size limitations for mailing. Items are shipped with freight charges collect. Examples: Most TV antennas, large TV's, organs, cabinets, speaker systems and garage door mechanisms.
- APO/FPO SHIPMENTS: We can send Heathkit models that are able to be mailed to servicemen anywhere in the world. For APO and FPO addresses, use the following Zones to estimate cost: West Coast - Zone 8; East Coast - Zone 5. PAL (Airlift Military) carries packages by air transport for a fee of \$1 per parcel in addition to regular postage rates. Parcel must weigh less than 30 lbs. and not exceed 60 in. in length and girth.
SAM: Parcel must weigh less than 15 lbs. and not exceed 60 in. in length and girth combined. Be sure to check with your local Postmaster for exceptions to certain APO or FPO numbers.

HOW TO FIGURE SHIPPING & HANDLING CHARGES

Use the zone chart below and the first three numbers of your zip code to determine your zone. Then refer to the Heath shipping rate chart at right for charges for each model per shipping weight given in each price line.

The 1st \$100 value of insurance is free. Insurance rates for orders over \$100 add 25¢ for each additional \$100 value

or fraction thereof.

Rate chart is for "mailable" items only. "Exp./Frt." items will be shipped transportation charges collect.

If you have one item on your order which must be sent "Exp./Frt.", ALL items on that order will be sent "Exp./Frt."

Heath Shipping Charges

(Mailable Items Only)

Shipping Weight	Zone 1 & 2	Zone 3	Zone 4	Zone 5	Zone 6	Zone 7	Zone 8	BLUE LABEL AIR SERVICE CHARGE to Calif., Ore., Wash. only.
1	\$0.66	\$0.68	\$0.70	\$0.73	\$0.76	\$0.80	\$0.85	\$0.95
2	0.72	0.75	0.83	0.92	1.02	1.12	1.21	1.30
3	0.78	0.83	0.92	1.04	1.18	1.32	1.45	1.65
4	0.84	0.90	1.01	1.16	1.33	1.51	1.69	2.00
5	0.90	0.98	1.10	1.28	1.49	1.71	1.93	2.35
6	0.96	1.05	1.20	1.40	1.64	1.90	2.17	2.70
7	1.02	1.13	1.30	1.52	1.80	2.10	2.41	3.05
8	1.08	1.20	1.40	1.64	1.95	2.29	2.65	3.40
9	1.14	1.28	1.50	1.76	2.11	2.49	2.89	3.75
10	1.20	1.35	1.60	1.88	2.26	2.68	3.13	4.10
11	1.26	1.43	1.70	2.00	2.42	2.88	3.37	4.45
12	1.32	1.50	1.80	2.12	2.57	3.07	3.61	4.80
13	1.38	1.58	1.90	2.24	2.73	3.27	3.85	5.15
14	1.44	1.65	2.00	2.36	2.88	3.46	4.09	5.50
15	1.50	1.73	2.10	2.48	3.04	3.66	4.33	5.85
16	1.56	1.80	2.20	2.60	3.19	3.85	4.57	6.20
17	1.62	1.88	2.30	2.73	3.35	4.05	4.81	6.55
18	1.68	1.95	2.40	2.85	3.50	4.24	5.05	6.90
19	1.74	2.03	2.50	2.98	3.66	4.44	5.29	7.25
20	1.80	2.10	2.60	3.10	3.81	4.63	5.53	7.60
21	1.86	2.18	2.70	3.23	3.97	4.83	5.77	7.95
22	1.92	2.25	2.80	3.35	4.12	5.02	6.01	8.30
23	1.98	2.33	2.90	3.48	4.28	5.22	6.25	8.65
24	2.04	2.40	3.00	3.60	4.44	5.41	6.49	9.00
25	2.10	2.48	3.10	3.73	4.60	5.61	6.73	9.35
Add'l lbs.	.06/ lb.	.08/ lb.	.10/ lb.	.13/ lb.	.16/ lb.	.20/ lb.	.24/ lb.	.35

IMPORTANT: 1. Shipping weights listed for model numbers shipped in more than one carton have been adjusted to provide correct postage.

Zip Code Prefixes	Zone										
006-009	8	260-261	3	370-386	4	478	3	600-609	2	823-826	6
010-069	5	262-278	4	387	5	479-489	2	610-619	3	827	5
070-089	4	279	5	388	4	490-491	1	620-623	4	828-832	6
090-099	5	280-283	4	389-397	5	492	2	624-628	3	833	7
100-108	5	284-285	5	400-406	3	493-495	1	629-668	4	834	6
109	4	286-293	4	407-409	5	496-499	3	669-679	5	835-838	7
110-119	5	294-295	5	410-412	3	500-516	4	680-687	4	840-847	6
120-123	4	296-297	4	413-422	4	520-524	3	688-693	5	850-864	7
124-126	5	298-299	5	423	3	525	4	700-722	5	865-884	6
127-128	4	300-303	4	424-426	4	526-528	3	723-727	4	890-898	7
129	5	304	5	427-432	3	530-534	2	728-768	5	900-921	8
130-152	4	305-307	4	433-436	2	535-539	3	769	6	922-928	7
153	3	308-329	5	437-457	3	540	4	770-778	5	930-934	8
154-160	4	330-334	6	458	2	541-548	3	779-789	6	935	7
181	3	335-338	5	460-462	2	547-548	4	790-792	5	936-960	7
162-163	4	339	6	463-464	2	549	3	793-799	6	961	7
164-165	3	350-352	4	465-466	1	550-566	4			962-976	8
166-199	4	354	5	467-469	2	567	5	800-803	5	977-979	7
		355-359	4	470-472	3	570-572	4	804-805	6	980-987	8
		360-361	5	473	2	573-588	5	806-807	5	988-994	7
200-232	4	362	4	474-475	3	590-597	6	808-816	8	995-999	8
233-237	5	363-369	5	476-477	4	598-599	7	820-822	5		

Heath's Convenient Revolving Charge Plan

The "Cash Price" of merchandise on Heath's Revolving Charge Plans includes the cash price as listed on the page describing the merchandise, plus applicable sales tax, shipping charges, and less any advertised allowances. Regular or extended terms are the two plans available for your use. To use the extended plan, the balance must be at least \$400. The amount of your monthly installment can be determined from the chart below. The **periodic rate** for the **FINANCE CHARGE** is **1½ %** per month and is equal to an **ANNUAL PERCENTAGE RATE** of **18%** before deducting

payments and credits or adding purchases made during the current billing period. No down payment is required on new orders but one may be remitted if desired. **HOW TO OPEN AN ACCOUNT.** Just fill out the credit application, sign the Revolving Charge agreement and mail to Heath with your order. **ADD-ON PURCHASES** List items you want on order blank, check the add-on box, and give your account number. Sign the Revolving Charge agreement, and send to us.

REVOLVING CHARGE AGREEMENT

TO: HEATH COMPANY, BENTON HARBOR, MICHIGAN 49022

I hereby purchase the merchandise listed on the reverse side at a time sale price which is the cash price including shipping charges and tax, if any, less down payment, if any, plus the **[FINANCE CHARGE]** which, in lieu of being added to this contract in total as of the date hereof will be added monthly on the previous month's ending balance of my account before deducting payments and credits or adding purchases made during the current billing period. **[FINANCE CHARGE]** will be assessed on the balance according to the following schedule or in accordance with the laws of the State of my residence which ever is the lesser.

Account Balance Amount
ALL BALANCES
[Periodic Percentage Rate]
1½ %
[ANNUAL PERCENTAGE RATE]
18%

The minimum **[FINANCE CHARGE]** assessed will be .50¢ on all small balances. If within 30 days from my billing date I pay the full outstanding balance shown on my monthly statement, no **[FINANCE CHARGE]** on such balance, will be charged on any subsequent statement.

The highest level of my balance reflected by the payment chart will govern my monthly payment, beginning 30 days from the cycle closing date shown on the statement, until such time as the total unpaid balance of each purchase is fully paid (minimum \$10). Regular or Extended Terms are the two plans available for my use. To use the extended plan, the balance of my account must be at least \$400. The amount of my monthly installment can be determined from the charts below:

REGULAR REVOLVING CHARGE									
Charge up to	\$150	200	250	300	350	400	450	500	550
Pay Monthly	\$10	15	20	25	30	35	40	45	50

EXTENDED REVOLVING CHARGE									
Charge up to	\$400	500	600	700	800	900	1,000	1,100	1,200
Pay Monthly	\$20	25	30	35	40	45	50	55	60

Add \$5 for every \$100, or a portion thereof over \$1,200.

I will not sell, transfer possession of, remove or encumber the property without your written consent: Upon default on the terms of this agreement, you may declare my existing outstanding balance due and payable and you may repossess the property. If legal proceedings are commenced, I will be required to pay reasonable attorney's fees in such an amount as may be allowed by the court. My installments shall be applied as follows: In case of items purchased on different dates, the first purchase shall be deemed first paid for. In the case of items purchased on the same date, the lowest price shall be deemed first paid for. You are authorized to investigate my credit record and report to proper persons and bureaus my performance of this agreement. **NOTICE TO BUYER: 1. Do not sign this agreement before you read it or if it contains blank spaces. You are entitled to a copy of the agreement you sign. 2. The other side of this page is part of this contract. 3. No FINANCE CHARGE if paid in full in 30 days from cycle billing closing date as shown on statement. 4. See accompanying statement regarding your rights to dispute billing errors.**

Date _____

Sign here _____
(Customer's Signature)

CREDIT APPLICATION

Check Revolving Charge Plan Desired

Regular Extended

NAME (Please Print) _____ (First Name) _____ (Middle Initial) _____ (Last Name) _____

IMPORTANT: Please fill in completely. Omissions and errors cause delays. SIGN REVOLVING AGREEMENT ABOVE.

ADDRESS _____

If Military Give Rank _____

CITY _____ STATE _____ ZIP CODE _____

Number of Dependents _____ How Long at Present Address _____ No. of Rooms _____ OWN RENT BOARD Monthly Rent or Mortgage Payments \$ _____

Former Address _____ City _____ State _____ How Long _____

Phone No. _____ AGE _____ MARRIED UNMARRIED SEPARATED Spouse's First Name _____

Employer _____ Address _____ City _____ State _____

How Long _____ Occupation _____ Social Security No. _____ Military Serial No. (If in service) _____ EARNINGS \$ _____ Hr. Wkly.

Former Employer _____ How Long _____

Name of Spouse's Employer _____ Address of Spouse's Employer _____ SPOUSE'S WEEKLY INCOME \$ _____

Other Income — Give Details _____ TOTAL FAMILY INCOME \$ _____

Your Bank _____ Address _____ Type of Account _____

CREDIT REFERENCE: (Give 2 Merchants, Firms or Finance Companies with whom you do or have done business.)

First Credit Reference _____ Address _____ Present Balance \$ _____ Monthly Payment \$ _____

Second Credit Reference _____ Address _____ Present Balance \$ _____ Monthly Payment \$ _____

Nearest Relative _____ Address _____ Relationship _____
(Do not list those with whom you are living) (If Military give permanent mailing address)

When ordering, be sure to remove entire page

THE PRESIDENT'S CORNER

"Our best product ideas come from customers like you.

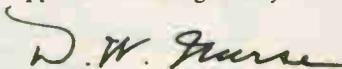
It was because of your suggestions that we recently introduced the Heathkit Continuing Education Series of Individual Learning Programs.

They've already proven to be very popular.

Incidentally, I am well into the Digital Techniques program. Forty years have slipped by since college, so I find it a challenge. But I must add, I'm finding it both stimulating and enjoyable.

We plan to expand these self-study programs and have many ideas for new learning areas. But we'd be most interested to know your thoughts first. Are you interested in programs teaching automotive tune-up, amateur radio license requirements, first class technician licensing, TV servicing, computers, microprocessors or other areas?

If you have a particular area of interest, we would certainly appreciate hearing from you."



D. W. Nurse President



Accompanying Statement Regarding Your Rights To Dispute Billing Errors

The Federal Truth in Lending Act requires prompt correction of billing mistakes.

1. If you want to preserve your rights under the Act, here's what to do if you think your bill is wrong or if you need more information about an item on your bill:

a. Do not write on the bill. On a separate sheet of paper write (you may telephone your inquiry but **doing so will not preserve your rights under this law**) the following:

i. Your name and account number (if any).

ii. A description of the error and an explanation (to the extent you can explain) why you believe it is an error.

If you only need more information, explain the item you are not sure about and, if you wish, ask for evidence of the charge such as a copy of the charge slip. Do not send in your copy of a sales slip or other document unless you have a duplicate copy for your records.

iii. The dollar amount of the suspected error.

iv. Any other information (such as your address) which you think will help the creditor to identify you or the reason for your complaint or inquiry.

b. Send your billing error notice to the address on your bill which is listed after the words: "Send Inquiries to:."

Mail it as soon as you can, but in any case, early enough to reach the creditor within 60 days after the bill was mailed to you. If you have authorized your bank to automatically pay from your checking or savings account any credit card bills from that bank, you can stop or reverse payment on any amount you think is wrong by mailing your notice so the creditor receives it within 16 days after the bill was sent to you. However, you do not have to meet this 16-day deadline to get the creditor to investigate your billing error claim.

2. The creditor must acknowledge all letters pointing out possible errors within 30 days of receipt, unless the creditor is able to correct your bill during that 30 days. Within 90 days after receiving your letter, the creditor must either correct the error or explain why the creditor believes the bill was correct. Once the creditor has explained the bill, the creditor has no further obligation to you even though you still believe that there is an error, except as provided in paragraph 5 below.

3. After the creditor has been notified, neither the creditor nor an attorney nor a collection agency may send you collection letters or take other collection action with respect to the amount in dispute; but periodic statements may be sent to you, and the disputed amount

can be applied against your credit limit. You cannot be threatened with damage to your credit rating or sued for the amount in question, nor can the disputed amount be reported to a credit bureau or to other creditors as delinquent until the creditor has answered your inquiry. **However, you remain obligated to pay the parts of your bill not in dispute.**

4. If it is determined that the creditor has made a mistake on your bill, you will not have to pay any **FINANCE CHARGES** on any disputed amount. If it turns out that the creditor has not made an error, you may have to pay **FINANCE CHARGES** on the amount in dispute, and you will have to make up any missed minimum or required payments on the disputed amount. Unless you have agreed that your bill was correct, the creditor must send you a written notification of what you owe; and if it is determined that the creditor did make a mistake in billing the disputed amount, you must be given the time to pay which you normally are given to pay undisputed amounts before any more **FINANCE CHARGES** or late payment charges on the disputed amount can be charged to you.

5. If the creditor's explanation does not satisfy you and you notify the creditor in writing within **10 days** after you receive his explanation that you still refuse to pay the disputed amount, the creditor may report you to credit bureaus and other creditors and may pursue regular collection procedures. But the creditor must also report that you think you do not owe the money, and the creditor must let you know to whom such reports were made. Once the matter has been settled between you and the creditor, the creditor must notify those to whom the creditor reported you as delinquent of the subsequent resolution.

6. If the creditor does not follow these rules, the creditor is not allowed to collect the first \$50 of the disputed amount and **FINANCE CHARGES**, even if the bill turns out to be correct.

7. If you have a problem with property or services purchased with a credit card, you may have the right not to pay the remaining amount due on them, if you first try in good faith to return them or give the merchant a chance to correct the problem. There are two limitations on this right:

a. You must have bought them in your home state or if not within your home state within 100 miles of your current mailing address; and

b. The purchase price must have been more than \$50.

However, these limitations do not apply if the merchant is owned or operated by the creditor, or if the creditor mailed you the advertisement for the property or services.

Get Heath Testers for that "extra measure"

Famous Heath VTVM's — you need one for your bench!



\$36⁹⁵
Kit

\$70⁰⁰
Assembled



\$46⁹⁵
Kit

\$90⁰⁰
Assembled

Heathkit IM-18 — our most popular VTVM

Features single probe for all measurements — seven AC, seven DC, and seven Ohms ranges; precision 4½" 200 μA meter; 1% precision divider network resistors; ±1 dB 25 Hz to 1 MHz frequency response; rms & p-p AC voltage measurements; circuit board design for fast, easy assembly; 120/240 VAC wiring options.

Kit IM-18, Shpg. wt. 5 lbs. **36.95**
Assembled SM-20A, Shpg. wt. 5 lbs. **70.00**

IM-18 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, 400, 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, 60/50 Hz, 10 W. Dimensions: 7¾" H x 4¼" W x 4¾" D.

Heathkit IM-28 Service Bench VTVM

A deluxe version of the IM-18 in a big stay-put size.

Kit IM-28, Shpg. wt. 7 lbs. **46.95**
Assembled SM-21A, Shpg. wt. 7 lbs. **90.00**

IM-28 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, X100k, X1 meg. Measures 1 ohm to 1000 megohms with internal battery. Meter: 6" 200 μA movement, polystyrene case. Battery: 1½ V, "C" cell (not supplied). Power requirement: 120/240 VAC, 60/50 Hz, 10 W. Dimensions: 5" H x 12¼" W x 4¾" D.

Heathkit Laboratory AC VTVM

The IM-38 features extended accuracy in measuring low-level AC voltages. Any voltage from 10 Hz to 1 MHz can be measured quickly. It can also be used as a VU meter to indicate changing AC voltages, such as those that occur in speech or music equipment.

Kit IM-38, Shpg. wt. 5 lbs. **52.50**
Assembled SM-22A, Shpg. wt. 5 lbs. **85.00**



IM-38 SPECIFICATIONS

Frequency response: ±1 dB 10 Hz to 500 kHz. ±2 dB 10 Hz to 1 MHz, all ranges. Ranges: Ten ranges from 0.01 to 300 V rms full scale. Decibels: Total-range -52 to +58, meter scale -12 to +2 dB (0 dB = 1 mW in 600 ohms). Ten switch selected ranges from -40 dB to +50 dB in 10 dB steps. Input impedance: 10 megohms shunted by 12 pF on ranges 10 to 300 V, scale. 10 megohms shunted by 22 pF on ranges 0.1 to 3 V. Accuracy: Within 5% of full scale. Power requirements: 120/250 VAC, 60/50 Hz, 10 W. Dimensions: 7¾" H x 4¼" W x 4¾" D.

\$17⁹⁵
Kit

Heathkit 40 kV Probe Meter



TV tube voltage measurements are fast and convenient with the new Heathkit IM-5210 Probe Meter.

It is light weight, portable and will measure DC voltages up to 40 kV with ±3% accuracy. You just attach the ground clip to the TV chassis, place the probe against the tube's high voltage connector and switch on the meter — it's as simple as that. The on-off switch on the handle protects the meter during hookup and when the probe is not in use. Assembles easily, in about an hour.

Kit IM-5210, Shpg. wt. 1 lb. **17.95**

IM-5210 SPECIFICATIONS

Voltage Range: 0-40 kVDC. Accuracy: ±3% of full scale. Size: 1½" H x 1¾" W x 15" D.

Now — convert your tube-type Heathkit VTVM to instant-on solid-state design

Replaces the 6AL5 and 12AU7 tubes used in many Heathkit VTVMs, including IM-18 and IM-28. Two solid-state devices plug directly into the tube sockets. One is a high voltage amplifier containing 4 FETs; the other contains 2 special diodes with low forward drop. Provides instant-on service, eliminates pointer-drift corrections.

IMA-18-1, Shpg. wt. 1 lb. **16.95**

Get the most from your meter

Handbook of Practical Electronic Tests & Measurements. EDP-137 **17.95**
101 Ways to Use Your VOM/VTVM, covers equipment checks ac & dc voltage, dc current, ohmmeter, signal tracing, alignment & color TV. EDP-150 **4.50**
Understanding & Using the VOM & DVM. EDP-140 **4.95**
Electronic Measurements Simplified, covers TV servicing, 2-way & ham radio, CB, etc. EDP-141 **4.95**
See page 48 for book-ordering information



of precision and accuracy



Heathkit IM-2202 Portable Digital Multimeter

The lowest-priced professional-grade digital multimeter we've ever offered! 26 ranges — measures AC and DC volts, DC current and resistance. Has 100% overrange capability, separate voltage and current inputs for circuit protection. All functions are protected against accidentally applied voltages up to 250 volts. Voltage ranges have high input impedance (10 megohm typical) for minimum circuit loading. Current ranges feature low voltage drop (100 mV typical) for high accuracy. Resistance ranges limit maximum test current to 1 mA. 2-volt full scale measurement on 1k, 10k and 1 meg ranges allow forward biased junction testing of semiconductor devices.

If a lab standard is used for calibration, DC accuracy is 0.2%. AC accuracy is 0.5% to 10 kHz. Internal standards (supplied) allow field calibration to 0.5% for DC and 1% for AC. Has 3½-digit display with leading zero suppression, automatic polarity indication and decimal placement. A flashing "1" display indicates overrange. Four push-button function switches and a continuous rotation range switch select range. Ultra-compact, with a single MOS/LSI integrated circuit containing all digital and logic functions. Assembly of the IM-2202 is aided by circuit board construction and plug-in components, but previous kitbuilding experience is recommended. Operates on four rechargeable nickel-cadmium batteries (included), 110 or 220 VAC, or temporarily on four "C" cells.

Kit IM-2202, Shpg. wt. 7 lbs. 179.95

IM-2202 SPECIFICATIONS

NOTE: Accuracy specifications of the IM-2202 depend on use of built-in references or laboratory standard references for calibration.

DC VOLTAGE — Range/Input Impedance: 100.0 mV/50 MΩ, 1.000 V/500 MΩ, 10.00 V/10 MΩ, 100.0 V/10 MΩ, 1000 V/10 MΩ. Overload Capability: 300 V on 100 mV & 1 V ranges; 1000 V on 10 V, 100 V & 1000 V ranges. Accuracy: Built-in references, ±0.5%, ±1 digit. Laboratory standards, ±0.2%, ±1 digit. **AC VOLTAGE** — Range/Input Impedance: 100.0 mV/10 MΩ-120 pF, 1.000 V/10 MΩ-120 pF, 10.00 V/10 MΩ-60 pF, 100.0 V/10 MΩ-60 pF, 750 V/10 MΩ-60 pF. Overload Capability: 250 V on 100 mV & 1 V ranges; 750 V on 10 V, 100 V & 750 V ranges. Accuracy: Built-in references... ±1.0%, ±3 digits; 40 Hz to 1 kHz (except 40 Hz to 10 kHz on 100 mV and ranges). Laboratory standards... ±0.5%, ±3 digits; 40 Hz to 2 kHz on 750 range). **DC CURRENT** — Range/Voltage Drop: 100.0 μA/100 mV, 1.000 mA/100 mV, 10.00 mA/100 mV, 100.0 mA/150 mV, 1000 mA/300 mV. Accuracy: Built-in references... ±5%, ±1 digit (except ±1%, ±1 digit on 1000 mA range). Laboratory standards... ±2%, ±1 digit (except ±5%, ±1 digit on 1000 mA range). Overload Protection: Input coupled through 3.0 Ampere fuse to shunt diodes for overloads above approximate 1.2 Volts. **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: Built-in references... ±1.0% ±3 digits (except ±1.5%, ±3 digits on 1000 mA range); 40 Hz to 10 kHz. Laboratory references... ±5%, ±3 digits (except ±1.0%, ±3 digits on 1000 mA range); 40 Hz to 10 kHz. Overload Protection: Input coupled through 3.0 Ampere fuse to shunt diodes for overloads above approximate 1.2 Volts. **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 mA, 1000 kΩ/10.0 μA. Accuracy: Built-in references... ±5%, ±1 digit. Laboratory standards... ±2%, ±1 digit. Open-circuit Voltage: 12 VDC. Overload Protection: Positive input over-voltage protection by blocking diode to 400 volts; negative input over-voltage through 0.03 A fuse and shunt diode. **GENERAL** — Overrange Capability: 100% on all ranges except 1000 VDC & 750 VAC. Display: 1999 maximum; seven segment planar; 0.55" high digits. Display Rate: Approximately 5 per second, non-blinking. Normal Mode Rejection: 35 dB (line operation); extended on battery operation. Common Mode Rejection: 80 dB (line operation); extended on battery operation. Power Line Isolation: May be operated 1500 V above power line ground (during line operation). Operating Temperature Range: 10°C to 40°C. Power Requirement: 110 to 130 VAC, or 220 to 260 VAC (internal selectable); 60/50 Hz; 5 watts typical during charge. Size (overall including handle folded to rear): 3" H x 8 3/4" W x 8" D.



Our lowest cost bench DVM

The low-cost DMM that hams, hobbyists and service techs have been waiting for. Its full-function capability even includes AC voltage measurements up to 700 volts. Has four overlapping AC & DC voltage & current ranges and five resistance ranges. Accuracy is 1% on DC volts, 1½% on AC volts and AC/DC current, and 2% on resistance.

A solid-state design uses IC circuitry for a clear non-blinking 2½-digit display with automatic decimal positioning. The easy assembly makes it a great project for student electronics labs. And the exclusive Heath built-in calibration standards are all that's needed for initial and periodic adjustments.

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.

Kit IM-1212, Shpg. wt. 7 lbs. 79.95

Assembled SM-1212, wired version of the IM-1212, Shpg. wt. 7 lbs. 125.00

IM-1212 SPECIFICATIONS

Ranges: (full scale): DC volts: 2, 20, 200, 1,000V. DC current: 2, 20, 200, 2,000 mA. AC volts: 2, 20, 200, 700V rms (25 Hz to 10 kHz). AC current: 2, 20, 200, 2,000 mA rms (25 Hz to 10 kHz). Ohms: 200, 2k, 20k, 200k, 2,000k ohms. Maximum Input Without Damage: 3 A into AC or DC mA, and ohms (fuse protected). 700 VAC rms into volts (except 2V range — 140 VAC rms). 1000 VDC into volts (except 2V range — 200 VDC). Accuracy: (Full scale ±1 digit): 1% DCV (1000 V max.), 1½% ACV (700V max.), AC & DC current, 2% ohms. Input Impedance: 1 megohm on all voltage ranges. 2V drop maximum on current ranges. Power Requirement: 120/240 VAC, 60/50 Hz, 8 watts. Dimensions: 3 1/4" H x 9 1/2" W x 8 3/4" D.

Our finest 3½-digit DVM

26 ranges — AC, DC volts, DC current, and resistance. Has automatic polarity indication and decimal positioning, overrange indication, complete overload protection on all ranges. One of the finest DVM's you can buy!

Kit IM-102, Shpg. wt. 9 lbs. 249.95



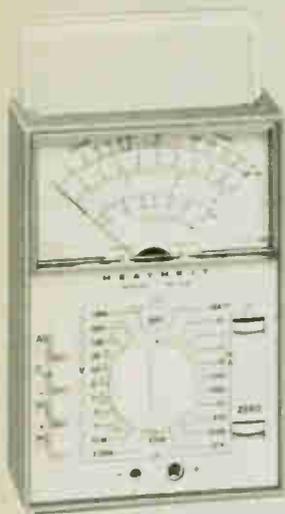
IM-102 SPECIFICATIONS

DC VOLTMETER — 5 Ranges: 200 mV, 2V, 20V, 200V, 1000V. Input Impedance: Approx. 100 megohm on 200 mV, approx. 1000 megohm on 2 V, 10 megohm on all other ranges. Accuracy: ±0.2% ±1 digit with furnished DC calibrator, ±0.1% ±1 digit with lab calibration. Normal Mode Rejection: 35 dB minimum @ 60 Hz. **OHMMETER** — 6 Ranges: 200 ohms with 1 mA test current, 2k with 100μA, 20k with 10μA, 200k with 10μA, 2M with 1μA, 20M with 100nA. Accuracy: With DC calibrator, ±0.5% ±1 digit on 200, 2k, 20k, 200k ranges; ±1.5% ±1 digit on 2M and 20M ranges. With lab calibration, ±0.5% ±1 digit on 200 ohm range; ±0.25% ±1 digit on 2k, 20k, 200k; ±1% ±1 digit on 2M and 20M. **AC VOLTMETER** (Average responding, rms calibrated) — 5 Ranges: 20 mV, 2 V, 20 V, 200 V, 1000 V. Input Impedance: 1 megohm @ 150 pF. Accuracy: With DC calibrator, ±0.75% ±1 digit for 40Hz-10kHz, ±1% ±1 digit for 10kHz-20kHz on 200 mV and 2V ranges; ±0.75% ±1 digit for 40Hz-5kHz, ±1.5% ±1 digit for 5kHz-10kHz on 20V and 200V ranges; ±1.5% ±1 digit for 40Hz-7.5kHz on 1000V range. **DC AMMETER** — 5 Ranges: 200μA, 2mA, 20mA, 200mA, 2A. Voltage Drop: 0.2V (nominal). Accuracy: With DC calibrator, ±0.5% ±1 digit for 2A, ±3% ±1 digit on all other ranges. With lab calibration, ±0.25% ±1 digit for 2mA and 20mA; ±0.3% ±1 digit for 200μA; ±0.5% ±1 digit for 2A. **AC AMMETER** (40Hz-10kHz) — 5 Ranges: 200μA, 2mA, 20mA, 200mA, 2A. Voltage Drop: 0.2 V (nominal). Accuracy: With DC calibrator, ±1.5% ±1 digit on 2A, ±1% on all other ranges. With lab calibration, ±0.75% ±1 digit on 200μA, ±0.7% ±1 digit on 2mA and 20mA; ±0.8% ±1 digit on 200mA; ±1 digit on 2A. **GENERAL** — Display: Maximum count, 1999. Power Requirement: 120 or 240 VAC, 60/50 Hz, 8 W nominal. Operating Temperature: 10°C-40°C. Size: 3" H x 7" W x 7.9" D.

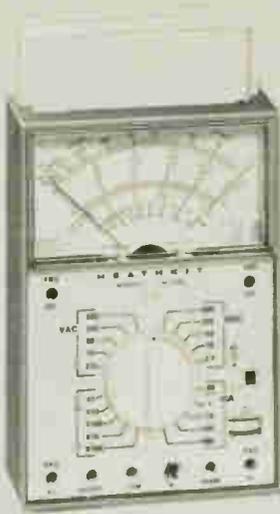
Charge a kit — no money down on any kit — see page 50 for details.

Precision VOM's, Line Voltage Monitor

Heath Test Instruments have won the confidence of thousands the world over. No matter what your electronic testing need, there's a Heath Instrument that will do it for you, and do it better.



1 \$94⁹⁵



2 \$64⁹⁵



LAST CALL!
Limited quantity

3 \$19⁹⁵



4 \$29⁹⁵

1 Heathkit FET taut-band VOM — ten megohm input in a portable meter

A portable lab-grade FET VOM combining accuracy, versatility, convenience and ruggedness — in an easy-to-build dollar-saving kit! Our IM-104 has low-drift 1% precision metal film and wirewound resistors for exceptional stability. Nine DCV & ACV ranges measure from .01V to 1000V. Six current ranges cover 0.001 mA to 1000mA, DC & AC. Seven resistance ranges from 1 ohm to 100 megohms, conventional or low voltage modes. Decibel ranges from -40 dB to +62 dB. DC null scale with better than 1 mV resolution. The 4½" ruggedized, taut-band meter is diode protected, built to take plenty of abuse. Built-in circuitry shows battery condition at the flip of the range selector. Three evenings put this great portable VOM on your bench.

Kit IM-104, Shpg. wt. 4 lbs. 94.95
Assembled SM-666, has additional 1μA current range, less 100 & 1000 mA ranges, Shpg. wt. 4 lbs. 149.00

IM-104 SPECIFICATIONS

DC VOLTMETER — 9 ranges: 0.1, 0.3, 1, 3, 10, 30, 100, 300, 1000V. Input resistance: 10 megohm. Accuracy: ±2% of full scale (meter in horizontal position). **AC rejection:** Accuracy not affected by impressed 60 Hz sine wave with rms value 2x greater than full-scale value. Null indicator: On 0.1, 1, 10, 100, 1000V, meter zero level may be adjusted to center of null referenced scale. Null variations of approx. 1% of full-scale can be resolved. **AC VOLTMETER** — 9 ranges: 0-0.1, 0.3, 1, 3, 10, 30, 100, 300, 1000V. Range factor: 1 to 3.162 (10 dB) per step. Input resistance: 10 megohm. Input capacity: 100 pF typical. Accuracy: ±3% of full scale (meter in horizontal position; 60 Hz sine wave). Response: Average value of ½ sine wave. Scale calibrated to indicate rms. Frequency response: 20 Hz to 20 kHz ±3%, 20 Hz to 50 kHz ±5% on 0.1 to 30 V, 20 Hz to 10 kHz ±3%, 20 Hz to 20 kHz ±5% on 100 and 300 V, 20 Hz to 1.0 kHz ±3%, 20 Hz to 2.5 kHz ±5% on 1000 V. **DC MILLIAMMETER** — 6 ranges: 0-0.01, .1, 1, 10, 100, 1000V mA. Voltage drop (approx. full scale): 0.100 V on 0.01 to 10, 0.150 V on 100, 0.350 V on 1000. Insertion resistance: Voltage drop divided by full-scale current. Accuracy: ±2% on 0.01 to 100, ±3% on 1000. (Meter in horizontal position.) **AC MILLIAMMETER** — 6 ranges: 0-0.01, 0.1, 1, 10, 100, 1000 mA. Voltage drop (approx. of full scale): 0.100 V on 0.01 to 1, 0.150 V on 100, 0.350 on 1000 V. Insertion resistance: Voltage drop divided by full scale. Accuracy: ±3% on 0.01 to 100, ±4% on 1000. (Meter in horizontal position; 60 Hz sine waves.) Response: Average value of ½ of sine wave (DC current must be negligible). Scale calibrated to include rms. Frequency response: 20 Hz to 5 kHz ±3% on 0.01, 20 Hz to 20 kHz ±3% on 0.1, 20 Hz to 50 kHz ±3% on 1 to 1000. **OHMMETER** — 7 ranges: Rx1 (10 ohm center scale), Rx10, Rx100, Rx1k, Rx10k, Rx100k, Rx1M. Accuracy: ±3% on x10 to 1M. Test voltage (nominal): 1.55V on +DC/ohm and -DC/ohm, 0.085 V on ohm. **DB RANGE** — 9 ranges (0 dB = mV into 600 ohm): -40 to -18, -30 to -8, -20 to +2, -10 to +12, 0 +22, +10 to +32, +20 to +42, +30 to +52, +40 to +62. Accuracy: ±3 dB @ -20 dB to ±0.3 dB @ +28. Meter protection: will sustain momentary overload of 220 VAC or DC on any range, diode and 2A fuse protected on ohms x1 and 0.01 to 100 mA, FET protected on 0.1 to 100 V and ohms x10k to ohms x1M. Internal circuitry protected against improper battery installation. Diode protected meter. Amplified circuit: Dual FET source followers driving operational amp. Operating temperature: 0 to 50°C. Storage temperature (less batteries): -40 to +80°C. Batteries (not supplied): 1 1.5 V D-cell (NEDA #13). 4 1.5 V AA-cell (NEDA #15). Dimensions: 6.95" H x 4.95" W x 2.25" D.

2 Heathkit taut-band general-purpose VOM

It's an easy, enjoyable one-evening kit — build-up two modular circuit boards and you have it. This highly versatile IM-105 gives you a low-friction, taut-band meter with diode & fuse protected movement. Fuse in-line with the input connector is removable from front for extra convenience. Other professional features include calibrating controls, DC polarity switch, self-storing handle.

Kit IM-105, Shpg. wt. 3 lbs. 64.95
Assembled SM-660, (less 5 KV ranges), Shpg. wt. 4 lbs. 72.00

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. Voltage drop: Approximately 0.25 V at full scale. **RESISTANCE RANGES:** -x1 (20 center scale), x10, x100, x1k, x10k. Accuracy: ±3 degrees of arc. Source voltage: x1 through x1k ranges: 1.5 V x 10k range: 15 V. **DECIBEL RANGES:** (0 dB = 1 mW in 600 ohms): -10 to +56 dB. **GENERAL** — Operating temperature range: 0-55° C. Batteries (not supplied): One 1.5V "D" cell (NEDA #13). One 15V (NEDA #208). Dimensions: 7" H x 5" W x 2¼" D.

3 Heathkit Line Voltage Monitor

Improper line voltage can cause poor operation of test equipment and circuits. With the solid-state IM-103, you always know what your line voltage is. When calibrated from a source of known accuracy, the IM-103 has an accuracy of ±2%.

Kit IM-103, Shpg. wt. 3 lbs. 19.95

IM-103 SPECIFICATIONS

Voltage range: 90 VAC (rms) — 140 VAC (rms). Voltage accuracy (sine wave): ±2% when calibrated with a known line voltage. Power requirement: 90-140 VAC, 50-60 Hz, 4.2 W. Dimensions: 5¼" H x 6¼" W x 3" D.

4 Heathkit IM-17 — everyman's VOM

The perfect buy for homeowners, hams, servicemen, hobbyists, modelers — everyone. All solid-state with FET input for less circuit loading, better accuracy than ordinary VOMs. Portable battery operation, zero and ohms adjust, accessory probe jack. DC polarity switch, three test leads, easy 3-5 hour assembly. Less batteries.

Kit IM-17, Shpg. wt. 4 lbs. 29.95

IM-17 SPECIFICATIONS

DC VOLTMETER — Four ranges: 0-1, 10, 100, 1000 V full scales. Input resistance: 11 meg. on all ranges. Accuracy: ±3% of full scale. **AC VOLTMETER** — Four ranges: 0-1, 10, 100, 1000V full scale. Input resistance: 1 meg. on all ranges. Accuracy: ±5% of full scale. Frequency response: ±1 dB, 10 Hz to 1 MHz. **OHMMETER** — Four ranges: RX1, RX100, RX10k, RX1M. Input resistance: 1 meg. on all ranges. Dimensions: 5¼" H x 9¼" W x 9" D.

Get more for your counter dollar at Heath



12 Volt Operation
Rear panel connector permits use of any 12-volt DC power source. A mating connector is supplied with the kit.

Overrange Indicator
Indicates when the number to be displayed is larger than the display can handle.

POWER/TIME BASE Switch
Turns the IM-4100 on, selects between kHz and MHz for frequency measurements, and selects second or millisecond time bases for period measurements.

Gate Lamp
Flashes on when the display is updated. Also functions as a logic probe (see right) for trouble-shooting during calibration or servicing.

Reset Switch
Pushbutton switch resets the display to zero in any mode of operation.

Input Attenuator
Three-position switch provides $\div 1$, $\div 10$ or $\div 100$ attenuation of the input signal.

Three Operating Modes
Modes for frequency measurement to 30 MHz, period measurements to 99,999 seconds, or totalize for events counting to 99,999 are easily switch-selected.

Our most versatile counter — frequency to 30 MHz, period to 99.999 seconds, events to 99,999.

Sensational counter value! It's a full five-digit frequency counter with period and totalize modes. As a frequency counter, it's guaranteed to 30 MHz with 1 Hz resolution. In the period mode, it measures intervals up to 99.999 seconds. Using the millisecond time base, it resolves to 1 msec! The totalize mode will add up (totalize) event pulses up to a count of 99,999. Pushing the RESET button starts the count at zero. An inhibit signal stops the totalize mode at any time, without loss of the displayed count. Front panel attenuator switch allows the amplitude of input signals to be divided by 1, 10 or 100. Front panel display includes overrange indicator and a gate lamp. A rear panel switch selects internal or external time base. The rear panel connector can be used as an input for the external time base signal, or as an output to check the internal 10 MHz time base or provide a convenient frequency standard of 1 MHz for bench use. Operates from any 12 VDC source. And the IM-4100 is easy to build thanks to the open circuit board layout. A simple gate light modification gives

you a handy logic probe for trouble-shooting should problems arise.
Kit IM-4100, Shpg. wt. 7 lbs. **129.95**
Assembled SM-4100, Shpg. wt. 7 lbs. **190.00**

IM-4100 SPECIFICATIONS

FUNCTIONS — Frequency: 5 Hz to 30 MHz. Period: 1 μ sec resolution to 99,999 sec. Totalize: 1-99,999 events. **INPUT** — Frequency Range: 5 Hz to 30 MHz minimum. Sensitivity: 15 mV rms (50 mV, 5 Hz to 50 Hz). Period Pulse Width: 25 nsec minimum. Low Frequency Signal Risettime: 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. Attenuator: X1, X10, X100 fixed compensation. **TIME BASE** — Frequency: 10 MHz. Setability: ± 1 ppm. Temperature stability: ± 10 ppm, maximum 0° to 40° C ambient. **OSCILLATOR CONNECTION** — External Input Frequency: DC to 20 MHz. External Input Sensitivity: TTL or 2.5 V rms from 50-ohm source. Internal Output: TTL signal at 1 MHz. **GENERAL** — Gate Interval: kHz-1 sec, MHz-1 msec. Manual Gate: DC control in events mode using external OSC input connector. Display Time: 200 msec plus gate interval. **Power Requirements:** 105-130 or 210-260 VAC (switch-selected). 60/50 Hz, (at 25 watts); or 9-14 VDC at 1.25 amperes. Dimensions: 2 3/4" H x 7 1/4" W x 10 1/2" D (less handle).



\$349⁹⁵

180 MHz Counter with phase-locked multiplier

Features 1 Hz to 180 MHz range, pushbutton selection of x1, 10, 100 or 1000 multiplier for resolution down to 0.001 Hz. Pushbutton selection of 1 msec, 100 msec and 1 second gate times for variable resolution readings. Input for external clock. Has 8-digit cold-cathode display plus range, overrange, gate and loop-unlocked indicators, separate AC and DC coupled inputs, 120/240 VAC primary.

Kit IB-1103, Shpg. wt. 12 lbs. **349.95**

IB-1103 SPECIFICATIONS

FREQUENCY MEASUREMENTS — Range: 1 Hz to 180 MHz. Accuracy: \pm count \pm time base stability. Readout: MHz, kHz, or Hz with correctly positioned decimal. Impedance: 1 megohm in parallel with 35 pF. Overload: Diode-protected input circuit. **TIME BASE** — Crystal frequency: 4 MHz TCXO (Temperature Compensated Crystal Oscillator). Stability: Aging rate ± 1 ppm/yr. **FREQUENCY MULTIPLIER** — Ranges versus input frequency: x1: No multiplier (direct counting). x10: 100 Hz to 300 kHz. x100: 10 Hz to 100 kHz. x1000: 10 Hz to 10 kHz. **EXTERNAL TIME BASE INPUT** — Frequency: 1 MHz with stability greater than 10⁻⁷. Input Impedance: 1000 ohms. Maximum input: 3 V rms. Power requirements: 120/240 VAC, 60/50 Hz. Dimensions: 3 3/4" H x 8 3/4" W x 9 1/4" D.



\$279⁹⁵

8-digit, 120 MHz Counter

120 MHz range...excellent sensitivity...high stability...low cost: that's the Heath IB-1102! 50 mV sensitivity over the entire range. FET input circuitry offers high impedance for minimum circuit loading...automatic triggering level. The high stability 4 MHz temperature compensated crystal oscillator provides unusual accuracy for a counter in this price class...for even more critical measurements you can use an external time base. Eight-digit, cold-cathode readout plus lighted indicators for MHz, kHz, overrange and gate condition mean resolution down to 1 Hz for frequencies up to 99.999 MHz...10 Hz resolution for frequencies over 100 MHz.

Kit IB-1102, Shpg. wt. 12 lbs. **279.95**

IB-1102 SPECIFICATIONS

FREQUENCY MEASUREMENTS — Range: 1 Hz to 120 MHz. Gate time: 1 msec. or 1 sec. Accuracy: ± 1 count \pm time base stability. Readout: kHz or MHz with fixed decimal point. **SIGNAL INPUT** — Sensitivity: 50 mV rms. Impedance: 1 megohm in parallel with 35 pF. Trigger level: Automatic. Overload: Diode protected input circuit. **TIME BASE** — Crystal Frequency: 4 MHz. TCXO (Temperature Compensated Crystal Oscillator). Stability: Aging rate: ± 1 ppm/yr. Short term: Better than 0.5 ppm in 1 sec. **EXTERNAL TIME BASE INPUT**: Frequency: 1 MHz with stability $> 10^{-7}$. Input Impedance: 1000 Ω . Maximum input: 3V rms. **GENERAL** — Display: 8 digits plus overrange, gate, kHz, and MHz lamps. Operating temperature range: Operating 10°C to 40°C. Power requirements: 120/220 VAC, 50/60 Hz, 30 W. Connectors: Two BNC's. Input on front panel; external clock on rear panel. Cabinet dimensions: 8 3/4" W x 3 3/8" H x 9 1/4" D.

Charge a kit — no money down on any kit — see page 50 for details.

There's a reliable Heathkit Power Supply

Prices Slashed on 2700 Series supplies!

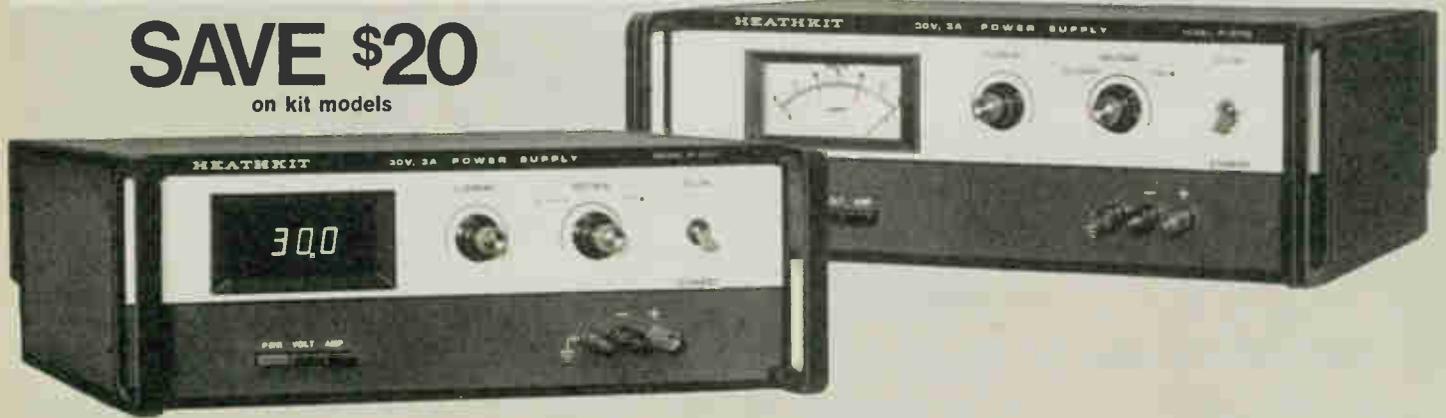
These ultra-reliable supplies provide a precise, accurate source of voltage and current for all your testing and design needs. They offer digital or analog readout, constant current or constant voltage operation, complete output protection. Choose the one that's right for your bench and SAVE!

SAVE \$35 to \$40

on assembled models

SAVE \$20

on kit models



2700 Series Digital and Analog Power Supplies

Ideal for powering breadboard circuits, electrical component testing, or as a power source for bench use. All feature remote programming and voltage sensing; simplified front panel operation. Digital readout

types have two decade auto-ranging for high resolution on low voltage and current settings. Choose from four DC models: 0-7.5V @ 10 A; 0-15 V @ 5 A; 0-30 V @ 3 A; 0-60 V @ 1.5 A.

Kit IP-2700, 60V analog, Shpg. wt. 35 lbs. . . . Was 169.95 Now 149.95
Assembled SP-2700, 60V analog, Shpg. wt. 35 lbs. . . . Was 255.00 Now 220.00

Kit IP-2720, 15V analog, Shpg. wt. 34 lbs. . . . Was 169.95 Now 149.95
Assembled SP-2720, 15V analog, Shpg. wt. 32 lbs. . . . Was 255.00 Now 220.00

Kit IP-2701, 60V digital, Shpg. wt. 37 lbs. . . . Was 219.95 Now 199.95
Assembled SP-2701, 60V digital, Shpg. wt. 37 lbs. . . . Was 340.00 Now 300.00

Kit IP-2721, 15V digital, Shpg. wt. 36 lbs. . . . Was 219.95 Now 199.95
Assembled SP-2721, 15V digital, Shpg. wt. 35 lbs. . . . Was 340.00 Now 300.00

Kit IP-2710, 30V analog, Shpg. wt. 34 lbs. . . . Was 169.95 Now 149.95
Assembled SP-2710, 30V analog, Shpg. wt. 34 lbs. . . . Was 255.00 Now 220.00

Kit IP-2730, 7.5V analog, Shpg. wt. 36 lbs. . . . Was 169.95 Now 149.95
Assembled SP-2730, 7.5V analog, Shpg. wt. 34 lbs. . . . Was 255.00 Now 220.00

Kit IP-2711, 30V digital, Shpg. wt. 36 lbs. . . . Was 219.95 Now 199.95
Assembled SP-2711, 30V digital, Shpg. wt. 36 lbs. . . . Was 340.00 Now 300.00

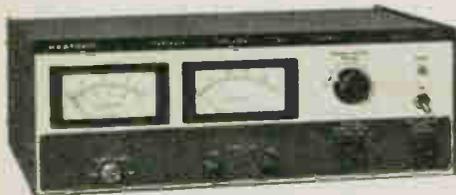
Kit IP-2731, 7.5V digital, Shpg. wt. 38 lbs. . . . Was 219.95 Now 199.95
Assembled SP-2731, 7.5V digital, Shpg. wt. 35 lbs. . . . Was 340.00 Now 300.00

IP/SP-2700 SERIES SPECIFICATIONS

(NOTE: Specs measured in accordance with NEMA standards (PYI-1972) after 30-minute warmup period.)

Max. Rated Output: Models IP/SP-2700 & 2701: 60V, 1.5A; models IP/SP-2710 & 2711: 30V, 3A; models IP/S-2720 & 2721: 15V, 5A; models IP-2730 & 2731: 7.5V, 10A. Load Regulation: Voltage: $\pm 0.05\%$ +1 mV, Current: $\pm 0.10\%$ +3.5 mA. Line Regulation: Voltage: $\pm 0.05\%$ +1 mV. Current: $\pm 0.10\%$ +1 mA. Ripple & Noise: Voltage: 1 mV RMS; 0.03% of rated output, peak-to-peak. Voltage/Current Readout (Switchable): Analog: $3\frac{1}{2}''$, 100 \circ , meter. Digital: $3\frac{1}{2}$ -digit (1999), two-decade, auto-ranging, digital meter. Readout Accuracy: Voltage: Analog $\pm 3\%$ of rated output; Digital $\pm 0.5\%$ of reading ± 1 count using lab standards, $\pm 1.0\%$ of reading ± 1 count using built-in calibrator. Current: Analog — $\pm 3\%$ of rated output; Digital — $\pm 1.0\%$ of reading ± 4 count using lab standards, $\pm 1.5\%$ of reading ± 4 count using built-in calibrator. Readout Response Time: (Digital): 2 seconds to within 5 counts. Stability at Output Terminals: Voltage: $\pm(0.01\% + 1 \text{ mV})/\text{hr}$. Current: $\pm(0.05\% + 1 \text{ mA})/\text{hr}$. Stability as Displayed (Digital): Voltage: $\pm(0.01\% + 1 \text{ mV} + \frac{1}{2} \text{ count})/\text{hr}$. Current: $\pm(0.01\% + 1 \text{ mA} + \frac{1}{2} \text{ count})/\text{hr}$. Operating Modes: Constant voltage, constant current, auto-series, auto parallel. Programming Mode: Voltage: A—zero to rated output with 0 to 5.0 VDC applied; B—zero to rated output with 0 to 5000 Ω external resistor. Current: Zero to rated output with applied voltage of 1.0 volt/amp (0.1 volt/amp for IP-2731). Programming transient response: 0.1 ms for low current to high current changes; 1.0 ms for high to low. Load resistance less than 10 x (E Rated/I Rated). Power Requirements: 120/240 \pm 10/20 VAC; 60/50 Hz, 2.0/1.0 Amps max. Overall Dimensions: 5.5" H x 15" W x 13.5" D.

IP-5220 Variable Isolated AC Power Supply



\$109⁹⁵ • Provides Variable
0-140 VAC Output

Offers safe, isolated AC power for service work, and testing. Features simultaneous metering of voltage and current output with 1A and 3A ammeter ranges for easy low-current readings; front panel isolated output. Starts from zero voltage — ideal for locating circuit faults due to high or low line voltage; testing new circuits. Continuous, smooth power is available to 360 volt-amperes, enough even for a color TV. Fused output protects the IP-5220 and the circuit under test.

Kit IP-5220, Shpg. wt. 27 lbs. 109.95

IP-5220 SPECIFICATIONS
Input Voltage: 120 V @ 60 Hz for specified output. Output Voltage: 0-140 V @ 60 Hz. Voltmeter Range: 0-150 VAC. Ammeter Ranges: 0-1 & 0-3 A, AC. Output Current: 3 A max. 10 A (direct line connection.) Output Power: 360 Volt-Amperes maximum. Dimensions: 5.5" H x 15" W x 10.5" D.

Learn more about power supplies

Regulated Power Supplies — covers static & dynamic characteristics, regulation techniques, use of integrated circuits and more.

EDP-152 5.50

See page 48 for book-ordering information.



FOR FASTEST SERVICE — USE THE HEATHKIT HOTLINE! — (616) 982-3411 DAY OR NIGHT.

for every voltage range, every price range

IP-2718 Tri-Output Experimenter Power Supply

\$79⁹⁵

Three floating outputs can be connected in any combination for a wide variety of output voltage and current capability

Combines 5 VDC fixed output with two 0-20 VDC variable outputs in a single, compact supply ideal for experimenters. The 0-20 variable outputs can be tracked — one will "follow" the other at any specified voltage difference — ideal for analog circuits requiring a + and — voltage. The 5-volt output is useful for digital circuits. All outputs are short-circuit proof, with current limiting. They can be operated independently, in series, or in parallel. Switchable front panel meter monitors all outputs.

Kit IP-2718, Shpg. wt. 12 lbs. 79.95
Assembled SP-2718, Shpg. wt. 12 lbs. 140.00

IP-2718 SPECIFICATIONS

Outputs: 5 volts DC $\pm 5\%$ at 1.5 A. Two 0-20 VDC at 0.5A, continuously adjustable. 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 VAC or 200-270 VAC, 60/50 Hz, 100 watts full load. Dimensions: 4½" H x 10¾" W x 9" D.

IP-2715 Power Supply/Battery Eliminator

\$134⁹⁵

Provides variable 9-15 volt output capable of 12 amps continuous, 20 amps intermittent

Heavy-duty supply is the one you NEED for reliable Ham and CB radio servicing, any high-current 12-volt use. Features negligible ripple; excellent regulation from no load to full load. Has double heat sinks with 4 output transistors, extra-large transformer for steady smooth power.

Kit IP-2715, Shpg. wt. 31 lbs. 134.95

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 Requirements: 110-130 VAC, 7A or 220-260 VAC, 3.5 A, 60/50 Hz. Dimensions: 5¼" H x 11" W x 11" D.

IP-18 1-15 VDC regulated supply

Kit
\$24⁹⁵

Assembled
\$50⁰⁰



Ideal for service, design and testing of low-voltage solid-state equipment — transistor radios, portable tape recorders, etc. Output continuously adjustable from 1-15 VDC with 50 mV load and line regulation...and adjustable current limiting from 10 mA to 500 mA. AC or DC programming capability. Three-terminal floating output.

Kit IP-18, Shpg. wt. 5 lbs. 24.95
Assembled SP-18A, Shpg. wt. 5 lbs. 50.00

IP-18 SPECIFICATIONS

Ripple and Noise: Less than 5 mV. Current Output: 500 mA maximum continuous load. Current Limiting: Adjustable from 10 mA to over 500 mA. Transient Response: 25 microseconds. Output Impedance: .5 ohm or less to 100 kHz. Power Requirements: 120/240 VAC, 60/50 Hz, 15 W at full load. Dimensions: 4¾" H x 5½" W x 5¾" D. Programming: AC or DC, 5000 ohm input resistance.

PLACE ORDERS FOR THESE PRODUCTS NOW FOR SHIPMENT BY APRIL 26, 1976.

New

Offers 3 Output Voltages for Virtually Any Circuit Design



Kit or Assembled

New

Ideal for 2-way Radio Servicing, High-Current 12-Volt Applications



Kit

IP-17 0-400 VDC general-purpose supply

\$94⁹⁵ Kit

Assembled
\$160⁰⁰



A versatile supply for experimenters and service techs. Provides 0-400 VDC at 0-100 mA continuous, 125 mA intermittent. Has front panel voltage and current meters, built-in circuit protection, binding posts insulated from chassis to allow positive or negative high voltage and bias operation. Makes a great general purpose supply for the physics or chemistry lab.

Kit IP-17, Shpg. wt. 21 lbs. 94.95
Assembled SP-17A, Shpg. wt. 21 lbs. 160.00

IP-17 SPECIFICATIONS

Additional Outputs: 0 to -100 VDC at 1 mA variable bias voltage. 6.3 VAC at 4 amps., 12.6 VAC at 2 amps. (25 VA max. AC load), filament voltage. Regulation: Output variation less than 1% from no load to full load. Ripple: Less than 10 millivolts rms. Output Impedance: Less than 10 ohms, DC to 1 MHz. Meters: Voltmeter 0-400 V or 0-150 V; Milliammeter 0-150 mA. Power Requirements: 120/240 VAC, 60/50 Hz, 150 W max. Dimensions: 5¾" H x 13¼" W x 11" D.

Want faster service? Order by phone — call (616) 982-3411 day or night.

There's a Heathkit Generator for every lab,



Kit
\$109⁹⁵

Assembled **\$150⁰⁰**

provides up to 20 dB additional attenuation for each step for total attenuation of 70 dB. Attenuator accuracy is ± 1 dB. Frequency accuracy is $\pm 3\%$. Nonlinearity of the triangle waveform is 5% maximum, with waveform symmetry within 10%. Square wave rise and fall times are 100 nsec maximum. 105-130 or 210-260 VAC operation. A triggered oscilloscope such as the IO-4530 (see page 64) is necessary for calibration.

Kit IG-1271, Shpg. wt. 7 lbs. **109.95**

Assembled SG-1271, wired version of the IG-1271 in same attractive blue & white styling (not shown), Shpg. wt. 7 lbs. . . . **150.00**

This low-cost function generator delivers sine, square & triangle waveforms from 0.1 to 1 MHz

Combines wide frequency range, compact size and reliable Heath engineering in a low-cost generator. All controls are located on the front panel for convenient operation. The Heathkit IG-1271 generates sine, square

or triangle waveforms over a frequency range of 0.1 Hz to 1 MHz. The large tuning control allows fast and precise control of frequency over a 100:1 range. The six-position Frequency Multiplier is the only other control needed to set any frequency. The short-circuit-proof output amplifier supplies a 10 volt peak-to-peak 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. The variable attenuator control

IG-1271 SPECIFICATIONS

Frequency range: 0.1 Hz to 1 MHz. Frequency accuracy: $\pm 3\%$ 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. Power requirements: 105-130 volts or 210-260 volts rms, 60/50 Hz. 15 watts max. Dimensions: 3" H x 7 1/4" W x 8 7/8" D.



1 Heathkit Audio Intermodulation Analyzer

Ideal for critical IM distortion checks on stereo and 4-channel components

Three audio test instruments in one. An AC VTVM, wattmeter and IM analyzer are combined in one compact package. High and low signal sources are built in for IM tests. Noninductive load impedance of 4, 8, 16 and 600 ohms are switch-selected. 120/240 VAC, 60/50 Hz, 20 W. Measures 9 1/2" H x 13" W x 7" D.

Kit IM-48, Shpg. wt. 13 lbs. **94.95**

3 Heathkit Stereo Generator

Provides audio or composite stereo signal for multiplex adapter adjustments...RF carrier modulated by these signals for tuner & receiver adjustments...phase test function for subcarrier transformer adjustment...a variable level crystal-controlled 19 kHz pilot signal for checking receiver lock-in ranges...plus built-in sweep and marker signals for RF & IF alignment. Other features include switch-selection of 400 Hz, 1 kHz, 5 kHz, 19 kHz, 38 kHz and one of two SCA frequencies...test leads included.

Kit IG-37, Shpg. wt. 12 lbs. **99.95**

2 Heathkit Harmonic Distortion Meter

Excellent low-cost meter for service and repair shops, lab work, hobby bench

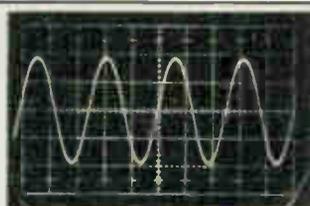
Operating convenience was a prime consideration in the design of the Heathkit IM-58. Harmonic distortion measurements can be made quickly and easily. Measures harmonic distortion as low as 1% full scale from 20-20,000 Hz. Measures noise down to -60 dBm. 120/240 VAC, 60/50 Hz, 30 W. 8 1/2" H x 13" W x 7" D. Requires audio generator such as the IG-72 (page 53) for alignment.

Kit IM-58, Shpg. wt. 13 lbs. **79.95**

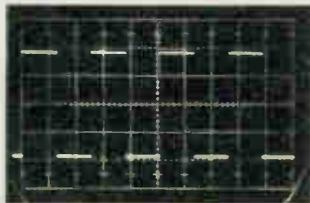
IG-37 SPECIFICATIONS

RF signal frequency: 100 MHz adjustable by approx. ± 2 MHz. Pilot modulating frequency: 19 kHz ± 2 Hz. FM modulation: Left channel (stereo), right channel (stereo), Phase Test (left plus right channel in phase). Monophonic FM. Deviation: Adjustable to 75 kHz. Sweep rate: (used for RF and IF alignment) 60 Hz. Sweep width: (used for RF and IF alignment). Adjustable to 750 kHz. RF attenuator range: 60 dB in 20 dB steps. Crystal-controlled markers: 10.7, 90.95, 96.30, 96.30, 101.65 & 107 MHz. Composite signal output: Left channel (stereo); Right channel (stereo). Phase test (left plus right channels in phase). Audio output: 400, 1000 & 5000 Hz; 10 kHz (± 2 Hz); 38 kHz & SCA (65 or 67 kHz). Distortion: (At 400, 1000 & 5000 Hz), Less than 5%. Power requirements: 120/240 VAC, 50/60 Hz, 35 W. Dimensions: 5 1/2" H x 13 1/2" W x 9" D.

every test bench, every application



Sine wave...distortion is 0.1% from 10 Hz to 20 kHz. Range is 1 Hz to 100 kHz.



Square wave...rise time is less than 50 nanoseconds. Overall frequency range is 5 Hz to 100 kHz.



Kit **\$84⁹⁵** Assembled **\$130⁰⁰**

The Heath IG-18 Sine & Square Wave Generator offers low cost, portability

Sine wave signals are available from 1 Hz to 100 kHz with distortion less than 0.1% from 10 Hz to 20 kHz. Eight output ranges from 0.003 to 10 V are provided when operating into a high impedance (10 k ohm min.) external load. Six ranges from 0.003 to 1 V are available when operating into the internal 600 ohm load or external load. A meter monitors the sine wave output, and is conveniently calibrated in both volts and dB. Square wave output is available from 5 Hz to 100 kHz with peak-to-peak output levels of 0.1, 1 and 10 V into a load of 2000 ohms or greater. Risetime is 50 nanoseconds. Frequency is selected using front panel switches for 0-100, 0-10, and x1, 10, 100 and 1000 multipliers. A separate vernier control is provided for the 0-1 range. Output is available simultaneously or independently. Dual primary transformer for 120 or 240 VAC operation.

Kit IG-18, Shpg. wt. 12 lbs. **84.95**

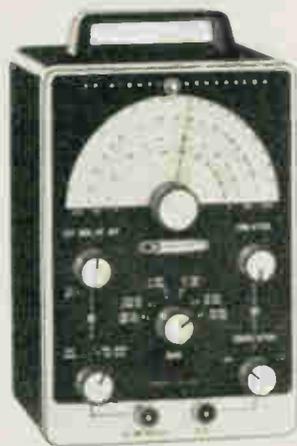
Assembled **SG-18A**, wired version of the IG-18 in black &

white styling, Shpg. wt. 10 lbs. **130.00**

IG-18 SPECIFICATIONS

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 +2 dB on meter and -50 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 indications: Two voltage and one dB scale on meter. Output impedance: 10 V range: 0-1000 ohm; 3 V range: 800-1000 ohm; 1 V range and lower: 600 ohm. Meter accuracy: ±10% of full scale with proper load termination. **SQUARE WAVE OUTPUT:** Output voltage (peak-to-peak): .1; 1, 10 V into 2000 ohm load or higher. Output impedance: .1 V and 1 V ranges: 52 ohm; 10 range: up to 220 ohm. Power requirements: 105-125 or 210-250 VAC, 60/50 Hz, 6 watts.

These Heathkit Generators make servicing and testing a breeze. Put one on your bench!



\$44⁹⁵

Heathkit General Purpose RF Generator

The Heathkit IG-102 is an accurate, stable source of modulated or unmodulated RF signals. It covers 100 kHz to 100 MHz in 6 bands (100-200 MHz on harmonics) with 2% tuning accuracy. Internal signal modulation is 400 Hz and a 100 Hz audio output is provided for audio tests. 120/240 VAC, 60/50 Hz. 9½" H x 6½" W x 5" D.

Kit IG-102, Shpg. wt. 6 lbs. **44.95**



\$97⁹⁵

Heathkit Precision RF Generator

The IG-42 provides 100 kHz to 30 MHz signals with ±3% adjustable frequency calibration for testing IF and RF sections of receivers determining sensitivity, measuring gain of individual stages and image ratio. RF output voltage adjusts from 5 to 100,000 μV in five attenuated steps, with 10:1 variable attenuation. Output can be modulated from 0-50% with 5% accuracy. 120/240 VAC, 60/50 Hz. 8½" H x 13" W x 7" D.

Kit IG-42, Shpg. wt. 15 lbs. **97.95**



\$64⁹⁵

Heathkit Low Distortion Audio Generator

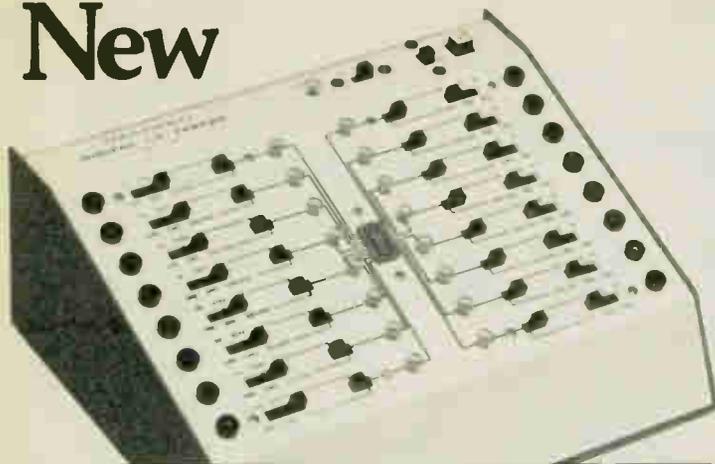
Get nearly perfect sine-wave signals with the Heathkit IG-72. Distortion is less than 0.1% from 20 to 20,000 Hz. Switch selects frequencies from 10 Hz to 100 kHz, meter monitors output in volts and dB to within ±5% from 10 Hz to 100 kHz. 120/240 VAC, 60/50 Hz, 40 W. 6½" H x 9½" W x 5" D.

Kit IG-72, Shpg. wt. 8 lbs. **64.95**
Assembled **SG-72A**, wired version of the IG-72 in black & white styling, Shpg. wt. 8 lbs. **100.00**

Need probes and cables? See our complete selection on page 67.

Famous Heathkit Test Equipment Makes Any

New



Heathkit IT-7400 Digital IC Tester adds amazing versatility to any hobby or test bench

- "Zero Force" Insertion Socket prevents bent pins on IC's
- No-bounce keyboard Mercury Switch allows stepping of more complex IC's

A "must" for anyone working with the latest digital IC's. Lets you determine functions of unknown IC's, check operation of IC's 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. An exclusive Heath "bounce-free," computer-type mercury stepping switch allows safe and easy "exercising" of multi-function IC's such as flip-flops. Has input-output jacks for each pin; easy-to-read neon indicators. Exceptionally easy to operate — 14- or 16-pin IC's can be installed in any position, switches and banana jacks allow each IC pin to be used as input or output. Ideal for use with the Heathkit ILP Digital Electronics Course (page 87).

Kit IT-7400, Shpg. wt. 7 lbs. 74.95

Get MORE from your IT-7400 with these valuable reference books

Perfect companions to your IC tester. Clearly written, easy to understand.

The TTL Data Book. Complete specifications, pin connections, test data and applications information on popular 7400 TTL digital IC's.

EDP-220 3.95

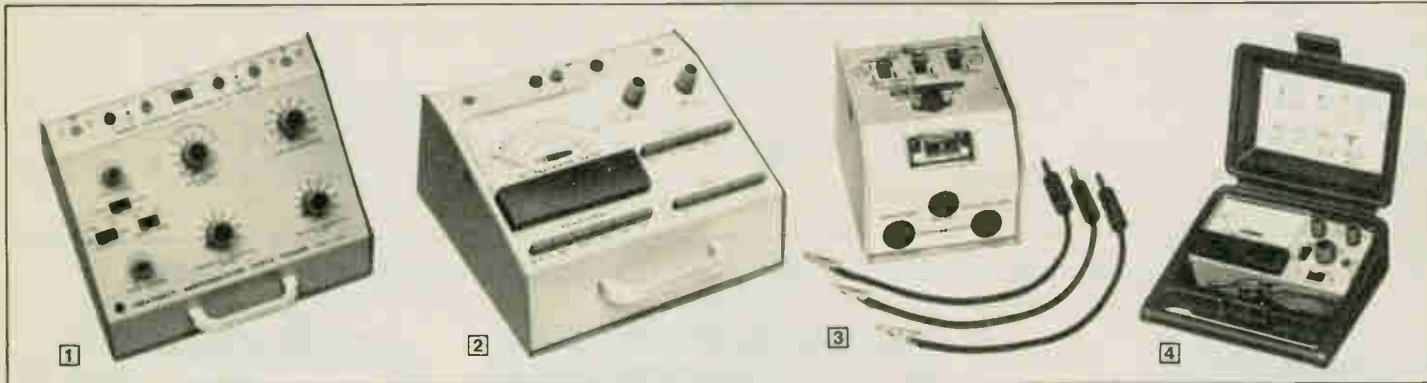
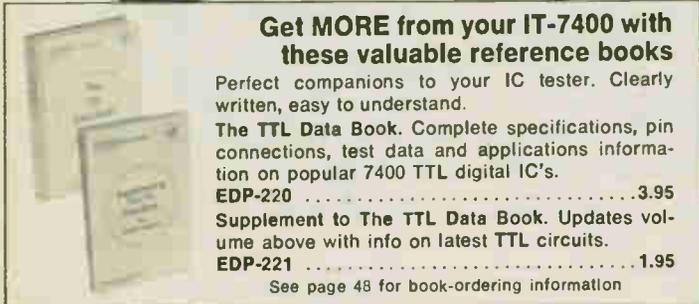
Supplement to The TTL Data Book. Updates volume above with info on latest TTL circuits.

EDP-221 1.95

See page 48 for book-ordering information

IT-7400 SPECIFICATIONS

Pin Arrangement: accepts 14 or 16-pin dual-in-line IC's. Indicator Lamps: 17 neon lamps, one at each pin, plus ON indicator. Stepping Circuit: mercury switch with zero bounce stepping into any pin selected. 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, $\pm 5\%$, 300 mA and 3.6 VDC, switch selected. Power Requirement: 100-135/200-270 VAC, 60/50 Hz, switch selected. Dimensions: 4 3/4" H x 11 3/4" W x 9 3/4" D.



1 IT-1121 Curve Tracer

For oscilloscopes with horizontal sensitivity of 0.5 V/div. and vertical sensitivity of 1 V/div. Displays parameters for virtually any discrete semiconductor — bipolar transistors, diodes, SCRs, triacs, FETs, etc. Plug-in cables are supplied for easy scope hookup. Switch permits fast and accurate scope calibration. Displays gain (beta), leakage, breakdown voltage saturation, forward conduction voltage, output admittance, linearity, capacitance effects, temperature effects and others.

Kit IT-1121, Shpg. wt. 11 lbs. 94.95

IT-1121 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. $\pm 3\%$. Sweep Current Sampling: .5, 1, 2, 5, 10, 50, 100 and 200 mA/div. $\pm 3\%$. Step Currents: .002, .005, .01, .02, .05, .1, .2, 2, 5, and 10 mA/step, $\pm 3\%$, ± 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 $\pm 2\%$ in 1 volt steps. Oscilloscope Requirements: Bandwidth to 20 kHz or greater. (DC-coupled oscilloscope is recommended). Power Requirements: 110 to 130 or 220 to 260 VAC. Dimensions: 4 1/2" H x 11 1/4" W x 10" D.

2 FET/Transistor Tester

Reduce your service time with quick, accurate tests of conventional (bipolar) transistors, diodes, FETs, SCRs, triacs and unijunction transistors. Either in-circuit using color-coded test leads supplied or out-of-circuit using built-in sockets. Read gain (DC Beta), transconductance (Gm) and leakage directly. Special circuitry balances out in-circuit impedances. Five current ranges measure leakage to 1 μ A and collector currents to 1 A.

Kit IT-121, Shpg. wt. 5 lbs. 62.95

IT-121 SPECIFICATIONS

DC Beta: 1 to 5000 in ranges of 1 to 50, 5 to 250, 10 to 500, 50 to 2500, 100 to 5000. Collector Currents Available: 1 mA, 5 mA, 10 mA, 100 mA, 500 mA, and 1 A. Gm: 0 to 50,000 μ mhos. Leakage Measurements: Five ranges, 0 to 100 μ A, 0 to 1 mA, 0 to 10 mA, 0 to 100 mA, 0 to 1 A. Out-of-Circuit Accuracy: $\pm 5\%$ 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 $1b_2$, $1b_2b_5$ and emitter current. Power Requirement: Two 1 1/2 V cells, (alkaline for best performance), not supplied. Dimensions: 5" H x 9 3/4" W x 8 1/2" D.

3 Transistor/Diode Checker

Checks high and low power transistors (NPN & PNP) for shorts, leakage, opens and current gain, diodes for forward and reverse current and serves as a continuity checker. Uses two 1.5 V "C" cells, not supplied. 3 1/8" H x 3 3/8" W x 3 3/4" D.

Kit IT-27, Shpg. wt. 2 lbs. 10.95

4 IT-18 Transistor Tester

For reliable in- or out-of-circuit tests. The large, easy-to-read meter permits direct reading of DC Beta (gain) on two ranges, 2-100 and 20-1000. Measures out-of-circuit leakage for transistors and diodes, range 0-5000 μ A. Identifies NPN or PNP transistors. Low power circuit will not damage transistor or diode incorrectly connected. Not for use with high power or switching transistors.

Kit IT-18, Shpg. wt. 4 lbs. 32.95

IT-18 SPECIFICATIONS

Out-of-Circuit Accuracy: $\pm 5\%$. In-Circuit Accuracy: Indicates good or bad. I_{ceo} — 0-5000 μ A; I_{cho} — 0-5000 μ A. Diodes: Forward or reverse current — 0-5000 μ A. Power: One standard "D" cell (not supplied). Dimensions: 4 1/2" H x 8 1/2" W x 7 1/8" D.

Service or Hobby Bench More Professional



1 \$109⁹⁵



2 \$99⁹⁵



3 4

1 Impedance Bridge

Has four separate bridge circuits for accurate measurement of resistance, capacitance, and low & high inductance. Requires headphones or scope for alignment.

Kit IB-28, Shpg. wt. 11 lbs. 109.95

IB-28 SPECIFICATIONS

DC Measurements: Built-in power supply. Binding posts for external supply. Meter: 100-0-100 micro-ampere meter. AC Measurements: Built-in 1000 Hz generator. Terminals on panel 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: 1/2 decade resistors used. Tube Complement: (2) 1U4, (2) 1L4. Power Supply: Transformer and silicon rectifier. Power Requirements: 105-125 V. or 210-250 V., 60/50 Hz, 10 watts. Dimensions: 8" H x 17" W x 6" D.

for shorts, leakage, open elements, and filament continuity.

Kit IT-17, Shpg. wt. 12 lbs. 99.95

Updated Tube Chart Subscription Service for all Heathkit Tube Checkers includes new chart plus two supplements per year for only \$6.20. Write: Heath Tube Data Service, P.O. Box 377, Hewlett, Long Island, New York 11557.

IT-17 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. Meter: 1 mA BAD-7-GOOD scale, illuminated. Line Voltage Adjustment: Step type. Roll Chart Mechanism: Constant tension, free-rolling, thumbwheel operation, illuminated. Filament Voltage: .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. Element Test Voltages: 30, 100, 250 VAC. Power Requirements: 120 VAC, 50/60 Hz. Dimensions: 8 1/2" H x 13" W x 5 1/2" D.

speaker, bright eye-tube indicator. Audio/RF probe included. 7 1/2" H x 4 1/2" W x 4" D.

Kit IT-12, Shpg. wt. 6 lbs. 32.95

4 Direct-reading Capacitor Checker

Fast, accurate analysis of all capacitor types. No calculations — just read directly from front-panel scales. Measures capacitance from 10 pF to 1000 μF, resistance from 5 ohms to 50 megohms and 16 leakage testing voltages. Terminals for external standard L, C or R measurements. External audio generator may also be used.

Kit IT-28, Shpg. wt. 7 lbs. 52.95

IT-28 SPECIFICATIONS

Test Circuit: AC bridge, powered by internal 60 Hz supply or partial external audio generator with 10 V output. Upper Frequency Limit: 10 Hz. Capacitance Ranges: 10 pF to .005 μF, .001 μF to .5 μF, .1 μF to 50 μF, 20 μF to 100 μF. External standard (comparison bridge: maximum ratio 25:1). Inductance Check: External standard only. Power Requirements: 120/240 VAC 60/50 Hz, 30 W. Dimensions: 9 3/8" H x 6 3/8" W x 5" D.

2 Low-cost Tube Checker

Tests tubes on the basis of total emission,



Get more out of your Heathkit test instruments with these valuable books.

Know Your Tube and Transistor Testers — a comprehensive source of information on design & applications of tube & transistor testers. EDP-147, 3.50

Tube Substitution Handbook — lists over 12,000 direct replacements for all types of domestic & foreign receiving & picture tubes. EDP-174, 2.25

Transistor Substitution Handbook — contains substitutions for over 100,000 bipolar transistors. EDP-175, 4.50

See page 48 for book ordering information.

3 Visual-aural Signal Tracer

Trace RF, IF and audio signals; locate noisy or intermittent components. Has 3 1/2-inch



5 6 7 8

5 Decade Capacitance Box

Selects 100 pF to 0.111 μF in 100 pF steps. Ideal for use with the IN-17 in solving R and C network problems.

Kit IN-27, Shpg. wt. 3 lbs. 26.95

IN-27 SPECIFICATIONS

Voltage Rating: 350 VDC continuous; 500 VDC intermittent; 100 VDC instantaneous test. Accuracy of Incremental Capacity: ±1%. Stray Capacitance: 10 to 15 pF at terminals. Dimensions: 4" H x 7 1/2" W x 5" D.

IN-17 SPECIFICATIONS

Minimum DC Resistance: .025 ohms or less at terminals with all switches at zero. Dimensions: 5" H x 7 1/2" W x 6 3/8" D.

7 Capacitor Substitution Box

18 EIA standard capacitors from 100 pF to 0.22 μF. Rated at 600 V except 3 lowest and 2 highest values are 500 & 400 V respectively. 5 3/8" H x 3 3/8" W x 3" D.

Kit IN-47, Shpg. wt. 2 lbs. 10.95

6 Decade Resistance Box

1 ohm to 999,999 ohms in 1-ohm steps. Resistors are 1-watt, 1/2% accuracy.

Kit IN-17, Shpg. wt. 4 lbs. 39.95

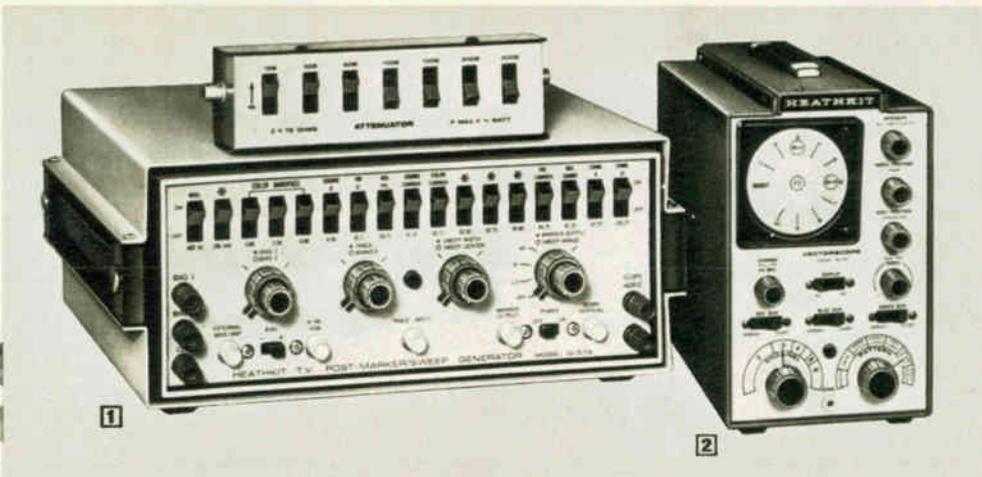
8 Resistor Substitution Box

15 ohms to 10 megohms. 36 EIA standard 10% 1-watt resistors. 5 3/8" H x 3 3/8" W x 3" D.

Kit IN-37, Shpg. wt. 2 lbs. 10.95

Charge a kit — no money down on any kit — see page 50 for details.

Heathkit has everything you need for First



1 Heath Post-Marker/ Sweep Generator

Kit **\$164⁹⁵**
 Assembled **\$275⁰⁰**

The Heathkit IG-57A checks overall receiver response from the antenna terminals throughout the tuner, IF strip video detector, to the color bandpass amplifier outputs. Sweep modulated picture carriers are available at 45.75 MHz for the tuner mixed input and at 67.25 MHz for the antenna terminal input. And the exclusive Heath external attenuator enables you to accurately set bandwidth in seconds...eliminates guessing at important 6 dB points. Fifteen crystal-controlled markers are provided...four for color bandpass...one for FM-IF...eight for TV IFs from 39.75 to 47.25 MHz...plus picture and sound carrier markers for channels 4 and 10. Accurate location of picture and sound carriers, 6 dB points and trap locations is a breeze with the IG-57A. Three sweep oscillators in stable Colpitts configurations produce five ranges using harmonics for color bandpass, FM IF, video IF bandpass, VHF channels 4 & 10.

Kit IG-57A, Shpg. wt. 15 lbs. 164.95

Assembled SG-57A, factory-assembled & calibrated version of the IG-57A in handsome black & white styling (not shown), Shpg. wt. 15 lbs. 275.00

IG-57A SPECIFICATIONS

Marker frequencies: 100 kHz. Marker frequencies, crystal-controlled: 3.08, 3.58, 4.08, and 4.50 MHz $\pm 0.1\%$. 10.7, 39.75, 41.25, 42.17, 42.50, 42.75, 45.00, 45.75, 47.25, 67.25 and 193.25 MHz $\pm 0.005\%$. 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. Type of marker: Birdie. Controls: Bias controls, Marker / Trace — dual concentric; Sweep Width / Sweep Center — dual concentric; Marker Out — concentric with Sweep Range switch; and Phase. Switches: Rocker type — separate switch for each of the above listed frequencies. Blanking, On/Off. Sweep frequency ranges and output voltage: LO Band — 2.5 to 5.5 MHz ± 1 dB at 0.5 volts rms (min.) fundamentals, and 10.7 MHz on harmonics. IF Band — 38 to 49 MHz ± 1 dB, at 0.5 volts rms (min.) fundamentals. RF band — 64 to 172 MHz ± 1 dB at 0.5 volts rms (min.) fundamentals and 192 to 198 MHz on harmonics. Attenuator: Total of 70 dB of attenuation in seven steps — 1 dB, 3 dB, 6 dB, 10 dB, 10 dB, 20 dB and 20 dB. Power requirement: 120 V, 60 Hz AC at 4.5 watts.

2 Heathkit Vectorscope/ Color Generator

Kit **\$144⁹⁵**

Two necessary instruments in one: a 3 inch vectorscope...and a color bar/pattern generator. The vectorscope displays the ten color bars generated, amplified and demodulated by the color receiver circuitry...accurately represents the chroma signal being fed to the CRT guns. Indicates missing or weak colors, proper adjustment of the burst phase transformer, 3.58 MHz oscillator, reactance coil, bandpass transformer, color demodulation angle. A grid-cathode switch displays all vector patterns the same way, regardless of how CRT is driven.

The color bar/pattern generator provides 12 patterns plus a raster for purity adjustments in either the familiar 9x9 display or the exclusive Heath 3x3 format. Features tuning for channels two through six, RF output variable to 50,000 μ V for composite signal injection into receiver antenna terminals, plus or minus going video signals for composite signal injection behind the video detector, front panel sync output, 4.5 MHz crystal controlled sound carrier, lead-piercing grid jacks and front panel gun shorting switches.

Kit IO-101, Shpg. wt. 12 lbs. 144.95

Heathkit Strip Chart Recorder

\$189⁹⁵

Has 1 mV or 10 mV full-scale input (selected during assembly); twelve chart speeds from 5 sec./in. to 200 min./in. Power, servo and chart switches, coarse and fine zero controls, floating input with high input impedance. Zener regulated reference voltage supply.

Kit IR-18M, Shpg. wt. 15 lbs. 189.95

3 rolls chart paper (140 ft./roll).

IRA-18-1, Shpg. wt. 5 lbs. 10.95

120 ft. roll chart paper. (Recommended for slow chart speeds.)

SU-445-17, Shpg. wt. 2 lbs. 4.75



IR-18M SPECIFICATIONS

Chart Paper: Grid width, 10". Length, 140 ft. roll. Markings: 0-100 right to left. Chart Speed: 12 speeds, pushbutton selected. 5, 10, 50, 100, 200 sec./inch and 5, 10, 20, 50, 100, 200 min./inch. Balancing Time: Approx. 0.1 sec./inch, 1 second full scale (10"). Line frequency rejection: (input shorted). 130 dB in common mode. Overall error: Less than 1% of full scale. Power requirement: 120/240 VAC 60 Hz, 14W or 120/240 VAC, 50 Hz, 16 W. Dimensions: 6" H x 15" W x 9 1/2" D.

IO-101 SPECIFICATIONS

PATTERNS — Purity: Produces a snow-free raster for purity adjustments. Dots*: 9x9 produces a display of 110 small dots. 3x3 produces a display of nine dots. Crosshatch*: 9x9 produces a display of 11 vertical and 10 horizontal lines. 3x3 produces a display of three vertical and three horizontal lines. Horizontal lines*: 9x9 produces a display of 10 horizontal lines. 3x3 produces a display of three horizontal lines. Vertical lines*: 9x9 produces 11 vertical lines. 3x3 produces a display of 3 vertical lines. Color bars*: 9x9 produces a display of ten standard color bars. A visual fingerprint (voltage pattern) of all ten color bars in the form of a petal pattern is displayed for color circuit servicing. Gray scale: Provides a wide bar crosshatch pattern with six shades of brightness. OUTPUT SIGNALS — Video: Greater than ± 1 volt peak-to-peak composite signal for composite signal injection beyond the video detector. Sync: Greater than 3.5 volts peak-to-peak signal for sync circuits without video, or sets having separate video and sync demodulator phase adjustments. Power requirement: 105-125 or 210-250 VAC, 60/50 Hz, 20 Watts. Dimensions: 9 1/4" H x 6 3/4" W x 14 1/2" D. *The number of dots, lines, and bars indicated for a 9x9 display is the number displayed if the receiver under test has no overcan.

Class Color TV Servicing



New



3 Versatile Color Bar Pattern Generator

Kit **\$94⁹⁵** Assembled **\$155⁰⁰**

The IG-28 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 μ V for antenna terminal input, variable plus and minus going video for injection behind the video detector, front panel gun shorting switches and lead piercing grid jacks, front panel sync output, 4.5 MHz sound carrier oscillator, two front panel 500W AC receptacles. Kit IG-28, Shpg. wt. 8 lbs. 94.95

Assembled SG-28A, factory assembled & calibrated version of the IG-28 in handsome black & white styling (not shown), Shpg. wt. 9 lbs. 155.00

Heater Adjust Control
Sets voltage at CRT cathode for precise testing

Cutoff/Power Control
Turns unit on or off, sets control grid voltage level

Heater Voltage Meter
Accurately indicates heater voltage supplied to cathode of CRT

Pushbutton Operation
Positive action pushbuttons control all tests and processes for really easy operation

Gun Meters
Individual meters for each color gun (use red gun meter for black-and-white tubes)

Restore Indicator
Monitors current level — Rises to brilliant glow as CRT is rejuvenated

Self-Contained Storage
Plenty of room at instrument top for cables, small tools

Rugged Case
High Impact Plastic case for easy portability, good protection

ORDER NOW FOR SHIPMENT BY APRIL 26th 1976

NEW! IT-5230 Universal CRT Tester/Rejuvenator

\$89⁹⁵ Kit **\$140⁰⁰** Assembled

- Tests IN-LINE GUN CRT's
- Individual meters for each color gun
- Separate clean and rejuvenate modes for each gun
- Heater/cathode short indicator

At last, a deluxe CRT tester/rejuvenator priced within reach of most any service shop, and it performs as well as models costing up to three times as much! The IT-5230 will help you test, rejuvenate and clean almost all popular CRT's, including the new IN-LINE GUN CRT's. Features simplified pushbutton operation for all test, rejuvenation and cleaning operations which lets you check gun tracking easily, individual grid current meters for each color gun, a separate heater voltage meter to allow precise settings of heater voltage on the CRT. Has lamp to indicate shorts in the CRT, heater voltage and cutoff controls. A special GUN REL/LIFE pushbutton provides an indication of the life remaining in the tube. The restore indicator glows brighter as the rejuvenating current level is increased for an easy visual indication of rejuvenation.

A separate cleaning process is applied after rejuvenation to assure proper operation of the tube. Transformer power supply assures

safe, reliable operation even at low line voltages.

The IT-5230 can also be used to clean and rejuvenate computer terminal and oscilloscope CRT's.

You'll find the IT-5230 to be an invaluable addition to your service shop, at a price that's simply hard to beat. It will pay for itself after just a few months in your shop.

Kit IT-5230, Shpg. wt. 10 lbs. 89.95

Factory Assembled version of above.

ST-5230, Shpg. wt. 10 lbs. 140.00

IG-28 SPECIFICATIONS

Output signals: Video — Greater than ± 1 V peak-to-peak composite signal. RF — Variable to 50,000 μ V output, channels 2 through 6. Sync. — Greater than 3.5 V peak-to-peak signal. Control Grids (3) — Individual red, blue, and green control grid signals for viewing chroma signal demodulator phase adjustments. Power supply: full wave zener diode regulated. Input — 120/240 VAC, 60/50 Hz. Output — 3.6 VDC, 500 mA, zener diode regulated. Dimensions: 5 1/2" H x 13 1/2" W x 8" D.

Boost your TV service efficiency and profits with Heathkit test gear and these valuable books



How to Use Vectorscope — Oscilloscopes & Sweep-Marker Generators — trouble-shooting & alignment techniques; how to isolate defective ICs and transistors. EDP-142 5.95

How to Use Color TV Test Instruments — get the most out of your investment in test gear. EDP-138 5.95

See page 48 for book ordering information.

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. Test Cables Supplied: 4 heavy duty. Power Requirement: 105-135 VAC, 60/50 Hz (50 watts maximum at 60 Hz). Dimensions: 5.12" high x 10" deep x 13.5" wide.

Charge a kit — no money down on any kit — see page 56 for details.

You get better value and performance



Kit or Assembled

Our best scope — dual-trace, DC to 15 MHz, 1 mV sensitivity

The Heathkit IO-4510 has vertical delay lines, 45 MHz typical trigger bandwidth and a maximum sensitivity of 1 millivolt over full vertical bandwidth.

Digitally-controlled time base provides automatic triggering — no stability control is necessary. Baseline is generated when trigger signal is absent. Trigger Select switch and Level control precisely trigger time base at any point along + or — slope. The automatic position of level control triggers at zero crossing point.

Modes of display are selected by position control for each channel and Time Base switch. Either channel can be displayed as a function of time, or both can be displayed together chopped (200 kHz) or alternate modes automatically selected by time base switch. Time Base control provides 20 calibrated time bases from 0.2 sec/cm to 0.1 μ sec/cm in 1, 2, 5 sequence, continuously variable between switch positions.

A line switch matches the regulated power supply to common line voltages from 100 volts to 280 volts AC. Major circuitry is contained on five circuit boards. And push-on connectors permit fast removal of any board. 6 x 10 cm CRT with illuminated graticule has post-deflection acceleration for brighter trace and faster writing speeds. IO-4510 calibration requires precise source of square waves such as IOA-4510-1 or IG-4505, see page 67.

Kit IO-4510, Shpg. wt. 34 lbs. 569.95

SO-4510, factory assembled & calibrated version of IO-4510, Shpg. wt. 28 lbs. 775.00

IO-4510 SPECIFICATIONS

VERTICAL: Deflection Factor: Sensitivity: 1 mV/cm to 5 V/cm in a 1-2-5 sequence. Variable: Continuous between steps to approx. 15 V/cm. Accuracy: Within 3%. Vertical Response: DC Coupling: DC to 15 MHz. AC Coupling: 2 Hz to 15 MHz. Rise Time: 24 ns. Overshoot: <3%. Delay Line: Allows display of at least 20 ns of pre-triggered waveform. Vertical Input: Impedance: 1 M Ω shunted by \approx 40 pF. Maximum Input: 400 V. **HORIZONTAL:** Accuracy: Within 3%. Magnifier: X5. External: Sensitivity: 0.2 V/cm (approx.). Impedance: 200 k Ω (approx.). Frequency Response: DC to 1 MHz. **TRIGGER:** Internal: Automatic: Zero crossing 0.5 cm. Normal: Adjustable over 8 division. Slope Selection: + or —. External: Automatic: Zero crossing \pm 0.2 V. Normal: Adjustable over \pm 5 V. Slope Selections: + or —. Impedance: 1 M Ω 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. Phase Shift: Less than 3 $^\circ$ @ 100 kHz. Operating Temperature Range: 10 $^\circ$ C to 40 $^\circ$ C. Dimensions: 6.4" H x 12.9" W x 19.3" D (without handle).

- Superior performance and benefit/features you just won't find on comparably-priced scopes
- Open chassis design and precision engineering assure you of easy assembly and calibration



Kit or Assembled

Heathkit IO-4530... a fine general-purpose scope... perfect for TV service and home experimenting

Features like TV coupling, DC-10 MHz bandwidth, wide-band triggering capability, 10 mV/cm vertical input and calibrated X-channel input make it a versatile scope for the service technician or hobbyist. Y-input has maximum sensitivity of 10 mV with 11-position attenuator to set deflection from 10 mV/cm to 20 V/cm. For true X-Y operation, a calibrated X-input is provided with maximum sensitivity of 20 mV. Its calibrated 3-position attenuator provides three AC or DC ranges from 20 mV/cm to 2 V/cm. Trigger circuits are digitally controlled, requiring only a Level control and a Slope switch. In automatic, triggering is at the zero crossing point. In normal, the level control is adjustable over the complete 8 cm span. In the TV trigger coupling, the 4530 can be precisely triggered on the vertical signal in a complex TV signal. Calibration requires a source of square waves such as the IOA-4510-1 or IG-4505, see page 67.

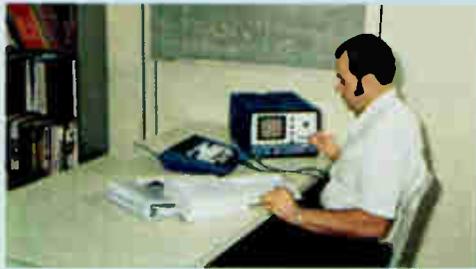
Kit IO-4530, Shpg. wt. 30 lbs. 299.95

SO-4530, factory assembled & calibrated version of IO-4530, Shpg. wt. 26 lbs. 425.00

IO-4530 SPECIFICATIONS

VERTICAL: Variable: Continuous between steps to approx. 50 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: <5%. Vertical Input: Impedance: 1 M Ω shunted by \approx 38 pF. Maximum Input: 400 V. **HORIZONTAL:** Time Base: Ramp: 0.2 S/cm to 200 ns/cm in decade sequence. Variable: Continuous between ranges to approximate 2 s/cm. Accuracy: Within 5%. Magnifier: X5. External: Deflection Factor: Sensitivity: 0.02 V/cm to 2 V/cm in decade sequence. Variable: Continuous between steps to approx. 20 V/cm. Accuracy: Within 3%. Response: DC Coupling: DC to 1 MHz. AC Coupling: 2 Hz to 1 MHz. Rise Time: 35 ns. Overshoot: <5%. Input: Impedance: 1 M Ω shunted by \approx 40 pF. Max. Input: 400 V. **TRIGGER:** Internal: Automatic: Zero crossing \pm 0.5 cm. Normal: Adjustable over 8 divisions. Slope Selection: + or —. External: Automatic: Zero crossing \pm 0.03 V. Normal: Adjustable over 1.2 V. Slope Selections: + or —. Impedance: 1 M Ω shunted by \approx 40 pF. X-Y: Phase Shift: Less than 5 $^\circ$ @ 100 kHz. **GENERAL:** CRT: 5" round, Phosphor: P31. Graticule: 8 x 10 cm. Power: 110-130/220-260 VAC, switch selected, 65 watts. Operating Temperature Range: 10 $^\circ$ C to 40 $^\circ$ C. Dimensions: 6.4" H x 12.9" W x 19.2" D (without handle).

in scopes from the Heath labs



For Schools — an ideal student scope, easy to operate, easy to understand



TV Servicing — excellent for stage by stage troubleshooting



Lab Work — circuit design, testing components, checking assembly

New A bright new dual-trace scope to round out your bench

The Heathkit IO-4550 brings you professional features at a low kit-form price



Kit or Assembled

Brighter trace and faster writing speed in our new 10MHz dual-trace scope...kit or assembled.

Here's how extensive engineering research in the Heath lab pays off for our customers. Introducing our new IO-4550 10MHz scope... at a price that will let you get it onto your bench for a lot less than other scopes with similar features.

Its broad base of applications is sure to make the IO-4550 appealing to anyone with a scope interest. Use it for TV and general electronics servicing, digital experimentation...even for your electronic design efforts.

The biggest news about the IO-4550 is that it features a brighter trace and faster writing speed than other 10MHz scopes at a similar price...in fact, it's the brightest 10MHz scope we've ever offered, so you're assured of an easy-to-read trace, even in high ambient light.

To maximize operational ease, input channels are displayed, chopped or alternate, as selected automatically by the Time Base switch. Exacting X-Y operation assures you of precise phase measurements.

The 4550's digitally-controlled time base circuitry provides automatic triggering, so no stability control is necessary and fewer ad-

- A complete mu-metal shield is used in the IO-4550 to eliminate display error caused by electromagnetic interference
- The fully-regulated high voltage supply allows accurate operation over widely-varying line voltages
- All IC's are socketed for easy servicing and troubleshooting

justments are required. It also lets you determine the frequency of a waveform.

The fully regulated high voltage supply assures operation to specifications on standard line voltages from 100-270 volts. And a mu-metal shield prevents interference from stray magnetic fields.

Improved circuitry and only four epoxy glass printed circuit boards, with plug-in IC's,

make the IO-4550 an easy-to-assemble kit. Establish a new standard for your test bench today...order the IO-4550. Calibration requires a precise source of square waves such as IOA-4510-1 or IG-4505, see page 67.

Kit IO-4550, Shpg. wt. 31 lbs. 379.95

SO-4550, factory assembled & calibrated version of IO-4550, Shpg. wt. 26 lbs. . . 525.00

IO-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 Input: Impedance: 1M Ω 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 k Ω (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: 1 M Ω 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 $^\circ$ @ 100 kHz. GENERAL: CRT: Type: 5" round. Acceleration Potential: 1.8 kV regulated. Phosphor: P-31. Graticule: 8 x 10 cm. Power: Voltage Range: 100-135 VAC/200-270 VAC switch selected, 70 watts at 120 VAC (240 VAC). Internal Supplies: Fully regulated. Operating Temperature: 10 $^\circ$ C to 40 $^\circ$ C. Dimensions: 6.9" H x 12.9" W x 19.3" (without handle).

Want faster service? Order by phone — call (616) 982-3411 day or night.

Add Heathkit scope versatility at amazing low cost

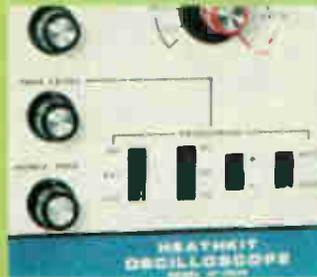
Our Lowest Priced Scope! **\$119⁹⁵**



\$179⁹⁵



DC-5 MHz 'scope for serviceman or hobbyist... kit or assembled



Complete trigger controls include TV coupling for easy triggering on complex TV signals.

Super-value auto-triggering scope ... DC-5 MHz, 100 mV sensitivity



The open chassis design of the IO-4560 makes it an easy kit to assemble — a great 'scope for student or home experimenter.

The Heathkit IO-4540 can quickly provide an accurate display of any waveform within its wide 5 MHz bandwidth — without the "fine tuning" required of the more expensive oscilloscopes in its performance class. The DC-5 MHz bandwidth and sensitive input make it ideal for servicing audio, TV and receiver circuitry.

A stable triggering circuit is used for solid waveform displays (not the recurrent type sweep generator normally used in scopes in its price range). Trigger controls include selection of normal or automatic modes, switch-controlled AC or DC coupling and front panel input for external triggering signals. The trigger selector control allows the 4540 to trigger on the vertical component of a complex TV signal.

Seven calibrated time bases from 200 ms to 0.2 μ s/cm can be selected by the TIME/CM switch. Horizontal amplifier accepts inputs from DC to 100 kHz with 1 megohm input impedance. Vertical input sensitivity of 20 mV/cm and nine calibrated vertical attenuator positions up to 10 volts/cm accommodates a broad range of input signals. Variable gain for precise control between settings. Input impedance is 1 megohm shunted by 38 pF and will accept up to 400 VDC. Regulated low-voltage power supplies provide stable voltages to all circuits under varying line voltage and load conditions. A sine-square wave generator is needed for calibration.

Kit IO-4540, Shpg. wt. 25 lbs. **179.95**
 SO-4540, factory-assembled & calibrated version of IO-4540,
 Shpg. wt. 24 lbs. **275.00**

Now you can have the most universal of all test instruments on your bench — the oscilloscope — at a low kit form price. The 4560 permits study of complex signals, such as those found in audio devices, television receivers, transmitters and other electronic equipment. And operation couldn't be easier...in addition to the power switch, there are only nine switches and controls.

Auto-triggering provides automatic, positive locking of the displayed waveform. A stable display is assured for any frequency up to the full 5 MHz bandwidth. The uncalibrated sweep speed control provides continuous adjustment from 20 ms/cm to 200 ns/cm.

The DC to 5 MHz vertical bandwidth is more than adequate for general design and service work. Maximum vertical sensitivity is 100 mV with a front panel switch for X1, X10 and X100 attenuation, AC or DC. For phase and frequency measurements, an external horizontal input can be applied directly through the front panel input jack. It has 250 mV sensitivity with DC to 100 kHz bandwidth. Zener-regulated low voltage supplies assure display stability. The primary circuit of the power transformer is fused for protection from overload.

The IO-4560 is an easy oscilloscope to build, making it a great kit for hobbyists and students. Assembly instructions are easy to understand, and a complete troubleshooting table helps you find the problem if anything goes wrong.

Kit IO-4560, Shpg. wt. 19 lbs. **119.95**

IO-4540 SPECIFICATIONS

VERTICAL: Bandwidth: DC to 5 MHz ± 3 dB. Attenuator: 1, 2, 5 sequence, calibrated and variable. Rise Time: 70 ns. Overshoot: 5% at 1 kHz. Impedance: 1M Ω /38 pF. Sensitivity: 20 mV/cm. SWEEP: Type: Triggered. Range: 200 ms — .2 μ s, 7 steps plus variable. Trigger Source: Int/Ext/Line. Trigger Modes: AC/DC/TV; +/—Slope; Auto/Norm. HORIZONTAL: Sensitivity: .25 V/cm. Bandwidth: DC to 100 kHz. Impedance: 1M Ω /50 pF. Ext. Horiz. Input: X1 and X10 attenuator. GENERAL: CRT: 5DEP31F, 8 x 10 cm, green, medium-persistence phosphor, 5" round, flat-face tube. Accelerating Potential: Approx. 1.5 kV. Graticule: Painted, 8 x 10 cm. Power Requirements: 110-130 VAC or 220-260 VAC, 60/50 Hz, 35 watts. Dimensions: 8" H x 13" W x 17" D.

IO-4560 SPECIFICATIONS

VERTICAL CHANNEL: Input Impedance: 1 megohm. Sensitivity: 100 mV/cm. Maximum Input Voltage: 400 volts DC. Frequency Response: DC to 5 MHz ± 3 dB. Attenuator: X1, X10, X100, AC or DC. HORIZONTAL CHANNEL: Input Impedance: 100 k Ω . Sensitivity: 0.25 volt/cm (uncalibrated). Frequency Response: DC to 100 kHz. TIME BASE: Sweep: 20 ms to 0.2 μ s/cm (uncalibrated). Trigger Mode: Automatic. GENERAL: CRT: 5DEP31F, 8 x 10 cm viewing area. Blue-green, medium persistence phosphor. 5" round, flat-face tube. Graticule: 8 x 10 cm. Power Requirements: 110-130 or 220-260 VAC. 60/50 Hz 35 watts. Dimensions: 8" H x 13" W x 17" D.

Precision Scope Switch and Calibrators



\$44⁹⁵

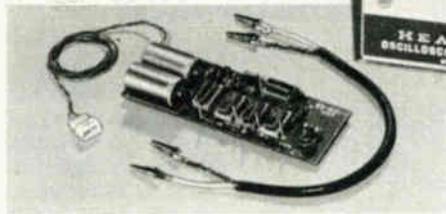
Heathkit ID-101 Scope Switch permits simultaneous display of two separate input signals

Gives any single beam scope dual-signal 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-101, Shpg. wt. 6 lbs. **44.95**

ID-101 SPECIFICATIONS

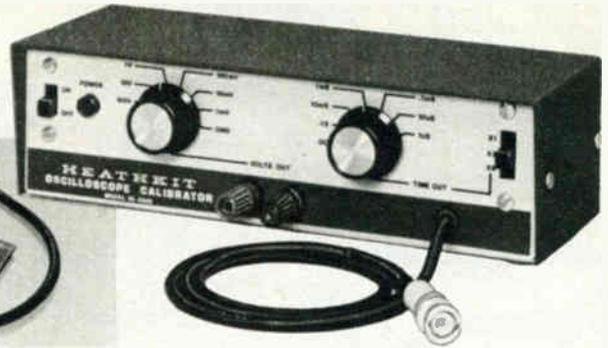
Signal gain: >10 times. Maximum input signal: 600 VDC or 600 VAC p-p. Input impedance: 1 megohm/50 pF. Maximum signal output: 8 V p-p. Output loading: 1000 ohm minimum. Hum and noise: (single channel only). <40 mV p-p. Chopping rates: Approx. 100, 500, 1000 and 5000 Hz. Power requirements: 120/240 V, 60/50 Hz, 6 W. Dimensions: 4¼" H x 10¾" W x 5¼" D.



IOA-4510-1 Scope Calibrator

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 new Heathkit 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. **14.95**



\$44⁹⁵

IG-4505 Deluxe Scope Calibrator for oscilloscopes with bandwidths to 35 MHz

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. **44.95**

Useful Scope Books



Understanding and using the Oscilloscope — details basic functions, circuits, inputs, pulses & waveforms; outlines every electronic test you're likely to make. EDP-139 **5.95**

101 Ways to Use your Oscilloscope — practical working handbook for faster servicing; new info on wide-band & triggered-sweep scopes; covers testing of b/w & color TV sets. EDP-149 **4.95**

See page 48 for book-ordering information

IG-4505 SPECIFICATIONS

TIME CALIBRATION: Range: .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 100V peak square wave in decade sequence. Accuracy: To within 2% with 1MΩ load referenced to 1V position. Rise Time: ≤2 µs. Frequency: DC, 2 Hz to 10 kHz in 1-2-5 sequence. Accuracy of Internal Standard: Within 1%. Power Requirements: 120-240 Volts AC, 60/50 Hz, 12 watts.



Probes & accessories for Heathkit instruments

1 50-ohm Termination for frequency counters and 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. **15.00**

2 RF Fuse in UHF BNC-to-BNC connector. Prevents accidental burnout. DC to 500 MHz range; 50 ohms impedance; 12:1 VSWR (max.); insertion loss 1.80 dB max. at 500 MHz. With spare fuses.

Assembled SU-512-50, Shpg. wt. 1 lb. **45.00**

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. **5.95**

4 Etched circuit RF probe for RF measurements from 1000 Hz to over 100 MHz; 11 meg input; 1000 VDC max. at tip; 90 V rms max.

Kit PK-3, Shpg. wt. 1 lb. **5.95**

Assembled PKW-3, Shpg. wt. 1 lb. **7.95**

5 Scope demodulator probe for distortion

checks and display of RF & IF signal. 30 V rms max., 500 VDC max.

Kit 337-C, Shpg. wt. 1 lb. **5.00**

6 High frequency compensated scope probe features DC-60 MHz bandwidth; 10 megohm/11.5 pF input impedance; X10 attenuation; 500 V AC & DC rating. Ideal for IO-104, IO-4510 and IO-4530 scopes.

Assembled PKW-101, Shpg. wt. 1 lb. **26.95**

PKA-101-1 Accessory Pack. Includes three assembled tips, two 6-inch ground leads and one 12-inch ground lead.

PKA-101-1, Shpg. wt. 1 lb. **9.95**

7 Direct (X1) scope probe for scopes, frequency counters or checking waveforms and levels in any low impedance circuit. 1 megohm/30 pF input impedance. 600 V AC & DC rating. Range 17 MHz typical. Rise time 17 nsec. typical.

Assembled PKW-104, Shpg. wt. 1 lb. **21.95**

8 30 kV High Voltage Probes...IMA-100-10 Probe multiplies DC ranges of any 10-meg-

ohm meter by 100. 1000 megohm input measures voltages as low as 1V in high-impedance circuits. Banana plug connector.

Kit IMA-100-10, Shpg. wt. 1 lb. **10.95**

IMA-100-11 Probe provides X100 measurement capability for meters with 11-megohm input impedance. Phone plug connector with alligator ground clip. Available kit or assembled.

Kit IMA-100-11, Shpg. wt. 1 lb. **10.95**

Assembled SMA-100-11, Shpg. wt. 1 lb. 13.95

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. **10.95**

Accessory cables...for inter-connecting scopes, counters, etc. All cable is RG-58/U, 50 ohm impedance. Shpg. wt. (each), 1 lb.

Assembled SU-501-1, 1 ft., BNC/BNC 7.50

Assembled SU-501-3, 3 ft., BNC/BNC 7.50

Assembled SU-501-6, 6 ft., BNC/BNC 7.50

Assembled SU-502-3, 3 ft., BNC/UHF 7.50

Assembled SU-503-3, 3 ft., BNC/Banana 7.50

Want faster service? Order by phone — call (616) 982-3411 day or night.

Here's easier circuit design from Heath

New

Heathkit ET-3300 lab breadboard makes circuit development simpler ...for experimenters, students and design engineers

Here's everything you could want for basic solid-state circuit design and development...in one neat package. The new Heathkit ET-3300 is a laboratory breadboard with solderless sockets and built-in power supplies...and that means convenient, easy circuit hook-up and fast teardown.

The ET-3300 can be as versatile as you like. It's an excellent aid for hobbyists and technicians in laboratory experiments; or the "3300" can be used by designers for building up a prototype of a new circuit design. And many of your troubleshooting efforts will be made easier because the ET-3300 is great for testing electronic components and circuits, even can be used as a power supply!

Unique features include three dual ground and power bus strips and four breadboarding sockets, each with forty-eight dual rows of common connection points. The "3300" accommodates both discrete components and integrated circuits...and its solderless connectors accept up to #20 solid wire. For maximum versatility and ease in circuit design and development, get your ET-3300 today.

Kit ET-3300, Shpg. wt. 6 lbs. 79.95

ET-3300 SPECIFICATIONS

OUTPUTS: +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.

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Check the white pages of your telephone directory for address and phone no.

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To see how easy it is to get more instrument value per dollar, send the coupon at left for your free copy of our latest catalog. We'll also place you on our mailing list to receive future catalogs and keep you informed about the latest from Heath/Schlumberger.

Heath CB Special: FREE Antenna

Worth up to \$39.95 when you buy Johnson CB 2-Way Radio from Heath

World-famous Johnson CB two-way radio is now an even better buy at Heath! Choose the base or mobile unit that meets your needs — get a FREE Antenna Specialists CB base or mobile antenna! See below for antenna descriptions.

Deluxe Base Station Messenger 250

\$244⁹⁰ Ready to go with ALL CB crystals included — FREE Antenna

One of the finest CB two-way radios around...100% solid-state design, large professional controls with full lighted metering for real operating convenience. Has electronic speech compression for extra transmit range, special voice tailored audio for crisp, clean reception. Covers all 23 CB channels with 4-watt output. 5 $\frac{1}{2}$ " H x 11" W x 9 $\frac{1}{8}$ " D. Brown/beige cabinet with walnut grain vinyl front panel insert. Operates on 117 VAC. With all CB crystals, microphone.

Model GWP-102, Shpg. wt. 16 lbs. Assembled. 244.90

The low-priced Messenger 123A

\$159⁹⁵ An Outstanding Choice for Dependable Mobile Communications — FREE Antenna Tool

Hundreds of thousands chose this model as the best CB value! Proven 100% solid-state chassis with speech compression, automatic noise limiter, "steep skirt" mechanical selectivity filter and acoustically isolated speaker. Lighted meter shows relative transmitter output and received signal strength. 23 channels and maximum legal power. 4 watts output, full band coverage, FCC type accepted, and fully assembled — ready to go anywhere. Just 2 $\frac{1}{2}$ " H x 6 $\frac{1}{8}$ " W x 9 $\frac{1}{8}$ " D and operates on 12 VDC neg. ground power. For base station use, just add the optional desk stand/AC supply. Includes all CB crystals, microphone, mounting bracket and instructions.

Model GWP-100, Shpg. wt. 6 lbs. Assembled. 159.95

Model GWP-100-1, AC supply, Shpg. wt. 4 lbs. 37.50

The best mobile we sell — Messenger 323A

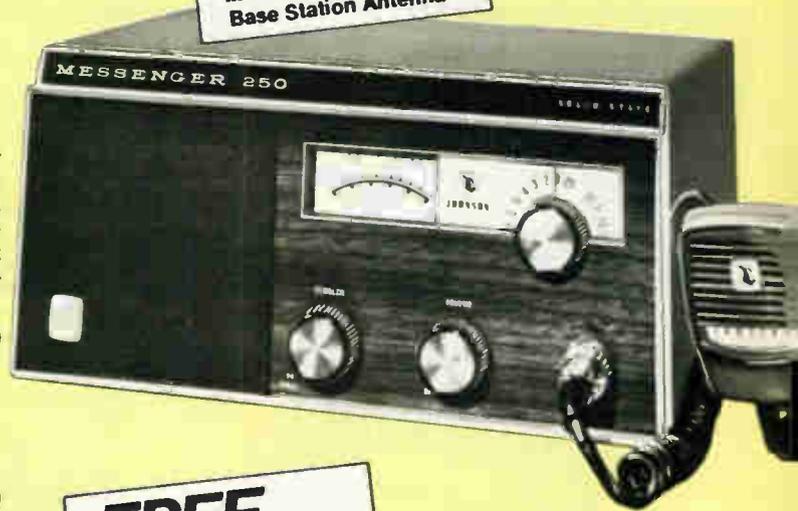
\$249⁹⁵ For the Serious Mobile CB'ers... a Rig That's Really Loaded — FREE Antenna Tool

Breakthrough in design...single conversion with dual cascade crystal filtering for spectacular freedom from interference. A separate noise blanker can be switched on to cut troublesome ignition pulse noise. An automatic noise limiter switches on when noise is present and off when not needed for maximum fidelity. Has front panel S/PRF meter, lighted channel indicator. An extra feature is its built-in PA function that lets you operate it as a PA system for meetings, traffic control, etc. Full 23 channel coverage; 4 watts output; FCC Type Accepted; hand held mike included. Size: 2 $\frac{1}{2}$ " H x 8" W x 9 $\frac{1}{2}$ " D; requires 12 volts DC power, positive or negative ground. Order AC supply to operate as base station.

Model GWP-101, Shpg. wt. 9 lbs. Assembled. 249.95

Model GWP-101-1, AC supply, Shpg. wt. 5 lbs. 46.50

FREE
M-117 "Super Magnum"
Base Station Antenna



FREE
Choice of M-176
or M-180 Mobile Antenna



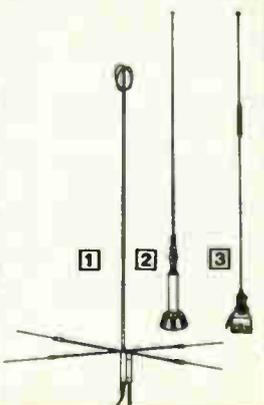
FREE
Choice of M-176
or M-180 Mobile Antenna



CB Antennas

FREE with purchase of CB Radio!

- 1 Antenna Specialists M-117 "Super Magnum" Base Antenna. 1/2 wave end-fed design gives 3.75 dB gain, improves S/N 6 dB! Curved static-reduction ball at top. Model GDP-2120, Shpg. wt. 9 lbs. 39.95
- 2 Antenna Specialists M-176 "Quick-Grip" Mobile Antenna. Trunk lid mount (no holes to drill); 46" high; weatherproof loading coil, DC grounded with 17' coax. Model GDP-2121, Shpg. wt. 3 lbs. 26.95
- 3 Antenna Specialists MR-180 "Flipper" Mobile Antenna. Rain-gutter mount (no holes to drill). Chrome plated clamp and fittings. With 10' coax. Model GDP-2122, Shpg. wt. 3 lbs. 22.95



Informative CB Books

- ABC's of Citizens Band Radio; new updated 128 page edition tells how to get started, choose equipment, channels, accessories, and get your license. EDP-212 (SAMS) 4.25
- 99 Ways to Improve Your CB Radio; 2nd edition. EDP-214 (SAMS) 3.95
- Citizens Band Radio Handbook; 4th edition. EDP-213 (SAMS) 5.50
- From CB to Ham Beginner; all the information needed to make the transition to ham radio; techniques, code, 144 p. EDP-215 (SAMS) 4.75
- Questions & Answers About CB Operations; new edition. EDP-216 (SAMS) 3.75

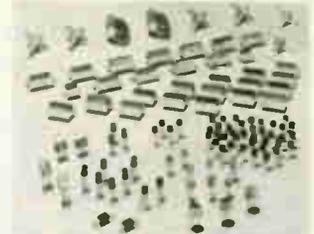
See page 48 for book ordering information.

Charge a kit — no money down on any kit — see page 50 for details.

Heathkit 104 series SSB Transceivers...



\$669⁹⁵



Completely solid-state design... including the finals. Over 275 solid-state devices, including 31 integrated circuits. Finals are warranted for one year.



Completely broadbanded. Neither the transmitter nor receiver sections require tuning from 3 to 30 MHz... instant QSY!

Heathkit SB-104 Amateur Transceiver

Totally broadbanded, completely solid-state, true digital readout and much more—the standard others will be judged by for years to come. Operates USB, LSB or CW — you can go from CW on the low end of 80 to USB on the high end of 10 in just seconds — and with perfect tune. At last, instant QSY. Choose the band, dial the frequency, select your mode and go — no more preselector, load or tune controls. True digital readout with 6 easy-to-read electronic digits provides resolutions down to 100 Hz on all bands. There's no more need to rely on inaccurate dial tracking or questionable VFO linearity. True digital circuitry takes into account all three frequencies: VFO, HFO and BFO. You don't even need a calibrator.

The transmitter delivers 100 watts output, and for QRP'ers, a front-panel switch instantly switches the output to one watt. And the four final transistors are protected against high SWR and thermal runaway, so they should never need replacement. The signal is clean and strong — low harmonic and spurious radiation, third-order distortion down 30 dB or better at 100 watts, carrier and unwanted sideband suppression down —55 dB. We've dramatically reduced cross-modulation and intermodulation to increase useable sensitivity, too. And we didn't forget convenience — 15 MHz WWV position on the bandswitch, 30 kHz per revolution spinner knob, tune button for loading linears, PTT mike jack, pushbutton 100 Hz blanking. ALC/relative power/S-meter, switchable VOX with gain and delay, much more.

Eleven of the 15 boards plug in and seven can be extended out of the chassis while the transceiver is operating. Two wiring harnesses eliminate most point-to-point wiring. Alignment is fast and simple requiring only a dummy load, mike and VTVM. The SB-104 operates directly from a 12V auto electrical system. For fixed station use, hook up the HP-1144 Power Supply.

- Kit SB-104, Shpg. wt. 31 lbs. 669.95
- Kit HP-1144, Fixed station power supply, Shpg. wt. 27 lbs. 89.95
- Kit SB-604, Speaker & cab., Shpg. wt. 8 lbs. 29.95
- Kit SBA-104-1, Noise blanker, Shpg. wt. 1 lb. 26.95
- Kit SBA-104-2, Mobile mount, Shpg. wt. 5 lbs. 36.95
- Kit SBA-104-3, 400 Hz CW crystal filter, Shpg. wt. 1 lb. 39.95

Fixed Station Power Supply

120 V/240 VAC operated supply provides 13.8 VDC required by SB-104 Transceiver. Full-wave bridge circuit has triple Darlington regulation with an integrated circuit which samples, compares, and automatically maintains a fixed voltage. Output is remotely sampled at the load end of the power cable, compensating for voltage drop across fuse and cable, to provide almost no change in voltage from no load to full load. Entire unit mounts within SB-604 speaker cabinet.



Kit HP-1144, Shpg. wt. 27 lbs. 89.95

HP-1144 SPECIFICATIONS

Output Voltage: 13.8 VDC regulated (Adjustable from approximately 11 to 16 VDC). Maximum Output Current: 20 amperes, intermittent. 8 amps continuous. Power Requirement: 110 to 130 VAC @ 6A or 220 to 260 VAC @ 3A, 50/60 Hz maximum. Dimensions: 5½" H x 9¼" W x 10¼" D. Regulation: Less than 2% output voltage variation from no load to 20 amperes. Ripple: Less than 1% at 20 amperes. Fuses: 7-amp, 3AG, slow-blow primary. 20-amp, 3AG, output. Net Weight: 23 lbs.

SB-604 Station Speaker (Not Shown)

Designed and styled to match the SB-104 Transceiver, the cabinet is large enough to house the HP-1144 AC Power Supply. The 5" x 7", 3.2 ohm speaker is response-tailored for SSB. Connector cable & plug are included.

Kit SB-604, Shpg. wt. 8 lbs. 29.95

SB-604 SPECIFICATIONS

Speaker Size: 5" x 7" oval. Voice Coil Impedance: 3.2 ohms. Frequency Response: 300 to 3000 Hz. Magnet Weight: 3.16 oz. Cabinet: Aluminum with gray wrinkle finish. Dimensions: 7½" H x 10½" W x 14" D.

SB-104 SPECIFICATIONS

TRANSCEIVER SECTION — GENERAL OPERATION: Frequency Coverage: 3.5 MHz through 29.7 MHz amateur bands, 15 MHz WWV receive only. Frequency Stability: Less than 100 Hz/hr drift after 30-min. warmup; less than 100 Hz drift for ±10% change in primary voltage. Readout Accuracy: Within ±200 Hz ±1 count. Audio Frequency Response: 350 to 2450 Hz ±75 Hz (6 dB bandwidth). Dial Backlash: 50 Hz max. Phone Patch Impedance: 4 ohm output to speaker; high impedance output to transmitter. **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 (minimum). Output Impedance: 50 ohms, less than 2:1 SWR. Carrier Suppression and Unwanted Sideband Suppression: 55 dB down from 100 watt single-tone output at 1000 Hz reference. Harmonic Radiation: 45 dB below 100 watt output. Spurious Radiation: —50 dB within ±3 MHz of carrier; —60 dB farther than ±3 MHz from carrier,

except —40 dB at 3.39 MHz on 80 meter band. Microphone Input: High impedance with a rating of —45 to —55 dB; approx. 25K ohms. **RECEIVER—Sensitivity:** Typically 0.6 μV (1 μV max.) for 10 dB S+N/N for SSB operation. Selectivity: 2.1 kHz minimum at 6 dB down, 5 kHz maximum at 60 dB down. (2:1 nominal shape factor). CW Selectivity: (with accessory CW filter) 400 Hz at 6 dB down; 2 kHz max. at 60 dB down. Audio Output: 2.5 watts into 4 ohms, 1.25 watts into 8 ohms, at less than 10% THD. Low impedance headphones (4-8 ohm). AGC: Less than 1 millisecond attack time; switch selectable 100 msec. and 1 sec. release, and OFF. IM Distortion: —65 dB min.; typically —57 dB with noise blanker. Image Rejection: —60 dB min. IF Rejection: —60 dB min. Internally Generated Spurious: Below 2 microvolt equivalent antenna input, except at 3.65, 3.74, 14.24 MHz and 21.2 MHz. Dimensions: 5¼" H x 14½" W x 13¾" D. (Less knobs, feet and connectors). Weight: 20 lbs.

Digital or Dial, Your BEST for the money!



Now more hams than ever can afford broadband design thanks to the Heathkit HW-104 Transceiver

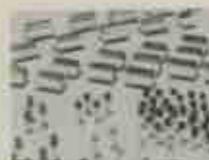
Instant QSY! Choose the band, frequency and mode and it stays tuned anywhere—without preselector, load or tune controls. Transmission is clean from 100 watts through one, with low harmonic and spurious radiation. At 100 watts third order distortion is down 30 dB and carrier and unwanted sideband suppression are down 55 dB. Reception is super clear thanks to a broadband design that minimizes cross-modulation and intermodulation. Active devices are minimized ahead of the 4-pole crystal filter. Adjacent signal overload is minimized too. Yet, sensitivity is less than 1 μ V. And for convenience, there's a 15 MHz WWV receive position on the band switch and a "pull-to-calibrate" position on the RF control.

The smooth action dial covers 3.5 MHz to 29.0 MHz with 15 kHz per knob revolution. A built-in 100 kHz and 25 kHz calibrator insures dial accuracy to within 2 kHz (markings in 5 kHz increments). The VFO is the same basic circuitry as the SB-104 with less

than 100 Hz/hr. drift after warmup. Want the top MHz of 10 meters? Add the HWA-104-1 accessory.

Assembly is clean and precise, too. All you need for alignment is a dummy load, microphone and VTVM. And you can add the matching SB-614 Station Monitor and SB-634 Console to your HW-101 rig. For fixed station use, order HP-1144 supply.

- Kit HW-104, Shpg. wt. 29 lbs. 539.95
- Kit HP-1144, AC power supply, Shpg. wt. 27 lbs. 89.95
- Matching speaker. (Shown above.)
- Kit HS-1661, Shpg. wt. 5 lbs. 19.95
- 10-meter accessory, coverage to 29.7 MHz.
- Kit HWA-104-1, Shpg. wt. 1 lb. 16.95
- SBA-104-1, Noise blanker. Shpg. wt. 1 lb. 26.95
- SBA-104-2, Mobile mount, Shpg. wt. 5 lbs. 36.95
- SBA-104-3, 400 Hz CW crystal filter, Shpg. wt. 1 lb. 39.95



All solid-state...including the finals. Output warranted for one year.



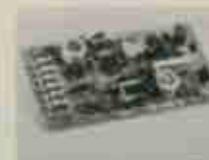
Completely broadband. No tuning from 3 to 30 MHz... instant QSY.



Built-in 100 kHz & 25 kHz calibrator. Keeps your dial scale accurate to 2 kHz.



Circuit board construction. Seven major boards can be extended for adjustment.



Optional noise blanker for up to 50 dB of effective blanking.



Complete back-panel connections. Access in & out to everything.

HW-104 SPECIFICATIONS

Frequency Coverage: 3.5 MHz through 29.0 MHz amateur bands, (through 29.7 MHz, with HWA-104-1 accessory). **Frequency Stability:** less than 100 Hz/hour drift after 30-min. warmup; less than 100 Hz drift for $\pm 10\%$ change in primary voltage. **Modes of Operation:** Selectable upper or lower sideband (suppressed carrier) and CW. **Dial Accuracy:** Within 2 kHz after calibration at nearest 100 kHz marker. **Built-in calibrator** provides 100 kHz and 25 kHz markers. 5 kHz dial markings. Approximately 15 kHz per turn. **Audio Frequency Response:** 350 to 2450 Hz ± 75 Hz (6 dB bandwidth). **Tuning Backlash:** 50 Hz or less. **Phone Patch Impedance:** 4 Ω output to speaker; high impedance output to transmitter. **Power Requirements:** 13.8 VDC nominal (maximum 16 VDC) at: Receive: 2 amps. Transmit, low power: 3 amps. Transmit, high power: 20 amps. **TRANSMITTER—RF Power Output:** High Power (50 Ω nonreactive load). SSB: 100 watts PEP ± 1 dB, CW: 100 watts ± 1 dB. Low Power: SSB: 1 watt PEP (minimum), CW: 1 watt (minimum). **Output Impedance:** 50 ohms, less than 2:1 SWR. **Carrier Suspension:** 55 dB down from 100 watt single-tone output at 1000 Hz reference. **Unwanted Sideband Suppression:** 55 dB down from 100 watt single-tone output at 1000 Hz reference. **Harmonic Radiation:** 45 dB below 100 watt output. **Spurious Radiation:** -50 dB within ± 3 MHz of carrier, except, on

the 3.5 band, -40 at 3.395 MHz. -60 dB greater than ± 3 MHz from carrier. **Third Order Distortion:** 30 dB down from two-tone output, reference at 100 watts PEP. **Transmit/Receive Operation:** SSB: PTT or Vox. CW: Keyed-tone Vox or Manual. **NOTE:** In the low power mode all transmit-receive switching is solid-state. **CW Sidetone:** Internally switched to speaker or headphones in CW mode. Approximately 700 Hz tone. **Microphone Input:** High impedance with a rating of -45 to -55 dB. **RECEIVER Sensitivity:** Typically 0.6 μ V (1 μ V max.) for 10 dB S+N/N for SSB operation. **Selectivity:** 2.1 kHz min. at 6 dB down, 7 kHz max. at 60 dB down. **CW Selectivity (with accessory CW filter):** 400 Hz at 6 dB down, 2 kHz at 60 dB down. **Overall Gain:** Less than 1 microvolt for 0.5 watt audio output. **Audio Output:** 2.5 watts into 4 ohms, 1.25 watts into 8 ohms, at less than 10% THD. **AGC:** Less than 1 millisecond attack time; switch selectable 100 μ sec and 1 S release, and OFF. **Intermodulation Distortion:** -60 dB. **Image Rejection:** -60 dB. **IF/IM Rejection:** -60 dB. **Internally Generated Spurious Signals:** Below 2 μ V equivalent antenna input, except at 3.65, 3.74, 14.25, and 21.2 MHz. **Dimensions:** (less knobs, feet, sockets, rails) 5 $\frac{3}{4}$ " H x 14 $\frac{1}{2}$ " W x 13 $\frac{1}{8}$ " D (14.6 cm. x 36.75 cm. x 35.24 cm.). **Net Weight:** 20 lbs. (7 kg.)

Informative Radio Books

Single-Sideband: Theory and Practice — a one-source guide emphasizing basic principles & circuitry rather than math. **EDP-120** 6.95

Radio Handbook — the standard work on practical & theoretical aspects of radio communications and electronics. **EDP-117** 19.50

See page 48 for book ordering information.

Versatile Station Accessories for the 104's



\$139⁹⁵

SB-614 Transmit Signal Station Monitor

Make sure your signal is in top shape!

WATCH IT on the 614's highly visible 1½x2" CRT

For use with 104 series, many other SSB Transceivers. Monitors transmitted SSB, CW and AM signals up to 1 kW from 80-6 meters. Its sharp, clean trace indicates a variety of common operating problems: non-linearity, insufficient or excessive drive, poor carrier or sideband suppression, regeneration, parasitics and key clicks. Features all standard scope controls, recurrent automatic sync-type sweep generator, front panel 11-step attenuator control. Has rear panel Astigmatism control, horizontal and vertical inputs and outputs, exciter and linear inputs/outputs. Solid-state circuit, easy to build circuit board/wiring harness design.

Kit SB-614, Shpg. wt. 17 lbs. **139.95**

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 SWEEP GENERATION: Type: Recurrent, automatic sync Frequency Range: 10 Hz to 10 KHz in three ranges. GENERAL: Graticule: .250 inch squares 6 x 8 (1.5 x 2.0 inches total viewing area). Power Requirement: 110-130 or 220-260 VAC, 60/50 Hz. DIMENSIONS: 7¼" H x 10¼" W x 15¼" D. Net Weight: 12 lbs.



\$179⁹⁵

SB-634 Five-Function Station Console

*Provides the five station functions every Amateur needs—
Clock, Timer, Wattmeter, SWR Bridge and Phone Patch*

It's five different instruments in a single, compact and stylish "SB"-type case! The 24-hour digital clock is independent of all other functions. The 10-minute ID timer indicates to 9.59, then recycles with either a visual or audible alarm. The RF wattmeter measures 200 or 2000 watts full scale with ±10% accuracy from 160 to 10 meters. The SWR meter has a separate sensitivity control. The phone patch can be used manually or with VOX control. Add real operating versatility to your 104 station today!

Kit SB-634, Shpg. wt. 14 lbs. **179.95**

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. PHONE PATCH — Circuit: Telephone hybrid for VOX or manual operation. TELEPHONE LINES — Input Impedance: Approximately 600 ohm. Null Depth: At least 30 dB isolation between transmit and receive circuits. Power Requirement: 120/240 VAC, 60/50 Hz, 15 watts. DIMENSIONS: 7¼" H x 10¼" W x 15¼" D. Net Weight: 10 lbs.



\$119⁹⁵

SB-644 Transmit/Receive Remote VFO

Designed exclusively for use with the SB-104. Provides split transmit/receive capability without a separate transmitter and receiver. Multi-mode capability allows transceive operation on either the "644" or the "104." Use either of the two crystal positions in the "644" for fixed-frequency control. Convenient front panel controls for all transceive, transmit or receive modes on both the "104" and the remote VFO. "644" tuning scale gets you into the right frequency area, exact frequency readout takes place in the "104." Switch from transmit to receive and the display automatically changes to the correct frequency. The "644" uses the same kit VFO as the SB-104. And the true digital frequency readout in the "104" eliminates concern about dial VFO linearity problems. "644" assembles easily, with minimal adjustments, and requires no modifications to "104".

Kit SB-644, Shpg. wt. 10 lbs. **119.95**

SB-644 SPECIFICATIONS

Frequency Coverage: 5.0 — 5.5 MHz allowing 80, 40, 20, 15, 10 meter operation in the SB-104. Frequency Stability: Less than 100 Hz drift per hour 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) Dial Backlash: 100 Hz max. Power Requirements: 11V and 13.6V at 500 mA from SB-104. RF Output: 0.34 to 0.4V RMS over 5 to 5.5 MHz into a 50 ohm load. DIMENSIONS: 7¼" H x 10¼" W x 15¼" D. Net Weight: 6½ lbs.

Heathkit Linears—Packed with Power and Features



Chassis of the SB-230.



The business end of the SB-230 — a conduction-cooled triode final and efficient heat sink. No blower needed.



SB-230 1kW Conduction-Cooled Linear \$369⁹⁵

The lowest cost conduction-cooled linear on the market. Uses a husky Eimac 8873 triode in proven, stable, grounded grid circuitry to deliver up to 1200 watts PEP SSB, 1000 watts CW input from less than 100 watts drive. It's also rated at 400 watts input for slow-scan TV and RTTY. And the final is completely enclosed in a double-shielded compartment. Bandswitching is done with a single knob... Load and Tune controls are clearly marked so you can return to a favorite operating frequency just by noting the control positions. A five-position switch, coupled with the back-lighted meter, indicates Relative Power, Plate current, Grid current and plate High Voltage at a glance. Relative Power sensitivity is adjustable with the front panel knob.

Built-in safety features include microswitch interlocks on both the top and bottom to shut down primary power when cabinet shells are re-

moved; a temperature monitored heat sink that shuts down the unit if temperature goes too high. Built-in delay circuit allows sufficient tube warmup. An Exciter light indicates the linear is running straight through, without amplification. The On-Off switch includes a circuit breaker for the primary side of the power transformer. And the cathode of the tube is fused.

Kit SB-230, Shpg. wt. 40 lbs. 369.95

SB-230 SPECIFICATIONS

Band Coverage: 80, 40, 20, 15 and 10 meter. Duty Cycle: SSB: continuous voice modulation; CW: continuous (max. key-down time 30 seconds); RTTY/SSTV: 50% (max. transmit time 10 minutes at 400 watts). Driving Power Required: less than 100 W. Third Order Distortion: -30 dB or better. Output Impedance: 50 ohms at 2:1 SWR max. Input Impedance: 52 ohms at 1.5:1 SWR max. Zero Signal Plate Current: 25 mA. Power Requirement: 120 VAC, 50/60 Hz, 14 A max. or 240 VAC, 50/60 Hz, 7 A max. Dimensions: 14 3/4" W x 16" D x 7" H. Net Weight: 33 1/2 lbs.

Heathkit SB-200 Amp has a 1 kW kick

Delivers a full 1200 W PEP SSB input, 1 kW on CW. Features include: Solid-state power supply with circuit breaker protection, metering for SWR, grid current, plate current, relative power, plate voltage. Pretuned cathode input circuit for maximum efficiency and low distortion. Clean, open layout makes assembly extra easy.

Kit SB-200, Shpg. wt. 50 lbs. 329.95

SB-200 SPECIFICATIONS

Band coverage: 80, 40, 20, 15 & 10 meters. Maximum power input: 1200 W P.E.P. SSB, 1000 W CW. Driving power required: 100 W. 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 W P.E.P. Output impedance: 50-75 ohm unbalanced; variable pi-output circuit. SWR: not to exceed 2:1. Input impedance: 52 ohm unbalanced; broadband pretuned input circuit requires no tuning. 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 requirements: 120 VAC @ 16 A (max.), 240 VAC @ 8 A (max.). Cabinet size: 6 1/2" H x 14 1/2" W x 13 3/4" D.

2 kW powerhouse — the Heathkit SB-220

The one that made history because it offered more features and performance for the price! A pair of Eimac 3-500Zs in grounded grid deliver up to 2 kW PEP SSB input... a full 1 kW on CW and RTTY. Requires just 100 W drive for full output. Pretuned broadband pi-input provides maximum efficiency and minimum distortion from 80 — 10 meters. Features include a husky built-in solid-state supply that can be wired for either 120 or 240 VAC... built-in circuit breaker protection... Zener diode regulated operating bias to reduce idle I_b for cool running, longer tube life... fan cooled, well-shielded final compartment... complete metering facilities.

Kit SB-220, Shpg. wt. 70 lbs. 469.95

SB-220 SPECIFICATIONS

Band coverage: 80, 40, 20, 15 and 10 meters. Duty cycle: SSB, Continuous voice modulation CW, Continuous (maximum key-down 10 minutes), RTTY, 50% (maximum transit 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. Rear panel: Line cord, circuit breakers (two 10 A). Antenna Relay (phono). ALC (phono). RF Input (SO 239). Ground post. RF Output (SO-239). Power required: 120 VAC, 50/60 Hz at 20 amp. max. 240 VAC, 60/50 Hz at 10 amp. max. Cabinet size: 8 1/4" H x 14 1/2" W x 14 1/2" D.



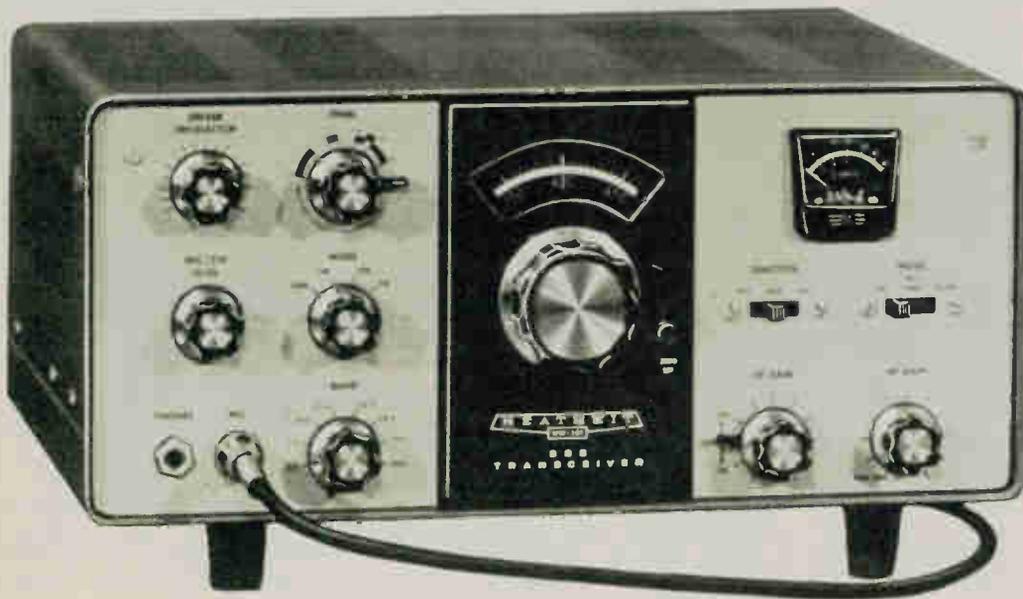
\$329⁹⁵



\$469⁹⁵

Want faster service? Order by phone — call (616) 982-3411 day or night.

Our world-famous HW-101 SSB Transceiver



Heathkit HW-101 5-Band Transceiver

\$339⁹⁵

Its price/performance ratio makes the HW-101 an exceptional value in amateur radio

Hybrid design, full featured. 20 tubes and 19 semiconductors are combined with the features you need for operating ease, convenience and versatility. 180 watts input PEP, 170 watts input CW; 0.35 μ V sensitivity; FET VFO; PTT and VOX with anti-trip; triple action level control; smooth dial drive with 36-to-1 ratio; built-in 100 kHz calibrator; 4-function meter for receive, ALC on transmit, relative power output, or final cathode current; all going for you on USB, LSB, or CW on 80 through 10.

Easy to build. Open chassis layout with uncrowded circuit boards, wiring harness, and special "Switch Boards" with built-in wafer switches to help eliminate intricate switch wiring make it happen fast and easy. Build it...join the thousands of hams who've found you can't beat it.

Kit HW-101, Shpg. wt. 21 lbs. 339.95

SBA-301-2, 400 Hz CW crystal filter, Shpg. wt. 1 lb. 29.95



Versatile front panel meter shows signal strength on receive, ALC voltage on transmit, switches to read relative power output or final amplifier cathode current.



Built-in crystal calibrator lets you accurately calibrate the dial at 100 kHz intervals. Extra-large tuning knob for smooth, backlash-free tuning.

HW-101 SPECIFICATIONS

RECEIVER: Sensitivity: $< 0.35 \mu$ V for 10 dB S+N/N for SSB operation. SSB selectivity: 2 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. Input: Low impedance for unbalanced coaxial input. 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: 55 dB below rated output. Harmonic radiation: 45 dB below rated output. Transmit-receive operation: SSB PTT or VOX. CW: Provided by operating VOX from a keyed tone, using grid-block keying. CW sidetone: Internally switched to speaker or headphone in CW mode. Approx. 1000 Hz tone. 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 .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 $\pm 10\%$ 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 2450 Hz. Power requirements: 700 to 850 volts at 250 mA with .1% maximum ripple. 300 volts at 150 mA with 05% maximum ripple; -115 volts at 10 mA with 5% maximum ripple; 12 volts AC/DC at 4.76 amps. (see fixed & mobile power supplies below). Cabinet dimensions: 6 $\frac{1}{4}$ " H x 14 $\frac{1}{4}$ " W x 13 $\frac{1}{4}$ " D.

*Triple Action Level Control.

Heathkit HP-23B Fixed Station Power Supply

\$57⁹⁵

For Use with HW-101 Above, Other Heathkit SSB Transceivers, Many Other Transceivers



Provides the operating voltages needed for fixed station transceiver use — high voltage, two low voltages, fixed bias, 12.6 volt filament. The improved HP-23B now features a higher voltage rating on B+ filter capacitors; improved filtering on bias voltage; fixed bias voltage, and heavier filament wires in the power cable. Now the popular Heathkit power supply is better than ever.

Kit HP-23B, Shpg. wt. 19 lbs. 57.95

HP-23B SPECIFICATIONS

Power requirements: 120/240 VAC, 60/50 Hz, 350 watts maximum. High voltage output: 820 VDC no load; 700 VDC @ 250 mA $\pm 10\%$. AC ripple: Less than 1% @ 250 mA. Duty cycle 150 mA continuous to 300 mA @ 50%. Low voltage output: (High tap) 350 VDC, no load; 300 VDC @ 150 mA $\pm 10\%$. (Low tap) 275 VDC, no load, 250 VDC @ 100 mA; $\pm 10\%$. Less than .05% AC ripple @ 150 mA, continuous duty to 175 mA. Fixed bias: -130 VDC $\pm 10\%$, no load; -100 VDC @ 20 mA. Filament voltage: 12.6 VDC @ 5.5 amps. Dimensions: 9" L x 4 $\frac{3}{4}$ " W x 6 $\frac{3}{4}$ " H.

Charge a kit — no money down on any kit — see page 50 for details.

Hear it ALL with the Super SB-303



Special extender board lets you make voltage checks easily even while the receiver is operating.

Last Call!



Heathkit SB-303 World-wide SSB Transceiver

\$389⁹⁵

Solid-state circuitry provides the reliability you need for day-in, day-out operating

80 through 10, SSB, CW, RTTY, and AM... the world over... all at your fingertips in this solid-state wonder of stability, selectivity, and sensitivity. The preassembled, prealigned solid-state LMO and crystal controlled heterodyne oscillators assure stable and linear tuning with a calibrated dial readout in 1 kHz increments and 100 Hz stability. Calibrate it with its built-in dual frequency integrated circuit crystal calibrator with markers for every 100 kHz or 25 kHz... or tune to WWV at 15 MHz. It has a 0.25 microvolt sensitivity and 2.1 kHz SSB selectivity to keep you going even when the band isn't, and an RF attenuator to use when it is. Three-position AGC, too, to make SSB operating easier. Solid-state circuitry has 28 silicon transistors including 4 MOSFETS and an IC plus a transistor-regulated dual-primary power supply.

Easier-than-ever assembly with modular plug-in Switch-Boards and circuit boards, plus extender boards for easier adjustment... all you need for alignment is an 11-megohm VTVM.

- Kit SB-303, Shpg. wt. 22 lbs. **389.95**
- SBA-301-1, Optional 3.75 kHz AM crystal filter, Shpg. wt. 1 lb. **24.95**
- SBA-301-2, Optional 400 Hz CW crystal filter, Shpg. wt. 1 lb. **29.95**

Heathkit HP-13B Mobile Power Supply

\$84⁹⁵

For mobile operation of all Heathkit SSB transceivers, other brands as well

Supplies all the necessary operating voltages for mobile use of SSB transceivers — high, low and fixed bias voltages, also switches filament voltage for equipment with which it is used. Features relay control of all primary power, individual circuit breaker protection of DC input and filament voltage line. Silicon rectifiers, heavy-duty capacitors and rugged circuit board mounting assure long life and reliable operation.

- Kit HP-13B, Shpg. wt. 7 lbs. **84.95**

SB-303 SPECIFICATIONS

Frequency range: 18-10 M amateur bands; 15 MHz WWV. Intermediate frequency (IF): 3.395 MHz. Frequency stability: <100 Hz drift/hr. after 10 min. warmup <100 Hz drift for ±10% line voltage variation. Modes of operation: SSB, CW, AM, RTTY. Sensitivity: <0.25 μV for 10 dB S+N/N for SSB operation. Overall gain: <1.5 μV input for 0.5 W audio output (single tone SSB). AGC characteristics: Blocking →3.0 V CW/SSB/RTTY. Dynamic Range →150 dB CW/SSB. RF Attenuator — variable 0.40 dB nominal. Selectivity: SSB — 2.1 kHz @ 6 dB down, 5.0 kHz max. @ 60 dB down (crystal filter supplied). CW — 400 Hz @ 6 dB down, 2.0 kHz max. @ 60 dB down (accessory CW crystal filter). AM — 3.75 kHz @ 6 dB down, 10 kHz max. @ 60 dB down (accessory AM crystal filter). RTTY — 2.1 kHz @ 6 dB down, 5.0 kHz max. @ 60 dB down (uses SSB crystal filter). Image rejection: >60 dB. IF rejection: 3.395 — >55 dB. 8.595 — >50 dB. Spurious response: All below 1 μV equivalent signal input. Temperature ranges: 10°C-50°C ambient. Dial accuracy: Electrical — Within 400 Hz after calibration at nearest 100 kHz or 25 kHz point. Visual — Within 200 Hz. Calibration: Every 100 kHz or 25 kHz. Dial accuracy: No more than 50 Hz. Antenna input impedance: 50 ohm nominal unbalanced. Audio response: SSB — 350-2420 Hz nominal @ 6 dB. CW (with accessory filter) — 800-1200 Hz nominal @ 6 dB. AM (with accessory filter) — 200-3500 Hz nominal @ 6 dB. RTTY — 1840-3940 Hz nominal @ 6 dB. Audio output impedance: Speaker — 8 ohm; Headphones — Low impedance. Audio output power: 4 W <10% distortion. Muting: Open external ground at mute socket. Power requirements: 120/240 VAC, 40 W max. Cabinet dimensions: 6 7/8" H x 12 1/4" W x 13" D. Overall dimensions (with knobs & feet installed): 7 3/8" H x 12 1/4" W x 14" D.



HP-13B SPECIFICATIONS

Input voltage: 12 to 16 VDC (neg. ground only). Input current: 25 amp. max. full load. High voltage output: 800 VDC, no load; 750 volts DC @ 250 mA. AC ripple: less than 1% @ 250 mA. Low voltage output: (high tap) 310 VDC, no load; 200 VDC @ 150 mA. (low tap) 265 VDC, no load; 250 VDC @ 150 mA. AC ripple: Less than .05% @ 150 mA. Fixed bias: —130 VDC @ 20 mA. Dimensions: 7 3/4" W x 7 3/8" L x 2 3/8" D. All voltages referenced at 13 VDC.

Want faster service? Order by phone — call (616) 982-3411 day or night.

Code is more fun than ever with these



\$139⁹⁵



One of the world's most popular CW Transceivers — the Heathkit HW-16

- **50-90 Watts Adjustable Input**
- **Better than 1 μ V Sensitivity**
- **True break-in capability**

Easily one of the most popular Novice Transceivers in the industry, and for those who stay on the CW bands even after they obtain their general license — the Heathkit HW-16 remains a favorite. For many Hams, it was a used HW-16 that first put them on the air. It's a rare Amateur that hasn't operated one once in his career.

The HW-16 is designed primarily for the Novice operator, but its fine performance and capabilities make it ideal for General ticket ops too. It's equally at home in the Shack of Novice or Pro.

Why is the HW-16 so popular? The features speak for themselves. The Heathkit HW-16 offers optimum CW operation on the first 250 kHz of the 80, 40 and 15 meter bands. The transmitter is crystal controlled for excellent stability... features true break-in capability with solid-state T/R switching... 75 watts input for Novices, up to 90 watts for General and above. All stages of the transmitter are grid block keyed for clean code signals.

Receiver uses dual conversion for excellent image rejection. The front end is crystal-controlled for excellent stability, and a 500 Hz crystal filter provides outstanding selectivity. Receiver is automatically muted each time the key is depressed for full break-in operation. Sensitivity is better than 1 μ V for crisp, clean copy.

Has front panel Relative Power and Plate Current meter, RF gain and power level controls, AF gain, tune and Band controls. The clearly marked tuning dial allows fast, accurate frequency selection. VFO input lets you add the HG-10B (below) for complete VFO transmit and receive capability.

Kit construction is easy and enjoyable. The famous Heathkit manual guides you every step of the way with step-by-step instructions and easy to follow illustrations. Final assembly and checkout requires only a VTVM, dummy load, code key and appropriate crystals. In addition to its fine CW performance, the HW-16 is a great kit project, even for first time builders.

Kit HW-16, Shpg. wt. 24 lbs. **139.95**

HW-16 SPECIFICATIONS

TRANSMITTER SECTION:

RF Power Input: 50-90 W (adjustable).

Frequency Control: 80 meter crystal or VFO on 80-meter band. 80- or 40-meter crystal, or VFO on 40-meter band. 40-meter crystal or VFO on 15-meter band.

Keying: Grid-block. Break-in with automatic antenna switching and receiver muting.

Output Impedance: 50 ohm unbalanced. SWR less than 2:1.

Sidetone: Neon lamp relaxation oscillator.

RECEIVER SECTION:

Sensitivity: less than 1 μ V for 10 dB S+N/N.

Selectivity: 500 Hz at 6 dB down.

Intermediate Frequency: 3396 kHz.

Antenna Impedance: 50 ohm, unbalanced.

External Speaker Impedance: 8 ohm.

GENERAL:

Frequency Coverage: 3.5 to 3.75 MHz. 7.0 to 7.25 MHz. 21.0 to 21.25 MHz.

Power: 120 VAC, 50-60 Hz.

Dimensions: 6 1/2" H x 13 3/4" W x 11 1/2" D.



\$69⁹⁵

HG-10B SPECIFICATIONS

Band Coverage: 80-2 meters. Load Impedance: 50,000 ohms or more. Output voltage: 5 V rms, open circuit. Output Connector: phono type socket. Controls: Function Switch, Frequency, Band Switch. Power Requirements: 108 VDC at 25 mA; and 6.3 V AC or DC at 0.75 A. Dimensions: 9 1/4" W x 6 1/2" H x 9 1/4" D.

Heathkit HG-10B 80-2 Meter VFO

- **Provides VFO operation on 80-10 meters**
- **For all grid-block-keyed transmitters**

Ideal for operation with the Heathkit HW-16 above or DX 60B (next page). Also can be used with many other Amateur transmitters capable of providing operating voltages and having a VFO input.

Provides VFO control from 80 through 2 meters with separate calibrated scales for each band. Continuously variable vernier tuning (28:1 ratio) permits accurate tuning within each band. Uses multiples of VFO output frequency on 20 through 2 meters, output frequency is used directly on 80 and 40 meters.

Special temperature compensated components in the oscillator circuit, along with regulated B+ voltage, provide stable, drift-free operation. Output voltage is 5 V rms at 3.4-4, 7-7.425 and 8-9 MHz range.

The HG-10B is compatible with virtually all grid-block-keyed transmitters. Alignment requires receiver of known accuracy covering 80-2 meter bands or 3.5 to 8.222 MHz.

Kit HG-10B, Shpg. wt. 11 lbs. **69.95**

great CW kits from Heath

Your best value in Ham radio starts with a do-it-yourself Heathkit rig. Communicate with the world... start yourself on a rewarding Ham radio hobby today!



Heathkit HW-8 — we've improved the world's most popular QRP Transceiver

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.

Output Impedance: 50 Ω , unbalanced.

Spurious & Harmonic Levels: -35 dB or better.

Offset Frequency: approx. -750 Hz, fixed on all bands.

RECEIVER:

Sensitivity: 0.2 μ V for readable signal; 1 μ V or less for 10 dB S+N/N.

Selectivity: wide, -750 Hz @ -6 dB narrow, -375 Hz @ -6 dB.

Audio Output Impedance: 1000 Ω , nominal.

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).

Frequency Stability: less than 100 Hz/hour drift after 30 min. warmup.

Power Requirement: 12-16 VDC, 90 mA, receive; 430 mA, transmit.

Dimensions: 9 1/4" x 8 1/2" x 4 1/4".

Net Weight: 4 lbs.

- Improved receiver section
- Better frequency coverage
- Front panel Relative Power Meter

We've made the world's most popular low-power CW transceiver even better! To the Heathkit HW-7 — we have added more bands, more features and a super new receiver section that's the best in its class. The famous HW-7 QRP Transceiver helped thousands of hams work the world on a couple of watts — and on a budget. Now, in the same value conscious tradition, Heath announces the HW-8. Pushbuttons instantly select any of the four bands — 3.5-3.75; 7-7.25; 14-14.25 and 21-21.25 MHz. Crystal heterodyne circuitry allows easy frequency tuning with a *single* dial scale for all four bands, excellent stability and fixed CW offset. Other features include adjustable sidetone volume, relative power meter, diode band switching and break-in keying with adjustable T/R delay, and RF gain control.

The direct-conversion receiver boasts dramatically improved resistance to overload and reduced microphonics and hum thanks

to a new RF amplifier stage and a two-position active audio filter. Its improved selectivity gives the HW-8 the finest receiver section in its price class. You get solid copy from all over with readable signals from as little as 0.2 μ V; 1 μ V or less produces 10 dB S+N/N! The HW-8 can be operated from its optional AC power supply or 12 VDC — great for vacationing or emergencies. Has built-in headphone jack, adjustable AF gain, preselector and tune controls.

Now's the time to get into the fun and challenge of low-power CW operation. Order your HW-8 today.

Kit HW-8, Shpg. wt. 7 lbs. 129.95

Kit HWA-7-1, AC Power Supply, Shpg. wt. 3 lbs. 14.95

Last Call! HW-7 3-band QRP CW Transceiver **\$89⁹⁵**

Heathkit DX-60B Phone and CW Transmitter

\$119⁹⁵ Run up to 75 watts input as Novice, up to 90 watts on your General ticket

The economical way to get on the air... an excellent transmitter designed for reliable Novice or General Class operation. Features up to 90 watts input, controlled carrier phone operation, four switched crystal positions, and provisions for the use of a VFO. Has Front panel controls for Crystal or VFO, Phone or CW operation.

A switchable front panel meter monitors both grid drive and plate current. Other front panels include a bandswitch for selecting proper operating band; drive tune and drive level controls; final tune control. Mike and key jacks on the front panel allow easy hookup of microphone or code key. Accessory power socket on rear provides 300 V at 50 mA DC and 6.3 VAC for VFO operation.

The DX-60B is an easy kit to assemble, with clean, open chassis layout and a pre-cut wiring harness to simplify most wiring connections. The finished DX-60B offers a clean, uncluttered, functional look that makes a nice addition to your shack.

Kit DX-60B, Shpg. wt. 24 lbs. less crystals 119.95



DX-60B SPECIFICATIONS

Power input: 90 watts, peak; controlled carrier phone, or CW. Output impedance: 50-75 ohm (coaxial). Output coupling: Pi-network. Operation: CW or AM phone — crystal or VFO control. Band coverage: 80 through 10 meters. Power requirements: 120/240 VAC, 60/50 Hz, 225 watts. Dimensions: 6 1/2" H x 13 1/4" W x 1 1/2" D.

Want faster service? Order by phone — call (616) 982-3411 day or night.

Code Keyers and Helpful Ham Books



Let Heath help you start a rewarding CW and Ham hobby. These CW kits are easy and fun to build, and they offer excellent reliability and performance. The Amateur Radio Starter Group and informative books below help you learn how to communicate with the world.



Heathkit Code Practice Oscillator

\$9⁹⁵

The FUN way to practice Code — it's an easy-to-build starter kit too

Safe, portable and reliable, the HD-1416 is designed in the Heath tradition of top quality and value. Most components mount on a single circuit board for easy assembly. The unit operates from a single inexpensive 9-volt transistor battery (not supplied) and comes complete with telegraph key and phone jack. The oscillator, with built-in speaker, has a separate control for volume on the front panel — as well as a tone control accessible from the back of the cabinet. The HD-1416 can also be used as a side tone oscillator with any transmitter using grid block keying — such as the Heathkit DX-60B. Molded plastic cabinet matches Heathkit "SB" series gear.

Kit HD-1416, Shpg. wt. 2 lbs. **9.95**

HD-1416 SPECIFICATIONS

Mode of Operation: Speaker or headphones. Tone Frequency: 200-800 Hz adjustable. Battery Required: 9-volt transistor battery equivalent Neda #1604 (not supplied). Speaker: 45 ohms. Headphones: 8-2000 ohms. Sidetone Oscillator: Grid block keying transmitters (400 volts DC, negative maximum). Controls: Volume, Tone (internal). Front Panel Connections: Key, Phone jack. Transistors: (2) MPSA20, (1) 2N5249. Color: Wrinkle grey and dark green.



\$49⁹⁵

Heathkit Solid-State Electronic Keyer

- Sends selectable 10-35 wpm for Novices or 10-60 wpm for "Pro's"
- Iambic operation for fully formed characters with minimal wrist movement

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. Dots and dashes are self-completing and always in proper proportion. Operates on 120 VAC or 12 VDC. Adjustable sidetone frequency, built-in speaker, headphone jack.

Kit HD-1410, Shpg. wt. 4 lbs. **49.95**

HD-1410 SPECIFICATIONS

Keying Output, Positive Line to Ground: max. voltage open circuit or spikes — 300 volts. Max. current — 200 mA. Keying Output, Negative Line to Ground: max. voltage open circuit or spikes — 200 volts. Max. current — 10 mA. Audio: internal speaker or jack for optional hi-Z (at least 500 ohms) headphones. Sidetone: adjustable from 500 to 1000 Hz. Internal Controls: sidetone frequency, paddle tension, paddle travel. Rear Panel Connections: AC power cord, 12-volt power input, keyer out, headphones, receiver audio in, ext. key. Power Requirement: 120/240 VAC (±10%), 60/50 Hz, 3.5 watts or 10-14.5 VDC, negative ground, 150 mA. Dimensions: approx. 3" H x 5" W x 7 1/2" D. Net Weight: 3 lbs.



Ham starter group

Includes 4 ARRL handbooks, HD-1416 practice oscillator, 3 code-teaching records or two cassettes.

\$19⁹⁵

- HDP-22, Complete group with records, Shpg. wt. 6 lbs. . . . **19.95**
- HDP-122, Complete group with cassettes, Shpg. wt. 4 lbs. **19.95**
- HDP-32, Records only, Shpg. wt. 2 lbs. **9.95**
- HDP-132, Cassettes only, Shpg. wt. 1 lb. **9.95**
- HDP-42, Books only, Shpg. wt. 2 lbs. **4.00**
- HD-1416, Oscillator & key, Shpg. wt. 2 lbs. **9.95**

Learn About Amateur Radio

Amateur Radio License Study Guides — makes getting any radio license easy — serve as a convenient reference after you get your license.

- NOVICE, EDP-122 **5.95**
- GENERAL, EDP-123 **7.95**
- ADVANCED, EDP-124 **5.95**
- EXTRA, EDP-125 **5.95**
- How to be a Ham — beginner's guide to Amateur Radio. EDP-115 **3.95**
- 101 Questions and Answers About Amateur Radio — introduction for beginners, valuable reference for veterans. EDP-118 **2.95**
- ARRL Amateurs Handbook — up to date info & theory. HDP-293 **6.00**

See page 48 for book ordering information.

Useful Heathkit station accessories

Add more versatility to transceivers and separates with these accessories...

Heathkit solid-state Dip Meter delivers more performance at big savings

Another Heath value triumph — a better dip meter at lower cost. The Colpitts oscillator covers 1.6 to 250 MHz in fundamentals with a MOS-FET 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 μ A meter movement for positive resonance indications. It includes a phone jack for modulation monitoring. It's smaller and lighter than others, too. Completely portable. 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. The custom molded gray carrying case protects the meter and the 7 color-coded, pre-adjusted, plug-in coils in transit, and makes a handy storage place.

Build it in one evening. Nearly everything mounts on two circuit boards. And when you finish, you'll have the best dip meter around — for a lot less money.

Kit HD-1250, less battery, Shpg. wt. 4 lbs. 59.95



Here's low-cost operating convenience



1 Heathkit Mobile Speaker

8 ohm speaker in rugged steel cabinet. Gimbal mount included. 6 $\frac{1}{2}$ " W x 4 $\frac{3}{4}$ " H x 2 $\frac{1}{2}$ " D. Kit HS-24, Shpg. wt. 4 lbs. 12.95

2 Heathkit VHF Wattmeter

Built-in SWR bridge, adjustable sensitivity. Kit HM-2102, Shpg. wt. 4 lbs. 34.95

HM-2102 SPECIFICATIONS
Frequency Range: 50 MHz to 160 MHz. Wattmeter Accuracy: $\pm 10\%$ of full-scale. Power Capability: To 250 W. SWR Sensitivity: Less than 10 W. Impedance: 50 ohms nominal. SWR Bridge: Continuous to 250. Connectors: UHF type SO-239. Dimensions: 5 $\frac{1}{4}$ " W, 5 $\frac{1}{4}$ " H and 6 $\frac{1}{2}$ " D, assembled as one unit. *Using a 50 Ω noninductive load.

Helpful Ham Books

U.S. Callbook EDP-126 13.95
DX Callbook. EDP-127 12.95
Amateur Tests and Measurements.
EDP-119 5.50
91 Dipole and Long-Wire Antennas — data for 73 different antennas. EDP-180... 4.95
73 Vertical, Beam and Triangle Antennas.
EDP-181 4.95
ARRL Antenna Handbook. EDP-182... 4.00
See page 48 for book-ordering information.



3 Heathkit Wattmeter/SWR Bridge

SWR bridge with adjustable sensitivity. Remote detector permits placement of meter in any location. Cable supplied.

Kit HM-102, Shpg. wt. 4 lbs. 34.95

HM-102 SPECIFICATIONS
Frequency Range: 1.8 to 30 MHz. Wattmeter Accuracy: $\pm 10\%$ of full-scale reading. Power Capability: 10 to 2000 watts. Impedance: 50 ohm nominal. Connectors: UHF type SO-239. Dimensions: 5 $\frac{1}{4}$ " H x 2 $\frac{1}{4}$ " W x 6 $\frac{1}{2}$ " D.

4 Heathkit Coax Switch

Switches RF source to any one of several antennas or loads; unused outputs grounded. Use two to switch up to four different transmitters, receivers, etc. 1.1:1 max SWR to 250 MHz. 2 kW PEP max. power rating.

Kit HD-1234, Shpg. wt. 1 lb. 9.95

5 "Antenna" dummy load

1 kW max input; 1.5-300 MHz w/SWR 1.5:1 or less. Oil not incl.

Kit HN-31, Shpg. wt. 3 lbs. 14.95

6 Heathkit hybrid Phone Patch

Individual rcvr-line & line-rcvr gain controls; VU meter. 30 dB isolation. Matches 3-16 ohm speakers & hi-Z or 600 ohm inputs. VOX or PTT. 2 $\frac{5}{8}$ " H x 9 $\frac{1}{4}$ " W x 3 $\frac{5}{8}$ " D.

Kit HD-15, Shpg. wt. 3 lbs. 36.95



Fully assembled base or mobile microphones

7 Heathkit Desk Mike

Hi-Z dynamic; grip-to-talk. With cables.

HDP-121, Shpg. wt. 4 lbs. 39.95

8 Heathkit Mobile PTT Mike

Rugged, hi-Z ceramic mike ideal for mobile work. With cable, less connector.

GH-12A, Shpg. wt. 1 lb. 10.95



Listen Here with Heathkit VHF/FM!



Famous Heathkit check-by-step building instructions guide you easily through the assembly of this quality VHF/FM scanning monitor.

Heathkit high-band VHF/FM scanning monitor lets you listen in on all the local action

Fire, police, emergency vehicle, marine, weather, amateur two meter FM, commercial radio, mobile and marine telephone calls...that's just some of the fascinating activity on VHF FM. And it's all yours with the Heathkit GR-110 scanning monitor.

Tunes any 9 MHz segment of the 146-174 MHz band, and you can listen to eight separate frequencies in use in your area (check state and local laws regarding use of monitors in vehicles in your locality). In the manual scanning mode you can manually select any channel from 0 through 7, with bright digital readout. The monitor stays locked on that frequency until you manually select another, or go to the automatic scanning mode. In automatic, the monitor rapidly scans all eight channels and locks on to the first one that starts a transmission. It will remain on that channel as long as a signal is present; when the signal stops, the monitor waits four seconds, then continues scanning. A priority channel "0" takes precedence over all other channels; the monitor will return to "0" whenever a station comes on that frequency, even though it might have already been locked on another channel. Front panel pushbuttons let you lock-out any channels, and the monitor automatically bypasses them as it scans.

Easy 4-evening assembly with the famous Heathkit manual, and during assembly you can wire the monitor to display the channel number

only when it is locked on a frequency or continuously as it scans. Line cords and plugs for both 120 VAC and 12 VDC are provided.

Features include built-in speaker plus external speaker jack... antenna jack... gimbal mount... complete front panel controls for volume, squelch, channel selection and scanning mode. Manual gives complete instructions on alignment and crystal ordering.

- Kit GR-110, Shpg. wt. 9 lbs. 99.95
- GRA-110-1, Crystal Certificate, postpaid each 4.95

GR-110 SPECIFICATIONS

Frequency Range: 146 to 174 MHz. Scanning Range: Any 9 MHz segment of frequency range. Sensitivity: Less than 1 μ V for 20 dB of quieting. Usable Sensitivity: Less than 0.5 μ V. Adjacent Channel Rejection: -40 dB (\pm 30 kHz spacing). Intermediate Frequency (IF): 10.7 MHz, crystal filter. IF Rejection: Greater than -80 dB. Image Rejection: Greater than -40 dB. Modulation Acceptance: 7.5 kHz maximum. Antenna Input Impedance: 50 ohms. Scan Rate: Approximately 17 channels per second. Audio Output: 2 watts into a 4-ohm load, with less than 10% distortion. Solid-State Devices: 29 transistors, 8 integrated circuits, 17 diodes. Readout Device: 3015A, 7-segment indicator tube. Power Requirements: AC: 120 volts, 50/60 Hz; 13 watts. DC: 13.8 volts. Squelched .275 amperes. Un-squelched with full audio, 9.8 amperes. Dimensions: 3" H x 8 $\frac{3}{4}$ " W x 9 $\frac{3}{4}$ " D.



Portable VHF/FM monitors

- Kit GR-88, VHF/FM Fire, Weather, Police Monitor, Shpg. wt. 5 lbs. 59.95
- Kit GR-98, Aircraft Monitor, Shpg. wt. 5 lbs. 59.95
- Kit GRA-88-1, AC power supply for both above, Shpg. wt. 2 lbs. 9.95

GR-88 SPECIFICATIONS

Tuning Range: 152-174 MHz. Antenna Input: 50-75 ohms. Sensitivity: 2.0 μ V or less for 20 dB quieting. IF Frequency: 10.7 MHz. IF Selectivity: \pm 40 kHz @ 6 dB down. Image Rejection: 40 dB or greater. IF Rejection: 80 dB or greater. Audio Output: 250 mW at less than 10% distortion. Speaker: 3" round, 24-ohms, permanent magnet. Batteries: Six 1.5 V "C" cells, not supplied. Dimensions: 7 $\frac{1}{2}$ " H x 8 $\frac{3}{4}$ " W x 3 $\frac{1}{2}$ " D.

GR-98 SPECIFICATIONS

Tuning Range: 108-136 MHz. Antenna Input: 50 to 75 ohms. Sensitivity: 1.5 μ V or less for 10 dB signal plus noise to noise @ 1000 Hz 30% modulation. IF Frequency: 10.7 MHz. IF Selectivity: 40 kHz @ 6 dB down; 100 kHz @ 30 dB down. Image Rejection: 40 dB or greater. IF Rejection: 80 dB or greater. Audio Output: 250 mW at less than 10% distortion. Speaker: 3" round, 24 ohm, permanent magnet. Batteries: Six 1.5 V size "C" cells (not included). Dimensions: 7 $\frac{1}{2}$ " H x 8 $\frac{3}{4}$ " W x 3 $\frac{1}{2}$ " D.

Informative books on SWL

Shortwave Listener's Handbook — covers basic equipment to modifications for better listening, characteristics of receivers and antennas, schedules and reception reports, lists major shortwave stations by country and frequency. EDP-196 4.90

ABC's of Shortwave Listening — programs available, how to get the most out of SW listening; advice on receivers & antennas in non-technical terms. EDP-154 3.50

99 Ways to Improve your Shortwave Listening — antennas & their installation, receivers, accessories, listening techniques, special bands, troubleshooting. EDP-155 . . . 4.50

How to Hear Police, Fire and Aircraft Radio — guide to VHF reception; home & mobile installations. EDP-156 3.50

Dial 911 — emergency communications systems and surveillance techniques; specific information on New York City, Los Angeles & Philadelphia. EDP-198 3.95

See page 48 for book ordering information.



Listen There with Heathkit SW gear!

This is the famous Heathkit SW-717 — a fine-performing Shortwave Radio and an ideal kit for a beginner — thousands have already built and enjoyed it!



Here's the one you need to "take the world along"... Includes nickel-cadmium battery with built-in charger

\$169⁹⁵



\$69⁹⁵

Six bands...AM, SSB & CW...plus portability

An ideal standby receiver for your shack... a top performer for general listening too

The Heathkit GR-78 is a favorite of SWLs and hams...and it's loaded with features: 190 kHz to 30 MHz coverage in 6 bands...AM, CW and SSB reception...Automatic Volume Control...switched Automatic Noise Limiter...front panel "S" meter...500 kHz crystal calibrator...receiver/standby switch...muting connection...external antenna connection...headphone jack...built-in whip antenna. Kit includes nickel-cadmium battery with built-in charger.

Kit GR-78, Shpg. wt. 13 lbs. 169.95

GR-78 SPECIFICATIONS

Frequency coverage: Band A, 190 kHz-410 kHz; Band B, 550 kHz-1300 kHz; Band C, 1.3 MHz-3.0 MHz; Band D, 3.0 MHz-7.5 MHz; Band E, 7.5 MHz-18.0 MHz; Band F, 18.0 MHz-30 MHz. Meter: Indicates relative signal strength. Intermediate frequency: Band A thru E: 455 kHz; Band F (Double conversion): 1st IF, 4 034 MHz; 2nd IF, 455 kHz Sensitivity*: 0.2 μ V-10 μ V depending on band and portion thereof. Selectivity: 7.5 kHz \pm 1 @ 6 dB down. Audio output: 300 milliwatts @ 10% distortion. Battery: 9.6 VDC 500 mAh Nickel-Cadmium rechargeable. Battery charge rate: The battery is always being charged at 20 to 25 mA when the built-in trickle charging circuit is connected to an external power source with the Receiver turned off. A full battery charge will be maintained if the Receiver is connected to an external power source and used an average of 5 hours daily at normal listening level. Overall size: 6 1/4" H x 11 1/2" W x 9" D.

*Signal level for 10 dB signal + noise/noise ratio.

4-Band Shortwave just right for the novice

Most components mount on a single circuit board for easy check-by-step assembly in about five evenings

If you've ever thought about kit-building, the SW-717 is for you. It's an ideal introduction to kit construction—and the assembled radio will bring you years of entertainment! 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; switched automatic noise limiting; signal-strength tuning meter; built in AM rod antenna plus connection for SWL antenna. It's the one to buy and build to start a fascinating kit hobby!

Kit SW-717, Shpg. wt. 10 lbs. 69.95

SW-717 SPECIFICATIONS

Frequency Coverage: Band A — 550 kHz — 1500 kHz, Band B — 1.5 — 4 MHz, Band C — 4 — 10 MHz, Band D — 10 — 30 MHz. Meter: Indicates relative signal strength. Headphone Jack: Accents low impedance headphones or external speaker. Loudspeaker: Built-in. Controls: Volume with on/off switch; Mode (AM, Standby & CW); BFO; Main Tuning; Bandsread Tuning; ANL on/off. Power Supply: Transformer operated; full-wave bridge rectifier. Voltage Requirements: 120/240 VAC, 60/50 Hz, 8 W. Dimensions: 5 1/2" H x 14 1/2" W x 8" D.



FOR FASTEST SERVICE — USE THE HEATHKIT HOTLINE!
(616) 982-3411 day or night

Top-quality SWL Accessories

Suprex headphones Excellent for all Heathkit SWL receivers except GRA-43A. Dual coils, wide headband, 600 ohms.

GD-396, Shpg. wt. 1 lb. 5.95

SWL guide Latest edition lists call signs, frequencies and addresses for SW, FM and TV stations worldwide.

GDP-315, Shpg. wt. 2 lbs. 8.95

Long-wire SWL antenna 75' long-wire antenna with 30' of lead-in, all insulators and hardware.

GRA-72, Shpg. wt. 2 lbs. 4.50



Find out how easy it is to build a kit — order the manual. See page 49.

Heathkit Educational Kits and Books



\$16⁹⁵

How to Understand and Use Your VTVM

Kit includes special power supply.

Kit EF-1, Text and power supply (for VTVM owners), Shpg. wt. 3 lbs. **16.95**

Kit EF-1-5, EF-1 & IM-18, 13 lbs. **49.95**

Kit EF-1-6, incl. EF-1 & IM-28, 15 lbs. **59.95**

Manuals Only for EF-1, (single copy) 5.00; (10 or more) ea. 3.00.



\$21⁹⁵

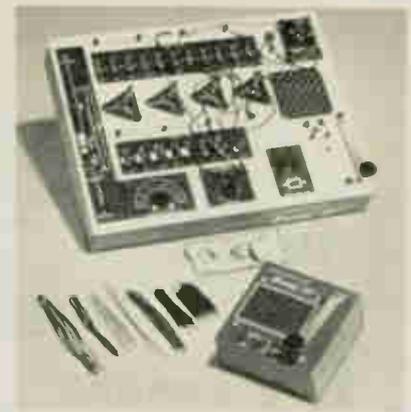
How to Understand and Use Your Signal Generator

This easy-to-understand text covers theory, function and use of RF and audio generators.

Kit EF-3, text, test chassis and parts, Shpg. wt. 3 lbs. **21.95**

Kit EF-3-2, includes EF-3 and IG-102, Shpg. wt. 17 lbs. **62.95**

Manuals Only for EF-3 (single copy) 5.00; (10 or more) ea. 3.00.



"Learn by Doing" Jr. Electronics Workshop

Explore the exciting world of electronics! Learn about basic electronic components... transistors, capacitors, resistors, loudspeakers. Build 35 different circuits, using large, detailed pictorials & famous Heathkit instructions. All circuits use solderless spring terminal connectors and are powered by four "D" cells (not included). A large schematic diagram includes a simple but complete explanation of what each component does. Each part is identified by a drawing and its schematic equivalent as used in circuit diagrams so the builder learns to read schematics while experimenting.

Build Code Flasher, Diode Tester, Transistor Tester, Rain Alarm, Timing Relay, Listening Device, PA Amplifier, Intercom, Voice Relay, Burglar Alarm, Metronome, Siren, Light Meter, Light Sensing Alarm, Target "Hit" Alarm, Light Dependent Flasher, Light Dependent Oscillator, Sound Meter, Transistor Radios, Code Transmitter, Voice Transmitter, Capacitance Relay, Wheatstone Bridge, etc.

Kit JK-18A, Shpg. wt. 10 lbs. **29.95**



\$19⁹⁵

How to Understand and Use Your Oscilloscope

Learn theory and application of the oscilloscope. This specially designed kit includes an experimental chassis for construction of many different circuits for tests used to illustrate and support the text.

Kit EF-2, text, special chassis and parts, Shpg. wt. 3 lbs. **19.95**

Manuals Only for EF-2 (single copy) 5.00; (10 or more) ea. 3.00.



\$32⁹⁵

Basic Electricity Kit/Course

The perfect way to learn about electricity and electronics. Learn theory, do interesting experiments to demonstrate principles. And at the same time you build a handy volt-ohm milliammeter. Your youngsters will enjoy a whole new world of electronics that can start them off on a profitable career.

Kit EK-1, Shpg. wt. 4 lbs. **32.95**

Informative, Heath-approved Books for Your Electronics Library



How to Build & Use Electronic Devices without Frustration, Panic, Mountains of Money, or an Engineering Degree — a practical guide to using op-amps and other electronic devices. EDP-202 **9.95**

Electronic Data Handbook, a convenient single-source of formulas and facts for solving virtually any electronic problem. EDP-171 **5.95**

CMOS Integrated Circuits, easy to understand explanation of how CMOS IC's work and how they are made. Build-it-yourself projects include a digital timer, wrist watch, capacitance meter and more. EDP-197 **4.95**

Metrics for Millions, a simplified, thorough explanation of metric weights and measures — shows how to convert from metric to U.S. and from U.S. to metric. EDP-173 **3.50**

How to Custom Design your Solid-State Equipment shows you how to adapt and combine

scores of "building block" circuits to create the equipment you want. EDP-199 **5.50**

Reference Data for Radio Engineers, a complete and comprehensive reference work that has been a favorite of radio & electronic engineers, universities and libraries for years. EDP-176 **30.00**

TTL Cookbook, explains what TTL is, how it works, and how to use it. EDP-183 **8.95**

IC OP-AMP Cookbook, first book published to cover basic theory of the IC op amp in detail — includes over 250 practical circuit applications, liberally illustrated. EDP-184 **12.95**

The Electronic Invasion — a probing look at electronic snooping including technical explanations of how the equipment operates, written by a former private investigator. EDP-203 **5.45**

Modern Dictionary of Electronics. Clear, non-

technical explanations of more than 18,000 terms. EDP-177 **14.50**

Radio Operator's License Question & Answer Manual, covers what you need to know to obtain a license. EDP-193 **7.45**

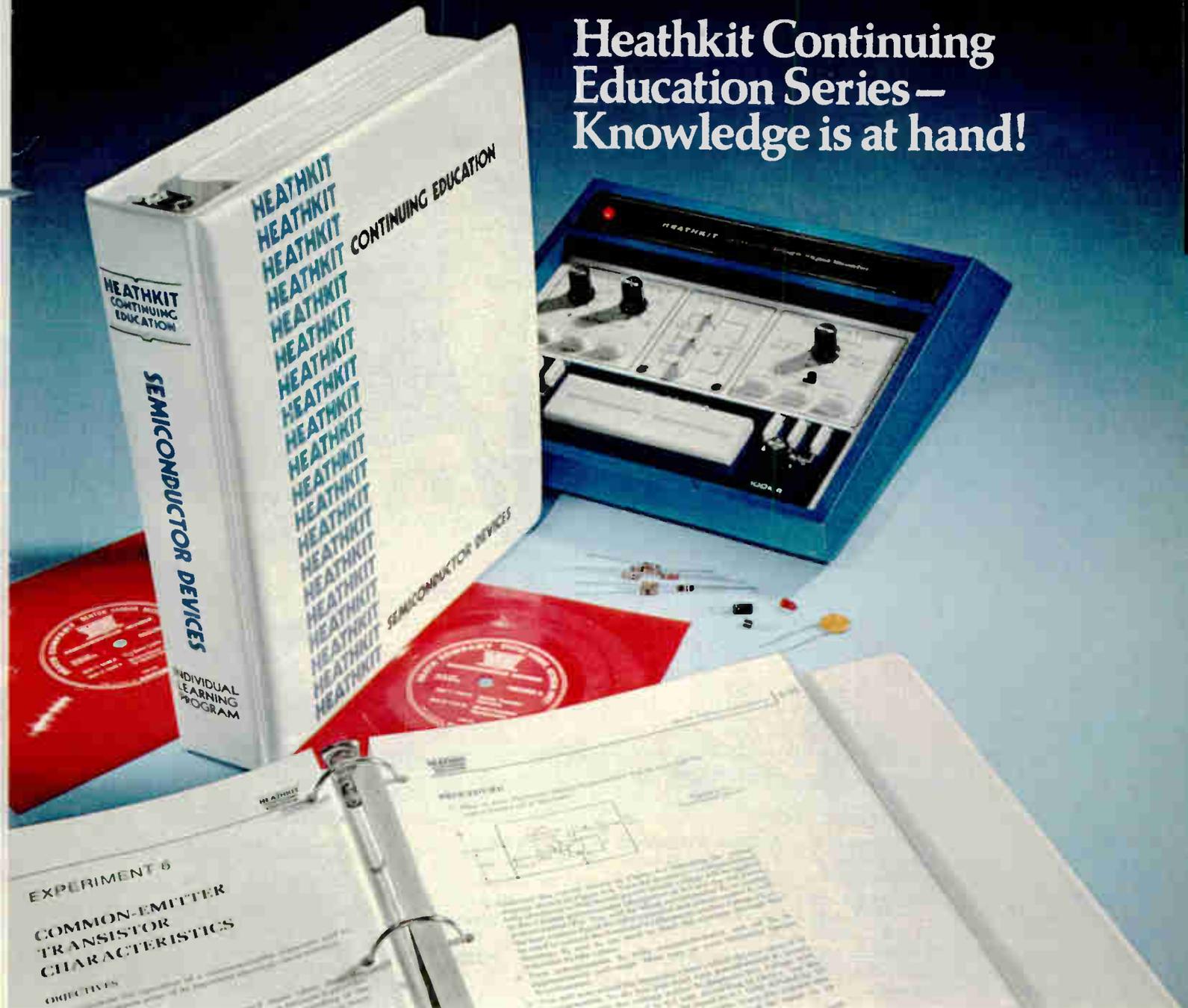
See page 48 for book-ordering information.

NEW! Learn about the hottest subject in electronics — MICROPROCESSORS!

An Introduction to Microcomputers. Microprocessor basics and a complete discussion of popular types 8080, 6800, F8, etc. EDP-217 **7.50**

Microcomputer Dictionary and Guide. Complete reference source on microcomputers. EDP-218 **14.95**

Heathkit Continuing Education Series — Knowledge is at hand!



These Heathkit Programs provide a detailed overview of contemporary electronics for everyone from beginners to experienced engineers.

With the introduction of the Heathkit Continuing Education Series, Heath offers you the opportunity to easily keep pace with the changing, complex world of electronics — and improve your technical competence. Learning is easy and inexpensive with these programs.

All Heathkit Individual Learning Programs (ILP's) are self-instructional electronics programs designed to allow thorough, independent study at your own pace. This is your own personal program with no school and no admission requirement. You study when you want to, for as long as you want to. Should you choose to submit the optional final exam, a passing grade will bring you a Certificate of Achievement and Continuing Education

Units (CEU). Continuing Education Units are a nationally recognized means of acknowledging your participation in non-credit adult education programs.

The ILP system teaches subjects thoroughly and efficiently. Comprehensive learning materials integrated with programmed instruction lessons and kit experiments lead you step-by-step to a thorough knowledge of electronics. Self-evaluation quizzes help check your progress.

Each Individual Learning program incorporates a variety of printed materials and experiments with audio records, to provide an overview of the subject and periodic reviews of pertinent topics.

Each subject is reinforced by actual "hands on" experience to help you learn, and give practical applications of the subject.

The Experimenter Trainers help you perform experiments as you study. They have solderless sockets for fast connections and provide built-in power supplies, signal sources and controls. After completing the programs, use the trainers for breadboarding your own design projects.

As the Continuing Education Series expands, it will include other programs, providing a complete overview of the fundamentals of contemporary electronics. Descriptions of the first programs in this exciting series are on the following pages.

Electronics Fundamentals—3 Basic Programs

Buy all three programs
with the ET-3100 trainer
and **SAVE \$24⁸⁵**

\$154⁹⁵ Complete

\$179.80 if purchased separately



These basic electronics programs take you step by step through the fundamentals of electronics. You proceed at the rate you wish, study completely at your leisure. All three programs require a Heath IM-17 VOM or equivalent, soldering iron, small tools, record player and Heathkit experimenter/trainer. Each program (or equivalent knowledge) is a prerequisite for the next.

Part 1: DC Electronics — electrical fundamentals, theory and practice — a perfect introduction to the subject

- | | |
|---------------------------|--------------------------------------|
| 1. <i>Electron Theory</i> | 6. <i>Electrical Measurements</i> |
| 2. <i>Voltage</i> | 7. <i>Network Theorems</i> |
| 3. <i>Resistance</i> | 8. <i>Inductance and Capacitance</i> |
| 4. <i>Ohm's Law</i> | |
| 5. <i>Magnetism</i> | |

Includes all texts, records, 56 parts for 20 experiments. Av. completion time, 20 hours. 2.0 CEU and certificate for passing optional exam.

Model EE-3101, Shpg. wt. 6 lbs. 39.95
Kit ET-3100, Experimenter/Trainer, Shpg. wt. 6 lbs. 59.95
EE-3101 & ET-3100 together, 17 lbs. . . 89.95

Part 2: AC Electronics — sine waves, inductive and capacitive reactance, impedance, phase shift, transformers and filters

- | | |
|---------------------------|---------------------------|
| 1. <i>AC Fundamentals</i> | 2. <i>AC Measurements</i> |
|---------------------------|---------------------------|

- | | |
|-------------------------------|--------------------------|
| 3. <i>Capacitive Circuits</i> | 5. <i>Transformers</i> |
| 4. <i>Inductive Circuits</i> | 6. <i>Tuned Circuits</i> |

Includes all texts, records, 34 parts for 8 experiments. Av. completion time, 15 hours. 1.5 CEU and certificate for passing optional exam.

Model EE-3102, Shpg. wt. 6 lbs. 39.95
Kit ET-3100, Experimenter/Trainer, Shpg. wt. 6 lbs. 59.95
EE-3102 & ET-3100 together, 17 lbs. . . 89.95

Part 3: Semiconductor Devices — transistors, zeners, SCR's, FET's, digital and linear IC's, LED's, opto-electronics

- | | |
|--|-----------------------------------|
| 1. <i>Fundamentals</i> | 7. <i>FET'S</i> |
| 2. <i>Diodes</i> | 8. <i>Thyristors</i> |
| 3. <i>Zener Diodes</i> | 9. <i>IC's</i> |
| 4. <i>Special Diodes</i> | 10. <i>Optoelectronic Devices</i> |
| 5. <i>Bipolar Transistor Operation</i> | |

6. *Bipolar Characteristics*
Includes all texts, records and 11 parts for 27 experiments. Av. completion time, 30 hours. 3.0 CEU and certificate for passing optional exam.

Model EE-3103, Shpg. wt. 6 lbs. 39.95
Kit ET-3100, Experimenter/Trainer, Shpg. wt. 6 lbs. 59.95
EE-3103 & ET-3100 together, 17 lbs. . . 89.95

Coming Soon — Part 4: Electronic Circuits and Applications

Heathkit Experimenter/Trainer



For the Heathkit Fundamental programs — helps you perform each project quickly and easily. And after you finish the programs, it's ideal for "breadboarding" your own design projects. Has solderless breadboarding sockets for fast, easy component connections, 2-range variable sine and square wave signal source, dual-variable power supplies for positive and negative voltages (both variable over 1.2 to 16 volts, current rating 120 mA, both regulated and short-circuit protected). Built-in 1k and 100k linear potentiometers. Center tapped power transformer secondary provides 30 V rms, 60 Hz for line experiments.

Kit ET-3100, Shpg. wt. 6 lbs. 59.95

ETS-3100, All three programs and trainer, Shpg. wt. 38 lbs. 154.95

Digital Techniques—An Advanced Program



For the experienced technician, engineer or experimenter

Learn digital fundamentals, circuit design, TTL, ECL, CMOS, PMOS, NMOS integrated circuits; SSI, MSI and LSI; ROM's, PLA's; microprocessor theory

1. **Introduction: techniques and uses, binary numbers, digital codes.**
2. **Semiconductor Devices for Digital Circuits.**
3. **Digital Logic Circuits: AND gates, OR gates, NAND/NOR logic, etc.**
4. **Digital Integrated Circuits: TTL, ECL, CMOS, nMOS, pMOS, how to choose.**
5. **Boolean Algebra.**
6. **Flip-Flops and Registers: latches, D & JK flip-flops, storage registers, applications.**
7. **Sequential Logic Circuits: binary, BCD, modulo N, up/down, counters, dividers, shift registers.**

8. **Combinational Logic Circuits: encoders, decoders, exclusive OR, comparators, multiplexers, ROM's, PLA's.**
9. **Digital Design: combinational and sequential circuits, procedures.**
10. **Digital Applications: counters, computers, microprocessors.**

Update your knowledge of electronics with this program in digital fundamentals. Provides a solid background with particular emphasis on circuit design. Covers the latest integrated circuits; ROM's and PLA's; even microprocessors. Helps you learn to design digital circuits for virtually any application.

The program assumes a prior knowledge of electronics fundamentals, either completion of the Heathkit basic electronics programs or equivalent knowledge. It can be successfully completed by most technically oriented people with a math or science background.

The program includes all texts, records and 44 parts for 24 experiments. Av. completion time: 40 hours. Credit: 4.0 CEU and certificate for passing optional exam.

Model EE-3201, Shpg. wt. 9 lbs. 49.95
 Kit ET-3200, Experimenter/Trainer, Shpg. wt. 6 lbs. 69.95
 EE-3201 & ET-3200 together, Shpg. wt. 20 lbs. 109.95



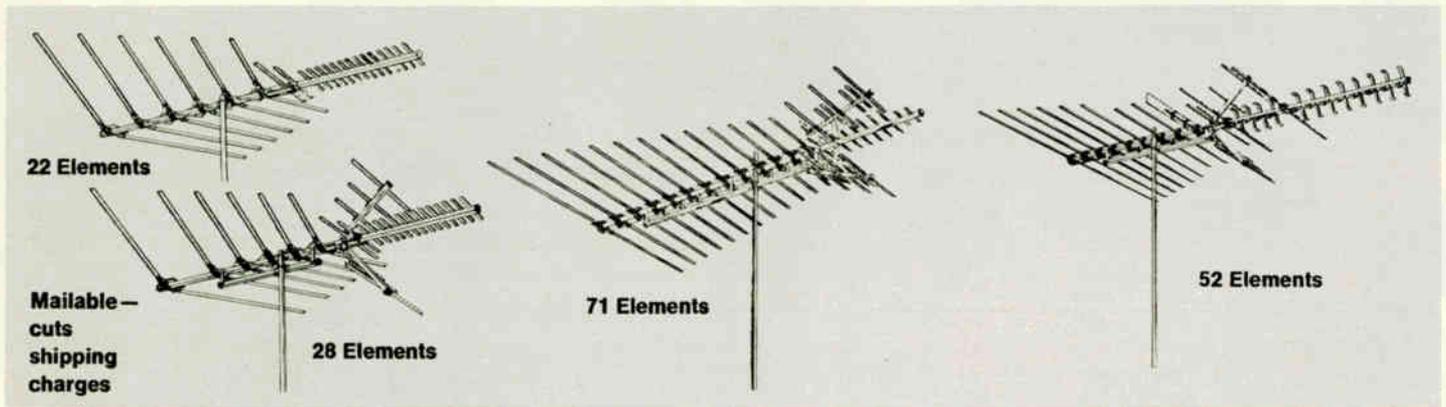
Heathkit Digital Design Experimenter/Trainer

Use it to perform all the experiments in the Heathkit Digital Techniques Program, also to develop projects, build and test prototypes, verify circuit operation, check digital IC's. Has solderless breadboard sockets, four binary data switches, 2 "no-bounce" switches to pulse logic circuits, 3-frequency pulse clock generator, 4 LED's for visual indication of logic states. Three regulated power supplies: +12 V, 100 mA current limited; -12 V, 100 mA current limited; +5 V, 500 mA, overload protected. Accommodates up to eight 14 or 16-pin dual-in-line IC's, also 24, 28 and 40-pin DIP's.

Kit ET-3200, Shpg. wt. 6 lbs. 69.95

Want faster service? Order by phone — call (616) 982-3411 day or night.

Quality antennas and accessories from Heath



“Fringe” Antenna

22-element antenna provides VHF reception up to 75 miles and UHF up to 45 miles. 119" boom, 68" turning radius.

GD-1431, 300 ohm, less mast and cable.
Shpg. wt. 8 lbs. 29.95
75 ohm 34.95*

Deluxe “Fringe” Antenna

Has 28 elements, pulls in signals even in problem reception areas. Provides VHF reception up to 100 miles, UHF up to 60 miles. 131" boom, 80" turning radius.

GD-1441, 300 ohm, less mast and cable.
Shpg. wt. 10 lbs. 39.95
75 ohm 44.95*

“Super” Antenna

A real signal-grabber—provides optimum reception even in the deepest fringe areas. Has 71 elements (26 on VHF, 13 driven; 45 on UHF, 1 driven). Outstanding front-to-back signal rejection; VHF Lo and Hi Band, 23 dB; UHF, 24 dB. Beam width: VHF Lo, 68°; Hi, 33°; UHF, 30°. 196" boom, 116" turning radius, 166" width. All aluminum construction with gold color, weather-protected finish.

GD-1460, 300 ohm; less mast and cable.
Shpg. wt. 24 lbs. Exp./Frt. 89.95
75 ohm 94.95*

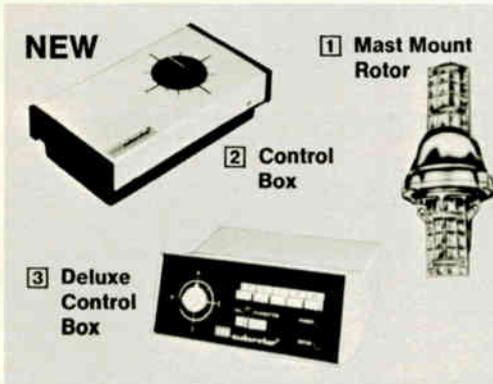
*Order GD-298 and GD-1054 to convert to 75 ohms. Reg. \$8.90 — only \$5 with antenna.

“Deep-Fringe” Antenna

Does the job anywhere but the farthest “boonies”. Really reaches out with its 52 elements (18 on VHF, 9 driven; 34 on UHF, 1 driven). Front-to-back signal rejection of 20 dB on VHF Lo and Hi band; 22 dB UHF. Beam width: VHF Lo, 68°; Hi, 33°; UHF, 30°. 149" boom; 82" turning radius; 102" wide. All aluminum construction with gold color weather-protected finish.

GD-1450, 300 ohm, less mast and cable.
Shpg. wt. 19 lbs. Exp./Frt. 57.95
75 ohm 62.95*

All antennas include removable FM blocking elements.



Cornell-Dubilier Heavy-Duty Auto-Rotor Systems

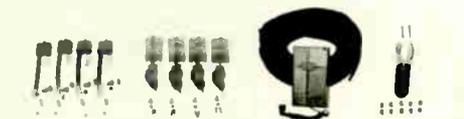
NEW! Antenna rotor system consists of units 1 & 2 shown at left. Pin-points your outdoor antenna for dramatically improved TV and FM reception. Heavy-duty 1 rpm rotor has positive automatic stop, instant reverse. ½" diameter ball thrust bearing supports antennas to 150 lbs. Lower mast clamp accepts ¾" to 2" diameter masts and is removable for direct mounting on rotor plate of tower. Lifetime lubricated bearings. Solid-state control box has 360° rotor control, plugs

into AC outlet. Requires 5-wire cable (not supplied).

GDP-1176, Shpg. wt. 14 lbs. 54.95

Deluxe antenna-rotor system consists of units 1 & 3 shown at left. Features solid-state rotor control with five pre-set push-buttons for instant antenna heading on your favorite stations. Also has manual directional control. Requires 5-wire cable not supplied.

GDP-258, Shpg. wt. 16 lbs. 64.95



Coaxial distributor for 4-room TV/FM network—Takes single coax input from all-channel antenna, amplifies it to feed 4 wall outlets. Includes 200' coax cable, connectors, crimping tool, 4 matching transformers/splitters.

GD-248, 14 lbs., mailable 89.95
GD-328, 100' coax, w/ connectors and antenna boot installed, 5 lbs., mailable 13.95



FM Coupler. takes FM signal off coax ahead of TV set.

GD-308, 1 lb., mailable ... 12.95



75-Ohm Mixer-Splitter. Operate 2 sets from one coax or combine two coax leads.

GD-318, 1 lb., mailable ... 9.95



75/300 Ohm Transformer-Splitter matches one 75 ohm coax to separate VHF, UHF 300 ohm leads.

GD-298, 1 lb., mailable 4.95



All-Channel Matching Transformer snaps on antenna, converts 300 ohms to 75 ohms for coax.

GD-1054, 1 lb., mailable 3.95

These informative books will help you get more TV enjoyment.



Easi-Guide to Color TV—buying a set, installing the antenna, adjustments.

EDP-128 3.50

Questions and Answers About Color TV—covers operation, installation, servicing.

EDP-129 3.95

99 Ways to Improve Your TV Reception. Emphasis on antenna & lead-in problems.

EDP-130 3.50

Home TV-FM Antennas—how to professionally design & install an antenna system.

EDP-186 5.95

See page 48 for book ordering information.

Here's Why Heath TV Gives More Value for Your Money



There's Performance

Heathkit TV's are designed to offer the best performance in each price category — they use first class components like rugged fiberglass circuit boards for long life, sockets for IC's and transistors, precision resistors and capacitors, latest design picture tubes. They're engineered for reliability and quality throughout, and since you build them yourself, you have direct control over how well they're put together!

There's Savings

Because you build Heathkit TV yourself, you become familiar with each circuit and each component in the set. And the troubleshooting sections included in each manual are extensive enough to cover virtually every problem that may arise. Our color TV's even have built-in servicing instruments so you can do convergence, alignment, vertical and horizontal centering and make many other adjustments yourself. You can keep your set in peak condition year after year.

And because you built it yourself, you can service it yourself. With the high price of repairs, that can be a really big savings.

There's Satisfaction

The kind of satisfaction that's "built-in" to every Heathkit black-and-white or color TV is a unique feature you simply won't find in an assembled TV. The knowledge that you yourself have put together one of the most advanced pieces of electronics equipment available will give you a feeling of pride and accomplishment words can hardly describe.

See pages 89-94 for our complete selection of black-and-white and color TV's.



Simulated TV Picture

Use Anywhere B&W TV Set

This 12" (diagonal) B & W portable operates on AC, DC, or its own optional battery supply

At home, the GR-104C plugs into a wall outlet. In the car, camper or boat it works just as well from your 12-volt battery system. Outdoors, it's completely self-contained with the optional rechargeable battery pack.

Features state-of-the-art solid-state design including a single integrated circuit that takes the place of 39 parts, yet is only the size of a transistor. The 110° shell bond picture tube features a 20mm neck that requires less deflection power. The automatic gain control circuit provides rock-steady pictures every time. Up-front speaker puts the sound where you are, and detent tuning on BOTH UHF and VHF gives you total tuning convenience.

Three video IF amplifiers offer superior gain and controlled bandwidth, deluxe 4-circuit VHF "memory" tuner tunes each VHF station with outstanding precision, regulated power supply for drift-free operation.

Has up-front controls, lighted channel indicators, built-in telescoping whip antenna for VHF, loop antenna for UHF, beige high-impact cabinet with black front panel.

Assembly of the GR-104C is a delight for novice and expert alike—most components mount on two roomy circuit boards and a single wiring harness connects the boards to chassis-mounted parts. Both VHF and UHF tuners are factory assembled and aligned.

Kit GR-104C. Shpg. wt. 35 lbs. 149.95

Optional Battery Pack.

Kit GRA-104-3. Shpg. wt. 9 lbs. 49.95



Great take-along entertainer—no need to miss your favorite programs

GR-104C SPECIFICATIONS

Picture Size: 74 sq. in. viewing area, picture diagonal 12". Deflection: Magnetic, 110 degrees, 20 mm neck. Focus: Electrostatic. Antenna Input Impedance: 300 ohm balanced. Tuning Range: VHF, TV Channels 2 through 13, UHF TV Channels 14 through 83. Picture IF Carrier: 45.75 MHz. Sound Carrier: 41.25 MHz. Sound IF Carrier: 4.5 MHz. Video Response: To 3.5 MHz. Audio Power Output: 500 milliwatts into 24 ohm load. Controls (front panel): UHF channel selector; UHF fine tuning, VHF channel selector; VHF fine tuning. OFF/ON volume, brightness, contrast, vertical hold, horizontal hold. Controls (rear panel): Height, Low voltage adjust, AGC. Tube & Semiconductor Complement: 27 transistors, 16 diodes, 1 IC, 1 picture tube. Power Requirements: 110-130 volts, AC, 40 watts; 12 volts DC @ 24 watts. Overall Size: 11½" H x 15¾" W x 9¾" D.

Famous-for-excellence Heathkit Color TV's—



- On-Screen digital channel readout with Optional Digital Clock available
- All-Channel VHF-UHF detent tuning
- New one-button preset picture control restores perfect picture at a touch
- No convergence or purity adjustments ever

Simulated TV Pictures



19" Diagonal Measure GR-500



Color TV viewing becomes an entirely new experience.

19V and 17V screen sizes

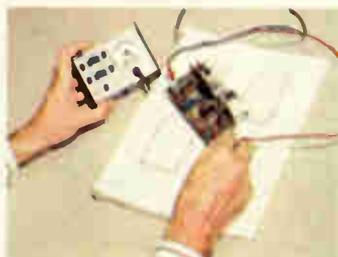
Heath color TV, quite simply, "looks" better than virtually any other color TV in the marketplace, and with good reason. Since you build the set yourself, each and every circuit throughout is perfectly aligned, by you, as you build. Your TV does not have to take the jolts and jars of shipping and handling common to "in the box" sets. And, thanks to Heath's precision engineering and design innovations, you have one of the most technologically advanced color sets available.

The precision in-line gun color tube uses a slotted shadow mask for far greater light output. And the negative matrix screen offers more contrast and brightness than conventional picture tubes. This advanced tube, coupled with design improvements in signal circuits, results in a color picture of simply amazing realism and detail, with particularly dramatic improvement in night scenes due to realistic and accurate light levels.

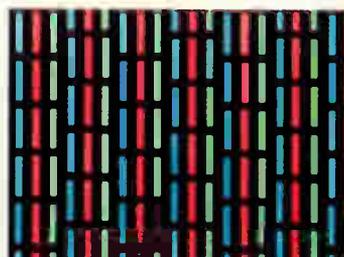
Factory adjusted and sealed static toroid yoke and magnet assemblies end purity and convergence adjustments forever. The VHF tuner features a new mixer circuit with a dual-gate FET for excellent cross modula-



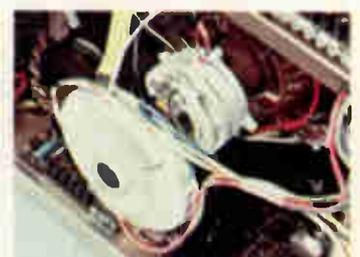
Modular circuit boards plug onto the slide out chassis for really easy servicing.



Separate test meter and troubleshooting manual let you solve most problems yourself—without expensive service calls.



New slot-mask picture tube for greater light output and picture realism.



New static toroid yoke & factory-adjusted & sealed assembly end convergence or purity adjustment—forever.

Charge a kit — no money down on any kit — see page 50 for details.

superior performance you build yourself



17" Diagonal Measure GR-400

Simulated TV Pictures

BUILDING YOUR HEATHKIT COLOR TV IS AN EXPERIENCE TO SAVOR!



The assembly manual is one of the finest

The world-famous Heathkit assembly manual guides you each and every step of the way — from unpacking your kit to turning the set on. Nothing is left to chance. It's an education in itself!



Assembly is a unique, creative pastime

As you proceed each easy step at a time — the kit "comes to life" before your eyes. It's an experience in satisfaction, pride and accomplishment you simply don't get with ready made products!

- all with on-screen digital readout and one-button picture control.

tion performance. The RF amplifier is also a dual-gate FET, resulting in a low-noise figure, high gain and low cross modulation. The four circuits of the tuner (most sets have just three) offer far greater selectivity than ordinary sets.

Each VHF and UHF channel is selectable simply by turning the channel selection knobs until they click to your favorite channel with positive detent tuning action. As you turn the knobs, every channel number is displayed on the screen in big bright digits — totally automatic. An automatic fine tune circuit (AFT) "locks in" on the perfect picture each time a channel is changed, so you can tune without making adjustments.

The one-button pre-set picture control is a very convenient feature, too. Once you set the brightness, contrast, color and tint (by rear preset controls), a touch of the PPC button returns the picture to perfection instantly, no matter how much the front panel controls have been disturbed.

Has front panel controls for on-off volume, tint/AFC and color; thumbwheel controls for contrast and brightness. Other features in-

clude instant-on operation with front panel defeat for vacation-time shutdown; hi-fi output jack and TV speaker defeat switch; 75 ohm VHF antenna input (ideal for cable TV installations).

The circuit and electronic components in these Heath TV's are designed for the utmost reliability, stability and long life. Metal case semiconductors are used in all power output stages for improved circuit reliability. Increased use of protection circuits assures long component life. The high voltage power supply features a voltage tripler circuit for plenty of reserve power. Quasi-complementary-symmetry vertical deflection circuit eliminates the need for an output transformer.

Has slide-out chassis, plus interconnecting cables with plugs and sockets for easy adjustment and service should the need arise. The complete and comprehensive troubleshooting manual and the test meter you use while building the kit let you solve most problems without expensive service calls.

Compare the design features, compare the quality, and you'll see that this generation of Heath color TV is the best value yet.

Kit GR-500, less cabinet, Shpg. wt. 88 lbs., Express/Frt. **499.95**

GRA-500-1, walnut veneer table model cabinet (main illustration), 17 $\frac{1}{4}$ " H x 25 $\frac{1}{2}$ " W x 14" D (17" D including cup), Shpg. wt. 35 lbs., Express/Frt. **39.95**

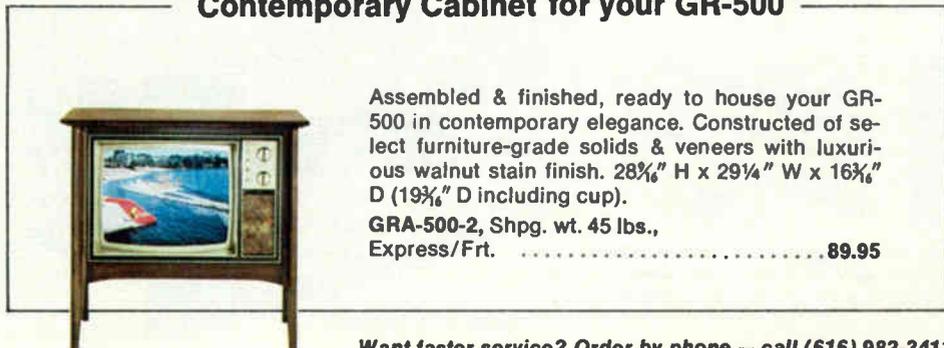
GRA-500-2, floor model cabinet of selected furniture-grade wood solids & veneers with luxurious walnut stain, 28 $\frac{1}{8}$ " H x 29 $\frac{1}{4}$ " W x 16 $\frac{1}{8}$ " D (19 $\frac{1}{8}$ " D including cup), Shpg. wt. 45 lbs., Express/Frt. **89.95**

Kit GR-400, with walnut veneer cabinet (16 $\frac{1}{8}$ " H x 24 $\frac{1}{8}$ " W x 12 $\frac{3}{4}$ " D, 15 $\frac{3}{4}$ " D including cup), Shpg. wt. 104 lbs., Express/Frt. **449.95**

GRA-403-18, roll-around cart. 22" H x 27" W x 15 $\frac{1}{2}$ " D, Shpg. wt. 17 lbs., Express/Frt. **21.95**

Kit GRA-2000-1, Digital Clock Accessory, Shpg. wt. 1 lb. **29.95**

Contemporary Cabinet for your GR-500



Assembled & finished, ready to house your GR-500 in contemporary elegance. Constructed of select furniture-grade solids & veneers with luxurious walnut stain finish. 28 $\frac{1}{8}$ " H x 29 $\frac{1}{4}$ " W x 16 $\frac{1}{8}$ " D (19 $\frac{1}{8}$ " D including cup).

GRA-500-2, Shpg. wt. 45 lbs., Express/Frt. **89.95**

GR-500, -400, SPECIFICATIONS
 Deflection: Magnetic, 90 degrees. Focus: Electrostatic. Convergence: Magnetic. Antenna input impedance: VHF: 300 Ω balanced or 75 Ω unbalanced. UHF: 300 Ω balanced. Tuning range: TV channels 2 through 83. Picture IF carrier: 45.75 MHz. Sound IF subcarrier: 42.17 MHz. Sound IF frequency: 4.5 MHz. Video IF bandwidth: 4.08 MHz at 6 dB down. Hi-Fi output impedance: 2200 Ω . Frequency response: ± 1 dB, 50 Hz to 15 kHz. Harmonic distortion: less than 1% at 1 kHz. Output voltage: greater than 1.0V rms. Audio output impedance: 8 Ω . Output power: 1 watt. Power requirements: 110-130 VAC, 60 Hz, 230W.

Want faster service? Order by phone — call (616) 982-3411 day or night.

Our finest digital design color TV's...



Heath 2000 series color TV's—our finest models feature advanced technology plus easy operation and easy assembly

Build your way to better color TV! The Heath 2000 series TV's combine the very latest technical design advances, the most modern negative matrix picture tube, and a well-thought-out design and assembly procedure that lets you put it all together yourself for pride and satisfaction that's priceless.

This is the set that brought color TV into the digital age — the Heathkit GR-2000. It offers one of the most vivid, realistic pictures in the industry today. And its superior circuitry and outstanding convenience have set new standards. It is the set other manufacturers are trying to imitate.

Total electronic tuning convenience

Simply touch a button on the front panel (or the optional remote control) and the sophisticated programmable digital counter sweeps up or down through any 16 pre-selected stations. And because the tuning is electronic, you eliminate noisy, unreliable turret tuners. Even the channel numbers are displayed electronically, right on the screen. The large, white digits can be positioned anywhere on the screen. They can be adjusted to remain on the screen for up to 1½ minutes, or permanently if you choose. And you can recall them by changing the channel or by tapping the Volume on the optional remote control.

A 25" (diagonal) color picture second to none!

Critics and owners have praised the GR-2000 for a bright, accurate color picture that seems to make programs "come alive". The picture tube provides outstanding brightness and sharpness thanks to its negative matrix and fully-illuminated phosphor dots.

Revolutionary electronics!

The GR-2000's circuitry is some of the most sophisticated in the industry. It was the first TV to utilize a fixed IF filter which virtually eliminates adjacent-channel interference — especially important in urban areas crowded with stations. This advanced filter provides ideally-shaped bandpass and — unlike the "traps" used in most sets — it never requires alignment.

And the GR-2000 uses other advanced circuitry to assure superior performance — improved signal circuits for greater clarity and definition, DC-controlled contrast for reduced interference, an integrated circuit color amplifier for more precise, realistic tints, and an IC automatic gain control for excellent sensitivity, selectivity and noise rejection. You get a consistently excellent picture year after year.

Easy and fun to build!

The completely illustrated assembly manual makes it easy to feel the pride of "building it yourself." Almost all the circuitry mounts on plug-in printed circuit boards and factory-fabricated wiring harnesses minimize point-to-point wiring. You'll find that building a GR-2000 is enjoyable — and you'll be even prouder of its exceptional performance.

Save money on service!

Because you build the set, you can service it. All the circuitry you need is built in — a digital-design dot generator, circuits for pur-

ity and convergence adjustments, vertical and horizontal centering circuits and a test meter. Most circuitry is accessible by pulling out the service drawer. You can keep your set in peak-performing condition with less inconvenience and expense. That alone makes the GR-2000 a bargain!

Optional accessories make your set even more enjoyable!

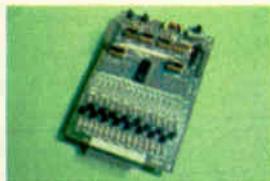
The optional Clock Module adds the time to the on-screen channel readout. The time appears in 1" digits beneath the channel and the clock can be set for 4 or 6-digit readout in 12 or 24-hour formats.

The optional remote control provides wireless selection of channel, volume, tint, color intensity — it even turns the set on and off!

And, if you want the incomparable performance of the GR-2000 in a more compact cabinet, look at the GR-2050 on page 94. It uses exactly the same chassis but with a smaller 21" (diagonal) screen. Either way, you'll own one of the world's finest color televisions.

GR-2000 SPECIFICATIONS

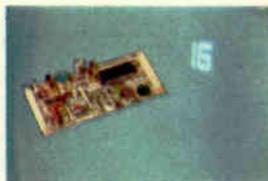
Picture Tube: 25" (diagonal). Viewing Area: 315 sq. in. Deflection: Magnetic, 90 degrees. Focus: Electrostatic. Convergence: Magnetic. Antenna Input Impedance: VHF: 300 Ω balanced or 75 Ω unbalanced. UHF: 300 Ω balanced. Tuning Range: TV channels 2 through 83. (Preset any 16). Picture IF Carrier: 45.75 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: Output Impedance: 2200 Ω. Frequency Response: ±1 dB, 50 Hz to 15 kHz. Harmonic Distortion: Less than 1% at 1 kHz. Output Voltage: greater than 1.0V rms. Audio Output: Output Impedance: 4 Ω or 8 Ω. Output Power: 2 watts. Power Requirements: 110 to 130 volts AC, 60 Hz, 200 watts. Net Weight: 112 lbs.



Programmable Channel Selection through digital up-down counter with computer-like programming board—a breakthrough in new tuning convenience.



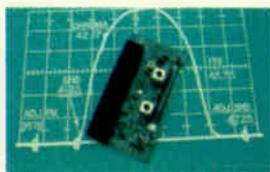
Silent All-Electronic Tuning with new combination UHF/VHF Varactor Tuner located inside the chassis where it is completely shielded.



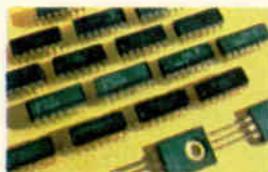
On-Screen Channel Readout in big, bright numerals, with adjustable brightness—easily viewable from across the room at any viewing angle.



On-Screen Clock Readout—gives you the correct time in four or six-digit format, and with your choice of 12 or 24 hour time.



Fixed Filter IF totally eliminates instrument IF alignment forever—gives ideally shaped bandpass — another Heath exclusive.



19 Integrated Circuits (ICs) simplify kit building and permit ultra-sophisticated technology with long term reliability.



Simulated TV Pictures

build yourself a lifetime of entertainment

GR-2000 25" Diagonal Measure Digital Color TV Kit

Less cabinet, order your choice below.

Kit GR-2000. With chassis, picture tube, one speaker.
Shpg. wt. 147 lbs. Exp./Frt. **689.95**

Remote Control for GR-2000.
Kit GRA-2000-6. Shpg. wt. 4 lbs. **89.95**

Digital Clock for GR-2000.
Kit GRA-2000-1. Shpg. wt. 1 lb. **29.95**

Second speaker for GR-2000. Fits in space provided on GR-2000 cabinets (where indicated). Includes all connecting cables.

GRA-2000-7. Shpg. wt. 3 lbs. **6.50**



Finished cabinets for your GR-2000

Compact Contemporary Cabinet. (Shown in major illustration at right.) Solidly constructed of wood solids and veneers finished in luxurious oiled walnut stain. Comes fully assembled with cutout for one speaker. 34 3/8" H x 33 7/8" W x 20 3/8" D (24 1/8" D including cup.) Shpg. wt. 60 lbs.

GRA-2000-8, Exp./Frt. 129.95



Mediterranean cabinet with doors. Accepts 2 speakers. Constructed of solids & veneers; simulated wood-grain base & trim. Dark oak stain. Hardware finished in Windsor Antique Gold tone. Fully assembled, finished. 29 3/8" H x 48 3/8" W x 23" D. (26 1/8" D including cup).

GRA-2000-5, Shpg. wt. 126 lbs., Exp./Frt. 219.95

Early American cabinet. Twin speaker capability. Distressed maple stained wood solids & veneers; simulated wood-grain trim. Hardware has Windsor Antique Gold finish. Fully assembled & finished. 31 3/8" H x 47 3/8" W x 20 1/2" D. (23 3/8" D including cup).

GRA-2000-3, Shpg. wt. 94 lbs., Exp./Frt. 169.95



Contemporary cabinet. Dual speaker capability. Comes completely assembled and finished. Constructed of solids and veneers; oiled walnut stain. 28 3/8" H x 46 3/8" W x 20 3/8" D. (23 3/8" D including cup).

GRA-2000-2, Shpg. wt. 89 lbs. Exp./Frt. 159.95

Mediterranean cabinet. Accepts 2 speakers. Crafted of solids & veneers; simulated wood-grain trim. Dark oak stain. Hardware features Antique Gold finish. Fully assembled and finished. 30 3/8" H x 49 3/8" W x 20 3/8" D. (23 3/8" D including cup.)

GRA-2000-4, Shpg. wt. 92 lbs. Exp./Frt. 169.95

**See page 94 for GR-2050
21V Color TV and Cabinets**



Simulated TV Pictures

Expedited 48-Hour No-Charge Warranty Service Plan for Solid-State TV Modules!

Special service facilities have been established at the factory and all Heathkit Electronic Centers to expedite service and return of Solid-State TV circuit modules within two working days (plus transportation time). If a component proves defective during the 90-day warranty period, the modules will be serviced with no charge for parts or labor. If the problem is due to a construction error or if the 90-day warranty has expired, modules will be serviced at a fixed charge of \$5.00 per module. All picture tubes warranted for two full years.

Ultrasonic Remote Control for GR-2000 and GR-2050



For armchair control of on and off, volume, channel selection, color intensity and tint, activation of digital readout. Includes receiver for in-chassis mounting, hand-held transmitter. Operates to 20 ft.

Kit GRA-2000-6. Shpg. wt. 4 lbs. **89.95**

GR-2050 TV, Cabinets, Music Accessories



GR-2050 21" Diagonal Measure Color TV Kit

Has the same outstanding features and specifications as the GR-2000 (see complete description on pages 92 and 93), but with the popular-size 21" diagonal measure screen. Use the same remote control and digital clock accessories as the GR-2000. Less cabinet, order your choice of space-saving contemporary or luxurious Mediterranean style below.

Easy to build with many modular circuits, more wiring harnesses, fewer point-to-point connections and chassis-mounted parts. Has built-in dot generator, service circuit board, centering and pin-cushioning circuits for easy adjustment and service.

Kit GR-2050. With chassis, picture tube, 1 speaker. Shpg. wt. 122 lbs. Exp./Frt. . . 599.95

Remote Control for GR-2050. See complete description on page 93.

Kit GRA-2000-6. Shpg. wt. 4 lbs. 89.95

Digital Clock for GR-2050. See complete description on page 92.

Kit GRA-2000-1. Shpg. wt. 1 lb. 29.95

GR-2050 SPECIFICATIONS
Same as GR-2000 except Picture Tube: 21" (diagonal). Viewing Area: 226 sq. in.



Simulated TV Pictures



Mediterranean Cabinet. (Shown in major illustration above.) Luxurious, romantic styling. Fully assembled with wood solids and veneers high-lighted with dark oak stain and simulated woodgrain trim. Brown patterned grille cloth. 28 $\frac{3}{8}$ " H x 38 $\frac{1}{2}$ " W x 19 $\frac{3}{4}$ " D. (23 $\frac{3}{8}$ " D w. cup). Shpg. wt. 89 lbs.

GRA-2050-2, Exp./Frt. 149.95

Finished Cabinets for your GR-2050

Space-Saver Contemporary Cabinet. Fully assembled and finished. Wood solids and veneers with luxurious oiled walnut stain; black expanded foam speaker grille in base. 28 $\frac{3}{8}$ " H x 30 $\frac{1}{2}$ " W x 18 $\frac{1}{2}$ " D (22 $\frac{1}{6}$ " D with cup). Shpg. wt. 65 lbs.

GRA-2050-1, Exp./Frt. 119.95

Finished cabinets for the Famous Heathkit GR-900 Color TV

Please allow up to 10 weeks for delivery.



Mediterranean cabinet. Pecan-stained wood solids and veneers, simulated wood-grain base and trim. 30 $\frac{7}{8}$ x 48 $\frac{3}{4}$ x 20 $\frac{5}{8}$ " HWD (23 $\frac{1}{2}$ " D. with cup).

Assembled GRA-404-25. 87 lbs. Exp./Frt. 169.95



Contemporary cabinet. Walnut-stained wood solids and veneers. 30 $\frac{3}{8}$ x 37 $\frac{1}{8}$ x 19 $\frac{1}{8}$ " HWD (22 $\frac{3}{4}$ " D. with cup).

Assembled GRA-401-25. 59 lbs. Exp./Frt. 119.95



Early American Cabinet. Maple-stained wood solids and veneers, simulated wood-grain trim. 32 $\frac{1}{2}$ x 38 $\frac{1}{2}$ x 19 $\frac{3}{4}$ " HWD (22 $\frac{5}{8}$ " D. with cup).

Assembled GRA-403-25. 73 lbs. Exp./Frt. 159.95

Put more pleasure in your playing with Heathkit musical accessories



1 Electronic Metronome

Adjustable from 40 to 210 beats per minute. Volume control. Chart relates tempos to beats per minute. One evening assembly. Requires two 9V batteries.

Kit TD-17, Shpg. wt. 2 lbs. 16.95

2 Here comes the "fuzz"

Add fuzz to your music. Just plug between your guitar and amp. Press footswitch once to turn it on — again to play it straight. Tone, distortion controls. Runs on penlite cell (not supplied).

Kit TA-28, Shpg. wt. 4 lbs. 24.95

3 25-watt Guitar Amp

25 watts EIA music power. Has 2 dual input

channels, double spring variable reverb and tremolo (with footswitches); 2 heavy-duty 12" speakers. $\frac{3}{4}$ " wood cabinet measures 28" W x 9" D x 19 $\frac{3}{4}$ " H.

Kit TA-16, Shpg. wt. 48 lbs. 139.95

4 Our best Guitar Amp

120 watts EIA music power. Full controls. Harmonic modifier for "fuzzy" sound. Spring-type variable reverb. 3 channels, 2 inputs for each. Optional speaker has two 12" woofers & horn driver. 25 $\frac{7}{8}$ " W x 14 $\frac{1}{2}$ " D x 38" H. Includes 20' cable.

Kit TA-17, amplifier only, Shpg. wt. 40 lbs. 199.95

Kit TA-17-1, One speaker system, Shpg. wt. 112 lbs., Exp./Frt. 189.95

Build a Lifetime of Music Entertainment



\$549⁹⁵



*For family fun,
for musical
entertainment
and education,
for sheer pleasure,
there's nothing more
rewarding than a
Heath/Thomas Organ*

Heathkit/Thomas Spinet — exciting performance at a budget price

You get more value for your money with our TO-1160 — two 44-note overhanging manuals with tilted keys, 13-note radial arc pedal rack, 25-watt RMS amplifier and wide-range 12" speaker. And with exclusive Color-Glo keys and our "Quick-Play" organ course, you'll be playing complete songs the first time you sit down. Fingertip controls include a Variable Pedal Volume, Variable Manual Balance; switch tabs for Vibrato, and a new Light Vibrato that gives true orchestral effects. Accessory front-panel on the keyboard has earphone and cassette recorder jacks and an AC power outlet. Plugging in the earphones defeats the main speaker to let you practice anytime without disturbing the rest of the family. Just use a conventional cassette deck to play lessons through the organ, or record your own organ selections on blank cassettes. On the upper manual are Flute 16', 8' and 4'; Trumpet 8'; Oboe 8'; and Violin 8'. The lower manual provides Horn 8'; Diapason 8'; Melodia 8' and Cello 8'. The pedal rack has a Flute 16'-8' combination. Add the Rhythm Section (below) for even more versatility. Cabinet and bench are handcrafted from selected walnut veneers in a Scandia finish, with solid hardwoods at all points that require strength and rigidity. Has plastic woodgrain decorative trim. Assembled, finished cabinet. 44" H x 43½" W x 25" D. Kit TO-1160, Shpg. wt. 233 lbs., Exp./Frt. **549.95**

SPECIAL ORGAN WARRANTY

The tone generators of the Heathkit/Thomas organs on these pages are warranted for a period of five (5) years from the date of purchase.



Add "Rhythm Section" versatility to your organ

Touching a button adds automatic bass patterns, alternating bass pedal notes, complete drum section, piano, guitar, banjo or harpsichord accompaniment and your choice of 8 rhythm patterns.

Kit TOA-60-1, Shpg. wt. 5 lbs. **279.95**



from
\$1145



This Heathkit/Thomas Spinet Organ puts an orchestra in your home

The TO-1260 is our most versatile organ, yet exclusive Color-Glo keys will have you playing complete songs in just minutes. And the Thomas Organ Course included with the TO-1260 is almost like having your own music teacher. A breathtaking range of voices helps you create exciting orchestral effects. And the optional TOA-60-1 (below) lets you add your own "Rhythm Section" for even more fun. It lets you add any of 8 preprogrammed rhythm patterns; piano, guitar, banjo or harpsichord accompaniment on the lower manual; alternating bass pedal notes to fit the rhythm pattern you're using and more. In addition to two 44-note overhanging manuals with tilted keys, the TO-1260 features a 13-note radial arc pedal rack, two 25-watt RMS amplifiers and two 12" speakers. A convenient accessory panel lets you plug in headphones for silent practice, use an external tape deck to play or record, or plug in an external tone cabinet. The handsome cabinet comes completely assembled and finished in your choice of Contemporary or Mediterranean styles. The cabinets are handcrafted using furniture-grade hardwoods with decorative plastic trim and are finished in hand-rubbed walnut (distressed antique in the Mediterranean). Kit TO-1260M, Mediterranean, Shpg. wt. 255 lbs., Exp./Frt. . . **1195.00**
Kit TO-1260W, Contemporary, Shpg. wt. 247 lbs., Exp./Frt. . . **1145.00**

TO-1260 SPECIFICATIONS

VOICES: UPPER KEYBOARD (Solo): Flute 16' Flute 8', Flute 4', Trombone 16', Bassoon 16', Trumpet 8', Diapason 8', Clarinet 8', Oboe 8', Violin 8', Mando (Pre-Set), Harpsichord (Pre-Set), Piano (Pre-Set), Accordion (Pre-Set). **LOWER KEYBOARD — (Accomp.):** Tuba 8', Diapason 8', French Horn 8', Melodia 8', Cello 8'. **PEDAL KEYBOARD —** Bourdon 16', Major Flute 8', String Bass 8'. **CONTROLS:** Solo — Bright, Accomp. — Bright, Solo Sustain — Long, Auto — Sostenuto, Solo O — Tremulant, Solo Flute — Tremulant Accomp. — Tremulant, Pedal Sustain — On/Off, WAH WAH — On/Off, Variable Slide — Pedal Volume, Variable Slide — Reverb Balance, Variable Slide — Percussion Volume, Variable Slide — Manual Balance, Expression Pedal. Dimensions: 37½" H x 44" W x 23½" D.

TOA-60-1 SPECIFICATIONS

PRE-PROGRAMMED RHYTHM PATTERNS: Waltz, Fox Trot, Rock, Soul, Polka, Samba, Bossa Nova, Rhumba. **Controls:** Drums (On/Off), Tempo, Volume. **RHYTHM VOICES:** Add Cymbal, Snare/Tom Tom. **FANCY FOOT:** (Alternating bass pedal notes that fit into rhythm pattern chosen — automatic when foot pedal is held). **Control:** Syncopated or Alternating Bass. **PRE-SET ACCOMPANIMENT —** Voices: Piano (Pre-Set), Guitar (Pre-Set), Harpsichord (Pre-Set). **Controls:** ACC Pre-Set (On/Off), Volume.

"Spring" for these super kit values from Heath



\$89⁹⁵

Deluxe
GD-348

\$69⁹⁵

Low-Cost GD-48

Sun season FUN is a Heathkit Metal Locator!

These Heathkit metal detectors will help you find coins, antiques, buried metal objects of any type, fast 'n easy. They're fun to use, practical too — use to locate buried plumbing pipes, metal cables, etc. before you dig.

GD-348 Deluxe Metal Locator

Heathkit metal locators use a sophisticated "induction balance" system — you don't hear anything until a piece of metal enters the field. Then the tone grows louder as you get closer to the object. Listen through the 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 conveniently located near the pistol grip handle. The shaft telescopes and the search coil folds flat for easy storage in suitcase or optional carrying case.

- Kit GD-348, Locator only, Shpg. wt. 6 lbs. 89.95
- GDA-48-1, 9-volt battery, Shpg. wt. 1 lb. 3.25
- GD-396, 600-ohm Superex headphones, Shpg. wt. 1 lb. 5.95
- GDA-348-1, carrying case, Shpg. wt. 2 lbs. 11.95

GD-48 Standard Metal Locator

The same sophisticated "induction balance" system as our deluxe locator — no tone variations to guess at, because there is no tone until a metal object enters the field. All solid-state circuitry, telescoping shaft, built-in speaker, headphone jack, meter. A single 9-volt battery (not included) supplies power.

- Kit GD-48, Locator only, Shpg. wt. 6 lbs. 69.95
- GDA-48-1, 9-volt battery, Shpg. wt. 1 lb. 3.25
- GD-396, 600-ohm Superex headphones, Shpg. wt. 1 lb. 5.95

FREE

Base or mobile CB antenna when you buy a Johnson CB radio! See page 69.

New

CI-1078 Digital Electronic Miles per Gallon Monitor/Speedometer! See page 9.

New

IP-2718 Three-Output Experimenter Power Supply! See page 57.

New

CRT Tester Rejuvenator!
See page 63.

New

Famous Hobie "Hawk" 8-ft. wingspan R/C glider at a special low Heath price. See page 24. Use it with the Heathkit 3-channel R/C system. See page 21.

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Schlumberger

HEATH COMPANY
BENTON HARBOR,
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See index on page 3.

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