

HEATHKIT

New kit gift ideas for Christmas 1975



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FACTORY MAIL ORDER CATALOG 806

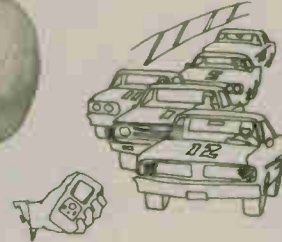
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SEE INDEX ON BACK COVER

A timely kit-gift for sports fans



Actual size!



A removable sunshield makes it easy to read the GB-1201's LED display even in direct sunlight.



New

For quick reference, instructions are summarized on the bottom. Includes an AC adapter/charger & lanyard.

Operate the GB-1201 by hand or use the rear panel jacks to start & stop it electronically by remote control.

Heath's electronic 8-digit Stopwatch has 7 functions with typical accuracy to $\pm 0.003\%$ and resolution to $1/100^{\text{th}}$ of a second for just 99.95

All the range and accuracy you'll ever need — from just $1/100^{\text{th}}$ of a second all the way up to 99 hours, 59 minutes, 59.99 seconds, with quartz-crystal precision. And the rugged GB-1201 is totally electronic with 2 exclusive, Heath-designed PMOS IC counters to give it versatility never before achieved. Bright LEDs show the time clearly and rechargeable batteries take it everywhere.

Seven functions handle timing jobs with ease.

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

Function 2 — Sequential — times each part of an event (each lap, for instance) and displays each separately while continuing to time the overall event. You can even compare the lap times of any participants while still timing the overall event. Ideal for multi-lap races.

Function 3 — Total Activity Time — accumulates the elapsed time for a series of events, excluding time between events. It also maintains a separate count of the total elapsed time including down time or breaks between events. Perfect for auto and plane trips, efficiency studies.

Function 4 — Split — displays the cumulative time to each "split" point while continuing to time the overall event. Particularly useful in ski races, swimming meets.

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

Function 6 — Upcount — counts to a programmed or "learned" time and sends a trigger pulse to the external alarm jack. The same number can be used repeatedly without reprogramming and the count

can be interrupted and resumed at any point. Perfect for administering tests, sports officiating, photographic timing, or to remind you of timed activities.

Function 7 — Downcount — counts from a programmed number to zero, then sends a trigger pulse to the alarm jack. Gives time remaining in easy-to-read digits and the count can be interrupted and resumed at any point. Ideal for yacht races, helps athletes pace themselves in training, and it's valuable for testing, officiating — any timing function. You'll discover dozens of other everyday uses for each function.

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

And much more. Start/stop jacks permit use with external triggering devices such as photoelectric and relay circuits. The Display switch turns the readouts off in functions 1-5 to conserve the batteries and, in functions 2 and 4, switching it off, then on, "unlatches" the display to let you watch the counting process. After an event is finished, pressing the start/stop button lets you alternately display the times in each counter. The high-impact plastic case is contoured to fit your hand and with the nickel-cadmium batteries which are included, it weighs about 8 ounces. Charger is included also.

Easy to build, easy to afford. The GB-1201 is designed so that a first-time kitbuilder can assemble it in less than two evenings. And in the value-conscious Heath tradition, its price is about half that of much less versatile electronic stopwatches.

Kit GB-1201, 3 lbs., mailable 99.95

ICA-2009-1, Felt-lined Naugahyde® carrying case, 1 lb., 4.95

GB-1201 SPECIFICATIONS — Measuring Range: up to 99 hours, 59 minutes, 59.99 seconds. Programmable Range: 9 hours, 59 minutes, 59 seconds (functions 6 & 7). Accuracy: $\pm 0.006\%$, typically better than 0.003% , without instrument alignment. Instrument alignment provides even higher accuracy. Power Requirement: built-in rechargeable nickel-cadmium batteries or 9-volt charger/adaptor operating from 120 VAC, 60 Hz. Battery Life: between charges, approx. 40 hours with displays mostly switched off; approx. 4 hours with displays continuously lighted. Battery Charging: approx. 14 hours for full charge with power turned off. Operating Temperature Range: -10° to $+120^{\circ}$ F. Dimensions: $5\frac{3}{8}''$ H x $2\frac{1}{4}''$ W x $2''$ D.

New Heathkit Holiday Bell-Ringers



Versatile installation. Both models can be wall-mounted — great for kitchen, work room.



High-quality dynamic microphone provides excellent voice pickup up to 10' away.

New Heathkit 2-Way Telephone Amplifiers

Amplified "talk" and amplified "listen", with or without dialer. These two new telephone amplifiers make phone calls easier, more convenient than ever. Talk and listen over the telephone from a distance — no need to be close to the mouthpiece. Great for business and family "conference" calls. In performance, features and value, they equal the best telephone amplifiers you can buy or rent.

Totally electronic VOX control. Voice-activated circuitry instantly and silently switches the GD-1112 and GD-1162 from talk to listen — without "clipping" words.

The GD-1112 and GD-1162 are versatile and easy to use. To answer the phone, just press the Power button; to hang up, press it again. 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.

Pick the model that's right for you. The GD-1112 requires an external phone 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. Both models come with a standard 4-prong plug and connector for telephone company couplers. 9-volt battery (not included) provides power for approximately 700 three-minute calls. Optional adapter for AC operation.

Easy to build. Just one circuit board to wire... complete in just a couple of evenings. The GD-1162's dial mechanism comes completely preassembled. Each assembly manual also includes detailed information on installation. Requirements and rates vary, so check with your local phone company for details.

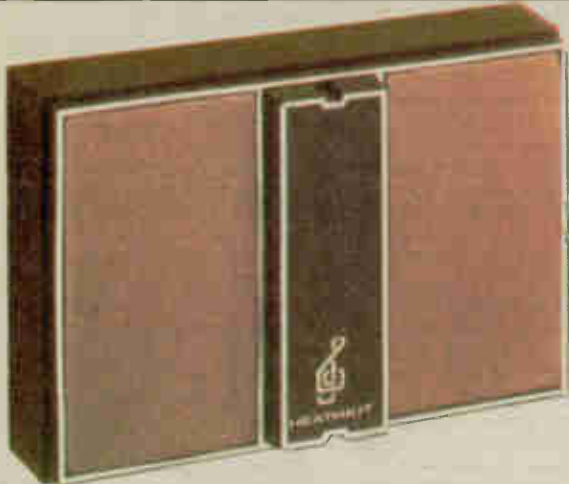
Kit GD-1112, Amplifier, 4 lbs., mailable 49.95

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

GRA-43-1, AC converter, 1 lb., mailable 4.95

GD-1112/1162 SPECIFICATIONS — Microphone Pickup 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, ¼" phone plug and 4-pin telephone plug; GD-1162, 4-pin telephone plug and 15-pin dataphone connector. Recommended Couplers: For GD-1112, use QKT coupler. For GD-1162, use STC coupler. Cable: 6', 4-conductor. Dimensions: 2½" H x 8½" W x 5¾" D. Net Weight: 2 lbs.

NOTE: CUSTOMER-OWNED EQUIPMENT CONNECTED TO TELEPHONE COMPANY LINES MAY BE SUBJECT TO LOCAL TARIFF.



Easy To Program. Just remove decorative front panel to change programming leads and make adjustments.

New Heathkit Electronic "Doorbell" — program it to play your favorite tune

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. The TD-1089 requires a 16 volt, 10 VA transformer (chances are that's already in your present doorbell, so you'll need only one additional wire between the transformer and the TD-1089). The attractive brown plastic cabinet with dull-gold color trim and tan fabric panels is included in the kit. And you can put it anywhere — it plays in any position.

One watt sound power plus extension capability. 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.

Put a song at your doorstep — with the Heathkit Electronic Doorbell.

Kit TD-1089, 4 lbs., mailable 44.95

TD-1089 SPECIFICATIONS — Power Requirements: 16 Volts AC, 50/60 Hz, from standard doorbell transformer (not supplied) with 10 VA Rating. Tonal Range: One octave (13 notes). Tune Length: 16 beats (notes and/or spaces). 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. Distinction Between inputs: Tune length. Controls: (Internal): Speed, Tuning, Volume, Decay. Programming Matrix: 13 notes x 16 beats — same note up to 9 beats. Dimensions: 5¾" H x 8¾" W x 2¾" D. Net Weight: Approx. 1½ lbs. Power Drain: Idle, 6 watts, Maximum Output, 12 watts.

Charge a kit — no money down on any kit — up to 2 years to pay — see order blank for details.

Heathkit Digital Time and Weather

A) NEW Digital Electronic Wind Speed and Direction Indicator... just 69.95

Our new ID-1590 is unique — a wind direction monitor and a highly accurate wind speed indicator with an easy-to-read digital display. It's perfect for pilots, boaters — anyone whose activities are affected by the wind.

A bright, two-digit, planar gas discharge readout displays the wind speed. During construction, you pick the two readout modes you need from three available modes: miles, knots or kilometers per hour. A rear panel switch chooses either of the two selected modes and front-panel lights show which mode is in use. A switch on the rear panel and two circuit board controls calibrate the ID-1590 for highly accurate readings. The wind direction indicator uses incandescent bulbs to mark the 8 principal compass points. Two adjacent bulbs can light at the same time to indicate an intermediate direction, providing 16-point resolution.

Installation is easy. The remote transmitter boom clamps onto any 1 to 1½" rooftop TV antenna mast and is connected to the receiver with optional cable. The rugged Cynolac® plastic case with teak-grain vinyl insert matches our GC-1005 Digital Clock and ID-1390 Digital Thermometer.

Kit ID-1590, 7 lbs., mailable 69.95
 IDA-1290-1, 50 ft. cable, 2 lbs., mailable 7.50
 IDA-1290-2, 100 ft. cable, 4 lbs., mailable 13.50
 IDA-1290-3, 150 ft. cable, 6 lbs., mailable 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.

B) Indoor/Outdoor Digital Thermometer... 59.95

The ID-1390 monitors indoor/outdoor (or any two temperatures) with big, bright digital readout. A switch selects either Fahrenheit or Celsius readings. Another switch lets you choose continuous readings of one temperature or alternate readings of both. In the "alternate" mode, each temperature is displayed alternately for about 4 seconds. In "hold", a single temperature is monitored continuously with updated readings every 4 seconds. The large planar gas discharge readout includes plus and minus signs as well as indoor and outdoor indicator lights. 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 Cynolac® plastic case with teak-grain vinyl inserts matches the GC-1094 digital clock and ID-1590 digital wind speed/direction monitor.

Kit ID-1390, 5 lbs., mailable 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.

C) Heathkit 5-in-1 Weather Station... 89.95

Indoor and outdoor temperatures, barometric pressure, wind speed and direction — all with electronic accuracy and reliability. The Uni-Mag barometer has 2½ times greater point deflection than conventional barometers so you can 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. The ID-1290's walnut-grained plastic plaque can be hung vertically or horizontally and it can also be used as a desk set with the stands included with the kit. The remote transmitter assembly (windcups, 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, 9 lbs., mailable 89.95
 IDA-1290-1, 50 ft. cable, 2 lbs., mailable 7.50
 IDA-1290-2, 100 ft. cable, 4 lbs., mailable 13.50
 IDA-1290-3, 150 ft. cable, 6 lbs., mailable 18.50



Easy to build. Most parts mount on two circuit boards.



Choose two readout modes from mph, knots and kilometers per hour.

D) Budget-Priced Electronic Digital Alarm Clock... now just 49.95

The GC-1005 makes waking up a little easier. It wakes you to a gentle electronic "beep" and a switch on the back panel lets you take additional 7-minute catnaps, up to an hour. Another switch "holds" the time for easy, accurate setting. 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-1005, 4 lbs., mailable . . . Was 59.95 NOW 49.95

GC-1005 SPECIFICATIONS — Accuracy: determined by line frequency. Power Requirement: 120/240 VAC, 60/50 Hz. Dimensions: 2½" H x 7" W x 4¾" D.

E) Save on our deluxe Digital Electronic Alarm Clock with standby battery power... just 79.95

You'll realize the GC-1092A is one of the world's finest 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. If you activated the snooze cycle the night before, the GC-1092A 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.

Deluxe features, kit price—switch-selected 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. A "hold" switch makes it easy to time intervals or set the clock. The handsome low-profile case in luxurious brown tones is compatible with any decor and 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, 5 lbs., mailable . . . Was 82.95 NOW 79.95

F) Big savings on this deluxe Digital Electronic Calendar/Clock... now just 69.95*

In this unique timepiece, we swapped the alarm feature of the GC-1092A for the date—and held the same low kit price.


Instant time and date. The GC-1092D 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. A switch selects 12 or 24-hour time format to suit your taste, and another switch lets you display time continuously or automatically display the date two seconds out of every ten. Or, simply touch the electronically-activated control on top of the case to call up the date display for approximately five seconds any time you want it.

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. Less batteries.

Kit GC-1092D, 5 lbs., mailable . . Was 82.95 SALE 69.95*

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.



Electronic Clocks and Watches — a complete guide to electronic timekeeping with sections on digital circuits, time-bases and more. Includes instructions for two projects.
 EDP-201 6.50*
 *\$10 minimum order for book only purchase. No minimum when book order accompanies kit order. Include 35¢ for each book to cover postage and handling.

New Low Prices on Digital Clocks



A)



Three styled-to-match kits show the time, temperature and windspeed in big, easy-to-read digits. From left to right, the GC-1005, ID-1390 and ID-1590.



B)

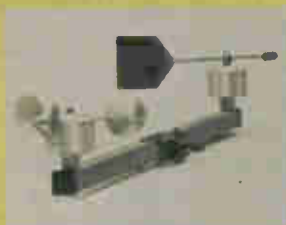
New



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



C)



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

SAVE \$10⁰⁰



D)

SAVE \$13⁰⁰

SAVE \$3⁰⁰



E)

F) The GC-1092A & D can be used with or without their pedestal bases.

Charge a kit — no money down on any kit — up to 2 years to pay — see order blank for details.



Enjoy holiday season sounds

New Heathkit high fidelity AM/FM Table Radio...99.95

- Performance and specifications of component quality — 5 watts, min. RMS at less than 1% total harmonic distortion from 60 Hz to 15 kHz into 8 ohms
- Separate bass and treble tone controls to tailor the sound
- Full range, foam suspension, high compliance speaker in a sealed cabinet
- Smart contemporary styling

Here's high fidelity performance in an AM/FM Table Radio and just in time to top your holiday gift list. The new Heathkit GR-1085 puts the performance and circuitry of Heath's mini systems in a unitary table radio package. Power with low distortion to give you a roomful of clean, clear monophonic sound of the quality you expect from a high fidelity system.

A good radio starts with a good tuner. The new GR-1085 features a combination AM/FM tuner with a 5 μ V sensitivity. And ceramic filters in the AM and FM IFs provide excellent 60 dB selectivity to remove alternate channel interference — clean, quiet reception. The AFC keeps stations locked on frequency. AM and FM antennas are built in and terminals for an external FM antenna are located on the back panel.

You can tailor the sound you most enjoy. Separate bass and treble tone controls, unusual in a table radio, point to the quality design of the GR-1085. Other controls include slider type volume, tuning knob and Off/AM/FM function switch. Everything you need to control the high power and wide response of this sensitive, low distortion receiver.

Building a superior radio has never been easier. Just five easy-to-build circuit boards means you'll complete the assembly in a couple of evenings. And minimal adjustments without instruments will have the unit aligned in minutes...performing to its superb specifications. Looks as good as it sounds. The closed cabinet is constructed of teak-grained, vinyl-covered particle board, and its black, molded front grille of double-knit jersey accented by the chromed dial makes it a sophisticated addition to any decorative scheme.

For quality sound in a table radio, there's only one you can build — the Heathkit GR-1085. Available November.

Kit GR-1085, 19 lbs., mailable 99.95

GR-1085 POWER OUTPUT: 5 WATTS, MINIMUM RMS, INTO 8 OHMS AT LESS THAN 1.0% TOTAL HARMONIC DISTORTION FROM 60 Hz TO 15 KHz.

OTHER SPECIFICATIONS — AM: Tuning Range: 535-1605 kHz. IF Frequency: 455 kHz. Sensitivity: 300 μ V/M for 20 dB S+N/N. Selectivity: 40 dB alternate channel. Hum & Noise: 30 dB below 1 watt. **FM:** Tuning Range: 87.5 MHz to 108.5 MHz. IF Frequency: 10.7 MHz. Sensitivity (3% THD): 5 μ V. Selectivity (IHF): 60 dB. Hum & Noise: 50 dB below 1 watt. **GENERAL:** Power Requirements: 120/240 VAC, \pm 15%, 50/60 Hz, 25 watts. Dial: 2 1/2" circular. Speaker: 4 1/2", 8 Ohm. Controls: Off/FM/AM, Bass, Treble, Volume, Tuning. Dimensions: 7" H x 13" W x 7 1/2" D.

Heathkit AM/FM Digital Electronic Alarm Clock-Radio...129.95

Only one of its kind. The new Heathkit GR-1075 is not just another new clock radio — it is truly unique, the only product of its kind.

All electronic digital clock with alarm. Setting the pace for advanced design features 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. Hours and minutes are clearly divided by the orange colon display. Directly below the minutes display, the letters "AM" or "PM" are displayed.

Adjacent to the AM/PM display is a lighted decimal: when it is pulsating, it indicates the seconds and also shows that the alarm is properly set. When the decimal is constant, it indicates that the alarm is not set to go off. The entire readout features automatic brightness control.

24-hour alarm cycle. You can 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 electronic pulsating "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. Or, flip a switch on the front panel for a few more minutes of sleep from the 7-minute snooze cycle feature, which is repeatable for up to an hour.

Internal stand-by battery supply: Two 9-volt batteries (not supplied) take over during a power interruption 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.

Heath-quality AM/FM radio circuitry. Making it all happen is an impressive array of sophisticated solid state devices; built-in antenna, automatic gain control, fixed ceramic filters, RF amplifier stage, AFC, 300-ohm FM antenna terminals, circuit board design, and factory built and aligned tuner.

Convenient fingertip controls. 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. Rear panel switches include time-hold/time-set; alarm time set; hours advance; minutes advance.

Styled for the sound of the 70's. The care-free textured black plastic cabinet is highlighted by simulated brushed aluminum front panel trim strip, and simulated walnut-grain vinyl end panels.

Kit GR-1075, 10 lbs., less batteries, mailable 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 1/2" W x 8 1/2" D.

A) Here's a solid-state Portable Radio anyone can build...15.95

A great kit idea 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 kitbuilding with this fun-to-build personal portable.

Kit GR-1008, 2 lbs., mailable 15.95

B) Solid-State AM Portable...32.95

This sound value features a six-transistor circuit, RF stage and double-tuned IF stage. A push-pull audio output stage produces exceptionally clean sound. Operates on six "D" cells (not supplied). Brown vinyl coated fiberboard case. Anodized aluminum grill. 7" H x 8 3/4" W x 3 3/4" D.

Kit GR-24, 5 lbs., mailable 32.95

C) AM Portable for Beginners...24.95

The perfect project for novice kit-builders. Kit includes basic radio theory. Radio features 4" x 6" speaker, pre-aligned coil and IF transformer, and built-in antenna. Tan vinyl coated fiberboard case measures 6 1/2" H x 8" W x 3" D.

Kit GR-151B, 5 lbs., mailable 24.95

D) Solid-State AM/FM Portable...46.95

This battery-powered portable plugs in, too, with the optional converter/charger. AM circuitry includes three tuned transformers and amplified AGC. FM circuitry has three IF stages and 5 μ V sensitivity. AFC locks in FM stations. Powered by six "D" cell batteries (not supplied). Brown vinyl coated fibreboard case measures 6 3/4" H x 8 3/4" W x 4" D.

Kit GR-17, 6 lbs., mailable 46.95

GRA-43-1, converter/charger, 1 lb., mailable 4.95

E) Solid-State AM Table Radio...26.95

All solid-state circuitry features seven transistors, three diodes; plus automatic gain control for constant volume. A full wave transformer power supply eliminates the annoyance of line hum. Gold plastic cabinet with brown grille cloth. 5 1/4" H x 10" W x 4 7/8" D.

Kit GR-28, 5 lbs., mailable 26.95

F) Solid-State AM/FM Table Radio...43.95

Budget-priced AM/FM enjoyment. AFC for drift-free tuning. AGC for constant AM volume. Built-in AM and FM antennas. Backlighted tuning dial; green plastic cabinet with dark green grille cloth. 5 1/4" H x 10" W x 4 7/8" D.

Kit GR-48, 5 lbs., mailable 43.95

with a top-quality Heathkit radio



Factory-assembled & tested FM front-end and ceramic filters for 5 μ V sensitivity.



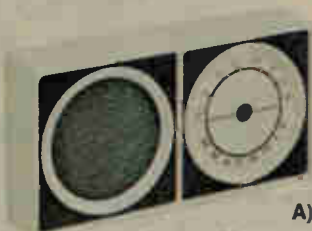
45W⁺ from automobile speaker with polyester damping for smooth, wide-range sound.



Advanced solid-state circuitry includes 4 ICs, 41 transistors, and 35 diodes.



Digital electronic readout tubes plug into circuit board for ease of assembly.



A) Fun-to-build Portable
Portable



B) "Big-sound" AM Portable



C) AM Portable beginners kit



D) Our best portable has AM & FM



E) Build your own AM Table Radio



F) AM-plus-FM Table Radio

Charge a kit — no money down on any kit — up to 2 years to pay — see order blank for details.

"Great gift" Heathkit home appliances



Electronic Air Cleaner...149.95

Protect your family from dust, dirt and pollen. Clean air is important in maintaining the overall good health of your family. And the Heathkit GD-1003 is designed to clean the air of 99% of airborne pollen and 95% of other contaminants...regardless of size or concentration.

The GD-1003 easily cleans the air in a 400 sq. ft. room, and can be carried from room to room — plugging 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.

Cleaning's a breeze, too. Simply flip off the rear grille screen, lift out the collector cell and wash in plain detergent and water. The activated charcoal deodorant filters also slip out easily for replacing when needed. 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 13½" W x 17¾" D.

Kit GD-1003, 55 lbs., mail . . . 149.95



Ultrasonic Cleaner...64.95

Looking for something that's unique, yet practical? Give your family the benefits of ultrasonic cleaning for those almost impossible cleaning chores. The Heathkit GD-1150 Ultrasonic Cleaner makes fast work of deep-cleaning watch parts, most jewelry, glass and contact lenses (except plastic), dentures, and even decorator paint brushes.

Easy, safe to use. To use, you simply fill the stainless steel tank with any safe detergent or solvent you would normally use for the item to be cleaned. Place the object or objects in the tank, set the timer and that's all there is to it. No matter what goes into the ultrasonic tank, 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. There is simply no more efficient method for getting agitating cleansing power into the most minute crevice of the most intricate object. 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 2¾" D. Overall cleaner size measures 11" L x 5¾" W x 3¾" H.

Kit GD-1150, 5 lbs., mail 64.95



A great kit for first-time builders — Heathkit Tabletop Lamp Dimmer...7.95

A great get acquainted kit. 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.

Easy to use. 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, total wattage of lamps should not exceed 300 watts. Makes a great heat-control, too, for pencil-type soldering irons used in circuit board work, installing ICs, etc. Measures 3¼" H x 3¼" W x 3¼" D.

Kit GD-1018, 2 lbs., mail 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.



Heathkit "Wireless" Intercom...34.95

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 transmission — and you can move units from room to room at will.

Each intercom has three channels. In a three-unit installation one station can talk to another without disturbing the third. In a six-intercom system, you can carry on three separate conversations at the same time. Pushbuttons provide channel selection, "Talk" mode, and "Dictate" position to hold channel open for monitoring. Linear slide controls volume, and internal squelch adjustment suppresses noise. Each GD-113 uses about as much current as an electric clock. Attractive light green cabinet measures 4½" H x 8½" W x 6¾" D.

Kit GD-113, 4 lbs., mailable each 34.95



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 4½" H x 8½" W x 6¾" D and 3¾" H x 6" W x 5¾" D. GD-130 has weatherproof crinkle finish, measures 5¾" H x 3¾" W x 2½" D.

Kit GD-110, Master Station, 5 lbs., mailable 44.95

Kit GD-120, Indoor Remote, 2 lbs., mailable 12.95

Kit GD-130, Outdoor Remote, 2 lbs., mailable 9.95

GDA-110-2, 100' 4-conductor cable, 2 lbs., mailable 8.95

GDA-110-4, 100' 2-conductor outdoor cable 2 lbs., mailable 4.95



Heathkit 2-Station Intercom System...32.95

Master station accommodates up to two remotes. Either remote 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. Big 3"x5" combination microphone-speakers for crisp, clear sound. Low-profile cabinets come with plastic feet for desk, shelf or tabletop use, as well as mounting holes for wall mounting if desired. Measures 3¾" H x 6" W x 5¾" D.

Kit GD-140, one Master, one Remote, 4 lbs., mailable 32.95

Kit GD-120, one extra Remote, 2 lbs., mailable 12.95

GDA-110-2, 100' 4-conductor cable, 2 lbs., mailable 8.95

New low-cost Heathkit Auto Intrusion Alarm



Your car is valuable — protect it with the Heathkit Auto Intrusion Alarm...24.95

Protects your car, truck or RV from tampering and theft. Our new 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.

Total protection. The Alarm Unit itself can be mounted almost anywhere and is connected to pushbutton switches on the doors, hood and trunk. The entire system can be armed or disabled by a convenient underdash switch. Two controls in the Alarm Unit set entry and exit delay times so you can enter or leave the car without accidentally triggering the alarm. However, with the system armed, the alarm sounds instantly whenever the hood or trunk is opened. The alarm sounds for approximately two minutes, then resets and repeats the two-minute alarm cycle until the Reset switch on the GD-1157 is flipped or the cause of the alarm has been removed.

The GD-1157 even resists tampering. Once the alarm sounds, the underdash Arm/Disable switch no longer functions and the only way to disable the system is to flip the Set/Reset switch on the 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.

Easy to build, easy to install. Just one simple printed circuit board to wire and the manual gives complete installation instructions. Includes 4 pushbutton switches, mounting hardware and cables. And, to simplify installation, your car's existing courtesy light switches can double as switches for the alarm.

Optional accessories for additional versatility. The 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 GDA-1157-1 Siren Adapter provides an attention-getting "yelping" sound louder than an ordinary car horn. Protect your car easily with this new alarm kit.

Kit GD-1157, 3 lbs., mailable 24.95

Kit GDA-1157-1, Siren Adapter, 2 lbs., mailable 19.95

Kit GDA-1157-2, Horn Relay, 1 lb., mailable 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 1/8" H x 4 3/4" W x 5" D.

A) New Digital Tachometer ...49.95

More responsive and accurate than ordinary meter-type tachs. Faster than the eye can see, the 2-digit electronic Beckman readouts sweep up to your engine's peak performance level. The bright, 1/2"-tall displays can be easily read even in direct sunlight and a dimmer control adjusts their brightness for safe nighttime driving.

You'll discover 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. See the specifications below for the many types of suitable engines.

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 the supplied bracket or tape. Installation is easy, too. With conventional, CD or factory electronic ignitions. Just connect it directly to the primary side of the ignition coil. Order the optional inductive pickup for engines with magnetos or without access to the primary of the coil.

Kit CI-1079, tach., 3 lbs., mailable 49.95

Kit CIA-1079-1, inductive pickup, 1 lb., mailable 5.95

CI-1079 SPECIFICATIONS — Power Requirement: 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; or any engine with an ignition delivering 2, 3 or 4 pulses per revolution. Dimensions: 1 7/8" H x 4 5/8" W x 4 3/4" D.

B) 2-in-1 — Digital Car Clock with 20-hour rally timer...64.95

More versatility and accuracy than any original equipment clock. 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 ten 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 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 a gimbal mounting bracket or you can use the permanent-stick tape to mount the GC-1093 on or under the dash of your car, boat, camper, or motorcycle. You can build the GC-1093 in just two evenings and enjoy accurate timekeeping for years to come.

Kit GC-1093, 2 lbs., mailable 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 7/8" H x 4 5/8" W x 4 3/4" D. Weight: 3 lbs

Charge a kit — no money down on any kit — up to 2 years to pay — see order blank for details.

Save money, save energy with

Diagnose ignition problems on this 5" scope

- Built-in rpm indicator
- Handy clamp-on inductive pickup
- Optional 12-volt inverter

The Heathkit CO-1015 Ignition Analyzer can be used with any standard, transistorized or capacitive discharge system on three, four, six or eight-cylinder engines to detect shorted spark plugs, bad points, defective wiring, worn distributor parts, incorrect dwell time, coil, condenser or transistor or CD circuitry problems. It features a built-in tachometer, constant pattern width circuitry. You select 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. The optional 12-volt inverter mounts permanently to the unit's rear panel. Operation handbook supplied, illustrates typical auto engine waveforms to aid in troubleshooting.

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

CO-1015 SPECIFICATIONS — Power Requirements: 120/240 VAC, 50/60 Hz, 16 W. RPM Range: 400-5000. Cylinders: 3, 4, 6 or 8. Ignition Systems: Standard, Transistorized or Capacitive Discharge. Displays: Parade or superimposed on both primary and secondary waveforms. Vertical Expand: Approx. 2 to 1. Horizontal Expand: Approx. 10 to 1. Sweep Length: (Referenced to Calibrate Position): ±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 ±5% of full scale. Dimensions: 7" H x 10½" W x 17½" D.



159⁹⁵

New stainless steel adapter allows you to use the CO-1015 with GM High Energy Ignitions.



29⁹⁵

Deluxe Timing Light flashes brighter than daylight

Handy inductive pickup snaps around #1 plug wire. Bright Xenon bulb can be seen in daylight. Rugged insulated blue plastic housing. Circuit protected against reversed polarity. Comes with all cables, pickup, and clips.

Kit CI-1040, 4 lbs., mailable **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. Connecting cables: 7-ft. battery cable with clips. 5-ft. trigger pickup cable with clips. Power requirements: 12 VDC automotive storage battery or separate 15 VDC power supply with 1.5 amp capacity. Dimensions: 6½" 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. Includes adapter for distributor cap hook-up. Insulated housing, circuit protected against reversed polarity.

Kit CI-1020, 3 lbs., mailable . . . **19.95**

CI-1020 SPECIFICATIONS — Useful light range: Up to 2 feet in daylight. Engine speed range: Full flash brightness up to 2000 rpm. Triggering requirements: Direct connection to number one spark plug of engine ignition system. Connecting cables: Battery cable with clips (7 feet). High voltage cable with clip (5 feet). Adapter/connector: Connects to either a spark plug or distributor. Power requirements: Automotive storage battery or separate 15 volt DC power supply. Size: 6½" H x 2" W x 10" L.



Check your car's fuel efficiency — Heathkit Exhaust Gas Analyzer

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

Kit CI-1080, 6 lbs., mailable **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. Accuracy: Within 1 Air-Fuel Ratio depending on fuel used. Meter: 4½", 100-0-100 µA. Connectors: Battery cord, 7 feet. Sensor cord, 21 feet. Exhaust flexible tube, 30 inches. Power Requirements: 6-volt or 12-volt car battery, less than 150 mA. Weight: 4 lbs., 12 oz.



64⁹⁵

15-Amp Automatic Battery Charger

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

Kit GP-1044, 23 lbs., mailable **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: Charger shuts off when voltage at terminals reaches 14.5 volts. Power Requirement: 110 to 130 VAC, 60 Hz. 1450 watts at 50 ampere charge rate. 250 watts at 15 ampere charge rate. Dimensions: 6½" H x 11½" W x 7¾" D.



10-Amp Automatic Charger

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

Kit GP-21, 13 lbs., mailable . . **36.95**

GP-21 SPECIFICATIONS — Charge rate: 10 amperes maximum at 120 VAC line, decreasing to leakage rate of battery. Output voltage: Between 13.2 VDC and 13.6 VDC depending on battery condition. Power requirements: 105-130 VAC, 60 Hz, 200 watts maximum (at 10 ampere charge rate). Dimensions: 5½" H x 9" W x 6¾" 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**



Heathkit Auto Test Gear

Save up to 30.00 on this portable 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 $\pm 3\%$ on all ranges over a wide temperature range. Three C cells supply power, with no drain unless leads are hooked up. All necessary leads and accessories included.

Kit CM-1050, less batteries, 8 lbs., mailable **69.95**

Assembled WM-5100, includes batteries, 9 lbs., mailable **Was 109.95, Now 79.95**

CM-1050 SPECIFICATIONS — Voltmeter ranges: 0-3.2 V DC, 0-32 V DC, $\pm 3\%$ of full scale. Ohm-meter: Two ranges: R x 1 (100 Ω center scale). R x 100 (10 k Ω center scale, $\pm 3^\circ$ arc). Tachometer: Two ranges: 0-1200 rpm, 0-6000 rpm, $\pm 3\%$ of full scale. Dwell meter: Two ranges: 0-45 $^\circ$ (on 0-60 $^\circ$ scale). 0-60 $^\circ$, $\pm 3\%$ of full scale. Amperes: -5 to +90 amperes DC, $\pm 3\%$ of full scale. Spark output: 0-50. Point resistance: Good/Bad. Alternator: Good/Bad. Condenser: 0.22 μ F, 10%. Accuracy: $\pm 3\%$ of full scale. Temperature coefficient: (Tref = 77 $^\circ$ F): Change less than $\pm 5\%$ of full scale over the temperature range of 32 $^\circ$ -120 $^\circ$ F (except Alternator -65 $^\circ$ -83 $^\circ$ F). Operating temperature range: RPM and Dwell: 0-140 $^\circ$ F with alkaline batteries. 32 $^\circ$ -140 $^\circ$ F with zinc-carbon batteries. All other functions: 0-140 $^\circ$ F. Battery Life: 100 hours average (with intermittent use of Low Ohms function). Meter: 6", 200 μ A, 105 $^\circ$ movement. 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). For use to 0 $^\circ$ F: Three 1.5V, C-cell, alkaline batteries (NEDA #14A). Dimensions: 7 $\frac{1}{2}$ " H x 10 $\frac{1}{2}$ " W x 8 $\frac{3}{4}$ " D.



69⁹⁵ Kit

79⁹⁵ Assembled

SAVE 27%
on assembled version



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. Uses 3 "C" cells, (not supplied).

Kit CM-1045, 5 lbs., mailable . . **42.95**

CM-1045 SPECIFICATIONS — Voltmeter: 0-20 V DC. Ohm-meter: 0 to 100 k Ω (10 k Ω center scale). Tachometer: Two ranges: 0-3000 rpm, 0-15000 rpm. Dwell meter: Four scales: 1 cylinder; 90 $^\circ$ -360 $^\circ$; 2 cylinder; 40 $^\circ$ -180 $^\circ$; 3 cylinder; 30 $^\circ$ -120 $^\circ$; 4 cylinder; 20 $^\circ$ -90 $^\circ$. Continuity: Lamp indicator. Operating temperature range: 0 $^\circ$ F-140 $^\circ$ F with alkaline batteries. 32 $^\circ$ F-140 $^\circ$ F with zinc-carbon batteries. Meter accuracy: Ohmmeter: ± 3 degrees arc at 76 $^\circ$ F, ± 5 degrees arc at 0 $^\circ$ F and 140 $^\circ$ F. Other functions: $\pm 3\%$ at 76 $^\circ$ F, $\pm 5\%$ at 0 $^\circ$ F and 140 $^\circ$ F. Power sources: Three 1.5 V C batteries. Dimensions: 9 $\frac{1}{4}$ " H x 9 $\frac{3}{8}$ " W x 5 $\frac{1}{4}$ " D.



Hanson Basic Tester Set

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, 3 lbs., mailable **11.95**



Three-in-One Tuneup Meter

29⁹⁵ Kit

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 since the engine provides both signal and power.

Kit CM-1073, 5 lbs., mailable **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 requirements: 10 mA approximate average current. Meter: 4 $\frac{1}{2}$ ", 1 mA (100 degree movement). Accuracy: $\pm 3\%$ of full scale. Dimensions: 4 $\frac{1}{4}$ " H x 8 $\frac{1}{2}$ " W x 7 $\frac{1}{4}$ " 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 only, 16 lbs., mailable **99.95**

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

CTW-1170 SPECIFICATIONS — Test voltage: 16.5 VDC. Sense voltage: Adjustable 0-17 VDC. Current through regulator under test: 3.5A and .26A. Voltmeter: 0-20 VDC $\pm 3\%$. Holder temperature: 118 $^\circ$ C (240 $^\circ$ F) within 5 minutes. Operating temperature range: 0-40 $^\circ$ C. Short circuit current: 0.1A. Power requirements: 120 VAC, 60 Hz, 150W. Case: Aluminum. Dimensions: 7" H x 11" W x 7" D.

Automotive Electronics — a look at the state-of-the-art, plus a complete explanation of your car's electrical & ignition system. EDP-162, **6.95***

Auto Engine Tune-Up — a complete how-to-do-it guide to car engine tune-up, including carburetion & ignition. EDP-163, **6.75***

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, tells everything you ever wanted to know about repairing your own car — complete specs & tune-up data on all U.S. cars 1967 to 1975. EDP-168, **11.95***

Small Gasoline Engines Training Manual — theory, design & operation of every domestic & foreign made small 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***

*\$10 minimum order for book only purchase. No minimum when book order accompanies kit order. Include 35¢ for each book to cover postage and handling.

Charge a kit — no money down on any kit — up to 2 years to pay — see order blank for details.

Kit-form automotive & aircraft accessories



Heathkit Emergency Strobe Light helps take the danger out of highway mishaps...29.95

Next time your car stalls, or you have to pull off the highway to change a tire, you can be prepared. The new Heathkit GD-1026 Emergency Strobe Light is a portable high-intensity arc discharge flasher specifically designed for use as a highway emergency warning or signal light.

Easy to use. Just insert the cigarette lighter adaptor plug provided into your car lighter. A 12 ft. cord lets you place the flashing light in any spot on the car — on the roof, fender, hood, trunk lid, any place that's convenient. The non-marring magnetic base plate holds the strobe securely in position. The highly visible flashing strobe with amber dome lens warns oncoming traffic of danger ahead. The entire unit is constructed of high impact plastic that is both moisture and corrosion resistant. And the cord coils neatly into the plastic base so that the unit can be stored away in the trunk, ready for instant use.

Kit GD-1026, 3 lbs., mailable29.95

GD-1026 SPECIFICATIONS: Supply voltage range: 13.8 VDC \pm 20%. Power consumption: 5 watts nominal. Flash voltage range: 450 VDC \pm 20%. Flash repetition rate: greater than 1 per sec. Operational temperature range: -30°C to +60°C.



Most parts mount easily on a single circuit board for one-evening assembly.



12 ft. cord with car lighter adaptor plug coils neatly into plastic base.

Heathkit Aircraft Strobe Light for aircraft, emergency vehicles, boats, markers...64.95

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 3 3/4" 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.

Dozens of uses. For marine foul-weather anti-collision protection; atop antennas and tail buildings; a highly visible marker light. Optional amber or red lens, below, for emergency vehicles.

Kit OL-1155, (with clear lens), 3 lbs., mailable64.95

OLA-1155-1, Red/clear lens, 1 lb., mailable11.95

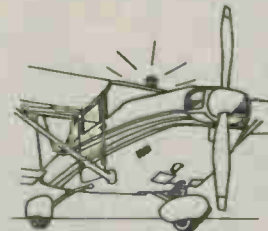
*OLA-1155-2, Red lens, 1 lb., mailable8.95

*OLA-1155-3, Amber lens, 1 lb., mailable8.95

*OLA-1155-4, Blue lens, 1 lb., mailable8.95

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

OL-1155 SPECIFICATIONS—FAA Design Approval: Under STC SA2719WE for all Cessna 182 aircraft prior to S/N 53599 & STC SA2720WE for all Cessna 210 aircraft prior to S/N 57481. **Power requirements:** 12 VDC negative ground only, 1.5A. **Dimensions:** 6" H x 3 1/4" diameter (mounting plate — 5 1/2" diameter).



Optional lenses offer added versatility to the OL-1155.



Heathkit Siren/PA System Now kit or assembled

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 4 1/2" x 4 1/2" x 13" behind grille. Note. Please check the required standards for mobile sirens in your area.

Kit GD-18, Siren/PA Amplifier, 6 lbs., mailable . . .64.95

Assembled **WD-5130**, assembled siren/PA amp, 6 lbs., mailable 89.95

Assembled **GDA-18-1**, exterior horn, 10 lbs., mailable62.95

Kit **GDA-18-2**, concealed horn, 11 lbs., mailable62.95

Assembled **WDA-5130-2**, concealed horn, 11 lbs., mailable74.95

GD-18A (GD-18 & exterior horn), 16 lbs., mailable119.95

GD-18B (GD-18 & concealed horn), 16 lbs., mailable119.95



Heathkit Cab-to-Camper Intercom...29.95

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, 5 lbs., mailable29.95

GDA-160-1, Accessory Plug, 1 lb., mailable4.50



Heathkit assembly manuals are famous for their simplicity and completeness



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



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



Powerful 1/2 hp motor easily opens the heaviest residential doors.



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



Build and install this "economy" chain-drive opener over the weekend...119.95

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 coding to prevent interference from neighboring units. Includes "doorbell" button & wire for manual door operation.



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.

Garage door opener kits for year 'round convenience

Heathkit deluxe garage door opener with pre-assembled transmitter & receiver...149.95

The last word in convenience and safety. Just touch the button on the wireless transmitter in your car — your garage door opens and the light turns on. Touch the button again when you're inside, the door closes, and the light stays on long enough to see you safely inside your house before automatically turning itself off. Door travel reverses, returns to full open if it is obstructed while closing. Adjustable slip clutch provides opening safety. Self lubricating screw drive & husky 1/2 hp motor assure quiet dependable operation.

Assembles in a couple of evenings. It 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 door operation.

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

SPECIFICATIONS: 120" L x 12" H x 9" W. 117 VAC 1/2 HP. Open and Close Time: Approx. 12 seconds. **Safety:** Door travel reverses, returns to full open position, and stops if obstructed while closing. **Mounting Clearance:** 3" above highest point of door travel. **Safety Lamp:** 75 watt max., automatically turns on when mechanism is activated. Delay circuit keeps lamp on 1 to 3 minutes after motor stops. **UHF TRANSMITTER SPECIFICATIONS:** Powered by standard 9-volt battery. RF Frequencies: 290 to 320 MHz. **Useful Temperature Range:** -50° F. to +140° F. **UHF RECEIVER SPECIFICATIONS:** Powered by 24 VAC from opener mechanism. Usable on any mechanism having 24 volt AC NEC class II circuit. **R.F. Frequencies:** 290 to 320 MHz. **Useful Temperature Range:** -55° F. to +140° F.

- Kit GD-309A, System with 1 transmitter, 51 lbs., mailable 119.95
 - Kit GD-309-B, System with 2 transmitters, 51 lbs., mailable 134.95
 - Kit GDA-309-1, Mechanism only, 52 lbs., mailable 89.95
 - Kit GDA-309-2, Adaptor for jamb & pivot door, 3 lbs., mailable 4.95
 - Kit GDA-309-3, Adaptor for vertical-opening 1-pc. "California" style doors, 4 lbs., mailable 9.95
- (To order additional transmitters & receivers, see listing under GD-3209A above.)

SPECIFICATIONS: 123" L x 10" H x 8 1/2" W, 120 VAC 1/4 HP. Open and Close 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 reverse, returns to fully open position, and stops if obstructed while closing. **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.

Charge a kit — no money down on any kit — up to 2 years to pay — see order blank for details.

Put Heathkit electronics aboard

A) The world's first Digital Radio Direction Finder — designed to help solve your navigation problems... 239.95

- Accurate digital frequency readout pinpoints AM & beacon stations — virtually eliminates waiting for station identification
- Exceptionally "hot" receiver really pulls in stations even on the difficult LW beacon band
- Covers 190-410 kHz LW band plus standard AM broadcasts
- Operates from boat's 12 VDC power or its own optional batteries

Bring your boat into the digital age with the unique Heathkit MR-1010. Big, bright digits show you the frequency to which it's tuned. That means you can identify most AM stations without waiting for an ID — even where the band is crowded. On the beacon band, you can dial to the exact frequency you want, even if the transmitter is in its "off" cycle. And the highly sensitive receiver even zeroes in on weak stations — if it's in range, you'll hear it loud and clear.

The MR-1010 is easier to use than conventional RDFs. The Beckman planar gas discharge displays are easy to read even in direct sunlight. And for maximum safety and convenience, they dim automatically at night. Finding your bearings is easy, too, thanks to the big azimuth ring marked in 2° increments and a generous 7-inch rod antenna. A lighted meter provides accurate null indications and a control adjusts meter sensitivity to allow accurate readings for weak or strong stations. The telescoping sense antenna completely eliminates 180° ambiguity. Overall, bearing accuracy is an impressive ±3°.

Versatile 2-way power options. The MR-1010 is designed to be used with your boat's 12 VDC electrical system — or it becomes completely portable with its own built-in power source consisting of 6 "D" cell flashlight batteries (not included). To prolong battery life, the digital readout display automatically shuts off after approximately 20 seconds — but can be recalled instantly at the touch of a front-panel switch. When operating from ship's power, the digital readout can be left on or off. And while it's really a precision navigational aid, the MR-1010 can double as a great sounding AM radio.

For the latest development in marine navigation equipment, put the MR-1010 on your bridge this coming season.

Kit MR-1010, less batteries, 14 lbs., mailable 239.95

MR-1010 SPECIFICATIONS — Bands: 190-410 kHz (LW); 535-1605 kHz (AM). Sensitivity: Typically 30 μ V/m (AM); 60 μ V/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); 110 mA (meter only); 30 mA (radio at typical listening level). Dimensions: 7¼" H x 11½" W x 12" D.

B) Digital depth sounder... 149.95

Accurate depth readings at a glance. Dual-range 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, 7 lbs., mailable 149.95

Kit MI-101-2, With high speed transom transducer, 6 lbs., mailable 149.95

MI-101-1 & -2 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: ±2%, ±1 digit. Current drain: 300-500 mA. Power requirements: 10-17 VDC @ 500 mA. Transducer: Barium titanate ceramic element encased in watertight housing. Dimensions: 2¼" H x 6¼" W x 8½" D (less gimbal hardware).

E) Sniffs out deadly gas fumes in your bilge — Heathkit Fuel Vapor Detector... 69.95

A "must" for every powered craft, the Heathkit MI-25 Fuel Vapor Detector 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 are also provided for control of bilge blower or additional warning devices.

Kit MI-25, 3 lbs., mailable 69.95

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.

F) Economy power inverter... 39.95

Operates electric razors, lamps and other small appliances from 12-volt input. Supplies 117 VAC square wave with up to 175 watts continuous at 12 volts. Not recommended for equipment with high starting current or sine wave AC. 25-amp fuse.

Kit MP-10, 8 lbs., mailable 39.95

G) 4-function Foghorn/Hailer... 99.95

The Heathkit MD-19A wraps up a foghorn, hailer, bothorn and intercom, all in a single inexpensive package. Features include 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, 15 lbs., mailable . . 99.95

Kit MDA-19-1, remote speaker, 2 lbs., mailable 11.95

MD-19A SPECIFICATIONS — Output power: 55 W peak. Boat horn frequency: Approx. 530 Hz. Foghorn frequency: Approx. 390 Hz. Foghorn rate: Approx. 2-90 sec., variable. Foghorn duration: Approx. 2-20 sec., variable. Speaker: 8 ohm weather resistant horn. Microphone: Ceramic with push-to-talk switch. Controls: Call volume; Listen volume; Station select; Function; Foghorn rate and duration. Power requirements: 12 VDC nominal, 4.5 A max. Idle current: 750 mA or less. Dimensions: 4¾" H x 9¾" W x 9¼" D. Color: White wrinkle and dark blue.

C) Deluxe dual-range depth sounder... 99.95

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. Two switch selected ranges make depth readings to 240 ft. easier, and give you more accurate readings in waters of 60 ft. or less.

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 that lets the super-bright neon indicator light stand 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, 8 lbs., mailable 99.95

Kit MI-1031-2, sounder with transom transducer & 25' cord, 7 lbs., mailable 99.95

MI-1031 SPECIFICATIONS — Frequency: approx. 200 kHz. Accuracy: Within 2% of actual depth. Transducer: Barium titanate ceramic element encased in watertight housing. Power requirements: 0-60' range, 225 mA @ 11-15 VDC; 0-240' range, 125 mA 11-15 VDC with one return pulse. Dimensions: 6½" H x 5¾" W x 7¼" D.


D) Economy depth sounder... 69.95

Single-range version of the MI-1031. Reads depths up to 240 feet. Same features as MI-1031, but single range and no alarm.

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

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

Take these valuable reference works aboard... along with your favorite Heathkit Marine Gear.

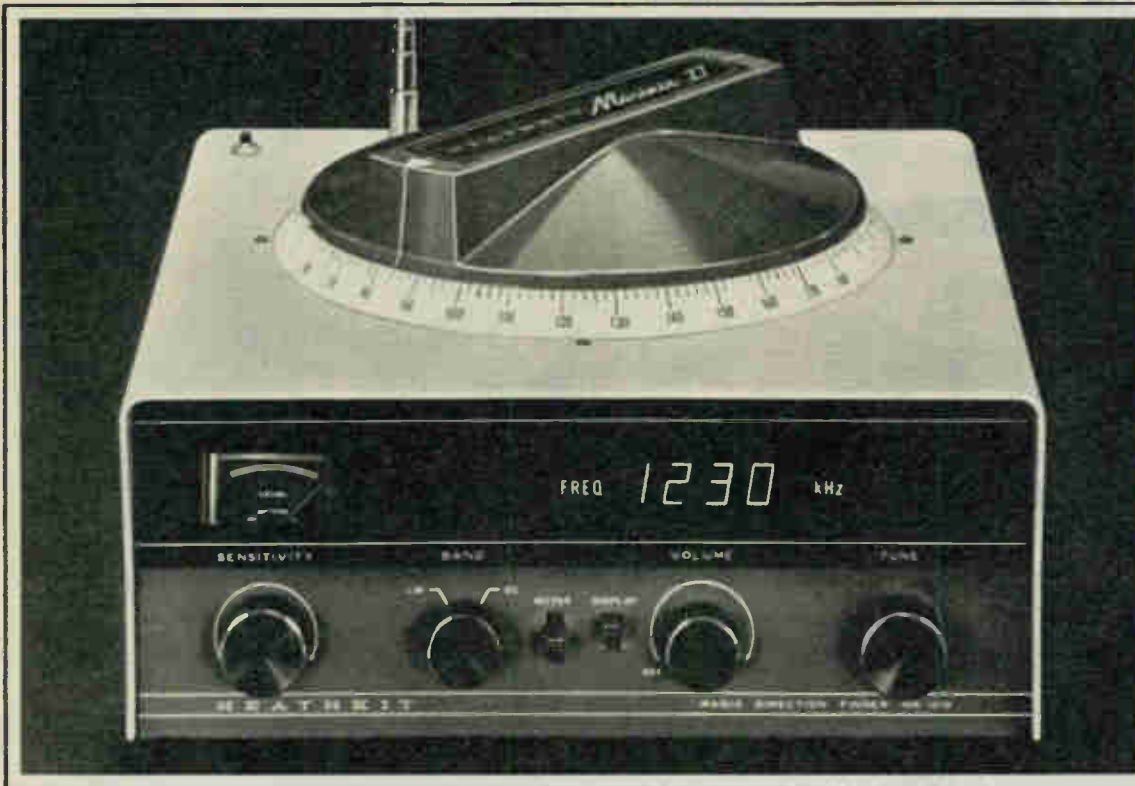


Marine Electronics Handbook — covers AM, FM, SSB ship-to-shore radios, rules & etiquette, codes, antennas, radio direction finders; written for both the marine radio technician and radio user. EDP-134, 4.95*

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*

*\$10 minimum order for book only purchase. No minimum when book order accompanies kit order. Include 35¢ for each book to cover postage and handling.

for savings and safety afloat



Digital readout shows frequency of broadcast on AM or LW bands with resolution to 1 kHz.

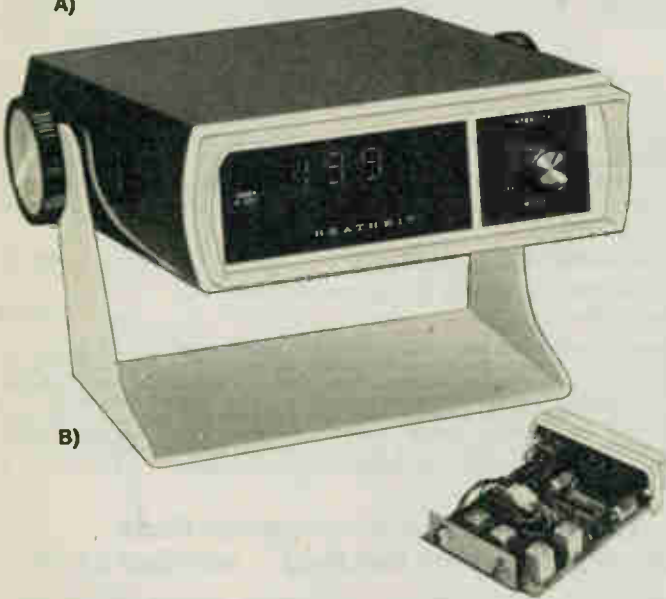


Two-way power supply — 12-volt external source or six internal "D" cells.

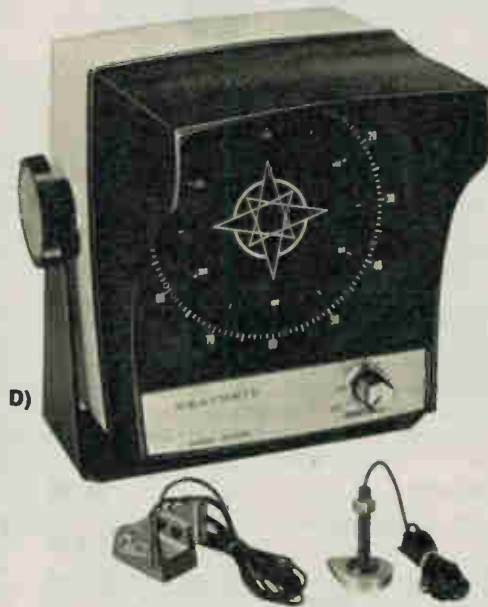


IF section contains 4 ceramic filters and 1 transformer for simplified alignment.

A)



B)

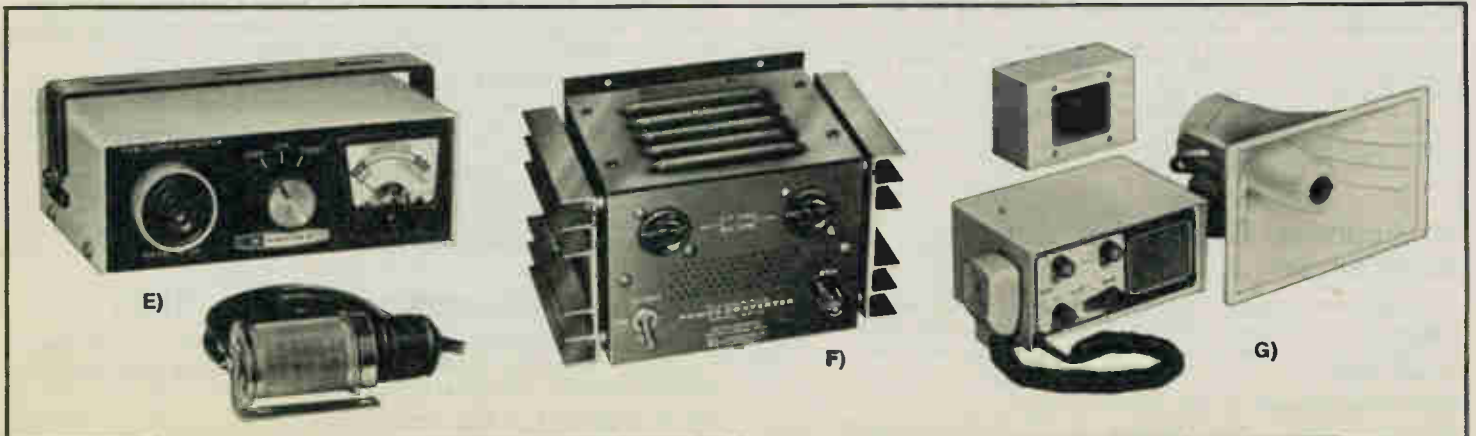


D)



C)

Transom-mount transducer (left) is recommended for high-speed craft with planing hulls. Through-hull transducer (right) is ideal for permanent installation in larger boats with displacement hulls.



E)

F)

G)

Charge a kit — no money down on any kit — up to 2 years to pay — see order blank for details.

Catch 'em with Heathkit tackle!



A) Dual-Range Fish Spotter® Sounder sounds off with a find... 99.95

The Heathkit MI-2901 Fish Spotter® Sounder makes expert angling even easier. Adjustable audible alarm lets you set it to sound off at any depth to 240 ft. Individual or schools of fish swimming between surface and preset depth will trigger alarm.

Two switch-selected ranges. Other features include switch-selected dual ranges (0-60' and 0-240') for sharper definition; bright neon-flasher to give you precise depth reading; solid-state circuitry for improved sensitivity, dependability and minimum battery drain; noise rejection circuitry to eliminate engine ignition interference. Rugged aluminum cabinet. Sun-shielded dial face. Portable suction-cup transducer bracket, or order scanning transducer bracket, below. Powered by two 6-volt lantern batteries (not supplied).

Kit MI-2901, 9 lbs., mailable 99.95

Kit MIA-2900-1, Scanning Transducer Bracket, 4 lbs., mailable 19.95

MI-2901 SPECIFICATIONS: Range: 0 to 60 feet on hard bottom. 0 to 240 feet on hard bottom. Accuracy: $\pm 2\%$ 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, $\pm 5\%$. Amplitude at the transducer: 150 volts peak-to-peak minimum. Pulse width: 0.8 milli-second on the 0-60' range. 1.4 milliseconds on the 0-240' range. 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. Controls: Sensitivity, with on-off switch. Alarm, with a pull-to-read alarm depth and off position. Range, with two depth indicating ranges (0-60 feet and 0-240 feet). Transducer: Barium titanate ceramic element encased in a watertight housing. Transducer Cable Length: 15'. Power Requirements: 12 VDC. Dimensions: (Less Handle): 7" H x 6" W x 11" D.

B) Economy Fish Spotter® Sounder finds 'em fast... 69.95

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 inter-

ference. Improved disk and slip-ring assembly for quieter operation. Bright neon indicator lamp to read depth 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, 9 lbs., mailable 69.95

Kit MIA-2900-1, Scanning Transducer Bracket, 4 lbs., mailable 19.95

MI-2900 SPECIFICATIONS: Range: 0-240 feet on hard bottom. Accuracy: $\pm 2\%$ @ 240 rpm. Sounding: Rate: 20 times per second. Frequency: 200 kHz $\pm 5\%$. Amplitude at the transducer: 150 volts peak-to-peak minimum. Pulse width: 1.0 millisecond. 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. Control: Sensitivity, with on-off switch. Transducer: Barium titanate ceramic element encased in a watertight housing. Transducer Cable Length: 15'. Power Requirements: 12 VDC, 2 6V lantern batteries. Dimensions: 7" H x 6" W x 11" D.

C) Thermo Spotter® thermometer finds temperature where fish feed... now just 27.95

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.

Fishing Guide included. Kit includes operations manual with fish temp. preference charts. Uses 1.5-volt penlight battery (not supplied).

Kit MI-104, 3 lbs., mailable new low price 27.95

MI-104 SPECIFICATIONS — ELECTRICAL: Circuit: Bridge type with thermistor sensor in one arm. Indicator: 50 μA meter. Temperature scale: 32°-86°F. (0°-30°C). Accuracy: within $\pm 3^\circ F$. 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 $\frac{1}{4}$ " x 5 $\frac{3}{4}$ " x 3 $\frac{1}{4}$ ".

D) Scanning Transducer Bracket... 19.95

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 $\frac{1}{2}$ " cylindrical transducers.

Kit MIA-2900-1, 4 lbs., mailable 19.95

Budget-priced Heathkit 3-ch/4-ch R/C Systems

A) Heathkit 3-channel system converts to 4, starts at...154.95

Designed to grow as your hobby grows! Order the 3-channel version now... convert it to four channels whenever you're ready. The system uses the same flight-proven circuitry that made the Heathkit GD-19 a favorite of the R/C fraternity. 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. Transmitter, available on all R/C frequencies, is housed in an attractive slim-line case with adjustable hand strap, designed for positive single-handed action during launch and engine adjustment.

Top-flight features... 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.

SPECIAL SYSTEM PRICE #1 — Order 3-Channel Transmitter, Receiver, Receiver Battery, two GDA-19-4 Standard Servos 154.95

SPECIAL SYSTEM PRICE #2 — Order same system as above, substituting GDA-405-44 Miniature Servos 164.95

SPECIAL SYSTEM PRICE #3 — Order same system as above, substituting GDA-505-44 Sub-miniature Servos 164.95

SPECIFY FREQUENCY WHEN ORDERING

Kit GDA-1057-1, 3-channel transmitter, 4 lbs., mailable 84.95

Kit GDA-1057-4, 4-channel conversion pack for both transmitter and receiver, 1 lb., mailable 21.95

Kit GDA-1057-2, 3-channel receiver, 1 lb., mailable 36.95

Kit GDA-1205-3, Receiver battery pack, 2 lbs., mailable 9.95

Kit GDA-19-4, standard servo, 1 lb., mailable 21.95

Kit GDA-405-44, miniature servo, 1 lb., mailable 29.95

Kit GDA-505-44, sub-miniature servo, 1 lb., mailable 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 or 72 MHz. Operating temperature: 0°-160° F. Power supply: 4.8V; Battery Pack GDA-405-3. Dimensions: 1½" H x 1¾" W x 2¼" D. Net receiver weight: 2.5 oz. Servo channels: 3 (4 with option). **GENERAL** — Complete airborne system weight: with 2 GDA-505-44 servos: 8.8 ozs.



B) Heathkit Thumb® Tach for peaking model engine performance... 24.95

A super little accessory, the Heathkit GD-69 Thumb Tach lets you peak your model engine for rpm changes you can't even hear. And it does the job quickly and easily, without touching or being physically connected to the engine. Measures model engine rpm on two ranges. 0-5,000 and 0-25,000. The perfect solution to needle valve adjustments, selection of glow plugs, gears and props.

Kit GD-69, 2 lbs., mailable 24.95

C) Heathkit Servo Simulator takes the guesswork out of servo adjustments... 24.95

A time-and-trouble-saver for any serious R/C hobbyist, the Heathkit GD-1053 Servo Simulator takes the place of both transmitter and receiver for making adjustments on all Heathkit servos, and a wide variety of others. It will operate servos either from 120 VAC line or from the optional internal battery pack (below). And it also serves as a charger for receiver and glo-plug batteries when plugged into 120 VAC. Long-life indicator bulb shows battery condition. Kit includes adaptor cable for Heathkit GD-405 series servos.

Kit GD-1053, 3 lbs., mailable 24.95

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



New

Servo Centering Standard . . . 9.95

The same factory-calibrated standard that comes with GD-505 and 1205 systems. It calibrates all present and past 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.

Kit GD-1189, 1 lb., mailable 9.95

Charge a kit — no money down on any kit — up to 2 years to pay — see order blank for details.

New 5-CHANNEL SYSTEMS

B) New 5-channel
Single Stick Transmitter
GDA-505S

New transmitters
New receiver
New servos
New plug-in
convenience

A) New 5-channel
Dual Stick Transmitter
GDA-505D

New 8-CHANNEL SYSTEMS

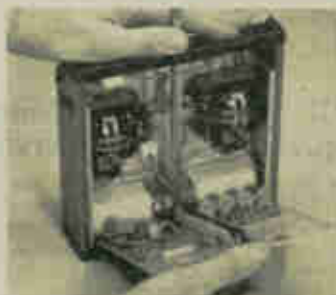
D) New 8-channel
Single Stick Transmitter
GDA-1205S

C) New 8-channel
Dual Stick Transmitter
GDA-1205D

Buy a System & Save



A Neath 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.

New Heathkit Pack-17™ R/C systems have 17 plug-in frequency modules

- Unique plug-in frequency modules for transmitters and receiver let you select any of 17 frequencies on all 3 bands — buy as many modules as you need
- Compatible 5 or 8-channel transmitters with your choice of single or dual-stick control
- Factory-calibrated standard simplifies servo centering and provides a permanent reference standard
- Completely new servos with heavy-duty gears and rugged cases for added reliability

The most flexible, reliable R/C systems we've ever offered. Whether you choose 5 or 8-channel with single or dual-stick control, you'll discover the versatility of Heath's exclusive Pack-17 plug-in frequency modules. You can change frequencies instantly by plugging in any of the 17 pairs of transmitter and receiver modules. And the modules are even interchangeable between 5 and 8-channel systems! To make buddy-box flying even easier, a factory-calibrated servo centering standard eliminates recentering when you switch from one transmitter or receiver to another.

Extra rugged construction. The GD-1205 and 505 series are built to last. Inside, there are tough glass epoxy circuit boards throughout and the transmitter cases are heavily reinforced and covered with scuff and scratch-resistant brown vinyl. The new servos are more rugged than any we've ever offered before, with stronger cases and heavier gearing. To round the system out, the GDA-1205-2 8-channel receiver is used in both 5 and 8-channel systems. It features long-life gold-plated contacts throughout and can be used with any Heath transmitter or servo.

Note: (Some servos may require connector change, mixing 3 and 4-wire types is not recommended.)

A) GDA-505-D 5-Channel Dual-Stick Transmitter—Provides 2-stick control of 4 channels in any mode with variable throttle friction. Includes one auxiliary channel.

B) GDA-505-S 5-Channel Single-Stick Transmitter—Provides simultaneous one-hand control of 3 channels—2 through the stick's gimbal couplings and one with the return-to-center knob on top of the stick. Includes throttle control with trim and one auxiliary channel.

C) GDA-1205-D 8-Channel Dual-Stick Transmitter—Same as the GDA-505-D, but includes landing gear switch and 2 additional auxiliary channels.

D) GDA-1205-S 8-Channel Single-Stick Transmitter—Same as the GDA-505-S, but includes landing gear switch and 2 additional auxiliary channels.

Each transmitter includes: one plug-in frequency module (specify frequency); 4 channels with trim; relative power meter to monitor radiated signal; socket for the Heathkit Trainer Link; built-in nickel-cadmium batteries and a separate plug-in transformer charger that recharges both transmitter and receiver simultaneously. Range controls for each channel adjust servo travel.

A) Kit GDA-505-D, 5-Channel Dual-Stick Transmitter with 1 module (specify freq.), 7 lbs., mailable 129.95

B) Kit GDA-505-S, 5-Channel Single-Stick Transmitter with 1 module (specify freq.), 7 lbs., mailable 139.95

C) Kit GDA-1205-D, 8-Channel Dual-Stick Transmitter with 1 module (specify freq.), 7 lbs., mailable 139.95

D) Kit GDA-1205-S, 8-Channel Single-Stick Transmitter with 1 module (specify freq.), 6 lbs., mailable 159.95

Kit GDA-1205-2, Receiver with 1 module (specify freq.), 2 lbs., mailable 59.95

Kit GDA-1205-3, Receiver battery pack, 2 lbs., mailable 9.95

Additional Frequency Modules

When ordering specify frequency desired (see list below).

Transmit Module, 1 lb., mailable 17.95

Receive Module, 1 lb., mailable 11.95

AVAILABLE FREQUENCY MODULES—27 MHz: 26.995, 27.045, 27.095, 27.145, 27.195. **53 MHz:** 53.1, 53.2, 53.3, 53.4, 53.5 **72 MHz:** 72.08, 72.24, 72.16, 72.32, 72.40, 72.96. Also available: 75.640 MHz. (When ordering specify transmit or receive).

GDA-1205 AND GDA-505 SERIES SPECIFICATIONS—TRANSMITTER—RF Carrier Frequency: crystal controlled on 27, 53 and 72 MHz. **Frequency Stability:** within ±.005% on 27 MHz band; within ±.002% on 53 MHz and 72 MHz bands. **Temperature Range:** 0 to 160°F. **RF Output Circuit:** pi network. **RF Input Power:** at least 500 mW. **Modulation:** on-off carrier keying. **Approximate Current Drain:** 100 mA on all bands. **Controls:** GDA-1205, 8 channels (4 with trim), on/off, trainer pushbutton; GDA-505, 5 channels (4 with trim), on/off switch, trainer pushbutton. **Power Supply:** internal 9.6V 500 mA nickel-cadmium 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 on 27, 53 or 72 MHz. **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 1¾" W x 2¼" D. **Net Weight:** 2 oz.

GDA-1205-3 SPECIFICATIONS—RECEIVER BATTERY—Type: Nickel-cadmium. Rechargeable simultaneously with transmitter batteries at 35 to 40 mA from 120 V power line. **Voltage:** + 2.4 V and + 4.8 V. **Current Rating:** 500 mA hours. **Dimensions:** 1¼" H x 1¼" W x 2¼" D. **Net Weight:** 3.8 oz.

Save on complete systems

5-Channel Systems include your choice of GDA-505-S or GDA-505-D Transmitter with one module (specify frequency); GDA-1205-2 Receiver with one module (specify frequency); GDA-1205-3 Receiver Battery Pack; four servos (GDA-1205-4 or GDA-1205-5 or any combination equalling four).

8-Channel Systems include your choice of GDA-1205-S or GDA-1205-D Transmitter with two modules (specify frequencies); GDA-1205-2 Receiver with two modules (specify frequencies); GDA-1205-3 Receiver Battery Pack; four servos (GDA-1205-4 or GDA-1205-5 or any combination equalling four).

Save 44.70. Complete 5-Channel Dual-Stick System 274.95

Save 44.70. Complete 5-Channel Single-Stick System 284.95

Save 49.60. Complete 8-Channel Dual-Stick System 309.95


Save 49.60. Complete 8-Channel Single-Stick System 329.95

System prices represent a savings over items purchased separately. All four systems come complete with batteries — a retail 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, 1 lb., mailable 9.95




The more you know about your R/C hobby, the more you'll enjoy it. These books plus Heathkit R/C equipment make your hobby complete.




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



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



Radio Control Handbook—revised edition of the R/C modelers "bible"—covering the entire range of control systems.
EDP-159 6.95*



Model Radio Control—gives basic concepts of building simple control projects for getting started in an R/C hobby.
EDP-160 4.95*

\$10 minimum charge for book only purchase. No minimum when book order accompanies kit order. Include 35¢ for each book to cover postage and handling.

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

Kit GDA-1205-5, 2 lbs., mailable . . 29.95

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 ¾" W x 2¼" L (length includes mounting ears; height includes the outputs). **Net weight:** 1.25 oz.

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

Kit GDA-1205-4, 2 lbs., mailable . . 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 ¾" W x 2¼" L (length includes mounting ears; height includes outputs). **Net weight:** 1.75 oz.



New low prices on Heathkit Calculators

SAVE \$40⁰⁰



A) **ONLY 79⁹⁵**

A) Save \$40 on this 8-digit desktop slide-rule calculator...79.95

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, 4 lbs., mailable Originally 119.95 NOW ONLY 79.95

SAVE \$59⁴⁵



ONLY 49⁹⁵

B) Calculator "package" at originally 109.40 NOW ONLY...49.95

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. Calculator operates on internal rechargeable nickel-cadmium battery; or plugs into charger; or use it with desk set's built-in charger. Calculator adds, subtracts, multiplies, divides. Features floating decimal; chain operation; credit balance with plus & minus results; constant key (K). Battery saver circuit turns off display after 15 seconds. Calculator retains all information and display is reactivated by depressing recall key (D) or by entering new information. Calculator measures 5½" H x 3¾" W x 1¾" D. Executive Desk Set measures 2½" H x 8½" W x 8¾" D. Handsome carrying case of rich Naugahyde® with felt lining and zipper closure. Battery is supplied. ICL-2009, includes calculator kit & charger, Executive Desk Set with charger, and carrying case, 7 lbs., mailable. **NOW ONLY 49.95**

SAVE \$10⁰⁰



ONLY 29⁹⁵

C) Lowest price ever on this pocket calculator...

Our "thinnest" calculator and it's our lowest priced. Use it with a built-in 9-volt battery (optional) or the optional AC adapter. A sophisticated integrated circuit adds, subtracts, multiplies and divides with computer-like speed and accuracy. A constant (K) speeds repetitive calculations in multiplication and division.

Other top-flight features include a 17-key keyboard and an 8-digit easy-to-read ½" high LED display with no distorting "magnifier." Complete manual explains operation and gives valuable reference tables for many applications. Fits in pocket, purse or briefcase. Designed for easy assembly, even for first-time kit builders. Measures 5" L x 2¼" W x 1¼" D, and weighs in at a feather-light 7 oz. (less battery).

Kit IC-2006, 2 lbs., mailable, was 39.95, NOW ONLY 29.95
GRA-43-1, AC converter, 1 lb., mailable 4.95

SAVE \$15⁰⁰




D) ONLY 49⁹⁵
for this Heathkit desktop calculator.

Sleek, low-profile case fits easily in an attaché case — has bright ½"-high Beckman planar gas-discharge tubes in an easy-to-read 8-digit display — and the large color-coded keyboard is conveniently sloped to let you rest your entire arm while operating the calculator. A constant key (K) simplifies

repetitive problem solving. The separate equal key (=) permits entering computations as you would write them out, totaling up as you go, or working in a chain manner. The 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. A rocker switch places the decimal in either the floating mode or in a single fixed position, preselected during kit assembly. And there's no warm-up delay in the IC-2108. Turn it on and the display lights up instantly. The kit is easy to build, with the single LSI mounting in a socket, related circuitry goes on 3 single-sided printed circuit boards. Can be wired for 120/240 VAC. Measures 2¼" H x 7" W x 9½" D.

Kit IC-2108, 4 lbs., mailable, was 64.95, NOW ONLY 49.95



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

99 Ways to Know & Use Your Calculator — a wealth of information including techniques that let you compute complex functions and solve complicated problems with an ordinary 4-function calculator. EDP-208, 5.95

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

New

Go-Anywhere Portable B&W TV Set

This 12 in. (diagonal) B&W portable operates on AC, DC, or its own battery supply...149.95

At home, the GR-104C plugs into a wall outlet. In the car, camper or boat it works just as well with a 12-volt battery system. Outdoors, it's completely self-contained with the optional rechargeable battery pack base and snap-on sun shield.

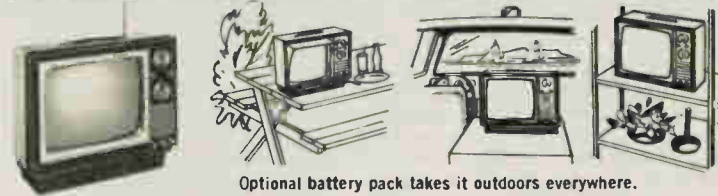
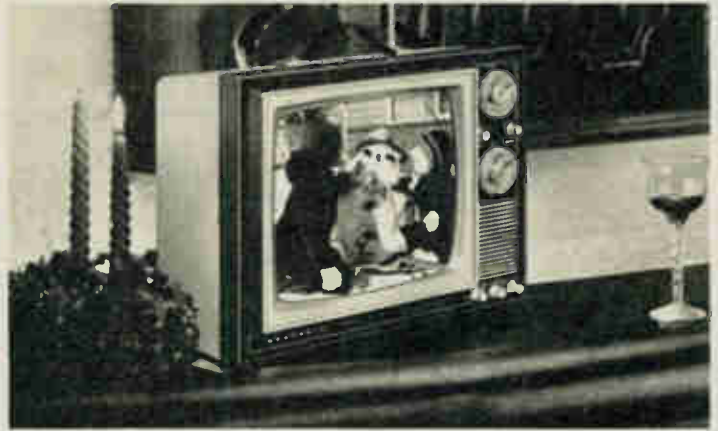
State-of-the-art design. The GR-104C gives you the latest in B&W TV circuitry. Automatic gain control gives rock-steady pictures. Front-panel speaker puts the sound where you are. And there are 3 video IF amplifiers with superior gain and controlled bandwidth; deluxe 4-circuit VHF "memory" tuner; detent UHF tuner; transformer operated and regulated power supply; lighted channel indicators; double circuit breaker protection. Kit includes beige (black front panel) high-impact plastic cabinet with carrying handle; preassembled and aligned tuners.

Kit GR-104C, 35 lbs., mailable 149.95

Kit GRA-104-3, battery pack & sun shield, 9 lbs., mailable 49.95

GRA-104-2, sun shield only, 1 lb., mailable 4.50

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 Sizes: 11½" H x 15¾" W x 9¾" D.



Optional battery pack takes it outdoors everywhere.

Get the picture with Heath antennas & accessories



Cornell-Dubilier Heavy-Duty Auto-Rotor. For sharp, ghost-free color reception even in fringe areas. Push-buttons for automatic heading selection of any 5 channels plus dial selector for any other compass heading. 1 rpm rotor with positive, automatic stop, instant reverse. 6½" diam. ball thrust bearing supports antennas up to 150 lbs. Lower mast clamp accepts ⅞" to 2" diam. masts and is removable for direct mounting on rotor plate of tower. Lifetime lubricated bearings. Requires 5-wire cable not supplied.

GDP-258, 16 lbs., mailable . . . 59.95



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



All-Channel Matching Transformer snaps on antenna, converts 300 ohms to 75 ohms for coax.

GD-1054, 1 lb., mailable 3.95



Blonder-Tongue Prism-Matic Rotor. Strong, light-weight, low cost, and easy to install. Short-proof solid-state circuitry. Lighted compass dial. Aluminum alloy housing, 350-lb. thrust bearings, lifetime synchronization circuit, dynamic braking, over-current protector, serrated "V" mounting clamp. Uses 4-wire cable, not supplied.

GDP-1016, 8 lbs., mailable . . . 34.95



Easy-mail antenna

"Fringe" Antenna. 22 elements, provides VHF reception up to 75 miles and UHF up to 45 miles. 119" boom; turning radius, 68".

GD-1431, 300 ohm; less mast & cable, 8 lbs. UPS 29.95

75 ohm 34.95*

All antennas include removable FM blocking elements

GD-298, 1 lb., mailable 4.95

75-Ohm Mixer-Splitter. Operate 2 sets from one coax or combine two 75 ohm coax leads.

GD-318, 1 lb., mailable 9.95

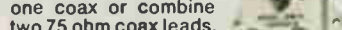


75/300 Ohm Transformer-Splitter matches one 75 ohm coax to separate VHF, UHF 300 ohm leads.

GD-298, 1 lb., mailable 4.95

75-Ohm Mixer-Splitter. Operate 2 sets from one coax or combine two 75 ohm coax leads.

GD-318, 1 lb., mailable 9.95



FM Coupler, takes FM signal off coax ahead of TV set.

GD-308, 1 lb., mailable 12.95



The "Super Antenna" for optimum reception. Wherever you live, the deepest fringe areas are no handicap for this signal grabber with its 71 elements (26 on VHF, 13 driven; 45 on UHF, 1 driven). Great front-to-back signal rejection; VHF Lo & Hi Band 23 dB, UHF 24 dB. Beam width: VHF Lo 68°, Hi 33°, UHF 30°. Boom 196"; turning radius 116"; width 166".

GD-1460, 300 ohm; less mast & cable, 24 lbs., Exp./Frt. 89.95

75 ohm 94.95*

GD-1450, 300 ohm; less mast & cable, 19 lbs., Exp./Frt. 57.95

75 ohm 62.95*



"Deep Fringe" Antenna; does the job anywhere but the farthest "boonies". Reaches out with its 52 elements (18 on VHF, 9 driven; 34 on UHF, 1 driven). Fine front-to-back signal rejection: VHF Lo & Hi Band 20 dB, UHF 22 dB. Beam width: VHF Lo 68°, Hi 33°, UHF 30°. Boom 149"; turning radius 82"; width 102".

GD-1450, 300 ohm; less mast & cable, 19 lbs., Exp./Frt. 57.95

75 ohm 62.95*

GD-1441, 300 ohm; less mast & cable, 9 lbs. UPS 39.95

75 ohm 44.95*

*Order GD-298 & GD-1054 with antenna to convert to 75 ohms & pay only \$5.



Easy-mail antenna

Easi-Guide to Color TV — a practical guide to buying a set, installing the antenna, and making adjustments on color sets. **EDP-128, 3.50***

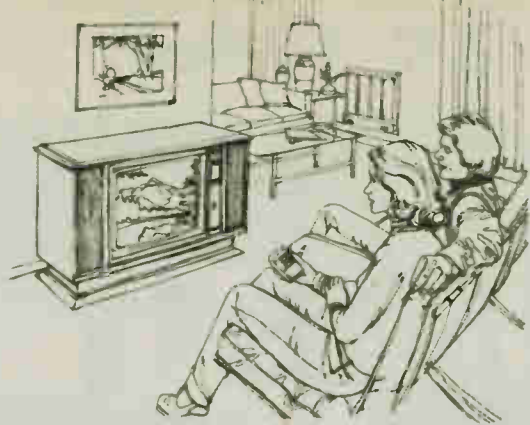
Questions and Answers About Color TV — covers theory of operation, installation, servicing, and modification of equipment. **EDP-129, 3.95***

99 Ways to Improve Your TV Reception — covers the full spectrum of methods for improving TV reception, with particular emphasis on antenna & lead-in problems. **EDP-130, 3.50***

Home TV-FM Antennas — tells radio/tv technicians and handy homeowners how to professionally design & install an antenna system. **EDP-186, 5.95***

Charge a kit — no money down on any kit — up to 2 years to pay — see order blank for details.

Our famous GR-2000



adjacent-channel interference. And, this totally new approach to IF design gives the GR-2000 another equally important plus—a consistently excellent color picture, year after year with no need for periodic instrument alignment. The GR-2000 IF system eliminates the highly critical traps that go out of adjustment because of normal component value changes through aging. In short, the Heathkit GR-2000 will maintain its best picture longer than any set with ordinary IF design.

Add Total Touch-Tune Remote Control—it's an all solid-state ultrasonic system that lets you select UHF/VHF channels, control volume, color tint and intensity, on and off. And you do so from as far as 20 feet from the set. The channel selector and volume buttons on the remote also may be used to return the channel and clock readouts to the picture screen whenever you wish.

The easiest-to-build color TV we've ever offered—The GR-2000 100% solid-state chassis has 19 ICs, including custom MOS designs, plus another 13 ICs with the remote control and yet another IC if you add the clock. DC controlled contrast for less picture interference. IC color amplifier for truer colors. IC color oscillator and automatic phase control for more precise and reliable tints. IC automatic gain control for improved sensitivity, stability and noise immunity. Improved picture interlace for remarkable image definition and crispness. For all this, the actual assembly operations for this kit have been greatly simplified. The GR-2000 has fewer point-to-point connections, more ICs, more modular circuit boards, more prefabricated wiring harnesses and cables, and fewer chassis-mounted parts to make it easier to build.

New, latest-design picture tube—a deluxe Black (Negative) Matrix 25V picture tube now with fully illuminated dots and black "surround"...it all adds up to greater contrast and a bright, vivid picture that's one of the finest in the world.

New exclusive Heath self-service features—no other manufacturer offers them to you at any price. Built-in service facilities such as a new digital-design true dot generator, purity and convergence adjustments; test meter; new vertical and horizontal centering circuits; new Top-Bottom-Sides pincushioning corrections; new "Service" circuit board puts everything in an easy-to-find place.

We set out to design the most advanced and unique color TV available today...we believe the performance of the set speaks for itself. The digital-design Heathkit GR-2000...it will change your mind about color TV.

Kit GR-2000, chassis, tube, 1 speaker (less cabinet), 147 lbs., Exp./Frt. 689.95

Kit GRA-2000-6, Remote Control, 4 lbs., mailable 89.95

Kit GRA-2000-1, Digital Clock Accessory, 1 lb., mailable 29.95

GRA-2000-7, second speaker for GR-2000, fits space provided in all GR-2000 cabinets, includes all necessary connecting cables, 3 lbs., mailable 6.50

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 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.

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.

The Heath GR-2000 25 in. (diagonal) Digital Design Color TV

It silently selects channels with digital-logic accuracy—it displays the channel digits on the screen—it displays the time digits on the screen—it uses a fixed filter IF that never needs alignment—it uses more integrated circuitry than any other set. Yet the kit-building process is easier than ever.

Silent, All-Electronic Touch-Tuning—no knobs to turn, no noisy turbines, no humming motors and no mechanical contacts to clean. Now you just touch a button on the front panel or optional remote control transmitter and the programmable Digital Counter silently sweeps up or down through any 16 preselected station. Release the button and the new UHF/VHF Varactor Tuner is precisely locked-in on the channel of your choice.

You program up to 16 channels into the Touch-Tune System located in the convenient slide-out service drawer. You can program any channels in any sequence, interspersing UHF with VHF, even programming the same channel to appear more than once if you like.

The channel number is seen on the screen—The Heath-designed On-Screen Electronic Digital Channel Readout has bright white numerals that are easy to see—from across the room, from any viewing angle. Each time you change channels, using the Touch-Tune button either on the set or on the remote control, illuminated digits (adjustable brightness) identify the UHF and VHF stations as you cycle through the channels. After stopping at a desired program, the readout remains on for as long as you want, up to 1½ minutes, or stays on all the time...the choice is yours. And you can position the digital readout anyplace on the screen, too.

We even changed the way you adjust the sound—With the optional remote control installed, a touch of either of two buttons on the set or the remote automatically raises or lowers the sound in a series of small steps. Just hold the button down until the sound level is right where you want it. This also controls the volume of the Hi-Fi Sound Output (to your separate amplifier) so you can control it with your remote transmitter.

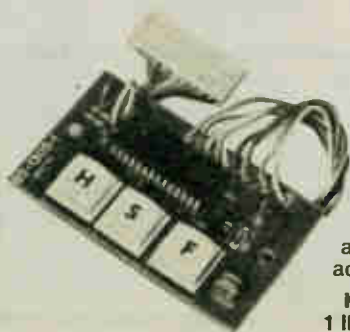
Build-in an optional Electronic Clock with Digital On-screen Readout—true digital circuitry gives you the time in four-digit, six digit, 12-hour or 24-hour format. A programming board in the slide-out service drawer lets you set your clock to display time the way you want to see it. The on-screen display appears directly below the channel numeral in same-size 1" digits. And when you add the clock option, it becomes an integral part of the channel display, responding to the same controls. It can be positioned anywhere on the screen with the channel digits, remains on for the same pre-set length of time, or remains on constantly.

A Heath-designed IF Filter sets this TV apart from all others—For truly superior color reception, particularly in urban areas where multiple transmitters are located or where multi-channel cable service is available, we designed a fixed LC-type filter with an IC IF amplifier into the GR-2000...a "first" in the television industry. This unique circuitry produces an ideally shaped bandpass that greatly reduces

Optional Digital Clock

Gives you on-screen readout of the time directly below the channel number readout when the set is "on". Clock circuit board has jumper wire for selecting 12 or 24-hour format. You set your on-screen display for hours and minutes, or hours, minutes and seconds. Order with your GR-2000, or add it later.

Kit GRA-2000-1, Digital Clock Accessory, 1 lb., mailable 29.95



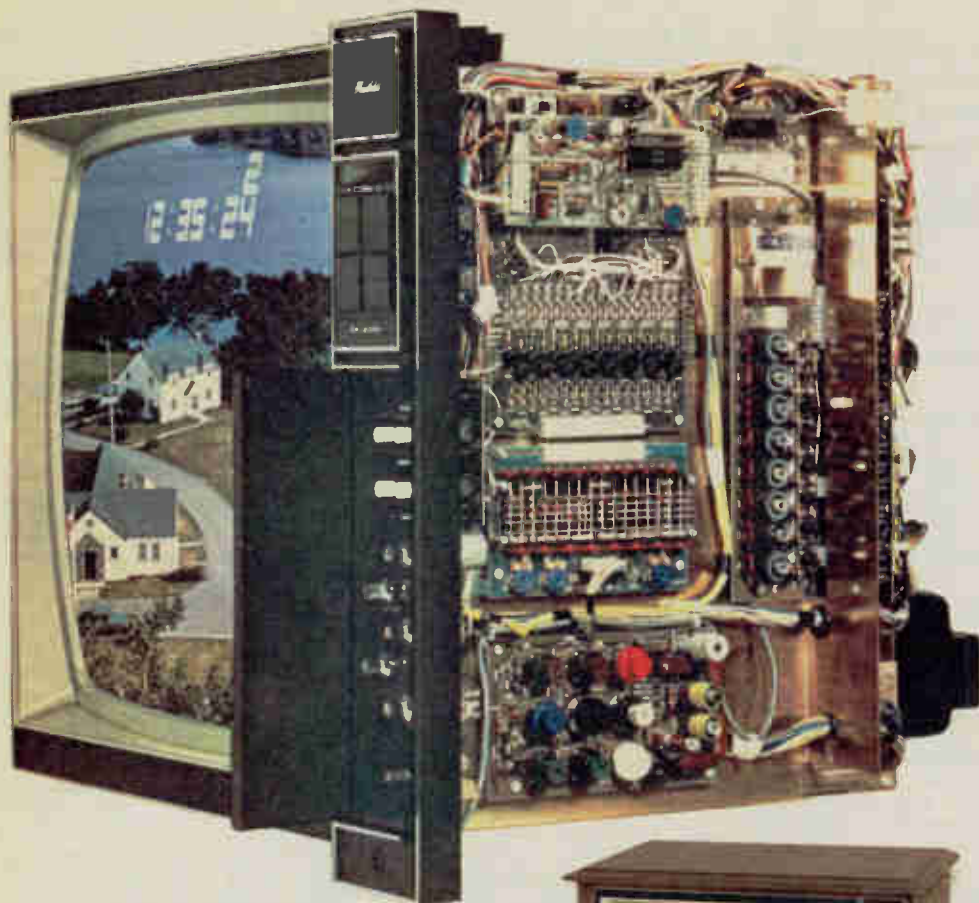
Ultrasonic Remote Control

Gives you wireless armchair control of on and off, volume, VHF/UHF channel selection, up or down color intensity, and tint. Plus, a touch of the volume button automatically recalls the digital readout to the screen. Kit includes receiver for in-chassis mounting and hand-held transmitter. Operates from 20-feet away from set.

Kit GRA-2000-6, 4 lbs., mailable 89.95



25V digital color TV



Simulated TV Pictures

Compact Contemporary Cabinet

Houses your GR-2000 in contemporary elegance even where space is limited. Like all Heath cabinets, it's solidly constructed of wood solids and veneers finished in luxurious oiled walnut stain. Comes fully assembled with cutout for one speaker. Measures 34 $\frac{1}{2}$ " H x 33 $\frac{3}{4}$ " W x 20 $\frac{1}{2}$ " D (24 $\frac{1}{2}$ " D including cup).

GRA-2000-8, 60 lbs., Exp./Frt. . . . 129.95



Only the Heathkit GR-2000 offers you all of these features:



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 to eliminate critical traps and interference—another Heath exclusive.



19 Integrated Circuits (ICs) simplify kit building and permit ultra-sophisticated technology with long term reliability.

Finished cabinets for your GR-2000



Mediterranean cabinet with doors

Handsome, simulated wood-grain bi-fold doors turn this Mediterranean model into a magnificent piece of furniture in its own right. Open them for a panoramic view of your superb GR-2000 picture. Constructed of select solids and veneers with simulated wood-grain base and trim. Finished in rich dark oak stain. Metal hardware is finished in Windsor Antique Gold tone. Shipped fully assembled and finished and accepts a second speaker for full-width sound reproduction. Measures 29 $\frac{3}{8}$ " H x 48 $\frac{1}{8}$ " W x 23" D. (26 $\frac{1}{8}$ " D including cup).

GRA-2000-5, 126 lbs., Exp./Frt. . . . 219.95



Mediterranean cabinet

Luxurious Mediterranean styling that serves as a suitably subtle back-drop for your brilliant GR-2000 color picture. Designed to accept two matching speakers for surrounding sound. Crafted of furniture-grade solids and veneers with simulated wood-grain trim. Finished in lovely dark oak stain. Metal hardware features Antique Gold finish. Shipped fully assembled and finished. Measures 30 $\frac{1}{2}$ " H x 49 $\frac{1}{8}$ " W x 20 $\frac{1}{2}$ " D. (23 $\frac{1}{8}$ " D including cup).

GRA-2000-4, 92 lbs., Exp./Frt. . . . 169.95



Contemporary cabinet

Here's contemporary styling at its finest—a fitting format for the world's most advanced color TV set. Has dual speaker capability that lets you place sound on both sides of the screen. Comes completely assembled and finished. Carefully constructed of select solids and veneers with oiled walnut stain. Measures 28 $\frac{1}{2}$ " H x 46 $\frac{1}{8}$ " W x 20 $\frac{1}{4}$ " D. (23 $\frac{1}{2}$ " D including cup).

GRA-2000-2, 89 lbs., Exp./Frt. . . . 159.95



Early American cabinet

An exciting contrast—traditional Early American design to house the world's most advanced color TV. Features twin speaker capability that gives you the option of room-filling sound. Constructed of distressed maple stained wood solids and veneers accented by simulated wood-grain trim. Hardware is metal with Windsor Antique Gold finish. Shipped fully assembled and finished. Measures 31 $\frac{3}{8}$ " H x 47 $\frac{1}{8}$ " W x 20 $\frac{1}{2}$ " D. (23 $\frac{3}{8}$ " D including cup).

GRA-2000-3, 94 lbs., Exp./Frt. . . . 169.95

Charge a kit—no money down on any kit—up to 2 years to pay—see order blank for details.

Heath's digital-design Color TV in a

Now, all the advanced technology of Heath's famous big-screen GR-2000 is available with the popular 21V picture tube at lower cost...599.95

Touch-tuning... silent, all-electronic. No knobs, no noisy turret tuner, no contacts to get dirty, no noisy motors. Just touch a button on the front panel (or the optional remote control) and the programmable digital counter sweeps up or down through the 16 pre-selected stations. Release the button and the combination VHF/UHF varactor tuner locks on the station of your choice. The program board for the touch-tune system is located in the slide-out service drawer. You can program any channels (up to 16) in any sequence, mixing VHF and UHF, even repeating channels if you like.

On-screen channel numbers. Bright, white numerals you can see from any angle, even across the room...adjustable in brightness, positionable anywhere on the screen...adjustable for time duration up to 1½ minutes or to remain on all the time, at your option. The ¾" numbers change as channels change.

On-screen clock time. A low-cost option that's a marvel of convenience. Big ¾" numbers appear just below the channel numbers each time you change channels. The programming board for the clock is located in the slide-out service drawer; it contains true digital circuitry that gives you the time in 4 digits or 6 digits and in 12 or 24 hour formats.

Fixed-filter IF assures best pictures longer. This unique Heath-designed circuitry incorporates a fixed L-C type filter with an integrated circuit IF amplifier that produces an ideally shaped bandpass. This new approach to IF design not only reduces adjacent channel interference (because of the bandpass shape), but it also assures you of consistently excellent color pictures year after year because it never needs periodic instrument alignment.

100% solid-state. Like the GR-2000, this set has an all solid-state chassis, including 19 IC's, plus another 13 ICs in the remote control, and another in the clock circuitry. The only tube is the picture. This sophisticated circuitry results in such refinements as DC controlled contrast for less interference, an IC color amplifier for truer colors, an IC color oscillator and automatic phase control for more precise and reliable tints, an IC automatic gain control for improved

sensitivity, stability and noise immunity, and improved picture interlace for better picture definition.

Total Touch-Tune Remote Control. An optional extra and well worth it. Lets you select channels, control volume in a series of small steps (also controls volume of Hi-Fi Sound Output to your separate amplifier), change color and tint, and recall channel number and time to the screen whenever you wish.

Black (negative) matrix 21V picture tube has fully illuminated dots with black "surround" and clear face for brighter, sharper pictures.

Easier to build and service. More modular circuits, more wiring harnesses, fewer point-to-point connections and few chassis-mounted parts make it easier to build than any TV we've offered. New digital-design dot generator, new Service circuit board, new centering and pin-cushioning circuits, and the test meter make self-service easier. Enjoy digital-design color TV in this new smaller picture size...its our best TV design at lower cost.

Kit GR-2050, less cabinet, 122 lbs., Exp./Frt. 599.95

Kit GRA-2000-6, remote control, 4 lbs., mailable 89.95

Kit GRA-2000-1, digital clock accessory, 1 lb., mailable 29.95

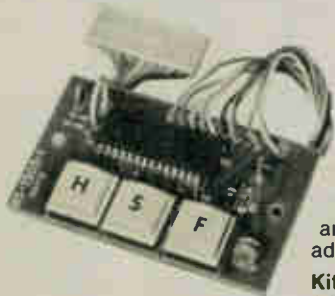
GRA-2050-1, Space-Saver Contemporary Cabinet. Exciting styling for an exciting color TV. Completely assembled and finished. Wood solids and veneers with luxurious oiled walnut stain; black expanded-foam speaker grille in base. 28¾" H x 30½" W x 18½" D (22¼" D including cup). 65 lbs., Exp./Frt. 119.95

GRA-2050-2, Mediterranean Cabinet. Luxurious, romantic styling, completely assembled of wood solids and veneers highlighted with dark oak stain and simulated woodgrain trim. Brown patterned grille cloth. 28¾" H x 38¾" W x 19¾" D (23¼" D including cup). 90 lbs., Exp./Frt. 149.95

GR-2050 SPECIFICATIONS: same as GR-2000 except Picture tube: 21" (diagonal). Viewing area: 226 sq. in.

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.

Optional Digital Clock



Gives you on-screen readout of the time directly below the channel number readout when the set is "on". Clock circuit board has jumper wire for selecting 12 or 24-hour format. You set your on-screen display for hours and minutes, or hours, minutes and seconds. Order with your GR-2050, or add it later.

Kit GRA-2000-1, Digital Clock Accessory, 1 lb., mailable 29.95



Ultrasonic Remote Control

Gives you wireless armchair control of on and off, volume, VHF/UHF channel selection, up or down color intensity, and tint. Plus, a touch of the volume button automatically recalls the digital readout to the screen. Kit includes receiver for in-chassis mounting and hand-held transmitter. Operates from 20 feet away from set.

Kit GRA-2000-6, 4 lbs., mailable . . 89.95

Our lowest cost 25" (diagonal) color TV

A) State-of-the-art features, the solid-state GR-900 has push-button (or remote) power detent tuning of all VHF channels and any 12 pre-selected UHF channels; black matrix picture tube; MOSFET VHF tuner, varactor UHF tuner; plug-in glass-epoxy circuit modules simplify assembly and servicing; 3-stage high-gain IF; automatic fine tuning; automatic chroma control; adjustable video peaking; adjustable noise limiting; tone control; hi-fi audio output plus 6 x 9" speaker; instant-on with defeat switch; plus angular tint control to reduce tint change between programs. A great buy in great viewing.

Kit GR-900, less cabinet, 125 lbs., Exp./Frt. 619.95

B) Mediterranean cab. of pecan-stained wood solids and veneers, simulated woodgrain base & trim. 30¾" x 48¾" x 20¾" (23½" D w. cup). Assembled **GRA-404-25, 87 lbs., Exp./Frt. 169.95**

C) Mediterranean console of pecan-stained veneers and wood solids, simulated woodgrain doors & base. 29¾" x 46¼" x 22¾" (25½" D w. cup). Assembled **GRA-405-25, 100 lbs., Exp./Frt. 219.95**

D) Contemporary cab. of walnut-stained wood solids and veneers. 30¾" H x 37½" W x 19¾" D (22¾" D w. cup). Assembled **GRA-401-25, 62 lbs., Exp./Frt. 119.95**

E) Early American cab. of maple-stained wood solids and veneers with simulated woodgrain trim. 32½" H x 38½" W x 19¾" D (22¾" D w. cup). Assembled **GRA-403-25, 75 lbs., Exp./Frt. 159.95**

Save 50.00 on convenient wireless remote control for your GR-900

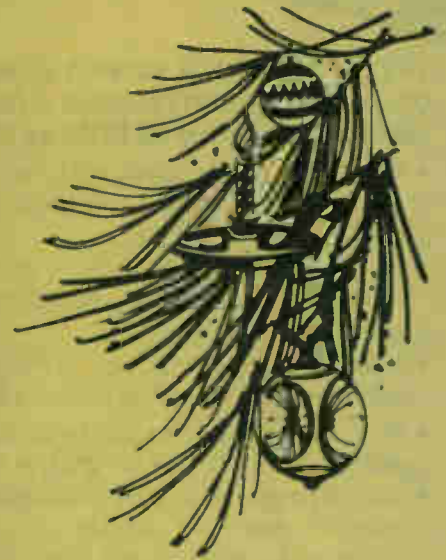
Now enjoy the convenience of remote control at an amazingly easy-to-afford price. Turn the set on or off, choose one of three preset volume levels, adjust color and tint and change channels — all from up to 20' away. Build and install it in just three evenings!

Kit GRA-900-6, 8 lbs., mailable Originally 89.95, Now Only 39.95

smaller (21" diagonal) screen size



Contemporary Cabinet



Simulated TV Pictures



Mediterranean Cabinet

All the famous design features of the GR-2000 are in the GR-2050



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.



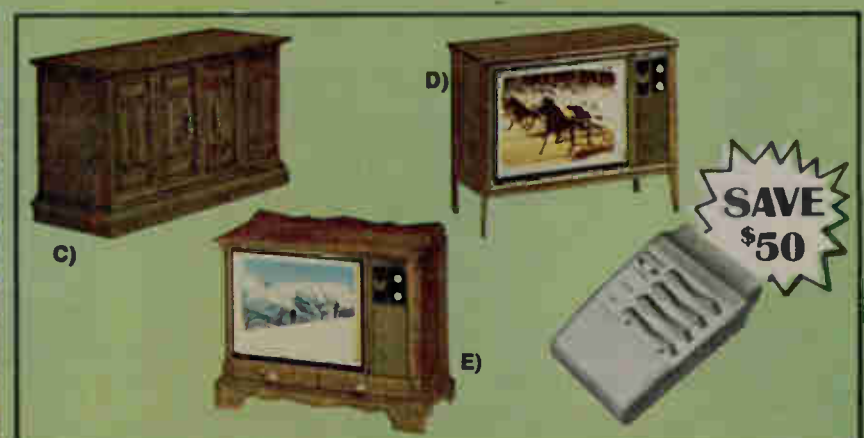
On-Screen Clock Readout — gives you the correct time in four or six-digit format, and with your choice of 12 or 24 hour time.



Fixed Filter IF totally eliminates instrument IF alignment forever — gives ideally shaped bandpass to eliminate critical traps and interference — another Heath exclusive.



A) B)



SAVE \$50

Charge a kit — no money down on any kit — up to 2 years to pay — see order blank for details.

Digital readout plus lots more

19V, 17V, and 15V screen sizes — all with on-screen digital readout & one-button picture control... now for as little as 399.95

- Featuring on-screen digital channel readout and optional Digital Clock originated in the famed Heathkit GR-2000
- All-channel VHF/UHF detent tuning — with every channel number display in big, clear digits right on the screen
- New one-button PPC (Preset Picture Control) that restores perfect picture at a touch
- New precision in-line gun picture tube with new slotted shadow mask for greater light output —
- No convergence or purity adjustments ever — with new precision static toroid yoke & factory-adjusted & sealed yoke & magnet assemblies

Heath made television history by bringing the world's first digital-design color TV receiver to market—the Heathkit GR-2000. Now, Heath brings you another industry first — a new generation of small screen color TV receivers featuring on-screen digital channel readout, optional digital clock, plus exciting new design innovations of their own. Chief among these are important new improvements in picture tube design. The new precision in-line gun tube uses a slotted shadow mask for far greater light output. And, in the GR-400 & 500, a negative matrix screen is used for greater contrast and brightness. This improvement in picture tube performance invited improvements in the signal circuits as well. So, a wider bandwidth IF amplifier with the GR-2000 fixed LC filter was added. This, coupled with luminance and video circuits with black level clamps maintains the true brightness level of the televised scene, with no compromise in picture quality between the studio camera and your receiver at home. Result: picture realism you never dreamed possible, with a particularly dramatic improvement in night scenes due to the realistic light levels.

Convergence and purity adjustment a thing of the past. Equally as dramatic as the improvement in picture tube performance are the design improvements that keep things that way. A decade ago, Heath engineers brought you the built-in dot generator to simplify convergence of Heathkit color TV sets. Now, they have done away with convergence adjustments entirely. A new precision static toroid yoke offers vastly improved convergence. And the factory adjusted and sealed yoke and magnet assemblies completely eliminate the need for convergence and purity adjustments, yet the results are superior to previous methods requiring manual adjustments.

Improved VHF tuner design. Another area receiving special attention in the design of this new television series was the VHF tuner. It was given a new mixer circuit featuring a dual gate FET to achieve better cross modulation 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 have only three) offer far greater selectivity than ordinary sets.

Total VHF/UHF detent tuning convenience—with on-screen channel display. Improved tuning convenience is another plus value. Every

VHF and UHF channel is selectable simply by turning the channel selection knobs until they click to your favorite channel with precision detent action. As you turn the knobs, every channel number is displayed on the TV screen in big bright digits. And it's all automatic — no need for pre-programming on your part. Fine tuning (AFT) is automatic, too. All you have to do is turn the knob from one channel to another and the picture is there — locked in perfectly. As in the GR-2000, the on-screen digital channel readout is completely adjustable as to brightness, position on the screen, and length of display time. And the same goes for the optional digital clock.

New one-button Preset Picture Control (PPC). An important new convenience feature is the PPC button located on the front panel. Once the brightness, contrast, color and tint have been correctly set by the 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.

Other convenient front-panel controls consist of On/Off/Volume, Tint/AFT, and Color. Contrast and Brightness are adjusted by unobtrusive knurled thumbwheel controls. Controls on the back panel are provided for vertical and horizontal hold. An adjustable peaking control on the chassis allows you to set the amount of picture sharpness desired.

Other design innovations include Instant-On operation with a front-panel defeat switch for vacation-time shutdown; hi-fi output jack and TV speaker defeat switch; 75-ohm VHF antenna input, eliminating the need for lossy baluns for CATV installations; metal case semi-conductors in all power output stages (audio, video, vertical and horizontal) for improved circuit reliability; increased use of protection circuits for extended component life; a new high voltage power supply with voltage tripler circuit for plenty of reserve power; a new quasi-complementary-symmetry vertical deflection circuit that eliminates the need for an output transformer; new slide-out chassis, plus interconnecting cables using plugs and sockets, for easier adjustment and servicing.

Compare the new design features, compare the quality—and you can see that the new generation of Heathkit small-screen color TV is the best value yet.

Kit GR-500, less cabinet, 88 lbs., Express/Frt. . . . 499.95

GRA-500-1, walnut veneer table model cabinet (main illustration), 17 1/4" H x 25 1/2" W x 14" D (17" D including cup), 35 lbs., Express/Frt. 42.95

GRA-500-2, floor model cabinet of selected furniture-grade wood solids & veneers with luxurious walnut stain, 28 3/8" H x 29 1/4" W x 16 3/8" D (19 3/8" D including cup), 45 lbs., Express/Frt. 89.95

Kit GR-400, with walnut veneer cabinet (16 1/8" H x 24 1/8" W x 12 3/4" D, 15 3/4" D including cup), 104 lbs., Express/Frt. 489.95

Kit GR-300, with walnut veneer cabinet (15 3/8" H x 22 1/4" W x 11 1/2" D, 14 1/2" D incl. cup), 90 lbs., Exp./Frt. Was 429.95, NOW 399.95

GRA-403-18, roll-around cart (see below), 22" H x 27" W x 15 1/2" D, 23 lbs., Express/Frt. 21.95

Kit GRA-2000-1, Digital Clock Accessory, 1 lb., mailable 29.95

GR-500, -400, -300 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 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 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.



Optional Digital Clock Module

Gives you on-screen readout of time, directly below channel readout when set is "on." Can be programmed to read out hours & minutes; hours, minutes and seconds; choice of 12 or 24-hour time format. Order with your GR-300, GR-400 & GR-500, or add it later on if you prefer.

Kit GRA-2000-1, 1 lb., mailable 29.95



Room-to-room portability

Put your GR-500, 400, or 300 on this attractive roll-around cart and add mobility to your TV viewing. Roll it from room to room, or out on the patio when weather permits. Features walnut stained wood with simulated woodgrain shelves and trim with pale brass accents. Measures 27" W x 15 1/2" D x 22" H.

GRA-403-18, 23 lbs., Express/Frt. 21.95

now in small-screen color TV

Simulated TV Pictures

▼ 19V GR-500 Color TV



**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 $\frac{1}{2}$ " H x 29 $\frac{1}{4}$ " W x 16 $\frac{3}{8}$ " D (19 $\frac{3}{8}$ " D including cup).

**GRA-500-2, 45 lbs.,
Express/Frt. 89.95**

▼ 17V GR-400 Color TV



**GR-500, GR-400
& GR-300 Features**



GR-2000-inspired on-screen digital channel readout and optional digital clock.

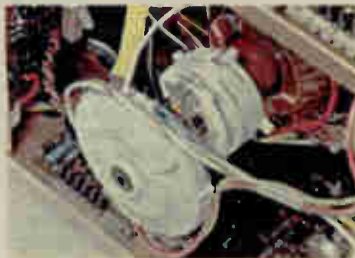


New slot-mask picture tube for greater light output and picture realism.

▼ 15V GR-300 Color TV



One-button Preset Picture Control (PPC) restores perfect picture at a touch.



New static toroid yoke & factory-adjusted & sealed assembly end convergence or purity adjustment — forever.

Charge a kit — no money down on any kit — up to 2 years to pay — see order blank for details.

Introducing the world's most versatile high-fidelity system — Heathkit MODULUS™

A totally new concept in high-fidelity.

Heath proudly introduces the world's first completely modular high-fidelity system — MODULUS. In performance and versatility, the six modules which make up the system rival the finest separate components, yet they are more convenient to use than ordinary receivers. By combining modules, you create exactly the system you want — stereo or quadraphonic — with your choice of features and power.

And because it is modular, you can change your system anytime — conveniently and inexpensively. Need more power? Just add a more powerful matching amplifier. Want the reduced noise and wider dynamic range of Dolbyized FM? Then just add the AD-1504 plug-in Dolby Module. Even if you start with stereo, and later want to convert to 4-channel, nothing in your system is obsolete. And you can choose exactly the kind of quadraphonic sound you want — discrete with the AN-2016 alone, or add the AM-1503 SQ Module and the AD-1507 CD-4 Module. You can do it all without "black box" adapters and yards of cable. MODULUS could very well be the last hi-fi system you ever need to buy.

The AN-2016 is your control-center.

The heart of the MODULUS system is the AN-2016 Digital AM/FM 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.

Convenient, accurate digital readout.

You always know exactly what frequency you're tuned to with the AN-2016. On either AM or FM, four 1/2"-tall LED digits display the frequency far more accurately than an ordinary dial (digital circuitry directly counts the local oscillator frequency, then subtracts the IF frequency). Finally, the AN-2016 displays only those frequencies which are actual broadcast channels. When you're on-channel, a signal-strength meter helps you fine tune and a center-channel meter accurately locates the point of lowest FM distortion. There are even oscilloscope outputs on the rear panel to help you align your FM antenna for minimum multipath distortion.

In sheer performance, the FM tuner is one of the finest Heath has ever offered. Two JFET's in the front-end and 4-ganged tuning provide excellent sensitivity — 1.7 μ V measured by IHF standards. But its sensitivity becomes even more remarkable when you consider how free of noise even weak stations can be. In mono, a mere 3.5 μ V produces a 50 dB signal-to-noise ratio and the same low noise level in stereo requires just 35 μ V. As with noise, distortion has been virtually eliminated. At midband, the digital discriminator keeps harmonic distortion below 0.3% in mono and 0.35% in stereo, while intermodulation distortion has been reduced to less than 0.1%. A sophisticated LC filter provides over 100 dB alternate channel sensitivity, effectively eliminating interference between stations. The 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. With that kind of performance, accurate digital readout and multipath outputs, the AN-2016 could even be an excellent broadcast monitor for radio stations.

At last — quality AM.

The AN-2016's AM section has been given the kind of careful attention usually reserved for FM. As a result, AM isn't just something you listen to, it's something you'll enjoy. 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 ever. Instead of the standard ferrite rod antenna, we've provided a shielded loop which increases dynamic range by 10 dB at the same time that it eliminates almost all atmospheric and fluorescent static. The sound is a revelation — a far cry from the "transistor radio" quality most people associate with AM.



Medium Power AA-1505 & High Power AA-1506 Stereo Amplifiers



AN-2016 Digital AM/FM Stereo/Quadraphonic Tuner/Preamplifier



AM-1503 SQ Module

AD-1507 CD-4 Module

AD-1504 FM Dolby Module

A superlative preamplifier.

Distortion and noise are reduced to what we believe are completely inaudible levels. Differential amplification and active current sources reduce harmonic and intermodulation distortion to less than 0.05% even at full output. Hum and noise are 80 dB below a 0.25 volt input in the high-level section. 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!

But no matter how good its other specifications, a poor phono amplifier can ruin the finest preamplifier's sound. That's why we've devoted special attention to this normally overlooked section. The result is a totally new 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. Finally, for use with high-output cartridges, a switch on the rear panel attenuates phono sensitivity by 10 dB while maintaining the same overall dynamic range.

A versatile control center.

A special muting circuit in the AN-2016 protects your speakers from power on/off surges. The instant you press the Power button a relay shorts the preamplifier outputs to prevent potentially-harmful "thumps" from reaching your speakers. In addition, four lighted level meters constantly monitor the output. The meters feature a wide 40 dB dynamic range, allowing them to follow the softest and loudest passages without switching ranges. The meters use "peak-indicating" circuitry to indicate 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.

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 all four tone controls and a pushbutton loudness switch compensates for the ear's reduced sensitivity to extreme bass and treble at low volume. In addition, a low filter effectively eliminates rumble and subsonic noise, while a high filter reduces hiss and other high-frequency noise.

Optional plug-in modules update your system instantly.

Whenever you are ready you can add FM Dolby, SQ or CD-4 to your AN-2016. There's absolutely no rewiring — just assemble the module and plug it into the AN-2016. The FM Dolby Module lets you enjoy the reduced noise and improved dynamic range of Dolbyized FM broadcasts.

Pressing the front-panel FM Dolby button automatically turns the module on and switches in the FCC-approved 25 microsecond deemphasis. Unlike many receivers, the AN-2016's optional quadraphonic circuitry is some of the most sophisticated available. The SQ Decoder Module uses full-logic and variable blend enhancement to produce quadraphonic separation that rivals discrete sources. The CD-4 Demodulator Module utilizes phase-locked loop circuitry to maintain excellent separation without periodic readjustment. Each of these optional modules can be assembled and installed in less than an evening. And because they plug right into the AN-2016, your system stays up to date without external "black box" adapters.

continued on page 32



New
MODULUS can be any kind
of hi-fi system you'll ever want



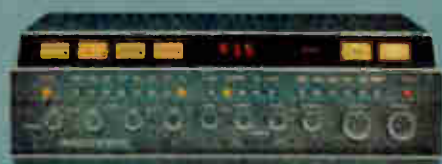
Fantastic 4-Channel

The AN-2016 flanked by a pair of matching amplifiers opens up the exciting world of discrete quadraphonic sound. Optional plug-in modules let you add a full-logic SQ decoder and a CD-4 disc demodulator.



Superb Stereo

With one of its matching amplifiers, the AN-2016 becomes an outstanding, low-distortion stereo receiver with exactly the power you need. And you can convert to 4-channel whenever you wish.



Terrific Tuner

By itself, the AN-2016 is an excellent AM/FM tuner with digital readout — and much more. It costs no more than many other tuners, and yet it includes a versatile stereo/4-channel preamplifier and headphone amplifier.



Super System

If only the finest will do, use the AN-2016 with one — or even a pair — of our AA-1540 "Super Amps." With incredibly low distortion and wide dynamic range, you will own one of the world's best systems.

Heathkit AR-1500A—in performance & value one of the world's finest stereo receivers

A better receiver, a better value. A great system starts with a great receiver — that's what our AR-1500A is all about. It 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. The AR-1500A delivers 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!

The FM section meets the same exacting standards. 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 even in fringe areas. If the FM band in your area is crowded with stations, the AR-1500A's fixed ceramic filters help keep stations separate. A phase-locked loop multiplex demodulator provides over 40 dB of midband FM stereo separation. Signal-strength and center-channel meters make tuning easy and accurate and oscilloscope outputs let you orient your antenna for minimum multipath distortion or allow you to continuously monitor the quality of the broadcast. There's even a front-panel control so you can set the FM muting threshold to suit reception conditions in your area.

The AR-1500A is also a versatile control center. Pushbuttons instantly select any input: tape, tape monitor, auxiliary, phono, AM, FM stereo stations only or FM with automatic stereo/mono switching. Push-buttons also control main and remote speakers and, for private listening, there are two front-panel stereo headphone jacks. There are a host of other conveniences — switchable loudness compensation, a tone flat button to remove bass and treble controls from the circuit 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. 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. For easy installation and servicing, nine of

the boards plug into the chassis and two factory-fabricated wiring harnesses eliminate most point-to-point wiring. And all nine of the plug-in boards can be flipped up or extended from the chassis while the receiver is operating. Even FM alignment is simple — just 3 adjustments for FM and one for FM multiplex — without special equipment. 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. The manual includes an extensive troubleshooting section and you can use the test meter to help track down problems and make repairs. So you spend less on service.

The AR-1500A is also a beautiful receiver. 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.

Kit AR-1500A, less case, 53 lbs., mailable \$399.95
ARA-1500-1, walnut veneer case, 8 lbs., mailable 24.95

AR-1500A POWER OUTPUT: 60 WATTS, MINIMUM RMS, PER CHANNEL INTO 8 OHMS AT LESS THAN 0.25% TOTAL HARMONIC DISTORTION FROM 20-20,000 HZ.

OTHER 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:** \pm 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 (Stereophonic) — 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 50/60 Hz AC. 40 watts idling (zero output) and 356 watts at full output. Dimensions: Overall — 18½" W x 5¼" H x 13¾" D.

* Rated IHF (Institute of High Fidelity) Standards.

Audio-Scope visually monitors Stereo and 4-channel systems...219.95

A professional-quality audio oscilloscope. With it you can monitor signal strength, FM center tuning, FM multipath, phasing and channel separation of all stereo and quadraphonic systems. A built-in audio oscillator lets you check frequency response easily. Rear-panel inputs let you monitor left-front, left-back, right-front, 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.

Kit AD-1013, less case, 19 lbs., mailable \$219.95

ARA-1500-1, Walnut veneer case, 8 lbs., mailable 24.95

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

Kit ARA-15-1, 1 lb., mailable 24.95

AD-1013 SPECIFICATIONS — FRONT PANEL — Scope Input: Vertical Sensitivity: 25 millivolts P-P/cm. Input Impedance: 100 k Ω . Frequency Response: 5 Hz to 200 kHz \pm 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 600 Ω . Calibrator Voltage: 1.0 volt P-P \pm 5%. Total Harmonic Distortion: 1% or less. **REAR PANEL — Oscillator Output Impedance:** 6000 Ω . Multipath Input (Scope Horizontal and Scope Vertical): Sensitivity: 25 mV P-P/cm. Input Impedance: 100 k Ω . Left Front, Right Front, Left Back and Right Back Inputs: Sensitivity: 25 mV P-P/cm. Input Impedance: 100 k Ω . Frequency Response: 5 Hz to 200 kHz, \pm 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 Requirements: 120 or 240 volts AC, 50/60 Hz, 15 watts. AC Outlet (on rear panel): Unswitched. Dimensions (overall): 5¼" H x 18½" W x 13¾" D.



Get the most out of your Heathkit Stereo Hi-Fi System with these valuable books

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

EDP-200 \$5.95*

Audio Cyclopedia — the most comprehensive & authoritative work on audio available — a complete audio reference library in itself — 3650 entries in all. EDP-113, . . . \$34.00*

99 Ways to Improve Your Hi-Fi — 99 simple 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

\$10 minimum order for book only purchase. No minimum when book order accompanies kit order. Include 35¢ for each book to cover postage and handling.



Save on Complete AR-1500A Systems



SAVE
to
117⁷⁰

- Heathkit AR-1500A AM/FM Stereo Receiver and walnut veneer case
- Two AS-1373 Speaker Systems (see page 44)
- Thorens TD-160C Manual Turntable with Base, Dustcover and choice of Empire 2000 E/111 or Shure M-91ED Cartridge (see page 46)

Value to **1024⁷⁵** Heath Price **907⁰⁵**



SAVE
to
138⁶⁴

- Heathkit AR-1500A AM/FM Stereo Receiver and walnut veneer case
- Two AS-103A Speaker Systems (see page 45)
- Garrard Zero 2000B Automatic Turntable with Base and choice of Empire 2000 E/111 or Shure M-91ED Cartridge (see page 46)

Value to **1140⁶⁵** Heath Price **1002⁰¹**



SAVE
to
146⁹⁵

- Heathkit AR-1500A AM/FM Stereo Receiver and walnut veneer case
- Two AS-48 Speaker Systems (see page 45)
- Dual 1249 Automatic Turntable with Base and choice of Empire 2000 E/111 or Shure M-91ED Cartridge (see page 46)

Value to **1291⁶⁵** Heath Price **1144⁷⁰**

Our best FM Stereo Tuner with advanced digital computer technology...579.95

Digital readout and digital frequency synthesis — the best and most accurate tuning system in the world. And it's the one used in our best FM tuner — the AJ-1510A. Its incredible 0.005% tuning accuracy virtually eliminates interference as well as many other problems associated with conventional tuners.

Convenient three-way tuning. First, you can tune the AJ-1510A by simply entering a station's frequency through the front-panel keyboard. Second, in the Auto-Sweep mode, the tuner counts down from the top of the FM band, stopping at each listenable station — or program it to stop only at stereo stations! To resume scanning, just press the Bypass button. Finally, the A, B and C buttons on the front panel let you 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.

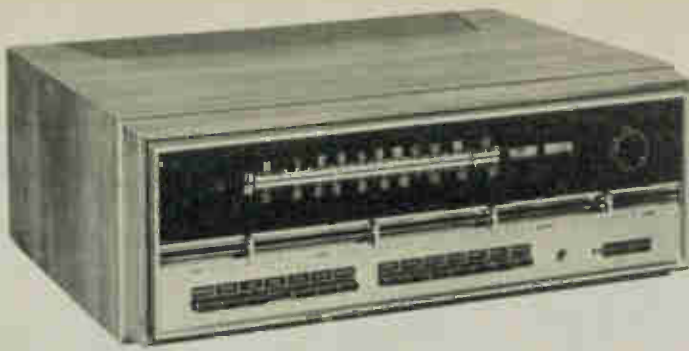
Plus dozens of additional features — multipath outputs for any DC-coupled oscilloscope (like the AD-1013), adjustable AGC, fully-adjustable noise-operated squelch and much more. Undoubtedly the Heathkit AJ-1510A is one of the world's finest FM tuners.

Kit AJ-1510A, less case, 25 lbs., mailable **579.95**
AJA-1510-1, Pecan veneer case, 8 lbs., mailable **26.95**



AJ-1510 SPECIFICATIONS — MONOPHONIC: Tuning: Digitally synthesized. Antenna: 75 or 300 ohm. Frequency response: 20-15,000 Hz, ±1 dB. Sensitivity: Less than 1.8 µV. 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. Signal-to-noise ratio: Greater than 65 dB. AM suppression: Greater than 60 dB. Channel frequency accuracy: Better than ±0.05%. **STEREOPHONIC —** Channel separation: 1,000 Hz, 40 dB; 80 Hz, 21 dB; 10 kHz, 25 dB; 15 kHz, 20 dB. Harmonic distortion: 0.35%. Frequency response: ±1 dB: 20 to 15,000 Hz; 70 kHz and 38 kHz suppression: Greater than 60 dB. SCA suppression: Greater than 60 dB. **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, 50-60 Hz, 50 W. AC convenience outlet: Unswitched, 350 W Max. Dimensions: 6" H x 16 1/2" W x 14 1/4" D. *Rated IHF (Institute of High Fidelity) Standards.

Heathkit products are the result of a quarter-century of kit engineering experience



Heathkit AR-29 AM/FM Stereo Receiver for cost-conscious connoisseurs... just 339.95

"No-compromise" performance at a price you can afford. Spec for spec, few receivers can match the AR-29's performance — and those that do invariably cost far more.

All the power you'll probably ever need — and the AR-29 has about half the distortion of many competitive receivers. Compare for yourself. The AR-29 delivers 35 watts, minimum RMS, per channel into 8 ohms at less than 0.25% total harmonic distortion from 20-20,000 Hz. Intermodulation distortion is less than 0.2% at full power and less than 0.1% at one watt. As audio experts have noted, the AR-29's sound is solid, clean and well-defined — which is what hi-fi is all about.

Easy to build. Unquestionably, the hours you spend building this kit will return a lifetime of exceptional stereo listening.

Kit AR-29, less case, 34 lbs., mailable 339.95
 AE-19, Pecan-stained veneer case, 9 lbs., mailable 21.95

AR-29 POWER OUTPUT: 35 WATTS, MINIMUM RMS, PER CHANNEL INTO 8 OHMS AT LESS THAN 0.25% TOTAL HARMONIC DISTORTION FROM 20-20,000 HZ.

OTHER SPECIFICATIONS — AMPLIFIER — Frequency Response: (1 W): -1 dB, 7 Hz to 60 kHz. Intermodulation Distortion: 0.2% at 35 W, 60 and 7000 Hz mixed 4:1; 0.1% at 1 W. Damping Factor: 50. 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 (Monophonic)** — Frequency Response: ±1 dB 20 to 15,000 Hz. Sensitivity: 1.8 μV*. Selectivity: 70 dB*. Image Rejection: 90 dB*. Capture Ratio: 1.5 dB*. AM Suppression: 50 dB*. Harmonic Distortion: 0.5%*. Intermodulation Distortion: 0.4%*. Hum & Noise: -60 dB. Spurious Rejection: -90 dB. Antenna: 75 or 300-ohm. — **FM (Stereophonic)** — Channel Separation: Typically 45 dB at mid-frequencies. Harmonic Distortion: 0.5% at 1000 Hz with 100% modulation. 19 kHz and 38 kHz Suppression: 55 dB. SCA Suppression: 55 dB. — **AM SECTION** — AM Antenna: Adjustable rod. Connections for external ant., gnd. Sensitivity: External antenna, 20 μV 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*. IF Rejection: 50 dB*. Harmonic Distortion: 2%. Hum & Noise: -35 dB*. **GENERAL** — AC Outlets: One switched (350 W max.), one unswitched (350 W max.). Power Requirement: 120/240 VAC 50/60 Hz 240 watts at full output. Dimensions: Overall — 5 1/4" H x 16 3/4" W x 14 1/2" D.

*Rated IHF (Institute of High Fidelity) Standards.

SAVE to 124⁹⁹

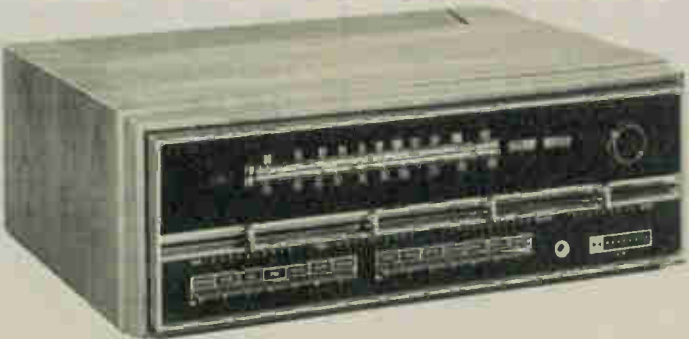
- AR-29 AM/FM Stereo Receiver & Case
- Two Heathkit AS-104 Speaker Systems
- Dual 1228 Automatic Turntable with Base and choice of Empire 2000 E/111 or Shure M-91ED Cartridge

Value to **867⁶⁵** Heath Price **742⁶⁶**

SAVE to 130⁴⁹

- AR-29 AM/FM Stereo Receiver & Case
- Two Heathkit AS-1373 Speaker Systems
- Garrard Zero 2000B Automatic Turntable with Base and choice of Empire 2000 E/111 or Shure M-91ED Cartridge

Value to **977⁶⁵** Heath Price **847¹⁶**



Performance & features worth much more — Heathkit AR-1302 AM/FM Stereo Receiver... 279.95

Now enjoy high-quality performance without paying for more watts than you really need. The AR-1302 has enough low-distortion power to fill almost any listening room with beautiful sound — 20 watts, minimum RMS, per channel into 8 ohms with less than 0.25% total harmonic distortion from 20-20,000 Hz. And the AM/FM tuner section has the kind of station-pulling performance usually found in only the most expensive tuners and receivers.

The AR-1302 is also loaded with features — FM interstation muting, tape monitoring, signal-strength and center-channel tuning meters, main/remote speaker switching, pushbutton input selection and much more.

So compare our AR-1302 to the high-priced competition. We think you'll agree it's got more performance for your money.

Kit AR-1302, less case, 32 lbs., mailable 279.95
 AE-19, Pecan-stained veneer case, 9 lbs., mailable 21.95

AR-1302 POWER OUTPUT: 20 WATTS, MINIMUM RMS, PER CHANNEL INTO 8 OHMS AT LESS THAN 0.25% TOTAL HARMONIC DISTORTION FROM 20-20,000 HZ.

OTHER SPECIFICATIONS — AMPLIFIER — Intermodulation Distortion: 0.25% at 20 W, 60 and 7000 Hz mixed, 4:1. — **FM (Monophonic)** — Frequency Response: ±1 dB, 20 to 15,000 Hz. Sensitivity: 1.9 μV*. Selectivity: 60 dB*. Capture Ratio: 1.8 dB*. AM Suppression: 45 dB*. Spurious Rejection: -90 dB*. — **FM (Stereophonic)** — Channel Separation: 40 dB at mid-frequencies. Frequency Response: ±1 dB from 20 to 15,000 Hz. Harmonic Distortion: 0.5% at 1000 Hz with 100% modulation. 19 kHz and 38 kHz Suppression: 50 dB*. Antenna Inputs: 75 or 300-ohm. **AM SECTION** — Antenna: Adjustable rod. Sensitivity: Rod Antenna, 300 μV/M*. Selectivity: 25 dB at 10 kHz. Image Rejection: 60 dB at 600 kHz*, 60 dB at 1400 kHz*. **GENERAL** — AC Outlets: One switched, one unswitched (350 W max. each). Power Requirement: 120/240 VAC 50/60 Hz. Dimensions: Overall — 5 1/4" H x 16 3/4" W x 14 1/2" D.

*Rated IHF (Institute of High Fidelity) Standards.

SAVE to 115⁷⁹

- AR-1302 AM/FM Stereo Receiver & Case
- Two Heathkit AS-1039 Speaker Systems
- B-I-C 960 Automatic Turntable with Base and choice of Empire 2000 E/111 and Shure M-91ED Cartridge

Value to **664⁶⁵** Heath Price **548⁸⁶**

SAVE to 120⁹⁹

- AR-1302 AM/FM Stereo Receiver & Case
- Two Heathkit AS-105W Speaker Systems
- B-I-C 980 Automatic Turntable with Base and choice of Empire 2000 E/111 or Shure M-91ED Cartridge

Value to **768⁶⁵** Heath Price **647⁶⁶**

Build a quadraphonic system for under \$230!



Our
"best buy"
4-Channel/Stereo
Amplifier...now only 139.95

4-channel for the price of stereo. With the AA-2005A, you can enjoy the spacious realism of quadraphonic sound — at a price lower than most comparable stereo amplifiers! You can even use the AA-2005A for stereo now and convert to 4-channel later. Either way, its exceptionally fine performance and low price make it an unbeatable bargain. Compare the features. The AA-2005A's built-in matrix decoder is optimized for SQ* encoded records, tape and FM. Of course there are complete inputs for discrete quadraphonic tuner, tape and aux as well as outputs for a discrete tape recorder. Four level controls on the front panel make it easy to control the volume of each channel and once the correct balance is established, a master control adjusts the overall volume. There are separate bass and treble controls for the front and rear channels and front-panel jacks for stereo or quadraphonic headphones. The AA-2005A looks as good as it sounds — the luxurious champagne gold front panel is accented by a black vinyl-clad steel top and walnut veneer end panels.

Kit AA-2005A, 28 lbs., mailable. . . Was 199.95, Now 139.95

SAVE to 40%

- Heathkit AA-2005A 4-Channel Amplifier
- Four Heathkit AS-1140 Speaker Systems (see page 41)
- Heath/BSR AD-1135 Changer with Base, Dustcover and Shure Cartridge (see page 46)

Original Value to **384⁶⁵** Heath Price **229⁹⁵**

AA-2005A POWER OUTPUT: 15 WATTS, MINIMUM RMS, PER CHANNEL INTO 8 OHMS AT LESS THAN 0.5% TOTAL HARMONIC DISTORTION FROM 20-20,000 HZ.

OTHER SPECIFICATIONS — Frequency Response: ± 1 dB 7 Hz to 50 kHz. ± 3 dB 5 Hz to 70 kHz. Intermodulation Distortion: Less than .5% at full power. Less than .25% at 1 watt output. Damping Factor: Greater than 30. Input Sensitivity: Phono: 2.2 millivolts, Tuner, Aux., Tape: 200 millivolts. Hum and Noise: Phono (10 millivolt reference) —60 dB; tuner, aux., tape (200 millivolt reference) —70. Channel Separation: Phono: 40 dB. Tape: 45 dB. Tape Output Impedance: Approximately 50 Ω . Input Impedance: Phono: 49 k Ω (RIAA equalized). Tuner, Aux., Tape: 100 k Ω . Tape Output: .4 volt output with .2 volt input. GENERAL — AC Sockets: Two. One switched (350 watts maximum) and one unswitched (350 watts maximum). Power Requirements: 120 or 240 volts 50/60 Hz AC. Dimensions: 4 $\frac{7}{8}$ " high x 19 $\frac{3}{4}$ " wide x 12" deep.

*SQ is a trademark of CBS, Inc.



Heathkit AM/FM
Quadraphonic Receiver —
an outstanding value...269.95

More performance for your money — that's what our AR-2020 receiver is all about. The amplifier circuitry is the same as the AA-2005A amplifier — 15 watts, minimum RMS, per channel into 8 ohms at less than 0.5% total harmonic distortion from 20-20,000 Hz. The AM and FM tuners offer the same kind of superior performance. The pre-assembled and aligned FM front-end provides 2 μ V sensitivity and a 2 dB capture ratio. Ceramic filters in the FM IF minimize alignment and provide superior amplifying and limiting characteristics.

Handles all matrix-encoded records, tapes and FM. The built-in matrix decoder is optimized for SQ† and the AR-2020 also has inputs for both stereo and discrete 4-channel auxiliary sources and inputs and outputs for a quadraphonic tape recorder. Includes handsome vinyl-clad steel top and walnut veneer end panels.

Kit AR-2020, 31 lbs., mailable. 269.95

SAVE to 129²⁹

- Heathkit AR-2020 AM/FM 4-Channel Receiver
- Four Heathkit AS-106 Speaker Systems (see page 44)
- B-I-C 940 Automatic Turntable with Base and choice of Empire 2000E/111 or Shure M-91ED Cartridge (see page 46)

Value to **556⁶⁰** Heath Price **427³¹**

AR-2020 POWER OUTPUT: 15 WATTS, MINIMUM RMS, PER CHANNEL INTO 8 OHMS AT LESS THAN 0.5% TOTAL HARMONIC DISTORTION FROM 20-20,000 HZ.

OTHER SPECIFICATIONS — **AMPLIFIER** — Frequency Response: ± 1 dB, 7 Hz to 50 kHz, ± 3 dB, 5 Hz to 70 kHz. Intermodulation Distortion: Less than .5% at full output. Less than .25% at 1 watt output. Damping Factor: Greater than 30. Input Sensitivity: Phono: 2.2 millivolts. Tape: 200 millivolts. Hum and Noise: Phono (10 millivolt reference) —60 dB. Tape: (200 millivolt reference) IF —70 dB. **FM SECTION (Monophonic)** — Frequency Response: ± 1 dB, 20 to 15,000 Hz. Sensitivity: 2 μ V.* Selectivity: 60 dB.* Image Rejection: 50 dB.* Capture Ratio: 2 dB.* AM Suppression: 50 dB. Harmonic Distortion: .5%.* Intermodulation Distortion: .5%.* Hum and Noise: —60 dB. Spurious Rejection: 70 dB.* **FM SECTION (Stereophonic)** — Channel Separation: 40 dB typical. Harmonic Distortion: .75% at 1000 Hz with 100% modulation. 19 kHz and 38 kHz Suppression: 55 dB typical. **AM SECTION** — Sensitivity: 100 μ V per meter. Selectivity: 40 dB (alternate channel). **GENERAL** — AC Outlet Sockets: Two. One switched (350 watts maximum) and one unswitched (350 watts maximum). 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.



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.
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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

Heathkit "best-value" stereo components



Heathkit AR-1214 AM/FM Stereo Receiver — real hi-fi everyone can afford... just 199.95

Great sound starts with great performance. The AR-1214's specifications show we're serious about performance. Take the power output — 15 watts, minimum RMS, per channel into 8 ohms with less than 0.5% total harmonic distortion from 20-20,000 Hz. That's plenty of power for good, solid bass even from inefficient speakers.

The FM tuner is designed to the same exacting standards. Two integrated circuits and two ceramic filters in the IF give this receiver greater than 60 dB selectivity with superior amplifying and limiting characteristics. The advanced phase-locked loop multiplex demodulator provides 40 dB typical channel separation, for stereo that sounds like stereo — and with less than 0.5% distortion. The factory-assembled and aligned FM front-end assures 2 μ V sensitivity and an excellent 2 dB capture ratio. That's the kind of station-pulling performance and sophisticated design usually found in far more expensive receivers.

And the AR-1214 also has the features you want — tape monitor, pushbutton input selection, speaker on/off button, headphone jack, smooth flywheel tuning, swivel-mounted AM antenna, inputs for a 75 or 300-ohm FM antenna, switched and unswitched AC convenience outlets, blackout dial and walnut-stained veneer end panels.

Easy to build, easy to enjoy. Even if you've never built a kit before, you can enjoy building the AR-1214. A famous Heathkit assembly manual takes you step by step with clear, illustrated instructions — it even teaches you how to solder. And when you're finished, you'll be ready to enjoy years of outstanding stereo sound.

Kit AR-1214, 18 lbs., (with case), mailable 199.95

AR-1214 POWER OUTPUT: 15 WATTS, MINIMUM RMS, PER CHANNEL INTO 8 OHMS AT LESS THAN 0.5% TOTAL HARMONIC DISTORTION FROM 20-20,000 HZ.

OTHER SPECIFICATIONS — AMPLIFIER — Frequency Response (1 W level): ± 1 dB, 7 Hz to 100 kHz, ± 3 dB, 5 Hz to 150 kHz. Intermodulation Distortion: Less than 0.5% with 15 W output. Less than 0.2% @ 1 W output. Damping Factor: Greater than 50. Hum and Noise: Phono — 65 dB. Channel Separation: 55 dB Phono & Tape. FM SECTION (Monophonic) — Frequency Response: ± 1 dB, 20 to 15,000 Hz. Sensitivity: 2 μ V.* Volume Sensitivity: Below measurable level.* Selectivity: 60 dB.* Image Rejection: 50 dB.* IF Rejection: 75 dB.* Capture Ratio: 2 dB.* AM Suppression: 50 dB.* Harmonic Distortion: 0.5%. Hum and Noise: —65 dB.* Spurious Rejection: 70 dB.* FM SECTION (Stereophonic) — Channel Sep-

aration: 40 dB typical, 35 dB minimum. Frequency Response: ± 1 dB from 20 to 15,000 Hz. Harmonic Distortion: 1% @ 1000 Hz with 100% modulation. 19 kHz and 38 kHz Suppression: 55 dB. SCA Suppression: 55 dB. AM SECTION — Sensitivity: 100 μ V per meter.* Selectivity: 40 dB (alternate channel). Image Rejection: 60 dB.* IF Rejection: 50 dB.* Harmonic Distortion: Less than 2%. Hum and Noise: 35 dB.* GENERAL — AC Outlets: 2 (350 W max.), 1 switched, 1 unswitched. Power Requirements: 120/240 VAC, 50-60 Hz. Dimensions: 3 $\frac{7}{8}$ " H x 17" W x 13" D.

*Rated IHF (Institute of High Fidelity) Standards.

SAVE
to
109⁷⁰

- Heathkit AR-1214 AM/FM Stereo Receiver
- Two Heathkit AS-1042 Speaker Systems (see page 45)
- Heath/BSR AD-1135 Changer with base, dustcover and diamond-stylus magnetic cartridge (see page 46)

Value to **542⁷⁵** Heath Price **433⁰⁵**

SAVE
to
115⁸⁹

- Heathkit AR-1214 AM/FM Stereo Receiver
- Two AS-1039 Speaker Systems (see page 45)
- B-I-C 940 Automatic Turntable with Base and choice of Empire 2000 E/111 or Shure M-91ED Cartridge (see page 46)

Value to **666⁷⁰** Heath Price **550⁸¹**



Low-Cost AA-1214 Stereo Amplifier...114.95

The same great performance as the amplifier section of our AR-1214 Receiver. Its solid, low-distortion power will drive almost any speaker with volume to spare. And the AA-1214 has a host of convenient "top-of-the-line" features — an input level control to match the amp to your phono cartridge's output, tape monitor, pushbutton input selection, headphone jack, bass and treble controls and much more.

Easy to build. Most circuitry mounts on two printed circuit boards and a wiring harness eliminates most point-to-point connections. Just follow the fully-illustrated step-by-step instructions. The AA-1214 looks great "stacked" with the matching AJ-1214 Tuner. Includes walnut-stained veneer end panels.

Kit AA-1214, 13 lbs., (with case), mailable 114.95

AA-1214 POWER OUTPUT: 15 WATTS, MINIMUM RMS, PER CHANNEL INTO 8 OHMS AT LESS THAN 0.5% TOTAL HARMONIC DISTORTION FROM 20-20,000 HZ.

GENERAL — AC outlet sockets: 2, one switched, one unswitched, 350 W max. Power requirement: 120/240 VAC, 50/60 Hz, 100 W at full output. Dimensions: 3 $\frac{7}{8}$ " H x 12 $\frac{3}{4}$ " W x 12" D. Other specifications same as amplifier section of AR-1214.



AJ-1214 AM/FM Stereo Tuner...114.95

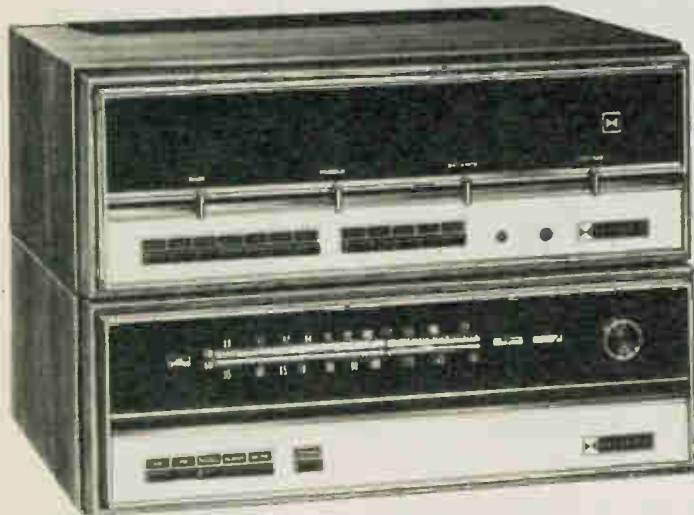
The perfect "system-mate" for the AA-1214. Here's a low-cost tuner with specifications and features worth much more. It has the same outstanding performance and circuitry as the tuner section of the AR-1214 Receiver. The preassembled and aligned FM front-end provides 2 μ V sensitivity with extremely low cross modulation and virtually no overload, even with extremely strong signals. The FM IF uses two ICs and two ceramic filters to achieve over 60 dB selectivity with superior amplifying and limiting. A phase-lock loop multiplex demodulator offers excellent FM stereo separation.

Plus the features you want — pushbutton band selection, ultra-smooth flywheel tuning, inputs for 75 and 300-ohm FM antennas, blackout dial, walnut-stained veneer end panels and much more. Add the AJ-1214 to your stereo system — it's a great tuner and a great value.

Kit AJ-1214, 11 lbs., (with case), mailable 114.95

AJ-1214 SPECIFICATIONS — AM output: 0.6 V nominal. FM output: 1 V nominal. Power Requirement: 120-240 VAC, 50/60 Hz, 10 W. Dimensions: Overall, 3 $\frac{7}{8}$ " H x 12 $\frac{3}{4}$ " W x 13" D. All other specifications same as Tuner Section of AR-1214 Receiver.

Heathkit component "best-values"



Where but at Heath — an amplifier for 24.95!

A) Heathkit AA-18 Solid-State Mono Amplifier

Music on a budget! Build this little wonder in an evening or two — use it anywhere you want a roomful of monophonic sound. It has inputs for a ceramic phono cartridge, monophonic AM or FM tuner, even a tape recorder. It will drive an efficient 8-ohm speaker to surprising sound levels... and it's a good headphone amplifier. Makes a good beginner kit, too.

Kit AA-18, 4 lbs., (with case), mailable 24.95

AA-18 POWER OUTPUT: 3.25 WATTS, MINIMUM RMS, PER CHANNEL INTO 8 OHMS AT LESS THAN 1.5% TOTAL HARMONIC DISTORTION FROM 40-20,000 HZ.

OTHER SPECIFICATIONS — Intermodulation Distortion: Less than 4% with 4 watts output using 60 Hz and 7 kHz mixed 4:1. Power Requirement: 120/240 VAC, 50/60 Hz, 5 watts maximum. Dimensions: 2½" H x 7¼" W x 5¼" D.

Solid-state and an incredible bargain.

B) Heathkit AR-14 FM Stereo Receiver...124.95

Want a lot of performance for your money? This time-tested design has a low-distortion stereo amplifier and a sensitive FM stereo tuner. Full-featured, too, with magnetic phono input, tape inputs and outputs, dual volume, bass, and treble controls, adjustable phase for best FM stereo reception, front panel headphone jack, and stereo FM indicator. Its quality performance and low price have made it a long-standing favorite with value-conscious music lovers.

Kit AR-14, (less case), 18 lbs., mailable 124.95

AE-55, Walnut veneer case, 7 lbs., mailable 13.95

AE-65, Beige metal case, 6 lbs., mailable 4.95

AR-14 POWER OUTPUT: 9 WATTS, MINIMUM RMS, PER CHANNEL INTO 8 OHMS AT LESS THAN 1.0% TOTAL HARMONIC DISTORTION FROM 20-20,000 HZ.

OTHER SPECIFICATIONS — AMPLIFIER — Damping Factor: 50. Hum and Noise: Phono — 60 dB; Auxiliary: — 63 dB. Frequency Response (1 watt): 12 to 60,000 Hz ± 1 dB; 6 to 100,000 Hz ± 3 dB. Channel Separation: 45 dB or better. Intermodulation Distortion (at rated output): Less than 1% (60 & 7,000 Hz, 4:1). FM — Sensitivity (IHF): 5 μ V. Hum & Noise (IHF): — 50 dB. Frequency response (IHF): 0 to — 3 dB from 20 to 15,000 Hz. Harmonic Distortion (IHF): 1% or less. Capture Ratio (IHF): 3 dB. AM Suppression (IHF): — 35 dB. IF Rejection (IHF): — 80 dB. FM STEREO — Separation: 30 dB @ 1 kHz. GENERAL — Power Requirements: 120/240 V, 50/60 Hz; Dimensions: 3¾" H x 15¼" W x 12" D.

The happy medium. Medium power, medium price.

C) Heathkit AA-29 Stereo Amplifier...189.95

And you'll be happy with its performance because it's the integrated amplifier section from our popular AR-29 stereo receiver. Power enough to drive even inefficient speakers; less than 0.25% distortion at full output; complete input level controls including tape monitor; slider-type main controls; push-button selector switches including two for main and remote speaker systems. Compare it with any for value...you'll build the AA-29.

Kit AA-29, 27 lbs., (less case), mailable 189.95

AE-19, Oiled pecan veneer case, 9 lbs., mailable 21.95

AA-29 POWER OUTPUT: 35 WATTS, MINIMUM RMS, PER CHANNEL INTO 8 OHMS AT LESS THAN 0.25% TOTAL HARMONIC DISTORTION FROM 20-20,000 HZ.

OTHER SPECIFICATIONS — Same as amplifier section of AR-29 receiver but includes additional aux and tuner inputs.



And here's the happy medium tuner...

D) Heathkit AJ-29 AM/FM Stereo Tuner...199.95

It's right out of our AR-29 stereo receiver and styled to match the AA-29 amplifier above. Good looks, good performance for those who prefer the flexibility of separate components. The preassembled FET FM tuner has 1.8 μ V sensitivity; IC multiplex; 3 ICs and a 9-pole filter in the IF for ideally shaped bandpass with 70 dB selectivity for good alternate channel rejection and no alignment ever. Even the AM sounds like FM. Build and enjoy.

Kit AJ-29, 19 lbs., (less case), mailable 199.95

AE-19, Oiled pecan veneer case, 9 lbs., mailable 21.95

OTHER SPECIFICATIONS — Same as tuner section of AR-29.

One of our best high-power amplifiers...

E) Heathkit AA-15 Stereo Amplifier...199.95

Immodest power levels at a modest price. Compare and you'll agree. It's the amp. section from our famous AR-15 stereo receiver with all its virtues... outstandingly flat frequency response...plenty of power... switches for main and remote stereo speakers, tape monitor, and loudness. Two headphone jacks. Flip-down name panel gives easy access to complete input level controls. Simplified circuit board construction. Check that power and that price.

Kit AA-15, (less case), 37 lbs., mailable 199.95

AE-18, Walnut veneer cabinet, 8 lbs., mailable 21.95

AA-15 POWER OUTPUT: 50 WATTS, MINIMUM RMS, PER CHANNEL INTO 8 OHMS AT LESS THAN 0.5% TOTAL HARMONIC DISTORTION FROM 20-20,000 HZ.

OTHER SPECIFICATIONS — Frequency Response: (1 W): ± 1 dB, 8 to 40 kHz. Damping Factor: 45. Hum & Noise: Phono, — 60 dB; Tape & Aux., — 65 dB. Channel Separation: Phono, 45 dB; Tape & Aux., 55 dB. Power Requirement: 120/240 VAC, 50-60 Hz, 240 W @ full output. Dimensions: 4¾" H x 16¾" W x 12½" D.

The tuner that made the industry envious.

F) Heathkit AJ-15 FM Stereo Tuner...259.95

This is the tuner section from our famous AR-15 stereo receiver... and it was primarily the tuner section of the AR-15 that startled everyone. Because it hadn't been done before. It was the first to use integrated circuits, the first to use crystal filters, the first with super specs... and it's still first in the hearts of thousands of owners. Enjoy its fine performance and easy construction.

Kit AJ-15, (less case), 18 lbs., mailable 259.95

AE-18, Walnut veneer cabinet, 8 lbs., mailable 21.95

AJ-15 SPECIFICATIONS — TUNER SECTION — Frequency Response: ± 1 dB, 20-15 kHz. Sensitivity: 1.8 μ V*. Selectivity: 70 dB*. Image Rejection: 90 dB*. IF Rejection: 90 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 midfrequencies. Frequency Response: ± 1 dB 20-15 kHz. Power Requirements: 120/240 VAC, 50-60 Hz, 0.25 W. Dimensions: 4¾" H x 16¾" W x 12½" D.

*Rated IHF (Institute of High Fidelity Standards).

Charge a kit — no money down on any kit — up to 2 years to pay — see order blank for details.

Heathkit Stereo "Super-Amp"

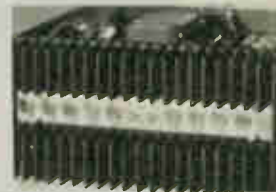


439⁹⁵
less meters

**COMING
JANUARY**

*Matching Preamplifier
and Audio-Equalizer.*

*Perfect for use with
AA-1640 Super-Amp.*



No fans needed. The 16 output transistors have 12 lbs. of heat-sink to assure adequate heat dissipation even for PA applications.



Optional peak-responding meters — read directly, instantly, from 0.2 to 200 watts and in dBs. Most useful design. Order with amp. and save.

Read Julian Hirsch's AA-1640 review in the May issue of Stereo Review:

"Lifting the 58-pound amplifier gives one an immediate clue to its robust construction and conservative ratings."

"The meters are by far the most useful we have seen on an audio amplifier. We would go so far as to say that they are the *only* ones that have any practical utility for the listener, since they constantly show how close the amplifier is coming to its real limits and readings are unencumbered by the sluggish indications of averaging-type meters."

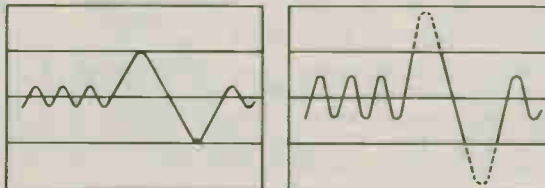
"The electrical performance of the Heath AA-1640 makes comment superfluous. In every respect it ranks with the finest high-power amplifiers on the market. We were constantly impressed with the conservatism of its construction and ratings."

Why super power?

Many hi-fi systems need a "super-amp" like the AA-1640 for good scientific and musical reasons. The basic reason is the way we hear. As sounds become louder, the ear becomes less sensitive. For example, for one sound to seem twice as loud as another (10 dB louder), requires 10 times as much power. A 3 dB change in loudness is barely audible, yet it requires twice as much power.

In an average size room, a pair of acoustic suspension speakers may require 20 watts per channel to produce a comfortable listening level — about 90 dB. But when a momentary musical peak of 10 dB comes along, that amplifier must try to produce 200 watts per channel. Tone controls, loudness circuits, and equalizers make similar demands. So, when you boost the bass or treble by 10 dB, you're again asking the amplifier to produce 200 watts per channel ... that's 1000% more power.

If your amp can't deliver that much power, it clips off the peaks as shown.



Unclipped & clipped signals in an amplifier

Clipping causes distortion — rough, raspy sounds. It also reduces the contrast or dynamic range between soft and loud passages, making the music sound constricted, dull, and unreal. Clipping also produces harmonics which not only alter the original sound, but also can actually damage your tweeters.

A high power amplifier can make a big difference in listening enjoyment. 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 new Heathkit AA-1640 can help them deliver their finest sound.

Heathkit AA-1640 Stereo Power Amplifier — low distortion and high power to make your music system sound its very best.

If you want the finest sound, you'll want the new Heathkit AA-1640 Stereo Power Amplifier. For sheer power and exceptionally low distortion, we believe it is one of the finest amplifiers ever made — 200 watts, minimum RMS, per channel into 8 ohms with less than 0.1% total harmonic distortion from 20-20,000 Hz. The specifications speak for themselves, yet they're only part of the story.

Strong and silent. Despite its enormous power, the AA-1640 is an exceptionally quiet amplifier... hum and noise are an inaudible 100 dB below full output. And you can enjoy all that quiet because there's no fan. Two 6-pound aluminum die-cast heatsinks cool the 16 output transistors... even when used as a PA amplifier, it needs only normal ventilation.

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

Optional peak-responding meters continuously monitor the output. The back-lighted meter scales have linear calibrations from -30 to +3 dB. They also can be read directly in watts from 0.2 to 200 watts into 8 ohms. They even respond to record clicks, making them useful as overload indicators. They can be installed when the amplifier is built, or later. But if you buy the amp and meters together, we'll take \$19.95 off the regular purchase price.

Front panel controls include pushbutton power on/off, left and right channel gain controls, and LED power and high temperature indicators.

Hear music as you've never heard it before... add the AA-1640 to your stereo system. It's an experience in super sound.

Kit AA-1640, less meters, 72 lbs., mailable 439.95

Kit AAA-1640-1, Output meters only, 4 lbs., mailable 69.95

Kit AA-1640 & Kit AAA-1640-1, 72 & 4 lbs., mailable 489.95

AA-1640 POWER OUTPUT — 200 WATTS, MINIMUM RMS, PER CHANNEL INTO 8 OHMS WITH LESS THAN 0.1% TOTAL HARMONIC DISTORTION FROM 20-20,000 HZ.

OTHER SPECIFICATIONS — Frequency Response (1 watt): -1 dB, 7 Hz to 50k Hz; -3 dB, 5 Hz to 100k Hz. Intermodulation Distortion: less than 0.1% from .25 to 200 watts, (60 Hz and 7000 Hz mixed 4:1). 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.

Low Cost Stereo & 4-Channel Components

139⁹⁵



Best-Buy AM/FM Stereo Receiver

Modern tuner design. The preassembled combination AM/FM front end offers 5 μ V sensitivity for distant station reception. Ceramic filters provide 60 dB selectivity to remove alternate channel interference. AFC keeps stations locked on frequency. Integrated circuits in the FM IF assure clean, quiet reception.

Direct-coupled amplifier design with an honest 4.5 watts, minimum RMS, per channel at 8 ohms from 50-15,000 Hz with less than 1% total harmonic distortion. Easy-to-use slider volume control and channel balance; ganged rotary bass and treble controls. Inputs for ceramic cartridge changer and stereo tape player. Handsome walnut-grained vinyl-clad plastic and metal enclosure is included, no extras to buy.

Easy to build. Five circuit boards hold most of the parts and just a few simple adjustments bring it to its rated performance.

Kit AC-1118, Receiver, 15 lbs., mailable 139.95

Kit AS-1140, Pair of speakers, 15 lbs., mail., Was 37.95, SALE 29.95

ACP-1138, Changer with ceramic cartridge, 15 lbs., mailable . . 44.95

Order with speakers, or with speakers and changer, and save 5%.



179⁹⁵

AM/FM/8-Track Stereo Receiver

Today's design, with extra performance. Preassembled combination AM/FM front end for sensitive reception; ceramic filters for excellent selectivity; automatic frequency control; integrated circuit FM IF strip; phase-locked-loop integrated circuit multiplex demodulator; stereo headphone jack; complete controls; and handsome cabinet. 4.5 watts, min. RMS, per channel into 8 ohms with less than 1% total harmonic distortion from 50-15,000 Hz.

Built-in 8-track stereo tape player. And it's all factory assembled and aligned, even the pre-amps are built... just drop it into place and connect the input and output. Full featured, too, with synchronous motor for low wow and flutter figures, automatic or manual program change, and lighted program indicators to tell you which track is playing.

Kit AC-1120, Receiver/Player, 22 lbs., mailable . . 179.95

Kit AS-1140, Pair of speakers, 15 lbs., mail., Was 37.95, SALE 29.95

ACP-1138, Changer with ceramic cartridge, 15 lbs., mailable . . 44.95

Order with speakers, or with speakers and changer, and save 5%.



SAVE \$40⁰⁰ NOW ONLY \$199⁹⁵

AM/FM/8-Track 4-Channel Receiver

4-channels of featured performance. Preassembled sensitive combination AM/FM front end; ceramic filters; automatic frequency control; ICs in the FM IF section; phase-locked-loop IC multiplex demodulator; and two headphone jacks for stereo or 4-channel. The 4-channel amplifier will function as 4 discrete channels, and the built-in SQ* decoder may be used to decode matrixed 4-channel records or broadcasts (also enhances stereo records).

4-channel 8-track tape player, all preassembled and aligned, and is fully compatible with 4-channel or stereo tapes, switching automatically between the two.

Kit AC-1122, 25 lbs., mailable . . Was 239.95 NOW 199.95

Kit AS-1140, Pair of speakers, 15 lbs., mail., Was 37.95, SALE 29.95

ACP-1138, Changer with ceramic cartridge, 15 lbs., mailable . . 44.95

Order with speakers, or with speakers and changer, and save 5%.

*SQ is a trademark of CBS, Inc.



SAVE \$70⁰⁰

NOW ONLY \$99⁹⁵



8-Track 4-Channel Tape Player/Amplifier

Direct-coupled 4-channel amplifier. Use it as 4 discrete channels, or switch in its self-contained SQ* decoder to enjoy matrixed 4-channel material or enhance your stereo tapes and records. Two extra sets of inputs accept ceramic cartridge changer and any high-level stereo or 4-channel source. Two headphone jacks for stereo or 4-channel phones. Cabinet is included.

4-channel 8-track tape player, preassembled and aligned, ready to connect, accepts 4-channel or stereo tapes with auto-switching.

Kit AT-1124, 21 lbs., mailable . . . Was 169.95 NOW 99.95

Kit AS-1140, Pair of speakers, 15 lbs., mail., Was 37.95, SALE 29.95

ACP-1138, Changer with ceramic cartridge, 15 lbs., mailable . . 44.95

Order with speakers, or with speakers and changer, and save 5%.

*SQ is a trademark of CBS, Inc.

These Fine Performance 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.

OTHER SPECIFICATIONS — 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 — (Monophonic) — Sensitivity*: 5 μ V. Selectivity*: 60 dB. Harmonic Distortion*: 1%. Hum & Noise: -55 dB. Frequency Response: 50-15,000 Hz, ± 3 dB. (Stereophonic) — Channel Separation: 35 dB. Harmonic Distortion: 1.5%. FM Antenna: 300-ohm, external.

AM — Sensitivity: 300 μ V/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



44⁹⁵

3-speed automatic changer, molded vinyl base, dust-cover, 45-rpm adaptor, low-mass tone arm, ceramic cartridge with diamond stylus, all cables. 7 $\frac{1}{4}$ " H x 15 $\frac{1}{4}$ " W x 14 $\frac{1}{8}$ " D.

ACP-1138, 15 lbs., mailable 44.95

Save on Matching Speakers

Efficient infinite baffle design for 2 to 10 watt amplifiers. Each has a 4 $\frac{1}{2}$ " foam suspension speaker with 3 oz. ceramic magnet. Useful response, 70-16,000 Hz, flat from 100-10,000 Hz ± 5 dB. Walnut-grain, vinyl-clad enclosure measures 12" H x 7" W x 6" D. Impedance is 8 ohms.

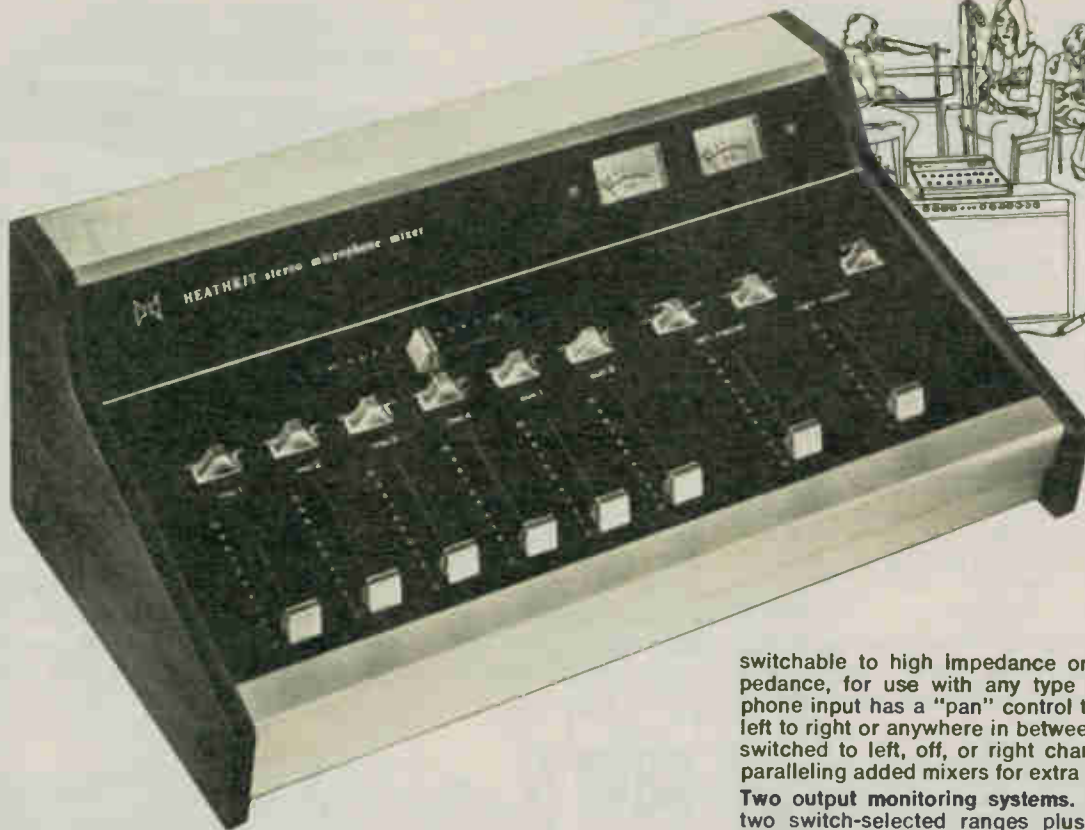
Kit AS-1140, 15 lbs., mail. . . . Was 37.95, SALE 29⁹⁵* Pair



SAVE \$8⁰⁰

**Hurry, sale prices end January 2, 1976!*

Tape it better with a Heathkit Mixer



Real versatility—4 mike inputs (hi or lo Z); 2 aux. inputs; 2 Master controls; 2 metered outputs (stereo or mono); parallel added units for extra capacity.



Lighted meters with 2 switch-selected ranges monitor each channel. LEDs respond to instantaneous peaks and can be preset to any level.

Stereo Mike Mixer — a hi-fi mixing console unmatched in versatility and value

High fidelity performance. The wide response (40-20,000 Hz, ± 1 dB) and low distortion (0.5%) of the new solid-state TM-1626 will give you clean, like-like mixing capability.

Versatile switching for complete flexibility. 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.

Two output monitoring systems. 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 in black with walnut stained veneer end panels. Build this quality mixer into your recording system now.

Kit TM-1626, 12 lbs., mailable 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 dBV 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 $\frac{3}{8}$ " H x 16" W x 9 $\frac{7}{8}$ " D.

Fully-Assembled Heath Stereo Equipment Cabinets

Last Call



Last Call



Luxuriously finished Early American Cabinet

Distressed maple stain finish accents your Traditional home furnishings. Constructed of finest furniture grade solids & veneers. The bifold doors feature magnetic latches and brass-plated simulated thumb-latches. There's room inside for your stereo system and records. A full-width top shelf, plus two side-by-side lower compartments with adjustable shelves provide lots of flexible storage space.

AE-1087, cabinet, 152 lbs., Express/Frt. 259.95
AEA-101-3, slide shelf accessory, 9 lbs., mailable 24.95

EARLY AMERICAN CABINET OVERALL: 29 $\frac{1}{4}$ " H x 48 $\frac{3}{4}$ " W x 22 $\frac{7}{8}$ " D. **TOP COMPARTMENT:** 8 $\frac{1}{2}$ " H x 43 $\frac{3}{4}$ " W x 19 $\frac{3}{8}$ " D. **BOTTOM COMPARTMENTS (EACH):** 13 $\frac{3}{4}$ " H x 21 $\frac{1}{2}$ " W x 19 $\frac{3}{8}$ " D (two removable shelves provided, adjust height in 2" increments). **SLIDE SHELF ACCESSORY:** 15 $\frac{3}{8}$ " W x 14" D.

Elegant Contemporary Equipment Cabinet

A new standard of elegance. The total impression is luxurious—hardwood veneers and solids with oiled walnut stain finish, striking pedestal base, sculptured bronze handles. The magnificently latched bifold doors open to reveal a full-width top shelf and two lower compartments with two adjustable shelves.

AE-1067, cabinet, 132 lbs., Express/Frt. 229.95
AEA-101-3, slide shelf accessory, 9 lbs., mailable 24.95

CONTEMPORARY CABINET OVERALL: 28 $\frac{3}{8}$ " H x 46 $\frac{3}{8}$ " W x 22 $\frac{3}{4}$ " D. **TOP COMPARTMENT:** 7" H x 42 $\frac{3}{4}$ " W x 19 $\frac{3}{8}$ " D. **BOTTOM COMPARTMENTS (EACH):** 13 $\frac{3}{4}$ " H x 21 $\frac{1}{2}$ " W x 19 $\frac{3}{8}$ " D (two removable shelves provided, adjust height in 2" increments). **SLIDE SHELF ACCESSORY:** 15 $\frac{3}{8}$ " W x 14" D.

Mediterranean credenza

Houses your entire stereo system — including speakers. One-piece, 5 $\frac{1}{2}$ -foot credenza crafted in hickory veneers with solid oak trim and finished in pecan stain. Adjustable shelf holds your tuner, amplifier or receiver. Below, there's room for a turntable and record storage. Built-in ducted port speaker enclosures have pre-cut 12" openings.

AE-101, credenza, 193 lbs., Express/Frt. 259.95

CABINET OVERALL: 26 $\frac{7}{8}$ " H x 66" W x 19 $\frac{1}{4}$ " D. **SHELF COMPARTMENT:** (A&B) overall, 35 $\frac{1}{2}$ " W x 17 $\frac{1}{2}$ " D (shelf 15" D), adjustable shelf height: 5 $\frac{1}{2}$ ", 6 $\frac{1}{2}$ ", 7 $\frac{1}{2}$ ", 8 $\frac{1}{2}$ ". **LOWER COMPARTMENT:** (C): 35 $\frac{7}{8}$ " W x 17 $\frac{1}{2}$ " D x 12 $\frac{1}{4}$ " H min. (with shelf at 8 $\frac{1}{2}$ "). **SPEAKER CABINET VOLUME:** (D): 2.3 cu. ft. **CHANGER BASE:** 5 $\frac{1}{2}$ " H x 18 $\frac{1}{2}$ " W x 14" D.

and a Heathkit Stereo Tape Deck

Dolby® Stereo Cassette Deck...279.95

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 performance. The preassembled and aligned tape transport is one of the best and most reliable in the industry. To that, we added our own custom-designed electronics with famous Dolby noise reduction. Building the AD-1530 is easy — just wire the modular circuit boards and plug them into the preassembled transport. Features include two VU meters, a level control for each channel tape counter, switch for regular and CrO₂ tapes, a switch to select auxiliary or microphone inputs, standard ¼" jacks for low-impedance mikes, automatic end of tape shutoff in record and play. Includes test cassette and blank 60-minute cassette, walnut-stained wood veneer base. Add the AD-1530 to your system now.

Kit AD-1530, 20 lbs., mailable279.95

ADA-1530-1, dust cover, 1 lb., mailable6.95

AD-1530 SPECIFICATIONS: Frequency Response: Iron oxide tape; ±3 dB, 40 — 12 kHz typical. Chromium dioxide tape; ±3 dB, 40 — 14 kHz typical. Distortion: Tape dependent; electronics less than 0.2%. Hum and Noise: -48 dB, Dolby provides up to 10 dB additional noise reduction. Wow and Flutter: Less than 0.25% rms. Inputs: Microphone: Lo-Z, 0.2 mV to 10 mV. Fast Forward/Rewind Time: Approximately 45 sec. for C-60 cassette. Output: Greater than 0.5 volts from low impedance source. Dimensions: 5½" H x 9½" D x 14" W. Power Requirement: 120 volts, 60 Hz, 15 W.



Stereo Cassette Deck...154.95

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, 12 lbs., mailable154.95

ADA-110-1, Pair of dynamic microphones, 2 lbs., mailable22.95

AD-110 SPECIFICATIONS — Frequency Response: ±3 dB from 30-12,000 Hz (record-play). Hum & Noise: -45 dB. Wow & Flutter: less than .25% WRMS. Output: Greater than .5 v. Power Requirement: 120/240 VAC, 60/50 Hz, 7 watts. Dimensions: 3½" H x 13½" W x 11" D.



Teac 2300S Reel-to-Reel Stereo Deck...549.50

Professional features and performance plus the rugged construction and outstanding reliability that have made Teac famous. 3-head, 3-motor design, logic circuitry for smooth tape handling; bias/equalization for high-energy or standard tapes; professional VU meters; mike/line mixing; total remote control capability.

Walnut end-panels. Fully assembled.

ATP-1072, 51 lbs., Express/Frt.549.50

SPECIFICATIONS — Recording system: 4-track, 2-channel stereo. Tape speed: 7½ ips, 3¾ ips, (±0.5%). Reel size: 7" max. Rewind and fast-forward time: 140 sec./1,800'. Wow and flutter: 0.08% (7½ ips), 0.10% (3¾ ips). Frequency response: (Hz): 25-24k (±3 dB, 30-20k at 7½ ips), 25-16k (±3 dB, 30-13k at 3¾ ips). Signal-to-noise ratio: 58 dB. Harmonic distortion: 1% at 1 kHz normal operating level. Crosstalk: 60 dB at 1 kHz. Stereo channel separation: 50 dB at 1 kHz. Microphone input impedance: 600 ohms. Input sensitivity: -72 dB (0.25 mV). Line input impedance: 100k ohms. Input sensitivity: 0.1V. Stereo headphone jack impedance: 8 ohms. Line output impedance: 10k ohms. Output level: 0.3 V. Power requirement: 117 V. AC, 60 Hz, 95 W. Dimensions: 17¼" x 15¼" x 8¾".

Questions and Answers About Tape Recording — advice on everything related to recording; alphabetical sections run the gamut from "accessories" to "weak sound."
EDP-1075.95

How to Select/Use/Troubleshoot Cassette and Cartridge Recorders — everything you need to know about how to select, use, maintain recorders. EDP-1954.55

Heath Separate Speakers for Custom Sound Systems



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, 15 lbs., mailable89.95
Pair (AS-27-2), 33 lbs., mailable170.00

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".

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

Model AS-183, 15 lbs., mailable69.95
Pair (AS-183-2), 39 lbs., mailable133.00

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, 12 lbs., mailable44.95
Pair (AS-163-2), 32 lbs., mailable85.00

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".

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

Model AS-153, 10 lbs., mailable26.95
Pair (AS-153-2), 28 lbs., mailable49.00

AS-152 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".

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, 6 lbs., mailable24.95
Pair (AS-133-2), 18 lbs., mailable47.00

AS-123 SPECIFICATIONS — Impedance: 8 ohms. Cone resonance: 70 Hz. Magnet weights: 10 oz., 0.68 oz. Voice coil sizes: 1" and ¾".

8" Dual Cone...3½" deep; 50-12,000 Hz response; handles up to 12 W; 1-yr. guarantee.

Model AS-123, 5 lbs., mail . . Was 12.95, Now 9.95
Pair (AS-123-2), 15 lbs., mail Was 24.00, Now 18.00

AS-123 SPECIFICATIONS — Impedance: 8 ohms. Cone resonance: 70 Hz. Magnet weight: 10 oz. Voice coil size: 1".

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, 3 lbs., mailable14.95



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-111,4.95

Charge a kit — no money down on any kit — up to 2 years to pay — see order blank for details.



New high-performance 3-way speaker



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

Available November

Our new AS-1373 could be one of the best-sounding \$250 speakers in the world. But we sell it for just \$149.95!

The new "value-standard" bookshelf system. There are many good speakers — Advent, AR, KLH, Epicure and others. The new Heathkit AS-1373 competes with their medlum-priced models — but only in price. Its performance rivals systems costing \$250 or more!

The specifications are excellent, honest and detailed. Useful response extends from 30 Hz to 22,000 Hz and is within ± 3 dB from 40-20,000 Hz...which is exceptional for any speaker. But in a speaker that sells for this low price, it is amazing. And we're so confident of our design that each performance specification is a guaranteed minimum!

But numbers can't begin to describe the sound. 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 4 1/2" 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.

Efficiency plus power handling. Although the AS-1373 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. And for easy bookshelf or wall mounting, the controls and fuses are accessible from the front by simply removing the grille.

Designed to be seen as well as heard. The sturdy acoustic suspension enclosure is covered on all four sides and the front with luxurious walnut veneer. Even without its grille, the AS-1373 is a beautiful addition to any room. And the foam grille, which comes in black, can be spray painted to suit your room's color scheme.

Easy to build — even for first-time kitbuilders. Assembly requires just 7-8 hours per system and when you're finished, you'll own a better-sounding speaker than you thought possible at this low price.

Kit AS-1373, 50 lbs., Express/Frt. 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, 1 1/4A slow-blow; midrange, 3/4A slow-blow; tweeter, 1/2A regular. **WOOFER Diameter:** 10", nominal. **Magnet Weight:** 2 lbs. **Power Handling:** 400 watts, pulse (if not excursion limited); 40 watts continuous. **MID-RANGE Diameter:** 4 1/2", 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 14 1/2" W x 11 1/2" D, without 1 1/4" grille. **Net Weight:** 47 lbs.

Low-cost speakers with famous Heathkit sound quality

SAVE
13⁹⁵
per pair



A)



B)

A) Our lowest-priced acoustic suspension speaker on sale for just 39.95 per pair

Clean, well-balanced sound, the kind you'd expect from larger, more expensive speakers. A high-compliance 4 1/2" 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 an evening.

Kit AS-106, 10 lbs., available each 26.95

Kit AS-106-2, 25 lbs., available Reg. 53.90 SALE 39.95, pair*

B) Two-way bookshelf speaker 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 3 1/2" cone/dome tweeter. A high-frequency level control. 24" H x 13 1/2" W x 11 1/2" D. 8 ohms.

Kit AS-105W, 52 lbs., Express/Frt. each 89.95

Compare performance & price - Heathkit speakers are your best buy



A) Heath/Altec-Lansing system...339.95

Combine Heathkit engineering with Altec-Lansing speakers, the result is audio excellence. The AS-101 is a bass reflex design with a high compliance 15-in. woofer. The woofer has a 10 1/2-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 1 3/4-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. 29 5/8" H x 27 3/4" W x 19 7/8" D.

Kit AS-101, 128 lbs., Express/Frt. each 339.95



B) High-efficiency 2-way system...57.95

Designed for low power amplifiers, it can be driven by 5 watts yet can handle up to 25 watts. Has 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. 21 1/2" H x 12" W x 10 1/2" D.

Kit AS-1039, 36 lbs., mailable each 57.95

C) "Best value" 2-way system...47.95

Good sound on a low budget. A high compliance, long throw 8" woofer and 3 1/2" shallow cone/dome tweeter deliver response from 40 to 18,000 Hz. The cross-over system operates at 1500 Hz with 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 walnut-toned vinyl. 19" H x 10" W x 8 1/4" D.

Kit AS-1042, 27 lbs., mailable each 47.95

D) 3-way acoustic suspension system...109.95

The Heathkit AS-104 has the 100 watt power-handling capacity and features of the AS-105 but adds a low resonance, high compliance 4 1/2-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. The assembled oiled walnut veneer cabinet has a removable front grille. Dimensions are 24" H x 13 1/2" W x 11 1/2" D.

Kit AS-104, 54 lbs., Express/Frt. each 109.95

E) Heathkit/JBL system...239.95

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 11 1/2-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 23 1/2" W x 12" D.

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

F) Heathkit/AR speaker system...219.95

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 25 W rms. 25" H x 14" W x 11 3/4" D.

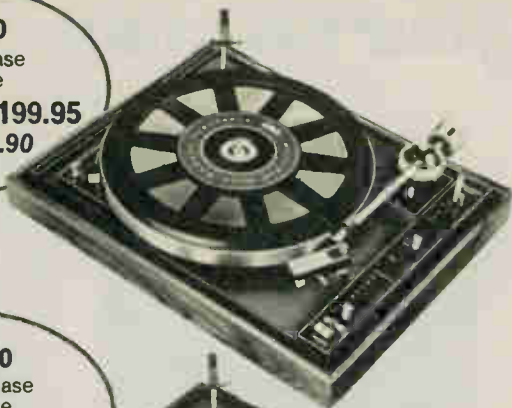
Kit AS-103A, 64 lbs., Express/Frt. each 219.95



Charge a kit — no money down on any kit — up to 2 years to pay — see order blank for details.

Free base & cartridge worth up to \$86⁹⁰

A)
B-I-C 980
 with FREE base
 & cartridge
Heath Price 199.95
Save to 86.90



B)
B-I-C 960
 with FREE base
 & cartridge
Heath Price 159.95
Save to 86.90



C)
B-I-C 940
 with FREE base
 & cartridge
Heath Price 109.95
Save to 86.90



D)
BSR 510A/X
 with FREE base,
 dustcover & cartridge
Heath Price 84.95
Save to 23.85



A) B-I-C 980 automatic turntable

Now B-I-C has combined performance and reliability with the convenience of a changer. The heart of the drive system is a 24-pole synchronous motor with totally electronic speed control. The tonearm's counterbalance is isolated to reduce feedback and resonances. A unique programming panel eliminates trouble-prone parts found in ordinary changers while it adds versatility—play a single disc once or up to six times or play a stack of up to 6 records. 33½ and 45-rpm operation, pitch control, strobe, adjustable viscous-damped cueing. And, with the purchase of a "980", you can order a free base and your choice of a Shure M91ED or Empire 2000E/111 cartridge. For even finer sound, you can substitute the Shure V-15 Type III cartridge or the Audio-Technica AT-14S for just \$35 extra. 4½" H x 15½" W x 12¼" D above mounting board, 1½" below.

ACP-1167, 13 lbs., mailable 199.95

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

All the performance & reliability of the B-I-C 980, but without electronic speed control, adjustable pitch and strobe. When you order a "960", you can also order a bonus worth up to \$86.90—a base and your choice of a Shure M91ED or Empire 2000E/111 cartridge—at no additional cost. 4½" H x 15½" W x 12¼" D above mounting board, 1½" below.

ACP-1166, 12 lbs., mailable 159.95

C) New B-I-C 940 belt-drive automatic turntable at a budget price

Like other B-I-C turntables, the "940" uses belt-drive and a low-speed, 24-pole synchronous motor to dramatically reduce wow, flutter and rumble. It also offers the convenience of a changer which will play up to six records. Extremely low-friction bearings and an isolated counterweight allow the tonearm to track even the highest-quality cartridges. Four isomer shock mounts guard against vibration and acoustic feedback better than conventional springs. Other features include: viscous-damped cueing, full-sized 12" platter, 33½ and 45-rpm operation, CD-4 compatibility. When you order a "940", we'll give you a base and your choice of a Shure M91 ED or an Empire 2000E/111 cartridge — at no extra cost. 4½" H x 15½" W x 12¼" above mounting board, 1½" below.

ACP-1161, 11 lbs., mailable 109.95

ACCESSORIES FOR ALL B-I-C TURNTABLES

- ADP-1163, Solid oiled walnut base, 4 lbs., mailable 16.95**
- ADP-1164, Hinged dustcover, 4 lbs., mailable 9.95**
- ADP-1165, 45-rpm spindle, 1 lb., mailable 3.95**

D) Ready-to-play Heath/BSR 510A/X Changer System

Great for budget systems. The low-mass tonearm features micrometer tracking force adjustment, viscous-damped cueing. Synchronous motor provides 33½, 45 and 78-rpm operation. Includes auto and manual spindles, base, dustcover and factory-mounted Shure M75-ECS magnetic cartridge with elliptical stylus. Save \$23.85 over the suggested retail price of the complete system. 15¼" W x 14¼" D, including base and dustcover.

AD-1135, 15 lbs., mailable 84.95

AD-1037, optional 45 rpm spindle, 1 lb., mailable 1.95

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

E) Shure V-15 Type III Stereo Cartridge

One of the finest cartridges in the world — famous for its excellent tracking ability and smooth, uncolored sound. In every respect, a superlative listening experience. For use in tonearms capable of tracking at ¾ to 1¼ grams.

AD-1059, 1 lb., mailable 72.50

With turntable purchase 35.00

F) New Audio-Technica AT-14S Stereo/Quadraphonic Cartridge with Shibata stylus

Provides the extended frequency response and excellent separation necessary for playing discrete 4-channel records—and it's also a great stereo cartridge. The specially-shaped and polished Shibata stylus reduces wear by distributing tracking force evenly in the groove—record wear is dramatically reduced and the stylus itself lasts twice as long as an elliptical stylus. Tracking at 2 grams, actual record wear is equivalent to an elliptical stylus tracking at 0.5 grams! An exceptional cartridge for stereo or 4-channel systems.

ADP-1139, 1 lb., mailable 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 Shure M91 ED	20-20,000	5.0 mV	25 dB	0.2 x 0.7	¾ to 1½ gr.	54.95	FREE
ADP-1147 Empire 2000E/111	5-35,000	5.0 mV	35 db	0.2 x 0.7	½ to 1½ gr.	69.95	FREE
AD-1059 Shure V-15 Type III	10-25,000	3.5 mV	28 dB	0.2 x 0.7	¾ to 1¼ gr.	72.50	35.00
ADP-1139 Audio-Technica AT-14S	5-45,000	2.7 mV	25 dB	Shibata	1-2	69.95	35.00

with any turntable purchase

G) New Dual belt-drive automatic turntable

The finest automatic turntable Dual has ever made — the Dual 1249. Belt-drive reduces rumble to -63 dB (DIN weighted) with less than ±0.06% wow and flutter. The new gimbal-mounted tonearm will track the finest cartridges with ease. A selector at the base of the tonearm maintains correct vertical tracking angle in automatic or manual modes. Another switch lets you replay a single record continuously. Includes built-in strobe, variable pitch, anti-skating, damped cueing, 8-pole synchronous motor, 4.5-lb. flywheel/platter, 33½ and 45-rpm, CD-4 compatible. And when you buy a "1249" you get a free bonus — a base and your choice of a Shure M91 ED or Empire 2000E/111 cartridge. Or, if only the very finest will do, substitute the Shure V-15 Type III or Audio-Technica AT-14S cartridge for just \$35 extra. 4½" H x 14¾" W x 12½" D, less base.

- ACP-1148, 15 lbs., mailable 279.95
- ADA-49-1, Walnut-stained wood base, 5 lbs., mailable 16.95
- ADA-49-4, Dustcover, 5 lbs., mailable 15.95
- ADA-39-2, 45-rpm spindle, 1 lb., mailable 9.95

H) 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, 33½ and 45-rpm operation, CD-4 compatible. And here's a special bonus worth up to \$84.90. When you order a "1228", you can also order a base and your choice of a Shure M91 ED or Empire 2000E/111 cartridge at no extra cost! 13" W x 10¾" D x 5" above motor board, 2¾" below.

- ACP-1142, 18 lbs., mailable 199.95
- ADA-39-1, Walnut-stained wood base for 1228, 5 lbs., mailable 15.95
- ADA-1218-1, Dustcover for 1228, 3 lbs., mailable 12.95
- ADA-39-2, 45-rpm spindle, 1 lb., mailable 9.95

I) New Garrard belt-drive automatic turntable

An outstanding combination—the famous Zero Tracking Error tonearm and a totally new belt-drive turntable mechanism — Garrard Z 2000B. Plus the most sought-after features — damped cueing, magnetic anti-skating, built-in strobe, variable pitch, vertical tracking angle adjustment, 33½ and 45-rpm operation. Completely compatible with CD-4. And here's a special Heath bonus — when you buy a "Z 2000B" you can order a base and Shure M91 ED or Empire 2000E/111 cartridge at no extra cost! 4¾" H x 15¾" W x 14¾" D above mounting board, 2¾" D below.

- ACP-1179, 17 lbs., mailable 229.95
- ADP-1178, Walnut-grained vinyl-clad base, 7 lbs., mailable ... 15.95
- ADP-1177, Dustcover, 3 lbs., mailable 9.95
- ADA-100-2, 45-rpm spindle, 1 lb., mailable 5.95

J) Thorens TD-160C belt-drive manual turntable

Performance of the highest caliber 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 available. Viscous-damped cueing; 33½ and 45-rpm operation with 45-rpm adapter. Includes walnut-stained wood base and hinged dustcover. With the purchase of a Thorens TD-160C you can have your choice of a Shure M91 ED or Empire 2000E/111 cartridge—worth up to \$69.95 and it's free! Or, if you want one of the finest turntable/cartridge combinations in the world, a Shure V-15 Type III or Audio-Technica AT-14S cartridge costs just \$35 when ordered with the Thorens. 7¾" Hx17" Wx13½" D.

- ACP-1099, 26 lbs., mailable 230.00

G)
Dual 1249
with FREE base
& cartridge
Heath Price 279.95
Save to 86.90



H)
Dual 1228
with FREE base & cartridge
Heath Price 199.95
Save to 85.90



I)
Garrard Zero 2000B
with FREE base & cartridge
Heath Price 229.95
Save to 85.90



J)
Thorens TD-160C
with FREE base,
dustcover & cartridge
Heath Price 230.00
Save to 69.95



Save an additional 5% on Heathkit hi-fi systems

Here's another way Heath helps you get more good sound for your money. Just order a complete Heathkit stereo or quadraphonic system and save an extra 5%.

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. Or, you can choose one of the carefully matched systems on pages 35-38—we've even done the arithmetic for you!

Either way, you'll get a superb system at substantial savings. And 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 headphone control box. The only exception is the CR-1000A automotive FM tuner.

Pick your own "dream system". See how little great sound costs.

	Price
Speakers	
Receiver OR Amplifier & Program Source	
Accessories	
<hr/>	
Total Price	
Less 5% Discount	
Heath System Price	

Charge a kit — no money down on any kit — up to 2 years to pay — see order blank for details.

Here's how to order Heathkit equipment



BY TELEPHONE: Use the Heath "Hotline" Call 616-982-3411

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.

The Heath phone order desk can handle revolving charge, COD, and commercial account orders. The people on the order desk can advise you about product availability and during daytime hours they also can answer many product questions.

To get your order moving, call the "hotline" at 616-982-3411 anytime. As with all orders, we will do our best to process it and ship it to you as fast as possible. You will find it an excellent way to purchase Heathkit equipment.

Replacement Parts Orders: 982-3571

Use this number for parts orders, weekdays only, from 8 A.M. to 4:30 P.M., EDT.

Technical Assistance: 982-3302

If you need help building a kit, or have a service problem, call this number, weekdays only, from 8 A.M. to 4:30 P.M., EDT.

General Office: 982-3200

Use this number for general office calls or to call our International Sales and OEM Sales departments, weekdays 8 A.M. to 4:30 P.M., EDT.

BOOK ORDERS:

Do not calculate postage for book orders. Just add 35¢ to the price of each book for postage and handling.



BY MAIL:

1) 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.

2) Please give full ordering information. Be sure to give model number, description and price, exactly as shown in the catalog.

3) Total up your order. Please refer to the chart and calculate the shipping charges of each mailable item separately, and total up the amount. Items listed as "Exp./Frt" will be sent with transportation charges to be collected at destination.

4) Insurance for mailable items: Heath insures delivery to your destination. Enclose 50¢ for the first \$100 value and 25¢ for each additional \$100, or part thereof.

5) 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.

6) 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.

7) 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. Shipping charges are higher for these large, bulky items, so contact a local trucking company for an estimate of freight charges including any extra cost for residential delivery.

APO/FPO SHIPMENTS: We can send Heathkit models that are classified as "Mailable" to servicemen anywhere in the world. For APO and FPO addresses, use the following Zones to estimate mailing 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.

Include 50¢ for insurance for the first \$100 value of any kit ordered from this catalog. Insurance rates for orders over \$100 can be calculated by adding 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.

Zip Code Prefixes	Zone	Zip Code Prefixes	Zone	Zip Code Prefixes	Zone	Zip Code Prefixes	Zone	Zip Code Prefixes	Zone	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	400-405	3	493-495	1	629-668	4	834	6
109	4	284-285	5	407-409	4	496-499	3	669-679	5	835-838	7
110-119	5	286-297	4	410-412	3	500-518	4	680-687	4	840-847	6
120-123	4	298-299	5	413-422	4	520-524	3	688-693	5	850-864	7
124-126	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	3	770-778	5	930-934	8
154-160	4	330-334	6	458	2	541-546	3	779-789	6	935	7
161	3	335-338	5	460-462	3	547-548	4	790-792	5	936-960	6
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
200-232	4	360-361	4	473	2	573-588	5	806-807	6	988-994	7
233-237	5	362	4	474-475	3	590-597	6	808-818	6	995-999	8
238-259	4	363-369	5	476-477	4	598-599	7	820-822	5		

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	\$0.68	\$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	0.98	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	4.08	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. up to 50 lbs. total.	.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.

USE THIS FORM FOR MANUAL ORDERS ONLY—USE REGULAR ORDER BLANK FOR BOOK ORDERS

Enclosed is \$_____ Please send me the following Heathkit manual(s): (I understand that the price of the manual will be refunded when I order the kit.)

MODEL NO.(S): _____

NAME: _____

ADDRESS: _____

CITY: _____ STATE: _____ ZIP: _____

ORDER A HEATHKIT MANUAL

YOUR MONEY BACK WHEN YOU ORDER THE KIT

"Shop" a Heathkit manual before you buy...only \$2 (except Color TV, Organs, SB-104, HW-104, AN-2016, EK & EF series which are \$5) plus 50¢ each postage and handling. And we'll deduct the price of the manual when you buy the kit (just include the manual invoice with your kit order). Use this mini order blank for all manual orders. Note: This offer does not apply to EE-series Individual Learning Programs.

Note: When ordering Revolving Charge, please write current account number here to speed processing:

AA

HEATH COMPANY
a Schlumberger company
 Benton Harbor, Michigan 49022

ORDER FORM

① Please Print or Write Plainly — Always Use the Same Name.

Name _____

Street Address _____

City _____

State _____ Zip _____

TELEPHONE AREA CODE ▼ YOUR PHONE NUMBER ▼

NUMBER ▶

② Ship To Another Address?

Name _____

Street Address _____

City _____

State _____ Zip _____

③ We will ship Best Way unless you indicate preference below.

④ Include Zone from Chart

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	1	2	3	4	5	6	7	8	9	1	2	3	4	5	6	7
	P/L	COD	I	R	A/F	PAL	U	P	2	3	4	5	6	7	8	9	10	11	12	13	14	15																				

QUAN.	MODEL NUMBER	KIT DESCRIPTION	WT.	PRICE EA.	TOTAL

IMPORTANT:

1. Please use separate sheet to order parts or for any correspondence.

2. All prices quoted are net FOB Benton Harbor, Mich., and apply to the U.S., FPO and APO areas.

3. Prices and specifications subject to change without notice.

4. **MAILABLE ITEMS:** Figure charges for each model separately using indicated shipping weight, then remit total of all charges.

Heath Co. Catalog

⑦ **806**

If merchandise ordered from previous catalog, please list Catalog No. _____

⑩ **TOTAL FOR MERCHANDISE.** \$ _____

Add Sales Tax for deliveries in Michigan only.

Add Shipping Charges + Insurance (see chart) (50¢ for first \$100 25¢ each additional \$100)

\$ _____ + \$ _____ = _____

⑧ **TYPE OF ORDER (CHECK ONE)**

CASH Please use registered mail for currency.

C.O.D. 20% deposit required. Also include 85¢ C.O.D. fee.

REVOLVING CHARGE See reverse side for details.

ADD ON

⑨ **Is this your first order?**

YES NO

If no, list year of last purchase date: _____

Allowance if offered _____

CASH PRICE _____

Amount Due Previous Order. Inv. # _____

TOTAL AMOUNT. _____

LESS: Down Payment _____

20% C.O.D. Deposit _____

UNPAID BALANCE (Total Amount less Down Payment or C.O.D. deposit) _____

PLEASE DO NOT WRITE IN THIS SPACE

HEATH REVOLVING CHARGE PLAN

ABOUT HEATH'S REVOLVING CHARGE PLANS

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	[Periodic Percentage Rate]	[Annual Percentage Rate]
ALL BALANCES	1½ %	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										EXTENDED REVOLVING CHARGE									
Charge up to	\$150	200	250	300	350	400	450	500	550	Charge up to	\$400	500	600	700	800	900	1,000	1,100	1,200
Pay Monthly	\$10	15	20	25	30	35	40	45	50	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.**

Date _____ Sign here _____ (Customer's Signature)

CREDIT APPLICATION

Check Revolving Charge Plan Desired

NAME (Please Print) _____ (First Name) _____ (Middle Initial) _____ (Last Name) Regular Extended

ADDRESS _____

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 WIDOWED SINGLE DIVORCED 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)



Heathkit News and Views

President's Letter

Dear Friends:

There are three noteworthy milestones for the Heath Company occurring with this issue of the Heathkit catalog.

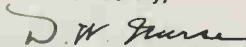
First, the introduction of the Heathkit Continuing Education series. This new Heath endeavor has been created to bring you interesting, up-to-date individual learning programs and self-instructional products. Realizing that electronic knowledge plays an important part in your life, we have developed a series of short "learning experiences" that we think will satisfy one of your current needs or interests. Heathkit Individual Learning Programs are designed to help you understand electronic subjects at varying levels of sophistication, and bring even greater enjoyment and personal satisfaction to your hobby of kit building. The first programs in this new series are described on pages 62-65.

Second, over 20 years ago Heath introduced its first amateur radio kit, the AT-1, a 25-watt, 4-band CW transmitter. Technical advances in electronics have been substantial since that time with Heath becoming a worldwide leader in the design of amateur radio equipment. In this catalog we introduce three new transceivers, the HW-104 5-band SSB, the HW-2021 2-meter hand-held, and the HW-2026 synthesized 2-meter fixed or mobile rig. These three significant new products are shown on pages 85-88.

Third, this catalog establishes a new record in that it contains the greatest number of new products ever introduced by the Heath Company at one time. They are the result of a decision we made several years ago to substantially increase the capability of our engineering department. That department, incidentally, now has nearly 200 employees.

These 200, and all of us at Heath, extend to you a Merry Christmas and the best of everything in the new year.

Sincerely,



David W. Nurse



NEW HEATH PHONE NUMBERS

Heath has converted to a Centrex phone system, allowing direct dialing to the department you need. Area code: 616.

Kit Orders & Ordering Information: 982-3411

Use this number for Revolving Charge, COD, or commercial account orders anytime, including nights and weekends.

Replacement Parts Orders: 982-3571

Use this number for parts orders, weekdays only, from 8 A.M. to 4:30 P.M., EDT.

Technical Assistance:

If you need help building a kit, or have a service problem, call these numbers, weekdays only, from 8 A.M. to 4:30 P.M., EDT. R/C, Audio and Electronic Organs — 982-3310; Amateur Radio — 982-3296; Test Equipment, Strobe Lights, Calculators, Clocks, Weather Instruments — 982-3315; Television — 982-3307; Automotive, Marine, Metal Locators, Appliances, Security, Shortwave & General Products — 982-3496.

General Office: 982-3200

Use this number for general office calls or to call our International Sales and OEM Sales departments, weekdays 8 A.M. to 4:30 P.M., EDT.

Order a Heathkit Manual ... your money back when you order the kit



If you've been wondering about a particular kit, but would like a chance to take a close look before you buy...just send for the manual. It costs only \$2 (except Color TV, Organs. SB-104, HW-104, AN-2016, EK and EF series which are \$5 and EE-series which are not available separately), plus 50¢ for postage and handling. Also, we give your money back on the manual when you buy the kit (see order form for complete details). Either way, Heath manuals are a bargain...many cost us more than this minimum charge.

Save 5% By Ordering A Complete Hi-Fi System

Here's how...(1) order a stereo or 4-channel amplifier and stereo program source (tuner turntable, tape deck) plus a pair of speaker systems or (2) a stereo or 4-channel receiver and a pair of speaker systems. Order the complete system at the same time, and subtract 5% from the total price. (Discount does not apply to automotive stereo components). NOTE: All system prices shown in this catalog already include 5% discount.

Other audio items related to the basic system and ordered at the same time such as turntables, tape decks, cabinets, additional speakers or speaker systems, AC-17 headphone control and antennas also qualify for the 5% discount.

HEATHKIT ELECTRONIC CENTERS (Sales and Service) Units of Schlumberger Products Corporation

ARIZONA

Phoenix, 85017
2727 W. Indian School Rd.
Phone: 602-279-6247

CALIFORNIA

Anaheim, 92805
330 E. Ball Rd.
Phone: 714-776-9420
El Cerrito, 94530
6000 Potrero Ave.
Phone: 415-236-8870
Los Angeles, 90007
2309 S. Flower St.
Phone: 213-749-0261
Pomona, 91767
1555 Orange Grove Ave. N.
Phone: 714-623-3545
Redwood City, 94063
2001 Middlefield Rd.
Phone: 415-365-8155
San Diego (La Mesa, 92041)
8363 Center Dr.
Phone: 714-461-0110
Woodland Hills, 91364
22504 Ventura Blvd.
Phone: 213-883-0531

COLORADO

Denver, 80212
5940 W. 38th Ave.
Phone: 303-422-3408

CONNECTICUT

Hartford (Avon, 06001)
395 W. Main St. (Rte. 44)
Phone: 203-678-0323

FLORIDA

Miami (Hialeah, 33012)
4705 W. 16th Ave.
Phone: 305-823-2280
Tampa, 33614
4019 West Hillsborough Ave.
Phone: 813-886-2541

GEORGIA

Atlanta, 30342
5285 Roswell Rd.
Phone: 404-252-4341

ILLINOIS

Chicago, 60645
3462-66 W. Devon Ave.
Phone: 312-583-3920
Chicago (Downers Grove, 60515)
224 Ogden Ave.
Phone: 312-852-1304

INDIANA

Indianapolis, 46220
2112 E. 62nd St.
Phone: 317-257-4321

KANSAS

Kansas City (Mission, 66202)
5960 Lamar Ave.
Phone: 913-362-4486

KENTUCKY

Louisville, 40243
12401 Shelbyville Rd.
Phone: 502-245-7811

LOUISIANA

New Orleans (Kenner, 70062)
1900 Veterans Memorial Hwy.
Phone: 504-722-6321

MARYLAND

Baltimore, 21234
1713 E. Joppa Rd.
Phone: 301-661-4446
Rockville, 20852
5542 Nicholson Lane
Phone: 301-881-5420

MASSACHUSETTS

Boston (Peabody, 01960)
242 Andover St.
Phone: (617) 531-9330
Boston (Wellesley, 02181)
165 Worcester Ave.
(Rt. 9 just west of Rt. 128)
Phone: 617-237-1510

MICHIGAN

Detroit, 48219
18645 W. Eight Mile Rd.
Phone: 313-535-6480
E. Detroit, 48021
18149 E. Eight Mile Rd.
Phone: 313-772-0416

MINNESOTA

Minneapolis (Hopkins, 55343)
101 Shady Oak Rd.
Phone: 612-938-6371

MISSOURI

St. Louis (Bridgeton) 63044
3794 McKelvey Rd.
Phone: 314-291-1850

NEBRASKA

Omaha, 68134
9207 Maple St.
Phone: 402-391-2071

NEW JERSEY

Fair Lawn, 07410
35-07 Broadway (Rte. 4)
Phone: 201-791-6935

NEW YORK

Buffalo (Amherst, 14226)
3476 Sheridan Dr.
Phone: 716-835-3090
Jericho, Long Island, 11753
15 Jericho Turnpike
Phone: 516-334-8181
New York, 10036
35 W. 45th St.
Phone: 212-765-4590

ROCHESTER, 14623

937 Jefferson Rd.
Phone: 716-244-5470
White Plains
(North White Plains, 10603)
7 Reservoir Rd.
Phone: 914-761-7690

OHIO

Cincinnati (Woodlawn, 45215)
10133 Springfield Pike
Phone: 513-771-8850
Cleveland, 44129
5444 Pearl Rd.
Phone: 216-886-2590
Columbus, 43229
2500 Morse Rd.
Phone: 614-475-7200
Toledo, 43615
48 So. Byrne Rd.
Phone: 419-537-1887

PENNSYLVANIA

Philadelphia, 19149
6318 Roosevelt Blvd.
Phone: 215-288-0180
Frazer (Chester Co.) 19355
630 Lancaster Pike
Phone: 215-647-5555
Pittsburgh, 15235
3482 Wm. Penn Hwy.
Phone: 412-824-3564

RHODE ISLAND

Providence (Warwick, 02886)
558 Greenwich Ave.
Phone: 401-738-5150

TEXAS

Dallas, 75201
2715 Ross Ave.
Phone: 214-826-4053
Houston, 77027
3705 Westheimer
Phone: 713-623-2090

VIRGINIA

Norfolk
(Virginia Beach, 23455)
1055 Independence Blvd.
Phone: 804-460-0997

WASHINGTON

Seattle, 98121
2221 Third Ave.
Phone: 206-682-2172

WISCONSIN

Milwaukee, 53216
5215 W. Fond du Lac
Phone: 414-873-8250

INDEPENDENT DISTRIBUTORS: ALASKA: Yukon Radio Supply 1) 1231 West Northern Lights Blvd., Anchorage 99503, Phone 907-274-4423; 2) 1112 Cushman St., Fairbanks 99701, Phone 907-452-1011; 3) Box 623, Valdez 99686, Phone 907-835-4880.

Heath recommends Johnson CB radio America's leading CB brand.



Johnson Messenger 123A...159.95

Hundreds of thousands chose this model as the best CB value! Proven 100% solid-state chassis has speech compression for extra transmit range. To cut noise and interference there's an 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 2½" h x 6¾" w x 9¾" d and operates on 12 VDC neg. ground power. For base station use, just add the optional desk stand/AC supply. Includes microphone, mounting bracket and instructions.

Model GWP-100, 5 lbs., mailable159.95

Model GWP-100-1, AC supply, 4 lbs., mailable37.50



Johnson Messenger 250...244.90

Superb base station...100% solid-state design with unparalleled power and efficiency plus sophisticated styling. Large professional controls and lighted metering put real operating convenience on your desk-top. Electronic speech compression for extra transmit range, plus special voice-tailored audio for crisp, clear reception. Covers all 23 channels with 4 watt output. FCC Type Accepted. Measures 5¾" h x 11" w x 9¾" d. Brown and beige color with walnut grain vinyl front panel insert. Operates on 117 VAC. Includes hand held microphone.

Model GWP-102, 15 lbs., mailable244.90



Johnson Messenger 323A...249.95

Breakthrough in design...unitary 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. An extra feature is its built-in PA function. Full 23 channel coverage; 4 watts output; FCC Type Accepted; hand held mike included. Size: 2½" h x 8" w x 9½" d; requires 12 volts DC power, positive or negative ground. Order AC supply to operate as base station.

Model GWP-101, 8 lbs., mailable249.95

Model GWP-101-1, AC supply, 4 lbs., mailable46.50

CB Antennas

Antenna Specialists M-117 "Super Magnum" Base Antenna
The most popular CB base station antenna. ½ wave end-fed design gives 3.75 dB gain across entire band. Exclusive noise reducing design with DC grounded coil improves signal-to-noise by 6 dB. Exclusive curved static-reduction ball at top. Easy to install; hardware inc.

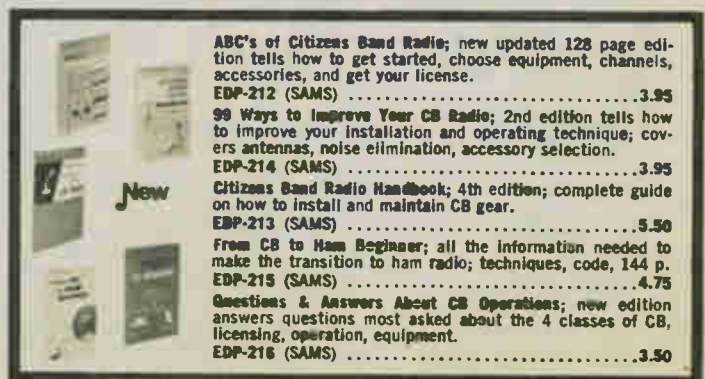
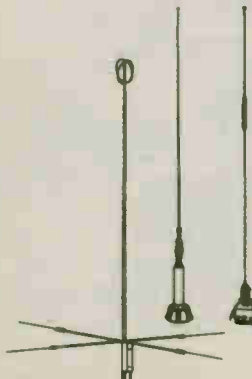
Model GDP-2120, 10 lbs., mailable39.95

Antenna Specialists M-176 "Quick-Grip" Mobile Antenna
"Quick-grip" trunk lid mount (no holes to drill) with stainless steel whip and shock spring; 46" high; weatherproof loading coil, DC grounded for less noise; includes 17' coax and connector.

Model GDP-2121, 2 lbs., mailable26.95

Antenna Specialists MR-100 "Flipper" Mobile Antenna
Rain-gutter mount (no holes to drill) with center loaded whip and fine tuning ball tip. Adjusts to 5 positions. Chrome plated clamp and fittings. Includes 10' coax and connector.

Model GDP-2122, 2 lbs., mailable22.95



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)3.95

99 Ways to Improve Your CB Radio; 2nd edition tells how to improve your installation and operating technique; covers antennas, noise elimination, accessory selection.

EDP-214 (SAMS)3.95

Citizens Band Radio Handbook; 4th edition; complete guide on how to install and maintain CB gear.

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 answers questions most asked about the 4 classes of CB, licensing, operation, equipment.

EDP-216 (SAMS)3.50

"More-for-your-money" Heathkit Organs



A) Heathkit/Thomas Spinet Organ puts an orchestra in your home... from 1145.00

An exciting musical experience that'll bring the whole family together. 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 pre-programmed 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, Mediter., 255 lbs., Exp./Frt. 1195.00

Kit TO-1260W, Contemp., 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, WAW WAW — 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.

B) Heathkit/Thomas Spinet — exciting performance at a budget price...549.95

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. Add to that an accessory front-panel on the keyboard with 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.

An orchestra at your fingertips. 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.

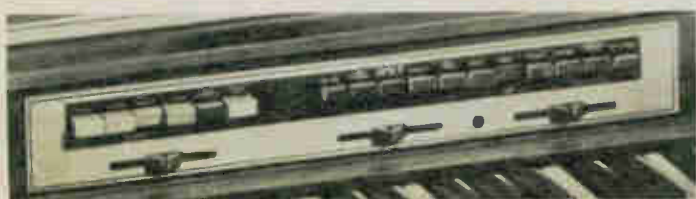
Exquisite Heathkit/Thomas cabinetry. Cabinet and bench are handcrafted from selected walnut veneers in a Scandia finish, with solid hardwoods used at all points that require strength and rigidity. Has plastic woodgrain decorative trim. Cabinet is shipped to you fully finished and assembled. Overall dimensions of cabinet are. 44" H x 43½" W x 25" D.

Kit TO-1160, 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 our deluxe "Rhythm Section" to your Heathkit/Thomas Organ...279.95



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, 5 lbs., mailable 279.95

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-Sets (On/Off), Volume.

Charge a kit — no money down on any kit — up to 2 years to pay — see order blank for details.

Give your family the protection they deserve



Heathkit FM Wireless Security System—priceless peace of mind 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.

Versatile, reliable protection. 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.

Design your own system. 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. With all the security and versatility it offers, you can't afford to be without it.

A) Central Processor Module...159.95

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, 8 lbs., mailable 159.95

GDA-1158-1 SPECIFICATIONS — Power requirements: 115 VAC, 60 Hz. Carrier frequencies: emergency, 40 kHz. intrusion, 56 kHz. Range: any point on same power distribution transformer secondary. Exit time: 2 minutes. Entry time: 20 seconds. Emergency activation time: 2 seconds. Disable time: 1.5 sec. Outputs: external speaker; relay contacts; telephone dialer. Sound source: switchable internal speaker; or optional external speaker (12 watts into 8 ohms). Sound level at 10 ft.: internal speaker, +88 dB. Dimensions: 4½" H x 10½" W x 6" D.



B) Ultrasonic Detector Module...74.95

Place any number of these ultrasonic detectors in your custom security system. Each plugs directly into an AC outlet and monitors up to 300 sq. ft. The range of each unit is up to 20 feet. Harmless, inaudible high frequency sound waves detect movement. If an intruder enters the area, the detector signals the Central Processor which sounds the alarm.

Kit GDA-1158-2, 4 lbs., mailable . . . 74.95



C) ON/OFF Transmitter Module...29.95

The On/Off Transmitter Module is the only way to disable the intrusion part of your security system. Just plug the unit into any AC outlet, then

push the button. To rearm Central Processor just release the button or unplug the transmitter.

Kit GDA-1158-3, 2 lbs., mailable 29.95

D) Emergency Transmitter Module...29.95

No security system is complete without a “panic button.” In any emergency situation just push the button and the unit transmits a signal to the Central Processor for an alarm. Plugs into the nearest AC outlet.

Kit GDA-1158-4, 2 lbs., mailable 29.95

E) Auxiliary Transmitter Module...39.95



Add other protection devices to your security system without extensive wiring. Door and window switches, mat pressure switches, heat and smoke detectors, etc. may be wired into the Auxiliary Transmitter. Switches must all be either normally open (N.O.) or normally closed (N.C.) types; accepts any number of switches. The transmitter relays signals from the connected devices to the Central Processor via the AC line. Transmitter plugs into any AC outlet.

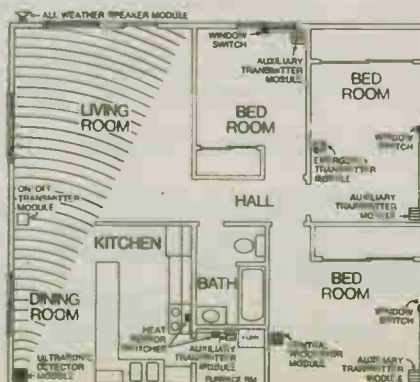
Kit GDA-1158-6, 3 lbs., mailable 39.95



F) Outdoor Speaker...19.95

Loud enough to frighten would-be intruders and summon help. For indoor or outdoor mounting. Accepts output from Central Processor.

GDA-1158-7, 3 lbs., mailable, 19.95



Typical home installation — put modules wherever you need them—even move them from room to room—to create a total home protection system.

Heathkit products are the result of a quarter-century of kit engineering experience

Design your own Heath Security System

"The Informer"[®] Ultrasonic Alarm keeps a watchful eye on your home... 64.95

No one but you will ever know it's there, for 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.

A soundless signal is transmitted throughout the room. 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. A second switch on the back of the unit lets you set the lamp and alarm for automatic reset after the alarm has sounded for 25 seconds. This switch also has a normal position so the audible alarm continues 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, 5 lbs., mailable 64.95
- GDA-39-1, indoor buzzer alarm, 3 lbs., mailable 9.95
- GDA-39-2, outdoor bell, 6 lbs., mailable 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). Ultrasonic frequency: Approximately 41 kHz. Power outlets: Two AC sockets: One for Lamp, one for Alarm. Power outlet current: Three amperes total for both. Power requirements: 120/240 VAC, 50/60 Hz, 1½ watts. Dimensions: Chassis only, 2" W x 9¼" H x 7" D (approximately). In book-style cover, 2¾" W x 10¼" H x 7½" D (approximately).



A) 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, 4 lbs., mailable 56.95

B) 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, 4 lbs., mailable 56.95

C) Utility transmitter

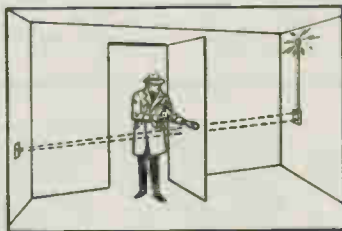
The Heathkit Utility transmitter accepts any switch or sensor that produces a closed circuit, such as Heathkit GDA-97-1 miniature magnetic-reed switch or GDA-97-2 miniature micro switch for doors and windows, or new, improved easily-mounted heat sensor switch GDA-97-4 (135°F.) Uses AC line to transmit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

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



B)

C)



Heathkit Eye Spy[™] photobeam relay... 14.95

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, 2 lbs., mailable 14.95

Photoelectric Lamp Switch... 5.95

Turns floor and table lamps on in the evening, off in the morning — automatically. Helps discourage burglars while you're away from home. No timers to set; just plug it in to any wall outlet, adjust the sensitivity and the GD-600 does the rest. Controls incandescent lamps up to 150 watts. A great one-evening get-acquainted kit.

- Kit GD-600, 1 lb., mailable ... 5.95



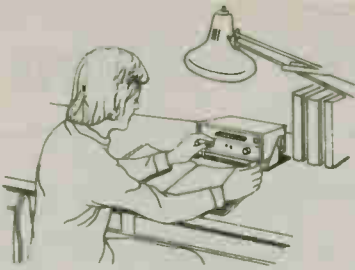
Start your own profitable security system career—these books show you how:

- Building & Installing Electronic Intrusion Alarms—covers construction, installation & maintenance of all types of alarms & sensors for home & auto. Of interest to novice or technicians. EDP-135, 4.50*
- Installing & Servicing Electronic Protective Systems—tells how to get started in this growing business. Covers virtually every electronic fire & theft security system. EDP-136, 4.95*

*\$10 minimum order for book only purchase. No minimum when book order accompanies kit order. Include 35¢ for each book to cover postage and handling.

Charge a kit — no money down on any kit — up to 2 years to pay — see order blank for details.

Listen in on the world...



6 EVENING KIT



Heathkit VHF/FM scanning monitor lets you listen in on all the local action... 99.95

- Covers any 9 MHz between 146-174 MHz
- Digital readout
- Manual or automatic scanning
- Priority channel for calls you can't afford to miss
- Adjustable squelch control
- Runs on either 120 VAC or 12 VDC for fixed or mobile operation

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 choose up to eight separate crystals to cover the 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, 9 lbs., mailable 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. Unsquelched with full audio, 0.8 amperes. Dimensions: 3" H x 8 1/4" W x 9 3/4" D.



Portable VHF/FM monitors... 59.95

- Kit GR-88, VHF/FM Fire, Weather, Police Monitor, 5 lbs., mailable 59.95**
- Kit GR-98, Aircraft Monitor, 5 lbs., mailable 59.95**
- Kit GRA-88-1, AC power supply for both above, 2 lbs., mailable . . . 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. Transistor complement-tuner: (2) 2SC784 and (1) SE-5006. Transistor complement-IF audio: (5) 2N2369, (4) 2N3393, (1) X29A829, (1) 2N2430, (1) 2N2431, (1) 40481. Diode complement: (2) 1N191 and (2) 1N4646. Batteries: Six 1.5 V "C" cells, not supplied. Dimensions: 7 1/2" H x 8 3/4" W x 3 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. Transistor complement-tuner: (2) 2SC784 and (1) SE-5006. Transistor complement-IF & audio: (4) 2N2369, (3) 2N3393, (2) Z29A829, (1) 2N2430, (1) 2N2431 and (1) 40481. Diode complement: (2) 1N191, (1) 1N4646 and (1) S-160. Batteries: Six 1.5 V size "C" cells (not included). Dimensions: 7 1/2" H x 8 3/4" W x 3 1/2" D.

Shortwave Listener's Handbook — covers everything from basic equipment to modifications for better listening, characteristics of receivers and antennas, how to get schedules and reception reports, lists major shortwave stations by country and frequency.
EDP-196 4.90

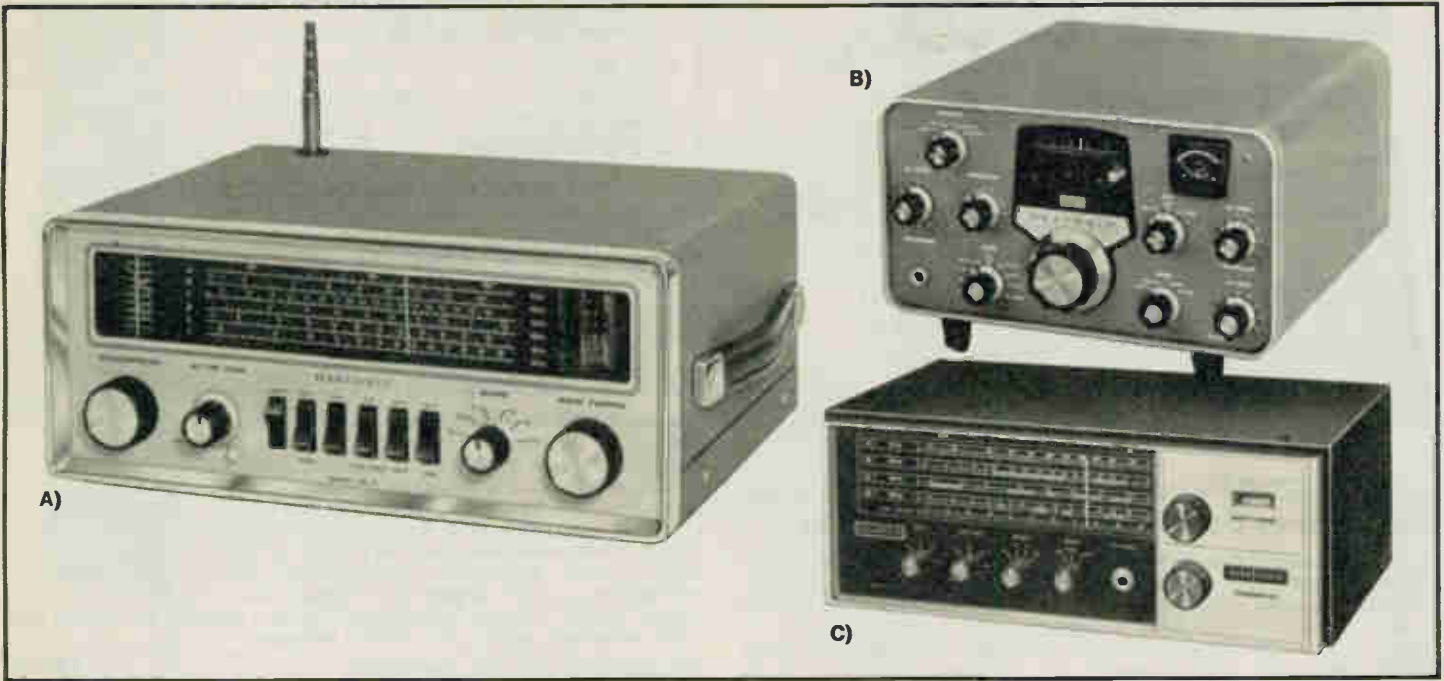
ABCs of Shortwave Listening — tells what programs are available, how to get the most out of shortwave listening; practical advice on receivers & antennas in nontechnical terms.
EDP-154, 2.95

99 Ways to Improve your Shortwave Listening — covers antennas & their installation, receivers, accessories, listening techniques, special bands & signals, troubleshooting tips.
EDP-155, 4.50

How to Hear Police, Fire and Aircraft Radio — a guide to VHF police, fire & aircraft reception; covers home & mobile installations.
EDP-156, 3.50

Dial 911 — exciting story of emergency communications systems and surveillance techniques, including specific information on New York City, Los Angeles & Philadelphia.
EDP-198 3.95

with Heathkit SWL gear



A) Get six band coverage...AM, SSB & CW reception...and portability, just...159.95

A fine medium cost receiver the Heathkit GR-78 is a favorite of SWLs and hams who need a standby receiver, and everyone who desires portability. 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, 14 lbs., mailable 159.95

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 $\frac{3}{4}$ " H x 11 $\frac{1}{2}$ " W x 9" D.

*Signal level for 10 dB signal + noise/noise ratio.

B) Our finest SWL receiver... the famous Heathkit SB-313...389.95

Provides AM and CW reception on 9 bands from 3.5 to 21.8 MHz. 5 kHz AM crystal filter supplied with the kit; optional CW crystal filter available for optimum selectivity. Advanced-design solid-state circuitry delivers excellent stability and sensitivity. Factory assembled & aligned Linear Master Oscillator for superior linearity, dial tracking and stability. Features include IC crystal calibrator for 25 & 100 kHz markers...three-position AGC...front panel "S" meter...RF attenua-

tor...smooth, backlash-free tuning. Requires 8-ohm speaker or headphones plus VTVM and antenna for alignment.

Kit SB-313, 22 lbs., mailable 389.95

Kit SB-600, 8-ohm 6" x 9" speaker & cab., 7 lbs., mailable 22.95

SB-313 SPECIFICATIONS — Frequency Range (MHz): 3.5 to 4.0, 5.7 to 6.2, 7.0 to 7.5, 9.5 to 10.0, 11.5 to 12.0, 14.0 to 14.5, 15.0 to 15.5, 17.5 to 18.8, 21.3 to 21.8. Intermediate Frequency (IF): 3.395 MHz. Frequency Stability: Less than 100 Hz per hour after 10 minutes' warmup under normal ambient conditions. Less than 100 Hz drift for \pm 10% line voltage variation. Sensitivity: Less than 0.5 microvolt for 10 dB signal plus-noise to noise ratio for SSB operation. Selectivity: AM: 5.0 kHz at 6 dB down, 15 kHz maximum at 60 dB down (crystal filter supplied). CW: 400 Hz at 6 dB down, 2.0 kHz maximum at 60 dB down (crystal filter available as an accessory). Image Rejection: 60 dB or better. IF Rejection: 3.395: Greater than 55 dB. 8.595: Greater than 40 dB. Spurious Response: All below 1 microvolt equivalent signal input except at 10.0 MHz and 15.375 MHz. Dial Accuracy: Electrical: Within 400 Hz after calibration at nearest 100 kHz point. Visual: Within 200 Hz. Calibration: Every 100 kHz or 25 kHz. Dial Backlash: No more than 50 Hz. Antenna Input Impedance: 50 Ω nominal unbalanced. Audio Output Impedance: Matching Speaker: 8 Ω . Matching Headphones: Low impedance. Audio Output Power: 4 watts at less than 10% distortion. Muting: Open external ground at Mute socket. Power Requirements: 105 to 130 or 210 to 260 volts, AC, 40 watts max. Overall Dimensions: 7 $\frac{1}{4}$ " H x 12 $\frac{1}{4}$ " W x 14" D.

C) Low cost 4-band receiver...69.95

An ideal beginner's kit... an excellent receiver for the SWL fan. Four bands cover 550 kHz-30 MHz...slide-rule tuning with separate bandspread... variable BFO for clear CW reception... automatic noise limiting... "S" meter... built-in speaker and headphone jack.

Kit SW-717, 10 lbs., mailable 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; Bandspeed Tuning; ANL on/off. Power Supply: Transformer operated; full-wave bridge rectifier. Voltage Requirements: 120/240 VAC, 50-60 Hz, 8 W. Dimensions: 5 $\frac{1}{2}$ " H x 14 $\frac{1}{2}$ " W x 8" D.



Superex headphones

Excellent for all Heathkit SWL receivers except GR-43A. Dual coils, wide headband, 600 ohms.

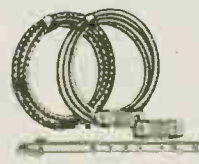
GD-396, 1 lb., mailable 5.95



SWL guide

1975 edition lists call signs, frequencies and addresses for SW, FM and TV stations worldwide.

GDP-315, 2 lbs., mailable 8.95



Long-wire SWL antenna

75' long-wire antenna with 30' of lead-in, all insulators and hardware.

GRA-72, 2 lbs., mailable 4.50

Heathkit Professional PA System



C) Speaker Column



B) Booster Amplifier

A) Control Amplifier

New

A) TA-1620 PA Control Amplifier—performance and features worth much more... just 449.95

A Master Control Center/Amplifier designed to outperform professional PA systems — at about half their price. It's ideal for singers, schools, churches and auditoriums in permanent or portable installations. Professional-type jacks accept up to six balanced low-impedance mikes. Each has its own level, bass and treble control, reverb on/off switch and separate switches to attenuate each input 18 dB. Two of the inputs can be used with high-level auxiliary sources by simply flipping a switch. The built-in reverb has its own on/off switch, master level control, bass and treble controls and a jack for an optional foot switch. Four switchable filters minimize feedback by cutting response in the low, mid-low, mid-high and high-frequency ranges. An exclusive Heath bass filter virtually eliminates the "boominess" of some cardioid mikes when used close up.

The built-in amplifier has the power you need — 100 watts continuous power with two speaker columns. A unique circuit "shapes" the signal before it reaches the amplifier, virtually eliminating raspy clipping distortion. Need even more power? Add as many Booster Amplifiers and Speaker Columns as you want. And if you need more mike inputs, interconnect any number of Control Centers. Plus many more features — lighted output meter with high/low range switch, well-lighted front-panel which flips down for easy servicing, a line reverse switch to minimize hum, a rugged particle-board case covered with gray high-pressure laminate with protective aluminum edge guard strips and convenient recessed handles. To simplify assembly, chassis layout is open and the level/test meter checks your work during assembly and simplifies servicing.

Kit TA-1620, 53 lbs., mailable 449.95

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, attenua-

Save 49⁹⁰ on a PA System

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

System price
799⁹⁵

If purchased separately 849⁸⁵

tor 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, 50/60 Hz. Dimensions: 11 $\frac{1}{4}$ " H x 21 $\frac{1}{2}$ " W x 12" D. Net Weight: 36 lbs.

B) Booster Amplifier... 179.95

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. The TA-1625 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 with two switch-selected ranges monitors the output, a level control adjusts the volume. Includes particle board end panels covered with gray high-pressure laminate.

Kit TA-1625, 23 lbs., mailable 179.95

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 $\frac{1}{4}$ " H x 21" W x 7" D. Net Weight: 25 lbs.

C) Speaker Column... 199.95

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, holes for permanent mounting. Removable dark brown grille cloth.

Kit TS-1630, 87 lbs., Exp./Frt. each 199.95

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.

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

Put more pleasure in your playing with Heathkit musical accessories



25-watt Guitar Amp... 139.95

25 watts EIA music power. Has 2 dual input channels; double spring variable reverb and tremolo with variable rate and depth; 2 foot switches for reverb & tremolo; 2 heavy-duty 12" speakers. Sturdy black vinyl covered $\frac{3}{4}$ " wood cabinet measures 28" W x 9" D x 19 $\frac{3}{4}$ " H.

Kit TA-16, 48 lbs., mailable. . . . 139.95



Our best Guitar Amp... 199.95

120 watts EIA music power. Harmonic modifier for "fuzzy" sound. Controls for brightness, tremolo rate & depth, bass, treble. Spring-type variable reverb. Dual foot switch for tremolo & reverb. 3 separate channels, 2 inputs for each. Optional speaker has two 12" woofers & horn driver. 25 $\frac{1}{2}$ " W x 14 $\frac{1}{2}$ " D x 38" H. Includes 20' cable.

Kit TA-17, amplifier only, 40 lbs., mailable 199.95

Kit TA-17-1, One speaker system, 112 lbs., Exp./Frt. 189.95



Electronic Metronome... 16.95

Adjustable from 40 to 210 beats per minute. Volume control. Chart relates tempos to beats per minute. One evening assembly. Requires two 9V batteries (not supplied).

Kit TD-17, 2 lbs., mailable. . . . 16.95

Here comes the "fuzz" ... 24.95

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, 4 lbs., mailable. . . . 24.95

New

Experimenting with Electronic Music — from sine-wave generators to synthesizers with simple transistor circuits to duplicate many instruments. EDP-209 (Tab) 4.95

Electronic Music Production — how to use basic building blocks such as ring modulators, multivibrators, etc. How to create special effects, duplicate the sound of instruments. EDP-210 (Tab) 3.95

Electronic Musical Instruments — electronics in music — from amplification to synthesizers. Includes troubleshooting guide for electronic instruments. EDP-211 (Tab) .. 4.95

Heathkit Educational Kits and Tools

Basic Electricity Kit/Course



Whether an adult or student, here is 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. Youngsters enjoy a whole new world of electronics that can start them off on a profitable career.

Kit EK-1, 4 lbs. 32.95

2-part Basic Radio Kit/Course



Starts with crystal receiver and regenerative tube-type receiver. Part II teaches more advanced circuits. You build 2-band superhet receiver. Requires EK-1 meter or equiv. EK-2A required for completion of EK-2B.

EK-2A, Part I, 7 lbs.,
mailable 32.95

EK-2B, Part II, 5 lbs.,
mailable 32.95

AK-8, Case for radio,
3 lbs., mailable 8.95

Basic Transistors Kit/Course



Simple yet thorough introduction to transistors. No difficult mathematics; interesting experiments support the text. Background and understanding gained from course provide basic transistor theory for faster, simplified servicing and troubleshooting of transistorized circuitry and equipment.

Kit EK-3, 4 lbs., mailable .. 29.95

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Theory & applications of VTVM. Kit includes special power supply.

Kit EF-1, Text and Power supply (for VTVM owners), 3 lbs., mailable 16.95

Kit EF-1-S, includes EF-1 and IM-18, 13 lbs., mailable 49.95

Kit EF-1-6, Includes EF-1 and IM-28, 15 lbs., mailable 59.95

Manuals Only for EF-1, (single copy) 5.00; (10 or more) ea. 3.00.

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, 4 lbs., mailable 19.95

Manuals Only for EF-2 (single copy) 5.00; (10 or more) ea. 3.00.

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, 4 lbs., mailable 21.95

Kit EF-3-2, includes EF-3 and IG-102, 17 lbs., mailable 62.95

Manuals Only for EF-3 (single copy) 5.00; (10 or more) ea. 3.00.

Heath-approved tools for easy building



A)



B)



C)



E)



F)



G)



H)

A) Basic kitbuilders tool set. Everything you need to get started except soldering iron. Includes diagonal cutters, midget long-nose pliers, wire stripper, 1/4" nutdriver, #1 Phillips screwdriver, 1/8"-blade screwdriver.

GHP-1113, 2 lbs., mailable 9.95

B) 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, 5 lbs., mailable 22.95

C) 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, 1 lb., mailable 7.95

D) Heath solder/de-solder set. Weller W-PS 25-watt pencil soldering iron that develops 860° heat fast. Includes de-solder squeeze bulb with heat and solder-resistant nozzle.

GDP-1009, 1 lb., mailable 9.95

E) Nut driver set. Seven drivers for most commonly used nut sizes; 3/8", 1/4", 3/16", 3/32", 1/32", 1/16" and 1/2". Plastic handles are color-coded for quick identification.

Model GDP-204, 2 lbs., mailable 10.95

F) Kitbuilders tool set. Includes combination wire stripper and diagonal side cutter; midget long-nose pliers; three screwdrivers (1/32", 1/8", 3/16"); Weller W-PS soldering iron; five nut drivers (3/8", 1/4", 3/16", 3/32", 1/2"); nut starter; soldering aid; solder, and information-packed "Kitbuilders Guide."

Model GH-25, 4 lbs., mailable 27.95

G) Workbench extension lamp kit. The extension arm comes already assembled. All you do is attach the socket, shade and cord. Lamp features a 45" reach and 360° sweep; vented shade, and movable base clamp. Incandescent bulb not included.

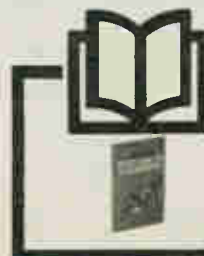
Kit GDP-202, 5 lbs., mailable 16.95

H) 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 portable drills, sabre saws, food mixers, sewing machines, etc.

Kit GD-973A, 2 lbs., mailable 19.95

I) 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, 8 lbs., mailable 39.95



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 3.25*

\$10 minimum charge for book only purchase. No minimum when book order accompanies kit order. Include 35¢ for each book to cover postage and handling.



Heathkit Do-It-Yourself Electronics Library

A Heathkit assembly manual tells you how to build and use your kit. A related book like those listed below can provide additional information, operating theory, capabilities and limitations plus ways to enjoy the kits you build even more. All the titles are listed below and many are described in more detail in the section of the catalog pertaining to the special interest they cover. When ordering by mail, please remember there is a \$10 minimum when ordering books ONLY. There is no minimum when your book order accompanies a kit order. Include 35¢ postage and handling for each book you order.

AMATEUR RADIO (See pages 84, 86, 90, 92)

EDP-114, 2M FM Repeater Circuits Handbook	6.95
EDP-115, How To Be a Ham	3.95
EDP-117, Radio Handbook	16.95
EDP-118, 101 Questions & Answers About Amateur Radio	2.95
EDP-119, Amateur Tests & Measurements	5.50
EDP-120, Single Sideband, Theory & Practice	6.95
EDP-122, Amateur Radio License Study Guide — Novice	3.95
EDP-123, Amateur Radio License Study Guide — General	6.95
EDP-124, Amateur Radio License Study Guide — Advanced	3.95
EDP-125, Amateur Radio License Study Guide — Extra	4.95
EDP-126, U.S. Callbook	12.95
EDP-127, DX Callbook	11.95
EDP-180, 73 Dipole & Long-Wire Antennas	4.95
EDP-181, 73 Vertical, Beam & Triangle Antennas	4.95
EDP-182, ARRL Antenna Handbook	3.00
EDP-193, Radio Operator's License Q & A Manual	7.45

OSCILLOSCOPES (See page 67)

EDP-139, Understanding & Using the Oscilloscope	4.95
EDP-149, 101 Ways to Use Your Oscilloscope	4.50

POWER SUPPLIES (See page 71)

EDP-152, Regulated Power Supplies	5.50
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RADIO CONTROL MODELING (See page 20)

EDP-157, Radio Control Manual	4.95
EDP-158, Advanced Radio Control	4.95
EDP-159, Radio Control Handbook	6.95
EDP-160, Model Radio Control	4.95

SECURITY SYSTEMS (See page 55)

EDP-135, Building & Installing Electronic Intrusion Alarms	4.50
EDP-138, Installing & Servicing Electronic Protective Systems	4.95

SHORT WAVE LISTENING (See page 57)

EDP-154, ABC's of Short Wave Listening	2.95
EDP-153, 99 Ways to Improve Your Shortwave Listening	4.50
EDP-156, How to Hear Police, Fire & Aircraft Radio	3.50
EDP-198, Shortwave Listener's Handbook	4.90

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EDP-144, Know Your Signal Generator	3.25
EDP-189, 101 Ways to Use Your Square-Wave & Pulse Generators	3.50

STEREO & 4-CHANNEL HI-FI (See pages 34, 37, 43)

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EDP-103, How to Wire Hi Fi Extension Speakers	3.95
EDP-104, Hi Fi Stereo Handbook	6.95
EDP-105, 99 Ways to Improve Your Hi Fi	3.50
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EDP-200, Dictionary of Audio & Hi-Fi	5.95
EDP-190, How to Select and Use Hi-Fi and Stereo Equipment, Vol. I	4.55
EDP-191, How to Select and Use Hi-Fi and Stereo Equipment, Vol. II	4.55
EDP-192, Hi-Fi Loudspeakers and Enclosures	6.85
EDP-194, Guide to High Fidelity	4.50
EDP-195, How to Select, Use and Troubleshoot Cassette and Cartridge Recorders	4.55
EDP-113, Audio Cyclopaedia	34.00

TELEVISION (See page 23)

EDP-128, Easi Guide to Color TV	3.50
EDP-129, Questions & Answers About Color TV	3.95
EDP-130, 99 Ways to Improve Your TV Reception	3.50
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TV SET INSTRUMENTS (See page 82)

EDP-142, How to Use Vectorscope Oscilloscopes & Sweep Marker Generators	4.95
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TESTERS & CHECKERS (See page 78)

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TOOLS (See page 59)

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ELECTRONICS — GENERAL

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

Electronics Data Handbook, a convenient single-source of formulas and facts for solving virtually any electronic problem.
EDP-171 4.95

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.
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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-159 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 23.00

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

AUTOMOTIVE (See pages 10, 12, 13)

EDP-204, Can-Do Tuneup (GM)	7.95
EDP-205, Can-Do Tuneup (Ford)	7.95
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EDP-185, Solid State Ignition Systems	4.50
EDP-188, How to Repair Small Gasoline Engines	5.95

CALCULATORS (See page 22)

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EDP-179, Electronic Calculators	5.95
EDP-208, 99 Ways to Know and Use Your Electronic Calculator	5.95

CITIZEN'S BAND RADIO (See page 52)

EDP-212, ABC's of Citizen's Band Radio	3.95
EDP-213, Citizen's Band Radio Handbook	5.50
EDP-214, 99 Ways to Improve Your Citizen's Band Radio	3.95
EDP-215, from CB to Ham Beginner	4.75
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CLOCKS (See page 4)

EDP-201, Electronic Clocks and Watches	6.50
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ELECTRONIC MUSIC (See page 58)

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EDP-211, Electronic Musical Instruments	4.95

MARINE ELECTRONICS (See page 16)

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METERS (See page 72)

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Heathkit Electronic Darkroom Timer

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 exposures with 2% accuracy.

Kit PT-15, 4 lbs., mailable 36.95



36⁹⁵

Heathkit "Most-Wanted" Christmas Gifts

Heathkit Model Railroad Control Center/ Power Supply brings dramatic new realism to your HO or N-gauge line...79.95

The RP-1065 true-action transistorized throttle precisely simulates the gradual momentum buildup of a real train and creates a highly realistic braking effect. Sophisticated pulse circuitry provides smooth, realistic starts and stops. The RP-1065 includes a built-in power supply and transformer — no extra parts to buy. Its husky 2-amp output powers two HO or N gauge engines — and at a low price that leaves the competition waiting at the station.

You'll think you're in a real cab when you use the controls. For maximum realism, set the mode switch to "momentum". The throttle slide control and braking knob put you in command. Just pull the throttle toward you to accelerate and watch the momentum gradually build up. Braking is independent of the throttle and controlled by a five-position knob. "Run" allows the engine to gather speed until it reaches the throttle setting. "Release" maintains the engine's speed without accelerating or decelerating. Or you can put a short "burst of air" on the brakes by turning the knob to "normal" for a moment. "Quick service" and "emergency" stop the train more rapidly, while still maintaining a realistic momentum effect. You can override the momentum effect by switching to the "direct" mode. This allows you to control both acceleration and deceleration with the throttle.

Fully adjustable pulse control automatically provides smooth, life-like acceleration and braking, completely eliminating the "jack rabbit" starts and stops of ordinary power supplies. The pulses also allow extremely accurate control even at low speed — great for crawling through yards or for switching operations. And you can use the pulses three ways — turn them on continuously, turn them off or switch them to automatic. In automatic, the RP-1065 continuously monitors track voltage and switches on the pulses at low speeds, when they're needed most. An internal control sets the threshold voltage for pulse operation. Front panel controls for pulse width and frequency optimize performance for each engine in your line.

Sophisticated circuitry solves many common problems. With ordinary power supplies, an engine climbing a grade may slow down or even stop, but not the RP-1065. It compensates by raising the output voltage and an internal adjustment selects exactly the compensation you want. You can maintain a constant speed or precisely simulate the way a real train slows slightly as it climbs, then speeds up as it descends. In addition, AC load compensation works automatically to overcome the effects of side rod and gear train binding, tight spots in wheel bearings and even tight sections of track!

Versatile, protected power. An overload sensor disconnects the output if there's a short circuit or the load exceeds 2 amps, then lights a front-panel indicator. After correcting the problem, just turn the brake knob to "reset". The protection circuitry's built-in time delay prevents false triggering. Another light instantly alerts you to a break in the circuit. And for maximum convenience, a front-panel starting voltage control optimizes performance with each engine; main and



Front-panel controls for starting voltage, pulse width and frequency provide optimum performance from every engine.



Versatile rear-panel outputs let you reverse main and loop voltages using front-panel switches — even power two sets of low-voltage accessories.

loop switches reverse track polarity instantly; a forward/reverse switch changes engine direction and there are two low-voltage AC accessory outputs, one of which can be switched from the front panel. And the RP-1065 is a compact 4 3/4" H x 9 1/2" W x 8 1/2" D.

Build it easily in just a few evenings. There's just one circuit board to wire and a plug-in integrated circuit simplifies construction. A clearly illustrated, step-by-step instruction manual makes the RP-1065 easy and fun to build — even if it's your first kit.

Open up a whole new world of HO or N railroading fun. The RP-1065 offers so much versatility, realism and value, we think it'll put you on the right track to enjoying your hobby more.

Kit RP-1065, 8 lbs., mailable 79.95



Easy, three-evening assembly Convenient handle-mounted controls

Black vinyl carrying case with adjustable shoulder strap. For GD-348 only.

A) Deluxe

B) Standard

Give the gift they'll treasure — a Heathkit Metal Locator

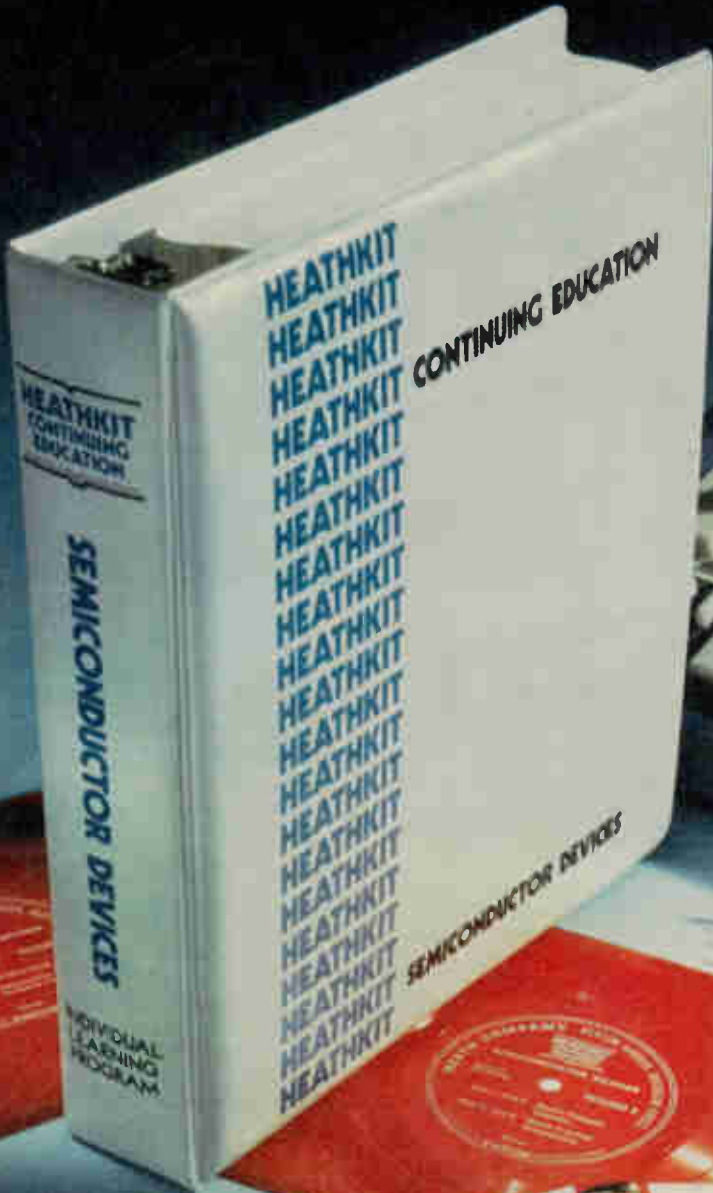
A) GD-348 Deluxe Metal Locator. Heathkit metal locators use a sophisticated "induction balance" system — you don't hear anything until a piece of metal enters the field. Then the tone grows louder as you get closer to the object. Listen through the built-in speaker, optional headphones or use the front-panel 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, 6 lbs., mailable 89.95
- GDA-48-1, 9-volt battery, 1 lb., mailable 3.25
- GD-396, 600-ohm Superex headphones, 1 lb., mailable 5.95
- GDA-348-1, carrying case, 2 lbs., mailable 11.95

B) 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, 6 lbs., mailable 69.95
- GDA-48-1, 9-volt battery, 1 lb., mailable 3.25
- GD-396, 600-ohm Superex headphones, 1 lb., mailable 5.95

Charge a kit — no money down on any kit — up to 2 years to pay — see order blank for details.



EXPERIMENT 6

COMMON-EMITTER TRANSISTOR CHARACTERISTICS

OBJECTIVES

To determine the operation of a common-emitter amplifier and to determine the various forms of an amplifier's characteristic characteristics.

INTRODUCTION

The common-emitter configuration is used in many applications where voltage gain and impedance matching are required. It is the most widely used configuration of a transistor amplifier. An understanding of its characteristics is essential for the design of many electronic systems.

In this experiment you will observe the relationship between a transistor's base current, collector current, and collector voltage. You will learn to derive the necessary measurements and then you will plot the transistor's collector characteristics curves. Then you will use the curves to determine the various gains of the device.

MATERIALS NEEDED

- Heathkit Electronic Design Experiment Kit (ET-110)
- Capacitor (Heathkit 50-55 or equivalent)
- 1.5KΩ resistor (A17-001)
- 1.5KΩ resistor (same stock #)
- 1.5KΩ resistor (same stock #)

PROCEDURE



1. Connect the circuit as shown in Figure 6-1. The collector load resistor is connected to the collector terminal of the transistor. The base resistor is connected to the base terminal of the transistor. The emitter terminal of the transistor is connected to ground. The DC supply is connected to the collector terminal of the transistor.
2. Set the DC supply to 10V. The collector load resistor is 1.5KΩ. The base resistor is 1.5KΩ. The emitter terminal of the transistor is connected to ground. The DC supply is connected to the collector terminal of the transistor.
3. Vary the base current by varying the base resistor. Measure the collector current and the collector voltage. Plot the collector current versus the collector voltage. The resulting curve is the collector characteristic curve of the transistor.
4. Repeat the procedure for base currents of 100μA, 200μA, 300μA, 400μA, and 500μA. Plot the resulting curves on the same graph. The resulting curves are the collector characteristic curves of the transistor.
5. Determine the DC current gain of the transistor. The DC current gain is the ratio of the collector current to the base current. The DC current gain is approximately 100.

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Self-instructional electronics courses
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**You Set
the Pace**



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Multi-media makes learning more interesting and faster paced. Heathkit programs incorporate not only a variety of printed materials and experiments, but also audio records to provide you with an introductory overview of the subject and periodic reviews of pertinent topics. A unique learning experience. Fast, effective, fun.

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Easy- To-Use Trainers

Experimenter Trainers. Low cost options to help you more conveniently perform the experiments as you study... and useful later for breadboarding your own design projects. Perfect for testing components and circuits. Solderless sockets for fast connections. Built-in power supplies, signal sources, and controls. All-in-one convenience and versatility.

The Fast, Simple, Inexpensive Way To Learn

Just what you want. Individual instruction programs with the back-up hardware you need to make them thorough and fast (as little as 15 hours completes an individual program). Inexpensive, too (courses in the Electronic Fundamentals group cost as little as \$39.95, the Digital Fundamentals course only \$49.95). And those low prices get you all the text materials, records, and experiment parts. The only extra-cost options are the Experimenter/Trainers at \$59.95 and \$69.95. And you can order a combination of courses and trainers and save up to \$25!

**As low as
\$ 39⁹⁵
a course**

You are in control. This is your personal program... you decide what courses you want to take, how far you want to go. No school, no admission requirement. No instructors, but Heath's Technical Consultants will answer your every question. No lesson tests to submit. But if you want to receive recognition for completing a program you can submit the optional final exam.

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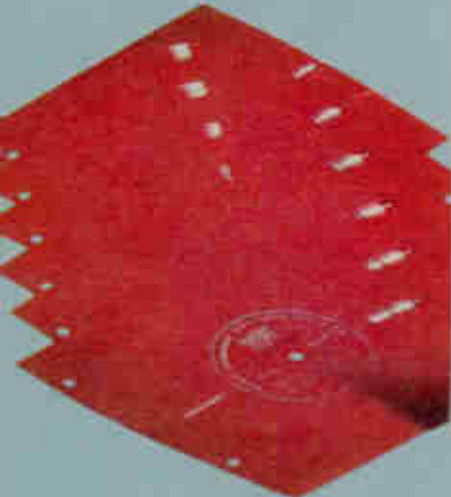
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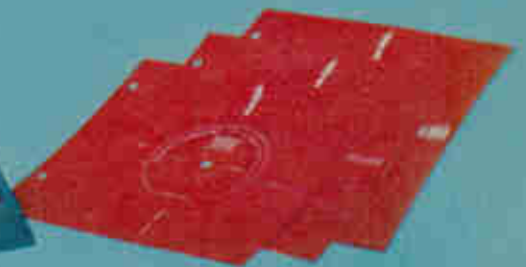
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"Electronics Fundamentals"... in 4 easy steps.

The four Individual Learning Programs in this series provide a complete overview of the subjects vital to an understanding of electronics. These subjects include electrical principles, electronic component operation and application, and the theory of operation of all basic electronic circuits.

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The four programs are general in nature and do not emphasize any one particular electronic specialty. Instead, the programs provide a solid educational foundation in basic electronics for anyone wishing to later pursue specialties such as communications, digital electronics and computers, industrial and consumer electronic equipment repair.

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The programs also are ideal for hobbyists and experimenters who want to know more about electronics...who want to really understand how their kits work...to expand their hobby to its fullest satisfaction.

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Because of their modularity, the individual programs in Electronic Fundamentals are very flexible. You need purchase only those programs covering the subjects in which you have an interest or need. Although each program is a prerequisite for the next, other experience or training is also applicable. You decide whether you meet the prerequisites for each. The first program, DC Electronics, assumes no prior knowledge of electronic principles. Anyone who is a high school graduate should be able to complete the program.

Up-to-date.

These programs are the latest...up-to-date in technology to keep you up-to-date in knowledge. Emphasis is on semiconductor technology, both discrete components and integrated circuits. See the course outlines in the next column...order those now that you need to get in step with the expanding world of electronics.

"Digital Techniques"...key to tomorrow.

This Individual Learning Program is designed for engineers, technicians, scientists, and hobbyists who need a good understanding of modern digital techniques to stay up-to-date.

Making "Impossibles" Realities.

Today, digital techniques are used virtually everywhere in electronics. Integrated circuits have made digital techniques a realistic alternative to analog methods. And digital techniques permit sophisticated control and measurement formerly impossible or impractical.

Expand Your Horizons

Sooner or later, everyone in electronics and other sciences will encounter the need to know digital techniques. As technology becomes more sophisticated and applications broaden in scope so you, too, must expand your basic knowledge to keep pace.

Prepare Today.

The Heathkit Digital Techniques program will provide you with a solid background in digital fundamentals. Get ready today for tomorrow.

"Electronics Fundamentals" Course Outlines.

Part 1—"DC Electronics" Text/Records/Parts
Electronic principles, laws, theories; component operation, characteristics, use; measurement techniques, basic circuits, practical applications. *Prerequisites:* high school or equivalent. *Average min. completion time:* 20 hours. *Credit:* 2.0 CEU and Certificate for passing optional final exam. **8 Unit-Subjects:** 1. Electron Theory; 2. Voltage; 3. Resistance; 4. Ohm's Law; 5. Magnetism; 6. Electrical Measurements; 7. Network Theorems; 8. Inductance & Capacitance. *Optional equipment needed:* Heath IM-17 VOM or equivalent; soldering iron, small tools; record player; Heathkit Experimenter/Trainer.

Model EE-3101, DC Electronics, 5 lbs. . . . 39.95
Kit ET-3100, Experimenter, 6 lbs., mailable, 59.95
Models 3101 & 3100 ordered together, only 89.95

Part 2—"AC Electronics" Text/Records/Parts
Alternating current principles; effect on resistive, inductive, capacitive components; circuits, applications. *Prerequisites:* completion of Heathkit DC Electronics program or equivalent experience. *Average min. completion time:* 15 hours. *Credit:* 1.5 CEU and Certificate for passing optional final exam. **6 Unit-Subjects:** 1. AC Fundamentals; 2. AC Measurements; 3. AC in Capacitive Circuits; 4. AC in Inductive Circuits; 5. Transformers; 6. Tuned Circuits. *Optional equipment needed:* Heath IM-17 VOM or other; soldering iron, small tools; record player; Heathkit Experimenter/Trainer.

Model EE-3102, AC Electronics, 5 lbs. . . . 39.95
Kit ET-3100, Experimenter, 6 lbs., mailable, 59.95
Models 3102 & 3100 ordered together, only 89.95

Part 3—"Semiconductor Devices" Text/Records/Parts

Operation, characteristics, basic application of commonly used semiconductors. *Prerequisites:* completion of Heathkit DC and AC Electronics programs or equivalent experience. *Average min. completion time:* 30 hours. *Credit:* 3.0 CEU and Certificate for passing optional final exam. **10 Unit-Subjects:** 1. Semiconductor Fundamentals; 2. Semiconductor Diodes; 3. Zener Diode; 4. Special Diodes; 5. Bipolar Transistor Operation; 6. Bipolar Transistor Characteristics; 7. Field Effect Transistors; 8. Thyristors; 9. Integrated Circuits; 10. Optoelectronic Devices. *Optional equipment needed:* Heath IM-17 VOM or other; soldering iron, small tools; record player; Heathkit Experimenter/Trainer.

Model EE-3103, Semiconductor Devices, 4 lbs., mailable 39.95
Kit ET-3100, Experimenter, 6 lbs., mailable, 59.95
Models 3103 & 3100 ordered together, only 89.95
Order all 3 Courses & Experimenter for only 154.95

"Digital Techniques" Course Outline.

Fundamentals and applications. Course includes text, records, and parts. *Prerequisites:* good technician or engineer electronics knowledge or experience; algebra. *Average min. completion time:* 40 hours. *Credit:* 4.0 CEU and Certificate for passing optional final exam. **10 Unit-Subjects:** 1. Introduction (techniques and use, 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, etc.). 8. Combinational Logic Circuits (encoders, decoders, exclusive OR, comparators, multiplexer, ROMs, PLAs, etc.). 9. Digital Design (how to design combinational and sequential logic circuits, procedures, etc.). 10. Digital Applications (test equipment, digital counters, digital computers, microprocessors). *Optional equipment needed:* Heath IM-17 VOM or other; soldering iron, small tools; record player; Heathkit Digital Experimenter/Trainer.

Model EE-3201, Digital Techniques, 5 lbs., mailable 49.95
Kit ET-3200, Digital Experimenter, 6 lbs., mailable 69.95
Model 3201 & 3200 when ordered together, only 109.95

Order your Experimenter with your courses and save! Use them as you learn—use them later in projects.



Heathkit Electronic Design Experimenter/Trainer.

Designed for Heathkit Electronic Fundamental courses, the ET-3100 helps you get the most in learning experiences by giving you all the facilities for performing every experiment in a fast, easy way. And when you've finished your courses, you'll find the Experimenter/Trainer perfect for "breadboarding" design projects at your job or at home. Great for school labs, too! Check these convenient features:

- Solderless breadboarding socket for fast, easy circuit connections without damage to components. Just plug in components with lead diameters up to .032". Socket has 96 terminals with 5 common connections each, arranged as 48 pairs. Uses standard #24 or 22 solid hook-up wire for connections.
- 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 2-range sine and square wave signal sources, variable 200 Hz to 20 kHz. Sine wave output is 1 v. rms at 600 ohms impedance, distortion less than 1%. Square wave output is 15 v. peak-to-peak, rise/fall times less than 1 microsecond, duty cycle 30%.
- Center-tapped power transformer secondary provides 30 v. rms, 60 Hz for power line experiments.
- Built-in 1K and 100K ohm linear potentiometers.

Make it easy, while you learn and after, with the Heathkit Electronic Design Experimenter. Kit ET-3100, 6 lbs., mailable 59.95



Heathkit Digital Design Experimenter/Trainer.

Use it while you study your Heathkit Digital Techniques course to perform all the experiments. Use later on the job or at home to develop projects, build and test prototypes, verify circuit operation, check digital ICs. Perfect experimental chassis for school labs as well. It's self-contained, nothing else is needed...just plug it in. It features:

- 3 regulated power supplies; +12 v., 100 mA current limited; -12 v., 100 mA current limited; +5 v., 500 mA, overload protected.
- 4 binary data switches (+5 v. and 0 v.), maximum current 10 mA each switch.
- 2 "no bounce" (flip-flop latched) spring return (momentary contact) logic switches to pulse logic circuits.
- 3-frequency pulse clock generator (1 Hz, 1000 Hz, 100 kHz ±20%), rectangular waveform, 5 v. peak-to-peak, for normal and complementary logic signals.
- 4 red LEDs (light emitting diodes) for visual indication of the logic states.
- Compatible with DTL, TTL, CMOS, nMOS and pMOS integrated circuits; RTL and ECL circuits can be accommodated with minor circuit additions.
- Solderless breadboarding socket for fast plug-in connections; accepts component lead diameters up to .032"; contains 128 terminals with 5 common points each, arranged in 64 pairs; will accommodate up to eight 14 or 16 pin dual in-line ICs. DIPs in 24, 28, and 40 pin packs can also be handled. Digital design comes easy with the "3200".

Kit ET-3200, 6 lbs., mailable 69.95

Two new 'scope values from Heath- New



Kit or Assembled



With Cyclocac® case removed, all components are easily accessible for calibration and servicing.



Complete trigger controls include TV coupling for easy triggering on complex TV signals.



New 10-4560 'scope

- ... DC-5 MHz bandwidth
- ... 100 mV sensitivity

only **119⁹⁵**



The open chassis design of the 10-4560 makes it an easy kit to assemble — a great project for student or home experimenter.



New

Heathkit IG-4505 Oscilloscope Calibrator

It's no longer necessary to return your oscilloscope to the manufacturer for complete calibration. 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 'scopes with bandwidths up to 35 MHz.

priced as low as 119⁹⁵



NEW DC-5 'scope for serviceman or hobbyist...only 179.95 kit, 275.00 assembled

The best scope value available today — the Heathkit IO-4540. Heathkit oscilloscopes have long been known for their versatility and value — and the 4540 is no exception. It is an easy to use, reliable scope for hobbyist or service tech. It 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 allow the 4540 to be used for nearly all types of waveform display and measurement applications. It's the perfect oscilloscope 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. All front panel trigger controls are clearly labeled for "no mistake" operation. A special TV position on the trigger selector control allows low frequencies to pass while rejecting high frequencies, so the 4540 will easily trigger on the vertical component of a complex TV signal.

Any one of seven calibrated time bases from 200 ms to 0.2 μ s/cm can be selected by the TIME/CM switch. The horizontal amplifier will accept external inputs from DC to 100 kHz with an input impedance of 1 megohm.

Vertical input sensitivity of 20 mV/cm and nine calibrated vertical attenuator positions up to 10 volts/cm will accommodate a broad

range of input signals. A variable gain control gives precise control between settings. Input impedance is 1 megohm shunted by 38 pF and will accept up to 400 VDC.

Both vertical amplifier and horizontal sweep circuit power supplies are regulated to provide stable voltages to all circuits under varying line voltage and load conditions. The 4540 will operate from either a 110-130 or 220-260 volt, 50/60 Hz AC power source.

Accurate measurements are easily made from the big 8 x 10 cm screen. The light weight, durable cabinet combines professional appearance with easy-to-carry portability. The flush-mounted handle allows stacking to avoid an Instrument-crowded bench. A sine-square generator is needed for calibration.

The Heathkit IO-4540, and the assembled SO-4540, are probably the best general-purpose oscilloscopes available today. When you consider all the performance and features they provide at such a low price, you can easily see why other scopes don't compare in value.

Kit IO-4540, 25 lbs., mailable 179.95

Assembled SO-4540, factory wired and calibrated version of the IO-4540, 24 lbs., mailable 275.00

IO-4540 SPECIFICATIONS — VERTICAL: Bandwidth: DC to 5 MHz \pm 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: 0C 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, 50/60 Hz, 35 watts. Dimensions: 8" H x 13" W x 17" D.

Lowest priced auto-triggering scope anywhere! DC-5 MHz, 100 mV sensitivity... only \$119.95

With the introduction of the Heathkit IO-4560, it is now possible for every electronics hobbyist and service tech to have a high performance Heath 'scope on his bench. Its low price makes an almost unbelievable instrument value. An excellent all-around hobbyist oscilloscope, it is also a good second oscilloscope for the audio and TV service shop.

The low price of the IO-4560 now makes it possible for everyone to have the most universal of all test instruments on your bench — the oscilloscope. The 4560's ability to display many types of voltage waveforms 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. Special effort was expended in the design of the IO-4560 to keep the number of controls and switches to a minimum. In addition to the power switch, there are only nine switches and controls, for correct operation — even the first time. The large 8 x 10 cm screen makes for easy waveform measurements.

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.

Vertical input impedance is 1 megohm for low circuit loading. Up to 400 VDC can be applied directly without circuit damage, making it a great scope for student use. 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. Display stability is excellent because the low voltage supplies for the amplifiers and sweep circuit are zener regulated. 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. Just build the sweep circuit board, assemble the chassis, solder the components, install the CRT and calibrate. Instructions given in the assembly manual are easy to understand. And if something goes wrong, a trouble-shooting table helps you quickly find the problem.

Easy assembly and operation, reliable, accurate performance, and low price make the IO-4560 the best instrument buy in years.

Kit IO-4560, 19 lbs., mailable ONLY 119.95

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 \pm 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. Graticule: 8 x 10 cm. Power Requirements: 110-130 or 220-260 VAC. 50/60 Hz 35 watts. Weight Dimensions: 8" H x 13" W x 17" D.

For time calibration, the IG-4505 generates a 0.5 second to 1 micro-second square wave in a 1-2-5 sequence — accurate to within .01%. Amplitude is 200 mV with \leq 3% overshoot. Output is provided through a permanently attached 50-ohm terminated cable with BNC connector. Voltage calibration ranges are 1 mV to 100 volts in decade sequence. Accuracy is within 2% with a 1-megohm load. Frequency can be varied from 2 Hz to 10 kHz in a 1-2-5 sequence. The internal standard is accurate to within 1%.

You won't find another 'scope calibrator that offers so much for such a little price. The Heathkit IG-4505 — every bench should have one. **Kit IG-4505, 4 lbs., mailable 44.95**

IG-4505 SPECIFICATIONS — TIME CALIBRATION: Range: .5 sec. to 1 μ s square wave in 1-2-5 sequence, accurate to within .01%. Amplitude: \approx 200 mV peak. Rise Time: \leq 4 ns. Overshoot: \leq 3%. Output: 50 ohm terminated cable. **VOLTAGE CALIBRATION:** Ranges: 1 mV to 100V peak square wave in decade sequence. Accuracy: To within 2% with 1M Ω load referenced to 1V position. Rise Time: \leq 2 μ s. Frequency: DC, 2 Hz to 10 kHz in 1-2-5 sequence. Accuracy of Internal Standard: Within 1%. Power Requirements: 120-240 Volts AC, 50/60 Hz, 12 watts.



These outstanding books can help make your Heathkit Scope an even more valuable tool

Understanding and using the Oscilloscope — details basic functions, circuits, inputs, pulses & waveforms; outlines every electronic test you're likely to make. **EDP-139 4.95**

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 4.50**

You get more Scope Performance



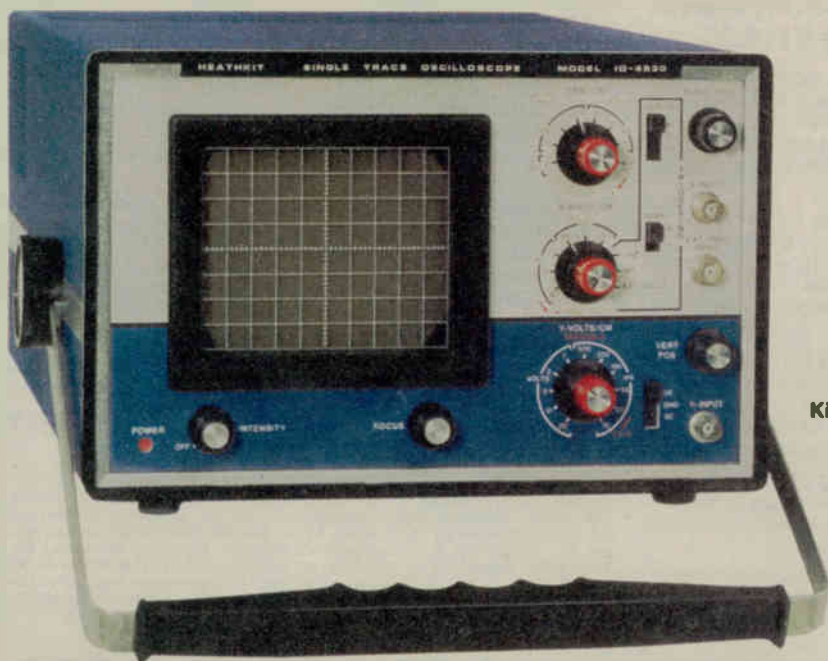
Kit or Assembled



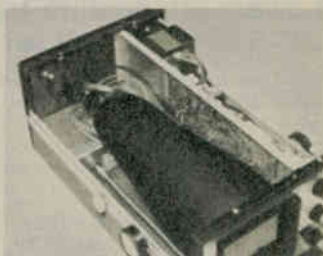
All major circuitry is contained on five easily removed circuit boards.



Adjustable line voltage switch matches the power supply of the IO-4510 to any voltage from 100 to 280 VAC.



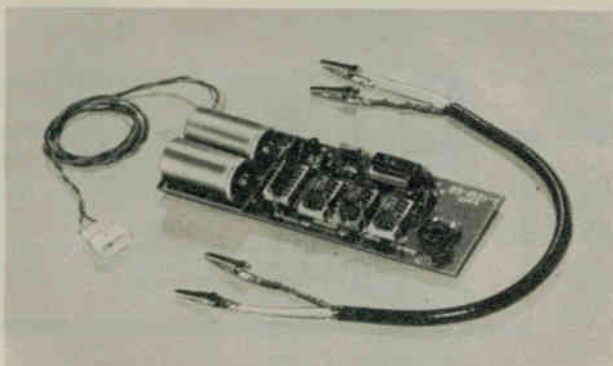
Kit or Assembled



A complete mu-metal shield is used in the IO-4530 to eliminate display error caused by electromagnetic interference.



The regulated high voltage supply is located in its own shielded compartment for complete isolation.



Oscilloscope Calibrator

The Heathkit IOA-4510-1 is a 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.

Kit IOA-4510-1, 1 lb., mailable 14.95

per Dollar when You buy Heath

Our best scope — dual trace, DC to 15 MHz, 1 mV sensitivity ... 569.95 Kit, 775.00 Assembled

The Heathkit IO-4510 has vertical delay lines, 45 MHz typical trigger bandwidth and a maximum sensitivity of 1 millivolt over full vertical bandwidth. With a x10 probe, you can read waveforms to 10 mV/cm. The attenuator networks can be switched through 12 calibrated ranges to set deflection factors from 1 mV/cm to 5 V/cm. Digitally-controlled time base circuitry provides automatic triggering for easy operation—no stability control is necessary. A reference baseline is generated when trigger signal is absent. Trigger Select switch and Level control allow time base to be precisely triggered at any point along positive or negative slope of trigger signal. The automatic position of level control triggers at zero crossing point.

Modes of signal 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. X-Y operation uses Channel 1 for horizontal deflection and Channel 2 for vertical deflection. Time Base control provides 22 calibrated time bases from 0.2 sec/cm to 0.1 μ sec/cm in 1, 2, 5 sequence, continuously variable between switch positions.

An adjustable AC line switch matches the regulated power supply to any common line voltage from 100 volts to 280 volts AC. All major circuitry is contained on five circuit boards for easy trouble-shooting. And push-on connectors permit fast removal of any board. The 6 x 10 cm CRT has post-deflection acceleration for a brighter trace and faster writing speeds.

Calibration of the IO-4510 requires a precise source of square waves to insure calibration to published specifications. Waveforms should be 5 volt, 1 kHz to 1 MHz square waves, with less than 5 nsec rise time and less than 1% overshoot. If a source is not available, the IOA-4510-1 Oscilloscope Calibrator (described below) may be ordered.

Kit IO-4510, 34 lbs., mailable 569.95

Assembled SO-4510, factory wired & calibrated version of the IO-4510, 34 lbs., mailable 775.00

IO-4510 SPECIFICATIONS—VERTICAL: Deflection Factor: Sensitivity: 1 mV/cm to 5 V/cm. Attenuator: 12 steps in 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:** Time Base: Ramp: 0.2 S/cm to 100 ns/cm. Positions: 20 steps in 1-2-5 sequence. Variable: Continuous between ranges to approximate 0.6 Sec/cm. Accuracy: Within 3%. Magnifier: X5 (adds additional 2% to sweep accuracy). External: Sensitivity: 0.2 V/cm (approx.). Impedance: 200 k Ω (approx.). Polarity: Neg. input causes right hand deflection. Frequency Response: DC to 1 MHz. **TRIGGER:** Internal: Automatic: Zero crossing \pm 0.5 cm. Normal: Adjustable over 8 divisions. Slope Selection: + or -. Sensitivity/Bandwidth: 1 cm deflection—DC, auto & norm: DC to 30 MHz; AC auto: 15 Hz to 10 MHz; AC norm: 10 Hz to 30 MHz; ACF auto: 20 kHz to 10 MHz; ACF norm: 10 kHz to 30 MHz. External: Automatic: Zero crossing \pm 0.2 V. Normal: Adjustable over \pm 5 V. Slope Selections: + or -. Sensitivity/Bandwidth: 0.5 V external trigger level—DC, auto & norm: DC to 30 MHz; AC auto: 10 Hz to 20 MHz; AC norm: 5 Hz to 30 MHz; ACF auto: 10 kHz to 20 MHz; ACF norm: 5 kHz to 30 MHz. 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. **GENERAL:** CRT: Type: 6 x 10 cm spiral PDA. Acceleration Potential: 4 kV regulated. Phosphor: P31. Graticule: 6 x 10 cm illuminated. Power: Voltage Range: 100-140/200-280 VAC, switch selected, 75 W. Internal Supplies: Fully regulated. Operating Temperature Range: 10 $^\circ$ C to 40 $^\circ$ C. Dimensions: 6.4" H x 12.9" W x 19.3" D (without handle).

Heathkit IO-4530...perfect for TV service & home experimenting... 299.95 Kit, 425.00 assembled

You won't find a better TV service oscilloscope value than the Heathkit IO-4530. Features like TV coupling, DC-10 MHz bandwidth, wide-band triggering capability, sensitive 10 mV/cm vertical input, and calibrated X-channel input make it a versatile, easy-to-use scope for the service technician and a good general purpose scope for the hobbyist.

The 4530 is one of the few single-trace scopes available with two input channels. The Y-input has a maximum sensitivity of 10 mV with an 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 can be switched through three AC or DC ranges from 20 mV/cm to 2 V/cm.

High or low frequency waveforms are no problem since the 4530's wide range of time bases can be switched from 200 ms/cm to 200 ns/cm. Any sweep speed can be expanded five times.

Trigger circuits are digitally controlled, requiring only a Level control and a Slope switch. In automatic mode, the triggering is at the zero crossing point. In normal mode, the level control is adjustable over the complete 8 cm span. Various trigger signals can be selected: a sample-of the vertical input signal, a sample of the line voltage or an externally applied trigger signal. In the TV trigger coupling mode,

the 4530 can be easily triggered on the vertical signal in a complex TV signal. Calibration requires a source of 1 volt, 10 kHz to 1 MHz square waves with less than 7 ns rise time and less than 1% overshoot (see IOA-4510-1 Oscilloscope Calibrator, page 68).

Kit IO-4530, 30 lbs., mailable 299.95

Assembled SO-4530, factory wired & calibrated version of IO-4530, 28 lbs., mailable 425.00

IO-4530 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 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. Positions: 7 steps in decade sequence. Variable: Continuous between ranges to approximate 2 s/cm. Accuracy: Within 5%. Magnifier: X5 (adds additional 2% to sweep accuracy). External: Deflection Factor: Sensitivity: 0.02 V/cm to 2 V/cm. Attenuation: 3 steps 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: 0.35 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 -. Sensitivity/Bandwidth: 0.5 cm deflection—DC, auto & norm: DC to 5 MHz; AC, auto & norm: 40 Hz to 5 MHz; TV, auto & norm: 40 Hz to 1 MHz. 1 cm deflection—DC, auto & norm: DC to 10 MHz; AC, auto & norm: 40 Hz to 10 MHz. 1.5 cm deflection—DC, auto & norm: DC to 15 MHz; AC, auto & norm: 40 Hz to 15 MHz. External: Automatic: Zero crossing \pm 0.03 V. Normal: Adjustable over 1.2 V. Slope Selections: + or -. Sensitivity/Bandwidth: 0.5 V external trigger level—DC, auto & norm: DC to 5 MHz; AC, auto & norm: 40 Hz to 5 MHz; TV, auto & norm: 40 Hz to 1 kHz. 1 V external trigger level—DC, auto & norm: DC to 15 MHz; AC, auto & norm: 40 Hz to 15 MHz. Impedance: 1 M Ω shunted by \approx 40 pF. X-Y: Y Channel: Same as vertical. X Channel: Same as external horizontal. Phase Shift: Less than 5 $^\circ$ @ 100 kHz. **GENERAL:** CRT: Type: 5" round. Acceleration Potential: 1.4 kV regulated. Phosphor: P31. Graticule: 8 x 10 cm. Power: Voltage Range: 110-130/220-260 VAC, switch selected, 65 watts. Internal Supplies: Fully regulated. Operating Temperature Range: 10 $^\circ$ C to 40 $^\circ$ C. Dimensions 6.4" H x 12.8" W x 19.2" D (without handle).



Heathkit ID-101 Electronic Switch

Provides simultaneous display of two separate input signals on a single trace scope by alternating between inputs. Response is DC-5 MHz, + 1 $\frac{1}{2}$ dB, - 3 dB.

Kit ID-101, 6 lbs., mailable 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, 50-60 Hz, 6 W. Dimensions: 4 $\frac{1}{4}$ " H x 10 $\frac{3}{8}$ " W x 5 $\frac{1}{4}$ " D.



Digital & Analog Power Supplies

4 DC models. Choose the voltage you need. 0-7.5V @ 10A, 0-15V @ 5A, 0-30V @ 3A, or 0-60V @ 1.5A. If you need greater voltages or current, connect additional supplies in series or parallel.

3½-digit or 3½" meter readout. The meter readout accuracy is $\pm 3\%$ for voltage and current. The digital readout accuracy on voltage is $\pm 0.5\%$ of reading, ± 1 count when calibrated with lab standards ($\pm 1\%$ of reading, ± 1 count with built-in calibrator). The digital readout accuracy on current is $\pm 1\%$ of reading, ± 4 counts using lab standards ($\pm 1.5\%$ of reading, ± 4 counts with built-in calibrator).

Remote programming. For systems and remote use, voltage and current can be remotely programmed through rear panel connectors using external voltage and resistance sources.

Constant current, constant voltage. Each supply in this new series has both adjustable constant current and adjustable constant voltage modes of operation.

Voltage sensing. All supplies can be connected for remote sensing of the voltage at the load to compensate for voltage drops caused by connectors and long leads.

Output protection. The conservatively rated, fully-dissipative regulator allows indefinite short-circuit operation with no damage. The output also is protected against accidentally applied voltages. In addition, the load is protected against open remote-sensing leads.

Kit IP-2700, 60V analog, 35 lbs., mailable	169.95
Assembled SP-2700, 60V analog, 35 lbs., mailable	255.00
Kit IP-2701, 60V digital, 37 lbs., mailable	219.95
Assembled SP-2701, 60V digital, 37 lbs., mailable	340.00
Kit IP-2710, 30V analog, 34 lbs., mailable	169.95
Assembled SP-2710, 30V analog, 34 lbs., mailable	255.00

Kit IP-2711, 30V digital, 36 lbs., mailable	219.95
Assembled SP-2711, 30V digital, 36 lbs., mailable	340.00
Kit IP-2720, 15V analog, 34 lbs., mailable	169.95
Assembled SP-2720, 15V analog, 32 lbs., mailable	255.00
Kit IP-2721, 15V digital, 36 lbs., mailable	219.95
Assembled SP-2721, 15V digital, 34 lbs., mailable	340.00
Kit IP-2730, 7.5V analog, 36 lbs., mailable	169.95
Assembled SP-2730, 7.5V analog, 34 lbs., mailable	255.00
Kit IP-2731, 7.5V digital, 38 lbs., mailable	219.95
Assembled SP-2731, 7.5V digital, 36 lbs., mailable	340.00

IP/SP-2700 SERIES SPECIFICATIONS (NOTE: Specifications 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/SP-2720 & 2721: 15V, 5A; models IP/SP-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: 3½", 100°, meter, Digital: 3½-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 laboratory 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 laboratory standards, $\pm 1.5\%$ of reading ± 4 count using built-in calibrator. Approx. Readout Rate (Digital): 7 per second (60 Hz line freq.); 6 per second (50 Hz line freq.). Readout Response Time: (Digital): 2 seconds to within 5 counts. Stability at Output Terminals: Voltage: $\pm (0.01\% + 1$ mV)/hr. Current: $\pm (0.05\% + 1$ mA)/hr. Stability as Displayed (Digital): Voltage: $\pm (0.01\% + 1$ mV + ½ count)/hr. Current: $\pm (0.01\% + 1$ mA + ½ count)/hr. Temperature Coefficient at Output Terminals (10° to 40°C): Voltage: $\pm (0.01\% + 1.5$ mV)/°C. Current: $\pm (0.05\% + 1$ mA)/°C. Temperature Coefficient as Displayed (Digital) (10° - 40°C): Voltage: $\pm (0.025\% + 2.0$ mV)/°C. Current: $\pm (0.065\% + 1.5$ mA)/°C. Load Transient Recovery: Output voltage within 0.05% + 1 mV within 50 μ sec for rated output current change or 5 A, whichever is less. Output Voltage Overshoot: None; using Power Switch only. 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). Frequency Response: DC to 100 Hz, ± 2 dB. 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; 50/60 Hz, 2.0/1.0 Amps max. Overall Dimensions: 5.5" H x 15" W x 13.5" D.

The Heath family of high-value supplies -with a new variable AC supply



New Heathkit IP-5220 Variable Isolated AC Supply

- Safe isolated source of AC power for service work
- Variable 0-140 VAC output
- 1 A & 3 A ammeter ranges for easy low-current readings
- Simultaneous metering of voltage and current output

Every service tech and hobbyist needs a Heathkit IP-5220. With this new variable AC source, you can isolate transformerless equipment for safer operation when servicing. It provides complete isolation between the AC power line and any electrical equipment that is plugged into its front panel variable output socket. The variable 0-140 volt output is useful anywhere a slow run-up of line voltage is needed...like the initial turn-on of that new breadboard you've been building.

A full 360 volt-amperes of AC power — available at the front panel variable output socket. More than enough to operate equipment with large power requirements, such as a color TV. And the IP-5220 is capable of supplying its full rated output continuously.

The IP-5220's ability to start from zero voltage is helpful when trying to locate circuit faults caused by high or low line voltage — or testing equipment with unknown power requirements. You simply monitor the

output on the large voltmeter and ammeter as output voltage is increased. When excessive current is observed, power can be quickly and easily removed before components are damaged.

For easier low current measurements, the ammeter has two switch-selected full scale ranges of 1 A and 3 A. Fuses for both ranges are front panel mounted for easy replacement. The variable output socket is fused to protect the IP-5220 and the circuit under test in case of a short circuit. A socket for direct line connection is front panel mounted for convenience.

Kit IP-5220, 27 lbs., mailable 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.



A)



B)

Kit
or
Assembled



C)

Kit
or
Assembled



Check this line-up and see why Heath has always been the "best buy" in power supplies

A) Regulated low voltage DC supply has two ranges of output voltage & current limiting

Compare the IP-28's specs against anything in its price range. You'll be convinced there is no better power supply value for the money.

Kit IP-28, 9 lbs., mailable 59.95

IP-28 SPECIFICATIONS — Voltage output: 2 ranges: 1-10 and 1-30 VDC, continuously adjustable. Load regulation: Less than 50 mV variation from no load to full load (at front panel terminals) without remote sensing. Less than 20 mV variation from no load to full load at front or rear panel terminals when using remote sensing. Line regulation: Less than 25 mV variation in output voltage for 10% change in line voltage. Ripple & noise: Less than 5 mV. Current output: 1A maximum continuous load (0.75 max. continuous load below 5 V). Current limiting: 2 ranges; 10-100 mA & 10 mA-1A, continuously adjustable. Transient response: 25 μS. Output impedance: 3.0 ohms or less to 100 kHz. Meter accuracy: 3% of full scale. Meter ranges: One switch determines voltage or current reading. 2 voltage ranges: 0-10 V, 0-30 V, 2 current ranges: 0-100 mA, 0-1A. External programming: AC or DC programming. 5000 ohm load on DC. Power requirements: 120/240 VAC, 50/60 Hz, 50 W, at full load. Dimensions: 6½" H x 10¾" W x 4¾" D overall.

B) 1-15 VDC regulated supply ...kit or assembled

Output continuously adjustable from 1-15 VDC with 50 mV regulation ...and adjustable current limiting from 10 mA to 500 mA. AC or DC programming capability. Three-terminal floating output.

Kit IP-18, 5 lbs., mailable 24.95

Assembled SP-18A, 5 lbs., mailable 50.00

IP-18 SPECIFICATIONS — Voltage output: 1-15 VDC, continuously adjustable. Load regulation: Less than 50 mV variation from no load to full load. Line regulation: Less than 50 mV change in output voltage for a 10% change in line voltage. 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, 50/60 Hz, 15 W at full load. Dimensions: 4¾" H x 5½" W x 5¾" D. Programming: AC or DC, 5000 ohm input resistance.

C) 0-400 VDC regulated supply ...kit or assembled

A versatile supply for experimenters and service techs. And a great general purpose supply for the physics or chemistry lab.

Kit IP-17, 21 lbs., mailable 94.95

Assembled SP-17A, 21 lbs., mailable 160.00

IP-17 SPECIFICATIONS — Output: 0-400 V regulated DC at 0-100 mA continuous, 125 mA intermittent, 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. Output variation less than 1% for a ±10 V change at 117 VAC input. Ripple: Less than 10 millivolts rms, ripple, jitter and noise. 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, 50/60 Hz, 150 W max. Dimensions: 5½" H x 13¼" W x 11" D.

D) 6/12 VDC variable battery eliminator doubles as a battery charger

Kit IP-12, 18 lbs., mailable 79.95

IP-12 SPECIFICATIONS — Continuously variable output: 6 V range: unfiltered, 10 amp continuous, 15 amp maximum; filtered, 5 amp continuous, less than .3% ripple. 12 V range: unfiltered, 5 amp continuous, 7.5 amp maximum; filtered, 5 amp continuous, less than .3% ripple. Power requirements: 120/240 VAC, 50/60 Hz at 200 W. Dimensions: 8½" H x 13" W x 7" D.



Order this valuable reference work with your Heathkit Power Supply

Regulated Power Supplies — useful to the engineer, technician, serviceman, ham and experimenter; covers static & dynamic characteristics, regulation techniques, use of integrated circuits, and more. EDP-152, 5.50*
*\$10 minimum order for book only purchase. No minimum when book order accompanies kit order. Include 35¢ for each book to cover postage and handling.

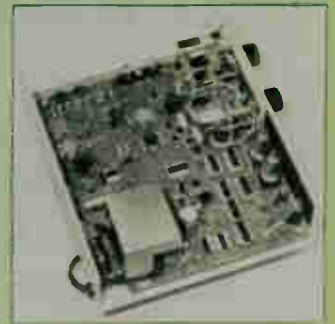
Charge a kit — no money down on any kit — up to 2 years to pay — see order blank for details.

Hobbyist or professional, there's a Heath



Kit or Assembled

A)



The all solid-state circuitry of the IM-1212 is contained on a single circuit board for easy assembly and access when servicing.



B)

- Truly portable — includes rechargeable nickel-cadmium batteries and built-in charger
- 26 ranges; resolves voltages to 100 μ V, currents to 100 nA; measures AC & DC current up to 2 A
- Built-in references for easy field calibration
- Compact size—only 3" H x 8 1/4" W x 8" D
- Automatic polarity indication
- Uses patented Schlumberger dual-slope conversion technique . . . the industry standard for DMMs



These "how-to" books help you get maximum use & enjoyment from your Heathkit meter.

- Handbook of Practical Electronic Tests & Measurements, a guide to the basic theory and application of every practical electronic test & measurement procedure for technicians, EDP-13716.95*
- 101 Ways to Use Your VOM/VTVM, covers equipment checks, ac & dc voltage tests, dc current tests, ohmmeter tests, signal tracing tests, alignment & color TV tests, EDP-1504.50*
- 101 More Ways to Use Your VOM/VTVM, expands on volume above, describing additional tests & uses. EDP-1514.50*
- Understanding & Using the VOM & DVM, a modern, practical guidebook to every possible application of the VOM. EDP-1404.95*
- Electronic Measurements Simplified, covers nearly every test or measurement you'll ever have to make in TV servicing, 2-way & ham radio, CB, etc.,—in plain English. EDP-1414.95*
- ABCs of Electronic Test Probes, shows how to use the many probes needed for testing radio, TV & other equipment. EDP-1432.95*
- *\$10 minimum order for book only purchase. No minimum when book order accompanies kit order. Includes 35¢ for each book to cover postage and handling.



C)

DMM for your measurement need

A) Our lowest cost DVM—now in a bench version... only 79.95 Kit, 125.00 Assembled

- Large, bright, easy-to-read display
- Completely self-calibrating
- For hobbyists, schools, and service techs

The new Heathkit IM-1212 Digital Multimeter is 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. Four overlapping AC & DC voltage & current ranges and five resistance ranges make operation fast and simple. Accuracy is very good for a multimeter in this price range: 1% on DC volts, 1½% on AC volts and AC/DC current, and 2% on resistance. Lighted front-panel indicators show overrange, positive and negative DC voltages and current at a glance.

The all solid-state design uses IC circuitry for a clear non-blinking display. The dependable ramp analog-to-digital converter updates the readout every 16 msec.

The IM-1212 is a great teaching aid for schools. It's simple to operate, and the large 2½-digit display with automatic decimal positioning ends "reading the wrong scale" errors. 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 those initial and periodic adjustments.

Other features include 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, 7 lbs., mailable 79.95

Assembled SM-1212, wired version of the IM-1212, 7 lbs., mailable 125.00

IM-1212 SPECIFICATIONS — Functions: \pm DC volts, \pm DC current, AC volts, AC current, ohms. 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). Resolution: (Lowest Range) Volts: 10 mV. Current 10 μ A. Ohms: 1 ohm. Display: Two & one half digit numeric. Rated accuracy carried to 25% overrange. Accuracy: (Full scale \pm 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. Sample Rate: Approximately 60 per second. Power requirements: 120/240 VAC, 50/60 Hz, 8 watts. Dimensions (overall): 3¼" H x 9½" W x 8¾" D.

B) Heathkit IM-2202 Portable Digital Multimeter — "Pro" performing compact... only 179.95

The Heathkit IM-2202 Portable Digital Multimeter is the lowest priced professional-grade digital multimeter we've ever offered. Designed for field or bench use, it will provide years of dependable measurement. Included are four rechargeable nickel-cadmium batteries that provide up to eight hours of continuous operation with each charge. It may also be operated from 110 or 220 VAC or temporarily from four "C" cells.

Its 26 ranges include AC and DC voltages, AC and DC current, resistance and a Battery Test position. Full scale ranges are 100 mV to 1000 volts DC, 100 mV to 750 volts AC, 100 μ A to 1000 mA and 100 ohms to 1000 kilohms. 100% overrange allows measurements up to 1.999 on all ranges except 1000 VDC and 750 VAC, giving full 2 amp or 2 megohm capability. Voltage and current inputs are separated for circuit protection. All functions are protected against accidentally applied voltages up to 250 volts. Overrange is indicated by a flashing "1" display.

All voltage ranges have high input impedance (10 megohms typical) to prevent circuit loading. Current ranges feature low voltage drop (100 mV typical) for accurate measurements. Resistance ranges limit maximum test current to 1 mA. The full scale measurement of 2 volts on the 1 kilohm, 10 kilohm and 1 megohm ranges still allows forward-biased junction testing of semiconductor devices.

If a lab standard is used for calibration, DC accuracy is \pm 0.2%; AC accuracy is \pm 0.5% to 10 kHz. Internal standards supplied allow field calibration to \pm 0.5% for DC and \pm 1% for AC.

The large 3½-digit display (1999 count) is easy to read, even in bright sunlight. Automatic polarity indication and decimal point placement reduce the possibility of erroneous readings. A continuous-rotation Range switch and four pushbutton Function switches select ranges.

A custom-designed MOS/LSI integrated circuit contains all digital counting and logic circuits — allowing the extensive circuitry of the

IM-2202 to be contained in its compact case. It provides leading zero suppression for all measurements to conserve battery charge and insures a stable, flicker-free display. It functions as the heart of a dual-slope analog-to-digital converter providing stable, accurate performance under all conditions of temperature and battery charge.

Although assembly of the IM-2202 is aided by circuit board construction and many "plug-in" components, previous kitbuilding experience would be helpful. If you've ever built an electronic kit, you'll appreciate the advanced techniques and engineering concepts used in its design. Professional features, easy operation, high accuracy and dependable performance — you get them all with the Heathkit IM-2202.

Kit IM-2202, 7 lbs., mailable 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 M Ω , 1.000 V/500 M Ω , 10.00 V/10 M Ω , 100.0 V/10 M Ω , 1000 V/10 M Ω . Overload Capability: 300 V on 100 mV & 1 V ranges; 1000 V on 10 V, 100 V & 1000 V ranges. Accuracy: Built-in references, \pm 0.5%, \pm 1 digit. Laboratory standards, \pm 0.2%, \pm 1 digit. Temperature coefficient: \pm 200 PPM/ $^{\circ}$ C. **AC VOLTAGE** — Range/Input Impedance: 100.0 mV/10 M Ω -120 pF, 1.000 V/10 M Ω -120 pF, 10.00 V/10 M Ω -60 pF, 100.0 V/10 M Ω -60 pF, 750 V/10 M Ω -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... \pm 1.0%, \pm 3 digits; 40 Hz to 1 kHz (except 40 Hz to 10 kHz on 100 mV and ranges). Laboratory standards... \pm 0.5%, \pm 3 digits; 40 Hz to 10 kHz (except 40 Hz to 2 kHz on 750 range). Temperature coefficient: \pm 300 PPM/ $^{\circ}$ C. **DC CURRENT** — Range/Voltage Drop: 100.0 μ A/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... \pm 0.5%, \pm 1 digit (except \pm 1%, \pm 1 digit on 1000 mA range). Laboratory standards... \pm 0.2%, \pm 1 digit (except \pm 0.5%, \pm 1 digit on 1000 mA range). Temperature coefficient: \pm 250 PPM/ $^{\circ}$ C. Overload protection: Input coupled through 3.0 Ampere fuse to shunt diodes for overloads above approximate 1.2 Volts. **AC CURRENT** — Range/Voltage Drop: 100.0 μ A/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... \pm 1.0%, \pm 3 digits (except \pm 1.5%, \pm 3 digits on 1000 mA range); 40 Hz to 10 kHz. Laboratory references... \pm 0.5%, \pm 3 digits (except \pm 1.0%, \pm 3 digits on 1000 mA range); 40 Hz to 10 kHz. Temperature coefficient: 350 PPM/ $^{\circ}$ C. 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 k Ω /1.0 mA, 10.00 k Ω /0.1 mA, 100.0 k Ω /1.0 μ A, 1000 k Ω /10. μ A. Accuracy: Built-in references... \pm 0.5%, \pm 1 digit. Laboratory standards... \pm 0.2%, \pm 1 digit. Temperature coefficient: \pm 300 PPM/ $^{\circ}$ C. 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. Polarity indication: Automatic "+" and "-". Overrange indication: Automatic above 1999; polarity sign and decimal point shown with flashing "1" in thousands. 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 $^{\circ}$ C to 40 $^{\circ}$ C. Storage temperature range: -40 $^{\circ}$ C to 50 $^{\circ}$ C with batteries installed; to 70 $^{\circ}$ C with batteries removed. Power requirements: 110 to 130 VAC, or 220 to 260 VAC (internal selectable); 50/60 Hz; 5 watts typical during charge. Operating time: 8 hours typical after 14 hours minimum charge time (from internal nickel-cadmium batteries). Standard "C" batteries may be used for intermittent operation up to 2 hours for Zinc - Carbon (NEDA type 14) and up to 6 hours for Alkaline (NEDA type 14A). Built-in "Battery Test" function provided. Size (overall including handle folded to rear): 3" H x 8¼" W x 8" D.

C) Our finest DVM... 3½ digits... high accuracy & resolution... 249.95

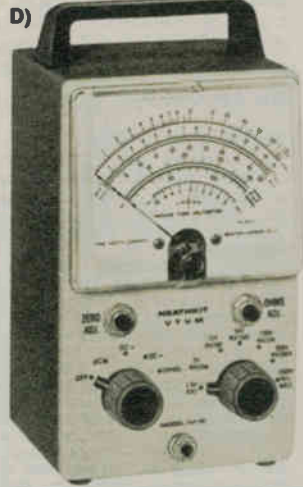
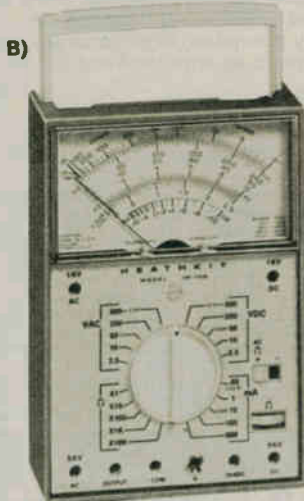
Kit IM-102, 9 lbs., mailable 249.95

IM-102 SPECIFICATIONS — **DC VOLTMEETER** — 5 ranges: 200 mV, 2V, 20V, 200V, 1000V. Input Impedance: Approx. 100 megohm on 200 mV, approx. 1000 megohm on 2V, 10 megohm on all other ranges. Accuracy: \pm 0.2% \pm 1 digit with furnished DC calibrator, \pm 0.1% \pm 1 digit with lab calibration. Overload protection: 350V on 200 mV and 2V, 1000V on other ranges. Overrange capability: 20% minimum (subject to overload protection limits). Resolution: 100 μ V. Full scale step response: 2 sec. to rated accuracy. Input bias current: 10 nA maximum at reference conditions. Temperature influence: \pm 0.005%/ $^{\circ}$ C, \pm 1 digit/ $^{\circ}$ C. Normal mode rejection: 35dB minimum @ 60 Hz. Common mode rejection: 80 dB minimum with 1k unbalance @ 60 Hz. **OHMMETER** — 6 ranges: 200 ohms with 1 mA test current, 2k with 100 μ A, 20k with 10 μ A, 200k with 10 μ A, 2M with 10 μ A, 20M with 100nA. Accuracy: With DC calibrator, \pm 0.5% \pm 1 digit on 200, 2k, 20k, 200k ranges; \pm 1.5% \pm 1 digit on 2M and 20M ranges. With lab calibration, \pm 0.5% \pm 1 digit on 200 ohm range; \pm 0.25% \pm 1 digit on 2k, 20k, 200k; \pm 1% \pm 1 digit on 2M and 20M. Overload protection: 250 V rms. Resolution: 0.1 ohm (200 ohm range). Full scale step response: 2 sec. on ohm and k ohm ranges, 10 sec. at 10 megohms to rated accuracy. Temperature influence: \pm 0.05% @ $^{\circ}$ C. Overrange capability: 20% minimum. **AC VOLTMEETER** (Average responding, rms calibrated) — 5 ranges: 20 mV, 2 V, 20 V, 200 V, 1000 V. Input impedance: 1 megohm @ 150 pF. Overload protection: 250 rms on 200 mV and 2 V, 500 V on higher ranges. Accuracy: With DC calibrator, \pm 0.75% \pm 1 digit for 40Hz-10kHz, \pm 1% \pm 1 digit for 10kHz-20kHz on 200 mV and 2V ranges; \pm 0.75% \pm 1 digit for 40Hz-5kHz, \pm 1.5% \pm 1 digit for 5kHz-10kHz on 20V and 200V ranges; \pm 1.5% \pm 1 digit for 40Hz-7.5kHz on 1000V range. **DC AMMETER** — 5 ranges: 200 μ A, 2mA, 20mA, 200mA, 2A. Voltage drop: 0.2V (nominal). Accuracy: With DC calibrator, \pm 0.5% \pm 1 digit for 2A, \pm 0.3% \pm 1 digit on all other ranges. With lab calibration, \pm 0.25% \pm 1 digit for 2mA and 20mA; \pm 0.3% \pm 1 digit for 200mA; \pm 0.5% \pm 1 digit for 2A. Resolution: 100 nanoamperes (200 μ A range). Overload protection: 3 A, any range, by fuse and clamp diodes. **AC AMMETER** (40Hz-10kHz) — 5 ranges: 200 μ A, 2mA, 20mA, 200mA, 2A. Voltage drop: 0.2 V (nominal). Accuracy: With DC calibrator, \pm 1.5% \pm 1 digit on 2A, \pm 1% on all other ranges. With lab calibration, \pm 0.75% \pm 1 digit on 200 μ A, \pm 0.7% \pm 1 digit on 2 mA and 20 mA; \pm 0.8% \pm 1 digit on 200mA; \pm 1% \pm 1 digit on 2A. Resolution: 100 nanoamperes. Overload protection: 3A, any range, by fuse and clamp diodes. **GENERAL** — Display: Maximum count, 1999. Overrange indication, automatic beyond 1999. Polarity indication automatic. "+" or "-" Reading rate, 5 per sec., non-blink (200 millisecond integration time). Numeric display by side-viewing neon glow tubes with integral decimal points. Power requirement: 120 or 240 VAC, 50Hz/60Hz, 8 W nominal. Operating temperature: 10 $^{\circ}$ C-40 $^{\circ}$ C. Reference: 25 $^{\circ}$ C. \pm 1 $^{\circ}$ C. Size: 3" H x 7" W x 7.9" D.

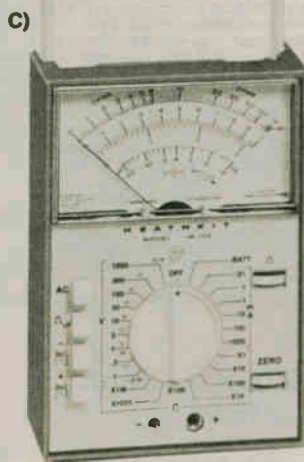
Charge a kit — no money down on any kit — up to 2 years to pay — see order blank for details.

Build Heathkit meters

"Kit or Assembled"



"Kit or Assembled"



"Kit or Assembled"



"Kit or Assembled"



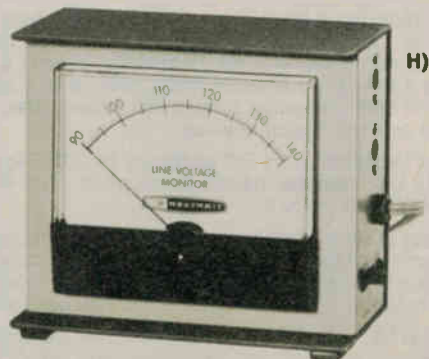
"Kit or Assembled"



E) "Kit or Assembled"



G)



H)

Now — convert your tube-type Heathkit VTVM to instant-on solid-state design



This new kit replaces the 6AL5 and 12AU7 tubes used in many Heathkit VTVMs, including current models IM-18 and IM-28. The two solid-state devices plug directly into the tube sockets. One device is a high voltage amplifier containing 4 FETs; the other contains 2 special diodes with low forward drop. The result is instant-on service — no more waiting for tubes to warm up — and no more pointer-drift corrections. Move your VTVM into the solid-state age today.

IMA-18-1, 1 lb., mailable16.95

for better performance, better value

A) 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 $\pm 3\%$ 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. The IM-5210 is an easy kit to build, taking about an hour to assemble and is the best high voltage measurement value on the market.

Kit IM-5210, 2 lbs., mailable 17.95

Assembled SM-5210, factory wired version of the IM-5210,

2 lbs., mailable Was 24.95, Now Only 19.95

IM-5210 SPECIFICATIONS — Voltage Range: 0-40 kVDC. Accuracy: $\pm 3\%$ of full scale. Size: 1½" H x 1¾" W x 15" D.

B) 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 that can suffer years of rough treatment and bounce back for more. 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, 3 lbs., mailable 64.95

Assembled SM-660, (less 5 KV ranges), 4 lbs., mailable 72.00

IM-105 SPECIFICATIONS — DC VOLTAGE RANGES: —0.25, 2.5, 10, 50, 250, 500, 1000 & 5000 V full scale. Accuracy: $\pm 3\%$ 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: $\pm 4\%$ of full scale. Input resistance: 5000 ohms/V. Input capacity: less than 20 pF. Frequency response: 2.5, 10, and 50 V ranges: $\pm 5\%$, 10 Hz to 100 kHz; 250, 500 V ranges: $\pm 5\%$, 10 Hz. DC CURRENT RANGES: —0.05, 1.0, 10, 100, 500 mA & 10 A full scale. Accuracy: $\pm 3\%$ 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 — Voltage dividers —1% metal film resistors on most ranges. Meter: 4½", 50 μ A, ruggedized, taut-band movement. Meter protection: Combined fuse and diode overload protection. Meter temperature coefficient: 15 to 35° C, $\pm 1\%$ (or 0.1 degree of arc) per degree C. Operating temperature range: 0-55° C. Batteries (not supplied): One 1.5 V "D" cell (NEDA #13). One 15V (NEDA #208). Dimensions: 7" H x 5" W x 2¼" D. Test Leads: Supplied.

C) 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, 4 lbs., mailable 94.95

Assembled SM-666, has additional 1 μ A current range, less 100 & 1000 mA ranges, 4 lbs., mailable 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: $\pm 2\%$ 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: $\pm 3\%$ 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 $\pm 3\%$, 20 Hz to 50 kHz $\pm 5\%$ on 0.1 to 30 V, 20 Hz to 10 kHz $\pm 3\%$, 20 Hz to 20 kHz $\pm 5\%$ on 100 and 300 V. 20 Hz to 1.0 kHz $\pm 3\%$, 20 Hz to 2.5 kHz $\pm 5\%$ 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, 0.150V on 100, 0.350 V on 1000. Insertion resistance: Voltage drop divided by full-scale current. Accuracy: $\pm 2\%$ on 0.01 to 100, $\pm 3\%$ 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 10, 0.350 on 1000 V. Insertion resistance: Voltage drop divided by full scale. Accuracy: $\pm 3\%$ on 0.01 to 100, $\pm 4\%$ 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 $\pm 3\%$ on 0.01, 20 Hz to 20 kHz $\pm 3\%$ on 0.1, 20 Hz to 50 kHz $\pm 3\%$ on 1 to 1000. OHMMETER — 7 ranges: Rx1 (10 ohm center scale), Rx10, Rx100, Rx1k, Rx10k, Rx100k, Rx1M. Accuracy: $\pm 3\%$ 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 to +22, +10 to +32, +20 to +42, +30 to +52, +40 to +62. Accuracy: ± 3 db @ —20 dB to ± 0.3 db @ +2B. Voltage dividers: 1% precision metal-film resistors. Meter: 4½", 100 μ A, 95° ruggedized, taut-band movement. 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. Front panel switches: 24-position, continuous rotation RANGE switch (including battery check position BATT and OFF). 4-position pushbutton switch for AC, ohm LV, —DC/ohm, +DC/ohm. Meter temperature coefficient: Maximum of $\pm 0.2\%$ or

$\pm 0.2\%$ or arc per °C over range of 15 to 35°C. 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 AA-cell (NEDA #15). Dimensions: 6.95" H x 4.95" W x 2.25" D.

D) Heathkit IM-18—our most popular VTVM

For decades, Heathkit VTVMs have been prized by owners for their convenient size, practical meter ranges, single test probe, and low cost. The IM-18 possesses all of these traditional Heathkit values, plus impressive features of its own: a single probe for all measurements—seven AC, seven DC, and seven Ohms ranges; precision 4½" 200 μ A 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, 5 lbs., mailable 36.95

Assembled SM-20A, 6 lbs., mailable 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 meg-ohms. Meter: 4½" 200 μ A 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 $\pm 3\%$, AC $\pm 5\%$ of full scale. Frequency response: ± 1 dB, 25 Hz to MHz (600 ohm source). Tubes: 12AU7, 6AL5. Battery requirements: 1.5 V, size "C" cell (not supplied). Power requirements: 120/240 VAC, 50/60 Hz. 10 W. Dimensions: 7¾" H x 4¾" W x 4¾" D.

E) Heathkit IM-28 Service Bench VTVM

A deluxe version of the IM-18 in a big stay-put size for your bench and a big easy-to-read 6" meter.

Kit IM-28, 7 lbs., mailable 46.95

Assembled SM-21A, 7 lbs., mailable 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: $\pm 3\%$ of full scale. AC VOLTMETER — Ranges: 0-1.5, 5, 15, 50, 150, 500, 1500 rms scales (.353 of peak-to-peak). Frequency Response (5 V range): ± 1 dB 25 Hz to 1 MHz (600 ohm source, referred to 60 Hz). Circuit: Halfwave voltage doubler, using twin diode. Accuracy: 5% of full scale. Input Resistance & Capacitance: 1 megohm shunted by 40 pF measured at input terminals (200 pF at probe tip). OHM-METER — 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 μ A movement, polystyrene case. Probe: Combined AC-OHMS-DC switching probe, single jack input for probe and ground connections. Dividers: 1% precision type. Battery: 1½ V, "C" cell (not supplied). Power Requirements: 120/240 VAC, 50/60 Hz, 10 W. Dimensions: 5" H x 12¼" W x 4¾" D.

F) 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, 5 lbs., mailable 52.50

Assembled SM-22A, 6 lbs., mailable 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 .01 to 3 V. Accuracy: Within 5% of full scale. Power requirements: 120/250 VAC, 50/60 Hz, 10 W. Dimensions: 7¾" H x 4¾" W x 4¾" D.

G) 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. Features include portable battery operation, zero and ohms adjust controls, accessory probe jack. DC polarity reversing switch, three built-in test leads, easy 3-5 hour assembly.

Kit IM-17, 4 lbs., mailable 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: $\pm 3\%$ of full scale. AC VOLTMETER — Four ranges: 0-1, 10, 100, 1000V full scale. Input resistance: 1 meg. on all ranges. Accuracy: $\pm 5\%$ of full scale. Frequency response: ± 1 dB, 10 Hz to 1 MHz. OHMMETER — Four ranges: Rx1, Rx10, Rx10k, Rx1M. Input resistance: 1 meg. on all ranges. Amplifier circuit: 8.4 V mercury cell (NEDA #1611), batteries not supplied. GENERAL — Meter: 4½", 200 μ A, 100° movement. Dimensions: 5¾" H x 9¾" W x 9" D.

H) Heathkit Line Voltage Monitor

The ideal accessory for labs, shops, hams & CBer's, hobbyists. 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 $\pm 2\%$. The large, expanded scale meter lets you know at a glance what your power line voltage is.

Kit IM-103, 3 lbs., mailable 19.95

IM-103 SPECIFICATIONS — Voltage range: 90 VAC (rms) — 140 VAC (rms). Voltage accuracy (sine wave): $\pm 2\%$ when calibrated with a known line voltage. Power requirements: 90-140 VAC, 50-60 Hz, 4.2 W. Dimensions: 5¾" H x 6¼" W x 3" D.

Charge a kit — no money down on any kit — up to 2 years to pay — see order blank for details.

New Multi-function Counter - only \$129⁹⁵

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.

Gate Lamp
Flashes on when the display is updated. Also functions as a logic probe (see right) for troubleshooting 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.

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.

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.

Measure frequency...or period.

The most versatile counter we've ever offered... displays frequency to 30 MHz, period to 99,999 seconds, counts events to 99,999... all for only 129.95!

The new Heathkit IM-4100 is an almost unbelievable counter value. It's a full five-digit frequency counter, it will also function in period mode or totalize mode. It provides built-in input attenuation and 12-volt operation all in one compact package.

As a frequency counter, the IM-4100 is guaranteed to 30 MHz with 1 Hz resolution. Sensitivity is a low 15 mV from 50 Hz to 30 MHz, 50 mV below 50 Hz.

In the period mode, it measures intervals up to 99,999 seconds. Using the millisecond time base, it resolves to 1 msec! This mode can be used for low frequency measurements with high accuracy. Just position the TIME BASE switch to mS and the MODE switch to PER. Then solve the equation $f = 1/\text{period}$, using the displayed value.

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 can be applied through a rear panel terminal to stop the totalize mode at any time, without loss of the displayed count.

The front panel attenuator switch allows the amplitude of input signals to be divided by 1, 10 or 100. The pushbutton RESET switch quickly resets the display to zero in any mode. Front panel display includes overrange indicator and a gate lamp.

A rear panel switch easily selects internal or external time base. The rear panel connector can be used as an input for the external time

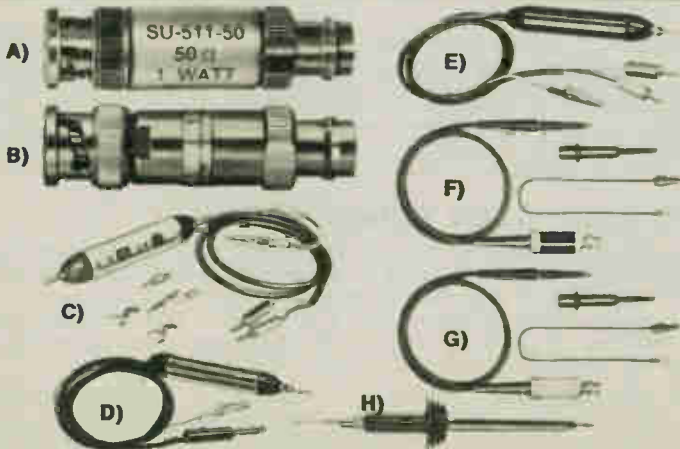
base signal, or as an output to check the internal 10 MHz time base or provide a convenient frequency standard of 1 MHz for the bench use. Operation from any 12-volt DC source is possible with the IM-4100 - no extra accessories are needed. Power is applied through a rear panel connector (mating connector supplied).

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 troubleshooting should problems arise.

It's a great instrument value at an almost-too-good-to-be-true price.

Kit IM-4100, 7 lbs., mailable 129.95

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. **Stability:** ± 1 ppm. **Temperature Stability:** ± 10 ppm, maximum 0° to 40° 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 (indicated by gate light). **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), 50/60 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).



Probes & accessories for Heathkit instruments

- A) 50-ohm Termination** for frequency counters and scopes. DC to 1 GHz range; power rating is 1 watt. VSWR: 250 MHz, 1.2:1; 600 MHz, 2:1. **Assembled SU-511-50, 1 lb., mailable 15.00**
- B) RF Fuse** in UHF BNC-to-BNC connector. Prevents accidental burn-out of devices sensitive to RF power. DC to 500 MHz range; 50 ohm's impedance; 12.1 VSWR (max.); insertion loss 1.80 dB max. at 500 MHz. Spare fuses included. **Assembled SU-512-50, 1 lb., mailable . . 45.00**
- C) Low capacitance scope probe** provides direct or X10 attenuated operation; options for 3.3 or 1 megohm input resistance. **Kit PK-1, 1 lb., mailable 5.95**
- D) 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, 1 lb., mailable 5.95**
Assembled PKW-3, 1 lb., mailable 7.95
- E) Scope demodulator probe** for distortion checks and display of RF & IF signal modulation. Functions as an AM detector, 30 V rms max.,

Your counter dollar buys more at Heath

180 MHz Counter with phase-locked frequency multiplier... 349.95



1 Hz to 180 MHz range...sensitivity of 50 mV to 120 MHz, 100 mV to 180 MHz. Pushbutton selection of x1, 10, 100 or 1000 multiplier permits resolution down to 0.001 Hz for signals up to 10 kHz.

TCXO (temperature compensated crystal oscillator) provides high stability and excellent aging characteristics, insuring its fundamental accuracy. Pushbutton selection of 1 msec, 100 msec and 1 second gate times allow variable resolution readings. Rear panel switch and input connection permit use of an external clock.

Features include 8-digit cold-cathode display plus range, overrange, gate and loop-unlocked indicators...separate AC and DC coupled inputs...120/240 VAC primary. You don't have to spend a fortune to get VHF counting capability...order your IB-1103 today.

Kit IB-1103, 12 lbs., mailable 349.95

IB-1103 SPECIFICATIONS — FREQUENCY MEASUREMENTS — Range: 1 Hz to 180 MHz. Gate time: 1 msec., 100 msec., or 1 sec. Accuracy: ± 1 count \pm time base stability. Readout: MHz, kHz, or Hz with correctly positioned decimal. **SIGNAL INPUT —** Maximum sensitivity: 50 mV to 120 MHz, 100 mV to 180 MHz. Coupling: AC and DC (two separate inputs). 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. Temperature ± 1 ppm between 15° to 40°C. Line voltage 0.5 ppm with $\pm 10\%$ voltage change. Frequency trimming: Accuracy ± 1 ppm. Range ± 10 ppm. Sample rate: Approx. 500 msec. (time between two openings of counting gate). **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. Accuracy: x10: ± 1 count \pm time base accuracy. x100: ± 1 count \pm time base accuracy. x1000: At less than 500 Hz, ± 1 count \pm time base stability. At greater than 500 Hz, ± 2 counts \pm time base stability. To remain locked: Frequency rate of change must not exceed 10 Hz. Lock time after step frequency change: x10 & x100: 5 sec. for frequencies less than 500 Hz; 3 sec. for frequencies greater than 500 Hz. x1000: 1.5 sec. for frequencies less than 500 Hz; 1 sec. for frequencies greater than 500 Hz. Lock indicator: Front panel lamp; "Off" = locked, "On" = unlocked. **EXTERNAL TIME BASE INPUT —** Frequency: 1 MHz with stability greater than 10^{-7} . Input impedance: 1000 ohms. Maximum input: 3 V rms. **GENERAL —** Display: 8½ digits plus overrange, gate, MHz, kHz, Hz and unlocked lamps. Operating temperature range: Operating 10°C to 40°C. Power requirements: 120/240 VAC, 50/60 Hz, 40 W when not using frequency multiplier, 45 W when using frequency multiplier. Connectors: 3 BNC's. Input (AC & DC) on front panel; external clock on rear panel. Dimensions: 3½" H x 8½" W x 9¼" D.

8-digit, 120 MHz Counter... 279.95

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, 12 lbs., mailable 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. Temperature: ± 1 ppm between 15°C to 50°C. Line voltage: 0.5 ppm with $\pm 10\%$ voltage change. Frequency trimming: Accuracy: ± 1 ppm. Range: ± 10 ppm. Sample rate: 500 msec. (Time between two openings of counting gate). **EXTERNAL TIME BASE INPUT:** Frequency: 1 MHz with stability $>10^{-7}$. Input impedance: 1000Ω. Maximum input: 3V rms. **GENERAL —** Display: 8 digits plus overrange, gate, MHz, kHz, and Hz 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: 8½" W x 3½" H x 9¼" D.



500 VDC max. Kit 337-C, 1 lb., mailable 6.50

F) High frequency compensated scope probe features DC-60 MHz bandwidth; 10 megohm/11.5 pF input impedance; compensation for any 1 megohm/15-40 pF scope input; X10 attenuation; 500 V AC & DC rating. Ideal for use with IO-104, IO-4510 and IO-4530 scopes. Assembled PKW-101, 1 lb., mailable 26.95

PKA-101-1 Accessory Pack...consists of the most commonly lost or damaged parts of the PKW-101. Includes three assembled tips, two 6-inch ground leads and one 12-inch ground lead. PKA-101-1, 2 lbs., mailable 9.95

G) Direct (X1) scope probe is useful with scopes, frequency counters or whenever you are 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. BNC connector. Assembled PKW-104, 2 lbs., mailable 21.95

H) 30 kV High Voltage Probes...IMA-100-10 Probe multiplies DC ranges of any 10-megohm meter by factor of 100, 1000 megohm input

for measuring voltages as low as 1 V in high-impedance circuits. Banana plug connector. Kit IMA-100-10, 2 lbs., mailable 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, 2 lbs., mailable 10.95

Assembled SMA-100-11, 2 lbs., mailable 13.95

IMA-1000-1 Probe provides X1000 attenuation for meters with 1-megohm input impedance. Banana plug connector. Kit IMA-1000-1, 2 lbs., mailable 10.95

Accessory cables...for inter-connecting instruments such as scopes, counters, etc. All cable is RG-58A/U, 50 ohm impedance.

Assembled SU-501-1, 1 lb., BNC/BNC, 1 lb. 7.50

Assembled SU-501-3, 3 ft., BNC/BNC, 1 lb. 7.50

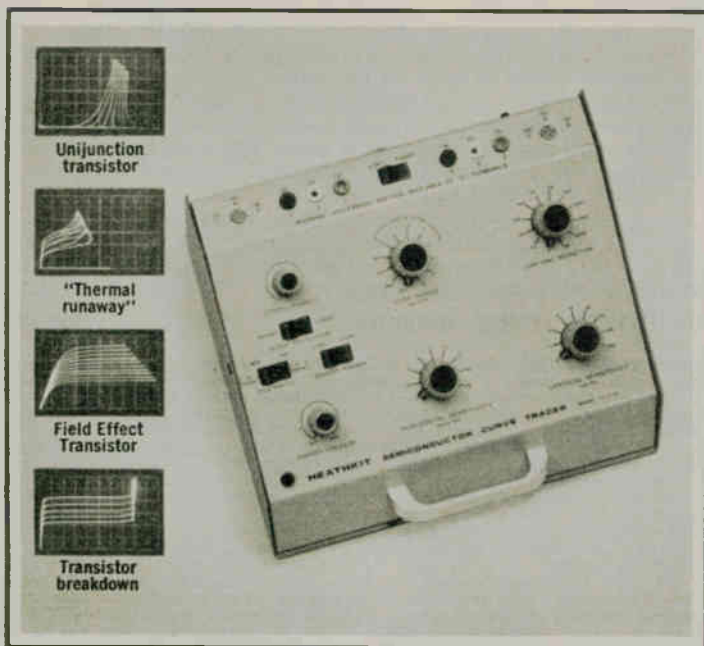
Assembled SU-501-6, 6 ft., BNC/BNC, 1 lb. 7.50

Assembled SU-502-3, 3 ft., BNC/UHF, 1 lb. 7.50

Assembled SU-503-3, 3 ft., BNC/Banana, 1 lb. 7.50

Charge a kit — no money down on any kit — up to 2 years to pay — see order blank for details.

Inflation-fighting values in



Check semiconductor parameters with your scope and the IT-1121 Curve Tracer...94.95

Just connect the IT-1121 to any oscilloscope with horizontal sensitivity of 0.5 V/div. and vertical sensitivity of 1 V/div. and get an accurate display of operating parameters for virtually any discrete semiconductor. Devices such as bipolar transistors, diodes, SCRs, triacs, FETs, etc. can be inspected or tested for specific applications. Extra leads are included for tests of large devices or for in-circuit tests.

Easy scope hook-up. The plug-in cables are supplied. A calibration switch permits fast and accurate scope calibration. You can display fundamental parameters such as gain (beta), leakage, breakdown voltage, saturation, forward conduction voltage, output admittance, linearity, capacitance effects, temperature effects and others (see insets for typical displays). The extensive manual included in each kit tells how to interpret each display.

Kit IT-1121, 11 lbs., mailable94.95

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. $\pm 3\%$. Sweep Dissipation Resistors: 0, 10, 50, 100, 500, 1000, 5000, 10 k, 100 k, 500 k, 1 M $\pm 10\%$. Step Currents Available: .002, .005, .01, .02, .05, .1, .2, 2, 5, and 10 mA/step, $\pm 3\%$, ± 250 nA offset current max. Step Voltages Available: .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). Operating Temperature Range: 10°C to 40°C. Temperature variation, referenced at 25°C, will have a maximum effect of $\pm 1\%$ on all other specifications. Power Requirements: 110 to 130 or 220 to 260 VAC. Dimensions: 4½" H x 11¼" W x 10" D.



A) In-circuit FET/Transistor Tester...62.95

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 for leakage measurements to 1 μ A and collector currents to 1 A.

Kit IT-121, 6 lbs., mailable62.95

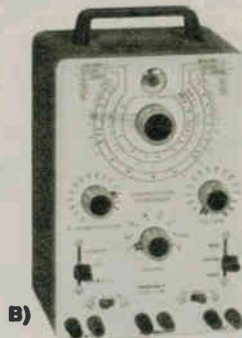
IT-121 SPECIFICATIONS — DC Beta: 1 to 5000 in ranges of 1 to 50, 5 to 250, 10 to 500, 50 to 2500, 100 to 5000. Collector currents available: 1 mA, 5 mA, 10 mA, 100 mA, 500 mA, and 1 A. Gm: 0 to 50,000 μ mhos. Leakage measurements: Five ranges, 0 to 100 μ A, 0 to 1 mA, 0 to 10 mA, 0 to 100 mA, 0 to 1 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 Veb,s, Rbb, and emitter current (out-of-circuit). Power Requirements: Two 1½ V cells, (alkaline for best performance). Dimensions: 5" H x 9¼" W x 8½" D.

B) Direct-reading Capacitor Checker...52.95

Fast, accurate analysis of all capacitor types. No calculations — just read directly from front-panel scales. Measures capacitance from 10 pF to 1000 μ F, resistance from 5 ohms to 50 megohms and 16 leakage testing voltages are provided. Terminals allow use of an external standard, if desired, when making L, C or R measurements. External audio generator may also be used for checking components at frequencies up to 10 kHz.

Kit IT-28, 7 lbs., mailable52.95

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 μ F, .001 μ F to .5 μ F, .1 μ F to 50 μ F, 20 μ F to 100 μ F. External standard (comparison bridge; maximum ratio 25:1). Inductance check: External standard only. Power requirements: 120/240 VAC 50/60 Hz, 30 W. Dimensions: 9¾" H x 6¾" D x 5" D.



C) Portable Transistor/Diode Checker...10.95

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. 3½" H x 3½" W x 3¾" D.

Kit IT-27, 2 lbs., mailable10.95


D) Heathkit IT-18 Transistor Tester...32.95

Its low internal impedance and handy color-coded test leads assure easy, reliable in-circuit checks. The large, easy-to-read meter permits direct reading of DC Beta (gain) on two ranges, 2-100 and 20-1000. The IT-18 also makes out-of-circuit leakage measurements for transistors and diodes, range 0-5000 μ A. It will also match and identify NPN or PNP transistors. The 1.5 V battery-powered circuit will not damage a transistor or diode that is incorrectly connected. Not for use with high power or switching transistors.

Kit IT-18, 4 lbs., mailable32.95

IT-18 SPECIFICATIONS — D. C. Beta: x1 range — 2 to 100, x10 range — 20 to 1000. Out-of-circuit accuracy: $\pm 5\%$. In-circuit accuracy: Indicates good or bad, I_{ceo} (out-of-circuit only) — 0-5000 μ A; I_{cbo} (out-of-circuit only) 0-5000 μ A diodes; forward or reverse current — 0-5000 μ A. Power: One standard "D" cell (not supplied). Dimensions: 4½" H x 8½" W x 7½" D.

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-175,2.95*

*\$10 minimum order for book only purchase. No minimum when book order accompanies kit order. Include 35¢ for each book to cover postage and handling.

Heathkit test instruments

Heathkit Strip Chart Recorder ...Kit 189.95...Assembled 265.00

Two input ranges permit accurate voltage measurements to 1 mV and 10 mV full scale. High input impedance prevents circuit loading. Floating input is useful when source and recorder have different ground potentials. Twelve chart speeds from 5 sec./in. to 200 min./in., all pushbutton selected. Chart motor drive circuitry is synchronized with the line frequency for accurate speeds. The pen holder accepts many different types of pens (a standard cartridge-type fountain pen is supplied). Multi-colored plots are made by changing pens. Paper width is 10", marked 0-100 right to left. The tip-back-top makes paper loading fast and easy. For slow chart speeds (100 sec./in. or longer), SU-445-17 chart paper is recommended.

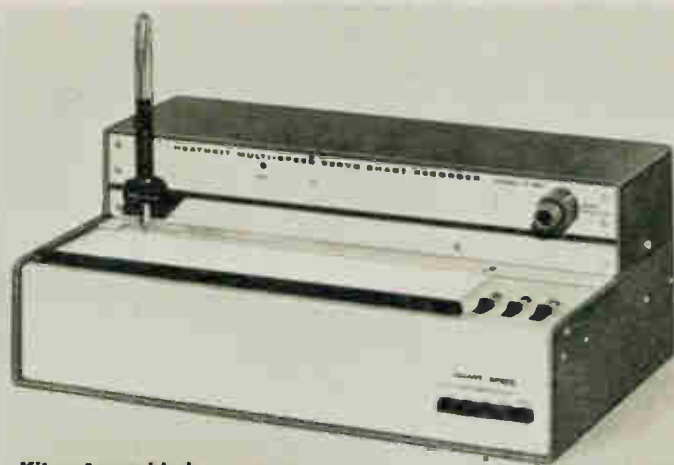
Individual **POWER**, **SERVO** and **CHART** switches make it possible to operate the servo mechanism and chart drive independently. Coarse and fine zero position controls. Reference voltage supply is zener-regulated. Other features include a light-operated modulator for comparison of input and reference voltages and a gearless servo chart drive system.

Kit IR-18M, 15 lbs., mailable 189.95

IRA-18-1, 3 rolls chart paper (140 ft./roll), 5 lbs., mailable 10.95

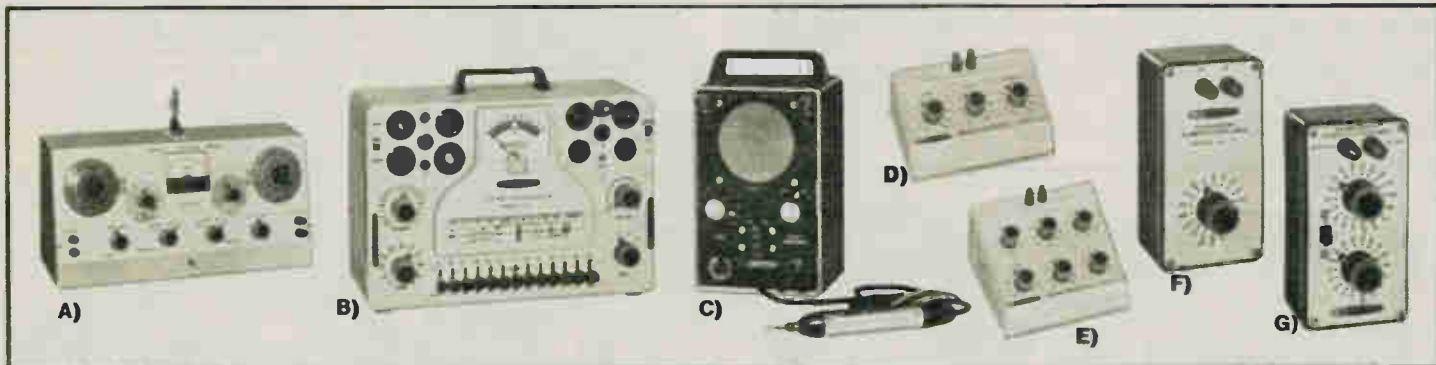
SU-445-17, chart paper, 120 ft. roll, mailable 4.75

SR-201A Chart Recorder, factory assembled and calibrated, wired for 10 mV full scale input, 15 lbs., mailable 265.00



Kit or Assembled

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: Approximately 0.1 sec./inch, 1 second full scale (10"). Input circuit: Self-balancing potentiometer. Input resistance: Essentially infinite at null. Line frequency rejection: (input shorted) 130 dB in common mode. Floating input: +100 VDC maximum with respect to ground. Overall error: Less than 1% of full scale. Maximum recommended source resistance: 100 k ohms. Power requirements: 120/240 VAC, 60 Hz, 14 W or 120/240 VAC, 50 Hz, 16 W. Fuse: ¼ amp slow-blow (120 VAC). Dimensions: 6" H x 15" W x 9½" D.



A) Impedance Bridge...109.95

Four separate bridge circuits for measurement of resistance, capacitance, and low & high inductance. Requires headphones or scope for alignment.

Kit IB-28, 11 lbs., mailable 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: ½% decade resistors used. Tube Complement: (2) 1U4, (2) 1L4. Power Supply: Transformer and silicon rectifier. Power Requirements: 105-125 V. or 210-250 V., 50/60 cycles, 10 watts. Dimensions: 8" H x 17" W x 6" D.

B) Low-cost Tube Checker...99.95

Tests tubes on the basis of total emission, for shorts, leakage, open elements, and filament continuity.

Kit IT-17, 12 lbs., mailable 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, 10-pin miniature, 9-pin novar, 9-pin miniature, 12-pin compactron, 5-pin nuvistor, 7-pin nuvistor. Meter: 1 mA BAD-?-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: 8½" H x 13" W x 5½" D.

C) Visual-aural Signal Tracer...32.95

Trace RF, IF and audio signals; locate noisy or intermittent components. A built-in 3½-inch speaker and a bright eye-tube indicator.

Switchable audio/RF probe included. 7½" H x 4½" W x 4" D.

Kit IT-12, 6 lbs., mailable 32.95

D) Decade Capacitance Box...26.95

100 pF to 0.111 µF selected by three range switches in 100 pF steps. Ideal for use with the IN-17 Decade Resistance Box in solving R and C network problems.

Kit IN-27, 3 lbs., mailable 26.95

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 7½" W x 5" D.

E) Decade Resistance Box...39.95

1 ohm to 999,999 ohms in 1-ohm steps. Resistors are 1-watt, ½% accuracy.

Kit IN-17, 4 lbs., mailable 39.95

SPECIFICATIONS: Minimum DC resistance: .025 ohms or less at terminals with all switches at zero. Dimensions: 5" H x 7½" W x 6½" D.

F) Capacitor Substitution Box...10.95

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. 5½" H x 3½" W x 3" D.

Kit IN-47, 2 lbs., mailable 10.95

G) Resistor Substitution Box...10.95

15 ohms to 10 megohms. 36 EIA standard 10% 1-watt resistors. 5½" H x 3½" W x 3" D.

Kit IN-37, 2 lbs., mailable 10.95

There's a Heathkit generator to

Low-cost Heathkit Function Generator delivers sine, square & triangle waveforms from 0.1 Hz to 1 MHz... Kit 109.95 ... Assembled 150.00

The Heathkit IG-1271 Function Generator 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.

Versatile performance features. The 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 — considerably more attenuation than offered by other function generators in this price range. The variable attenuator control 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. Choice of 105-130 or 210-260 VAC operation is made by positioning a chassis-mounted switch and using the appropriate fuse. Most of the components are mounted on a single circuit board, making the IG-1271 easy to build and service. A triggered oscilloscope such as the IO-4530 (see page 49) is necessary for calibration.

Kit IG-1271, 7 lbs., mailable 109.95



Assembled SG-1271, wired version of the IG-1271 in same attractive blue & white styling (not shown), 7 lbs., mailable 150.00

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. Attenuator: 0 to 50 dB in 10 dB steps. 0 to 20 dB minimum variable, ± 1 dB accuracy. Output: 10 volts peak-to-peak into 50 ohms. ± 1.5 dB flatness from 0.1 Hz to 1 MHz. 50 ohms impedance $\pm 5\%$. Power requirements: 105-130 volts or 210-260 volts rms, 50/60 Hz, 15 watts max. Operating temperature: 0 to 40°C. Dimensions: 3" H x 7 1/4" W x 8 7/8" D (with handle removed). Net weight: 4.2 lbs.



A) Audio Intermodulation Analyzer... 94.95

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, 50/60 Hz, 20 W. Measures 8 1/2" H x 13" W x 7" D.

Kit IM-48, 13 lbs., mailable 94.95

B) Heathkit Stereo Generator provides fast & accurate FM/FM stereo alignment... 99.95

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, 12 lbs., mailable 99.95

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, 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.

C) Harmonic Distortion Meter... 79.95

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, 50/60 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, 13 lbs., mailable 79.95



The perfect companion to your Heathkit Generator...

Know Your Signal Generators — explains basic principles; covers theory, operation & application of all types; special chapter on FM stereo multiplex; invaluable for service techs, hams, hobbyists. EOP-144, 3.25*

*\$10 minimum order for book only purchase. No minimum when book order accompanies kit order. Include 35¢ for each book to cover postage and handling.

fit your needs—and your budget



Sine wave... distortion is 0.1% from 10 Hz to 20 kHz. Overall frequency 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 or Assembled

Heath IG-18 Solid-state Sine-square Wave Generator...Kit 84.95...Assembled 130.00

A low cost, portable signal source that will be invaluable in a variety of service and laboratory applications. Sine wave signals are available from 1 Hz to 100 kHz with distortion less than 0.1%. Eight switch-selected 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, making the SG-18A ideal for checking audio amplifier response or use as a trigger for testing digital circuits. Frequency is quickly and accurately 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. Other features include output available simultaneously or independently at 5-way banana jacks...switchable

internal or external load...dual primary transformer for 120 or 240 VAC operation...built-in carrying handles for easy portability.

Kit IG-18, 12 lbs., mailable 84.95

Assembled SG-18A, wired version of the IG-18 in handsome black & white styling (not shown), 10 lbs., mailable 130.00

IG-18 PARTIAL SPECIFICATIONS — GENERAL: Frequency selection: 0-100 switch (steps 10), 0-10 switch (steps of 1), 0-1 control (vernier) & multiplier switch (x1, 10, 100, 1000). **SINE WAVE OUTPUT:** Output voltage: 8 ranges, 0.003 to 10 Vrms (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, 50/60 Hz, 6 watts.

Kit or Assembled



A) Low Distortion Audio Generator... Kit 64.95...Assembled 100.00

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, 50/60 Hz, 40 W. 6½" H x 9½" W x 5" D.

Kit IG-72, 8 lbs., mailable 64.95

Assembled SG-72A, wired version of the IG-72 in handsome black & white styling (not shown), 9 lbs., mailable 100.00

B) Precision RF Generator...97.95

The IG-42 provides 100 kHz to 30 MHz signals with ±3% adjustable frequency calibration. 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, 50/60 Hz. 8½" H x 13" W x 7" D.

Kit IG-42, 15 lbs., mailable 97.95



C) General Purpose RF Generator...44.95

The Heathkit IG-102 is an accurate, stable source of modulated or unmodulated RF signals. It covers 100 kHz to 200 MHz in 6 bands with 2% tuning accuracy. Internal signal modulation is 400 Hz and a 400 Hz audio output is provided for audio tests. 120/240 VAC, 50/60 Hz. 9½" H x 6½" W x 5" D.

Kit IG-102, 6 lbs., mailable 44.95



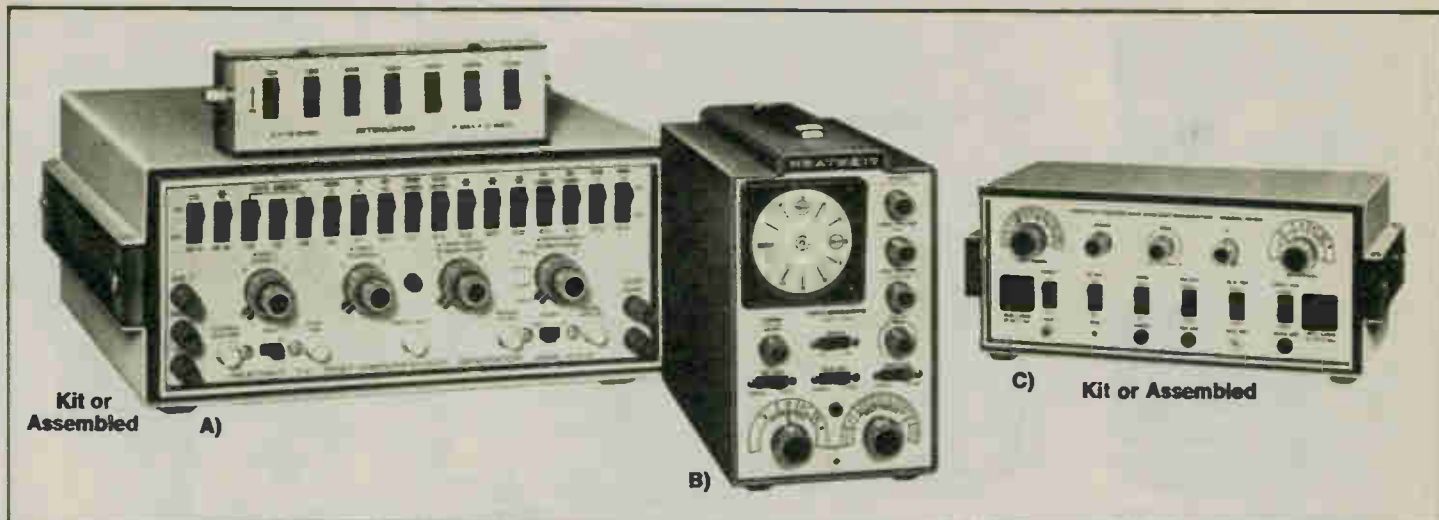
The perfect companion to your Heathkit Generator...

101 Ways to Use Your Square-Wave & Pulse Generators, describes basic tests for r-c circuits, audio amplifiers, video amplifiers, inductive circuits, TV if amplifiers, rf/if amplifiers, stereo fm units, and r-c coupled amplifiers. **EOP-189, 3.50**

*\$10 minimum order for book only purchase. No minimum when book order accompanies kit order. Include 35¢ for each book to cover postage and handling.

Charge a kit — no money down on any kit — up to 2 years to pay — see order blank for details.

Heathkit TV Service Instruments



A) Heath post-marker/sweep generator... Kit...164.95 — assembled...275.00

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 mixer 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, 15 lbs., mailable 164.95

Assembled SG-57A, factory-assembled & calibrated version of the IG-57A in handsome black & white styling (not shown), 16 lbs., mailable 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 $\pm 0.05\%$. 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; Trace Reverse; Modulation 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 72 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 requirements: 120 V, 60 Hz AC at 4.5 watts.

B) Heathkit vectorscope/color generator...144.95

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. At a glance you can see missing or weak colors... proper



Boost your TV service efficiency & profits with Heathkit test gear and these valuable books

How to Use Vectorscope — Oscilloscopes & Sweep-Marker Generators — covers vectorscopes & vectorscope troubleshooting & alignment techniques; how to isolate defective ICs and transistors. EDP-142, 4.95*

How to Use Color TV Test Instruments — a common-sense approach to using the right instruments, thereby getting the most out of your investment in test gear. EDP-138, 4.95*

*\$10 minimum order for book only purchase. No minimum when book order accompanies kit order. Include 35¢ for each book to cover postage and handling.

adjustment of the burst phase transformer, 3.58 oscillator, reactance coil, bandpass transformer... you can even check color demodulation angle. A grid-cathode switch on the rear panel allows all vector patterns to be displayed the same way, regardless of how the CRT is driven.

Provides 12 patterns. The color bar/pattern generator provides 12 patterns plus a raster for purity adjustments... all patterns available at the turn of a knob, in either the familiar 9x9 display or the exclusive Heath 3x3 format. Features include front panel tuning for channels two through six... RF output variable to 25,000 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, 12 lbs., mailable 144.95

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 convergence adjustments. Crosshatch*: 9x9 produces a display of 11 vertical and 10 horizontal lines. 3x3 produces a display of three vertical and three horizontal lines for convergence and linearity adjustments. Horizontal Lines*: 9x9 produces a display of 10 horizontal lines. 3x3 produces a display of three horizontal lines for vertical linearity and pin-cushion adjustments. Vertical Lines*: 9x9 produces 11 vertical lines. 3x3 produces a display of 3 vertical lines for horizontal linearity and convergence adjustments. Color Bars*: 9x9 produces a display of ten standard color bars. 3x3 produces a display of three 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 for color gun level adjustments. OUTPUT SIGNALS — Video: Greater than ± 1 volt peak-to-peak composite signal for composite signal injection beyond the video detector. RF: Variable to approximately 25,000 μ V output, channels 2 through 6, for composite signal injection into the TV receiver antenna input terminals. Sync: Greater than 3.5 volts peak-to-peak signal for servicing sync circuits without video, or sets having separate video and sync demodulator phase adjustments. GENERAL — Power Requirements: 105-125 or 210-250 VAC, 50/60 Hz, 20 Watts. Cabinet 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 overscan.

C) Color bar/pattern generator...build it yourself for just 94.95 or let us do it for only 155.00

Our versatile 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 at the flip of a switch. Features include 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 500 W AC receptacles.

Kit IG-28, 8 lbs., mailable 94.95

Assembled SG-28A, factory assembled & calibrated version of the IG-28 in handsome black & white styling (not shown), 10 lbs., mailable 155.00

IG-28 SPECIFICATIONS — Output signals: Video — Greater than ± 1 V peak-to-peak composite signal for composite signal injection behind the video detector. RF — Variable to 50,000 μ V output, channels 2 through 6, for composite signal injection into the receiver antenna input terminals. Sync. — Greater than 3.5 V peak-to-peak signal for servicing sync circuits without video, or sets having separate video and sync demodulators. Control Grids (3) — Individual red, blue, and green control grid signals for viewing chroma signal demodulator phase adjustments. Power supply: Transformer operated, full-wave zener diode regulated. Input — 120/240 VAC, 50/60 Hz. Output — 3.6 VDC, 500 mA, zener diode regulated. Dimensions — overall: 5 1/2" H x 13 1/2" W x 8" D.

We wrote the book on high performance, low cost instruments.

If you're looking for instruments that can deliver a maximum of performance with a minimum of strain on your budget, then you need the latest Heath/Schlumberger Assembled Instruments Catalog. It contains complete descriptions, specifications and prices for many high performance instruments for industrial and educational applications. Included are frequency counters...oscilloscopes...power supplies...function generators...TV and audio service equipment...multimeters...strip chart recorders...and more.

Among our new instruments you'll find the SO-4540 — an accurate, easy-to-use 'scope for hobbyist or service tech. Its DC-5 MHz bandwidth and sensitive 20 mV vertical input make it the perfect scope for trouble-shooting audio and TV receiver circuitry. Its stable triggering circuit will easily trigger on the vertical component of a complex TV signal. Seven time bases from 200 ms to 0.2 μ s/cm and nine calibrated vertical attenuator positions up to 10 volts/cm accommodate a broad range of input signals. The SO-4540 is probably the best general purpose oscilloscope value available anywhere. Only \$275.



Like all of our strip chart recorders, the new SR-204 has many standard features that are available only as extra-cost options with other manufacturers. Full scale spans of 10 mV, 100 mV, 1V, and 10 V are pushbutton-selected. The variable span control allows expansion to 100 V full scale. Ten chart speeds from 10 in/min to 0.01 in/min are instantly selectable. Overall error is less than 0.5% of full scale, and balance time is only 1/2 second. Standard equipment includes complete remote control capability (including electric pen lift), rack mount and easy metric conversion. All for only \$395.



To see how easy it is to get more instrument value per dollar, send the coupon below 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.

Send for your free catalog!

Please send my free copy of the latest Heath/Schlumberger Assembled Instruments Catalog.

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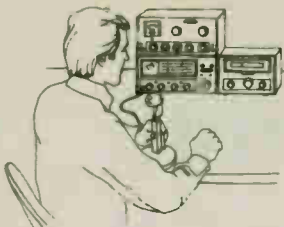
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ZIP _____

Prices & specifications subject to change without notice.





The Right Way to Start in Ham Radio Build Your Own Heath Rig

Heathkit Phone & CW transmitter runs up to 90 watts input...109.95

Run 75 watts CW input as a Novice . . . up to 90 watts phone or CW when you get your General ticket. Front panel controls for Drive Tune, Drive Level, Final Loading and Final Tuning allow proper tune-up for maximum output, minimum harmonics, high quality audio. Features include grid/plate current meter . . . 4 crystal sockets and provision for VFO operation . . . front panel microphone and key jacks. Easy assembly with the famous Heathkit manual . . . requires only a VTVM for alignment.

Kit DX-60B, 24 lbs., less crystals, mailable 109.95

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, 50/60 Hz, 225 watts. Dimensions: 6½" H x 13¾" W x 11½" D.

Heathkit 5-band receiver tunes AM, CW & SSB for just 109.95

Top performance at a modest price. Full 80-10 M coverage with each band accurately displayed on the calibrated slide-rule dial. Separate RF and AF gain controls . . . adjustable BFO for easy sideband tuning. Sensitivity of 1 µV and 3 kHz selectivity from the crystal filter deliver performance comparable to more expensive receivers. Features include built-in "S" meter . . . switchable AVC . . . front panel head phone jack . . . provision for optional HRA-10-1 100 kHz crystal calibrator. Alignment requires VTVM and RF signal generator.

Kit HR-10B, less speaker, 20 lbs., mailable 109.95

Kit HRA-10-1, plug-in 100 kHz crystal calibrator, 1 lb., mailable 9.95

HR-10B SPECIFICATIONS — Frequency coverage: 80 Meter Band, 3.5 to 4.0 MHz; 40 Meter Band, 7.0 to 7.3 MHz; 20 Meter Band, 14.0 to 14.35 MHz; 15 Meter Band, 21.0 to 21.5 MHz; 10 Meter Band, 28.0 to 29.7 MHz. Intermediate frequency (IF): 1681.0 kHz. Sensitivity: 1 microvolt for a 10 dB signal plus noise-to-noise ratio. Selectivity: 3 kHz at 6 dB down, 9 kHz at 40 dB down. Image rejection: 40 dB or better. Input impedance: 50 to 75 Ω coaxial. Audio output impedance: 8 Ω, or 500 Ω. Panel controls: AF GAIN, AC OFF-ON; RF GAIN; BFO TUNE; BAND Switch; MAIN TUNING; CALibrate; ANTenna TRIMmer; REC-STBY Switch; CALIBRATE ON-OFF; BFO On-Off; AVC On-Off; ANL On-Off. Tube complement: 6BZ6 RF Amplifier; 6EA8 Mixer Oscillator; 6BA6 1st IF Amplifier; 6EA8 2nd IF Amplifier; BFO; 6BJ7 Detector-AVC-ANL; 6EB8 1st Audio-Audio Output; 6x4 Rectifier. Power requirements: 120/240 VAC, 50/60 Hz, 50 watts. Cabinet size: 6½" H x 13¾" W x 11½" D.

80-2 meter VFO only 64.95

Ideal accessory for the HW-16 and DX-60B. Provides VFO control from 80 through 2 meters with separate calibrated scales for each band. Smooth 28:1 vernier tuning . . . temperature compensated circuitry for minimum drift. Provides 5 V rms at 3.4-4, 7-7.425 and 8-9 MHz range . . . compatible with virtually all grid-block keyed transmitters and most cathode-keyed transmitters. Alignment requires receiver of known accuracy covering 80-2 meter bands or 3.5 to 8.222 MHz.

Kit HG-10B, 12 lbs., mailable 64.95



Optional plug-in crystal calibrator

An Amateur Radio hobby can open up a whole new world of adventure for you. These books and Heathkit Gear can get you started . . . now!



Amateur Radio License Study Guides — make getting any radio license easy — include typical FCC exam questions & answers — serve as a convenient reference after you get your license.

- NOVICE, EDP-122 3.95*
- GENERAL, EDP-123 6.95*
- ADVANCED, EDP-124 3.95*
- EXTRA, EDP-125 4.95*

How to be a Ham — ideal beginner's guide to an exciting Amateur Radio hobby.
EDP-115 3.95*

101 Questions and Answers About Amateur Radio — a great introduction for beginners, as well as a valuable reference for veteran hams.
EDP-118 2.95*

ARRL Amateurs Handbook — a classic reference work for hams, engineers, scientists — up to date info & theory on all ham gear.
HDP-293 5.50*

*\$10 minimum order for book only purchase. No minimum when book order accompanies kit order. Include 35¢ for each book to cover postage and handling.



Ham starter group...19.95

Includes 4 ARRL handbooks, HD-1416 practice oscillator, 3 code-teaching records or two cassettes.

- HDP-22, Complete group with records, 6 lbs., mailable 19.95
- HDP-122, Complete group with cassettes, 4 lbs., mailable 19.95
- HDP-32, Records only, 3 lbs., mailable 9.95
- HDP-132, Cassettes only, 2 lbs., mailable 9.95
- HDP-42, Books only, 2 lbs., mailable 4.00
- HD-1416, Oscillator & key, 2 lbs., mailable 9.95

NEW Heathkit Handheld 2-Meter Transceiver



Select any of 5 channels, adjust squelch and volume with convenient top-mounted controls.



Up to 10 transmit channels by switching to Simplex or Offset. —600 kHz crystal is included.



Rechargeable nickel-cadmium battery pack and charger are included. A \$45 value.



Flexible "rubber duckie" antenna, matched to transceiver, is included plus jack for external antenna.



Red LED is both received signal & battery condition indicator. Pulsing LED shows Battery-Saver working.



Optional Auto-Patch Encoder permits telephone calls through repeaters. Vinyl carrying case also optional.



New

Optional Auto-Patch Encoder shown installed

1-Watt out, 5 receive & 10 transmit channels plus \$60 in accessories for only 169.95

More versatility & value for less than you expected. Compare the features and specs. of the new Heathkit HW-2021 to any other handheld 2-M transceiver. You'll agree it's a value that can't be matched.

One crystal does the work of two... gives you both receive and transmit frequencies for any channel. (We've even included a crystal for 146.94 to get you started). And this heterodyne circuitry is a natural for offset repeater operation... so we've also included a —600 kHz crystal in the kit together with a Simplex-Offset switch built into the case. Result? Every crystal you buy gets you one receive channel and two transmit channels. And if that isn't enough versatility, you can install a crystal with a different offset frequency. To use the full capability of the HW-2021, just buy four crystals (not pairs) in any 2 MHz segment of the 143.9 to 148.3 MHz range and you'll have 5 receive and 10 transmit channels. That's money-saving versatility.

One watt out and better audio. That transmitter output is one watt minimum with a 0.005% (or better) stability. And it has frequency modulation and a built-in separate microphone for better audio.

For personal and emergency communications, add "Auto-Patch." The optional HWA-2021-3 auto-patch encoder gives you access to telephone lines through repeaters (with touch-tone input) to extend the versatility of your HW-2021 at remarkably low cost. See below.

Built-in Battery-Saver, rechargeable Battery Pack & Battery Charger. The battery-saver circuit of the HW-2021 extends the battery pack's useful duty cycle on "stand-by/receive" by about 75% through a pulsing technique which actuates the receiver approx. 5 times per second. The LED indicates this pulsing. The battery pack included consists of 10 nickel-cadmium batteries housed in a plastic case with connectors molded in. When fully charged, the pack will operate the transceiver for approximately 10 hours, assuming the receiver is "on" all the time and the transmitter in use about 15% of the time. The charger will recharge the batteries fully in approxi-

HA-201 2-meter amplifier — 10 watts for 27.95

For everyone who owns a one- or two-watt transceiver and wants to get some extra output for very little money, the HA-201 delivers up to 10 watts for a 1½ watt input... 8 watts for 1 watt input... ideal for the HW-2021 above.

Completely automatic operation... all solid-state transmit-receive switching eliminates relays. Will withstand an infinite VSWR load without failure. Tuned input and output maximize efficiency and reduce spurious emissions. Assembly is a quick 1-2 hours, and we've included both a dummy load and a handy RF detector to eliminate the need for additional equipment other than a VTVM for tune-up. Operates from 12-16 VDC (HWA-202-1 or car battery).

Kit HA-201, 3 lbs., mailable 27.95

mately 16 hours. Charger plug is built into transceiver case.

Compact and rugged. Textured, black high-impact plastic case. Double sided glass epoxy circuit board weighs only 2 lbs., with batteries. *Not recommended for beginning kit builders* due to its compactness. Requires small 25-watt soldering iron such as Weller W-PS for construction and VOM or VTVM for alignment.

For the best value in go-anywhere 2-M rigs, build the HW-2021.

Kit HW-2021, 5 lbs., mailable 169.95

HWA-2021-2, carrying case & strap, 1 lb., mailable 12.95

HW-2021 SPECIFICATIONS — RECEIVER — Sensitivity: 0.5 μ V for 12 dB SINAD; 0.75 μ V for 20 dB quieting. Squelch Threshold: .3 μ V or less. Audio Output: .5 watts at less than 10% THD. Operating Frequency Stability: .005% or better. Image Rejection: Greater than —45 dB. IF Frequency: 10.7 MHz. Modulation Acceptance: \pm 7 kHz minimum. **TRANSMITTER —** Power Output: 1 watt minimum. Stability: .005% or better. Oscillator Frequency: Approximately 15 MHz. Multiplier Factor: x9. Modulation: Frequency (with limiting). **GENERAL —** Speaker Impedance: 8 Ω . Operating Frequency Range: 143.9 to 148.3 MHz (unit will meet specifications \pm 1 MHz from alignment frequency within this range). Operating Temperature Range: +10° to +120°F (–12° to +47°C). Operating Voltage: 12 VDC nominal. Size (overall): 9¼" x 1⅞" x 3¼". Weight (including batteries): 2 lbs.



NEW Auto-Patch Encoder

Use it to place telephone calls through repeaters set up for touch tone input — can even be used for repeater control. 12 digit keyboard with LED keying light and 2-sided epoxy board. Designed for "2021" but can be used in others. For experienced builders. Available November
Kit HWA-2021-3, 2 lbs., mailable 39.95

HW-2021 Crystal Certificates

Crystals designed to exacting Heath standards assure optimum performance from your HW-2021. A certificate will be sent to you postpaid. You mail the certificate to the manufacturer and get the crystals postpaid by return mail.

HWA-2021-4, Crystal Certificate, postpaid 6.95



Charge a kit — no money down on any kit — up to 2 years to pay — see order blank for details.

New synthesized 2-meter transceiver joins



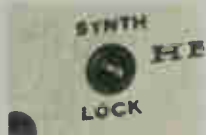
Meet the new Heathkit HW-2026 — the best value in synthesized 2-M rigs... only 289.95

- Built-in synthesizer
- Built-in continuous and burst tone encoders
- Automatic transmitter offset
- Channel activity indicator
- Synthesizer lock indicator
- Lever-switched channel selection with digital readout
- 5 kHz channel spacing
- 8-pole IF crystal filter
- Built-in speaker
- Microphone & gimbal mount included

Available November



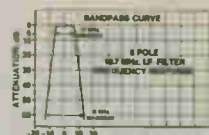
Built-in frequency synthesizer. Flip the lever switches to the channel you want... frequency readout is digital.



Synthesizer lock indicator warns that synthesizer is not locked on frequency & transmitter will not key.



Built-in continuous & burst tone encoders are standard equipment, not extra-cost options.



8-pole IF crystal filter gives ideally shaped receiver bandpass for reduced adjacent channel interference.

Get on "2" with the "202"...for only 179.95

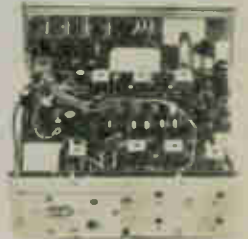


A)

HW-202 shown with optional Tone Burst Encoder installed.



Neat mobile mount, supplied with your kit, attaches under your car's dash. Remove two knurled screws, unplug two cables, and the radio and gimbal mount can be quickly removed for safe keeping.



Open design makes the HW-202 easy to build (shown with encoder board installed). Nine built-in adjustments let you align without special instruments.

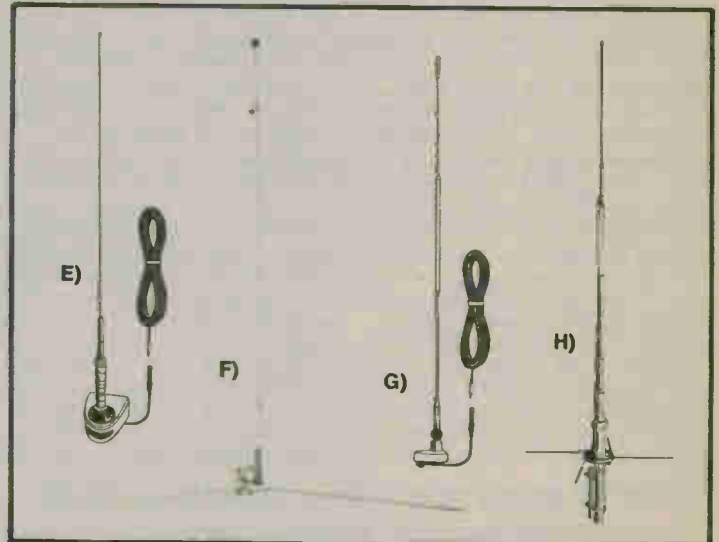


B)

D)



C)



E)

F)

G)

H)

HW-202 Crystal Certificates

Crystals designed to exacting Heath standards assure optimum performance from your HW-202. A certificate will be sent to you postpaid. You mail the certificate to the manufacturer and get the crystals postpaid by return mail.

- HWA-202-6, one Transmit Crystal Certificate, postpaid 5.95
- HWA-202-7, one Receive Crystal Certificate, postpaid 5.95

2-Meter FM is the fastest growing segment of Amateur Radio today. This book & Heathkit 2-Meter Gear get you in on the fun.

2-Meter FM Repeater Circuits Handbook — a comprehensive treatment of repeaters, antennas, transmitters, receivers, and much, much more.

EDP-114 6.95

the growing Heathkit VHF FM line

New Heathkit HW-2026—the transceiver that gets you on 2 with synthesis for up to 50% less

This is the one you've been waiting for. State-of-the-art technology and exceptional operating ease... all in one easy-to-build kit that can save you hundreds of dollars. Compare and you'll agree.

True Digital Frequency Synthesizer. This is the way to go — no half-way schemes, no crystals to buy, no channel limitations. The HW-2026 uses digital technology with a voltage controlled oscillator (VCO) and 1 MHz crystal time base each of whose outputs are divided down to 5 kHz and compared in a phase detector. You control the divisor and therefore the frequency of the VCO from the front panel lever switches.

Lever-switched channel selection with digital readout. Just flip the levers on the front panel to select any frequency in any 2 MHz segment of the 144 to 147.995 operating range. You select the last four digits, three with the lever switches which display the frequency directly, and the last with the 0/5 kHz miniature toggle switch. The lever switches are easier to use than the usual thumbwheels and the 5 kHz steps make all 2-meter frequencies available to you. And if you inadvertently dial up an out-of-band frequency, don't worry — the transmitter won't key outside of the band.

LED status lights signal you that the synthesizer is "locked" on the frequency you dialed up and whether that channel is in use. Convenient.

Automatic repeater offset plus built-in tone encoder means you can work any open repeater. Use simplex or the -600 kHz offset, or add a crystal to the "Aux." position for offset. The encoder has both burst and continuous modes for access to most closed repeaters.

A) Heathkit HW-202 2-Meter transceiver

Operates within spec. on any 2 MHz segment of the 143.9 to 148.3 MHz range; provides independent selection of 6 transmit and 6 receive channels. And all 12 crystals can be netted for optimum performance. The transmitter delivers a solid 10 watts minimum...more than enough to bring up most repeaters. Standard narrow band deviation adjustable up to 7.5 kHz with instant limiting.

Will operate into an infinite VSWR without failure. And the receiver is hot: 0.5 μ V signal provides 15 dB of quieting...squelch threshold is 0.3 μ V or less. Audio is excellent...output to the speaker is typically 2 watts at less than 3% harmonic distortion. Diode-protected dual gate MOSFETS in the front end...an IC IF that limits at less than 10 μ V...dual conversion...a monolithic 4-pole 10.7 MHz crystal filter...a built-in hash filter/voltage regulator keeps ignition noise out and maintains input voltage constant despite changing car system demand...complete built-in alignment procedures using the famous Heathkit manual and the front panel meter. Kit includes a set of crystals for 146.94 MHz to aid in tune-up and get you on the air in a hurry...push-to-talk mike...quick-connecting cable for 12 V hook-up...heavy-duty alligator clips for use in a temporary installation...antenna coax jack...gimbal bracket...and a quick-release mobile mount so you can store the rig in the trunk when you leave the car. Get on 2 with maximum versatility and lowest cost with the HW-202. And check out the full line of accessories.

Kit HW-202, 11 lbs., mailable 179.95

HW-202 SPECIFICATIONS — RECEIVER — Sensitivity: 12 dB SINAD* (or 15 dB of quieting) at .5 μ V or less. Squelch threshold: 0.3 μ V or less. Audio output: 3 W at less than 10% total harmonic distortion (THD). Operating frequency stability: Better than \pm .0015%. Image rejection: Greater than 45 dB. Spurious rejection: Greater than 60 dB. IF rejection: Greater than 80 dB. First IF frequency: 10.7 MHz \pm 2 kHz. Second IF frequency: 455 kHz (adjustable). Receiver bandwidth: 22 kHz nominal. De-emphasis: -6 dB per octave from 300 to 3000 Hz nominal. Modulation acceptance: 7.5 kHz minimum. **TRANSMITTER —** Power output: 10 watts minimum. Spurious output: Below -45 dB from carrier. Stability: Better than \pm .0015%. Oscillator frequency: 6 MHz, approximately. Multiplier factor: X 24. Modulation: Phase, adjustable 0-7.5 kHz, with instantaneous limiting. Duty cycle: 100%. High VSWR shutdown: None. **GENERAL —** Speaker impedance: 4 ohms. Operating frequency range: 143.9 to 148.3 MHz (will meet specifications \pm 1 MHz of alignment frequency within this range). Current consumption: Receiver (squelched): Less than 200 mA. Transmitter: Less than 2.2 amperes. Operating temperature range: -12° to 122° F (-25° to +50° C). Operating voltage range: 12.6 to 16.0 VDC (13.8 VDC nominal). Dimensions: 2 3/4" H x 8 1/4" W x 9 7/8" D.

B) Tone Burst Encoder for HW-202

Components mount on a single circuit board and fits behind the HW-202's removable bezel. The four tone select buttons can be preset between 1800 Hz and 2500 Hz with bursts adjustable from 0.25 second to continuous. Frequency stability is \pm 1% from -30° to +50° C. Placing all buttons in out position removes encoder from circuit.

Kit HWA-202-2, 1 lb., mailable 26.95

C) AC Power Supply for HW-202 or HW-2026

Delivers 13.8 VDC at 2.2A to your HW-202. Better than 1.0% regulation. 120/240 VAC wiring options, circuit breaker overload protection. With cables and 3-wire line cord.

Kit HWA-202-1, 7 lbs., mailable 32.95

Charge a kit — no money down on any kit — up to 2 years to pay — see order blank for details.

10 watts output & infinite VSWR without failure. That's a *minimum* of 10 watts out and it's circuitry-protected from high VSWR. (For more output, see the HA-202 amplifier below). True FM means great audio quality too.

A hot receiver with superior audio. 0.5 μ V sensitivity...Schmitt-Trigger squelch with a threshold of 0.3 μ V or less...diode protected dual gate MOSFETS in the front end...IC I.F....dual conversion... 8 pole crystal filter...linear audio response for a sound so natural you'll think the op. you're working is sitting in the room with you. Built-in, big 2" x 6" speaker plus jack for an external speaker.

One of the smallest synthesized rigs, yet easy to build with 5 circuit boards. Alignment requires only a VTVM...a freq. counter helps but alternate methods are described. Get the best value going in synthesized 2-M; get the new HW-2026.

Kit HW-2026, 12 lbs., mailable 289.95

Kit HWA-202-1, AC supply, 7 lbs., mailable 32.95

HW-2026 SPECIFICATIONS — RECEIVER — Sensitivity: .5 μ V for 12 dB SINAD (or 15 dB of quieting). Squelch Threshold: .3 μ V or less. Audio Output: 2 watts (typical) at less than 10% THD (5 kHz deviation). Image Rejection: Greater than 45 dB. Spurious Rejection: Greater than 50 dB. IF Rejection: Greater than 80 dB. Internally Generated Spurious: Below 1 μ V equivalent, except at 146.87, 146.90, 147.46, 147.53, and 147.80 MHz. Bandwidth: 6 dB: 15 kHz, min. 60 dB: 30 kHz max. Modulation Acceptance: 7.5 kHz, minimum. **TRANSMITTER —** Power Output: 10 watts, minimum. Spurious Output: -40 dB within 2 MHz of carrier; -45 dB elsewhere. Modulation: FM, 0 to 7.5 kHz adjustable. Duty Cycle: 100% with ∞ VSWR. Tone Encoder: Burst mode: 1800 to 2500 Hz, 6 kHz deviation. Continuous Mode: 70 to 200 Hz, 0.7 kHz deviation. **GENERAL —** Frequency Coverage: 144.000 to 147.995 MHz (any 2 MHz segment). Frequency Increments: 5 kHz. Frequency Stability: \pm .0015%. Transmitter Offset: 0 and -600 kHz supplied, provision for 1 additional. Operating Temperature Range: -10 to +50°C. Current Consumption: Receive: (squelched); 700 mA, max. Transmit: 2.5 A, max. Operating Voltage: 12.6 to 16.0 VDC, 13.8 VDC nominal. Dimensions: 2.75" H x 8.25" W x 9.875" D. Weight: 6 lbs.

D) 40-watt 2-meter amplifier — NOW 59.95

Solid 40 W minimum for 10 W in. Draws only 7 A maximum from your car battery, and it can be mounted just about anywhere.

Fully automatic operation... an internal antenna changeover relay and sensing circuitry provide completely automatic T/R switching. Solid-state design features husky 2N5591 output devices in a highly efficient heat sink. Emitter-ballasted configuration enables the HA-202 to withstand VSWRs up to 3:1, yet remain cool and continue to run. Tuned input/output circuits provide low spurious radiation and allow coverage of any 1.5 MHz portion of the band. Final alignment requires only a VTVM, wattmeter or SWR bridge. Get your HA-202 today...and be working through the repeater tomorrow.

Kit HA-202, 4 lbs., mailable Was 69.95 NOW 59.95

HA-202 SPECIFICATIONS — Frequency range: 143-149 MHz. Power output: 20 W @ 5 W in. 30 W @ 7.5 W in, 40 W @ 10 W in, 50 W @ 15 W in. Power input (rf drive): 5 to 15 W. Input/output impedance: 50 ohms, nominal. Input VSWR: 1.5:1 max. Load VSWR: 3:1 max. Power supply requirements: 12 to 16 VDC, 7 amps max. Operating temperature range: -30° F. to +140° F. Dimensions: 3" H x 4 1/4" W x 5 1/2" D.

E) Standard gain mobile 2-M antenna

5/8-wavelength rear deck whip. 3.4 dB gain over 1/4-wave vertical. Shunt fed matching maximizes radiation at point of lowest SWR; typically 1.1:1 at resonance. 100 watts power rating. 47" stainless steel radiator. 17' of RG-58-U coax with connectors.

Kit HWA-202-3, 2 lbs., mailable 19.95

F) Standard gain fixed-station 2-M antenna

Mast mount 5/8-wave vertical with radials, 3.4 dB gain over 1/4-wave ground plane; superior to conventional or end fed 1/2-wave antennas. 143-149 MHz, field adjustable. Enclosed matching transformer; 50 ohm impedance. SWR at resonance, 1.5:1 or better. 200 watts FM power rating. Hardware inc. for mounting to 1"-1 3/8" mast. Coax not inc.

Kit HWA-202-4, 4 lbs., mailable 19.95

G) Super gain mobile 2-M colinear antenna

Optimized low angle radiation by phasing of 1/4 and 3/8 wave radiators. 5.2 dB gain over 1/4 wave vertical. 180° swivel ball. 200 watt FM power rating. 6 MHz bandwidth; 1.5:1 or better SWR. Typical SWR at resonance, 1.1:1. Height: antenna & mount, 85". Removable stainless steel elements. 17' of RG-58-U coax with connectors.

Kit HWA-202-9, 3 lbs., mailable 37.95

H) NEW Super gain fixed station 2-M colinear

6 dB gain over 1/4 wave ground plane from two 5/8 wave colinear radiators with 1/4 wave phasing. 140-150 MHz, field adjustable. 6 MHz bandwidth for 2:1 or better SWR. Resonance SWR, 1.2:1 at antenna. One kw FM power rating, for repeater, fixed station. Shunt fed with DC grounding. SO-239 connector. Alum. vertical element 117" long, 4 radials; 21" alum. rod. Wind load, 26 lbs. at 100 mph; wind survival, 100 mph. Mounts to 1 3/4" OD vertical pipe. Less coax.

Kit HWA-202-10, 8 lbs., mailable 47.95

New 5-Band SSB Transceiver - The HW-104



Now the latest in broadband technology moves into the lower cost HW-series...the new HW-104 Transceiver...only 539.95

Concepts continued. In keeping with the tradition of the famous Heathkit HW-series of transceivers, the new HW-104 is the proud inheritor of the advanced technology pioneered by the SB-104 and the high value concept of the HW-101.

Completely solid-state...from receiver front end to transmitter out.

Totally broadbanded. Instant QSY. Just choose the band, frequency, and mode. Stays in tune anywhere, any band, without prescaler, load, or tune controls.

Clean transmissions...100 watts out or 1 watt. 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.

Clean, clear reception...thanks to the broadband design that minimizes cross-modulation and intermodulation. Active devices are minimized ahead of the 4-pole crystal filter. Adjacent signal overload is minimized and yet sensitivity is less than 1 μ V. Convenient, too... with a 15 MHz WWV receive position on the band switch and a "pull-to-calibrate" position on the RF gain control.

Easy-to-read circular dial. Coverage from 3.5 MHz to 29.0 MHz. These are the two notable differences between the HW-104 and its parent SB-104. The dial spinner covers about 15 MHz per turn... smoothly. Built-in 100 kHz and 25 kHz calibrator insures the dial accuracy within 2 kHz (dial markings are 5 kHz). Backlash is 50 Hz or less. The VFO behind that dial is the same basic circuitry as the SB-104 with less than 100 Hz/hour drift after warmup. And if you need the top end of the 10 meter band, order the HWA-104-1 accessory for the necessary crystals and coils to get there (they all fit on circuit boards already in the chassis).

Easy to build and align. Nearly everything mounts on phenolic plug-in circuit boards and 2 wiring harnesses reduce much of the point-to-point wiring. An extender circuit board allows easy checking while operational. Because of broadband design, alignment is simple... all you need is a dummy load, a microphone, and a VTVM. When you've finished, it's ready to go mobile (for fixed station use, order the HP-1144 supply). Everything you need on a back panel is there and we even kept the lighted call sign on the "black out" front panel. Optional accessories include noise blanker, CW crystal filter, 10 meter option, speaker, and mobile mount. And you can use the SB-614 Station Monitor and SB-634 Station Console with your HW-104.

An experience in operating...a lesson in value. Both are super and you get both in the new HW-104.

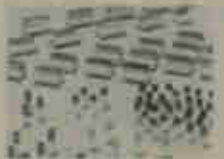
Kit HW-104, 31 lbs., mailable	539.95
Kit HP-1144, AC power supply, 28 lbs., mailable	89.95
Kit HS-1661, station speaker, 5 lbs., mailable	19.95
Kit HWA-104-1, ten-meter accessory, 1 lb., mailable	16.95
SBA-104-1, noise blanker, 1 lb., mailable	26.95
SBA-104-2, mobile mount, 6 lbs., mailable	36.95
SBA-104-3, 400 Hz CW crystal filter, 1 lb., mailable	39.95

HW-104 SPECIFICATIONS - GENERAL - Active Devices: All solid-state. Frequency Coverage: 3.5 MHz through 29.0 MHz amateur bands, (through 29.7 MHz, with HWA-104-1 accessories) WWV receive only up to 25 MHz. 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 supply or lower sideband (suppressed carrier) and CW. Dial Accuracy: Within 2 kHz after calibration at nearest 500 kHz marker. Built-in calibrator provides 100 kHz and 25 kHz markers. 5 kHz dial markings. Ten μ V scale. Approximately 15 kHz per turn. Audio Frequency Response: 250 to 2450 Hz ± 7.5 Hz (6 dB bandwidth). Tuning Backlash: 50 Hz or less. Phone Patch Impedance: 60 Ω output to speaker; high impedance input to transmitter. Power Requirements: 13.8 VDC nominal (maximum 18 VDC at 200 watts); 2 amps. Transmit: low power: 2 amps. Transmit high power: 2.5 amps. **TRANSMITTER** - RF Power Output: High Power (500 manufacturer's max.) SSB: 100 watts PEP ± 1 dB; CW: 100 watts ± 1 dB. Low Power (250) 5 watt PEP (maximum), CW: 1 watt (minimum). Output Impedance: 50 ohms; less than 2:1 SWR. Carrier Suppression: 55 dB down from 100 watt single-tone output at 1000 Hz reference. Intermodulation Suppression: 55 dB down from 100 watt single-tone output at 1000 Hz reference. Intermodulation Suppression: 45 dB below 100 watt output. Spurious Rejection: -50 dB within ± 3 MHz of carrier, except on the 2.5 band; -40 at 3.35 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 Distortion: SSB: P1T or Vox. CW: Keying-tone Vox or Manual. NOTE: In the low power mode all transmit/receive switching is solid-state. CW keying: Internally switched to speaker or headphones in CW mode. Approximately 700 Hz tone. Microphone Input: High impedance with a rating of -45 to -35 dB, approximately 25 Ω to match Heath desk-type microphones. **RECEIVER** - Sensitivity: Less than 1 microvolt for 12 dB signal-to-noise for SSB operation. Selectivity: 2.1 kHz minimum at 6 dB down, 7 kHz maximum at 60 dB down. CW Selectivity (with accessory CW filter): 600 Hz at 6 dB down, 2 kHz at 60 dB down. Overall Gain: Less than 1 microvolt for 0.5 watt single output. Audio Output: 2.5 watts into 4 ohms, 1.25 watts into 8 ohms, at less than 10% THD. Low Impedance Headphones (16-ohm): AGC: Less than 1 milliwatt attack time; switch selectable 100 μ sec and 1 μ sec release; and OFF. 1 intermodulation distortion; -60 dB Image Rejection; -60 dB IF Rejection; 50 dB Intermodulation Generated Spurious Signal; Below 2 microvolt equivalent antenna input, except at 3.65, 7.74, 14.25 and 21.2 MHz. **MECHANICAL** - Front Panel Controls/Switches: AGC - Off, Slow, Fast; AF Gain; Microphone Jack; Headphone Jack; Main Tuning; M; CW Level; Vox Gain; Vox Delay; Bandwidth; RF Gain; Calibrator On/Off; Preset/Store; ALC Meter; 13.8V Meter; Heater Power Meter; Vox On/Off; 25-100 kHz Calibrate Select; Noise Blanker; On/Off; SSB (Mode); USB (Mode); CW (Mode); Tune; Hi/Lo Power Select; PWR (On/Off); Rear Panel Controls/Sockets: Anti-Trip; Side-tone Level; Linear Attenuator ALC Input; Phone Patch Input; Phone Patch Output; Key (CW) Input; Speaker (4 ohm output); Spare (2); Receiver Audio Input; 150 Ω Input; VFO Output; IF Output; Driver Output; Ground Point; Power Plug; Accessory Socket (includes relay output); Antenna Input; Receiver Antenna Input; Common; Separate Antenna Switch. Cabinet Dimensions: (feet, inches, mill, socket rails) 5 1/4" H x 14 3/4" W x 13 1/2" D (14.6 cm x 26.75 cm x 32.24 cm). Net Weight: 20 lbs. (7 kg).

HS-1661 Station Speaker. Styled to match the HW-104; response tailored to SSB. Cable and plug are included.

Kit HS-1661, 5 lbs., mailable 19.95

HS-1661 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 green wrinkle finish. Dimensions: 5 3/4" H x 8 3/4" W x 5 1/4" D.



All solid-state...including VFO finals. Output warranted for one year.



Completely broadbanded. 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. Even 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 needed.

Heathkit performance specifications are guaranteed

Go CW for More Fun and Challenge



New Solid State Electronic Keyer...49.95

Sending code's easy with the HD-1410 whether you're operating base or portable. The dot and dash paddles travel and tension are easily adjustable. When the two paddles are treated as one, the HD-1410 operates like a single-paddle keyer with dot and dash memories. Iambic operation forms most characters with reduced wrist movement. Dots and dashes are self-completing and always in proper proportion. During construction, you select the speed range you want—10 to 35 words per minute or 10 to 60 words per minute. Operates on 120 VAC or 12 VDC. Adjustable sidetone frequency, built-in speaker, headphone jack. Styled to match our famous "SB" line.

Kit HD-1410, 5 lbs., mailable 49.95

HD-1410 SPECIFICATIONS—Keying Speed: Variable from under 10 to over 35 or from under 10 to over 60 wpm. 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. Temperature Range: 0°C to +40°C (typ. -10°C to +40°C) or approx. 50°F to 105°F. 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.



A)



B)



C)

A) The famous Heathkit 3-band QRP CW Transceiver...89.95

Work the world on one or two watts. That's the challenge of QRP... and the HW-7 is ready to help you meet it. And whether you're an avid QRP'er, an experienced OM looking for a portable emergency vacation rig, you'll appreciate the Heathkit HW-7. The all solid-state circuitry features both built-in high stability VFO and crystal-controlled transmit capability. Direct conversion receiver circuitry delivers solid-copy with as little as 1 microvolt input. The transmitter has 3 watts input on 40 meters...2 1/2 watts on 20 meters...and 2 watts on 15. Band-changing and tune-up are quick and simple: pushbutton band-selection...large main tuning dial with 6 to 1 vernier drive that's virtually backlash-free...receiver preselector marked for 40, 20 and 15 M bands...single-knob final tuning. Pushbutton crystal transmit provision is ideal for roundtables and nets.

Top-value features include: built-in sidetone...front panel relative power meter...break-in keying with adjustable T/R delay...headphone jack...small size and light weight. The HW-7 can be operated from the accessory AC power supply, an equivalent low impedance supply, or 12 VDC lantern or auto batteries...draws only 35 mA on receive, 450 mA on transmit. Assembly is easy, quick (about 3 evenings) and fun. All circuitry mounts on a single circuit board. Get an excellent QRP rig...and a portable rig...and a low cost Novice rig...get your HW-7 now.

Kit HW-7, Transceiver, less batteries, 6 lbs., mailable 89.95

Kit HWA-7-1, low voltage power supply provides 13 VDC to power the HW-7 Transceiver from an AC power source. 120/240 VAC operation. 4 lbs., mailable 14.95

HW-7 SPECIFICATIONS—TRANSMITTER: RF Power Input: 3 watts on 40 meters, 2.5 watts on 20 meters, 2 watts on 15 meters. Frequency Control: 40 meter crystal, or built-in VFO on 40 meters, 20 meter crystal or built-in VFO on 20 meters, 15 meter crystal, or built-in VFO on 15 meters. Output Impedance: 50 Ω unbalanced. Sidetone: Built-in. Spurious and Harmonic Levels: At least 25 dB down. RECEIVER: Sensitivity: Less than 1 microvolt provides a readable signal. Selectivity: 1 kHz at 6 dB down. Type of Reception: CW. Audio Output Impedance: 1000 Ω nominal. GENERAL: Frequency Coverage: 40 meters 7.0 to 7.2 MHz, 20 meters, 14.0 to 14.2 MHz, 15 meters, 21.0 to 21.3 MHz. Frequency Stability: Less than 100 Hz drift after 10 minutes warmup. Power Required: 13 volts DC, 35 mA receive and 450 mA transmit. Dimensions: 4 1/4" H x 9 1/4" W x 8 1/2" D, including knobs and feet.

B) One of the world's most popular CW rigs... the Heathkit HW-16...129.95

We've sold thousands of these fine rigs...it's a rare ham that

hasn't at least operated the HW-16. Why so popular? The features speak for themselves: optimum CW operation on the first 250 kHz of the 80, 40 and 15 meter bands...true break-in capability with solid-state T/R switching...75 watt input for Novices, up to 90 watts for General and above...crystal-controlled transmit with VFO receive...provision for VFO transmit with Heathkit HG-10B VFO...500 Hz CW selectivity with high quality crystal filter...receiver sensitivity better than 1 microvolt...built-in sidetone...front panel Rel Pwr/Plate Current meter...easy, enjoyable assembly with the famous Heathkit manual...final assembly and checkout requires only a VTVM, dummy load, key and appropriate crystals.

Kit HW-16, 25 lbs., mailable 129.95

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 μV 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.

C) Code Practice Oscillator...9.95

As much fun to build as it is to use—and it makes a great starter kit for a beginning CW operator. The molded plastic cabinet with dark green front panel matches Heathkit "SB" series gear.

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.

Kit HD-1416, 2 lbs., mailable 9.95

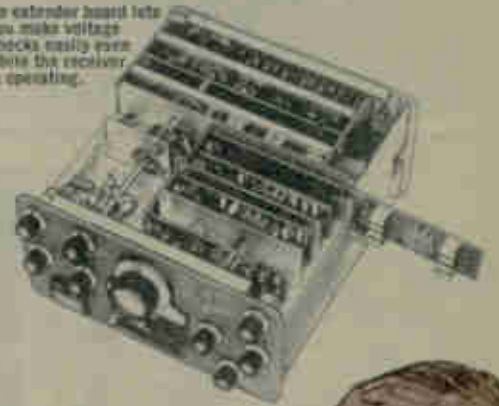
HD-1416 SPECIFICATIONS—Mode of Operation: Speaker or headphones. Tone Frequency: 200-800 Hz adjustable. Battery Required: 9-volt transistor battery equivalent Neda #1604 (not supplied). Speaker: 45 ohms. Headphones: 8-2000 ohms. Sidetone Oscillator: Grid block keying transmitters (400 volts DC, negative maximum). Controls: Volume, Tone (internal). Front Panel Connections: Key, Phone Jack. Transistors: (2) MPSA20, (1) 2N5249. Color: Wrinkle grey and dark green.


Charge a kit — no money down on any kit — up to 2 years to pay — see order blank for details.

Heathkit SB-



An extender board lets you make voltage checks easily even while the receiver is operating.




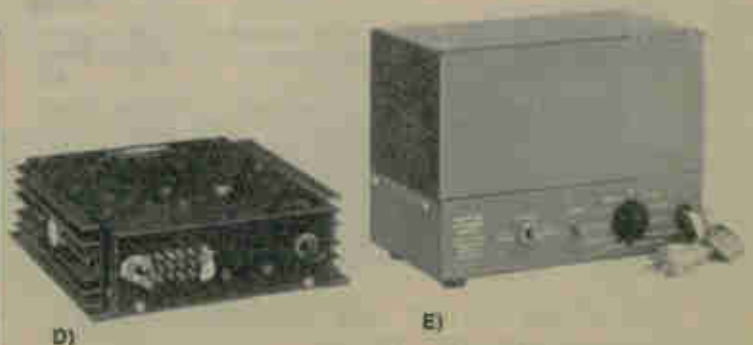


Start your own ham shack library with these outstanding book values:

Single-Sided: 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-147,	16.95*

*\$10 minimum order for book only purchase. No minimum when book order accompanies kit order. Include 35¢ for each book to cover postage and handling.





world famous performance & value

A) SB-401 SB Transmitter...389.95

Thousands of hams the world over are using this renowned series of transmitters for a lot of reasons, but one stands out above all...its performance/value ratio. Stable, convenient, powerful...at a reasonable price.

180 watts PEP, USB or LSB, 170 watts CW input, from 3.5 to 30 MHz, with a crystal controlled heterodyne oscillator and preassembled and aligned linear master oscillator for accuracy and stability you can count on. Versatile, too...use it in "transceive" with any Heathkit SB-300 series receiver, or with any other by adding the SBA-401-1 Crystal Accessory. Other features include: voice operated (VOX) and push-to-talk (PTT) control in SSB mode; break-in keying in CW mode; built-in antenna change-over relay, switched 120 VAC for an external antenna relay, crystal filter type SSB generator, automatic level control for low distortion, high talk power. The large circular dial has calibrations every kHz and covers 100 kHz per revolution for a bandwidth equal to about 10 feet per megahertz; the slide-rule dial pointer indicates the number of rotations of the circular dial. The 5-function meter indicates grid current, plate current, ALC action, plate voltage, and relative power output. Dual voltage primary, transformer operated, silicon-diode power supply for long life and low heat power. Build it...enjoy it.

Kit SB-401, 36 lbs., mailable 389.95
SBA-401-1, Crystal pack, 1 lb., mailable 29.95

SB-401 SPECIFICATIONS — Emission: SSB (upper or lower sideband) and CW. Power input: 170 W CW, 180 W P.E.P. Power output: 100 W (80-15 meters), 80 W (10) meters. Output impedance: 50-75 ohm — less than 2:1 SWR. Frequency range: 80-10 M amateur bands. Frequency stability: <100 Hz/hr. drift after 20 min. warmup. Carrier suppression: 55 dB below peak output. Unwanted sideband suppression: 55 dB @ 1 kHz. Intermodulation distortion: 30 dB below peak output (two-tone test). Keying characteristics: Break-in CW provided by operating VOX from a keyed tone (Grid block keying). CW sidetone: 1000 Hz. ALC characteristics: >10 dB @ 0.2 mA final grid current. Noise level: 40 dB below rated carrier. Visual dial accuracy: Within 200 Hz (all bands). Backlash: <50 Hz. Oscillator feed-through or mixer products: 55 dB below rated output (except 3910 kHz crossover which is 45 dB). Harmonic radiation: 35 dB below rated output. Audio input: High impedance microphone or phone patch. Audio frequency response: 350-2450 Hz \pm 3 dB. Power requirements: 80 W Sbtly, 260 W key down @ 120/240 VAC, 50/60 Hz. Dimensions: 6 $\frac{1}{2}$ " H x 14 $\frac{1}{2}$ " W x 13 $\frac{1}{2}$ " D.

B) SB-303 Receiver...389.95

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 to control oscillators under varying line voltages and load conditions. Power and antenna connections for two VHF converters and four spare sockets for adding Heathkit station accessories.

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, 22 lbs., mailable 389.95
SBA-301-1, Optional 3.75 kHz AM crystal filter, 1 lb., mailable 24.95
SBA-301-2, Optional 400 Hz CW crystal filter, 1 lb., mailable 29.95

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 \pm 10% line voltage variation. Modes of operation: SSB, CW, AM, RTTY. Sensitivity: <0.25 μ V for 10 dB S+N/N for SSB operation. Overall gain: <1.5 μ V 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 μ V 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 $\frac{1}{2}$ " H x 12 $\frac{1}{4}$ " W x 13" D. Overall Dimensions (with knobs & feet installed): 7 $\frac{1}{2}$ " H x 12 $\frac{1}{4}$ " W x 14" D.

C) You can't beat the price on this 5-band transceiver...the famous HW-101...299.95

One of the world's best transceiver values. If you've shopped the amateur radio world for transceivers, we think you'll agree the HW-101 is tough to beat in price...or performance. Even its accessories cost less. Compare and be convinced.

Hybrid design, full featured. 20 tubes and 19 semiconductors are combined with the operating features you need. 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. Circuit boards, wiring harness, and "Switch-Boards" make it happen fast and easy. Build it...join the thousands of hams who've found you can't beat it.

Kit HW-101, 23 lbs., mailable 299.95
SBA-301-2, 400 Hz CW crystal filter, 1 lb., mailable 29.95

HW-101 SPECIFICATIONS — RECEIVER: Sensitivity: <0.35 μ V for 10 dB S+N/N for SSB operation. SSB selectivity: 2.1 kHz min. @ 6 dB down; 7 kHz max. @ 60 dB down (3.395 MHz filter). CW selectivity: (optional SBA-301-2 CW crystal filter); 400 Hz min. @ 6 dB down; 2.0 kHz max. @ 60 dB down. 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 $\frac{1}{2}$ " H x 14 $\frac{1}{2}$ " W x 13 $\frac{1}{2}$ " D.

*Triple Action Level Control.

D) Get your station on the road with an HP-13B Mobile Power Supply...84.95

The solid-state circuit has been further refined for improved starting and power transistor protection. The bias voltage is now fixed and we've put heavier wires in the filament leads of the power cable.

Kit HP-13B, DC power supply, 8 lbs., mailable . . . 84.95

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. Duty cycle: Continuous up to 150 mA; 50% up to 300 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. Continuous duty cycle to 175 mA. Fixed bias: -130 VDC @ 20 mA. Switching frequency: 1500 Hz (approx.). Ambient temperature: -10° to 122°F. Dimensions: 7 $\frac{3}{4}$ " W x 7 $\frac{1}{4}$ " L x 2 $\frac{3}{8}$ " D. All voltages referenced at 13 VDC.

E) Heathkit HP-23B Fixed-Station Power Supply...just 57.95

Our popular fixed station power supply 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, AC power supply, 19 lbs., mailable . . . 57.95

HP-23B SPECIFICATIONS — Power requirements: 120/240 VAC, 50-60 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.

Heathkit station accessories



A)



B)



C)

Add these to your original SB transceivers and separates now.



D)



E)



F)



G)



H)



I)



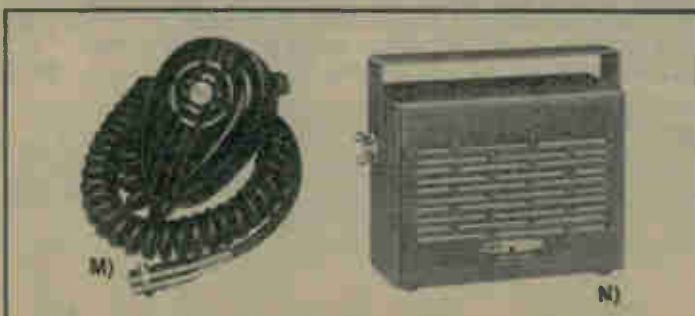
J)



K)



L)



M)

N)

U.S. Callbook	EDP-126	12.95*
DX Callbook	EDP-127	11.95*
Amateur Tests and Measurements — tells in simple language how to make all necessary performance tests & adjustments on transmitters, receivers & antennas.		
	EDP-119	5.50*
73 Dipole and Long-Wire Antennas — includes dimensions, configurations, construction & measurement data for 73 different antennas.		
	EDP-150	4.55*
73 Vertical, Beam and Triangle Antennas — contains construction, design & measurement data on practically all types of antennas used by amateurs.		
	EDP-151	4.95*
ARRL Antenna Handbook		
	EDP-152	3.00

A) Heathkit 1 kW Amplifier...299.95

Probably the most popular linear on the market...and no wonder. Delivers a full 1200 W PEP SSB input...1 kW on CW.

Kit SB-200, 50 lbs., mailable 299.95

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. Meter functions: 0-100 mA grid current, 0-100 mA plate current, 0-1000 mA plate current, 0,1000 relative power, 1:1-3:1 SWR, 1500-3000 volts high voltage. Front panel controls: Load; Tune; Band; Relative Power Sensitivity; Meter Switch, Grid-Plate-Rel. Power-SWR-HV; and Power Switch, on/off. Tube complement: Two 572B/T-160-L (in parallel). Power requirements: 120 VAC @ 16 A (max.), 240 VAC @ 8 A (max.). Cabinet size: 6 $\frac{1}{2}$ " H x 14 $\frac{7}{8}$ " W x 13 $\frac{3}{4}$ " D.

B) Heathkit 2 kW Amplifier...449.95

This is the one that made history when we announced it...and it's easy to understand why. 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. Another example of what happens when ham products are designed by hams...the Hams at Heath. Get your 220 today.

Kit SB-220, 70 lbs., mailable 449.95

SB-220 SPECIFICATIONS — Band coverage: 80, 40, 20, 15 and 10 meters. Driving power: 100 W. Max. power input: SSB, 2000 W, P.E.P.; CW, 1000 W.; RTTY, 1000 W. 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 (Grid mA, Antenna Power and High Voltage). Rear panel: Line cord, circuit breakers (two 10 A), Antenna Relay (phono), ALC (phono). RF input (SO 239). Ground post. RF Output (SO-239). Tubes: Two Eimac 3-500Z. Power required: 120 VAC, 50/60 Hz at 20 amp. max. 240 VAC, 50/60 Hz at 10 amp. max. Cabinet size: 8 $\frac{1}{4}$ " H x 14 $\frac{7}{8}$ " W x 14 $\frac{1}{2}$ " D.

C) Heathkit Station Speaker...22.95

Audio response is shaped from 300-3000 Hz for optimum sideband reproduction. Eight ohm Z matches most gear. Large 6 $\frac{1}{2}$ " H x 10" W x 10 $\frac{1}{2}$ " D cabinet provides mounting space for any HP-23 series supply. Gray and green styling matches the SB line.

Kit SB-600, 7 lbs., mailable 22.95

D) Heathkit Spectrum Analyzer...149.95

Provides 10 and 50 kHz sweep widths for single signal analysis...variable sweep to 100 kHz for 455 kHz IFs to 500 kHz above 1 MHz. Both log and linear displays. Operates with common receiver IFs up to 5.2 MHz. Gray and green styling to match other SB-series gear...6 $\frac{1}{2}$ " H x 10" W x 10 $\frac{1}{2}$ " D. Not for use with SB-104.

Kit SB-620, 15 lbs., mailable 149.95

E) Heathkit solid-state Dip Meter — more performance at big savings...59.95

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. And it's a whole lot less expensive.

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, 4 lbs., mailable 59.95

Charge a kit — no money down on any kit — up to 2 years to pay — see order blank for details.

F) Heathkit RF Load/Wattmeter...59.95

Every ham should have a dummy load and a wattmeter in the shack, and now you have both in a single piece of gear. A husky 50 ohm non-inductive load resistor handles 175 W continuous, 1 kW intermittent...less than 1.2:1 SWR from 1.8 to 30 MHz. High-temp lamp & lamp test circuit. Meter ranges of 0-200 & 0-1000 W, \pm 10% FS accuracy.

Kit HM-2103, 6 lbs., mailable 59.95

HM-2103 SPECIFICATIONS — Frequency Range: 1.8 to 30 MHz. Wattmeter Range: 0-200 and 0-1000. Wattmeter Accuracy: \pm 10% of full-scale reading. Power Rating: 175 watts continuous, 1000 watts maximum. Overload Indication: Thermal switch activated (requires 9 volt battery, NEDA #1604). SWR: Less than 1.2:1. Load Type: Noninductive. Load Impedance: 50 ohms nominal. Connectors: UHF type SO-239. Dimensions: 6" H x 5 $\frac{3}{4}$ " W x 13 $\frac{3}{4}$ " D.

G) Heathkit VHF Wattmeter...34.95

A VHF wattmeter at this low price? Well, that's what happens when your engineering department is populated with VHF fans. Power ranges of 1-25 & 10-250 W FS \pm 10%. 50 ohm nominal Z for minimum loss. Built-in SWR bridge with adjustable sensitivity.

Kit HM-2102, 4 lbs., mailable 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.

H) Heathkit Wattmeter/SWR Bridge...34.95

Two switch-selected ranges: 10-200 & 100-2000 W...built-in SWR bridge with adjustable sensitivity...negligible insertion loss in 50 ohm line. Remote detector permits placement of meter in any convenient location...6 ft. of cable supplied.

Kit HM-102, 4 lbs., mailable 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.

I) Heathkit Coax Switch...9.95

Switches an 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, 2 lbs., mailable 9.95

J) Heathkit hybrid Phone Patch...36.95

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 $\frac{3}{8}$ " H x 9 $\frac{1}{4}$ " W x 3 $\frac{3}{8}$ " D.

Kit HD-15, 3 lbs., mailable 36.95

K) "Cantenna" dummy load...13.95

1 kW max input; 1.5-300 MHz w/SWR 1.5:1 or less. Oil not incl.

Kit HN-31, 3 lbs., mailable 13.95

L) Heathkit Relative Power Meter... 15.95

100 kHz — 250 MHz range; 0.3 V rms sensitivity; magnetic base.

Kit PM-2, 2 lbs., mailable 15.95

M) Heathkit Mobile PTT Mike...10.95

Rugged, hi-Z ceramic mike ideal for mobile work. With cable, less connector. Excellent for "single banders."

GH-12A, 1 lb., mailable 10.95

N) Heathkit Mobile Speaker...12.95

8 ohm speaker in rugged steel cabinet. Gimbals mount included. 6 $\frac{1}{2}$ " W x 4 $\frac{3}{4}$ " H x 2 $\frac{1}{2}$ " D.

Kit HS-24, 4 lbs., mailable 12.95

Heathkit SB-104 Series...our most



Completely solid-state design... including the finals. Over 275 solid-state devices, including 31 integrated circuits. The SB-104 output board and final transistors are warranted for one full year.



Completely broadbanded. Neither the transmitter nor receiver sections require tuning from 3 to 30 MHz... instant QSY from 80 to 10 meters is a reality.

Heathkit SB-104 Amateur Transceiver

Probably the world's most advanced amateur transceiver — totally broadbanded, completely solid-state, true digital readout and much more. This transceiver is the standard others will be judged by for years to come.

Totally broadbanded. 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. Just choose the band, dial in the operating frequency, select your mode and go — no more preselector, load or tune controls.

True digital readout with 6 easy-to-read electronic digits provides resolution 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.

Performance plus convenience. 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. And broadbanding assures that it stays that way on all bands. Specifications alone don't do justice to the receiver's performance because we've dramatically reduced cross-modulation and intermodulation to increase useable sensitivity. 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 front-panel gain and delay, and much more.

Easy assembly and alignment. 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, 31 lbs., mailable **669.95**
- Kit HP-1144, Fixed station power supply, 28 lbs., mailable **89.95**
- Kit SB-604, Speaker & cab., 8 lbs., mailable **29.95**
- Kit SBA-104-1, Noise blanker, 1 lb., mailable **26.95**
- Kit SBA-104-2, Mobile mount, 6 lbs., mailable **36.95**
- Kit SBA-104-3, 400 Hz CW crystal filter, 1 lb., mailable **39.95**

SB-104 SPECIFICATIONS — TRANSCIVER 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 $\pm 10\%$ change in primary voltage. Modes of Operation: Selectable upper or lower sideband (suppressed carrier) and CW. 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. Power Requirements: 13.8 VDC nominal (max. 16 VDC) at: Receive: 2 amp. Transmit: low power: 3 amps.; high power: 20 amps. 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. Har-

monic 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. 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. CW Side-Tone: 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; approx. 25K ohms to match Heath desk-type microphone. RECEIVER — Sensitivity: Less than 1.0 microvolt for 10 dB signal-plus-noise-to-noise ratio 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. 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. Low impedance headphones (4-8 ohm). AGC: Less than 1 millisecond attack time; switch selectable 100 msec. and 1 sec. release, and OFF. Intermodulation 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. MECHANICAL — Rear Panel Controls/Sockets: Anti-Trip; Sidetone Level; Linear Amplifier ALC Input; Phone Patch Input; Phone Patch Output; Key (CW) Input; Speaker (4 ohm) Output; Spare (2); Receiver Audio Input; VFO Input; VFO Output; IF Output; Driver Output; Ground Post; Power Plug; Accessory Socket (includes relay output); Antenna Input; Receiver Antenna Input; Common/Separate Antenna Switch. Dimensions: 5 $\frac{3}{4}$ " H x 14 $\frac{1}{2}$ " W x 13 $\frac{3}{8}$ " D. (Less knobs, feet and connectors). Weight: 20 lbs.

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 adjusts transistor bias to maintain a fixed output level. Output is remotely sampled at the load end of the power cable, thereby compensating for voltage drop across fuse and cable, to provide almost no change in voltage from no load to full load conditions. Heat sink fits on back of supply; entire unit mounts within SB-604 speaker cabinet.



Kit HP-1144, Fixed-station supply, 28 lbs., mailable 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. Transistor Integrated Circuit and Diode Complement: 2N3643 transistor; 2N3055 transistor; 40411 pass transistor (2); MFC6030 regulator IC; 1N4002 silicon diode; MDA990-2 bridge rectifier. Power Requirements: 110 to 130 VAC @ 6A or 220 to 260 VAC @ 3A, 50/60 Hz maximum. Dimensions: 5 $\frac{1}{2}$ " H x 9 $\frac{1}{4}$ " W x 10 $\frac{1}{4}$ " 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

Designed and styled to match the new 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, Speaker & cabinet, 8 lbs., mailable . . . 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: 7 $\frac{1}{8}$ " H x 10 $\frac{1}{4}$ " W x 14" D

sophisticated SSB transceiver system



Chassis of the SB-230.



The business end of the new SB-230: a conduction-cooled 8873 triode final and a highly efficient heat sink. No blower needed.

Heathkit SB-230 1kw Conduction-Cooled Linear

The new value in linears. The lowest cost conduction-cooled linear on the market.

Strong and silent. The "230" 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. The "230" is also rated at 400 watts input for slow-scan TV and RTTY. A massive heat sink eliminates noisy cooling fans. And the final is completely enclosed in a double-shielded compartment.

Convenience. 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.

A full complement of built-in safety features. The cabinet features

microswitch interlocks on both the top and bottom to shut down the primary power when the cabinet shells are removed. The heat sink for the 8873 is temperature monitored; if the temperature rises too high, a thermal circuit breaker opens, the linear shuts down and the Hi Temp light goes on. The Exciter light indicates the linear is running straight through, without amplification. To allow the tube sufficient time to warm up, a delay circuit is built-in. The On-Off switch also includes a built-in circuit breaker for the primary side of the power transformer. And the cathode of the tube is fused for additional protection.

Kit SB-230, 40 lbs., mailable 339.95

SB-230 SPECIFICATIONS: Band Coverage: 80, 40, 20, 15 and 10 meter amateur bands. Maximum Power Input: 1200 W PEP SSB; 1000 W CW; 400 watts RTTY/SSTV. 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. Rear Panel: ALC output; Exciter relay; RF input; RF output; Ground lug; Fuse; Line cord. Tube: Type 8873. Zero signal plate current: 25 mA. Power Requirements: 120 VAC, 50/60 Hz, 14 A max. 240 VAC, 50/60 Hz, 7 A max. Dimensions: 14 1/4" W x 16" D x 7" H. Net Weight: 33 1/2 lbs.



SB-614 Station Monitor

Monitors transmitted SSB, CW, & AM signals up to 1 kW from 80-6 meters. CRT indicates non-linearity, insufficient or excessive drive, poor carrier or sideband suppression, regeneration, parasitics and CW key clicks. Manual includes 40 CRT displays and explanations.

Kit SB-614, 17 lbs., mailable 139.95

SB-614 SPECIFICATIONS — RF SAMPLING SECTION: Frequency Coverage: 80 through 6 meters (3.5 — 54 MHz). RF 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/1/4" vertical deflection. Attenuator: 2 position; x1, 2 volts rms max. Input; x10, 20 volts rms max. Input. Frequency Response: 10 Hz to 50 kHz ±3 db. **HORIZONTAL AMPLIFIER:** Input Impedance: 1 Megohm shunted by 50 pf. Sensitivity: 50 mV rms/1/4" horizontal deflection. Frequency Response: 10 Hz to 3 MHz ±3 db. **SWEEP GENERATION:** Type: Recurrent, automatic sync. Frequency Range: 10 Hz to 10 kHz in three ranges. **GENERAL:** CRT: 3RP1/A flat face, green, medium persistence phosphor. Graticule: .250 inch squares 6 x 8 (1.5 x 2.0 inches total viewing area). Power Supplies: All solid-state rectifiers. All amplifier supplies regulated. Power Requirements: 110-130 or 220-260 VAC, 50/60 Hz, 35 watts. Front Panel Controls: Intensity — Off-on; Mode — SSB, TRAP, CROSS; Focus; Vertical Gain; Vertical Position; Horizontal Gain; Horizontal Position; Sweep — variable; Range — 100 Hz, 1 kHz, 10 kHz. Rear Panel Controls: Astigmatism; Vertical attenuator — X1, X10. Rear Panel Connectors: Antenna: SO-239; Exciter: Phono; Vertical Input: Phono; Horizontal Input: Phono. **DIMENSIONS:** 7 1/4" H x 10 1/4" W x 15 1/4" D. Net Weight: 12 lbs.



SB-634 Station Console

Provides five necessary station functions every amateur needs. 24-hour digital clock; ten-minute ID timer; RF wattmeter; SWR bridge; phone patch.

Kit SB-634, 14 lbs., mailable 179.95

SB-634 SPECIFICATIONS — CLOCK — Display: Six full digits. Time Base: 24 hours. Accuracy: Determined by accuracy of power line frequency. **TIMER — Display:** Three full digits. Time Interval: 10 minutes with automatic reset. Manual reset at any portion of 10-minute period. Accuracy: Determined by accuracy of power line frequency. Signal: Visual only or both visual and aural; switch selected. **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 circuit. Allows voice control or manual operation. **TELEPHONE LINES — Input Impedance:** Approximately 600 ohm. Null Depth: At least 30 dB isolation between transmit and receive circuits. **Receiver Impedance:** Effective match from 3 to 16 ohm. **Transmitter Impedance:** 600 ohm or higher impedance output. **GENERAL — Meter:** 100 µA movement. VU readings for phone patch monitoring. Null depth indication. RF power output, relative power, and SWR readings. **FRONT PANEL CONTROLS —** Timer: Off, Visual, Aural Visual. Reset: Pushbutton switch. Patch Gain: Transmitter, Receiver. **SWR:** Sensitivity. Mode: SWR, Forward and Reflected. 2000 W and 200 W. Phone Patch. Rear Panel Controls — Clock: Time hold, minutes set, seconds set. Null Adjust control; Null-Monitor switch; C adjust control; R adjust control. Power Requirements: 120/240 VAC, 50/60 Hz, 15 watts. **DIMENSIONS:** 7 1/4" H x 10 1/4" W x 15 1/4" D. Net Weight: 10 lbs.



SB-644 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 transceiver 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, 10 lbs., mailable 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 cycles max. Power Requirements: 11V and 13.6V at 500 mA from the SB-104. RF Output: 0.34 to 0.4V RMS over 5 to 5.5 MHz into a 50 ohm load. **DIMENSIONS:** 7 1/4" H x 10 1/4" W x 15 1/4" D. Net Weight: 6 1/2 lbs.

Charge a kit — no money down on any kit — up to 2 years to pay — see order blank for details.

There's a Heathkit Gift for Everyone

4-Channel, 140 Light Color Organ ...just 79.95

A swirling kaleidoscope of holiday lights. The TD-1006 translates music into pulsing whirling starbursts of light. Just connect it to any sound source (except AM) and, without affecting the sound, active filters separate the audio into four bands. Each band controls 35 brilliantly colored lights—red for bass, blue for low midrange, green for upper midrange and amber for treble... 140 lights in all! Each color pulsates as its frequency band changes intensity, creating spokes of color that seem to swirl and change brightness to the beat of the music. And because it has an extra wide 25 dB dynamic range, the TD-1006 works with any kind of music—even classical!

Great for parties or just plain listening. The TD-1006 is easy to use. Once you've made the initial adjustments, a single knob controls the sensitivity and turns the power on and off.

Just 4½" deep—you can even hang the TD-1006 on the wall. And its rich walnut-grained, vinyl-covered cabinet looks good in any room. It's also an easy kit to build—even for a beginner. When you're finished, we think you'll agree music has never looked better.

Kit TD-1006, 32 lbs., mailable 79.95

TD-1006 SPECIFICATIONS — Center Frequency of Bands: red, 80 Hz; blue, 350 Hz; green, 1000 Hz; amber, 3000 Hz. Dynamic Range: 25 dB, minimum. Input Signal: 1 volt RMS minimum to 22 volts RMS maximum. Source Protection: line isolation. Power Requirements: 120/240 VAC, 50-60 Hz, 80 watts maximum, all lights full brightness. Dimensions: 22¾" W x 22¾" H x 4½" D. Net Weight: 20 lbs.



"Learn by Doing" jr. electronics workshop...29.95

Explore the exciting world of electronics...with the Heathkit Jr. JK-18A. While building the 35 different circuits, youngsters will have hours of fun, learning about & using basic electronic components...transistors, capacitors, resistors, loudspeakers. Each project begins with a simple explanation of what the circuit does and how it is used. Then, using a large, detailed pictorial & famous Heathkit instructions, the circuit is

built. For complete safety, the JK-18A uses solderless spring terminal connectors and is powered by four "D" cells (not included). When finished, the new circuit is tested and used. A large schematic diagram includes a simple but complete explanation of what each part 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.

Thirty-five different experiments like these: Code Flasher, Diode Tester, Transistor Tester, Rain Alarm, Timing Relay, Listening Device, Public Address Amplifier, Intercom, Voice Relay, Code Oscillator, Flasher, Experimental Multivibrator, Electronic Organ, Burglar Alarm, Metronome, Siren, Light Meter, Light Sensing Alarm, Target "Hit" Alarm, Light Dependent Flasher, Light Dependent Oscillator, Sound Level Meter, Two, Three & Four-Transistor Radios, Field Strength Indicator, Code Transmitter, Voice Transmitter, Capacitance Relay, Wheatstone Bridge, Capacitance Bridge. Help a youngster discover the world of electronics...put the JK-18A on your Christmas list now.

Kit JK-18A, 10 lbs. mailable 29.95

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